AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:21-cv-00955	9/15/2021	Western District of Texas

PLAINTIFF	DEFENDANT
AIRE TECHNOLOGY LIMITED	SAMSUNG ELECTRONICS CO., LTD.; and SAMSUNG ELECTRONICS AMERICA, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	8,581,706	11/12/2013	Aire Technology Limited
2	8,816,827	8/26/2014	Aire Technology Limited
3	8,205,249	6/19/2012	Aire Technology Limited
4	8,174,360	5/8/2012	Aire Technology Limited
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

Print Save As... Reset

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	05/08/2012	8174360	FINK3001/JJC/BEL	1969

23364 7590 04/18/2012

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 1131 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Klaus Finkenzeller, Unterfohring, GERMANY;

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
10/565,732	06/30/2006	2612	1330	FINK3001/JJC/BEL	16	2

CONFIRMATION NO. 1969

CORRECTED FILING RECEIPT

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

Date Mailed: 04/11/2012

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Klaus Finkenzeller, Unterfohring, GERMANY;

Power of Attorney: The patent practitioners associated with Customer Number 23364

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/EP04/08537 07/29/2004

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
GERMANY 103 34 765.8 07/30/2003

If Required, Foreign Filing License Granted: 07/22/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 10/565,732**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES

Preliminary Class

340

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where

the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23364 7590 12/27/2011
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

TITLE OF INVENTION: COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	03/27/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
TUN, NAY L	2612	340-010100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Bacon & Thomas, PLLC
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: GIESECKE & DEVRIENT GMBH

(B) RESIDENCE: (CITY and STATE OR COUNTRY): MUNCHEN, GERMANY

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☒ Advance Order - # of Copies 4

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

☐ A check is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 02-0200 (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Betty E. Lee/ Date March 27, 2012

Typed or printed name BETTY E. LEE Registration No. 65,209

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal

Application Number:	10565732
Filing Date:	30-Jun-2006
Title of Invention:	COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Filer:	Justin John Cassell
Attorney Docket Number:	FINK3001/JJC/BEL

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1740	1740
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
Printed copy of patent - no color	8001	4	3	12
		Total in USD ($)		**2052**

Electronic Acknowledgement Receipt

EFS ID:	12398005
Application Number:	10565732
International Application Number:	
Confirmation Number:	1969
Title of Invention:	COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Customer Number:	23364
Filer:	Justin John Cassell/Jennifer McCarthy
Filer Authorized By:	Justin John Cassell
Attorney Docket Number:	FINK3001/JJC/BEL
Receipt Date:	27-MAR-2012
Filing Date:	30-JUN-2006
Time Stamp:	09:44:06
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$2052
RAM confirmation Number	13283
Deposit Account	020200
Authorized User	MCCARTHY,JENNIFER N.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Issue Fee Payment (PTO-85B)	FINK3001_IF_trans.pdf	99828 efd4b1d46b84e7f42a2e57ad6a26cca3427f6105	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	33955 72a0c2ca0fb1e1d0f10789422df863aabfa9ec59	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	133783		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

OK TO ENTER: /N.T./ 03/22/2012

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	10/565,732	Confirm. No.:	1969
Filing Date:	June 30, 2006	Examiner:	Tun, Nay L
First Inventor:	Klaus Finkenzeller	Art Unit:	2612
Attorney No.:	FINK3001/JJC/BEL		
For:	COMMUNICATION APPARATUS FOR SETTING UP A DATACONNECTION BETWEEN INTELLIGENT DEVICES (AS AMENDED)		

AMENDMENT AFTER NOTICE OF ALLOWANCE UNDER 37 C.F.R. § 1.312

Mail Stop: Issue Fee
Commissioner for Patents
P.O. Box 145
Alexandria, VA 22313-145

Sir:

INTRODUCTORY COMMENTS

This is responsive to the Notice of Allowance mailed on December 27, 2011. The amendment after notice of allowance is filed to correct the title.

Pursuant to 37 C.F.R. § 1.312, amendment to the title is requested in accordance with the following proposed amendment. No new issues are presented by the amendment, which submits a corrected title. Accordingly, entry of the amendment is believed to be appropriate.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

23364 7590 03/26/2012

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER	
TUN, NAY L	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
03/26/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Response to Rule 312 Communication	Application No.	Applicant(s)
	10/565,732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	NAY TUN	2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

1. ☒ The amendment filed on *16 March 2012* under 37 CFR 1.312 has been considered, and has been:

a) ☐ entered.

b) ☒ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

/DANIEL WU/ Supervisory Patent Examiner, Art Unit 2612	/NAY TUN/ Examiner, Art Unit 2612

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	10/565,732	Confirm. No.:	1969
Filing Date:	June 30, 2006	Examiner:	Tun, Nay L
First Inventor:	Klaus Finkenzeller	Art Unit:	2612
Attorney No.:	FINK3001/JJC/BEL		
For:	COMMUNICATION APPARATUS FOR SETTING UP A DATACONNECTION BETWEEN INTELLIGENT DEVICES (AS AMENDED)		

AMENDMENT AFTER NOTICE OF ALLOWANCE UNDER 37 C.F.R. § 1.312

Mail Stop: Issue Fee
Commissioner for Patents
P.O. Box 145
Alexandria, VA 22313-145

Sir:

INTRODUCTORY COMMENTS

This is responsive to the Notice of Allowance mailed on December 27, 2011. The amendment after notice of allowance is filed to correct the title.

Pursuant to 37 C.F.R. § 1.312, amendment to the title is requested in accordance with the following proposed amendment. No new issues are presented by the amendment, which submits a corrected title. Accordingly, entry of the amendment is believed to be appropriate.

AMENDMENT

In the title

Please amend the title as shown below:

COMMUNICATION ~~DEVICE~~ APPARATUS FOR ~~ESTABLISHING~~ SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT ~~APPLIANCES~~ DEVICES

REMARKS

The foregoing amendment is presented in order to amend the title. Support for the amendment to the title can be found in the Application Data Sheet filed on January 24, 2006 and Supplemental ADS on June 30, 2006. Additionally, a fillable ADS is concurrently submitted with this amendment. No new matter is added, and entry of the amendment to the title is respectfully requested.

If any issues remain that may be resolved by a telephone or facsimile communication with the Applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314-1176
Phone: (703) 683-0500
Facsimile: (703) 683-1080

Date: March 16, 2012

Respectfully submitted,

/Justin J. Cassell/

JUSTIN J. CASSELL
Attorney for Applicant
Registration No. 46,205

PTO/SB/14 (11-08)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	FINK3001/JJC/BEL
	Application Number	
Title of Invention	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ○ Legal Representative under 35 U.S.C. 117 ○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Klaus		FINKENZELLER	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Unterföhring	Country Of Residence[i]	DE
Citizenship under 37 CFR 1.41(b)[i]	DE		

Mailing Address of Applicant:

Address 1	Ahornstrasse 19		
Address 2			
City	Unterföhring	State/Province	
Postal Code	85774	Country[i]	DE

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	23364		
Email Address	mail@baconthomas.com	Add Email	Remove Email

Application Information:

Title of the Invention	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES		
Attorney Docket Number	FINK3001/JJC/BEL	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

PTO/SB/14 (11-08)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	FINK3001/JJC/BEL
	Application Number	
Title of Invention	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Enter either Customer Number or complete the Representative Name section below. If both sections are completed the Customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	23364		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	a 371 of international	PCT/EP2004/008537	2004-07-29

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
103 34 765.8	DE	2003-07-30	◉ Yes ○ No

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Assignee Information:

Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office.

Assignee 1 Remove

PTO/SB/14 (11-08)
Approved for use through 01/31/2014. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	FINK3001/JJC/BEL
	Application Number	
Title of Invention	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES	

If the Assignee is an Organization check here. ☐				
Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information:			
Address 1			
Address 2			
City		**State/Province**	
Country [i]		Postal Code	
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the **Add** button.		Add	

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.					
Signature	/Justin J. Cassell/			Date (YYYY-MM-DD)	2012-03-16
First Name	JUSTIN	Last Name	CASSELL	Registration Number	46205

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	12313836
Application Number:	10565732
International Application Number:	
Confirmation Number:	1969
Title of Invention:	COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Customer Number:	23364
Filer:	Justin John Cassell/Jennifer McCarthy
Filer Authorized By:	Justin John Cassell
Attorney Docket Number:	FINK3001/JJC/BEL
Receipt Date:	16-MAR-2012
Filing Date:	30-JUN-2006
Time Stamp:	13:12:38
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		FINK3001_312_amend.pdf	76524 a31f243b37174933f909ba6bbe663a06de0632de	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment after Notice of Allowance (Rule 312)	1	1
	Specification	2	2
	Applicant Arguments/Remarks Made in an Amendment	3	3

Warnings:					
Information:					
2	Application Data Sheet	FINK3001_suppl_ADS.pdf	1421095 d61017c2451410033354797dca96939bf33ff067	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	1497619		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

23364 7590 01/27/2012

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EXAMINER	
TUN, NAY L	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
01/27/2012	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of Allowability	Application No.	Applicant(s)	
	10/565,732	FINKENZELLER, KLAUS	
	Examiner	Art Unit	
	NAY TUN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *IDS filed on 8/25/2006*.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are *1-17*.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 8/25/2006
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/NAY TUN/ Examiner, Art Unit 2612	/DANIEL WU/ Supervisory Patent Examiner, Art Unit 2612

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on August 25, 2006 is being considered by the examiner because the international search report established in PCT/EP2004/008537 satisfies the requirement for a concise explanation of relevance for the non-English language references (MPEP 609.04(a)).

Contact Information

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nay Tun whose telephone number is (571) 270-7939. The examiner can normally be reached on Mon-Thurs from 9:00-5:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/NAY TUN/
Examiner, Art Unit 2612

/DANIEL WU/
Supervisory Patent Examiner, Art Unit 2612

Notice

Description DE19855207

The invention relates to a contactless switch responsive to activation of a contactless identification system as described in the preamble of claim 1.

Contactless identification systems with code-makers on transponder-based and are known for in practice
As in various mains operated access control systems implemented.
The transmitter is activated in these cases all the time.
He therefore has a permanent electromagnetic field, which supplies the transponder code to the sender of an approximate energy and operating carrier is modulated by feedback of th
The permanently activated by the transmitter caused prolonged power consumption of 100 mA can be tolerated in a mains-powered system.
The problem of power consumption will occur when the system is battery operated, which is especially valuable independently operated electronic locks and electronic security hardwa
In such cases, the battery would only have an unacceptably short life.
This applies to a limited extent also for systems that, while mains powered, but which must be supplied with power failure over a longer time by battery, for
Example, in intrusion detection systems, VdS government regulations
There, then the battery should be sized unreasonably large

One possible solution is presented in DE 44 35 894 A1.
Described is a method for securing a motor vehicle and a system for implementing the method.
The system has an electronic locking system from a transponder, 2 induction coils, a control unit and an electronic immobilizer, and a mechanical locking system
The transponder, which is powered by an induction coil at each demand with energy, sends out an identification code that is transferred inductively to the induction coil and from this to
The control unit decodes this identification code that checks the access permissions and unlocked with a positive result, the mechanical locking system and the electronic immobilizer.
The two induction coils are each turned on only when needed.
The power of an induction coil is done through a door handle that is mitbetätigt automatically when the door handle.
The other induction coil is switched on by pressing the ignition switch.
The induction coils are usually at rest and thus be "woken up" if required by a particular activity.
Since only during the brief activation phase current need, this solution is well suited for battery operation.
The disadvantage of this solution is that the activation can be triggered only by a previous special operation.
It would be advantageous, however, if the mere convergence would trigger the activation of the transponder.

Two possible solutions have been in the battery-operated electronic security hardware company realized HEWI (Heinrich Wilke GmbH in Arolsen 34 454)
Where the transmitter is activated only when needed.
In the version with "active ident-makers", the activation is done with the help of the carrier used in the system code
This not only have a transponder, but also has a battery-operated "alarm station," activated at the approach of the carrier code to the lock the lock transmitter so that it can then proce
This solution is power efficient and therefore suitable for battery operation.
The disadvantage is that the code carriers require a relatively large dimensions and thus are quite unwieldy.
They also lose their alarm when the voltage of the battery carrier code is too low.

Even at HEWI version with "passive identification carriers" of the transmitter power consumption of the hardware is activated only when needed and is therefore suitable for battery op
The activation is done in this version by turning the outer knob of the bracket.
This knob is the same for unlocking and locking the lock to open or needed.
This solution has the advantage that the code carrier can be made compact and waterproof sealed because it contains only one transponder with an antenna
The disadvantage of this solution is cumbersome, however, the type of operation: the castle and its transmitter must first be activated by turning the knob before code and carrier lock

The object of the invention is to provide a touch-free addressable switch, which by mere approximation of the code carrier to the fixed transmitter that extra without any activity automa
carriers without their own power supply.

The problem is advantageously solved by the characterizing part of claim 1 listed measures.

A further advantageous embodiment of the invention according to claim 2 that is amplified by an amplifier coupled operation, the induced voltage, which causes the signal to activate t

Through the measures described in claim 3 of the permanent magnet in the simplest possible design is achieved
However, this requires a precise approach to the operation of the code carrier to the magnet.

Through the measures described in claim 4 is reached, that the approach can be carried out of the code carrier to the magnets must be less precise.

Through the measures described in claim 5 is reached that can be tolerated at the approach of the code carrier to the magnet, a certain lateral displacement without loss of function.

The described in claim 6 Mass. company will ensure that the requirements are reduced to the precision of the approximation further - but opposed by a larger and more complicated d

Some embodiments of the invention will be described below with reference to the drawings.
In the drawings:

FIG
1: implementation of the permanent magnet as a bar magnet with a surrounding coil

FIG
2: Code support in the form of keys with transponders and ferromagnetic tongue

FIG
3: a switch and a transmitter circuit diagram

FIG
4: implementation of the permanent magnet as a U-coil magnet with

FIG
5: execution of the permanent magnets as an E-coil magnet with

FIG
6: Execution of the permanent magnet as a magnet with a coil pot.

1 shows the permanent magnet 1a as a bar magnet with a surrounding coil 2a is shown.
The magnet is placed firmly in the vicinity of the transmitter sixth

The design shown as a bar magnet is particularly simple and space saving.
Since the magnetic field lines on both sides of the bar magnet 1a, only those lines of action have to be on that side to which the code carrier is approximated fourth
This has the disadvantage that the ferromagnetic part must be 3 brought very close to the bar magnet 1a and that the convergence of the ferromagnetic part 3 only induces the desire
magnet 1a is approximated.

2, a carrier 4 in the key code form with an attached ferromagnetic part 3 is shown.
The head of the code carrier 4 is composed of non-ferromagnetic material - preferably plastic-sealed waterproof and encloses a transponder with an antenna 7, are stored in the chip,
Firmly to the head of the code carrier 4 is related to the ferromagnetic part 3, which extends in the form of a key tongue.
Since the code requires 4 carrier not own battery, it can be designed in a handy, compact, robust and turnkey similar form, so that it can be easily carried by the user on a key ring.

3 shows six switches and transmitters are shown in the circuit diagram.
A code carrier 4 the permanent magnet 1 and its associated coil 2 is approximated, which causes the code carrier 4 related ferromagnetic part 3 is an enlargement of the magnetic flu
If you remove the code from the magnet holder 4 1, is reduced, the magnetic flux through the coil 2 and it is induced in the coil 2, a small voltage in the opposite direction.
The desired voltage (toward or away) is an operational amplifier 5 so far increased that it meets certain to activate the transmitter 6.
The activated transmitter 6 is based on an electromagnetic field, which provides operating power to the transponder 7 and is modulated by feedback of the transponder code 7 and thu
with the code stored as valid information.
The transmitter 6 is deactivated as soon as the code information of the transponder 7 is no longer needed.
The deactivation of the channel 6 is done at the latest when the code field of the transmitter, the carrier 4 6 leaves

4 shows the permanent magnet as the magnet is shown zweischenkeliger U-1b with associated coil 2b.
In this configuration the magnetic field lines are guided by the two legs of the magnet in that direction, the code takes the approach of the carrier 4.
Compared with the performance as a bar magnet 1a here a greater effect is achieved, so that already at a greater distance induces the desired voltage.
But even with this design is to ensure that the ferromagnetic part 3 is approximated as parallel to the line connecting the two magnetic legs.

5 shows the permanent magnet as the magnet is shown dreischenkeliger E-1c associated with coil 2b.
Even with this design is to ensure that the ferromagnetic part 3 is approximated as parallel to the line connecting the magnet leg.
Compared with the design of a U-magnet 1b is here with the same effect, however, allows a greater lateral displacement at the approach of Part 3, so that less precision is required in

6 shows the permanent magnet as the magnet pot with assigned 1d coil 2b is shown.
This design is more complex and more voluminous than the others.
it offers the advantage, however, that the ferromagnetic part 3 can be approximated with the same effect in any direction, and that even greater lateral displacement on the approach
This design thus allows the comparison in the most comfortable handling of the code carrier fourth

Notice

Description EP1024451

[0001] The invention relates to a reader with an antenna circuit for contactless power supply of portable data carriers, especially smart cards, with an induction loop according to the pr

[0002] Portable data carriers, hereinafter referred to as chip cards, but other forms such as watches, pendants, etc., are meant, this type generally have electronic circuits with a proce authorize the execution of various processes or carry out an exchange of information.

[0003] The operation of such chip cards have the electronic circuits are fed to a supply voltage.
It is known to transmit the power supply from the contactless reader by induction on the smart card.
For this purpose, on the smart card is an induction loop to which a circuit is connected to the preparation of the induced voltage and to supply this voltage as the supply voltage to the

[0004] A problem can arise, however, if there are too many cards within range of a reader.
In this case, the antenna circuit of the reader is attenuated too much, so that the antenna voltage drops and the transmit power of the reader might not be sufficient to supply all the ca
An information exchange and a recognition of the card is no longer ensured.

[0005] It would be possible to monitor a voltage drop of the antenna.
This solution is not very reliable, because power consumption is also influenced by the supply voltage of the reader, particularly if the reader is powered by a battery, can vary quite co
Another disadvantage of this solution is that it does not distinguish between smart cards and other parts, which are introduced in the transmit field of the reader and cause eddy currer

[0006] The invention therefore has the task of creating a reading device of the type mentioned above, are generated by reliably signaling, may if within his reach so many smart cards

[0007] This object is achieved with a reading device that has an antenna circuit for contactless power supply of smart cards with an induction circuit according to claim 1 in that a devic
generating a signal when the resonant frequency by a plurality of smart cards that are in the field of the antenna circuit, falls below a predetermined value.

[0008] A particular advantage of this approach is that monitoring is essentially unaffected by the amplitude of the antenna voltage remains.
The invention is based on the recognition that the resonant frequency of the antenna circuit by the presence of smart cards not only attenuated, but shifted depending on the number c

[0009] Another advantage of this solution is that between chip cards and other items, such as conductive films, or coins, can be distinguished, as these items cause only a much small

[0010] The dependent claims contain advantageous embodiments of the invention to the content.

[0011] After that comprises the above-mentioned device, particularly a first means for changing the resonance frequency of the antenna circuit of a first low value, which is essentially
evaluating change in a voltage amplitude in the antenna circuit when switching to the second value of the resonance frequency and a third means for generating the signal when the v

[0012] Other objects, features and advantages of the invention will become apparent from the following description of a preferred embodiment of the drawing.
It shows.
1 shows a block diagram of an antenna circuit of a novel reader;
2 is a graph illustrating the frequency shift and
FIG 3 different voltage waveforms and analyze the data frequency shift.

[0013] An antenna circuit of a novel reader comprises according to FIG 1, a resonant circuit comprising a coil 1 and a parallel-connected first capacitor 2, which is connected to a corre
the operating frequency is .
In parallel with the resonant circuit a series circuit comprising a second capacitor 4 and a variable capacitance diode (Varicap diode) 5.
The varactor diode is connected to a unit 6 for generating and switching between a low and a high blocking voltage.

[0014] For detecting and evaluating a change in the voltage amplitude in the antenna circuit is a circuit unit 7 is provided with a signaling device 8 is activated.

[0015] In normal operation rests on the capacity of the diode reverse voltage is low.
As a result, the capacitance of the varactor diode 5 is high and thus the resonance frequency of the resonant circuit has a low value that is set so that it is essentially the operating frec

[0016] This frequency is transmitted to the supply of smart cards required RF power.

[0017] In particular, preferably periodic intervals which can be freely chosen, is created by the unit 6, a high breakdown voltage (switching voltage) to the varactor diode 5 so that the c
the oscillating circuit accordingly.
Figure 2 shows the resulting change in voltage amplitude occurring in the antenna circuit.

[0018] This change is monitored by the control unit 7 and evaluated.
Decreased in the case shown in Figure 2, the operating voltage amplitude by switching to the higher resonance frequency of the amplitude value of 1 where indicated on the second a
This means that the low resonance frequency is in the immediate area of the operating frequency so that only one or a few smart cards within range of the reader.

[0019] In contrast, when a certain minimum number of smart cards within range of the reader is exceeded, as mentioned above, move the (low) frequency response down.
In this case, switching leads to the higher resonance frequency means that the voltage amplitude is increased, since this is closer to the operating frequency.

[0020] The control unit 7 then activates the signaling device 8 so that it generates an appropriate alarm signal, for example, displayed with its provision that is no longer guaranteed du

[0021] The circuit unit 7 is thus a phase comparison between the conduct of the varactor diode 5 out high blocking voltage and the voltage amplitude of the change in the antenna circ
This is easy in a known manner with comparators and XOR gates, or other circuits feasible.

[0022] The signaling device 8 can be an alarm or any other device with which generates an alarm signal and / or off the reader and / or other action is taken, depending on the applica

[0023] Instead of switching the resonance frequency, it is also possible to tune the operating frequency of the antenna circuit slightly to obtain the same information with regard to a po

[0024] Figure 3 shows the relationship between the temporal voltage waveforms and amplitudes at different operating cases.
The switching voltage (A) is periodically switched between the high and low value.
Accordingly, changes the resonance frequency (B), and switches between the high and low value.
If during normal operation (C) the resonance frequency at or slightly above the operating frequency reduces the voltage amplitude in the antenna circuit when switching to the high res
In contrast, when too many smart cards within range of the antenna circuit are such that the (low) resonant frequency shifted down and below the operating frequency is (D), increase
the operating frequency .

[0025] To determine the resonance frequency shift, it is also possible to automatically tune the antenna circuit and to generate the control process by evaluating a signal with an imper

IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application
Klaus FINKENZELLER

Confirmation No. 1969

Serial Number: 10/565,732

Group Art Unit: 2635

Filed: January 24, 2006

Examiner: Unassigned

Attorney Docket No. FINK3001/JEK

For: COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to Rule 37 C.F.R. §1.51(b), §1.56, §1.97, and §1.98, this Information Disclosure Statement is submitted in the above-identified patent application. A listing of documents to be published on the face of any patent granted from this application is submitted herewith on Form PTO-1449. Any other documents or information submitted for consideration by the Examiner are listed in this paper. A copy of each U.S. and foreign patent, or each publication or portion thereof listed or herein identified is submitted herewith, except that (1) a copy of any U.S. patent application identified herein or any patent, publication or other information listed herein cited or submitted in a prior application relied upon for an earlier filing date under 35 U.S.C. §120 and identified below, is not submitted herewith, and (2) a copy of any U.S. patent or published patent application identified herein is not submitted herewith, if this application was filed or entered the U.S. national stage on or after June 30, 2003 (or if applicable, this international application entered the U.S. national stage on or after June 30, 2003).

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.T./

Serial Number: 10/565,732
Attorney Docket: FINK3001/JEK

ADDITIONAL DOCUMENTS OR INFORMATION NOT LISTED ON ACCOMPANYING FORM PTO-1449 SUBMITTED FOR CONSIDERATION

International Search Report mailed November 5, 2004 in International Patent Application No. PCT/EP2004/008537, of which this application is the U.S. national stage.

CONCISE STATEMENT OF RELEVANCY (NON-ENGLISH LANGUAGE DOCUMENTS ONLY)

All of the documents identified on the appended PTO-1449 form are mentioned in the appended International Search Report established in PCT/EP2004/008537, of which this application is the U.S. national stage. The relevancy of the documents is evident from the International Search Report.

STATEMENT REGARDING TRANSLATIONS

English language translations of the non-English language documents are not readily available to Applicants' attorney, apart from any English language abstracts that may be appended to the documents. The examiner is requested to note that English language patents or patent applications corresponding to the non-English language documents may be identified in the documents accompanying this paper.

STATEMENT OF CUMULATIVE INFORMATION

US 2005/0156752 corresponds to DE 102 06 676.

STATEMENT OF TIMELINESS

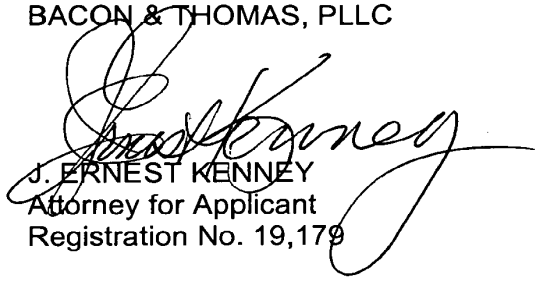
This Information Disclosure Statement is submitted prior to the mailing date of the first Office Action on the merits received by Applicant in the above-identified application.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.T./

Serial Number: 10/565,732
Attorney Docket: FINK3001/JEK

The Examiner is requested to acknowledge consideration of the information provided in this paper in accordance with prescribed procedures.

Respectfully submitted,
BACON & THOMAS, PLLC



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Customer 23364

Date: August 25, 2006

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.T./

B/O Form PTO-1449	Attv. Docket Number	Serial Number:
	FINK3001/JEK	10/565,732
U.S. Department of Commerce Patent and Trademark Office	Applicant: **Klaus FINKENZELLER**	
Information Disclosure Statement by Applicant	Filing Date: **January 24, 2006**	Group: **2635**

U.S. Patent Documents

Examiner Initial		Document Number	Date	Patentee/Applicant	Class	Subclass	Filing Date if Appropriate
		2005/0156752	07/21/2005	FINKENZELLER et al.			

Foreign Patent Documents

Examiner Initial		Document Number	Publication Date	Country/Agency	Class	Subclass	Translation	
							Yes	No
		DE 34 12 610	10/17/1985	GERMANY				X
		DE 102 06 676	08/28/2003	GERMANY				X
		DE 198 55 207	05/18/2000	GERMANY				X
		EP 0 696 011	02/07/1996	EPO			X	
		EP 1 024 451	08/02/2000	EPO				X

Other Documents (Including Author, Title, Date, Pertinent Pages, Place of Publication, Etc.)

Examiner	/Nay Tun/	Date Considered	01/25/2012

***EXAMINER:** Initial if citation is considered, whether or not citation is in conformance with MPEP 609; Draw a line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.*

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.T./

Notice

Description DE3412610

Method for data transmission

and data transmission system, the invention relates to a method for transferring data between a transmitter and this relatively closely spaced receivers, especially between a receiver a limited time interval up to a predetermined distance and a data transmission system for implementing the process.

For <RTI ID=4.1> Obertragung </ RTI> data between a transmitter and a receiver, numerous methods have been reported.
in particular, it is transferred during the data transmission between receivers and transmitters of a transportation system are known, the data by radio, infrared radiation and ultrasound that used in addition to these non-contact data transmission systems, systems are where the data transmission over wire lines, on which vehicles run along the grinder, but this also o

Starting from the prior art, the invention aims to provide an improved method for data transmission and a corresponding data transmission system, in which the data can be transmitte method and the data transmission system according to the invention are suitable especially for use in transport systems.

The object is, as far as the procedure, according to the invention in that it changes the damping of a Senderschwinakreises depending on the data to be transmitted between at least t circuit and that one by one <RTI ID=5.1> Dämpfungsänderuns </ RTI> in the transmitter resonant circuit caused change in the oscillation amplitude at the receiver end <RTI ID=5.2> <

To carry out the inventive data transmission method has thereby a data transmission system proved, which is characterized in that the transmitter output side has a transmitter oscillat switching facilities between at least two different values can be switched to the receiver input side a receiver resonant circuit which is inductively coupled to the transmitter oscillator ar amplitude of the coupled oscillators can be evaluated.

An advantage of besonserer method and system according to the invention consists in the fact that for the duration of data transmission, two simple resonant circuits are coupled in st resonant circuit, is modified in which the oscillation amplitude as a function of the data to be transmitted, which is generally to digital data.
In this manner it is possible for the usual, relatively complicated Transmission and reception facilities to abandon and to arrive at an inexpensive but reliable data transmission system.

Although basically a capacitive coupling of the two circuits is possible, it is preferred in an embodiment of the invention, when the oscillator coils of the resonant circuits of the transmitt through the construction and arrangement of the oscillator coils particularly simple and effective way to influence the shape of the circles coupled electromagnetic field can be taken.

Furthermore, it has proved advantageous if comprise the switching devices of a switch that is connected in parallel to the transmitter oscillator circuit underlying resistance, since in thi amplitude can be assigned because either the resistance or effective as a damping element is bridged by the switch.

For transportation systems, it is often sufficient if a particular vehicle has a fixed, predetermined identifier is assigned, which can be scanned as they pass by evaluation.
For this application is es günstig if the data to be transmitted are stored in a read only memory on the vehicle, for example, in one-<RTI ID=7.1> sogenannten </ RTI> ROM, PROM, EPROM. Can be formed.
Except when the additional identifier information, such
. As destination information, <RTI ID=7.2> Le degutinformationen etc </ RTI> want to transfer, then recommends other hand, the use of a write / read memory <RTI ID=7.3> </ RTI> -

In any case, it is often advantageous to store the data to be transmitted in a memory of the transmitter.

For a data transmission system according to the invention for a transport system with longitudinally at least one route traveling vehicles, it is favorable in one embodiment of the invent receiver is positioned at a predetermined position on the route of the transportation system, which may be provided in the transmitter has its own energy source such as a small (buffe

Further details and advantages of the invention are hereinafter described with reference to the drawings.

In the drawings, Figure 1 is a schematic block diagram of a data transmission system according to the invention and FIG 2 is a schematic diagram to emphasize this Ver of the basic p

Specifically, 1 shows a schematic block diagram of a novel data transmission system with a transmitter 10 and receiver 12, which are referred to on the grounds that the following desc The code carrier 10 transfers the data previously stored there to the transmitting / receiving unit 12, as indicated by the arrow D <RTI ID=8.2> is .. </ RTI> The code support 10 thus a 12 to receive this data is used.
On the output side, the transmitting / receiving unit 12, as is indicated by a connecting line 14, ID=9.1> a <RTI Auswerteeinhei; </ RTI> 16 connected to the input side to a supply voltz and data lines 22 which.
The evaluation unit 16 <RTI ID=9.2> receives </ RTI> the data from the transmitting / receiving unit 12 via line 14 and transmits on this line 14 is also the energy required by the suppl -core 14 and that the evaluation unit 16 typically includes a power unit to generate the proper voltage from the power supply voltages for the elements of the evaluation unit 16 and the

In the <RTI ID=9.3>.
Datentibetragungssystem </ RTI> as shown in FIG 1 may, where appropriate, a data transmission from the evaluation first .6 via the transmit / receive unit 12 to the code carrier 10, a store.
In this case, as the storage medium 10 for the code instead of the commonly used ROM, ie, a write memory, RAM, that uses a read / write memory with random access.

As shown in FIG 2, have the code carrier 10 and the transmitting / receiving unit 12 and output-input side, each one tuned circuit.
The resonant circuit of the transmitting / receiving unit 12 comprises an inductor L1 and C1 capacity, while the code carrier 10 has a resonant circuit with an inductor L2 and a capacit is in addition to the circuit carrier 10 <RTI ID=10.1> code </ RTI> a resistor R to the S is a switch connected in series.
The switch S, as indicated schematically, actuated by an output of a memory SP, depending on the data stored there.

The inductors and
Coils L1, L2 are the intermediate transmission path Ü electromagnetically coupled, and the entire system therefore acts like an air-core transformer, with the data using a conventional 10.3> C1 </ RTI> The unit can be tapped.

The transmitter may include a battery.
Preferably sends the <RTI ID=10.4> transmit / EmpEangseinheit </ RTI> 12 to the code carrier 10, as indicated by an arrow E, the energy that is needed in the code carrier.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

23364 7590 12/27/2011

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER
TUN, NAY L

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 12/27/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

TITLE OF INVENTION: COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	03/27/2012

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23364 7590 12/27/2011
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

TITLE OF INVENTION: COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1740	$300	$0	$2040	03/27/2012

EXAMINER	ART UNIT	CLASS-SUBCLASS
TUN, NAY L	2612	340-010100

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above**)

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

23364 7590 12/27/2011

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER	
TUN, NAY L	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 12/27/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 662 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 662 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No.	Applicant(s)	
	10/565,732	FINKENZELLER, KLAUS	
	Examiner	Art Unit	
	NAY TUN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *8/23/2011*.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are *1-17*.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/NAY TUN/
Examiner, Art Unit 2612

DETAILED ACTION

Claims status

1. In the amendment filed on August 23, 2011, claims 1, 15 and 17 have been amended. Therefore, claims 1-17 are currently pending for examination.

Allowable Subject Matter

2. Claims 1-17 are allowed.

3. The following is an examiner's statement of reasons for allowance:

Regarding claim 1, the prior art of record does not sufficiently teach or suggest the claimed limitations in their entirety in view of applicant's amendment and arguments, such as a transmission oscillator for carrying out a contactless data exchange, said oscillator including a coil; a communication element which is connected to the coil and to a data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device, a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property, the monitored property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance, and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received the control signal from the measuring device by connecting the communication element to an energy source.

Regarding claim 15, the prior art of record does not sufficiently teach or suggest the

claimed limitations in their entirety in view of applicant's amendment and arguments, such as a method for switching on a communication element configured to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil, comprising the following steps: monitoring a property of the transmission oscillator by means of a measuring device, wherein the property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance, producing a control signal upon the occurrence of a change in the monitored property, switching on the communication element by a switching apparatus in response to the control signal by connecting the communication element to an energy source.

Regarding claims 2-14 and 16-17, the claims are found allowable due to their dependence upon an already allowed claim and lacking any technical errors.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nay Tun whose telephone number is (571) 270-7939. The examiner can normally be reached on Mon-Thurs from 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where

this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/NAY TUN/

/DANIEL WU/
Supervisory Patent Examiner, Art Unit 2612

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"10565732"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S2	11	("20050156752" | "5287112" | "5319569" | "5489908" | "5491715" | "5790946" | "6317027" | "6353406" | "6593845" | "6894572" | "7209014").PN.	US-PGPUB; USPAT	OR	ON	2011/12/15 10:05
S3	10	arisawa.in. and (data adj carrier)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S4	243	(frequency with chang$4) with detect$4 with (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S5	20	(frequency with chang$4) with detect$4 same (search$4 or query or discover$3) adj (mode or state)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S6	98	(multi adj (protocol or frequency) with (tag or transponder)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S7	100	((interrogator or reader) with (wak$3 adj up or wakeup)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S8	2	11/370482.app.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S9	226	(de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S10	3	"6703920".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S11	289	(measur$3 or monitor$3) near5 frequency with coil same switch$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S12	54	(measur$3 or monitor$3) near5 frequency	US-PGPUB;	OR	ON	2011/12/15

		with coil same switch$3 and proximity	USPAT; EPO; JPO; DERWENT; IBM_TDB			10:05
S13	7810	340/10.1-10.6.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S14	1692	455/41.1,106.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S15	9321	S13 or S14	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S16	816	S15 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S17	59	S15 and (measur$3 or monitor$3) near5 (frequency or voltage or impedence or resistance) with coil	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S18	572	S16 and ((radio or RF$2) near2 tag or transponder)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S19	53	S16 and ((radio or RF$2) near2 tag or transponder or reader or interrogator) and NFC	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S20	2	10/504779.app.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S21	11	("20050156752" | "5287112" | "5319569" | "5489908" | "5491715" | "5790946" | "6317027" | "6353406" | "6593845" | "6894572" | "7209014").PN.	US-PGPUB; USPAT	OR	ON	2011/12/15 10:05
S22	10	arisawa.in. and (data adj carrier)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S23	243	(frequency with chang$4) with detect$4 with (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S24	20	(frequency with chang$4) with detect$4 same (search$4 or query or discover$3) adj (mode or state)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05

S25	98	(multi adj (protocol or frequency) with (tag or transponder)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S26	100	((interrogator or reader) with (wak$3 adj up or wakeup)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S27	2	11/370482.app.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S28	0	(mutual adj induction) and (de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S29	226	(de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S30	3	"6703920".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S31	289	(measur$3 or monitor$3) near5 frequency with coil same switch$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S32	54	(measur$3 or monitor$3) near5 frequency with coil same switch$3 and proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S33	7810	340/10.1-10.6.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S34	1692	455/41.1,106.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S35	9321	S33 or S34	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S36	816	S35 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S37	59	S35 and (measur$3 or monitor$3) near5 (frequency or voltage or impedence or	US-PGPUB; USPAT;	OR	ON	2011/12/15 10:05

		resistance) with coil	EPO; JPO; DERWENT; IBM_TDB			
S38	572	S36 and ((radio or RF$2) near2 tag or transponder)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S39	53	S36 and ((radio or RF$2) near2 tag or transponder or reader or interrogator) and NFC	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S40	1443	340/539.23,686.6,658,13.2.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S41	449	S40 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S42	51	S41 and (measur$3 or monitor$3) near5 (frequency or impedance)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S43	11	("4219740" | "4613830" | "5337353" | "5418860" | "5760688").PN. OR ("6545612").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S44	1	"6507189".pn.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S45	47	("2531807" | "3205323" | "3502966" | "3643155" | "3743853" | "3956693" | "4117401" | "4140971" | "4387339" | "4553040" | "4556859" | "4587486" | "4618823" | "4652820" | "4719362" | "4853575" | "4857841" | "4868498" | "4879531" | "4924180" | "4994738" | "5012206" | "5014006" | "5229715" | "5278496" | "5336997" | "5351004" | "5507089" | "5712621" | "5767672" | "5801340" | "5801530" | "6002251" | "RE30012").PN. OR ("6507189").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S46	28	("2983852" | "3469204" | "3601620" | "3601691" | "3732503" | "3743853" | "3747010" | "3764819" | "3872398" | "4323847" | "4419646").PN. OR ("4553040").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S47	23	("4879531").PN. OR ("5012206").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/12/15 10:05
S48	172	S40 and (measur$3 or monitor$3) near5 (frequency or impedance)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S49	84	S45 S46 S47	US-PGPUB;	OR	ON	2011/12/15

			USPAT; EPO; JPO; DERWENT; IBM_TDB			10:05
S50	4468	340/10.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S51	130	S50 and (frequency or impedance or capacitance) with (chang$4 or monitor$4) same coil	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S52	1887	(frequency or impedance or capacitance) with (chang$4 or monitor$4) same coil and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S53	497	(frequency or impedance or capacitance) with (chang$4 or monitor$4) same coil same proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S54	7407	("near" adj field) near2 communicat$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S55	11	S53 and S54	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S56	299	(frequency or impedance) near8 (chang$4 or monitor$4) with coil same proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S57	18	(RFID or RF near2 tag or transponder or NFC or "near" adj field) and S56	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S58	1	11/015518.app.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S59	85	("20010029430" | "20020053909" | "20020058517" | "20030003864" | "20030044033" | "20030048920" | "20030059076" | "20030076974" | "20030152243" | "20030223592" | "20040100358" | "20040214598" | "20040240692" | "20040258261" | "20050006466" | "20050111680" | "20050111681" | "20050111682" | "20050113060" | "20050113060" | "20050125570" | "20050134213" |	US-PGPUB; USPAT	OR	ON	2011/12/15 10:05

		"20050135644" | "20050209657" | "20050244022" | "20050244022" | "20060009156" | "20060013420" | "20060025172" | "20060025172" | "20060050906" | "20060269088" | "20070052595" | "20070063895" | "20070230728" | "20070285248" | "20080113694" | "20090227288" | "3601550" | "4596899" | "5568516" | "5740257" | "5774791" | "5787154" | "5835610" | "5861822" | "6075491" | "6092422" | "6104913" | "6154422" | "6307945" | "6381308" | "6587568" | "6636146" | "6690169" | "6694034" | "6763116" | "6801044" | "6813481" | "6879695" | "6931140" | "6951305" | "6951305" | "6958684" | "7010132" | "7034660" | "7058191" | "7099486" | "7106870" | "7127078" | "7167571" | "7171167" | "7177436" | "7206426" | "7224815" | "7242777" | "7245730" | "7256695" | "7260234" | "7274292" | "7274292" | "7319396" | "7336796" | "7356153" | "7366466" | "7426279" | "7512383" | "7515881" | "7522740" | "7551942").PN.				
S60	112	(sweep$4 with frequency) same coil and (sens$4 or detect$4) with proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05
S61	36	(voltage and impedance) with (alter$4 or chang$4) same coil same (sens$4 or detect$4) with proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/12/15 10:05

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S62	3599	340/10.1-10.6.ccls.	USPAT; UPAD	OR	ON	2011/12/15 10:22
S63	947	340/539.23,686.6,658,13.2.ccls.	USPAT; UPAD	OR	ON	2011/12/15 10:23
S64	7	((frequency and impedance) with (alter$7 or chang$4) and coil and (sens$4 or detect$4) with proximity).clm.	USPAT; UPAD	OR	ON	2011/12/15 10:24
S65	6	finkenzeller-klaus.in.	USPAT; UPAD	OR	ON	2011/12/15 10:24
S66	322	(giesecke and devrient).as.	USPAT; UPAD	OR	ON	2011/12/15 10:25
S67	4817	S62 S63 S65 S66	USPAT; UPAD	OR	ON	2011/12/15 10:25
S68	834	((frequency and impedance) with (alter$7 or chang$4) and (sens$4 or detect$4)).clm.	USPAT; UPAD	OR	ON	2011/12/15 10:26
S69	12	S67 and S68	USPAT; UPAD	OR	ON	2011/12/15 10:26

12/15/2011 10:50:06 AM

C:\ Users\ ntun\ Documents\ EAST\ Workspaces\ 10565732_B.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	NAY TUN	2612

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/07/2009	12/31/2009	08/12/2010	05/20/2011	12/15/2011				
1	1	✓	✓	✓	✓	=				
2	2	✓	✓	✓	✓	=				
3	3	✓	✓	✓	✓	=				
4	4	✓	✓	✓	✓	=				
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6	6	✓	✓	✓	✓	=				
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8	8	✓	✓	✓	✓	=				
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12	12	✓	✓	✓	✓	=				
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14	14	✓	✓	✓	✓	=				
15	15	✓	✓	✓	✓	=				
16	16	✓	✓	✓	✓	=				
17	17				✓	=				

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	**Art Unit**
	NAY TUN	2612

ORIGINAL		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
340	10.1	H 0 4 Q 5 / 22 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
340	539.23	686.6	658	13.2	

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17												
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15	15														
16	16														

/NAY TUN/ Examiner.Art Unit 2612	12/15/2011	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	17	
/DANIEL WU/ Supervisory Patent Examiner.Art Unit 2612	12/17/2011	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun / Charles G Curtis III	2612

SEARCHED

Class	Subclass	Date	Examiner
340	10.1-10.6	05/28/2009	CGC
455	41.1, 106	05/28/2009	CGC
340	10.1-10.6	8/12/2010	NT
455	41.1, 106	8/12/2010	NT
340	539.23,686.6,658,13.2,10.1-10.6	4/6/2011	NT
455	41.1,106	4/6/2011	NT
340	539.23,686.6,658,13.2,10.1-10.6	12/15/2011	NT
455	41.1, 106	12/15/2011	NT

SEARCH NOTES

Search Notes	Date	Examiner
PLUS Search	05/28/2009	CGC
Inventor/Assignee Search (PALM/EDAN)	05/28/2009	CGC
EAST Search Printout	06/07/2009	CGC
Updated Search on East - see detail in printout	12/30/2009	NT
Updated Search on East - see detail in printout	8/12/2010	NT
Updated Search on East - see detail in printout	4/6/2011	NT
Updated Search on East - see detail in printout	12/15/2011	NT
Daniel Wu for allowable subject matter	12/15/2011	NT

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner
340	539.23,686.6,658,13.2,10.1	12/15/2011	NT

/NAY TUN/ Examiner.Art Unit 2612	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	10/565,732	Confirm. No.:	1969
Filing Date:	June 30, 2006	Examiner:	Tun, Nay L
First Inventor:	Klaus Finkenzeller	Art Unit:	2612
Attorney No.:	FINK3001/JJC/BEL		
For:	COMMUNICATION APPARATUS FOR SETTING UP A CONNECTION BETWEEN INTELLIGENT DEVICES		

REPLY TO OFFICE ACTION OF MAY 23, 2011

Commissioner for Patents
P.O. Box 145
Alexandria, VA 22313-145

Sir:

INTRODUCTORY COMMENTS

This is responsive to the outstanding Office Action dated May 23, 2011, in the above-identified application wherein the claims are rejected. In view of the following amendments and remarks, reconsideration of the application is respectfully requested.

AMENDMENT

Please amend the application in accordance with the following particulars.

In the Claims

The claims are amended as shown on the following pages under the heading LIST OF CURRENT CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.

LIST OF CURRENT CLAIMS

1. (Currently Amended) A communication apparatus for setting up a data connection between intelligent devices, comprising:

a transmission oscillator for carrying out a contactless data exchange, said oscillator including a coil;

a communication element which is connected to the coil and to a data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device,

a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property, the monitored property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance,

and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received [[a]] the control signal from the measuring device by connecting the communication element to an energy source.

2. (Previously Presented) The communication apparatus according to claim 1, including an assembly that is switchable to the transmission oscillator via a switch, said assembly causing an increase in the bandwidth of the oscillating circuit.

3. (Previously Presented) The communication apparatus according to claim 2, wherein the assembly is a resistive element.

4. (Previously Presented) The communication apparatus according to claim 1, including an assembly switchable to the transmission oscillator via a switch, said assembly causing a change in the resonant frequency of the transmission oscillator.

5. (Previously Presented) The communication apparatus according to claim 4, wherein the assembly is arranged to enable a reduction in the resonant frequency.

6. (Previously Presented) The communication apparatus according to claim 4, wherein the assembly comprises a capacitor.

7. (Previously Presented) The communication apparatus according to claim 1, wherein the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

8. (Previously Presented) The communication apparatus according to claim 1, wherein the switching apparatus has a time controller for cyclically switching the measuring device on and off.

9. (Previously Presented) The communication apparatus according to claim 8, wherein the time controller keeps the on state of the measuring device shorter than the off state.

10. (Previously Presented) The communication apparatus according to claim 8, wherein the measuring device stores a measuring value obtained during a cyclical on phase.

11. (Previously Presented) The communication apparatus according to claim 10, wherein the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases.

12. (Previously Presented) The communication apparatus according to claim 8, wherein, when the intelligent device is switched on, the communication element is initially on and the measuring device off.

13. (Previously Presented) The communication apparatus according to claim 1, wherein the measuring device has a first oscillator device coupled at least temporarily with the coil, for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal.

14. (Previously Presented) The communication apparatus according to claim 13, wherein the measuring device has circuit components for producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom.

15. (Currently Amended) A method for switching on a communication element configured to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil, comprising the following steps:

monitoring a ~~parameter~~ property of the transmission oscillator by means of a measuring device, wherein the property ~~parameter~~ of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance,

producing a control signal upon the occurrence of a change in the monitored property,

switching on the communication element by a switching apparatus in response to the control signal by connecting the communication element to an energy source.

16. (Previously Presented) The method according to claim 15, wherein the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

17. (Currently Amended) The communication apparatus according to claim 1, including an assembly switchable to the transmission oscillator via a switch, said assembly causing a change in the resonant frequency of the transmission oscillator, when the measuring device has ascertained a change of the monitored property and outputted [[a]] the control signal.

REMARKS

Reconsideration of the pending application is respectfully requested in view of the following observations.

In the claims

Claims 1, 15, and 17 have been amended.

Claim 1 has been amended to recite the feature of a switching apparatus "switches on the communication element when it has received the control signal from the measuring device by connecting the communication element to an energy source." Support for this amendatory language may be found at least in paragraphs [0036] and [0039]-[0041] and Fig 2.

Claims 1 and 17 have been amended to clarify indefinite language identified in the Office Action.

Claim 15 has been amended similarly to amended claim 1 and has also been amended to clarify indefinite language identified in the Office Action.

No new matter is introduced by the amendment to the claims. Entry of the amendment to the claims is kindly requested.

Rejection of the claims under 35 USC § 112, second paragraph

Reconsideration of this amendment is kindly requested in view of the amendment to the claims 1, 15, and 17.

In claims 1 and 17, "a control signal" in the claims has been changed to "the control signal."

In claim 15, the term "parameter" has been changed to "property" to make the language used consistent throughout the claims.

It is submitted that the amendment to the claims makes the claims conform to 35 USC § 112, second paragraph.

Withdrawal of this rejection is kindly requested.

Rejection of claims 1-6, 8-12, 15, and 17 under 35 USC 103(a) as being unpatentable over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*) and US 2002/0149376 (*Haffner*)

Reconsideration of this rejection is respectfully requested, in view of the amendment to claims 1and 15, on the basis that the rejection fails to establish a *prima facie* case of obviousness with respect to claims 1.

Amended claim 1 recites a communication apparatus for setting up a data connection between intelligent devices, comprising:

a transmission oscillator for carrying out a contactless data exchange, said oscillator including a coil;

a communication element which is connected to the coil and to a data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device,

a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property,

the monitored property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance,

and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received the control signal from the measuring device by connecting the communication element to an energy source.

It is submitted that the proposed combination of *Schuermann*, *Charrat*, and *Haffner* fails to disclose all of the features of amended claim 1.

First, the cited references do not disclose a switching apparatus switching on the communication element when it has received the control signal from the measuring device by connecting the communication element to an energy source.

Schuermann is directed to a transponder (10) which uses a control circuit (16) to control modulator (48) which opens and closes switch (50) to change the resonant frequency of the resonant circuit (28) by connecting and disconnecting capacitor (52) from ground (see col. 3, lines 27-36 and Fig. 1). Thus, *Schuermann* does not disclose a switching apparatus as required by amended claim 1.

The rejection also acknowledges that *Schuermann* does not disclose a switching element which is connected to the measuring device and the communication element and switches on the communication element when it receives the control signal from the measuring device. *Charrat* is relied on for the disclosure of this feature.

Charrat, however, does not cure the deficiencies of *Schuermann*. *Charrat* discloses a contactless integrated circuit reader having a power saving mode (see Title). More specifically, the reader of *Charrat* saves power by using magnetic field pulses which

are much shorter than that of classical magnetic field bursts and spacing out the pulses at larger intervals (see col. 7, lines 25-30).

The method of saving power used in *Charrat* is fundamentally different from the mechanism used in amended claim 1. Amended claim 1 requires a switch which physically connects and disconnects the energy source from the communication element (see also Fig. 2). In contrast, *Charrat* reduces power consumption by having the magnetic field operate for shorter periods of time and operate less frequently which results in the use of less current overall. *Charrat* does not explicitly show an energy source in Fig. 3 and only generally discloses that a reader (10) has an autonomous power supply system, such as a battery or a cell, or may be powered by hard wired power sources (see col. 11, lines 8-13). *Charrat* is silent as to the specific connection of circuit in the reader and the energy source. Therefore, *Charrat* does not disclose switching on a communication by connecting the element to an energy source as required by amended claim 1.

Moreover, *Charrat* does not disclose the microprocessor cutting off power from certain circuits to conserve energy. *Charrat* reduces power usage through current and explicitly states so in disclosing that the described features "save on current consumption of a reader (10) having an autonomous power supply" using the method described above (see col. 11, lines 8-13). Further, *Charrat* describes the microprocessor as having various ports (PT_1-PT_N) (see Fig. 3). None of these ports (PT_1-PT_N) are shown or described as being used to issue a circuit power down command or to power down a circuit.

As seen in Fig. 3, port (PT_1) links data to be transmitted (DT_x) to the modulator circuit (MODC) of data sending circuit (30) (see col. 6, lines 29-38). Port (PT_2) is an input of the microprocessor (MP) for receiving data (DT_r) sent from the contactless integrated circuit (5) (see col. 6, lines 65-67). Port (PT_3) of the microprocessor

receives input from the monitoring circuit (DETC), and ports (PT_4-PT_N) are used to output the amplitude value (DVREF) to the monitoring circuit (DETC) (see Fig. 3).

Thus, *Charrat* discloses no functionality in the microprocessor (MP) which would allow the microprocessor to power down specific circuits in order to save power.

Furthermore, *Charrat* does not disclose a measuring device which sends a control signal to the switching apparatus which, as a result of receiving the control signal, connects the communication element to an energy source. *Charrat* discloses three embodiments of monitoring circuit DETC which receives the envelope signal SE (see col. 7, line 65 – col. 8, line 2). DETC1 and DETC2 compare the envelope signal SE with VREF to determine whether or not a contactless integrated circuit is present (see Figs. 6-9B and col. 8, lines 22-35 and col. 8, line 63 – col. 9, line 20). DETC3 "simply comprises an analog-to-digital converter ADC and the actual monitoring of the envelope pulses is here performed by the microprocessor MP. The converter ADC thus receives the envelope signal SE at input and delivers a digital amplitude value DSE that is applied to ports of the microprocessor" (see col. 9, lines 25-32).

In summary, DETC1 and DETC2 perform a comparison between the envelope signal SE and VREF while DETC3 merely outputs the digitized envelope signal SE to the microprocessor and the microprocessor performs the comparison (see col. 9, lines 49-52). Using the DETC and the microprocessor, a reader becomes aware that a contactless integrated circuit is within communication range of the reader. *Charrat* does not disclose that once the reader becomes aware of the presence of a contactless integrated circuit, the reader connects the communication element to an energy source. Thus, *Charrat* fails to disclose a switching apparatus as required by amended claim 1 since *Charrat* does not disclose switching on the communication element by connecting the communication element to an energy source.

Finally, *Haffner* fails to cure the shortcomings of *Schuermann* and *Charrat*. *Haffner* discloses a proximity sensor which senses the approach of an initiator or trigger (4) by the change of the impedance of the coil (L) or the capacitor (C) (see Fig. 1 and par. [0031]). *Haffner* does not disclose that as the result of a signal, a switching apparatus connects the communication element to an energy source.

Therefore, the proposed combination of *Schuermann*, *Charrat*, and *Haffner* fails to establish a *prima facie* case of obviousness since none of the references taken together or alone disclose all of the features of amended claim 1.

Amended claim 15 includes features similar to those of amended claim 1 and is likewise allowable for reasons similar to those given above.

Claims 2-6, 8-12, and 17 depend from claim 1, and are therefore patentable as containing all of the recited features of claim 1, as well as for their respective recited features.

Withdrawal of the rejection is kindly requested.

Rejection of claims 7 and 16 under 35 USC 103(a) as being unpatentable over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*), US 2002/0149376 (*Haffner*), and US patent 6,317,027 (*Watkins*)

Claims 7 and 16 depend from claim 1 or 15 and are therefore patentable as containing all of the recited features of claim 1 or 15, as well as for their respective recited features.

Moreover, *Watkins* does not cure the deficiencies of *Schuermann*, *Charrat*, or *Haffner* since *Watkins* does not disclose a switching apparatus which switches on the

communication element when it has received the control signal from the measuring device by connecting the communication element to an energy source.

Accordingly, the proposed combination of *Schuermann*, *Charrat*, *Haffner*, and *Watkins* does not establish a *prima facie* case of obviousness with respect to claim 1 or 15 from which claims 7 and 16 depend.

Withdrawal of the rejection is kindly requested.

Rejection of claims 13 and 14 under 35 USC 103(a) as being unpatentable over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*), US 2002/0149376 (*Haffner*), and US patent 5,491,715 (*Flaxl*)

Claims 13 and 14 depend from claim 1 and are therefore patentable as containing all of the recited features of claim 1, as well as for their respective recited features.

Moreover, *Flaxl* does not cure the deficiencies of *Schuermann*, *Charrat*, or *Haffner* since *Flaxl* does not disclose a switching apparatus which switches on the communication element when it has received the control signal from the measuring device by connecting the communication element to an energy source.

Accordingly, the proposed combination of *Schuermann*, *Charrat*, *Haffner*, and *Flaxl* does not establish a *prima facie* case of obviousness with respect to claim 1 from which claims 13 and 14 depend.

Withdrawal of the rejection is kindly requested.

Conclusion

As a result of the amendment to the claims, and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

If any issues remain that may be resolved by a telephone or facsimile communication with the Applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

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625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314-1176
Phone: (703) 683-0500
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Date: August 23, 2011

Respectfully submitted,

/Justin J. Cassell/

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Electronic Acknowledgement Receipt

EFS ID:	10795037
Application Number:	10565732
International Application Number:	
Confirmation Number:	1969
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Customer Number:	23364
Filer:	Justin John Cassell/Betty Lee / Kim Forsell
Filer Authorized By:	Justin John Cassell
Attorney Docket Number:	FINK3001/JJC/BEL
Receipt Date:	23-AUG-2011
Filing Date:	30-JUN-2006
Time Stamp:	15:46:49
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		AM_082311.pdf	290853 d656d63650faf3f6cbcd9370832963a744b47346	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	13
Warnings:			
Information:			
	Total Files Size (in bytes):	290853	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 10/565,732	Filing Date 06/30/2006	☐ To be Mailed

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	08/23/2011	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)		OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DENISE HOPKINS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/BEL	1969

23364 7590 05/23/2011

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EXAMINER	
TUN, NAY L	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
05/23/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,732	FINKENZELLER, KLAUS	
	Examiner	Art Unit	
	NAY TUN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 November 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 15, 2010 has been entered. Claims 1 and 15 have been amended and claim 17 has been newly added. Therefore, claims 1-17 are currently pending for examination.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 and 17 recite “a control signal” in line 14 and line 4 respectively. It is unclear that it is the same “control signal” recited in line 9 of claim 1 or not. Claims 2-14 are also rejected since they depend from the rejected claim 1.

Claim 15 recites "the monitored property" and claim 16 recites "the property" without proper antecedent basis. For the purpose of examination, Examiner will assume as "the monitored parameter" and "the parameter" respectively.

Claim Rejections - 35 USC § 103

5. Claims 1-6, 8-12, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** (U. S. Patent No. 5,287,112) in view of **Charrat** et al. (**Charrat:** WO 03/052672: see US 6,905,074 as translation) and further in view of **Haffner** et al. (**Haffner**: US 2002/0149376).

Regarding claim 1, **Schuermann** discloses a communication apparatus for setting up a data connection between intelligent devices, comprising:

• a transmission oscillator (resonant circuit 28) for carrying out a contactless data exchange, said oscillator including a coil (Column 4 Lines 42-44 and 50-52);

• a communication element (control circuit 16) which is connected to the coil and the data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device (Column 3 Lines 46-54);

Schuermann does not disclose:

• a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property; and

• a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal

from the measuring device.

However, the preceding limitations are known in the art of communications. **Charrat** discloses an RFID reader with an active standby mode comprising a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property (FIG. 3, 10 and Column 9 Lines 25-31, DETC3 measures the amplitude of the envelope signal of the transmitter coil and Column 9 Lines 38-55; microprocessor compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit and Column 4, Lines 43-47: variations higher than a determined variation threshold); and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device (Column. 11, Lines 7-12: saving on the current consumption of a reader using the invention. Therefore, one can easily see that part of the communication circuits can be powered down/switched off by the microprocessor on standby mode since sending identification request from the reader and receiving identification message from the tag do not need to be performing during the standby mode).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine **Schuermann** with **Charrat** in order to send the identification request from the reader after the non-contact IC enters the proximity of the reader and therefore, prolongs battery life and/or saves energy of the reader (**Charrat**: Column 11 Lines 1-12).

The combined embodiment does not explicitly disclose wherein the parameter of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance.

However, in the same field of endeavor in proximity sensing, **Haffner** teaches a proximity sensor having a tuned circuit 1 with capacitor C and coil L (Fig. 1) and as a result of the approach of initiator or trigger 4, the impedance of the tuned circuit and the voltage changes (Paragraph [0031] [0014] & [0017]).

Therefore, it would have been obvious to the one of the ordinary skill in the art at the time of the invention was made to measure impedance in stead of the amplitude, as taught by **Haffner**, in the combined system of **Schuermann** and **Charrat**, as a known parameter to measure in the base process of proximity sensing with the predictable result of detecting the presence of the object in the predetermined distance.

Regarding claim 2, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 1 as discussed above. **Schuermann** further discloses an assembly that is switchable to the transmission oscillator via a switch (the tuning circuit consisting of capacitor 56 and resistor 58 connects to resonant circuit 34 via switch 54 to form new resonant circuit 60), said assembly causing an increase in the bandwidth of the oscillating circuit (Column 5 Lines 47-59; one of ordinary skill in the art could combine this arrangement from the transponder with the interrogator since it is known in the art that interrogators can act as transponders and receive data from other transponders).

Regarding claim 3, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 2 as discussed above. **Schuermann** further discloses that the assembly is a resistive element (the tuning circuit is a resistive element since it comprises a resistor).

Regarding claim 4, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 1 as discussed above. **Schuermann** further discloses including an assembly (capacitor 52) switchable to the transmission oscillator via a switch (switch 50), said assembly causing a change in the resonant frequency of the transmission oscillator (Column 5 Lines 13-19).

Regarding claim 5, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 4 as discussed above. **Schuermann** further discloses that the assembly causes a reduction in the resonant frequency (Column 5 Lines 13-15).

Regarding claim 6, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 4 as discussed above. **Schuermann** further discloses that that the assembly comprises a capacitor (see above).

Regarding claim 8, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 1 as discussed above but does not explicitly disclose the switching apparatus has a time controller for cyclically switching the measuring device on and off.

However, **Charrat** further discloses that pulses of 10 to 50 microseconds spaced out by 200ms (Column 7 Lines 17-37). Since the DETC circuit does not need to measure the amplitude between the pulses, one can easily see that it can be switched off for 200ms after detection of each pulse and switched on cyclically.

Therefore, it would have been obvious to the one of the ordinary skill in the art at the time of the invention was made to provide a switching apparatus with a time controller for cyclically switching the measuring device on and off in order to save the power more by turning

off the idling components of the circuit and turning on only when required.

Regarding claim 9, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 8 as discussed above. **Charrat** further discloses that the time controller keeps the on state of the measuring device shorter than the off state (Column 7 Lines 17-27 and as modified in claim 8 above, pulse width i.e. the on state of the DETC is 10-50 microseconds long and off state will be 200ms).

Regarding claim 10, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 8 as discussed above. The combination further discloses that the measuring device stores a measuring value obtained (**Charrat**: Column 9 Lines 37-55).

Regarding claim 11, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 10 as discussed above. The combination further teaches the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases (**Charrat**: Column 9 Lines 37-55)

Regarding claim 12, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 8 as discussed above. While the combination does not expressly disclose that when the intelligent device is switched on, the communication element is initially on and the measuring device off, this is an obvious matter of design choice (the specification of the present application does not seem to give a reason for or an advantage to having this arrangement), which does not patentably distinguish the invention over the prior art.

Regarding claim 15, **Schuermann** discloses a communication element designed to use a

coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil (see regarding claim 1 above). **Schuermann** does not disclose the method steps of:

• monitoring a parameter of the transmission oscillator by means of a measuring device;

• producing a control signal upon the occurrence of a change in the monitored property; and

• switching on the communication element by a switching apparatus due in response to the control signal.

However, the preceding limitations are known in the art of communications. **Charrat** discloses an RFID reader with an active standby mode comprising a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property (FIG. 3, 10 and Column 9 Lines 25-31, DETC3 measures the amplitude of the envelope signal of the transmitter coil and Column 9 Lines 38-55; microprocessor monitors/compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit and Column 4, Lines 43-47: variations higher than a determined variation threshold); and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device (Column. 11, Lines 7-12: saving on the current consumption of a reader using the invention. Therefore, one can easily see that part of the communication circuits can be powered down/switched off by the microprocessor on standby mode since sending identification request from the reader and receiving identification message from the tag do not need to be performing during the standby mode).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine **Schuermann** with **Charrat** in order to send the identification request from the reader after the non-contact IC enters the proximity of the reader and therefore, prolongs battery life and/or saves energy of the reader (**Charrat**: Column 11 Lines 1-12).

The combined embodiment does not explicitly disclose wherein the parameter of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance.

However, in the same field of endeavor in proximity sensing, **Haffner** teaches a proximity sensor having a tuned circuit 1 with capacitor C and coil L (Fig. 1) and as a result of the approach of initiator or trigger 4, the impedance of the tuned circuit and the voltage changes (Paragraph [0031] [0014] & [0017]).

Therefore, it would have been obvious to the one of the ordinary skill in the art at the time of the invention was made to measure impedance in stead of the amplitude, as taught by **Haffner**, in the combined system of **Schuermann** and **Charrat**, as a known parameter to measure in the base process of proximity sensing with the predictable result of detecting the presence of the object in the predetermined distance.

Claim 17 is rejected for the same reason as claim 4.

6. Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann, Charrat** and **Haffner** as applied to claim 1 and 15 above, and further in view of **Watkins** (U.S. Patent No. 6,317,027).

Regarding claim 7, the combined apparatus of **Schuermann, Charrat** and **Haffner** teaches the apparatus of claim 1 as discussed above. The combination does not teach that the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

However, the preceding limitation is known in the art of communications. **Watkins** discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the combined apparatus of **Schuermann, Charrat** and **Haffner** with the addition of sweeping over a frequency range as the motivation lies in **Watkins** that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

Regarding claim 16, the combined method of **Schuermann** in view of **Charrat** teaches the method of claim 15 as discussed above. The combination does not teach that the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

However, the preceding limitation is known in the art of communications. **Watkins** discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of **Schuermann** in view of **Charrat** with the addition of sweeping over a frequency range as the motivation lies in **Watkins** that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

7. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann**, **Charrat** and **Haffner** as applied to claim 1 above, and further in view of **Flaxl** (U.S. Patent No. 5,491,715).

Regarding claim 13, the combination of **Schuermann**, **Charrat** and **Haffner** teaches the apparatus of claim 1 as discussed above. The combination does not disclose that the measuring device has a first oscillator device coupled at least temporarily with the coil for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal.

However, the preceding is known in the art of communications. **Flaxl** discloses an antenna tuning method and circuit, wherein a first oscillator device (antenna resonance circuit 18) and a second oscillator device (osc/xmit circuitry 44) are fed into a phase comparator to perform adjustments to the device based on feedback (Figure 7 and Column 5 Line 33 - Column 4 Line 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the apparatus of **Schuermann**, **Charrat** and **Haffner** with the circuit disclosed in **Flaxl** as the phase comparison circuit in **Flaxl** in addition to the change in magnitude in order to ascertain a change in the signal from the coil.

Regarding claim 14, **Schuermann**, **Charrat** and **Haffner** further in view of **Flaxl** teaches the apparatus of claim 13 as discussed above. The combination further teaches producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom (in **Flaxl**, the phase comparator 60

outputs a signal to the control unit 50 which adjusts the antenna resonance circuit 18).

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nay Tun whose telephone number is (571) 270-7939. The examiner can normally be reached on Mon-Thurs from 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner, Art Unit 2612

/DANIEL WU/
Supervisory Patent Examiner, Art Unit 2612

Notice of References Cited	Application/Control No. 10/565,732	Applicant(s)/Patent Under Reexamination FINKENZELLER, KLAUS	
	Examiner NAY TUN	Art Unit 2612	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0149376	10-2002	Haffner et al.	324/635
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

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	N	WO 03052672 A1	06-2003	World Intellect	BRUNO C et al.	
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	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun / Charles G Curtis III	2612

SEARCHED

Class	Subclass	Date	Examiner
340	10.1-10.6	05/28/2009	CGC
455	41.1, 106	05/28/2009	CGC
340	10.1-10.6	8/12/2010	NT
455	41.1, 106	8/12/2010	NT
340	539.23,686.6,658,13.2,101,10.6	4/6/2011	NT
455	41.1,106	4/6/2011	NT

SEARCH NOTES

Search Notes	Date	Examiner
PLUS Search	05/28/2009	CGC
Inventor/Assignee Search (PALM/EDAN)	05/28/2009	CGC
EAST Search Printout	06/07/2009	CGC
Updated Search on East - see detail in printout	12/30/2009	NT
Updated Search on East - see detail in printout	8/12/2010	NT
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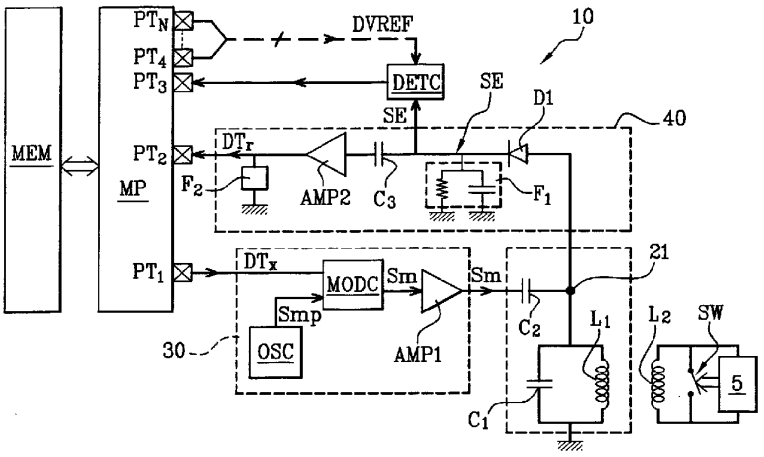
(81) États désignés *(national)* : AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

[Suite sur la page suivante]

(54) **Title:** NON-CONTACT INTEGRATED CIRCUIT READER COMPRISING A LOW POWER CONSUMPTION ACTIVE STANDBY MODE

(54) **Titre :** LECTEUR DE CIRCUIT INTEGRE SANS CONTACT COMPRENANT UN MODE DE VEILLE ACTIVE A FAIBLE CONSOMMATION ELECTRIQUE



(57) **Abstract:** The invention concerns a non-contact integrated circuit reader comprising an antenna coil (L1) for emitting an oscillating magnetic field, and means for detecting the presence of a non-contact integrated circuit (5) in a communication perimeter of the reader without reception of an identification message. The invention is characterized in that the detection means comprise means (MP, L1) for emitting short duration magnetic field pulses, means (D1, F1) for extracting from the antenna coil an envelope signal (SE) having envelope magnetic field pulses corresponding to the magnetic field pulses, and means (DETC) for monitoring the amplitude of the envelope pulses, designed to detect an amplitude variation of the envelope impulses representing the non-contact integrated circuit input in the reader communication perimeter.

[Suite sur la page suivante]

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(84) États désignés *(régional)* **:** brevet ARIPO (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), brevet eurasien (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), brevet européen (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), brevet OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.

(57) Abrégé : L'invention concerne un lecteur de circuit intégré sans contact comprenant une bobine d'antenne (L1) pour émettre un champ magnétique oscillant, et des moyens de détection de la présence d'un circuit intégré sans contact (5) dans un périmètre de communication du lecteur sans réception d'un message d'identification. Selon l'invention les moyens de détection comprennent des moyens (MP, L1) pour émettre des impulsions de champ magnétique de courte durée, des moyens (Dl, F1) pour extraire de la bobine d'antenne un signal d'enveloppe (SE) présentant des impulsions d'enveloppe correspondant aux impulsions de champ magnétique, et des moyens (DETC) de surveillance de l'amplitude des impulsions d'enveloppe, agencés pour détecter une variation de l'amplitude des impulsions d'lenveloppe représentative de l'entrée du circuit intégré sans contact dans le périmètre de communication du lecteur.

LECTEUR DE CIRCUIT INTEGRE SANS CONTACT COMPRENANT UN MODE DE VEILLE ACTIVE A FAIBLE CONSOMMATION ELECTRIQUE

La présente invention concerne le domaine des transmissions de données par couplage inductif.

La présente invention concerne notamment les lecteurs de circuits intégrés sans contact, utilisés pour échanger des données avec des objets portatifs électroniques comportant un circuit intégré sans contact, comme les cartes à puce sans contact, les étiquettes électroniques sans contact, les badges électroniques sans contacts,...

Plus particulièrement, la présente invention concerne un lecteur de circuit intégré sans contact comprenant une bobine d'antenne pour émettre un champ magnétique oscillant, et des moyens de détection de la présence d'un circuit intégré sans contact dans un périmètre de communication du lecteur sans réception d'un message d'identification.

La présente invention concerne également un procédé pour détecter la présence d'un circuit intégré sans contact dans un périmètre de communication d'un lecteur de circuit intégré sans contact, sans réception d'un message d'identification.

Ces dernières années, les circuits intégrés sans contact ont connu un important développement et les méthodes de transmission de données par couplage inductif font aujourd'hui l'objet de divers protocoles dont certains sont normalisés, par exemple ceux décrits par les normes ISO/IEC 15693 et ISO/IEC 14443.

Ces protocoles comprennent des dispositions permettant à un lecteur de détecter la présence d'un circuit intégré sans contact dans son périmètre de communication, afin d'engager une communication. De telles dispositions consistent souvent dans une requête

en identification devant être émise répétitivement par le lecteur. Sur réception d'une telle requête, le circuit intégré présent dans le champ d'interrogation du lecteur renvoie un message d'identification. Le message d'identification peut être personnalisé et comprendre un numéro d'identification du circuit intégré, comme son numéro de série ou tout autre identifiant. Le message d'identification peut également être un simple signal d'identification anonyme, par exemple une période de modulation de l'amplitude du champ magnétique faite par modulation de charge. Dans les applications dans lesquelles de nombreux circuits intégrés sans contact sont susceptibles de se trouver simultanément dans le périmètre de communication d'un lecteur, la requête en identification est associée à un protocole anti-collision permettant la sélection d'un circuit intégré et d'un seul.

Cette méthode de détection/identification de circuit intégré nécessite que le lecteur émette en permanence un champ magnétique alternatif ou, à tout le moins, qu'il émette des salves de champ magnétique d'une durée suffisante pour permettre l'envoi de la requête en identification et la réception du message d'identification.

Pour fixer les idées, la figure 1 représente schématiquement un lecteur 1 équipé d'une bobine d'antenne L1 émettant un champ magnétique FLD, oscillant par exemple à 13,56 MHz ou 125 KHz (fréquences souvent utilisées). En regard du lecteur se trouve un circuit intégré sans contact 5 équipé d'une bobine d'antenne L2. La figure 2 représente la forme générale du champ magnétique. Le lecteur envoie ici des salves de champ magnétique FLD1, FLD2,... chaque salve durant au moins une milliseconde. La fréquence porteuse du champ magnétique est schématisée par des traits verticaux. L'enveloppe 3 du champ magnétique présente une période de modulation d'amplitude pendant l'envoi de la requête

RQST, selon un profil de modulation qui est déterminé par le protocole utilisé, représenté sur la figure par une zone en traits hachurés.

Cette méthode de détection/identification de circuit intégré sans contact implique une consommation de courant non négligeable par le lecteur, pour l'émission du champ magnétique. De ce fait, elle ne convient pas aux applications où il est souhaité que le lecteur présente une faible consommation de courant lorsque aucun circuit intégré ne se trouve dans le champ d'interrogation. Ces applications concernent notamment les lecteurs alimentés par une batterie ou par une pile électrique.

Selon d'autres protocoles de communication, un circuit intégré sans contact envoie spontanément un message d'identification lorsqu'il détecte la présence d'un champ magnétique émis par un lecteur. Ce mode de détection par identification spontanée implique également une consommation de courant non négligeable car le lecteur doit émettre un champ magnétique permanent ou des salves de champ magnétique d'une durée suffisante pour activer le circuit intégré et lui permettre d'envoyer le message d'identification (pouvant consister en un simple signal d'identification, comme indiqué plus haut).

Afin de pallier cet inconvénient, on connaît une méthode de détection de circuit intégré faisant intervenir un émetteur/récepteur infrarouge. En dehors des périodes de communication, le lecteur est placé dans un état de veille active où il n'émet aucun champ magnétique et surveille seulement le signal reçu par le capteur infrarouge. Lorsqu'un circuit intégré sans contact (solidaire d'un objet portatif) se trouve dans le champ de rayonnement infrarouge, le lecteur détecte une modulation du niveau de réception infrarouge et bascule dans un mode actif, où il émet le champ magnétique (par salves ou de façon permanente, avec ou sans requête en identification). Si aucun message d'identification n'est

reçue après un nombre déterminé de requêtes ou de salves, le lecteur repasse en mode de veille active.

Toutefois, cette méthode nécessite d'avoir recours à un système de détection infrarouge complexe à mettre en œuvre, qui grève le prix de revient du lecteur. En outre une détection infrarouge n'apporte pas entière satisfaction du fait que le faisceau infrarouge ne couvre qu'une portion de l'espace autour du lecteur.

Ainsi, la présente invention vise un moyen permettant de détecter un circuit intégré sans contact sans réception d'un message d'identification et sans utiliser un détecteur infrarouge.

Pour atteindre cet objectif, la présente invention repose sur la constatation que l'amplitude du champ magnétique émis par un lecteur se trouve sensiblement altérée lorsque la bobine d'antenne d'un circuit intégré sa trouve dans le périmètre de communication du lecteur. En effet, lorsqu'un circuit intégré sans contact se trouve à proximité du lecteur, la bobine d'antenne du circuit intégré interfère avec la bobine du lecteur (apparition d'une mutuelle inductance) ce qui désaccorde sensiblement le circuit d'antenne du lecteur. D'autre part, il est connu que l'amplitude du champ magnétique est aisée à surveiller par extraction dans la bobine d'antenne d'un signal d'enveloppe. Ainsi, l'idée de l'invention est d'émettre des impulsions de champ magnétique de courte durée, n'entraînant qu'une consommation de courant négligeable, et d'observer l'amplitude du signal d'enveloppe. Si à un instant donné, l'amplitude du signal d'enveloppe présente une variation supérieure à un seuil déterminé ou un affaiblissement déterminé, cela signifie, selon l'invention, qu'un circuit intégré sans contact vient de pénétrer dans le périmètre de communication du lecteur.

Ainsi, la présente invention prévoit un lecteur de circuit intégré sans contact comprenant une bobine d'antenne pour émettre un champ magnétique oscillant et

des moyens de détection de la présence d'un circuit intégré sans contact dans un périmètre de communication du lecteur sans réception d'un message d'identification, dans lequel les moyens de détection comprennent des moyens pour émettre des impulsions de champ magnétique de courte durée, des moyens pour extraire de la bobine d'antenne un signal d'enveloppe présentant des impulsions d'enveloppe correspondant aux impulsions de champ magnétique, et des moyens de surveillance de l'amplitude des impulsions d'enveloppe, agencés pour détecter une variation de l'amplitude des impulsions d'enveloppe représentative de l'entrée du circuit intégré sans contact dans le périmètre de communication du lecteur.

Selon un mode de réalisation, les moyens de surveillance comprennent des moyens pour comparer des variations d'amplitude des impulsions d'enveloppe à un seuil de variation déterminé, un circuit intégré sans contact étant présumé détecté lorsque l'amplitude des impulsions d'enveloppe présente une variation supérieure au seuil de variation déterminé.

Selon un mode de réalisation, les moyens de surveillance comprennent des moyens pour comparer l'amplitude des impulsions d'enveloppe supérieure à un seuil d'amplitude déterminé, un circuit intégré sans contact étant présumé détecté lorsque l'amplitude d'au moins une impulsion d'enveloppe devient inférieure au seuil d'amplitude déterminé.

Selon un mode de réalisation, les moyens de surveillance comprennent des moyens pour générer un signal de référence d'amplitude déterminée, et

- des moyens pour comparer l'amplitude des impulsions d'enveloppe au signal de référence.

Selon un mode de réalisation, les moyens pour générer le signal de référence comprennent des moyens pour générer une valeur d'amplitude numérique et un convertisseur analogique numérique pour transformer la

valeur d'amplitude numérique en un signal analogique formant le signal de référence.

Selon un mode de réalisation, le lecteur comprend des moyens pour ajuster l'amplitude du signal de référence en l'absence du circuit intégré sans contact à détecter.

Selon un mode de réalisation, les moyens pour ajuster l'amplitude du signal de référence sont agencés pour ajuster l'amplitude du signal de référence pendant l'émission d'impulsions de champ magnétique de courte durée.

Selon un mode de réalisation, les moyens pour ajuster l'amplitude du signal de référence sont agencés pour ajuster l'amplitude du signal de référence de manière que celle-ci soit sensiblement inférieure à celle des impulsions d'enveloppe.

Selon un mode de réalisation, les moyens pour générer le signal de référence comprennent un condensateur et des moyens pour charger le condensateur à partir des impulsions d'enveloppe.

Selon un mode de réalisation, le lecteur comprend un convertisseur analogique/numérique pour convertir les impulsions d'enveloppe en un signal d'amplitude numérique comprenant des valeurs d'amplitude représentatives de l'amplitude des impulsions d'enveloppe, et des moyens de surveillance du signal d'amplitude numérique.

Selon un mode de réalisation, les moyens de surveillance sont agencés pour comparer des variations du signal d'amplitude numérique à un seuil de variation numérique.

Selon un mode de réalisation, les moyens de surveillance sont agencés pour comparer le signal d'amplitude numérique à un seuil d'amplitude numérique.

Selon un mode de réalisation, les moyens de surveillance sont agencés pour ajuster le seuil de variation numérique ou le seuil d'amplitude numérique en l'absence du circuit intégré à détecter.

Selon un mode de réalisation, les moyens de surveillance sont agencés pour ajuster le seuil de variation d'amplitude numérique ou le seuil d'amplitude numérique en calculant une valeur moyenne de valeurs d'amplitude.

Selon un mode de réalisation, les moyens de surveillance sont agencés pour ajuster le seuil de variation d'amplitude numérique ou le seuil d'amplitude numérique pendant l'émission d'impulsions de champ magnétique de courte durée.

Selon un mode de réalisation, les moyens de surveillance sont agencés pour ajuster en temps réel le seuil de variation numérique ou le seuil d'amplitude numérique en utilisant les valeurs d'amplitude des impulsions d'enveloppe correspondant à N dernières impulsions de champ magnétique émises.

Selon un mode de réalisation, les moyens pour extraire le signal d'enveloppe forment une partie d'un circuit de réception de données du lecteur.

Selon un mode de réalisation, le lecteur présente un mode de veille active à faible consommation électrique dans lequel le lecteur émet continuellement des impulsions de champ magnétique de courte durée et détermine à chaque impulsion si le circuit intégré est détecté ou non.

Selon un mode de réalisation, une impulsion de champ magnétique de courte durée présente une durée inférieure à une salve de champ magnétique permettant au circuit intégré sans contact d'envoyer un message d'identification.

Selon un mode de réalisation, une impulsion de champ magnétique de courte durée présente une durée inférieure à 100 microsecondes.

La présente invention concerne également un procédé pour détecter la présence d'un circuit intégré sans contact dans un périmètre de communication d'un lecteur de circuit intégré sans contact, sans réception d'un

message d'identification, le lecteur comprenant une bobine d'antenne pour émettre un champ magnétique oscillant, comprenant les étapes consistant à émettre des impulsions de champ magnétique de courte durée, extraire de la bobine d'antenne un signal d'enveloppe présentant des impulsions d'enveloppe correspondant aux impulsions de champ magnétique, et surveiller l'amplitude des impulsions d'enveloppe pour détecter une variation de l'amplitude des impulsions d'enveloppe représentative de l'entrée du circuit intégré sans contact dans le périmètre de communication du lecteur.

Selon un mode de réalisation, un circuit intégré sans contact est présumé détecté lorsque l'amplitude des impulsions d'enveloppe présente une variation supérieure à un seuil de variation déterminé.

Selon un mode de réalisation, un circuit intégré sans contact est présumé détecté lorsque l'amplitude d'au moins une impulsion d'enveloppe devient inférieure à un seuil d'amplitude déterminé.

Selon un mode de réalisation, le procédé comprend les étapes suivantes : générer un signal de référence d'amplitude déterminée, et comparer l'amplitude des impulsions d'enveloppe au signal de référence.

Selon un mode de réalisation, le procédé comprend une étape d'ajustement de l'amplitude du signal de référence en l'absence du circuit intégré sans contact à détecter.

Selon un mode de réalisation, l'étape d'ajustement est faite pendant l'émission d'au moins une impulsion de champ magnétique de courte durée.

Selon un mode de réalisation, l'amplitude du signal de référence est ajustée de manière que celle-ci soit sensiblement inférieure à celle que présente le signal d'enveloppe.

Selon un mode de réalisation, le signal de référence est une tension prélevée sur une borne d'un condensateur chargé au moyen des impulsions d'enveloppe.

Selon un mode de réalisation, le signal de référence est généré par transformation, au moyen d'un convertisseur analogique numérique, d'une valeur d'amplitude numérique.

Selon un mode de réalisation, le procédé comprend les étapes consistant à convertir les impulsions d'enveloppe en un signal d'amplitude numérique comprenant des valeurs d'amplitude représentatives de l'amplitude des impulsions d'enveloppe, et surveiller le signal d'amplitude numérique en comparant des variations du signal d'amplitude numérique à un seuil de variation numérique ou en comparant le signal d'amplitude numérique à un seuil d'amplitude numérique.

Selon un mode de réalisation, le seuil de variation numérique ou le seuil d'amplitude numérique est ajusté en l'absence du circuit intégré à détecter.

Selon un mode de réalisation, l'ajustement du seuil de variation d'amplitude numérique ou du seuil d'amplitude numérique comprend le calcul d'une valeur moyenne de valeurs d'amplitude.

Selon un mode de réalisation, le seuil de variation d'amplitude numérique ou le seuil d'amplitude numérique est ajusté pendant l'émission d'impulsions de champ magnétique de courte durée.

Selon un mode de réalisation, le seuil de variation numérique ou le seuil d'amplitude numérique est ajusté en temps réel en utilisant les valeurs d'amplitude des impulsions d'enveloppe correspondant à N dernières impulsions de champ magnétique émises.

Selon un mode de réalisation, le procédé comprend l'émission continuelle d'impulsions de champ magnétique de courte durée pour la détection du circuit intégré.

Selon un mode de réalisation, une impulsion de champ magnétique de courte durée présente une durée inférieure à une salve de champ magnétique permettant au circuit intégré sans contact d'envoyer un message d'identification.

Selon un mode de réalisation, une impulsion de champ magnétique de courte durée présente une durée inférieure à 100 microsecondes.

Ces objets, caractéristiques et avantages ainsi que d'autres de la présente invention seront exposés plus en détail dans la description suivante du procédé de l'invention, d'un exemple de réalisation d'un lecteur selon l'invention, et de divers exemples de réalisation d'un circuit de surveillance selon l'invention, faite à titre non limitatif en relation avec les figures jointes parmi lesquelles :

- la figure 1 précédemment décrite représente schématiquement un lecteur de circuit intégré sans contact et un circuit intégré sans contact,
- la figure 2 précédemment décrite représente l'allure du champ magnétique émis par un lecteur lors de l'envoi d'une requête en identification,
- la figure 3 représente l'architecture générale d'un lecteur selon l'invention,
- la figure 4A représente des impulsions de champ magnétique émises par le lecteur, et la figure 4B représente le profil d'un signal d'enveloppe apparaissant lors de l'émission de ces impulsions,
- la figure 5 illustre un phénomène de mutuelle inductance sur lequel repose le procédé de l'invention,
- la figure 6 représente un premier mode de réalisation d'un circuit de surveillance selon l'invention,
- les figures 7A et 7B représentent des signaux électriques illustrant le fonctionnement du circuit de surveillance de la figure 6,
- la figure 8 représente un second mode de réalisation d'un circuit de surveillance selon l'invention,
- les figures 9A et 9B représentent des signaux électriques illustrant le fonctionnement du circuit de surveillance de la figure 8,
- la figure 10 représente un premier mode de réalisation d'un circuit de surveillance selon l'invention, et

- la figure 11 représente des signaux électriques illustrant exemple de mise en oeuvre du procédé de l'invention au moyen du circuit de la figure 10.

Le procédé selon l'invention sera décrit dans ce qui suit en relation avec un exemple d'architecture classique de lecteur de circuit intégré sans contact, représenté en figure 3 et décrit à titre d'exemple non limitatif de mise en œuvre de l'invention.

Le lecteur 10 représenté comprend un microprocesseur MP, une mémoire programme MEM, un circuit d'antenne 20, un circuit d'émission de données 30 et un circuit de réception de données 40.

Le circuit d'antenne 20 est accordé sur une fréquence de résonance déterminée, par exemple 13,56 MHz, et comprend une bobine d'antenne L1 connectée en parallèle avec un condensateur C1 pour former un circuit L1C1. Le circuit L1C1 présente une borne connectée à un nœud 21 et l'autre borne connectée à la masse. Le nœud 21 est connecté à une extrémité d'un condensateur C2 dont l'autre extrémité est connectée à la sortie du circuit d'émission de données 30. Le nœud 21 est également connecté à l'entrée du circuit de réception de données 40.

Le circuit d'émission de données 30 comprend un oscillateur OSC délivrant un signal de modulation primaire Smp oscillant à une fréquence porteuse Fc, ici 13,56 MHz, qui est appliqué sur une entrée d'un circuit modulateur MODC. Une autre entrée du circuit modulateur MODC est reliée à un port PT1 du microprocesseur pour recevoir des données DTx à émettre. Le circuit MODC délivre un signal de modulation d'amplitude Sm appliqué à l'entrée d'un amplificateur AMP1. La sortie de l'amplificateur AMP1 forme la sortie du circuit 30 et est connectée au condensateur C2 du circuit d'antenne.

Le circuit de réception de données 40 comprend en entrée une diode de redressement D1 dont l'anode est connectée au nœud 21 du circuit d'antenne et reçoit un

signal d'antenne. La cathode de la diode D1 est reliée à un filtre basse-bas F1 prévu pour éliminer la porteuse Fc présente dans le signal d'antenne redressé, le filtre F1 présentant par exemple une fréquence de coupure de 1 MHz pour une porteuse de 13,56 MHz. Sur la cathode de la diode D1 se trouve ainsi un signal d'enveloppe SE qui est appliqué à l'entrée d'un amplificateur AMP2 par l'intermédiaire d'un condensateur C3. La sortie de l'amplificateur AMP2 délivre des données DTr envoyées au lecteur par modulation de charge, et est reliée à un port PT2 du microprocesseur, chargé de décoder les données DTr. Un filtre F2, de type passe-bande ou passe-haut, peut être prévu à la sortie de l'amplificateur AMP2 pour supprimer une sous-porteuse de modulation de charge, quand le protocole de communication prévoit l'utilisation d'une telle sous-porteuse pour l'émission de données dans le sens circuit intégré sans contact vers lecteur.

Pour illustrer le fonctionnement du lecteur 10, qui est en soi bien connu de l'homme de l'art, la figure 3 représente en regard du lecteur un circuit intégré sans contact 5 équipé d'une bobine d'antenne L2, le circuit intégré se trouvant dans le périmètre de communication du lecteur. La bobine d'antenne 20 délivre un champ magnétique oscillant. Lorsque des données DTx doivent être envoyées au circuit intégré 5, le lecteur module l'amplitude du champ en fonction des données DTx, qui peuvent être codées. Lorsque des données DTr doivent être envoyées au lecteur par le circuit intégré 5, le circuit intégré court-circuite sa bobine L2 (court-circuit total ou partiel) au moyen d'un interrupteur SW, au rythme des données à émettre DTr (qui peuvent être combinées avec une sous-porteuse comme signalé plus haut). Les courts-circuits de bobine se répercutent par couplage inductif dans le circuit d'antenne 20 du lecteur, sous forme d'une modulation de charge entraînant une modulation de l'amplitude du signal d'antenne qui se retrouve dans le signal d'enveloppe SE.

Comme indiqué plus haut, l'attente d'un message d'identification en provenance du circuit intégré sans contact, avec ou sans envoi préalable d'une requête en identification, nécessite d'émettre le champ magnétique de façon permanente ou sous forme de salves d'une durée non négligeable.

Pour pallier cet inconvénient, la présente invention prévoit de programmer le lecteur 10 de sorte que celui-ci présente un mode de veille active dans lequel il émet des impulsions de champ magnétique de courte durée et surveille le signal d'enveloppe.

Pour fixer les idées, la figure 5A représente une suite d'impulsions de champ magnétique P1, P2, P3...P_{N-1}, P_N selon l'invention, et la figure 5B représente le profil du signal d'enveloppe SE pendant les périodes d'émission des impulsions. Le signal d'enveloppe SE recopie les impulsions P1 à P_N et présente ainsi lui-même des impulsions SE1, SE2...SE_{N-1}, SE_N, ou impulsions d'enveloppe.

Les impulsions de champ magnétique sont d'une durée Ti très inférieure à celle des salves classiques de champ magnétique, par exemple de l'ordre de 10 à 50 µs. Elles sont espacées les unes des autres d'une durée Ts nettement supérieure à leur durée propre, par exemple 200 ms. Ainsi, la consommation moyenne du circuit d'antenne est égale à la consommation que présente le circuit d'antenne pendant l'émission continue du champ magnétique divisée par le rapport Ts/Ti, soit une consommation réduite par un facteur de 2000 à 4000 pour des impulsions de 10 à 50 µs espacées de 200 ms. On constate en pratique que même des impulsions plus longues, par exemple de 100 µs, permettent d'obtenir une très faible consommation moyenne de courant et de conférer une grande autonomie à un lecteur alimenté par piles.

En l'absence du circuit intégré sans contact 5, les impulsions d'enveloppe SE1, SE2...SE_{N-1}, SE_N présentent

une amplitude V1 sensiblement constante. En présence du circuit intégré sans contact, les impulsions d'enveloppe présentent une amplitude V2 sensiblement inférieure à V1. Ceci est illustré sur les figures 4A et 4B, où l'on suppose que le circuit intégré sans contact 5 pénètre dans le périmètre de communication du lecteur entre l'impulsion P_{N-1} et l'impulsion P_N. L'amplitude du champ magnétique est sensiblement diminuée ainsi que, par conséquent, celle de l'impulsion d'enveloppe SE_N. Ce phénomène est dû à l'apparition d'une mutuelle inductance M entre la bobine L1 du lecteur et la bobine L2 du circuit intégré, comme illustré en figure 5. La bobine L1 devient égale à une inductance de valeur L1-M en série avec une inductance de valeur M, ce qui désaccorde légèrement le circuit d'antenne et affaiblit le champ magnétique.

Il doit être noté qu'une telle perturbation de l'amplitude du champ magnétique se produit également lorsqu'un deuxième circuit intégré sans contact apparaît dans le périmètre de communication, par rapport à l'amplitude que présente le signal d'antenne en présence d'un premier circuit intégré sans contact. Ainsi, bien que l'on considère dans ce qui suit le cas où un premier circuit intégré pénètre dans le périmètre de communication du lecteur, l'invention concerne tout aussi bien le cas ou un second circuit intégré pénètre dans le périmètre de communication, voire un troisième circuit intégré, etc..

Comme représenté en figure 3, le lecteur 10 est équipé d'un circuit de surveillance DETC présentant une sortie connectée à un port PT3 du microprocesseur et une entrée connectée à l'anode de la diode D1 du circuit 40 pour recevoir le signal d'enveloppe SE. L'entrée du circuit DETC pourrait toutefois être connecté à tout autre moyen d'extraction du signal d'enveloppe SE, par exemple une diode supplémentaire connectée au circuit

d'antenne 20, un capteur de courant agencé dans le circuit d'antenne, etc..

Trois exemples de réalisation du circuit DETC sont représentés sur les figures 6, 8 et 10 et sont respectivement référencés DETC1, DETC2, et DETC3.

Dans le mode de réalisation représenté en figure 6, le circuit DETC1 comprend un amplificateur différentiel DAMP agencé en comparateur, un condensateur C4 et une diode D2. L'amplificateur DAMP délivre un signal de détection DETS. Le condensateur C4 a sa cathode reliée à la masse et reçoit sur son anode, par l'intermédiaire de la diode D2, le signal d'enveloppe SE, diminué de quelques dixièmes de Volt en raison de la chute de tension dans la diode D2. L'amplificateur DAMP reçoit sur son entrée négative le signal d'enveloppe SE. Son entrée positive reçoit un signal de référence VREF prélevé sur l'anode du condensateur C2 et égal à la tension de charge du condensateur.

La figure 7A illustre l'aspect des signaux SE et VREF lors de l'émission des impulsions de champ magnétique P1, P2... P_{N-1}, P_N (fig. 4A). Le signal SE présente les impulsions SE1, SE2... SE_{N-1}, SE_N déjà illustrées en figure 4B, l'impulsion SE_N étant d'une amplitude V2 inférieure à l'amplitude V1 des impulsions SE1 à SE_{N-1} en raison de la présence de la bobine L2 du circuit intégré sans contact. Le condensateur se recharge à chaque nouvelle impulsion d'enveloppe et se décharge faiblement entre deux impulsions, de telle sorte que le signal VREF présente une valeur moyenne comprise entre V1 et V2. Lorsque l'impulsion SE_N d'amplitude V2 apparaît, le signal VREF est supérieur à l'amplitude V2 de sorte que le signal DETS est à 1 au lieu d'être à 0, comme représenté en figure 7B.

La mise en oeuvre du procédé de l'invention et du détecteur DETC1 implique une programmation correspondante du microprocesseur, au moyen d'un programme de gestion du mode de veille active chargé dans la mémoire programme

MEM. Cette opération de programmation étant en soi à la portée de l'homme de l'art, elle ne sera pas décrite. Il découle de ce qui précède que le microprocesseur doit observer le signal DETS sur le port PT3 pendant que sont émises les impulsions de champ magnétique P1 à P_N, ce qui définit des fenêtres W1, W2...W_{N-1}, W_N de surveillance du signal DETS. La valeur du signal DETS en dehors des fenêtres de surveillance n'est pas prise en compte et n'est pas significative, du fait que le signal d'enveloppe SE est nul.

Dans le mode de réalisation représenté en figure 8, le circuit de surveillance DETC2 comprend l'amplificateur différentiel DAMP agencé en comparateur et un convertisseur numérique-analogique DAC. L'amplificateur DAMP reçoit sur son entrée négative le signal d'enveloppe SE, sur son entrée positive le signal VREF, et délivre le signal de détection DETS. Le signal VREF est délivré ici par le convertisseur DAC qui reçoit en entrée un signal numérique DVREF délivré par des ports PT4 à PT_N du microprocesseur, via une liaison représentée en traits pointillés en figure 3, chaque port PT4 à PT_N délivrant un bit du signal DVREF. Le signal DVREF est une valeur d'amplitude numérique et l'amplitude du signal VREF est fonction de la valeur d'amplitude DVREF.

L'utilisation du circuit de surveillance DETC2 nécessite un ajustage préalable du signal VREF, comme illustré sur les figures 9A et 9B. La figure 9A illustre l'aspect des signaux SE et VREF pendant une phase d'ajustage PH1 suivie d'une phase de détection PH2, et la figure 9B représente le signal DETS. On considère dans cet exemple que le lecteur émet cinq impulsions de champ magnétique pendant la phase PH1, faisant apparaître cinq impulsions d'enveloppe SE1 à SE5. Le microprocesseur augmente progressivement, par incréments, la valeur d'amplitude DVREF jusqu'à ce que le signal VREF devienne supérieur au signal d'enveloppe SE et que le signal DETS passe à 1 dans l'une des cinq fenêtres de surveillance

W1, W2... W5 correspondant aux cinq impulsions d'enveloppe. Dans cet exemple, l'amplitude du signal VREF dépasse celle du signal d'enveloppe pendant l'impulsion d'enveloppe SE4 et le signal DETS passe à 1 dans la fenêtre de surveillance W4. Le microprocesseur diminue ensuite d'un incrément la valeur DVREF, de sorte qu'à l'impulsion suivante, ici l'impulsion SE5, le signal DETS est à 0 dans la fenêtre de surveillance W5. Le signal VREF est ainsi calibré avec une amplitude sensiblement inférieure à V1. La phase de détection PH2 commence à l'impulsion SE6. Lorsque apparaît l'impulsion SE_N d'amplitude V2 inférieure à V1, le signal VREF est supérieur à l'amplitude V2 de sorte que le signal DETS est à 1 dans la fenêtre de surveillance de rang N au lieu d'être à 0.

Comme précédemment, la mise en œuvre du procédé de l'invention implique une programmation correspondante du microprocesseur qui est en soi à la portée de l'homme de l'art.

Dans le mode de réalisation représenté en figure 10, le circuit de surveillance DECT3 comprend simplement un convertisseur analogique-numérique ADC et la surveillance proprement dite des impulsions d'enveloppe est assurée ici par le microprocesseur. Le convertisseur ADC reçoit ainsi en entrée le signal d'enveloppe SE et délivre une valeur d'amplitude numérique DSE qui est appliquée sur des ports du microprocesseur. La valeur DSE est par exemple codée sur 10 bits et appliqué sur dix ports PT3 à PT_N.

Ce mode de réalisation du procédé de l'invention comprend également une phase d'ajustage PH1, visant ici à calibrer un seuil numérique DTH permettant au microprocesseur de faire la distinction entre les amplitudes V1 et V2 des impulsions d'enveloppe.

Un exemple de phase PH1 est illustré sur la figure 11, qui représente l'aspect du signal SE. On considère comme précédemment que le lecteur émet cinq impulsions de

champ magnétique pendant la phase PH1, faisant apparaître cinq impulsions d'enveloppe SE1 à SE5. A chaque impulsion, le microprocesseur reçoit une valeur d'amplitude correspondante DSE, soit des valeurs DSE1, DSE2, DSE3, DSE4, DSE5, par exemple 128, 125, 127, 126 et 125. Au terme de la phase PH1, le microprocesseur calcule le seuil numérique DTH, par exemple en calculant la valeur moyenne DSEa des valeurs DSE1 à DSE5 (soit ici 126,2) et en lui appliquant un coefficient modérateur, par exemple 0,95. La phase de détection PH2 commence à l'impulsion SE6 et le microprocesseur compare la valeur d'amplitude de chaque impulsion d'enveloppe avec le seuil DTH. Lorsque apparaît l'impulsion d'enveloppe SE_N d'amplitude V2, la valeur d'amplitude correspondante DSE_N est inférieure au seuil DTH et le microprocesseur en déduit la présence d'un circuit intégré sans contact.

Comme précédemment, la mise en œuvre du procédé de l'invention implique une programmation du microprocesseur qui est en soi à la portée de l'homme de l'art.

Ce mode de réalisation du procédé de l'invention est susceptible de diverses variantes.

Selon une variante, le microprocesseur calcule la valeur moyenne DSEa des valeurs d'amplitude dans une fenêtre temporelle glissante comprenant les N dernières impulsions du signal d'enveloppe, par exemple les cinq dernières impulsions, et rafraîchit en permanence le seuil DTH. A chaque nouvelle impulsion, le microprocesseur compare la valeur d'amplitude DSEi de la dernière impulsion du signal d'enveloppe avec le seuil DTH. Si la nouvelle valeur d'amplitude DSEi n'est pas inférieure au seuil DTH, elle est incorporée dans la valeur moyenne DSEa et une nouvelle valeur du seuil DTH est calculée. Dans le cas contraire, le microprocesseur considère qu'un circuit intégré est détecté.

Selon une autre variante, le microprocesseur calcule à chaque nouvelle impulsion une variation d'amplitude ΔDSE égale à la différence entre la valeur

moyenne DSEa et la valeur d'amplitude DSEi de la dernière impulsion du signal d'enveloppe, soit ΔDSE = DSEa-DSEi, "i" étant un indice. La variation d'amplitude ΔDSE est comparée à un seuil prédéterminé DTHD, qui est ici un seuil différentiel, par exemple un pourcentage de la valeur moyenne DSEa. Si la variation ΔDSE est inférieure au seuil DTHD, elle n'est pas considérée comme significative et la nouvelle valeur d'amplitude DSEi est incorporée dans la valeur moyenne DSEa. Si au contraire la variation ΔDSE est supérieure au seuil DTHD, le microprocesseur considère qu'un circuit intégré est détecté.

D'autre part, il est envisageable de prendre en compte une hypothèse prévue par la demanderesse, selon laquelle l'apparition du circuit intégré sans contact dans le périmètre de communication du lecteur peut provoquer une augmentation temporaire de l'amplitude du signal d'enveloppe, suivie d'une diminution. Sous réserve d'essais plus approfondis, un tel phénomène pourrait se produire lorsqu'il existe une relation déterminée entre la fréquence propre du circuit d'antenne d'un circuit intégré sans contact et la fréquence propre du circuit d'antenne d'un lecteur.

Bien que ce cas puisse être considéré comme exceptionnel, il entre dans le cadre de la présente invention de prévoir à toutes fins utiles une détection des variation d'amplitude du signal d'enveloppe dans laquelle le signe des variations n'est pas pris en compte. Ceci implique encore une autre variante de réalisation du procédé décrit ci-dessus, dans laquelle on considère qu'un circuit intégré est détecté quand DSEi > DSEa, ce qui correspond à une variation ΔDSE négative si par définition ΔDSE = DSEa-DSEi, ou une variation ΔDSE positive si par définition ΔDSE = DSEi-DSEa.

En pratique, une surveillance du signal d'enveloppe ne portant que sur la valeur absolue de la variation ΔDSE

permet de prendre compte simultanément une augmentation ou une diminution de la valeur d'amplitude au-delà du seuil DTHD. Dans ce cas, un circuit intégré est présumé détecté quand l'amplitude du signal d'enveloppe baisse soudainement ou lorsqu'elle augmente brusquement.

Les circuits de détection décrits plus haut, faisant intervenir un comparateur, sont susceptibles de variantes correspondantes en utilisant par exemple deux comparateurs et deux signaux de référence VREF1, VREF2, l'un étant supérieur et l'autre inférieur à l'amplitude du signal d'enveloppe en l'absence du circuit intégré sans contact à détecter.

D'autre part, il convient de noter que le procédé selon l'invention permet de faire une "pré-détection" de circuit intégré plutôt qu'une détection complète et certaine comme le permet la réception d'un message d'identification. Un lecteur mettant en œuvre le procédé selon l'invention est en effet susceptible d'être induit en erreur par l'introduction d'un objet métallique dans le voisinage du lecteur, par exemple une pièce de monnaie, provoquant une diminution du signal d'enveloppe. C'est pourquoi, lorsqu'un circuit intégré est présumé détecté au moyen du procédé de l'invention, le lecteur s'en assure en envoyant ensuite une salve de champ magnétique permettant au circuit intégré sans contact d'envoyer un message d'identification, précédé ou non d'une requête en identification. La réception du message d'identification permet de confirmer ou non la présence du circuit intégré et le cas échéant d'engager une communication.

Enfin, bien que l'on ait indiqué au préambule que l'objectif de la présente invention était d'économiser la consommation de courant d'un lecteur ayant un système d'alimentation autonome, tel une batterie ou une pile, il va de soi que la présente invention peut être implémentée dans tout type de lecteur, y compris ceux qui sont alimentés par le secteur. De façon générale, un lecteur

selon l'invention peut être commercialisé avec, dans son programme d'exploitation, une option "gestion de mode de veille active" que l'utilisateur a le choix d'activer ou non en fonction de l'application visée.

REVENDICATIONS

1. Lecteur de circuit intégré sans contact comprenant une bobine d'antenne (L1) pour émettre un champ magnétique oscillant et des moyens de détection de la présence d'un circuit intégré sans contact (5) dans un périmètre de communication du lecteur sans réception d'un message d'identification, caractérisé en ce que les moyens de détection comprennent :
- des moyens (MP, L1) pour émettre des impulsions de champ magnétique ($P1-P_N$) de courte durée,
- des moyens (D1, F1) pour extraire de la bobine d'antenne un signal d'enveloppe (SE) présentant des impulsions d'enveloppe ($SE1-SE_N$) correspondant aux impulsions de champ magnétique, et
- des moyens (DETC, DAMP, ADC, DAC, MP) de surveillance de l'amplitude des impulsions d'enveloppe, agencés pour détecter une variation de l'amplitude des impulsions d'enveloppe représentative de l'entrée du circuit intégré sans contact dans le périmètre de communication du lecteur.

2. Lecteur selon la revendication 1, dans lequel les moyens de surveillance comprennent des moyens (DAC, MP) pour comparer des variations d'amplitude des impulsions d'enveloppe à un seuil de variation déterminé (DTHD), un circuit intégré sans contact étant présumé détecté lorsque l'amplitude des impulsions d'enveloppe présente une variation (ΔDSE) supérieure au seuil de variation déterminé.

3. Lecteur selon la revendication 1, dans lequel les moyens de surveillance comprennent des moyens (DAMP, ADC, MP) pour comparer l'amplitude des impulsions d'enveloppe supérieure à un seuil d'amplitude déterminé (VREF, DTH), un circuit intégré sans contact étant présumé détecté lorsque l'amplitude d'au moins une

impulsion d'enveloppe (SE_N) devient inférieure au seuil d'amplitude déterminé.

4. Lecteur selon la revendication 3, dans lequel les moyens de surveillance comprennent :
- des moyens (D2, C4, DAC) pour générer un signal de référence (VREF) d'amplitude déterminée, et
- des moyens (DAMP) pour comparer l'amplitude des impulsions d'enveloppe (SE1-SE_N) au signal de référence (VREF).

5. Lecteur selon la revendication 4, dans lequel les moyens pour générer le signal de référence comprennent des moyens (MP) pour générer une valeur d'amplitude numérique (DVREF) et un convertisseur analogique numérique (DAC) pour transformer la valeur d'amplitude numérique (DVREF) en un signal analogique formant le signal de référence (VREF).

6. Lecteur selon l'une des revendications 4 et 5, comprenant des moyens (DAC, MP) pour ajuster l'amplitude du signal de référence (VREF) en l'absence du circuit intégré sans contact à détecter.

7. Lecteur selon la revendication 6, dans lequel les moyens pour ajuster l'amplitude du signal de référence sont agencés pour ajuster l'amplitude du signal de référence pendant l'émission d'impulsions de champ magnétique de courte durée.

8. Lecteur selon l'une des revendications 6 et 7, dans lequel les moyens pour ajuster l'amplitude du signal de référence sont agencés pour ajuster l'amplitude du signal de référence de manière que celle-ci soit sensiblement inférieure à celle (V1) des impulsions d'enveloppe (SE1-SE5).

9. Lecteur selon la revendication 4, dans lequel les moyens pour générer le signal de référence comprennent un condensateur (C5) et des moyens (D2) pour charger le condensateur à partir des impulsions d'enveloppe.

10. Lecteur selon l'une des revendications 1 à 3, comprenant :
- un convertisseur analogique/numérique (ADC) pour convertir les impulsions d'enveloppe ($SE1-SE_N$) en un signal d'amplitude numérique (DSE) comprenant des valeurs d'amplitude ($DSE1-DSE_N$) représentatives de l'amplitude des impulsions d'enveloppe, et
- des moyens (MP) de surveillance du signal d'amplitude numérique.

11. Lecteur selon la revendication 10, dans lequel les moyens de surveillance (MP) sont agencés pour comparer des variations (ΔDSE) du signal d'amplitude numérique à un seuil de variation numérique (DTHD).

12. Lecteur selon la revendication 10, dans lequel les moyens de surveillance (MP) sont agencés pour comparer le signal d'amplitude numérique (DSE, $DSE1-DSE_N$) à un seuil d'amplitude numérique (DTH).

13. Lecteur selon l'une des revendications 11 et 12, dans lequel les moyens de surveillance sont agencés pour ajuster le seuil de variation numérique (DTHD) ou le seuil d'amplitude numérique (DTH) en l'absence du circuit intégré à détecter.

14. Lecteur selon la revendication 13, dans lequel les moyens de surveillance sont agencés pour ajuster le seuil de variation d'amplitude numérique (DTHD) ou le seuil d'amplitude numérique (DTH) en calculant une valeur moyenne de valeurs d'amplitude (DSE, $DSE1-DSE_N$).

15. Lecteur selon l'une des revendications 13 et 14, dans lequel les moyens de surveillance sont agencés pour ajuster le seuil de variation d'amplitude numérique (DTHD) ou le seuil d'amplitude numérique (DTH) pendant l'émission d'impulsions de champ magnétique de courte durée.

16. Lecteur selon la revendication 15, dans lequel les moyens de surveillance sont agencés pour ajuster en temps réel le seuil de variation numérique (DTHD) ou le seuil d'amplitude numérique (DTH) en utilisant les valeurs d'amplitude des impulsions d'enveloppe correspondant à N dernières impulsions de champ magnétique émises.

17. Lecteur selon l'une des revendications 1 à 16, dans lequel les moyens (D1, F1) pour extraire le signal d'enveloppe forment une partie d'un circuit de réception de données (40) du lecteur.

18. Lecteur selon l'une des revendications 1 à 17, présentant un mode de veille active à faible consommation électrique dans lequel le lecteur émet continuellement des impulsions de champ magnétique de courte durée et détermine à chaque impulsion si le circuit intégré est détecté ou non.

19. Lecteur selon l'une des revendications 1 à 18, dans lequel une impulsion de champ magnétique de courte durée présente une durée inférieure à une salve de champ magnétique permettant au circuit intégré sans contact d'envoyer un message d'identification.

20. Lecteur selon l'une des revendications 1 à 19, dans lequel une impulsion de champ magnétique de courte durée présente une durée inférieure à 100 microsecondes.

21. Procédé pour détecter la présence d'un circuit intégré sans contact dans un périmètre de communication d'un lecteur de circuit intégré sans contact, sans réception d'un message d'identification, le lecteur comprenant une bobine d'antenne pour émettre un champ magnétique oscillant, procédé caractérisé en ce qu'il comprend les étapes consistant à :
- émettre des impulsions de champ magnétique (P1-P_N) de courte durée,
- extraire de la bobine d'antenne un signal d'enveloppe (SE) présentant des impulsions d'enveloppe (SE1-SE_N) correspondant aux impulsions de champ magnétique, et
- surveiller l'amplitude des impulsions d'enveloppe, et détecter une variation de l'amplitude des impulsions d'enveloppe représentative de l'entrée du circuit intégré sans contact dans le périmètre de communication du lecteur.

22. Procédé selon la revendication 21, dans lequel un circuit intégré sans contact est présumé détecté lorsque l'amplitude des impulsions d'enveloppe présente une variation (ΔDSE) supérieure à un seuil de variation déterminé (DTHD).

23. Procédé selon la revendication 21, dans lequel un circuit intégré sans contact est présumé détecté lorsque l'amplitude d'au moins une impulsion d'enveloppe devient inférieure à un seuil d'amplitude déterminé (VREF, DTH).

24. Procédé selon la revendication 23, comprenant les étapes suivantes :
- générer un signal de référence (VREF) d'amplitude déterminée, et
- comparer l'amplitude des impulsions d'enveloppe (SE1-SE_N) au signal de référence (VREF).

25. Procédé selon la revendication 24, comprenant une étape d'ajustement de l'amplitude du signal de référence (VREF) en l'absence du circuit intégré sans contact à détecter.

26. Procédé selon la revendication 25, dans lequel l'étape d'ajustement est faite pendant l'émission d'au moins une impulsion de champ magnétique de courte durée.

27. Procédé selon l'une des revendications 25 et 26, dans lequel l'amplitude du signal de référence (VREF) est ajustée de manière que celle-ci soit sensiblement inférieure à celle que présente le signal d'enveloppe.

28. Procédé selon l'une des revendications 24 à 27, dans lequel le signal de référence (VREF) est une tension prélevée sur une borne d'un condensateur (C5) chargé au moyen des impulsions d'enveloppe.

29. Procédé selon l'une des revendications 24 à 27, dans lequel le signal de référence est généré par transformation, au moyen d'un convertisseur analogique numérique (DAC), d'une valeur d'amplitude numérique (DVREF).

30. Procédé selon la revendication 21, comprenant les étapes consistant à :
- convertir les impulsions d'enveloppe (SE1-SE_N) en un signal d'amplitude numérique (DSE) comprenant des valeurs d'amplitude (DSE1-DSE_N) représentatives de l'amplitude des impulsions d'enveloppe, et
- surveiller le signal d'amplitude numérique (DSE) en comparant des variations (ΔDSE) du signal d'amplitude numérique à un seuil de variation numérique (DTHD) ou en comparant le signal d'amplitude numérique (DSE, DSE1-DSE_N) à un seuil d'amplitude numérique (DTH).

31. Procédé selon la revendication 30, dans lequel le seuil de variation numérique (DTHD) ou le seuil d'amplitude numérique (DTH) est ajusté en l'absence du circuit intégré à détecter.

32. Procédé selon la revendication 31, dans lequel l'ajustement du seuil de variation d'amplitude numérique (DTHD) ou du seuil d'amplitude numérique (DTH) comprend le calcul d'une valeur moyenne de valeurs d'amplitude (DSE, DSE1-DSE_N).

33. Procédé selon l'une des revendications 31 et 32, dans lequel le seuil de variation d'amplitude numérique (DTHD) ou le seuil d'amplitude numérique (DTH) est ajusté pendant l'émission d'impulsions de champ magnétique de courte durée.

34. Procédé selon la revendication 33, dans lequel le seuil de variation numérique (DTHD) ou le seuil d'amplitude numérique (DTH) est ajusté en temps réel en utilisant les valeurs d'amplitude des impulsions d'enveloppe correspondant à N dernières impulsions de champ magnétique émises.

35. Procédé selon l'une des revendications 21 à 34, comprenant l'émission continuelle d'impulsions de champ magnétique de courte durée pour la détection du circuit intégré.

36. Procédé selon l'une des revendications 21 à 35, dans lequel une impulsion de champ magnétique de courte durée présente une durée inférieure à une salve de champ magnétique permettant au circuit intégré sans contact d'envoyer un message d'identification.

37. Procédé selon l'une des revendications 21 à 36, dans lequel une impulsion de champ magnétique de courte durée présente une durée inférieure à 100 microsecondes.

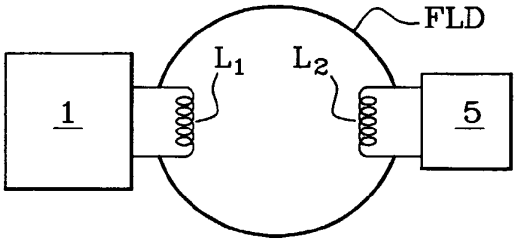

Fig. 1

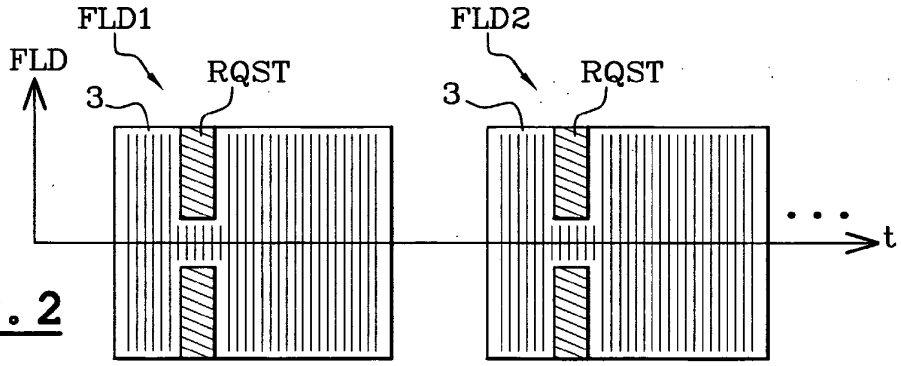

Fig. 2

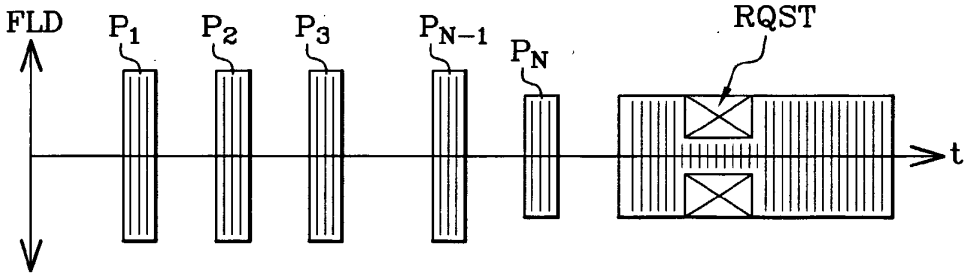

Fig. 4A

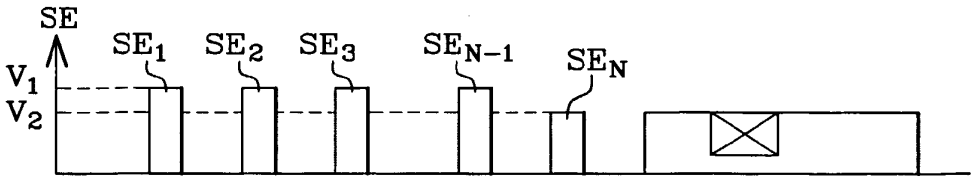

Fig. 4B

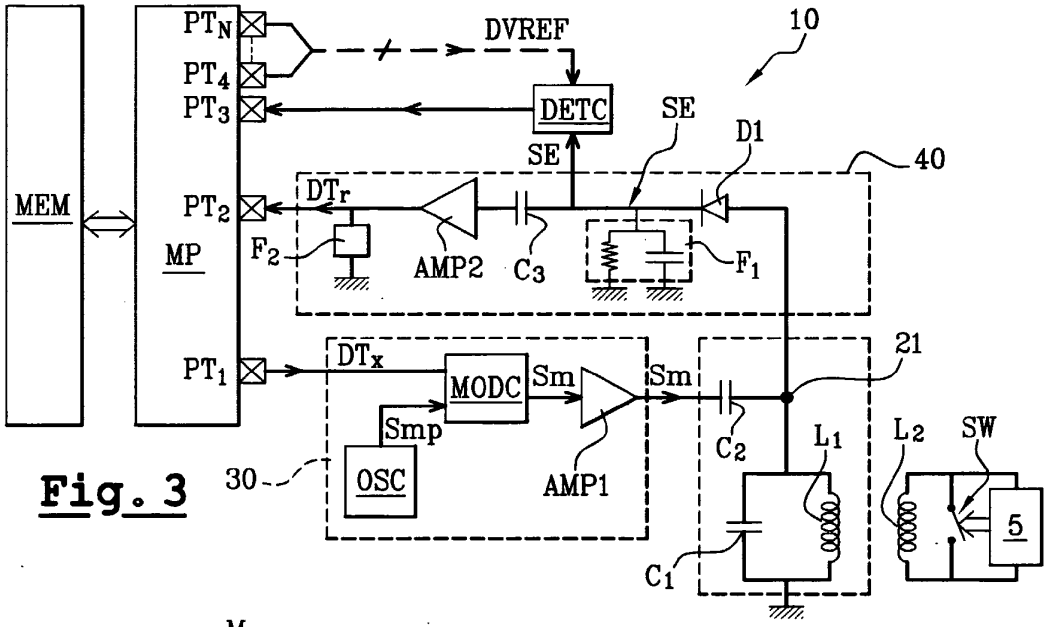

Fig. 3

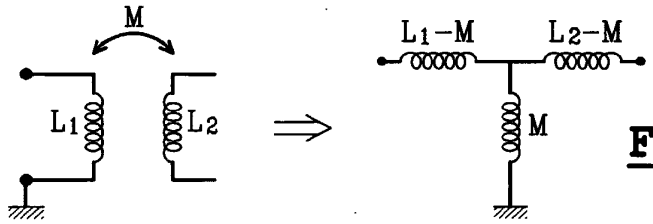

Fig. 5

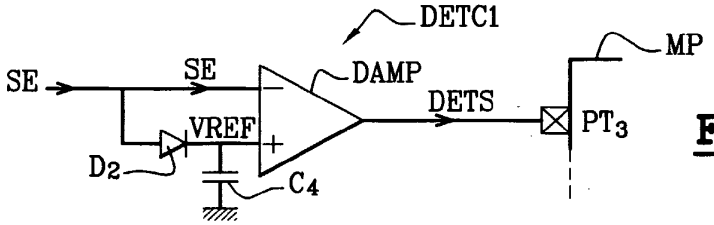

Fig. 6

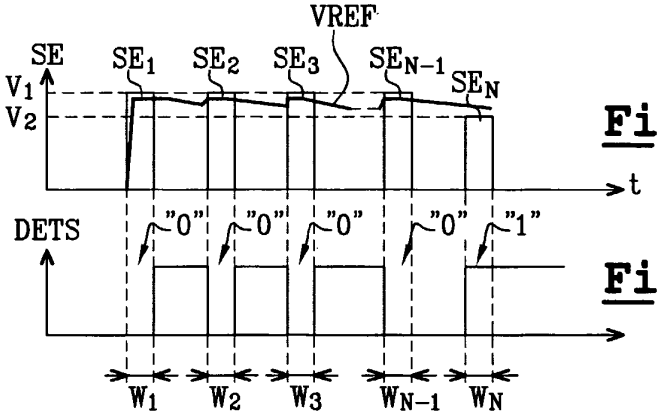

Fig. 7A

Fig. 7B

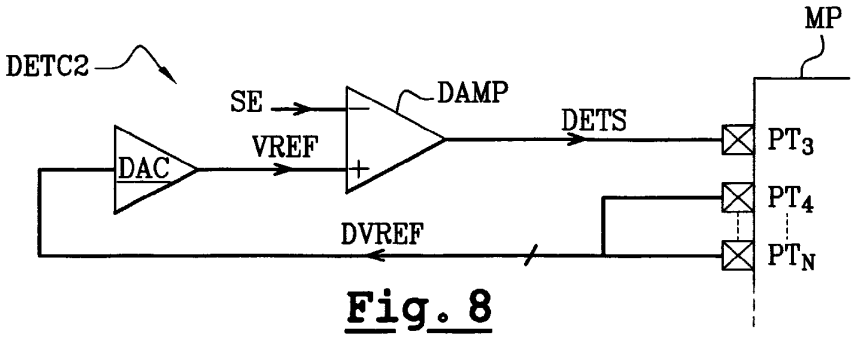

Fig. 8

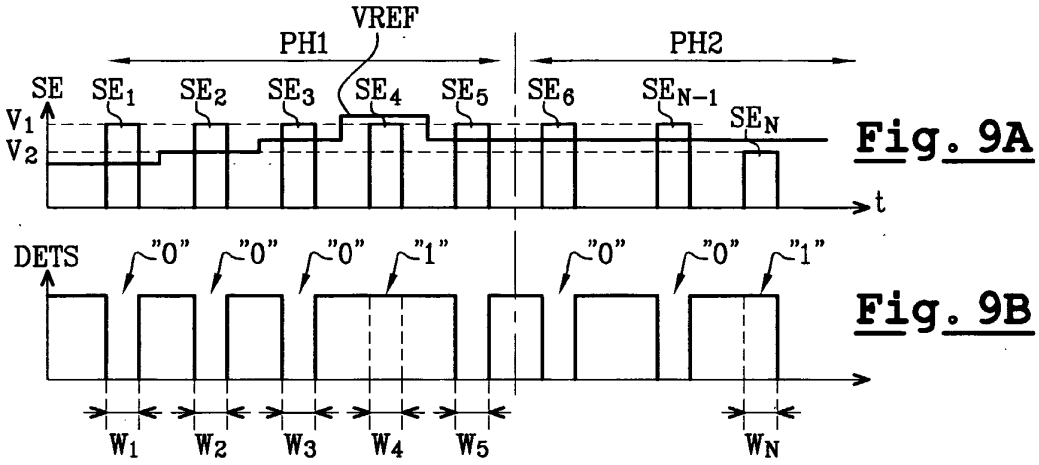

Fig. 9A

Fig. 9B

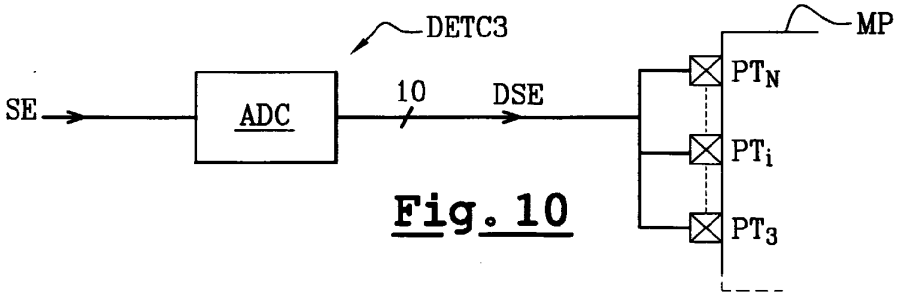

Fig. 10

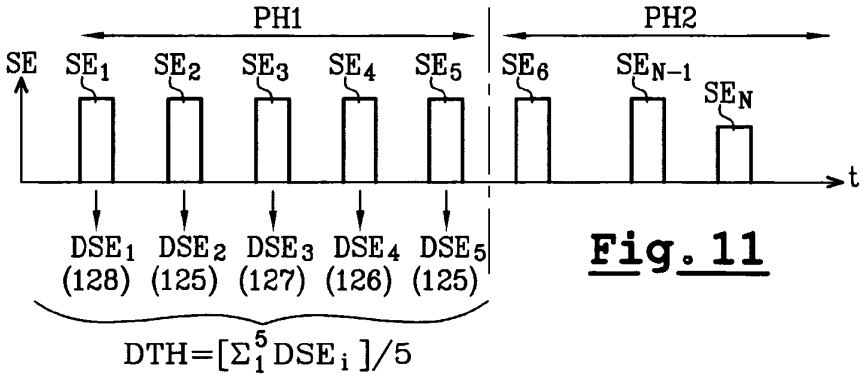

Fig. 11

INTERNATIONAL SEARCH REPORT

International Application No
PCT/FR 02/04361

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06K7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, IBM-TDB, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 391 559 A (AVERY LTD W & T) 10 October 1990 (1990-10-10) column 1, line 43 -column 2, line 5 column 3, line 13 -column 4, line 20; figure 1	1-5, 9-12, 17-24, 28-30, 35-37
A	FR 2 780 585 A (MANNESCHI ALESSANDRO) 31 December 1999 (1999-12-31) claims 1-3	1,21

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 April 2003	22/04/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Chiarizia, S

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/FR 02/04361

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0391559 A	10-10-1990	GB 2229845 A ,B	03-10-1990
		US 5352877 A	04-10-1994
		DE 69012392 D1	20-10-1994
		DE 69012392 T2	16-02-1995
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FR 2780585 A	31-12-1999	IT AR980020 A1	30-12-1999
		DE 19930132 A1	05-01-2000
		ES 2150873 A1	01-12-2000
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		GB 2339115 A	12-01-2000
		US 2002089429 A1	11-07-2002

Form PCT/ISA/210 (patent family annex) (July 1992)

RAPPORT DE RECHERCHE INTERNATIONALE

De[redacted]de Internationale No
PCT/FR 02/04361

A. CLASSEMENT DE L'OBJET DE LA DEMANDE
CIB 7 G06K7/00

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B. DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification suivi des symboles de classement)
CIB 7 G06K

Documentation consultée autre que la documentation minimale dans la mesure où ces documents relèvent des domaines sur lesquels a porté la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données, et si réalisable, termes de recherche utilisés)
EPO-Internal, WPI Data, PAJ, IBM-TDB, INSPEC

C. DOCUMENTS CONSIDERES COMME PERTINENTS

Catégorie °	Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents	no. des revendications visées
X	EP 0 391 559 A (AVERY LTD W & T) 10 octobre 1990 (1990-10-10) colonne 1, ligne 43 -colonne 2, ligne 5 colonne 3, ligne 13 -colonne 4, ligne 20; figure 1 ---	1-5, 9-12, 17-24, 28-30, 35-37
A	FR 2 780 585 A (MANNESCHI ALESSANDRO) 31 décembre 1999 (1999-12-31) revendications 1-3 -----	1,21

☐ Voir la suite du cadre C pour la fin de la liste des documents

☒ Les documents de familles de brevets sont indiqués en annexe

° Catégories spéciales de documents cités:

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"T" document ultérieur publié après la date de dépôt international ou la date de priorité et n'appartenenant pas à l'état de la technique pertinent, mais cité pour comprendre le principe ou la théorie constituant la base de l'invention

"X" document particulièrement pertinent; l'inven tion revendiquée ne peut être considérée comme nouvelle ou comme impliquant une activité inventive par rapport au document considéré isolément

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"&" document qui fait partie de la même famille de brevets

Date à laquelle la recherche internationale a été effectivement achevée	Date d'expédition du présent rapport de recherche internationale
9 avril 2003	22/04/2003

Nom et adresse postale de l'administration chargée de la recherche internationale	Fonctionnaire autorisé
Office Européen des Brevets, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Chiarizia, S

Formulaire PCT/ISA/210 (deuxième feuille) (juillet 1992)

RAPPORT DE RECHERCHE INTERNATIONALE

Renseignements relatifs aux membres de familles de brevets

De[illegible]de internationale No
PCT/FR 02/04361

Document brevet cité au rapport de recherche		Date de publication	Membre(s) de la famille de brevet(s)		Date de publication
EP 0391559	A	10-10-1990	GB	2229845 A ,B	03-10-1990
			US	5352877 A	04-10-1994
			DE	69012392 D1	20-10-1994
			DE	69012392 T2	16-02-1995
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			GB	2339115 A	12-01-2000
			US	2002089429 A1	11-07-2002

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S41	2	10/504779.app.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:02
S42	2	("6150948" | "6703920").PN. OR ("7209014").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:02
S43	76	("4240064" | "4847485" | "5682032" | "6040773").PN. OR ("6150948").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:06
S44	1	"10565732"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S45	11	("20050156752" | "5287112" | "5319569" | "5489908" | "5491715" | "5790946" | "6317027" | "6353406" | "6593845" | "6894572" | "7209014").PN.	US-PGPUB; USPAT	OR	ON	2011/04/04 09:16
S46	2	("6150948" | "6703920").PN. OR ("7209014").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S47	59	("3713148" | "4201960" | "4356477" | "4480178" | "5025492" | "5053774" | "5270717" | "5347280" | "5353011" | "5374930" | "5396251" | "5491484" | "5491715" | "5541604" | "5568512" | "5583819" | "5815355" | "5856809").PN. OR ("6317027").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S48	125	("4333072" | "5041826" | "5053774" | "5430447" | "5438335").PN. OR ("5489908").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S49	10	arisawa.in. and (data adj carrier)	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S50	339	(frequency with chang$4) with detect $4 same (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S51	211	(frequency with chang$4) with detect $4 with (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S52	1	(frequency with chang$4) with detect $4 same (interrogator or reader) with (wak$3 adj up or wakeup)	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S53	1	(frequency with chang$4) with detect $4 same (interrogator or reader) with (search$4 or query or discover)	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S54	20	(frequency with chang$4) with detect $4 same (search$4 or query or discover $3) adj (mode or state)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16

S55	87	(multi adj (protocol or frequency) with (tag or transponder)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S56	1131	(interrogator or reader) with (wak$3 adj up or wakeup)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S57	92	((interrogator or reader) with (wak$3 adj up or wakeup)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S58	21	("3976974" | "4645914" | "4730188" | "4783823" | "4837822" | "5099113" | "5198643" | "5305459" | "5437174" | "5473236" | "5796827" | "5902998" | "5977878" | "6011320" | "6084524" | "6178259").PN. OR ("6535136").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S59	2	11/370482.app.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S60	7	("6202927" | "6476708" | "6535136" | "6905074").PN. OR ("7245222").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S61	6	("5352877").PN. OR ("6905074").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S62	5	("6202927" | "6476708" | "6535136" | "6905074" | "7016647").PN. OR ("7598872").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/04 09:16
S65	0	(mutual adj induction) and (de$1tun$3 near5 (antenna or coil)) same (chang $4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S66	210	(de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S67	105	S66 and (RFID or tag or transonder or contactless or data adj carrier)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S68	3	"6703920".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S69	103	(measur$3 or monitor$3) with frequency near2 coil same switch$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16

S70	281	(measur$3 or monitor$3) near5 frequency with coil same switch$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S71	52	(measur$3 or monitor$3) near5 frequency with coil same switch$3 and proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S72	6993	340/10.1-10.6.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S73	1457	455/41.1,106.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S74	8290	S72 or S73	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S75	718	S74 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S76	49	S74 and (measur$3 or monitor$3) near5 (frequency or voltage or impedence or resistance) with coil	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S77	507	S75 and ((radio or RF$2) near2 tag or transponder)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S78	40	S75 and ((radio or RF$2) near2 tag or transponder or reader or interrogator) and NFC	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/04 09:16
S79	7059	340/10.1-10.6.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:44
S80	1474	455/41.1,106.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:44

S81	8370	S79 or S80	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:44
S82	725	S81 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:44
S85	609	S79 and (measur$3 or monitor$3) near5 (frequency or impedence)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:49
S86	1357	340/539.23,686.6,658,13.2.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:51
S87	410	S86 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:52
S89	44	S87 and (measur$3 or monitor$3) near5 (frequency or impedance)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 15:54
S90	11	("4219740" | "4613830" | "5337353" | "5418860" | "5760688").PN. OR ("6545612").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:02
S91	1	"6507189".pn.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:07
S92	45	("2531807" | "3205323" | "3502966" | "3643155" | "3743853" | "3956693" | "4117401" | "4140971" | "4387339" | "4553040" | "4556859" | "4587486" | "4618823" | "4652820" | "4719362" | "4853575" | "4857841" | "4868498" | "4879531" | "4924180" | "4994738" | "5012206" | "5014006" | "5229715" | "5278496" | "5336997" | "5351004" | "5507089" | "5712621" | "5767672" | "5801340" | "5801530" | "6002251" | "RE30012").PN. OR ("6507189").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:08
S93	28	("2983852" | "3469204" | "3601620" | "3601691" | "3732503" | "3743853" | "3747010" | "3764819" | "3872398" | "4323847" | "4419646").PN. OR ("4553040").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:17
S94	23	("4879531").PN. OR ("5012206").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:21

S95	160	S86 and (measur$3 or monitor$3) near5 (frequency or impedance)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 16:27
S96	82	S92 S93 S94	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 16:27
S98	105	S95 and communicat$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/04/21 16:28
S100	6	("5352877").PN. OR ("6905074").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:44
S101	5	("6202927" | "6476708" | "6535136" | "6905074" | "7016647").PN. OR ("7598872").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:46
S102	28	("4870419" | "4899036" | "5164732" | "5235326").PN. OR ("5352877").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:51
S103	7	("6202927" | "6476708" | "6535136" | "6905074").PN. OR ("7245222").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:58
S104	18	("20040134994" | "20040256460" | "20050237198" | "20060241396" | "20070008140" | "20070164122" | "20090061768" | "6150948" | "6834251" | "6889905" | "6952167" | "7245222" | "7280045" | "7290715" | "7290718" | "7432809" | "7541930" | "7555616").PN. OR ("7652578").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/04/21 16:59
S105	4009	340/10.1.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/17 13:59
S106	119	S105 and (frequency or impedance or capacitance) with (chang$4 or monitor $4) same coil	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/17 14:01
S107	1813	(frequency or impedance or capacitance) with (chang$4 or monitor $4) same coil and proximity with (sens $3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/19 12:55
S108	484	(frequency or impedance or capacitance) with (chang$4 or monitor $4) same coil same proximity with (sens $3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/19 12:56
S109	5902	("near" adj field) near2 communicat$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/19 13:01

S110	8	S108 and S109	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/19 13:01
S111	18	("20040134994" | "20040256460" | "20050237198" | "20060241396" | "20070008140" | "20070164122" | "20090061768" | "6150948" | "6834251" | "6889905" | "6952167" | "7245222" | "7280045" | "7290715" | "7290718" | "7432809" | "7541930" | "7555616").PN. OR ("7652578").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/05/19 13:06
S112	78	("4240064" | "4847485" | "5682032" | "6040773").PN. OR ("6150948").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/05/19 13:15
S113	6	("5352877").PN. OR ("6905074").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/05/19 14:33
S114	18	("20050083180" | "20050258940" | "3859624" | "4471343" | "4525686" | "4730188" | "4752776" | "5347263" | "5523746" | "5541574" | "5973611" | "6340932" | "6476708" | "6650227" | "6905074" | "7180403" | "7245222" | "7439862").PN. OR ("7782209").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2011/05/19 14:37
S116	294	(frequency or impedance) near8 (chang$4 or monitor$4) with coil same proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/19 14:42
S117	18	(RFID or RF near2 tag or transponder or NFC or "near" adj field) and S116	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/19 14:44
S118	1	11/015518.app.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/20 08:37
S119	85	("20010029430" | "20020053909" | "20020058517" | "20030003864" | "20030044033" | "20030048920" | "20030059076" | "20030076974" | "20030152243" | "20030223592" | "20040100358" | "20040214598" | "20040240692" | "20040258261" | "20050006466" | "20050111680" | "20050111681" | "20050111682" | "20050113060" | "20050113060" | "20050125570" | "20050134213" | "20050135644" | "20050209657" | "20050244022" | "20050244022" | "20060009156" | "20060013420" | "20060025172" | "20060025172" | "20060050906" | "20060269088" | "20070052595" | "20070063895" | "20070230728" | "20070285248" | "20080113694" | "20090227288" | "3601550" | "4596899" | "5568516" |	US-PGPUB; USPAT	OR	ON	2011/05/20 08:38

		"5740257" | "5774791" | "5787154" | "5835610" | "5861822" | "6075491" | "6092422" | "6104913" | "6154422" | "6307945" | "6381308" | "6587568" | "6636146" | "6690169" | "6694034" | "6763116" | "6801044" | "6813481" | "6879695" | "6931140" | "6951305" | "6951305" | "6958684" | "7010132" | "7034660" | "7058191" | "7099486" | "7106870" | "7127078" | "7167571" | "7171167" | "7177436" | "7206426" | "7224815" | "7242777" | "7245730" | "7256695" | "7260234" | "7274292" | "7274292" | "7319396" | "7336796" | "7356153" | "7366466" | "7426279" | "7512383" | "7515881" | "7522740" | "7551942").PN.				
S120	112	(sweep$4 with frequency) same coil and (sens$4 or detect$4) with proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/20 11:09
S121	36	(voltage and impedance) with (alter$4 or chang$4) same coil same (sens$4 or detect$4) with proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2011/05/20 11:16

EAST Search History (Interference)

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5/20/2011 12:56:54 PM
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun	2612

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/07/2009	12/31/2009	08/12/2010	05/20/2011					
	1	✓	✓	✓	✓					
	2	✓	✓	✓	✓					
	3	✓	✓	✓	✓					
	4	✓	✓	✓	✓					
	5	✓	✓	✓	✓					
	6	✓	✓	✓	✓					
	7	✓	✓	✓	✓					
	8	✓	✓	✓	✓					
	9	✓	✓	✓	✓					
	10	✓	✓	✓	✓					
	11	✓	✓	✓	✓					
	12	✓	✓	✓	✓					
	13	✓	✓	✓	✓					
	14	✓	✓	✓	✓					
	15	✓	✓	✓	✓					
	16	✓	✓	✓	✓					
	17				✓					

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	10/565,732	Filing Date	2006-06-30	Docket Number (if applicable)	FINK3001/JJC/BEL	Art Unit	2612
First Named Inventor	Klaus FINKENZELLER			Examiner Name	Tun, Nay		

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

SUBMISSION REQUIRED UNDER 37 CFR 1.114

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months _____
(Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

☐ Other _____

FEES

☒ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 020200

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Signature of Registered U.S. Patent Practitioner			
Signature	/Justin J. Cassell/	Date (YYYY-MM-DD)	2010-11-15
Name	JUSTIN J. CASSELL	Registration Number	46205

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	10/565,732	Confirm. No.:	1969
Filing Date:	June 30, 2006	Examiner:	Tun, Nay
First Inventor:	Klaus Finkenzeller	Art Unit:	2612
Attorney No.:	FINK3001/JJC/BEL	Customer No.:	23364
For:	COMMUNICATION APPARATUS FOR SETTING UP A CONNECTION BETWEEN INTELLIGENT DEVICES		

REPLY TO OFFICE ACTION
OF AUGUST 16, 2010

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This is responsive to the outstanding Office action dated August 16, 2010 in the above-identified application.

A Request for Continued Examination and appropriate fee are concurrently filed herewith.

In view of the following amendments and remarks, reconsideration of the application is respectfully requested.

AMENDMENT

In the Claims

The claims are amended as shown on the following pages under the heading AMENDMENT TO THE CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A communication apparatus for setting up a data connection between intelligent devices, comprising:

a transmission oscillator for carrying out a contactless data exchange, said oscillator including a coil;

a communication element which is connected to the coil and to a data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device,

a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property, the monitored property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance,

and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device.

2. (Previously Presented) The communication apparatus according to claim 1, including an assembly that is switchable to the transmission oscillator via a switch, said assembly causing an increase in the bandwidth of the oscillating circuit.

3. (Previously Presented) The communication apparatus according to claim 2, wherein the assembly is a resistive element.

4. (Previously Presented) The communication apparatus according to claim 1, including an assembly switchable to the transmission oscillator via a switch, said assembly causing a change in the resonant frequency of the transmission oscillator.

5. (Previously Presented) The communication apparatus according to claim 4, wherein the assembly is arranged to enable a reduction in the resonant frequency.

6. (Previously Presented) The communication apparatus according to claim 4, wherein the assembly comprises a capacitor.

7. (Previously Presented) The communication apparatus according to claim 1, wherein the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

8. (Previously Presented) The communication apparatus according to claim 1, wherein the switching apparatus has a time controller for cyclically switching the measuring device on and off.

9. (Previously Presented) The communication apparatus according to claim 8, wherein the time controller keeps the on state of the measuring device shorter than the off state.

10. (Previously Presented) The communication apparatus according to claim 8, wherein the measuring device stores a measuring value obtained during a cyclical on phase.

11. (Previously Presented) The communication apparatus according to claim 10, wherein the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases.

12. (Previously Presented) The communication apparatus according to claim 8, wherein, when the intelligent device is switched on, the communication element is initially on and the measuring device off.

13. (Previously Presented) The communication apparatus according to claim 1, wherein the measuring device has a first oscillator device coupled at least temporarily with the coil, for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal.

14. (Previously Presented) The communication apparatus according to claim 13, wherein the measuring device has circuit components for producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom.

15. (Currently Amended) A method for switching on a communication element configured to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil, comprising the following steps:

monitoring a parameter of the transmission oscillator by means of a measuring device, wherein the parameter of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance,

producing a control signal upon the occurrence of a change in the monitored property,

switching on the communication element by a switching apparatus in response to the control signal.

16. (Previously Presented) The method according to claim 15, wherein the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

17. (New) The communication apparatus according to claim 1, including an assembly switchable to the transmission oscillator via a switch, said assembly causing a change in the resonant frequency of the transmission oscillator, when the measuring device has ascertained a change of the monitored property and outputted a control signal.

REMARKS

Reconsideration of the pending application is respectfully requested in view of the following observations.

1. In the claims

Claims 1 and 15 have been amended, and claim 17 is new.

Claims 1 and 15 have been amended to clarify that the monitored property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance. Support for this amendment may be found at least in paragraph [0045] of the Specification.

New claim 17 recites an assembly switchable to the transmission oscillator via a switch, said assembly causing a change in the resonant frequency of the transmission oscillator, when the measuring device has ascertained a change of the monitored property and outputted a control signal. Support for claim 17 may be found at least in paragraphs [0030], [0033], [0035], and [0046].

The claims are now considered to be placed in condition for allowance.

No new matter is introduced via the amendment to the claims.

Entry of the amendment to the claims is kindly requested.

2. Rejection of claims 1-6, 8-12, and 15 under 35 USC 103(a) as being unpatentable over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*)

Reconsideration of the rejection is respectfully requested in view of the amendment to the claims and the following observations.

Amended claim 1 recites a communication apparatus for setting up a data connection between intelligent devices comprising a transmission oscillator, a communication element, a measuring device, and a switching apparatus. The transmission oscillator includes a coil, and the communication element is connected to the coil and to a data processing component of an intelligent device. The communication element emits search signals via the coil to receive a response from another intelligent device. The measuring device monitors a property of the transmission oscillator and outputs a control signal when ascertaining a change of the monitored property, where the monitored property includes the frequency or impedance of the transmission oscillator in resonance. The switching apparatus is connected to the

measuring device and the communication element. The switching apparatus switches on the communication element when it has received a control signal from the measuring device.

It is submitted that the proposed combination of *Schuermann* and *Charrat* fails to teach or suggest all of the features of amended claim 1. Specifically, the proposed combination does not teach or suggest the measuring device monitoring a property of the transmission oscillator including the frequency or impedance of the transmission oscillator in resonance and the switching apparatus switching on the communication element when it has received a control signal from the measuring device as required by amended claim 1.

Schuermann is directed to a transponder which communicates with an interrogator. The transponder has a resonant circuit (34) which is tuned to a specific frequency to receive energy and comprises a parallel combination of a coil (36) and a capacitor (38) (see col. 4, lines 52-55). The Office Action acknowledges that *Schuermann* does not disclose the measuring device and the switching apparatus as claimed in claim 1, and *Charrat* is relied on for the disclosure of the measuring device and the switching apparatus.

Charrat monitors the amplitude of envelope pulses to determine the presence of a contactless integrated circuit. When a contactless integrated circuit (5) is not present, the envelope pulses (SE1, SE2…SE_N) have a substantially constant amplitude (V1) (see col. 7, lines 39-41). When a contactless integrated circuit (5) is present, the amplitudes of the envelope pulses have an amplitude (V2) that is substantially lower than the amplitude V1 (see col. 7, lines 41-43). The mutual inductance (M) of the coil (L1) of the reader and the coil (L2) of the integrated circuit causes an attenuation of the magnetic field (see col. 7, lines 51-54). Since the magnetic field is attenuated, the amplitude (V2) of the envelope pulse is also substantially reduced.

Charrat does not disclose that the frequency or impedance of the coil of the transmission oscillator is being monitored in resonance as required by amended claim 1.

First, *Charrat* is silent as to the specific frequency or impedance of the coil (L1, L2) while operating in resonance. *Charrat* discusses only the effect of the presence of the contactless integrated circuit (5) on the inductance of the coil which is not the frequency or impedance of the coil. *Charrat* focuses only on monitoring the amplitude of the envelope pulses.

Second, *Charrat* does not disclose that the monitored property is a property of the transmission oscillator. Amended claim 1 has specified that the property of the transmission oscillator includes the frequency or impedance of the transmission oscillator in resonance. The amplitude of the envelope pulse cannot be considered to be a property of the coil. The amplitude of the envelope pulse in *Charrat* is not linked to the frequency or impedance of the coil such that it would cause the frequency or impedance of the coil to be monitored. *Charrat* specifically discloses that the change in the amplitude of the envelope pulse is caused by the attenuation of the magnetic field which is caused by the mutual inductance of two coils (L1, L2). None of the properties in this chain can be considered to be the frequency or impedance of the coil. Moreover, *Charrat* does not disclose that the mutual inductance of the coil is being directly monitored only that the amplitude of the envelope pulse is monitored which is a property of the envelope pulse signal. Thus, *Charrat* fails to teach or suggest the monitored property of the transmission oscillator including the frequency or impedance of the transmission oscillator in resonance.

It is further submitted that *Charrat* does not disclose a switching apparatus as required by amended claim 1. The switching apparatus of amended claim 1 switches on the communication element based on a control signal from the measuring device. While *Charrat* discloses that the embodiments have been described with features to save on the current consumption of the reader (see col. 11, lines 7-12), *Charrat* does not explicitly disclose switching on the communication element based on measuring a property of the transmission oscillator, and if a change has occurred, switching on the communication element so that the communication element can emit search signals to another intelligent device.

Accordingly, the proposed combination of *Schuermann* and *Charrat* fails to teach or suggest all of the features of amended claim 1.

Amended claim 15 contains similar features to amended claim 1 and is allowable at least for the reasons discussed above. Moreover, claims 2-6 and 8-12 depend from claim 1 and are likewise allowable for the reasons above in view of their dependency from claim 1 and their individually recited features.

New claim 17 depends from claim 1 and is allowable at least for the reasons discussed in view of claim 1. Claim 17 is further allowable for the reasons below.

Claim 17 recites an assembly switchable to the transmission oscillator via a switch, the assembly causing a change in the resonant frequency of the transmission oscillator, when

the measuring device has ascertained a change of the monitored property and outputted a control signal. In the instant application, connecting the capacitor and/or the resistor after the communication element has been turned on ensures that other intelligent devices designed for automatic data connection setup in the same way are not disturbed by a search mode (see Specification, paragraph [0008]).

The proposed combination of *Schuermann* and *Charrat* does not teach or suggest using the switchable assembly to cause a change in the resonant frequency of the transmission oscillator when the measuring device has ascertained a change of the monitored property and outputted a control signal.

First, *Schuermann* in combination with *Charrat* does not disclose the switching assembly causing a change in the resonant frequency of the transmission oscillator in response to a signal from the measuring device.

Schuermann discloses connecting capacitor (52) in parallel with tuned circuit (28) to form a new turned circuit (29) with a new, lower resonant frequency (f_2) (see col. 5, lines 13-15). Switch (50) is opened and closed in synchronism with the control of programmable divider (25). Further, by choosing frequency (f_1) to represent one logic level and frequency (f_2) to represent another logic level, information can be transmitted from the interrogator (12) to the transponder (14) (see col. 5, lines 13-19). The capacitor (56) is switched into the tuned circuit (28) to ensure that the transponder resonant circuit (34) is tuned to the signal of the interrogator (see col. 5, lines 47-52).

As noted above, it is acknowledged in the Office Action that *Schuermann* does not disclose a measuring device. Therefore, *Schuermann* cannot disclose the assembly causing a change in the resonant frequency of the transmission oscillator in response to a signal output from the measuring device. Moreover, *Schuermann* uses the capacitor (52) to switch between two frequencies (f_1, f_2) to transmit data. *Schuermann* does not disclose that the changing of the resonant frequency of the circuit using the capacitor is based on an ascertained change of the monitored property by the measuring device and a control signal from the measuring device. Thus, the capacitors in *Schuermann* are not switched into the tuned circuits based on an ascertained change of the monitored property of the oscillator.

Charrat also does not disclose the assembly causing a change in the resonant frequency of the transmission oscillator when the measuring device has ascertained a change of the monitored property and outputted a control signal. As discussed above, *Charrat* does

not disclose a monitored property of the transmission oscillator as required by amended claim 1 and therefore, cannot have the assembly cause a change in the resonant frequency when a change of the monitored property has been ascertained.

Further, *Charrat* does not disclose an assembly switchable to the transmission oscillator via a switch, where the assembly causes a change in the resonant frequency of the oscillator. The antenna circuit (20) in *Charrat* is tuned to a determined resonance frequency of 13.56 (MHz), and the antenna coil is connected in parallel with a capacitor (C1). *Charrat* does not disclose changing the resonant frequency of the antenna circuit (20) and further does not disclose switching in a capacitor (C1) to change the resonant frequency of the antenna circuit (20).

Thus, the proposed combination of *Schuermann* and *Charrat* does not disclose or suggest all of the features of new claim 17.

Therefore, withdrawal of the rejection of the claims in view of the prior art is kindly requested.

3. Rejection of claims 7 and 16 under 35 USC 103(a) as being unpatentable over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*) and further in view of US patent 6,317,027 (*Watkins*)

Reconsideration of the rejection is respectfully requested in view of the amendment to the claims and the following observations.

Claims 7 and 16 depend from one of claims 1 or 15 and are likewise allowable in view of their dependency from claim 1 or claim 15 and their individually recited features. Moreover, *Watkins* does not cure the deficiencies of *Schuermann* or *Charrat*.

Watkins does not disclose the monitoring of a property of the transmission oscillator including the frequency or impedance of the transmission oscillator in resonance. *Watkins* merely recalibrates the antenna circuit periodically, for example every ten seconds (see col. 5, lines 61-66), and does not have a mechanism for monitoring or a device monitoring an actual property of the antenna circuit continuously.

Therefore, withdrawal of the rejection of the claims in view of the prior art is kindly requested.

4. Rejection of claims 13 and 14 under 35 USC 103(a) as being unpatentable over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*) and further in view of US patent 5,491,715 (*Flaxl*)

Reconsideration of the rejection is respectfully requested in view of the amendment to the claims and the following observations.

Claims 13 and 14 depend from claim 1 and are likewise allowable in view of their dependency from claim 1 and their individually recited features. Moreover, *Flaxl* does not cure the deficiencies of *Schuermann* or *Charrat*.

Flaxl is directed to an automatic antenna tuning method and does not disclose a mechanism for monitoring or a device monitoring an actual property of the antenna circuit continuously.

Therefore, withdrawal of the rejection of the claims in view of the prior art is kindly requested.

5. Conclusion

As a result of the amendment to the claims, and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

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Date: November 15, 2010

Respectfully submitted,

/Justin J. Cassell/

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Electronic Patent Application Fee Transmittal

Application Number:	10565732
Filing Date:	30-Jun-2006
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Filer:	Justin John Cassell/Kim Forsell
Attorney Docket Number:	FINK3001/JJC/BEL

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
Request for continued examination	1801	1	810	810
		Total in USD ($)		**810**

Electronic Acknowledgement Receipt

EFS ID:	8837597
Application Number:	10565732
International Application Number:	
Confirmation Number:	1969
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Customer Number:	23364
Filer:	Justin John Cassell/Kim Forsell
Filer Authorized By:	Justin John Cassell
Attorney Docket Number:	FINK3001/JJC/BEL
Receipt Date:	15-NOV-2010
Filing Date:	30-JUN-2006
Time Stamp:	15:59:01
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$810
RAM confirmation Number	2824
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Request for Continued Examination (RCE)	RCE.pdf	639405 20914176d8344780aefdbdd751eb0bdd0ff22fbe	no	3
Warnings:					
Information:					
2		AM_111510.pdf	280233 9d89a818008b300d146f90c92e97a2113df96e09	yes	10
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Amendment Submitted/Entered with Filing of CPA/RCE		1	1	
	Claims		2	4	
	Applicant Arguments/Remarks Made in an Amendment		5	10	
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30177 a54694f273bdce83ebf8cbc95628c26decb334f6	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	949815		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/565,732	06/30/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 11/15/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/LASHAWN MARKS/

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/PMB	1969

23364 7590 08/16/2010

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EXAMINER	
TUN, NAY L	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
08/16/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,732	FINKENZELLER, KLAUS	
	Examiner	Art Unit	
	NAY TUN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims status

1. In the amendment/request for reconsideration filed on May 05, 2010, no claim has been amended. Therefore, claims 1-16 are currently pending for examination.

Specification

2. The amendment to specification filed on October 10, 2009 has been entered.

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

4. Claims 1-6, 8-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** (U. S. Patent No. 5,287,112) in view of **Charrat** et al. (hereinafter "**Charrat**" - U.S. Patent No. 6,905,074).

Regarding claim 1, **Schuermann** discloses a communication apparatus for setting up a data connection between intelligent devices, comprising:

• a transmission oscillator (resonant circuit 28) for carrying out a contactless data exchange, said oscillator including a coil (Column 4 Lines 42-44 and 50-52);

• a communication element (control circuit 16) which is connected to the coil and the data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device (Column 3 Lines 46-54);

Schuermann does not disclose:

• a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property; and

• a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device.

However, the preceding limitations are known in the art of communications. **Charrat** discloses an RFID reader with an active standby mode comprising a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property (FIG. 3, 10 and Column 9 Lines 25-31, DETC3 measures the amplitude of the envelope signal of the transmitter coil and Column 9 Lines 38-55; microprocessor compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit and Column 4, Lines 43-47: variations higher than a determined variation threshold); and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device (Column. 11, Lines 7-12: saving on the current consumption of a reader using the invention. Therefore, one can easily see that part of the communication circuits can be powered down/switched off by the microprocessor on standby mode since sending identification request from the reader and receiving identification message from the tag do not need to be performing during the standby mode).

Therefore it would have been obvious to one of ordinary skill in the art at the time the

invention was made to combine **Schuermann** with **Charrat** in order to send the identification request from the reader after the non-contact IC enters the proximity of the reader and therefore, prolongs battery life and/or saves energy of the reader (**Charrat**: Column 11 Lines 1-12).

Regarding claim 2, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. **Schuermann** further discloses an assembly that is switchable to the transmission oscillator via a switch (the tuning circuit consisting of capacitor 56 and resistor 58 connects to resonant circuit 34 via switch 54 to form new resonant circuit 60), said assembly causing an increase in the bandwidth of the oscillating circuit (Column 5 Lines 47-59; one of ordinary skill in the art could combine this arrangement from the transponder with the interrogator since it is known in the art that interrogators can act as transponders and receive data from other transponders).

Regarding claim 3, **Schuermann** in view of **Charrat** teaches the apparatus of claim 2 as discussed above. **Schuermann** further discloses that the assembly is a resistive element (the tuning circuit is a resistive element since it comprises a resistor).

Regarding claim 4, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. **Schuermann** further discloses including an assembly (capacitor 52) switchable to the transmission oscillator via a switch (switch 50), said assembly causing a change in the resonant frequency of the transmission oscillator (Column 5 Lines 13-19).

Regarding claim 5, **Schuermann** in view of **Charrat** teaches the apparatus of claim 4 as discussed above. **Schuermann** further discloses that the assembly causes a reduction in the resonant frequency (Column 5 Lines 13-15).

Regarding claim 6, **Schuermann** in view of **Charrat** teaches the apparatus of claim 4 as discussed above. **Schuermann** further discloses that that the assembly comprises a capacitor (see above).

Regarding claim 8, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. **Schuermann** in view of **Charrat** does not explicitly disclose the switching apparatus has a time controller for cyclically switching the measuring device on and off.

However, **Charrat** further discloses that pulses of 10 to 50 microseconds spaced out by 200ms (Column 7 Lines 17-37). Since the DETC circuit does not need to measure the amplitude between the pulses, one can easily see that it can be switched off for 200ms after detection of each pulse and switched on cyclically.

Therefore, it would have been obvious to the one of the ordinary skill in the art at the time of the invention was made to provide a switching apparatus with a time controller for cyclically switching the measuring device on and off in order to save the power more by turning off the idling components of the circuit and turning on only when required.

Regarding claim 9, **Schuermann** in view of **Charrat** teaches the apparatus of claim 8 as discussed above. **Charrat** further discloses that the time controller keeps the on state of the measuring device shorter than the off state (Column 7 Lines 17-27 and as modified in claim 8 above, pulse width i.e. the on state of the DETC is 10-50 microseconds long and off state will be 200ms).

Regarding claim 10, the combination of **Schuermann** in view of **Charrat** teaches the apparatus of claim 8 as discussed above. The combination further discloses that the measuring

device stores a measuring value obtained (**Charrat**: Column 9 Lines 37-55).

Regarding claim 11, **Schuermann** in view of **Charrat** and further in view of Nichols teaches the apparatus of claim 10 as discussed above. The combination further teaches the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases (**Charrat**: Column 9 Lines 37-55)

Regarding claim 12, **Schuermann** in view of **Charrat** teaches the apparatus of claim 8 as discussed above. While the combination does not expressly disclose that when the intelligent device is switched on, the communication element is initially on and the measuring device off, this is an obvious matter of design choice (the specification of the present application does not seem to give a reason for or an advantage to having this arrangement), which does not patentably distinguish the invention over the prior art.

Regarding claim 15, **Schuermann** discloses a communication element designed to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil (see regarding claim 1 above). **Schuermann** does not disclose the method steps of:

• monitoring a parameter of the transmission oscillator by means of a measuring device;

• producing a control signal upon the occurrence of a change in the monitored property; and

• switching on the communication element by a switching apparatus due in response to the control signal.

However, the preceding limitations are known in the art of communications. **Charrat**

discloses an RFID reader with an active standby mode comprising a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property (FIG. 3, 10 and Column 9 Lines 25-31, DETC3 measures the amplitude of the envelope signal of the transmitter coil and Column 9 Lines 38-55; microprocessor monitors/compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit and Column 4, Lines 43-47: variations higher than a determined variation threshold); and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device (Column. 11, Lines 7-12: saving on the current consumption of a reader using the invention. Therefore, one can easily see that part of the communication circuits can be powered down/switched off by the microprocessor on standby mode since sending identification request from the reader and receiving identification message from the tag do not need to be performing during the standby mode).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine **Schuermann** with **Charrat** in order to send the identification request from the reader after the non-contact IC enters the proximity of the reader and therefore, prolongs battery life and/or saves energy of the reader (**Charrat**: Column 11 Lines 1-12).

5. Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** in view of **Charrat** as applied to claim 1 above, and further in view of **Watkins** (U.S. Patent No. 6,317,027).

Regarding claim 7, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. The combination does not teach that the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

However, the preceding limitation is known in the art of communications. **Watkins** discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the apparatus of **Schuermann** in view of **Charrat** with the addition of sweeping over a frequency range as the motivation lies in **Watkins** that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

Regarding claim 16, **Schuermann** in view of **Charrat** teaches the method of claim 16 as discussed above. The combination does not teach that the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

However, the preceding limitation is known in the art of communications. **Watkins** discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of **Schuermann** in view of **Charrat** with the addition of sweeping over a frequency range as the motivation lies in **Watkins** that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

6. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** in view of **Charrat** as applied to claim 1 above, and further in view of **Flaxl** (U.S. Patent No. 5,491,715).

Regarding claim 13, the combination of **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. The combination does not disclose that the measuring device has a first oscillator device coupled at least temporarily with the coil for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal. However, the preceding is known in the art of communications. **Flaxl** discloses an antenna tuning method and circuit, wherein a first oscillator device (antenna resonance circuit 18) and a second oscillator device (osc/xmit circuitry 44) are fed into a phase comparator to perform adjustments to the device based on feedback (Figure 7 and Column 5 Line 33 - Column 4 Line 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the apparatus of **Schuermann** in view of **Charrat** with the circuit disclosed in **Flaxl** as the phase comparison circuit in **Flaxl** in addition to the change in magnitude in order to ascertain a change in the signal from the coil.

Regarding claim 14, **Schuermann** in view of **Charrat** and further in view of **Flaxl** teaches the apparatus of claim 13 as discussed above. The combination further teaches producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom (in **Flaxl**, the phase comparator 60 outputs a signal to the control unit 50 which adjusts the antenna resonance circuit 18).

Response to Arguments

7. Applicant's arguments filed on May 05, 2010 have been fully considered but they are not persuasive.

On page 3-4, Applicants argue that "the proposed combination of Schuermann and Charrat does not teach or suggest a switching device which receives a control signal from the measuring device and switches on the communication element in response to the control signal". Examiner disagrees because Charrat teaches saving the power consumption of the reader (Col. 11 lines 7-12). Since Charrat's invention is directed toward the "pre-detection" before the actual data communication is performed and saving the power consumption, the one of the ordinary skill in the art understands that powering down the part of the circuits that are only required for data communication saves the power consumption. Examiner also notes that a switch can be implemented in the form of a software program executed by the controller/microprocessor in the light of specification paragraph [29-30].

On page 4, Applicants argue that "the proposed combination of Schuermann and Charrat does not teach or suggest a measuring device which monitors a property of the transmission oscillator and further outputs a control signal when it has sensed a change in the monitored property" and "the monitoring circuit (DECT3) of Charrat monitors a property of the envelope pulse, not of the coil". In response, Charrat discloses that DETC3 measures the amplitude of the envelope signal of the transmitter coil (Column 9 Lines 25-31) and microprocessor compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit (Column 9 Lines 38-55). The amplitude of the envelope signal is of the coil L1(see FIG. 3) and therefore, can be interpreted as a property of the coil which forms the oscillating circuit together

with capacitor C1.

On Page 4, Applicants argue that "a property of the transmission oscillator would be the oscillator's frequency or impedance when operated in resonance (see paragraph [0045])" and "in contrast to Charrat, the search signals of the communication element are not emitted until the communication element is switched on by the switching element" and "the proposed combination of Schuermann and Charrat would not monitor the frequency of the resonant circuit". In response to applicant's argument, it is noted that the features upon which applicant relies are not recited in the rejected claim 1. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nay Tun whose telephone number is (571) 270-7939. The examiner can normally be reached on Mon-Thurs from 9:00-5:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/NAY TUN/

/Daniel Wu/
Supervisory Patent Examiner, Art Unit 2612

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun	2612

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/07/2009	12/31/2009	08/12/2010						
	1	✓	✓	✓						
	2	✓	✓	✓						
	3	✓	✓	✓						
	4	✓	✓	✓						
	5	✓	✓	✓						
	6	✓	✓	✓						
	7	✓	✓	✓						
	8	✓	✓	✓						
	9	✓	✓	✓						
	10	✓	✓	✓						
	11	✓	✓	✓						
	12	✓	✓	✓						
	13	✓	✓	✓						
	14	✓	✓	✓						
	15	✓	✓	✓						
	16	✓	✓	✓						

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"10565732"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/22 11:55
S2	11	("20050156752" | "5287112" | "5319569" | "5489908" | "5491715" | "5790946" | "6317027" | "6353406" | "6593845" | "6894572" | "7209014").PN.	US-PGPUB; USPAT	OR	ON	2009/12/30 09:20
S3	2	("6150948" | "6703920").PN. OR ("7209014").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 09:33
S4	41	("3713148" | "4201960" | "4356477" | "4480178" | "5025492" | "5053774" | "5270717" | "5347280" | "5353011" | "5374930" | "5396251" | "5491484" | "5491715" | "5541604" | "5568512" | "5583819" | "5815355" | "5856809").PN. OR ("6317027").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:25
S5	96	("4333072" | "5041826" | "5053774" | "5430447" | "5438335").PN. OR ("5489908").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:33

S6	7	arisawa.in. and (data adj carrier)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:35
S7	290	(frequency with chang $4) with detect$4 same (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:37
S8	181	(frequency with chang $4) with detect$4 with (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:37
S10	0	(frequency with chang $4) with detect$4 same (interrogator or reader) with (wak$3 adj up or wakeup)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:38
S11	1	(frequency with chang $4) with detect$4 same (interrogator or reader) with (search$4 or query or discover)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:39
S15	18	(frequency with chang $4) with detect$4 same (search$4 or query or discover$3) adj (mode or state)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 11:44
S16	72	(multi adj (protocol or frequency) with (tag or transponder)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 11:51
S17	967	(interrogator or reader) with (wak$3 adj up or wakeup)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 12:52
S18	78	((interrogator or reader) with (wak$3 adj up or wakeup)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 12:52

S19	21	("3976974" | "4645914" | "4730188" | "4783823" | "4837822" | "5099113" | "5198643" | "5305459" | "5437174" | "5473236" | "5796827" | "5902998" | "5977878" | "6011320" | "6084524" | "6178259").PN. OR ("6535136").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 12:58
S21	1	11/370482.app.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:03
S22	5	("6202927" | "6476708" | "6535136" | "6905074").PN. OR ("7245222").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:08
S23	4	("5352877").PN. OR ("6905074").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:31
S24	5	("6202927" | "6476708" | "6535136" | "6905074" | "7016647").PN. OR ("7598872").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:34
S25	0	(mutual adj induction) and (detun3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 14:54
S26	0	(mutual adj induction) and (de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 14:55
S27	0	(mutual adj induction) and (de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 14:55

S28	169	(de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 14:56
S29	83	S28 and (RFID or tag or transonder or contactless or data adj carrier)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 14:56
S30	3	"6703920".pn.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/07/13 10:06
S31	98	(measur$3 or monitor $3) with frequency near2 coil same switch $3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/03 11:30
S32	260	(measur$3 or monitor $3) near5 frequency with coil same switch $3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/03 11:41
S33	43	(measur$3 or monitor $3) near5 frequency with coil same switch $3 and proximity	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/03 11:42
S34	6195	340/10.1-10.6.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:52
S35	1247	455/41.1,106.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:52
S36	7310	S34 or S35	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:52
S37	600	S36 and proximity with (sens$3 or detect$3)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:53

S38	45	S36 and (measur$3 or monitor$3) near5 (frequency or voltage or impedence or resistance) with coil	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:54
S39	414	S37 and ((radio or RF $2) near2 tag or transponder)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:55
S40	17	S37 and ((radio or RF $2) near2 tag or transponder or reader or interrogator) and NFC	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2010/08/12 17:56

EAST Search History (Interference)

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8/ 13/ 2010 8:49:27 AM
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun / Charles G Curtis III	2612

SEARCHED

Class	Subclass	Date	Examiner
340	10.1-10.6	05/28/2009	CGC
455	41.1, 106	05/28/2009	CGC
340	10.1-10.6	8/12/2010	NT
455	41.1, 106	8/12/2010	NT

SEARCH NOTES

Search Notes	Date	Examiner
PLUS Search	05/28/2009	CGC
Inventor/Assignee Search (PALM/EDAN)	05/28/2009	CGC
EAST Search Printout	06/07/2009	CGC
Updated Search on East - see detail in printout	12/30/2009	NT
Updated Search on East - see detail in printout	8/12/2010	NT

INTERFERENCE SEARCH

Class	Subclass	Date	Examiner

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	10/565,732	Confirm. No.:	1969
Filing Date:	June 30, 2006	Examiner:	TUN, Nay
First Inventor:	Klaus Finkenzeller	Art Unit:	2612
Attorney No.:	FINK3001/JJC/PMB	Customer No.:	23364
For:	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES		

REPLY TO OFFICE ACTION
OF JANUARY 5, 2010

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This is responsive to the outstanding Office action dated January 5, 2010 in the above-identified application.

A petition and fee to extend the period of reply by 1 month is concurrently filed herewith.

In view of the following remarks, reconsideration of the application is respectfully requested.

REMARKS

Reconsideration of the pending application is respectfully requested in view of the following observations.

1. In the specification

The Office Action indicates that the substitute specification filed on June 10, 2009 was not entered. We note, however, that a substitute specification was not filed in the instant application. An Amendment to the Specification was correctly filed on October 9, 2009 in proper form.

Entry of the Amendment to the Specification filed on October 9, 2009 is kindly requested.

2. Rejection of claims 1-6, 8-12, and 15 under 35 USC 103(a) over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*)

Reconsideration of the rejection is respectfully requested in view of the following observations.

Claim 1 recites a communication apparatus for setting up a data connection between intelligent devices. The communication apparatus comprises four elements: a transmission oscillator, a communication element, a measuring device, and a switching apparatus. The measuring device is used to monitor a property of the transmission oscillator and outputs a signal to the switching apparatus when the measuring device ascertains a change of the monitored property. When the switching apparatus receives a control signal from the measuring device, the switching apparatus switches the communication device on.

The *Schuermann* patent is directed to an RFID system where a transponder can receiving powering signals through an antenna. The transponder arrangement includes an interrogator (12) and a responder or transponder (14). The interrogator contains a control circuit (16) and a resonant circuit (28). As acknowledged by the Examiner, the *Schuermann* patent does not disclose a measuring device or a switching apparatus as required by claim 1.

The *Charrat* patent is relied on for the teaching of the measuring device and the switching device. The device of the *Charrat* patent is a contactless reader with an active standby mode to reduce power consumption. The contactless reader communicates with a

contactless integrated circuit (5) through an antenna coil (L2) (see Fig. 3). The reader detects the presence of a contactless integrated circuit (5) based on the amplitude of the magnetic field. The amplitude of the envelope signal (SE) is further based on the amplitude of the magnetic field pulses. When a contactless integrated circuit (5) is present, the amplitude (V2) of the envelope signal is substantially lower than when the contactless integrated circuit (5) is absent. (see col. 7, lines 49-54). The active standby mode of the reader reduces power consumption by emitting short magnetic field pulses compared to the longer magnetic field pulses of the prior art.

The reader (5) contains a monitoring circuit (DETC3) which is an analog-to-digital converter and outputs a digital amplitude value (DSE) to the microprocessor (MP). The MP does the actual monitoring of the envelope pulses (SE) (see col. 9, lines 26-32) by comparing the amplitude value of each envelope pulse with the threshold DTH (see col. 9, lines 50-53). When the amplitude value of the envelope pulse is lower than DTH, a contactless integrated circuit is present.

It is submitted that the proposed combination of *Schuermann* and *Charrat* fails to teach all of the features of claim 1.

First, the proposed combination of *Schuermann* and *Charrat* does not teach or suggest a switching device which receives a control signal from the measuring device and switches on the communication element in response to the control signal. Neither *Schuermann* nor *Charrat* teach or suggest a switching device as required by claim 1. The *Charrat* patent does disclose a switching device (SW). This switching device, however, is used in the transmission of data (DTr) and is in no way used to turn on elements (see col. 6, line 65 – col. 7, line 3).

Second, while the Office Action indicates that *Charrat* supports the notion of communication circuits being powered down or switched off by the microprocessor in standby mode, the Applicant respectfully disagrees. *Charrat* is completely silent as to the powering down of circuits. *Charrat* attributes its power savings to the use of a shorter magnetic field pulse whereas the prior art uses a constant magnetic field or longer bursts (see col. 7, lines 8-16). *Charrat* reduces power consumption in the standby mode, not by powering down circuits, but by reducing the length of time that the magnetic field is propagated.

A general teaching of powering down circuits would not teach or suggest turning on a communication element in response to a changed oscillator property. Claim 1 is specific in requiring that the switching apparatus turn on the *communication element*. Therefore, the proposed combination of *Schuermann* and *Charrat* cannot teach or suggest a switching device as required by claim 1.

Next, the proposed combination of *Schuermann* and *Charrat* does not teach or suggest a measuring device which monitors a property of the transmission oscillator and further outputs a control signal when it has sensed a change in the monitored property. The *Schuermann* patent does not disclose a measuring device, and the *Charrat* patent discloses a monitoring device and multiprocessor used in the detection of the presence of a contactless integrated circuit (5).

The measuring device of claim 1 monitors a property of the transmission oscillator. The monitoring circuit (DECT3) of *Charrat* monitors a property of the envelope pulse, not of the coil. A property of the transmission oscillator would be the oscillator's frequency or impedance when operated in resonance (see paragraph [0045]). DECT3 continuously monitors the amplitude of the envelope pulse which is used in the detection of a contactless integrated circuit (5). *Charrat* utilizes the magnetic field pulses throughout the detection period.

In contrast to *Charrat*, the search signals of the communication element are not emitted until the communication element is switched on by the switching element as supported by claim 1. Thus, the search signals are only begun once the measuring device detects that a transponder may be located within the response range of the coil (see paragraph [0006]), so no search signals are emitted during detection mode (see paragraphs [0040] and [0041]).

Lastly, the control circuit (16) of *Schuermann* changes the frequency of the resonant circuit (28) (see col. 3, lines 33-41) and *Charrat* monitors amplitudes of pulses. As a result, the proposed combination of *Schuermann* and *Charrat* would not monitor the frequency of the resonant circuit.

Accordingly, the proposed combination of *Schuermann* and *Charrat* fails to disclose or suggest all of the features of claim 1. Independent claim 15 contains features similar to claim 1 and is also allowable for the reasons above. Moreover, claims 2-6 and 8-12 are

likewise in condition for allowance in view of their dependency from one of claims 1 and 15 and their individually recited features.

Withdrawal of the rejection of the claims in view of the prior art is kindly requested.

3. Rejection of claims 7 and 16 under 35 USC 103(a) over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*) and US patent 6,317,027 (*Watkins*)

Claims 7 and 16 are in condition for allowance in view of their dependency from claims 1 or 15, as discussed above and their individually recited features. The *Watkins* patent does not correct the deficiencies of *Schuermann* or *Charrat* as discussed above.

Accordingly, claims 7 and 16 are allowable over the prior art.

Withdrawal of the rejection of the claims in view of the prior art is kindly requested.

4. Rejection of claims 13 and 14 under 35 USC 103(a) over US patent 5,287,112 (*Schuermann*) in view of US patent 6,905,074 (*Charrat*) and US patent 5,491,715 (*Flaxl*)

Claims 13 and 14 are in condition for allowance in view of their dependency from claim 1, as discussed above and their individually recited features. The *Flaxl* patent does not correct the deficiencies of *Schuermann* or *Charrat* as discussed above.

Accordingly, claims 13 and 14 are allowable over the prior art.

Withdrawal of the rejection of the claims in view of the prior art is kindly requested.

5. Conclusion

In view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314-1176
Phone: (703) 683-0500
Facsimile: (703) 683-1080

Date: May 5, 2010

Respectfully submitted,

/Justin J. Cassell/

JUSTIN J. CASSELL
Attorney for Applicant
Registration No. 46,205

Electronic Patent Application Fee Transmittal

Application Number:	10565732
Filing Date:	30-Jun-2006
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Filer:	Justin John Cassell/Donna Lizama
Attorney Docket Number:	FINK3001/JJC/PMB

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	1251	1	130	130

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**130**

Electronic Acknowledgement Receipt

EFS ID:	7557706
Application Number:	10565732
International Application Number:	
Confirmation Number:	1969
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Customer Number:	23364
Filer:	Justin John Cassell/Donna Lizama
Filer Authorized By:	Justin John Cassell
Attorney Docket Number:	FINK3001/JJC/PMB
Receipt Date:	05-MAY-2010
Filing Date:	30-JUN-2006
Time Stamp:	16:23:56
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$130
RAM confirmation Number	2701
Deposit Account	020200
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
File Listing:					
Document Number	**Document Description**	**File Name**	**File Size(Bytes)/ Message Digest**	**Multi Part /.zip**	**Pages (if appl.)**
1	Extension of Time	FINK3001_EOT.pdf	219860 0d3d86f74399b6f80900854bf8850a4642138cec	no	1
Warnings:					
Information:					
2	Amendment/Req. Reconsideration-After Non-Final Reject	FINK3001_RESPONSE.pdf	110356 ad4a071631312c015e861665ef25fe1d3ca0d88b	no	6
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30100 69e5acf77afaa5b27f6dfda7d5236062ae674f2a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	360316		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/22 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** (*Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).*)	Docket Number (Optional) FINK3001/JJC/PMB
Application Number 10/565,732	Filed June 30, 2006
For COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT	
Art Unit 2612	Examiner TUN, Nay

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☑ One month (37 CFR 1.17(a)(1))	$130	$65	$ 130
☐ Two months (37 CFR 1.17(a)(2))	$490	$245	$
☐ Three months (37 CFR 1.17(a)(3))	$1110	$555	$
☐ Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐ Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☑ Payment by credit card. Form PTO-2038 is attached.

☑ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 02-0200.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 46,205

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

/Justin J. Cassell/	May 5, 2010
Signature	Date
Justin J. Cassell	703.683.0500
Typed or printed name	Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☐ Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/565,732	06/30/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 05/05/2010	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ANTHONY WILLIAMS/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001/JJC/PMB	1969

23364 7590 01/05/2010

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER	
TUN, NAY L	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
01/05/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,732	FINKENZELLER, KLAUS	
	Examiner	Art Unit	
	NAY TUN	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/09/2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10/09/2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims status

1. In the amendment filed on October 10, 2009, claim 1 has been amended. Therefore, claims 1-16 are currently pending for examination.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Specification

3. The substitute specification filed 10 June 2009 has NOT been entered because it does not conform to 37 CFR 1.125(b) and (c) because: a clean copy has not been provided.

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

Drawings

4. Objections to drawings from previous office action are withdrawn and substitute drawings filed on 10/09/2009 are entered.

Claim Rejections - 35 USC § 103

5. Claims 1-6, 8-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** (U. S. Patent No. 5,287,112) in view of **Charrat** et al. (hereinafter "**Charrat**" - U.S. Patent No. 6,905,074).

Regarding claim 1, **Schuermann** discloses a communication apparatus for setting up a data connection between intelligent devices, comprising:

• a transmission oscillator (resonant circuit 28) for carrying out a contactless data exchange, said oscillator including a coil (Column 4 Lines 42-44 and 50-52);

• a communication element (control circuit 16) which is connected to the coil and the data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device (Column 3 Lines 46-54);

Schuermann does not disclose:

• a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property; and

• a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device.

However, the preceding limitations are known in the art of communications. **Charrat** discloses an RFID reader with an active standby mode comprising a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property (FIG. 3, 10 and Column 9 Lines 25-31, DETC3 measures the amplitude of the envelope signal of the transmitter coil and Column 9 Lines 38-55; microprocessor compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit and Column 4, Lines 43-47: variations higher than a determined variation threshold); and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device (Column. 11, Lines 7-12: saving on the current consumption of a reader using the invention. Therefore, one can easily see that part of the communication circuits can be powered down/switched off by the microprocessor on standby mode since sending identification request from the reader and receiving identification message from the tag do not need to be performing during the standby mode).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine **Schuermann** with **Charrat** in order to send the identification request from the reader after the non-contact IC enters the proximity of the reader and therefore, prolongs battery life and/or saves energy of the reader (**Charrat**: Column 11 Lines 1-12).

Regarding claim 2, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. **Schuermann** further discloses an assembly that is switchable to the transmission oscillator via a switch (the tuning circuit consisting of capacitor 56 and resistor 58 connects to resonant circuit 34 via switch 54 to form new resonant circuit 60), said assembly

causing an increase in the bandwidth of the oscillating circuit (Column 5 Lines 47-59; one of ordinary skill in the art could combine this arrangement from the transponder with the interrogator since it is known in the art that interrogators can act as transponders and receive data from other transponders).

Regarding claim 3, **Schuermann** in view of **Charrat** teaches the apparatus of claim 2 as discussed above. **Schuermann** further discloses that the assembly is a resistive element (the tuning circuit is a resistive element since it comprises a resistor).

Regarding claim 4, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. **Schuermann** further discloses including an assembly (capacitor 52) switchable to the transmission oscillator via a switch (switch 50), said assembly causing a change in the resonant frequency of the transmission oscillator (Column 5 Lines 13-19).

Regarding claim 5, **Schuermann** in view of **Charrat** teaches the apparatus of claim 4 as discussed above. **Schuermann** further discloses that the assembly causes a reduction in the resonant frequency (Column 5 Lines 13-15).

Regarding claim 6, **Schuermann** in view of **Charrat** teaches the apparatus of claim 4 as discussed above. **Schuermann** further discloses that that the assembly comprises a capacitor (see above).

Regarding claim 8, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. **Schuermann** in view of **Charrat** does not explicitly disclose the switching apparatus has a time controller for cyclically switching the measuring device on and off.

However, **Charrat** further discloses that pulses of 10 to 50 microseconds spaced out by

200ms (Column 7 Lines 17-37). Since the DETC circuit does not need to measure the amplitude between the pulses, one can easily see that it can be switched off for 200ms after detection of each pulse and switched on cyclically.

Therefore, it would have been obvious to the one of the ordinary skill in the art at the time of the invention was made to provide a switching apparatus with a time controller for cyclically switching the measuring device on and off in order to save the power more by turning off the idling components of the circuit and turning on only when required.

Regarding claim 9, **Schuermann** in view of **Charrat** teaches the apparatus of claim 8 as discussed above. **Charrat** further discloses that the time controller keeps the on state of the measuring device shorter than the off state (Column 7 Lines 17-27 and as modified in claim 8 above, pulse width i.e. the on state of the DETC is 10-50 microseconds long and off state will be 200ms).

Regarding claim 10, the combination of **Schuermann** in view of **Charrat** teaches the apparatus of claim 8 as discussed above. The combination further discloses that the measuring device stores a measuring value obtained (**Charrat**: Column 9 Lines 37-55).

Regarding claim 11, **Schuermann** in view of **Charrat** and further in view of Nichols teaches the apparatus of claim 10 as discussed above. The combination further teaches the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases (**Charrat**: Column 9 Lines 37-55)

Regarding claim 12, **Schuermann** in view of **Charrat** teaches the apparatus of claim 8

as discussed above. While the combination does not expressly disclose that when the intelligent device is switched on, the communication element is initially on and the measuring device off, this is an obvious matter of design choice (the specification of the present application does not seem to give a reason for or an advantage to having this arrangement), which does not patentably distinguish the invention over the prior art.

Regarding claim 15, **Schuermann** discloses a communication element designed to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil (see regarding claim 1 above). **Schuermann** does not disclose the method steps of:

• monitoring a parameter of the transmission oscillator by means of a measuring device;

• producing a control signal upon the occurrence of a change in the monitored property; and

• switching on the communication element by a switching apparatus due in response to the control signal.

However, the preceding limitations are known in the art of communications. **Charrat** discloses an RFID reader with an active standby mode comprising a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property (FIG. 3, 10 and Column 9 Lines 25-31, DETC3 measures the amplitude of the envelope signal of the transmitter coil and Column 9 Lines 38-55; microprocessor monitors/compares the amplitude with the threshold and deduces the presence of a contactless integrated circuit and Column 4, Lines 43-47: variations higher than a determined variation threshold); and a switching apparatus which is connected to the measuring device and

the communication element and which switches on the communication element when it has received a control signal from the measuring device (Column. 11, Lines 7-12: saving on the current consumption of a reader using the invention. Therefore, one can easily see that part of the communication circuits can be powered down/switched off by the microprocessor on standby mode since sending identification request from the reader and receiving identification message from the tag do not need to be performing during the standby mode).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine **Schuermann** with **Charrat** in order to send the identification request from the reader after the non-contact IC enters the proximity of the reader and therefore, prolongs battery life and/or saves energy of the reader (**Charrat**: Column 11 Lines 1-12).

6. Claims 7 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** in view of **Charrat** as applied to claim 1 above, and further in view of **Watkins** (U.S. Patent No. 6,317,027).

Regarding claim 7, **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. The combination does not teach that the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

However, the preceding limitation is known in the art of communications. **Watkins** discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the apparatus of

Schuermann in view of **Charrat** with the addition of sweeping over a frequency range as the motivation lies in **Watkins** that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

Regarding claim 16, **Schuermann** in view of **Charrat** teaches the method of claim 16 as discussed above. The combination does not teach that the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

However, the preceding limitation is known in the art of communications. **Watkins** discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of **Schuermann** in view of **Charrat** with the addition of sweeping over a frequency range as the motivation lies in **Watkins** that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

7. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Schuermann** in view of **Charrat** as applied to claim 1 above, and further in view of **Flaxl** (U.S. Patent No. 5,491,715).

Regarding claim 13, the combination of **Schuermann** in view of **Charrat** teaches the apparatus of claim 1 as discussed above. The combination does not disclose that the measuring device has a first oscillator device coupled at least temporarily with the coil for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal.

However, the preceding is known in the art of communications. **Flaxl** discloses an antenna tuning method and circuit, wherein a first oscillator device (antenna resonance circuit 18) and a second oscillator device (osc/xmit circuitry 44) are fed into a phase comparator to perform adjustments to the device based on feedback (Figure 7 and Column 5 Line 33 - Column 4 Line 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the apparatus of **Schuermann** in view of **Charrat** with the circuit disclosed in **Flaxl** as the phase comparison circuit in **Flaxl** in addition to the change in magnitude in order to ascertain a change in the signal from the coil.

Regarding claim 14, **Schuermann** in view of **Charrat** and further in view of **Flaxl** teaches the apparatus of claim 13 as discussed above. The combination further teaches producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom (in **Flaxl**, the phase comparator 60 outputs a signal to the control unit 50 which adjusts the antenna resonance circuit 18).

Response to Arguments

8. Applicant's arguments filed on October 10, 2009 have been fully considered but they are moot in view of new grounds of rejection.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Johnson (US 6476708) discloses a method is provided for operating an RF transponder system to detect the presence of an RFID device in the proximal space of an RF reader unit having an excitation signal generator circuit and an RFID device detection circuit.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nay Tun whose telephone number is (571) 270-7939. The examiner can normally be reached on Mon-Thurs from 9:00-5:00.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Daniel Wu can be reached on (571) 272-2964. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/NAY TUN/

/Daniel Wu/
Supervisory Patent Examiner, Art Unit 2612

Notice of References Cited	Application/Control No. 10/565,732	Applicant(s)/Patent Under Reexamination FINKENZELLER, KLAUS	
	Examiner NAY TUN	Art Unit 2612	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,476,708 B1	11-2002	Johnson, David A.	340/10.34
*	B	US-6,905,074 B2	06-2005	Charrat, Bruno	235/492
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun	2612

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/07/2009	12/31/2009							
	1	✓	✓							
	2	✓	✓							
	3	✓	✓							
	4	✓	✓							
	5	✓	✓							
	6	✓	✓							
	7	✓	✓							
	8	✓	✓							
	9	✓	✓							
	10	✓	✓							
	11	✓	✓							
	12	✓	✓							
	13	✓	✓							
	14	✓	✓							
	15	✓	✓							
	16	✓	✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Nay Tun / Charles G Curtis III	2612

SEARCHED			
Class	Subclass	Date	Examiner
340	10.1-10.6	05/28/2009	CGC
455	41.1, 106	05/28/2009	CGC

SEARCH NOTES		
Search Notes	Date	Examiner
PLUS Search	05/28/2009	CGC
Inventor/Assignee Search (PALM/EDAN)	05/28/2009	CGC
EAST Search Printout	06/07/2009	CGC
Updated Search on East - see detail in printout	12/30/2009	NT

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"10565732"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/22 11:55
S2	11	("20050156752" | "5287112" | "5319569" | "5489908" | "5491715" | "5790946" | "6317027" | "6353406" | "6593845" | "6894572" | "7209014").PN.	US-PGPUB; USPAT	OR	ON	2009/12/30 09:20
S3	2	("6150948" | "6703920").PN. OR ("7209014").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 09:33
S4	41	("3713148" | "4201960" | "4356477" | "4480178" | "5025492" | "5053774" | "5270717" | "5347280" | "5353011" | "5374930" | "5396251" | "5491484" | "5491715" | "5541604" | "5568512" | "5583819" | "5815355" | "5856809").PN. OR ("6317027").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:25
S5	96	("4333072" | "5041826" | "5053774" | "5430447" | "5438335").PN. OR ("5489908").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:33

S6	7	arisawa.in. and (data adj carrier)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:35
S7	290	(frequency with chang $4) with detect$4 same (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:37
S8	181	(frequency with chang $4) with detect$4 with (interrogator or reader)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:37
S10	0	(frequency with chang $4) with detect$4 same (interrogator or reader) with (wak$3 adj up or wakeup)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:38
S11	1	(frequency with chang $4) with detect$4 same (interrogator or reader) with (search$4 or query or discover)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 11:39
S15	18	(frequency with chang $4) with detect$4 same (search$4 or query or discover$3) adj (mode or state)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 11:44
S16	72	(multi adj (protocol or frequency) with (tag or transponder)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 11:51
S17	967	(interrogator or reader) with (wak$3 adj up or wakeup)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 12:52
S18	78	((interrogator or reader) with (wak$3 adj up or wakeup)).ab.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 12:52

S19	21	("3976974" | "4645914" | "4730188" | "4783823" | "4837822" | "5099113" | "5198643" | "5305459" | "5437174" | "5473236" | "5796827" | "5902998" | "5977878" | "6011320" | "6084524" | "6178259").PN. OR ("6535136").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 12:58
S21	1	11/370482.app.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:03
S22	5	("6202927" | "6476708" | "6535136" | "6905074").PN. OR ("7245222").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:08
S23	4	("5352877").PN. OR ("6905074").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:31
S24	5	("6202927" | "6476708" | "6535136" | "6905074" | "7016647").PN. OR ("7598872").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 13:34
S25	0	(mutual adj induction) and (detun3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 14:54
S26	0	(mutual adj induction) and (de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; USOCR	OR	ON	2009/12/30 14:55
S27	0	(mutual adj induction) and (de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 14:55

S28	169	(de$1tun$3 near5 (antenna or coil)) same (chang$4 with frequency)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 14:56
S29	83	S28 and (RFID or tag or transonder or contactless or data adj carrier)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/12/30 14:56

EAST Search History (Interference)

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12/ 31/ 2009 9:35:00 AM
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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.:	10/565,732	**Examiner:**	Charles G. Curtis III
Filing Date:	June 30, 2006	**Art Unit:**	2612
First Inventor:	Klaus Finkenzeller	**Customer No.:**	23364
Attorney No.:	FINK3001/JJC/PMB	**Confirm. No.:**	1969
For:	**COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES**		

REPLY UNDER 37 C.F.R. § 1.111 TO OFFICE ACTION OF JUNE 9, 2009

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This is responsive to the Office Action dated June 9, 2009 in the above application.

In view of the following amendments and remarks, reconsideration of the application is respectfully requested.

A petition and appropriate fee to extend the period of reply by one month are concurrently filed herewith.

AMENDMENT

Please amend the pending application in accordance with the following particulars.

In the Specification

An amendment to the specification is shown in the following pages under the heading AMENDMENT TO THE SPECIFICATION.

In the Drawings

REPLACEMENT SHEETS for changes made to the drawing pages 1-6 are submitted herewith.

In the Claims

The claims are amended as shown on the following pages under the heading LIST OF CURRENT CLAIMS. The list shows the status of all claims presently in the application and is intended to supersede all prior versions of the claims in the application. Any cancellation of claims is made without prejudice or disclaimer.

AMENDMENT TO THE SPECIFICATION

Please insert the following heading prior to paragraph [0001] in the specification:

BACKGROUND

Please insert the following heading prior to paragraph [0005] in the specification:

SUMMARY

Please replace paragraph [0006] of the specification with the following marked-up paragraph:

> This problem is solved by an apparatus having the features as discussed herein ~~of the main claim~~. The inventive communication apparatus has a communication element with a coil for emitting search signals, whereby the search signal mode is only commenced when a property change in a transmission oscillator set up by means of the same coil has been detected by means of a measuring device. Since transmission oscillator and measuring device can be operated almost non-dissipatively, the output of search signals for detecting the presence of corresponding intelligent devices must only be effected when a further intelligent device is possibly located within the response range of the coil. The energy requirement of the communication apparatus can thus be considerably reduced. The inventive solution is therefore in particular also suitable for intelligent devices with limited energy resources, e.g. for battery-operated devices. It is particularly advantageous that an intelligent device equipped with an inventive communication apparatus can be handled just the same as if the device permanently emitted search queries. No special actions by a user are required. Advantageously, the use of an inventive

communication apparatus also does not require any intervention in the execution of the data connection set-up after detection of a further intelligent device present.

Please insert the following heading prior to paragraph [0011] in the specification:

BRIEF DESCRIPTION OF THE DRAWINGS

Please insert the following heading prior to paragraph [0020] in the specification:

DETAILED DESCRIPTION

Please replace paragraph [0027] of the specification with the following marked-up paragraph:

Fig. 2 shows a simplified equivalent circuit diagram of a device 10, 20, 30. The data processing component 11, 21 [[22]], and therefore the external appearance of the device 10, 20, is represented therein by an on/off switch 40 operable by a user for switching on and off the main energy supply 41 of the device 10, 20. The main energy supply 41 can be in particular a battery or an accumulator. Particularly a firmly installed reading device can also use a mains voltage as the main energy supply 41. The presence of the switch 40 depends on the form of the device; in certain embodiments, e.g. upon execution as a chip card 30, the switch 40 can be omitted. The device 30 is then either constantly on or is switched on by an equally acting mechanism adapted to the design.

AMENDMENT TO DRAWINGS

Replacement sheets 1-6 are provided to add page numbers to the drawing sheets.

LIST OF CURRENT CLAIMS

1. (Currently Amended) A communication apparatus for setting up a data connection between intelligent devices, comprising:

a transmission oscillator for carrying out a contactless data exchange, said oscillator including a coil;

a communication element which is connected to the coil and to a ~~the~~ data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device,

a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property,

and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device.

2. (Previously Presented) The communication apparatus according to claim 1, including an assembly that is switchable to the transmission oscillator via a switch, said assembly causing an increase in the bandwidth of the oscillating circuit.

3. (Previously Presented) The communication apparatus according to claim 2, wherein the assembly is a resistive element.

4. (Previously Presented) The communication apparatus according to claim 1, including an assembly switchable to the transmission oscillator via a switch, said assembly causing a change in the resonant frequency of the transmission oscillator.

5. (Previously Presented) The communication apparatus according to claim 4, wherein the assembly is arranged to enable a reduction in the resonant frequency.

6. (Previously Presented) The communication apparatus according to claim 4, wherein the assembly comprises a capacitor.

7. (Previously Presented) The communication apparatus according to claim 1, wherein the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

8. (Previously Presented) The communication apparatus according to claim 1, wherein the switching apparatus has a time controller for cyclically switching the measuring device on and off.

9. (Previously Presented) The communication apparatus according to claim 8, wherein the time controller keeps the on state of the measuring device shorter than the off state.

10. (Previously Presented) The communication apparatus according to claim 8, wherein the measuring device stores a measuring value obtained during a cyclical on phase.

11. (Previously Presented) The communication apparatus according to claim 10, wherein the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases.

12. (Previously Presented) The communication apparatus according to claim 8, wherein, when the intelligent device is switched on, the communication element is initially on and the measuring device off.

13. (Previously Presented) The communication apparatus according to claim 1, wherein the measuring device has a first oscillator device coupled at least temporarily with the coil, for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal.

14. (Previously Presented) The communication apparatus according to claim 13, wherein the measuring device has circuit components for producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom.

15. (Previously Presented) A method for switching on a communication element configured to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil, comprising the following steps:

monitoring a parameter of the transmission oscillator by means of a measuring device,

producing a control signal upon the occurrence of a change in the monitored property,

switching on the communication element by a switching apparatus in response to the control signal.

16. (Previously Presented) The method according to claim 15, wherein the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. In the specification

The specification is amended, as shown in the foregoing AMENDMENT TO THE SPECIFICATION, to eliminate reference to the claims, to add section headings, and to correct minor informalities. It is respectfully submitted that no new matter is added, as the changes simply correct minor informalities.

Entry of the AMENDMENT TO THE SPECIFICATION is respectfully requested in the next Office communication.

In view of the above changes to the specification, removal of the objection to the specification is respectfully requested.

2. In the drawings

The drawing pages are presently amended in the REPLACEMENT SHEETS of page 1-6 of the drawings. Specifically, page numbers are added to the drawings. No new subject matter is introduced, since only identification of already illustrated features is provided by way of the amendment.

Acceptance of the REPLACEMENT SHEETS is respectfully requested in the next Office communication.

In view of the above changes to the drawing pages, removal of the objection to the drawings is respectfully requested.

3. In the claims

As shown in the foregoing LIST OF CURRENT CLAIMS, the claims have been amended to more clearly point out the subject matter for which protection is sought.

A. Claim amendments

Claim 1 is amended to provide antecedent basis for the data processing component. It is respectfully submitted that no new matter is added, since the change merely corrects a minor informality.

Claims 2-16 are left unchanged.

Entry of the LIST OF CURRENT CLAIMS is respectfully requested in the next Office communication.

B. Rejection of claims 1-14 under 35 U.S.C. § 112 second paragraph

Reconsideration of this rejection is respectfully requested, in view of the amendment to claim 1, from which claims 2-14 depend, on the basis that antecedent basis is provided for every element of amended claim 1.

Accordingly, amended claim 1 is clear and definite, and withdrawal of this rejection is respectfully requested.

4. Rejection of claims 1-6, 8, 9, 12, and 15 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 5,287,112 (*Schuermann*) in view of U.S. patent no. 6,593,845 (*Friedman et al.*)

Reconsideration of this rejection is respectfully requested on the basis that the rejection fails to establish a *prima facie* case of obviousness with respect to claims 1 and 15. The remaining claims 2-6, 8, 9, and 12 depend from claim 1, and are therefore patentable as containing all of the recited elements of claim 1, as well as for their respective recited features.

By way of review, claim 1 requires, at least in part, a communication apparatus for setting up a data connection between intelligent devices. The communication apparatus includes a transmission oscillator for carrying out a contactless data exchange, where the oscillator further includes a coil. The communication apparatus also includes a communication element connected to the coil and to a data processing component of an intelligent device, and which emits search signals via the coil to receive a response from another intelligent device. The

communication apparatus also includes a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property. And the communication apparatus further includes a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device.

Pending claim 15 is a method claim corresponding to pending claim 1.

The *Schuermann* patent discloses a fast read/write RFID system in which a transponder is operable to receive powering signals over an antenna that is tuned with a high Q-factor to the antenna of an interrogator (col. 1, lines 15-19). Both the interrogator and the transponder use a single set of circuitry for transmission and reception of both powering and communication signals (col. 2, lines 43-45). The single resonant circuit is implemented in each of the interrogator and the transponder for maximum efficiency of cost, size, and power consumption (col. 2, lines 47-49).

The transponder is adapted to receive data signals modulated by FSK modulation, where prior art devices utilize ASK or PSK modulation (col. 2, lines 50-55).

The *Schuermann* patent further discloses the interrogator 12 including a control circuit 16 connected to a resonant circuit 28 having a coil 30 (Fig. 1; col. 3, lines 23-58).

However, as acknowledged in the Office action on pages 5 and 7, the *Schuermann* patent fails to disclose that the interrogator also includes a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property, and a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device, as is required by pending claims 1 and 15.

The Office action turns to the *Friedman* patent as disclosing an RF tag with a wake up circuit (Office action pages 5 and 7).

In particular, the *Friedman* patent discloses an active RF transponder that is provided with a wake up circuit that wakes the RF transponder from a sleep state

upon detection of an RF interrogating signal (col. 2, lines 30-33). The wake up circuit is coupled to the antenna and includes a switch adapted to selectively couple the battery to the electronic circuitry and provide electrical power thereto upon detection of RF signals in order to facilitate communication with an interrogator (col. 2, lines 40-43; col. 4, lines 45-49).

However, in contrast to pending claims 1 and 15, the wake up circuit of the *Friedman* patent is provided in the transponder, and not in the interrogator, as is required by pending claims 1 and 15. That is, in the *Friedman* patent, the transponder includes a wake up circuit in order to be turned on when an interrogation signal of the interrogator is received. This is in contrast to pending claims 1 and 15, in which the communication apparatus (interrogator) for sending the interrogation or search signals is equipped with the wake up mechanism, including the measuring device that is coupled to the switching device in order to be turned on to send search signals in case a transponder approaches the interrogation field of the communication apparatus (specification, paragraphs [0006], [0029], [0045], [0046]).

Thus, the *Friedman* patent fails to disclose a wake up circuit provided in the communication apparatus (interrogator), as is required by pending claims 1 and 15.

Accordingly, if a person having ordinary skill in the art were to modify the RFID device of the *Schuermann* patent using the teachings of the *Friedman* patent, the proposed combination of the *Schuermann* and *Friedman* patents would result in a transponder having a wake up circuit, and not a communication apparatus (interrogator) having a wake up circuit, as is required by pending claims 1 and 15.

Further, since the configuration of the *Schuermann* patent is already optimized for maximum efficiency of cost, size, and power consumption (*Schuermann* patent, col. 2, lines 47-49).

Thus, a person having ordinary skill in the art would not have turned to the teachings of the *Friedman* patent in order to reduce power consumption, since the configuration of the *Schuermann* patent is already optimized therefore.

Additionally, since the *Friedman* patent discloses a wake up circuit in the transponder only, the *Friedman* patent does not disclose how to reduce the power consumption of the interrogator. In other words, even if the wake up circuit of the transponder of the *Friedman* patent were added to the transponder of the *Schuermann* patent, the problem solved by pending claims 1 and 15 of minimizing the power consumption of the communication apparatus (interrogator) would still be unsolved.

Further still, the wake up circuit of the *Friedman* patent appears to be technically different from the measuring device according to the pending claims, which is adapted for monitoring a property of the transmission oscillator. While the *Schuermann* patent does describe a resonant circuit which in principal could be monitored by a measuring device according to the pending claims, the *Friedman* patent does not disclose any such resonant circuit and the RF detect circuit 32 of the *Friedman* patent (col. 13, line 6 through col. 14, line 63) appears to differ considerably from the claimed measuring device.

Thus, even if the wake up circuit, including the RF detect circuit 32, of the *Friedman* patent were added to the transponder of the *Schuermann* patent, considerable technical difficulties would arise since the *Friedman* patent fails to disclose how to utilize the RF detect circuit 32 for monitoring the properties of a transmission oscillator, as is required by pending claims 1 and 15.

Accordingly, in view of the above discussion, it is respectfully submitted that a *prima facie* case of obviousness cannot be established with respect to claims 1 and 15, and withdrawal of this rejection is respectfully requested.

As mentioned above, applicant submits that independent claim 1 is patentable and therefore, claims 2-6, 8, 9, and 12, which depend from claim 1, are also considered to be patentable as containing all of the elements of claim 1, as well as for their respective recited features.

5. Rejection of claims 7 and 16 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 5,287,112 (*Schuermann*) in view of U.S. patent no. 6,593,845 (*Friedman et al.*) and further in view of U.S. patent no. 6,317,027 (*Watkins*)

Reconsideration of this rejection is respectfully requested on the basis that the *Watkins* patent fails to provide for the deficiencies of the proposed combination of the *Schuermann* and *Friedman* patents, as discussed above in detail with respect to claims 1 and 15, from which claims 7 and 16 respectively depend.

Accordingly withdrawal of this rejection is respectfully requested.

6. Rejection of claims 10 and 11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 5,287,112 (*Schuermann*) in view of U.S. patent no. 6,593,845 (*Friedman et al.*) and further in view of U.S. patent no. 5,319,569 (*Nichols et al.*)

Reconsideration of this rejection is respectfully requested on the basis that the *Nichols* patent fails to provide for the deficiencies of the proposed combination of the *Schuermann* and *Friedman* patents, as discussed above in detail with respect to claim 1, from which claims 10 and 11 depend.

Accordingly withdrawal of this rejection is respectfully requested.

7. Rejection of claims 13 and 14 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 5,287,112 (*Schuermann*) in view of U.S. patent no. 6,593,845 (*Friedman et al.*) and further in view of U.S. patent no. 5,491,715 (*Flaxl*)

Reconsideration of this rejection is respectfully requested on the basis that the *Flaxl* patent fails to provide for the deficiencies of the proposed combination of the *Schuermann* and *Friedman* patents, as discussed above in detail with respect to claim 1, from which claims 13 and 14 depend.

Accordingly withdrawal of this rejection is respectfully requested.

8. Conclusion

As a result of the amendment to the claims, and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicant's attorney, the examiner is invited to contact the undersigned at the numbers shown below.

BACON & THOMAS, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, Virginia 22314-1176
Phone: (703) 683-0500
Facsimile: (703) 683-1080

Date: October 9, 2009

Respectfully submitted,

/Patrick M. Buechner/

PATRICK M. BUECHNER
Attorney for Applicant
Registration No. 57,504

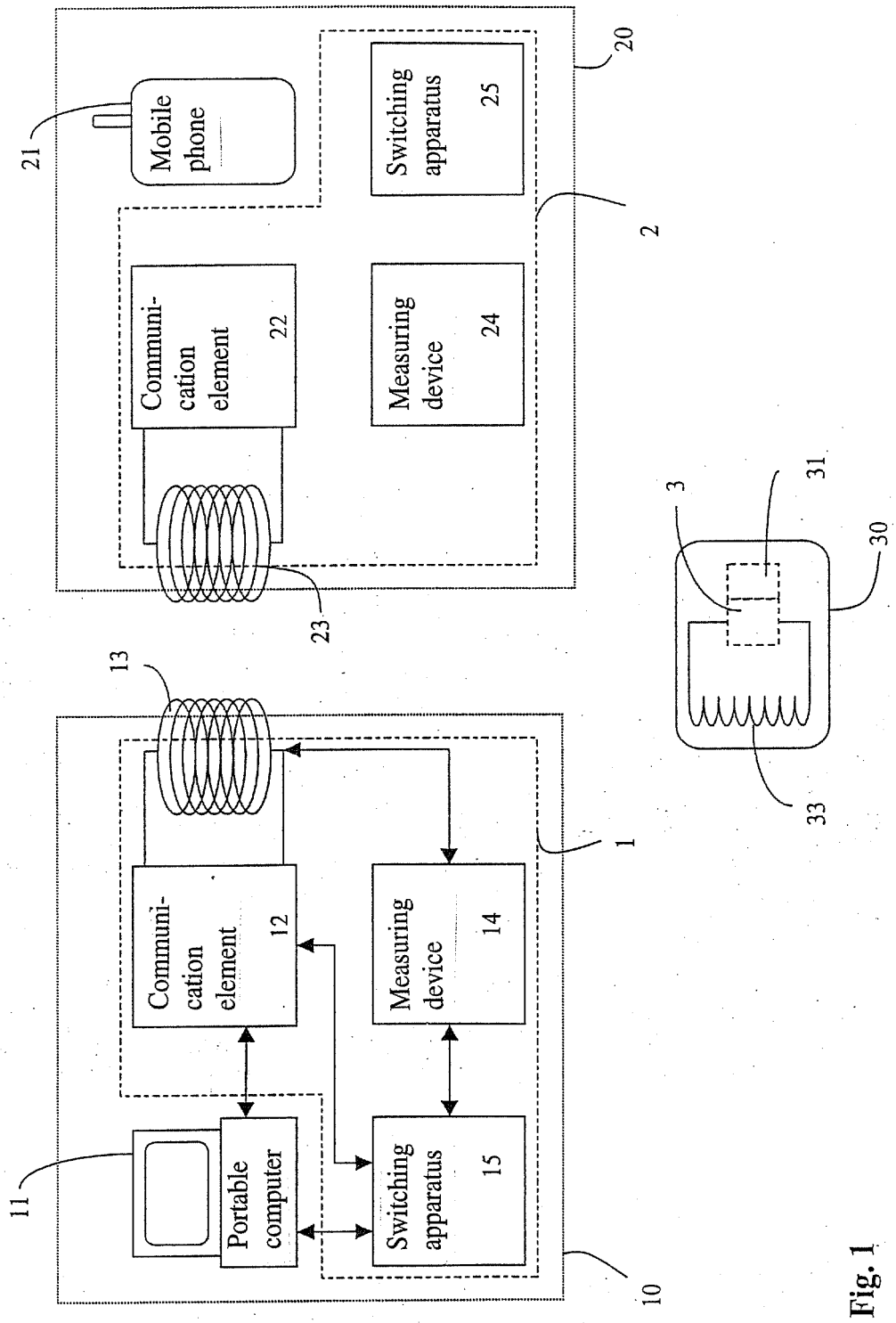

Mobile phone
21
Switching apparatus
25
20
Communi-cation element
22
Measuring device
24
2
23
13
Communi-cation element
12
Measuring device
14
1
11
Portable computer
Switching apparatus
15
10
3
31
30
33

Fig. 1

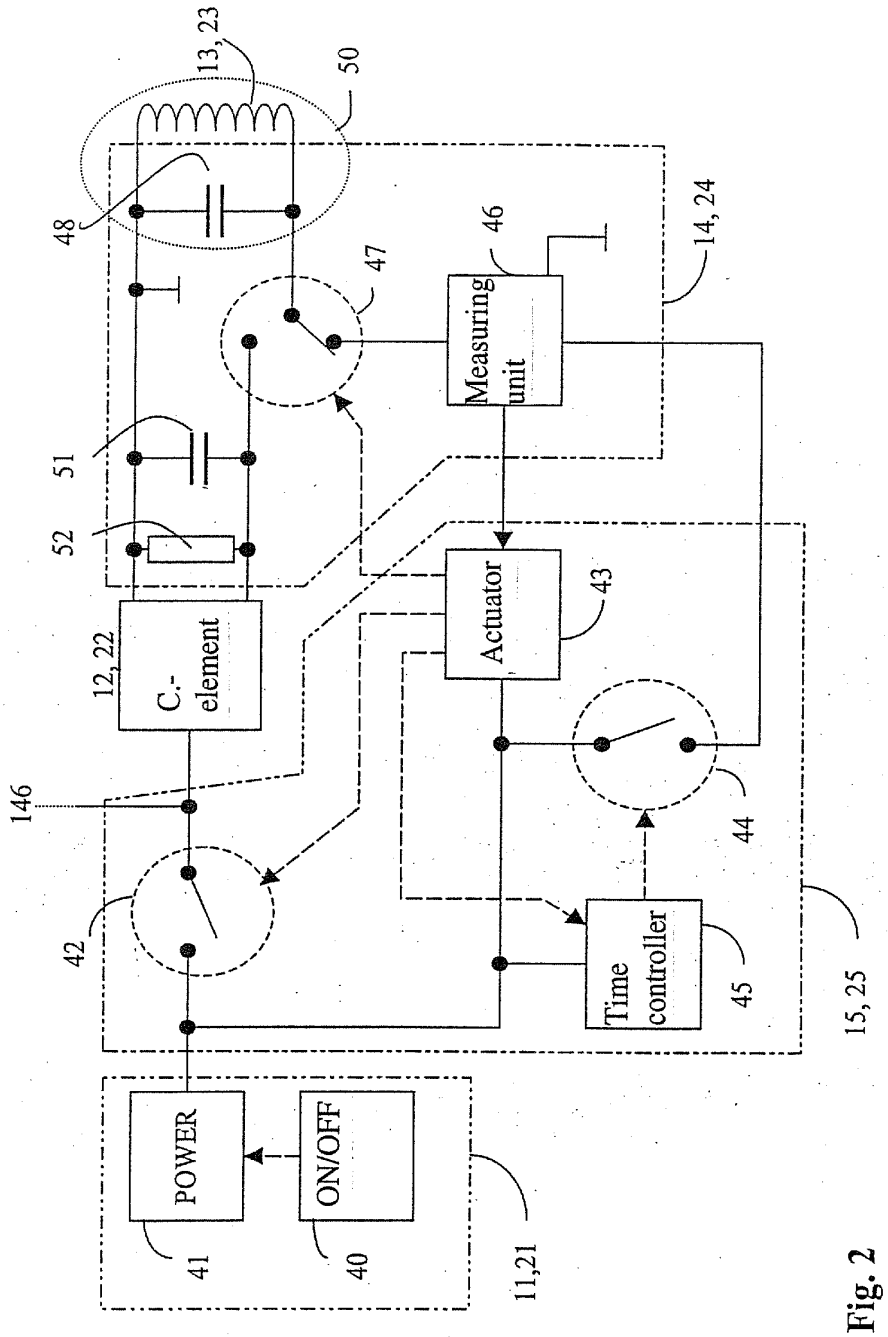

13, 23
50
48
47
46
Measuring unit
14, 24
51
52
12, 22
C.-element
Actuator
43
146
42
44
Time controller
45
15, 25
POWER
ON/OFF
41
40
11,21

Fig. 2

Fig. 3

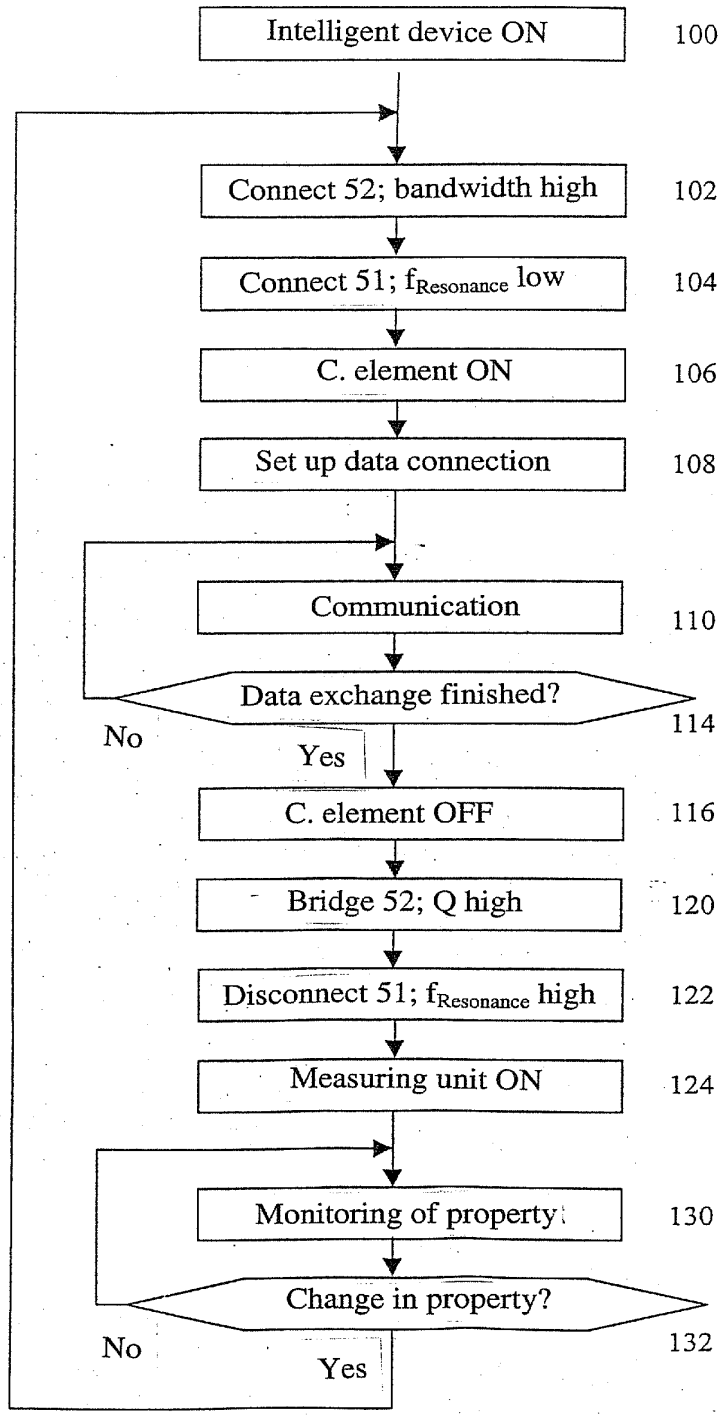
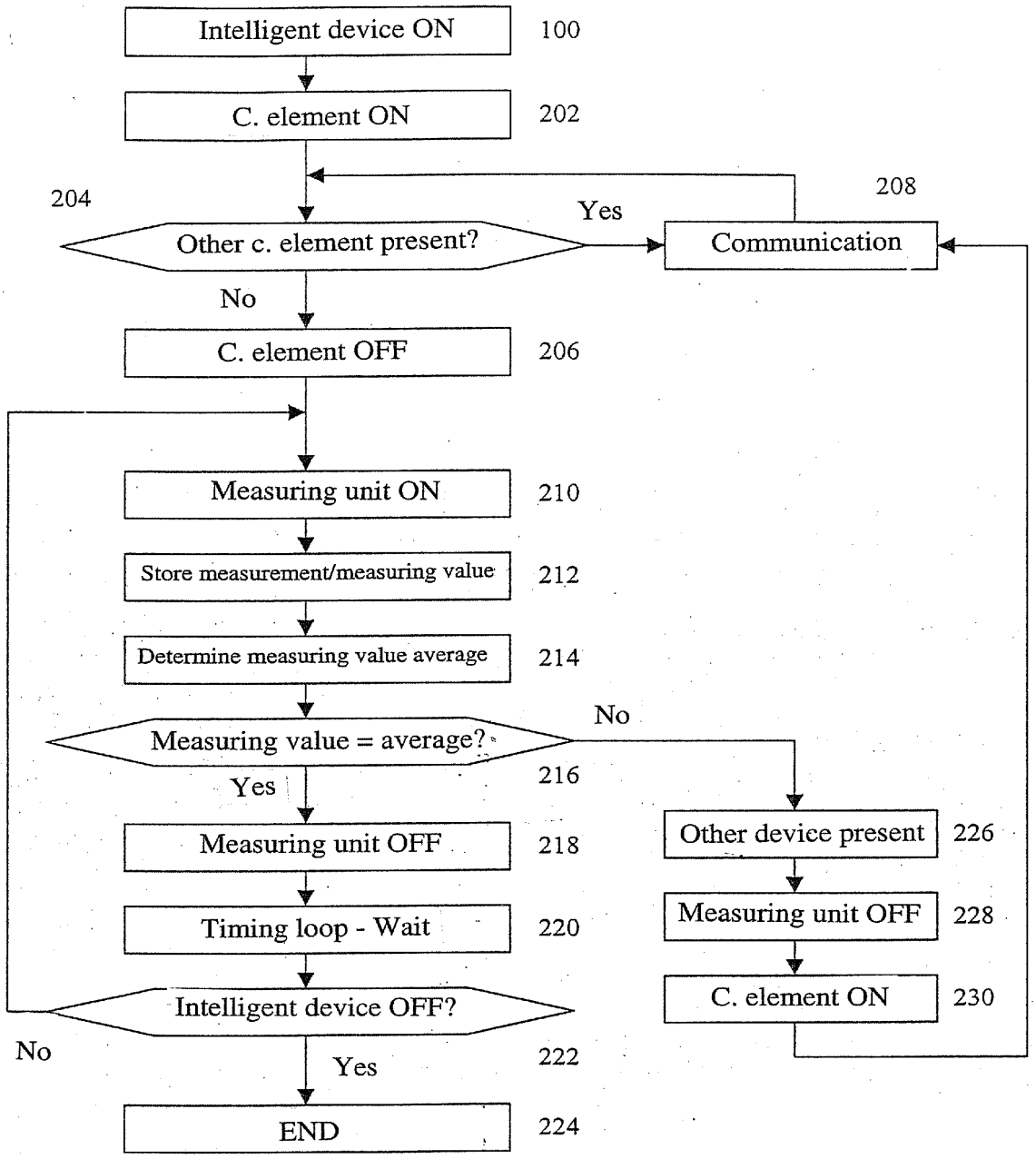

Intelligent device ON
100
Connect 52; bandwidth high
102
Connect 51; $f_{Resonance}$ low
104
C. element ON
106
Set up data connection
108
Communication
110
Data exchange finished?
114
No
Yes
C. element OFF
116
Bridge 52; Q high
120
Disconnect 51; $f_{Resonance}$ high
122
Measuring unit ON
124
Monitoring of property
130
Change in property?
132
No
Yes

Fig. 4


Intelligent device ON
100
C. element ON
202
204
Other c. element present?
Yes
208
Communication
No
C. element OFF
206
Measuring unit ON
210
Store measurement/measuring value
212
Determine measuring value average
214
Measuring value = average?
No
216
Yes
Measuring unit OFF
218
Timing loop - Wait
220
Intelligent device OFF?
No
Yes
222
END
224
Other device present
226
Measuring unit OFF
228
C. element ON
230

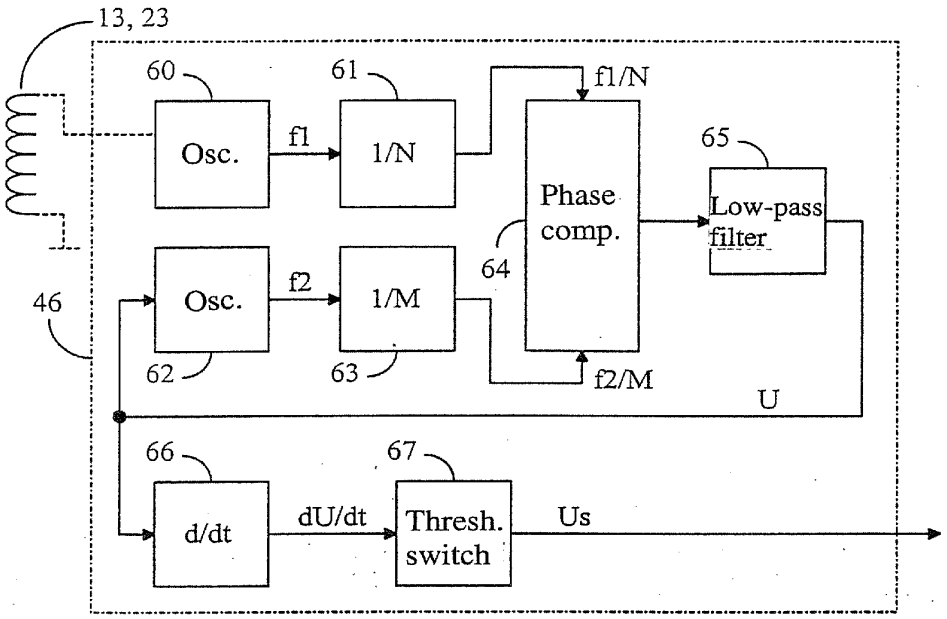

13, 23
60
Osc.
f1
61
1/N
f1/N
65
Phase comp.
Low-pass filter
64
46
Osc.
f2
1/M
62
63
f2/M
U
66
d/dt
dU/dt
67
Thresh. switch
Us

Fig. 5

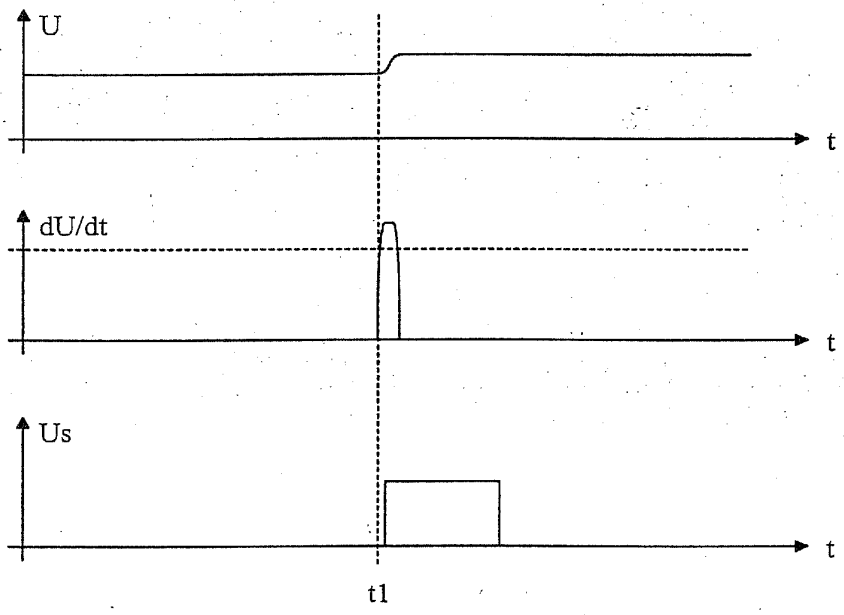

U
t
dU/dt
t
Us
t
t1

Fig. 6

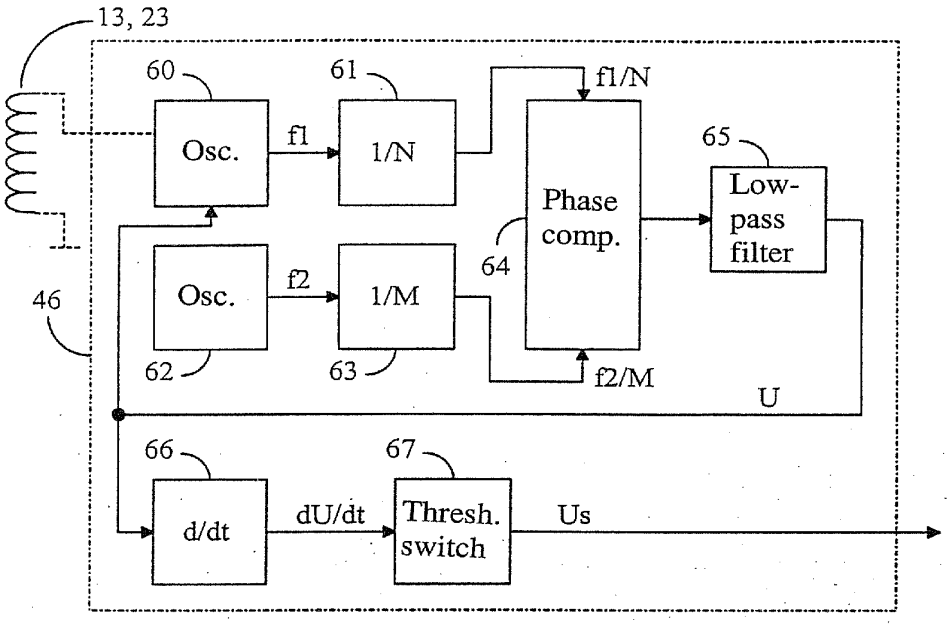

13, 23
60
61
f1/N
Osc.
f1
1/N
65
Phase comp.
Low-pass filter
64
Osc.
f2
1/M
46
62
63
f2/M
U
66
67
d/dt
dU/dt
Thresh. switch
Us

Fig. 7

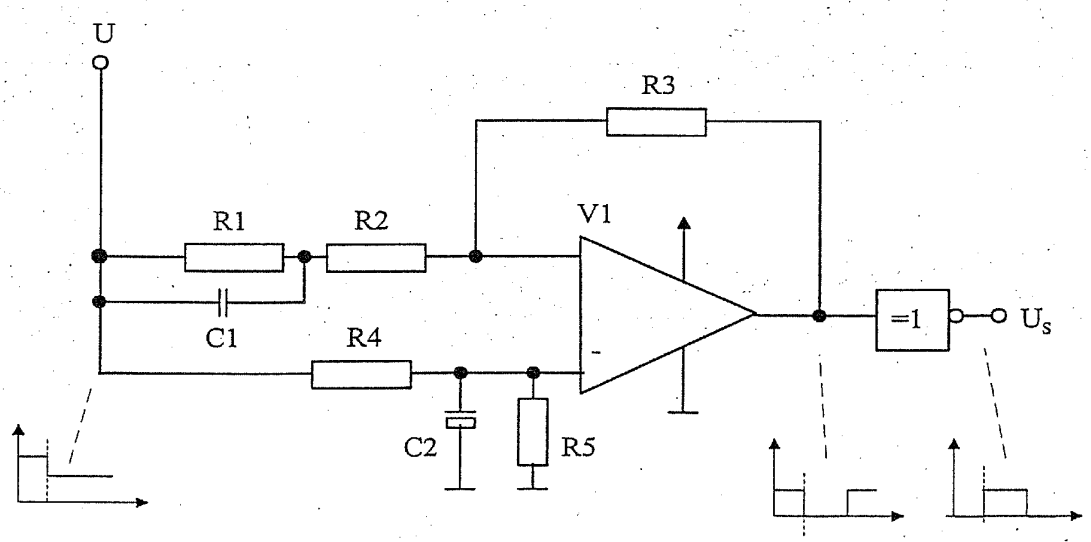

U
R3
R1
R2
V1
C1
R4
=1
Us
C2
R5

Fig. 8

Electronic Patent Application Fee Transmittal

Application Number:	10565732
Filing Date:	30-Jun-2006
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Filer:	Patrick Michael Buechner
Attorney Docket Number:	FINK3001JEK

Filed as Large Entity

U.S. National Stage under 35 USC 371 Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	1251	1	130	130

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**130**

Electronic Acknowledgement Receipt

EFS ID:	6240712
Application Number:	10565732
International Application Number:	
Confirmation Number:	1969
Title of Invention:	Communication device for establishing a data connection between intelligent appliances
First Named Inventor/Applicant Name:	Klaus Finkenzeller
Customer Number:	23364
Filer:	Patrick Michael Buechner
Filer Authorized By:	
Attorney Docket Number:	FINK3001JEK
Receipt Date:	09-OCT-2009
Filing Date:	30-JUN-2006
Time Stamp:	19:58:49
Application Type:	U.S. National Stage under 35 USC 371

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$130
RAM confirmation Number	5544
Deposit Account	020200
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. 1.492 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees) Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees) Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		amendment_100909.pdf	69837 706efc48907fa1cc48ebf963f4208ba4761335fe	yes	15

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	2
	Specification	3	4
	Drawings-only black and white line drawings	5	5
	Claims	6	8
	Applicant Arguments/Remarks Made in an Amendment	9	15

Warnings:					
Information:					
2	Drawings-only black and white line drawings	replacement_sheets_100909.pdf	533523 d3d0e4c86493b1a98711669a46f557baafcef8ac	no	6
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29967 75b427ef594cee1a8545bb950bd541d9608b9e48	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	633327		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
10/565,732	06/30/2006	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☐		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	10/09/2009	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	X $ =		OR	X $52=	0
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $ =		OR	X $220=	0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/KAREN VESTAL/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001JEK	1969

23364 7590 06/09/2009

BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

EXAMINER	
CURTIS III, CHARLES G	
ART UNIT	PAPER NUMBER
2612	

MAIL DATE	DELIVERY MODE
06/09/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,732	FINKENZELLER, KLAUS	
	Examiner	Art Unit	
	Charles G. Curtis III	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 January 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *08/25/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because it lacks section headings as required by 37 CFR 1.77(b) (see below). Appropriate correction is required.

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Drawings

3. The drawings are objected to because the drawing sheets are not numbered as required by 37 CFR 1.84(t). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1-14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 1 recites the limitation "the data processing component" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Therefore, claims 2-14 depending therefrom are also rejected.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. **Claims 1-6, 8, 9, 12 and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuermann (U.S. Patent No. 5,287,112) in view of Friedman et al. (hereinafter "Friedman" - U.S. Patent No. 6,593,845).

Regarding claim 1, Schuermann discloses a communication apparatus for setting up a data connection between intelligent devices, comprising:

- a transmission oscillator (resonant circuit 28) for carrying out a contactless data exchange, said oscillator including a coil (Column 4 Lines 42-44 and 50-52);

- a communication element (control circuit 16) which is connected to the coil and the data processing component of an intelligent device and which emits search signals via the coil to receive a response from another intelligent device (Column 3 Lines 46-54);

Schuermann does not disclose:

- a measuring device for monitoring a property of the transmission oscillator which outputs a control signal when ascertaining a change of the monitored property; and
- a switching apparatus which is connected to the measuring device and the communication element and which switches on the communication element when it has received a control signal from the measuring device.

However, the preceding limitations are known in the art of communications. Friedman discloses an RF tag with a wake-up circuit (Figure 2) wherein a measuring device (comprising RF detect circuit 32) monitors for an interrogating signal and actuates a switch (flip flop 44) to power on the tag when a valid interrogating signal is detected (Column 6 Lines 17-40). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Schuermann with Friedman as the suggestion lies in Friedman that the RF detect circuit can be part of an RF receiver/transmitter (i.e. coupled with the transmission oscillator; Column 5 Lines 8-11) and switching on the transponder/tag only when needed prolongs battery life and/or saves energy.

Regarding claim 2, Schuermann in view of Friedman teaches the apparatus of claim 1 as discussed above. Schuermann further discloses an assembly that is switchable to the transmission oscillator via a switch (the tuning circuit consisting of capacitor 56 and resistor 58 connects to resonant circuit 34 via switch 54 to form new resonant circuit 60), said assembly

causing an increase in the bandwidth of the oscillating circuit (Column 5 Lines 47-59; one of ordinary skill in the art could combine this arrangement from the transponder with the interrogator since it is known in the art that interrogators can act as transponders and receive data from other transponders).

Regarding claim 3, Schuermann in view of Friedman teaches the apparatus of claim 2 as discussed above. Schuermann further discloses that the assembly is a resistive element (the tuning circuit is a resistive element since it comprises a resistor).

Regarding claim 4, Schuermann in view of Friedman teaches the apparatus of claim 1 as discussed above. Schuermann further discloses including an assembly (capacitor 52) switchable to the transmission oscillator via a switch (switch 50), said assembly causing a change in the resonant frequency of the transmission oscillator (Column 5 Lines 13-19).

Regarding claim 5, Schuermann in view of Friedman teaches the apparatus of claim 4 as discussed above. Schuermann further discloses that the assembly causes a reduction in the resonant frequency (Column 5 Lines 13-15).

Regarding claim 6, Schuermann in view of Friedman teaches the apparatus of claim 4 as discussed above. Schuermann further discloses that that the assembly comprises a capacitor (see above).

Regarding claim 8, Schuermann in view of Friedman teaches the apparatus of claim 1 as discussed above. Friedman further discloses that the switching apparatus has a time controller (oscillator 36 and comparator 38) for cyclically switching the measuring device on and off (Column 5 Lines 16-24 and Column 6 Lines 36-40).

Regarding claim 9, Schuermann in view of Friedman teaches the apparatus of claim 8 as

discussed above. Friedman further discloses that the time controller keeps the on state of the measuring device shorter than the off state (Column 5 Lines 16-18 and Column 6 Lines 36-40).

Regarding claim 12, Schuermann in view of Friedman teaches the apparatus of claim 8 as discussed above. While the combination does not expressly disclose that when the intelligent device is switched on, the communication element is initially on and the measuring device off, this is an obvious matter of design choice (the specification of the present application does not seem to give a reason for or an advantage to having this arrangement), which does not patentably distinguish the invention over the prior art.

Regarding claim 15, Schuermann discloses a communication element designed to use a coil, which is part of a transmission oscillator, for automatically setting up a data connection with an intelligent device likewise having a communication element and a coil (see regarding claim 1 above). Schuermann does not disclose the method steps of:

- monitoring a parameter of the transmission oscillator by means of a measuring device;
- producing a control signal upon the occurrence of a change in the monitored property; and
- switching on the communication element by a switching apparatus due in response to the control signal.

However, the preceding limitations are known in the art of communications. Friedman discloses an RF tag with a wake-up circuit (Figure 2) wherein a measuring device (comprising RF detect circuit 32) monitors for an interrogating signal and actuates a switch (flip flop 44) to power on the tag when a valid interrogating signal is detected (Column 6 Lines 17-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Schuermann with Friedman as the suggestion lies in Friedman that the RF detect circuit can be part of an RF receiver/transmitter (i.e. coupled with the transmission oscillator; Column 5 Lines 8-11) and switching on the transponder/tag only when needed prolongs battery life and/or saves energy.

10. **Claims 7 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuermann in view of Friedman as applied to claim 1 above, and further in view of Watkins (U.S. Patent No. 6,317,027).

Regarding claim 7, Schuermann in view of Friedman teaches the apparatus of claim 1 as discussed above. The combination does not teach that the measuring frequency of the measuring device is sweepable over a predetermined frequency domain.

However, the preceding limitation is known in the art of communications. Watkins discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the apparatus of Schuermann in view of Friedman with the addition of sweeping over a frequency range as the motivation lies in Watkins that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

Regarding claim 16, Schuermann in view of Friedman teaches the method of claim 16 as discussed above. The combination does not teach that the measuring frequency of the measuring unit is swept over a given frequency domain during the monitoring of the property.

However, the preceding limitation is known in the art of communications. Watkins discloses an auto-tuning RFID reader, wherein a range of frequencies are scanned when searching for devices/transponders (Figure 2 and Column 3 Lines 44-62). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the method of Schuermann in view of Friedman with the addition of sweeping over a frequency range as the motivation lies in Watkins that off-frequency tags/transponders can be more reliably detected (Column 2 Lines 13-23).

11. **Claims 10 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuermann in view of Friedman as applied to claim 8 above, and further in view of Nichols et al. (hereinafter "Nichols" – U.S. Patent No. 5,319,569).

Regarding claim 10, the combination of Schuermann in view of Friedman teaches the apparatus of claim 8 as discussed above. The combination does not disclose that the measuring device stores a measuring value obtained during a cyclical on phase.

However, the preceding limitation is known in the art of communications. Nichols discloses a method and device for averaging signal measurements, including frequency and phase, wherein a measured value is stored and ultimately averaged with other values (Figure 6 and Column 7 Lines 3-32). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the storing and averaging method of Nichols with the apparatus of Schuermann in view of Friedman as the motivation lies in Nichols that signal averaging is well-known practice in the art of communications to reduce the impact of noise on signal measurements and to establish a baseline (Column 1 Lines 28-34).

Regarding claim 11, Schuermann in view of Friedman and further in view of Nichols teaches the apparatus of claim 10 as discussed above. The combination further teaches that the measuring device emits a control signal to the switching apparatus when a measuring value deviates from the average of the measuring values stored with the previous on phases (Friedman discloses using a threshold value with the RF detect circuit (e.g. Column 6 Lines 32-36), and it would be obvious to use the average value of Nichols to define this threshold value since the average value represents a baseline when no other devices are present - i.e. when the communication element should be off - and deviating from this value means another device is in range and that the element should be switched on).

12. **Claims 13 and 14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuermann in view of Friedman as applied to claim 1 above, and further in view of Flaxl (U.S. Patent No. 5,491,715).

Regarding claim 13, the combination of Schuermann in view of Friedman teaches the apparatus of claim 1 as discussed above. The combination does not disclose that the measuring device has a first oscillator device coupled at least temporarily with the coil for producing a first oscillation signal, and a second oscillator device for producing a second oscillation signal.

However, the preceding is known in the art of communications. Flaxl discloses an antenna tuning method and circuit, wherein a first oscillator device (antenna resonance circuit 18) and a second oscillator device (osc/xmit circuitry 44) are fed into a phase comparator to perform adjustments to the device based on feedback (Figure 7 and Column 5 Line 33 - Column 4 Line 6). It would have been obvious to one of ordinary skill in the art at the time the invention

was made to combine the apparatus of Schuermann in view of Friedman with the circuit disclosed in Flaxl as the phase comparison circuit in Flaxl can be used to ascertain a change in the signal from the coil, which is a way of monitoring for an interrogating signal as done by the RF detect circuit in Friedman (i.e. the RF detect circuit in Friedman could be implemented as the phase comparison circuit of Flaxl).

Regarding claim 14, Schuermann in view of Friedman and further in view of Flaxl teaches the apparatus of claim 13 as discussed above. The combination further teaches producing the control signal for the switching apparatus on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom (in Flaxl, the phase comparator 60 outputs a signal to the control unit 50 which adjusts the antenna resonance circuit 18; as discussed above, the phase comparator circuit with resulting control signal could be used as the RF detect circuit of Friedman).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Rotzoll (U.S. Patent No. 5,790,946) discloses a wake up device for a communications system.
- Finkenzeller et al. (U.S. Patent No. 7,209,014) – this commonly assigned patent with a common inventor discloses a switching device with similar subject matter to the present application.
- Orthmann et al. (U.S. Patent No. 5,489,908) discloses an apparatus and method for

identifying multiple transponders.

- Lanzl et al. (U.S. Patent No. 6,353,406) discloses a dual mode tracking system.
- Heide et al. (U.S. Patent No. 6,894,572) discloses a device for producing an oscillator signal in a wireless tag.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles G. Curtis III whose telephone number is 571-270-7493. The examiner can normally be reached on Monday - Friday 7:30 AM - 4:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Wu can be reached on 571-272-2964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Charles G Curtis III/

/Daniel Wu/
Supervisory Patent Examiner, Art Unit 2612

Notice of References Cited	Application/Control No. 10/565,732	Applicant(s)/Patent Under Reexamination FINKENZELLER, KLAUS	
	Examiner Charles G. Curtis III	Art Unit 2612	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-5,287,112	02-1994	Schuermann, Josef H.	342/42
*	B	US-6,593,845	07-2003	Friedman et al.	340/10.33
*	C	US-5,319,569	06-1994	Nichols et al.	702/199
*	D	US-6,317,027	11-2001	Watkins, Randy	340/10.1
*	E	US-5,491,715	02-1996	Flaxl, Thomas J.	375/344
*	F	US-5,790,946	08-1998	Rotzoll, Robert R.	455/343.1
*	G	US-7,209,014	04-2007	Finkenzeller et al.	331/117FE
*	H	US-5,489,908	02-1996	Orthmann et al.	340/10.32
*	I	US-6,353,406	03-2002	Lanzl et al.	342/118
*	J	US-6,894,572	05-2005	Heide et al.	331/74
	K	US-			
	L	US-			
	M	US-			

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
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	S					
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NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Charles G Curtis III	2612

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/07/2009								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
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	7	✓								
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	10	✓								
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	12	✓								
	13	✓								
	14	✓								
	15	✓								
	16	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	10565732	FINKENZELLER, KLAUS
	Examiner	Art Unit
	Charles G Curtis III	2612

SEARCHED			
Class	Subclass	Date	Examiner
340	10.1-10.6	05/28/2009	CGC
455	41.1, 106	05/28/2009	CGC

SEARCH NOTES		
Search Notes	Date	Examiner
PLUS Search	05/28/2009	CGC
Inventor/Assignee Search (PALM/EDAN)	05/28/2009	CGC
EAST Search Printout	06/07/2009	CGC

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

B/O Form PTO-1449	Attv. Docket Number	Serial Number:
	FINK3001/JEK	10/565,732
U.S. Department of Commerce Patent and Trademark Office	Applicant: **Klaus FINKENZELLER**	
Information Disclosure Statement by Applicant	Filing Date: **January 24, 2006**	Group: **2635**

U.S. Patent Documents

Examiner Initial		Document Number	Date	Patentee/Applicant	Class	Subclass	Filing Date if Appropriate
		2005/0156752	07/21/2005	FINKENZELLER et al.			

Foreign Patent Documents

Examiner Initial		Document Number	Publication Date	Country/Agency	Class	Subclass	Translation Yes	Translation No
		~~DE 34 42 640~~	~~10/17/1985~~	~~GERMANY~~				X
		~~DE 102 06 676~~	~~08/28/2003~~	~~GERMANY~~				X
		~~DE 198 55 287~~	~~05/18/2000~~	~~GERMANY~~				X
		EP 0 696 011	02/07/1996	EPO			X	
		~~EP 1 024 451~~	~~08/02/2000~~	~~EPO~~				X

Other Documents (Including Author, Title, Date, Pertinent Pages, Place of Publication, Etc.)

Examiner	/Charles Curtis III/	Date Considered	05/28/2009

***EXAMINER:** Initial if citation is considered, whether or not citation is in conformance with MPEP 609; Draw a line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.*

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /CGC/

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10/565,732	06/30/2006 RULE	340	2612	FINK3001JEK

APPLICANTS
Klaus Finkenzeller, Unterfohring, GERMANY;

**** CONTINUING DATA ***************************
This application is a 371 of PCT/EP04/08537 07/29/2004

**** FOREIGN APPLICATIONS ***************************
GERMANY 103 34 765.8 07/30/2003

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
07/22/2006

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /CHARLES G CURTIS III/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		GERMANY	6	16	2

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TITLE
Communication device for establishing a data connection between intelligent appliances

FILING FEE RECEIVED		
1030	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	("20050156752").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 15:44
S2	4	"7209014".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 15:50
S5	2	("6150948" | "6703920").PN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/05/28 15:51
S7	2519	340/10.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 15:58
S8	2122	"near" field communication	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 17:14
S9	4889	340/10.1-10.6.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 17:17
S10	956	455/41.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 17:19
S12	194	S10 and oscillator	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 17:31

S13	2	"5489908".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 17:34
S14	77	("5489908").URPN.	USPAT	ADJ	ON	2009/05/28 17:39
S15	17	S14 and oscillator	USPAT	ADJ	ON	2009/05/28 17:44
S16	2	"20060244630".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/05/28 18:49
S18	6	(PLL (phase adj lock$3 adj loop) colpitts) near20 (oscillator coil) near20 switch$4 near12 (resonant adj frequency)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 10:44
S19	2	"20050156752".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 10:52
S20	5	(6703920|6150948).pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 11:05
S21	2530	340/10.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 11:57
S22	128	S21 and (oscillator) and (PLL (phase adj (lock locked) adj loop))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 11:57
S23	26	S22 and (bandwidth) near12(adjust$3 switch $3 change increase$1 decrease$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 12:07

S24	2	"20080208072".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 13:35
S25	5	"7100835".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 13:43
S26	2	"6894572".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/05 13:49
S38	2530	340/10.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 16:47
S39	2140	"near" field communication	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 16:47
S40	59	S39 and S38	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 16:47
S41	25	S39 and VCO	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 17:21
S42	34	(RFID (reader or interrogator or receiver)) and (VCO or voltage controlled oscillator)	USPAT	ADJ	ON	2009/06/05 18:06
S43	140	455/106.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 18:33

S44	960	455/41.1.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 18:35
S45	2	"5287112".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/05 18:44
S46	78	("5287112").URPN.	USPAT	ADJ	ON	2009/06/05 18:48
S47	1	"5491715".pn.	USPAT	ADJ	ON	2009/06/05 19:02
S48	1	"6353406".pn.	USPAT	ADJ	ON	2009/06/05 19:04
S49	2	DE-19855207-$.did.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/06 14:57
S50	89	(wake$up) with (reader or interrogator or writer) with (RFID or radio frequency identification)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 16:18
S54	2141	"near" field communication	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 16:47
S55	3	(wake$up) with circuit and S54	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 16:47
S56	180	340/10.33.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 18:13

S57	2	"5790946".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 18:14
S58	0	"11715428".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 20:46
S59	2	"11715428"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/06 20:46
S60	2	"5287112".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/07 11:57
S61	78	("5287112").URPN.	USPAT	ADJ	ON	2009/06/07 11:57
S62	33	S61 and (Q$factor or bandwidth)	USPAT	ADJ	ON	2009/06/07 12:05
S63	1	"6946989".pn.	USPAT	ADJ	ON	2009/06/07 12:11
S72	1	S63 and wake up and bandwidth and q factor	USPAT	ADJ	ON	2009/06/07 12:13
S73	109	(sweep$3) near10 (frequenc$5) near10 (store or save or write)	USPAT	ADJ	ON	2009/06/07 13:48
S74	2	S73 and RFID	USPAT	ADJ	ON	2009/06/07 13:49
S77	96	(PSC near2 scanning).as.	USPAT	ADJ	ON	2009/06/07 14:00
S78	13	S77 and rfid	USPAT	ADJ	ON	2009/06/07 14:00
S79	1	"5185700".pn.	USPAT	ADJ	ON	2009/06/07 14:04
S81	542	(sweep$3 or scan$5) near10 (frequenc$5) near10 (store or save or write)	USPAT	ADJ	ON	2009/06/07 14:05

S82	17	(sweep$3 or scan$5) near10 (frequenc$5) near10 (store or save or write) and rfid	USPAT	ADJ	ON	2009/06/07 14:05
S83	152	(sweep$3 or scan$5) near10 (frequenc$5) near10 (store or save or write) and average	USPAT	ADJ	ON	2009/06/07 14:13
S84	405	(frequenc$5 and (sweep $3 or scan$5)).ti.	USPAT	ADJ	ON	2009/06/07 14:32
S85	3898	"334".clas.	USPAT	ADJ	ON	2009/06/07 14:36
S86	0	S85 and ((store or save or write) with (average or mean))	USPAT	ADJ	ON	2009/06/07 14:37
S87	0	S85 and ((store or save or write) near20 (average or mean))	USPAT	ADJ	ON	2009/06/07 14:37
S88	12	S85 and ((store or save or write) and (average or mean))	USPAT	ADJ	ON	2009/06/07 14:37
S89	3810	average frequency	USPAT	ADJ	ON	2009/06/07 14:48
S90	99	(average frequency) near5 (stor$6 or writ$5 or sav$6)	USPAT	ADJ	ON	2009/06/07 14:49
S91	8	("4680540").URPN.	USPAT	ADJ	ON	2009/06/07 14:57
S92	830	(PLL (phase adj lock$3 adj loop) colpitts) and RFID	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/07 16:04
S93	148	(PLL (phase adj lock$3 adj loop) colpitts) and RFID and ((wake adj up) or wakeup)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/07 16:08
S94	3	(PLL (phase adj lock$3 adj loop) colpitts) near20 ((wake adj up) or wakeup) and RFID	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/07 16:09

S95	127	(PLL (phase adj lock$3 adj loop) colpitts) near20 ((wake adj up) or wakeup)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/07 16:18
S96	2	"20010050580".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2009/06/07 16:30
S97	0	(wake$up or wake up) with (reader or interrogator or writer) with (RFID or radio frequency identification) with (PLL or phase locked loop or colpitts)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/07 16:37
S98	0	(wake$up or wake up) with (reader or interrogator or writer) with (PLL or phase locked loop or colpitts)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/07 16:37
S99	28	PHASE LOCKED LOOP with (wake up or wakeup or wake-up)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/07 16:40
S100	545	(sweep$3 or scan$5) near10 (frequenc$5) and rfid	USPAT	ADJ	ON	2009/06/07 17:36
S101	1	"7044373".pn.	USPAT	ADJ	ON	2009/06/07 17:38

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PLUS Search Results for S/N 10565732, Searched Thu May 28 15:48:38 EDT 2009

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APPLICATION NUMBER	FILING OR 371(c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/565,732	06/30/2006	Klaus Finkenzeller	FINK3001JEK

CONFIRMATION NO. 1969

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
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ALEXANDRIA, VA22314

Title: Communication device for establishing a data connection between intelligent appliances

Publication No. US-2006-0244630-A1
Publication Date: 11/02/2006

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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Pre-Grant Publication Division, 703-605-4283

IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application
Klaus FINKENZELLER **Confirmation No. 1969**

Serial Number: 10/565,732 **Group Art Unit: 2635**

Filed: January 24, 2006 **Examiner: Unassigned**

Attorney Docket No. FINK3001/JEK

For: COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to Rule 37 C.F.R. §1.51(b), §1.56, §1.97, and §1.98, this Information Disclosure Statement is submitted in the above-identified patent application. A listing of documents to be published on the face of any patent granted from this application is submitted herewith on Form PTO-1449. Any other documents or information submitted for consideration by the Examiner are listed in this paper. A copy of each U.S. and foreign patent, or each publication or portion thereof listed or herein identified is submitted herewith, except that (1) a copy of any U.S. patent application identified herein or any patent, publication or other information listed herein cited or submitted in a prior application relied upon for an earlier filing date under 35 U.S.C. §120 and identified below, is not submitted herewith, and (2) a copy of any U.S. patent or published patent application identified herein is not submitted herewith, if this application was filed or entered the U.S. national stage on or after June 30, 2003 (or if applicable, this international application entered the U.S. national stage on or after June 30, 2003).

ADDITIONAL DOCUMENTS OR INFORMATION NOT LISTED ON ACCOMPANYING FORM PTO-1449 SUBMITTED FOR CONSIDERATION

International Search Report mailed November 5, 2004 in International Patent Application No. PCT/EP2004/008537, of which this application is the U.S. national stage.

CONCISE STATEMENT OF RELEVANCY (NON-ENGLISH LANGUAGE DOCUMENTS ONLY)

All of the documents identified on the appended PTO-1449 form are mentioned in the appended International Search Report established in PCT/EP2004/008537, of which this application is the U.S. national stage. The relevancy of the documents is evident from the International Search Report.

STATEMENT REGARDING TRANSLATIONS

English language translations of the non-English language documents are not readily available to Applicants' attorney, apart from any English language abstracts that may be appended to the documents. The examiner is requested to note that English language patents or patent applications corresponding to the non-English language documents may be identified in the documents accompanying this paper.

STATEMENT OF CUMULATIVE INFORMATION

US 2005/0156752 corresponds to DE 102 06 676.

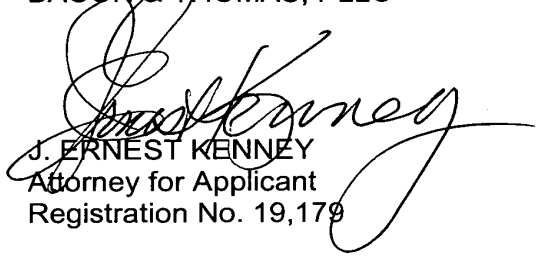
STATEMENT OF TIMELINESS

This Information Disclosure Statement is submitted prior to the mailing date of the first Office Action on the merits received by Applicant in the above-identified application.

Serial Number: 10/565,732
Attorney Docket: FINK3001/JEK

The Examiner is requested to acknowledge consideration of the information provided in this paper in accordance with prescribed procedures.

Respectfully submitted,
BACON & THOMAS, PLLC



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B/O Form PTO-1449	Attv. Docket Number	Serial Number:
	FINK3001/JEK	10/565,732
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Information Disclosure Statement by Applicant	Filing Date: **January 24, 2006**	Group: **2635**

U.S. Patent Documents

Examiner Initial		Document Number	Date	Patentee/Applicant	Class	Subclass	Filing Date if Appropriate
		2005/0156752	07/21/2005	FINKENZELLER et al.			

Foreign Patent Documents

Examiner Initial		Document Number	Publication Date	Country/Agency	Class	Subclass	Translation	
							Yes	No
		DE 34 12 610	10/17/1985	GERMANY				X
		DE 102 06 676	08/28/2003	GERMANY				X
		DE 198 55 207	05/18/2000	GERMANY				X
		EP 0 696 011	02/07/1996	EPO			X	
		EP 1 024 451	08/02/2000	EPO				X

Other Documents (Including Author, Title, Date, Pertinent Pages, Place of Publication, Etc.)

Examiner	Date Considered

***EXAMINER:** Initial if citation is considered, whether or not citation is in conformance with MPEP 609; Draw a line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.*

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DEUTSCHES PATENTAMT

(12) **Offenlegungsschrift**

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(72) Erfinder:

Antrag auf Nichtnennung

(54) Verfahren zur Datenübertragung und Datenübertragungssystem

Die Erfindung betrifft ein Verfahren bzw. ein System, bei dem Daten zwischen einem Sender und einem relativ dicht benachbarten Empfänger übertragen werden, insbesondere zwischen einem Empfänger und einem Sender eines Transportsystems, die sich im Verlauf einer Relativbewegung für ein begrenztes Zeitintervall bis auf einen vorgegebenen Abstand nähern. Gemäß der Erfindung wird die Dämpfung eines Senderschwingkreises in Abhängigkeit von den zu übertragenden Daten verändert, und die Änderung der Schwingungsamplitude wird in dem berührungslos mit dem Senderschwingkreis gekoppelten Empfänger ausgewertet.

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BUNDESDRUCKEREI 08. 85 508 042/67 6/60

HOEGER, STELLRECHT & PARTNER
PATENTANWÄLTE
UHLANDSTRASSE 14 c · D 7000 STUTTGART 1

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A 46 092 b
k - 189
3. April 1984

Anmelder: Gebhard Balluff
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Patentansprüche

1. Verfahren zur Datenübertragung zwischen einem Sender und einem diesem relativ dicht benachbarten Empfänger, insbesondere zwischen einem Empfänger und einem Sender eines Transportsystems, die sich im Verlauf einer Relativbewegung für ein begrenztes Zeitintervall bis auf einen vorgegebenen Abstand nähern, dadurch g e k e n n z e i c h n e t , daß man die Dämpfung eines Senderschwingkreises in Abhängigkeit von den zu übertragenden Daten zwischen mindestens zwei Werten ändert, daß man den Senderschwingkreis berührungslos mit einem Empfängerschwingkreis koppelt und daß man die durch eine Dämpfungsänderung im Senderschwingkreis hervorgerufene Änderung der Schwingungsamplitude empfängerseitig auswertet.

2. Datenübertragungssystem zur Durchführung des Verfahrens nach Anspruch 1 mit einem Sender und mit einem diesem relativ dicht benachbarten Empfänger, insbesondere zwischen einem Empfänger und einem Sender, die sich im Verlauf einer Relativbewegung für ein begrenztes Zeitintervall bis auf einen vorgegebenen Abstand nähern, dadurch gekennzeichnet, daß der Sender ausgangsseitig einen Sender-

schwingkreis aufweist, dessen Dämpfung in Abhängigkeit von den zu übertragenden Daten mittels zugeordneter Schalteinrichtungen zwischen mindestens zwei verschiedenen Werten umschaltbar ist, daß der Empfänger eingangsseitig einen Empfängerschwingkreis aufweist, der induktiv mit dem Senderschwingkreis gekoppelt ist und daß Auswerteeinrichtungen vorgesehen sind, mit deren Hilfe empfangsseitig die Schwingungsamplitude der gekoppelten Schwingkreise auswertbar ist.

3. Datenübertragungssystem nach Anspruch 2, dadurch gekennzeichnet, daß die Schwingkreise Schwingkreisspulen aufweisen, die transformatorisch gekoppelt sind.

4. Datenübertragungssystem nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß die Schalteinrichtungen einen Schalter umfassen, der zu einem im Senderschwingkreis liegenden Widerstand parallel geschaltet ist.

5. Datenübertragungssystem nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, daß die zu übertragenden Daten in einem Speicher des Senders gespeichert sind.

6. Datenübertragungssystem nach Anspruch 5, dadurch gekennzeichnet, daß der Speicher ein Lesespeicher ist.

7. Datenübertragungssystem nach Anspruch 6, dadurch gekennzeichnet, daß der Speicher ein Schreib/Lese-Speicher ist.

8. Datenübertragungssystem nach einem der Ansprüche 2 bis 7 für ein Transportsystem mit längs mindestens einer Strecke verfahrbaren Fahrzeugen, dadurch gekennzeichnet, daß der Sender an einem Fahrzeug des Transportsystems montiert ist und daß der Empfänger an einer vorgegebenen Position an der Strecke des Transportsystems angeordnet ist.

9. Datenübertragungssystem nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß die Schalteinrichtungen einen Schalter in Serie zu einem parallel zu der Schwingkreiskapazität liegenden Widerstand umfassen.

10. Datenübertragungssystem nach einem der Ansprüche 2 bis 9, dadurch gekennzeichnet, daß dem Empfängerschwingkreis ein aus einer Speisespannungsquelle gespeister Oszillator zugeordnet ist und daß die elektrische Energie für das Arbeiten des Senders induktiv aus dem Empfängerschwingkreis in den Senderschwingkreis eingekoppelt wird.

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3. April 1984

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Gartenstraße 21
7303 Neuhausen

Verfahren zur Datenübertragung und Datenübertragungssystem

Die Erfindung betrifft ein Verfahren zur Datenübertragung zwischen einem Sender und einem diesem relativ dicht benachbarten Empfänger, insbesondere zwischen einem Empfänger und einem Sender eines Transportsystems, die sich im Verlauf einer Relativbewegung für ein begrenztes Zeitintervall bis auf einen vorgegebenen Abstand nähern sowie ein Datenübertragungssystem zur Durchführung des Verfahrens.

Für die Übertragung von Daten zwischen einem Sender und einem Empfänger sind zahlreiche Verfahren bekannt geworden. Insbesondere ist es bei der Datenübertragung zwischen Empfängern und Sendern eines Transportsystems bekannt, die Daten per Funk, durch Infrarotstrahlung und mittels Ultraschall zu übertragen, wobei alle drei Verfahren teils störanfällig und teils technisch relativ aufwendig sind, so daß neben diesen berührungslos arbeitenden Datenübertragungssystemen auch Systeme eingesetzt werden, bei denen die Datenübertragung über Drahtleitungen erfolgt, an welchen Schleifer der

- 5 -

Fahrzeuge entlanglaufen, was jedoch ebenfalls nicht in allen Fällen voll befriedigen kann.

Ausgehend vom Stand der Technik liegt der Erfindung die Aufgabe zugrunde, ein verbessertes Verfahren zur Datenübertragung anzugeben sowie ein entsprechendes Datenübertragungssystem, bei dem die Daten trotz geringen technischen Aufwands mit hoher Störsicherheit übertragen werden können, so daß sich das Datenübertragungsverfahren und das Datenübertragungssystem gemäß der Erfindung speziell für den Einsatz in Transportsystemen eignen.

Die gestellte Aufgabe wird, was das Verfahren anbelangt, gemäß der Erfindung dadurch gelöst, daß man die Dämpfung eines Senderschwingkreises in Abhängigkeit von den zu übertragenden Daten zwischen mindestens zwei Werten ändert, daß man den Senderschwingkreis berührungslos mit einem Empfängerschwingkreis koppelt und daß man die durch eine Dämpfungsänderung im Senderschwingkreis hervorgerufene Änderung der Schwingungsamplitude empfängerseitig auswertet.

Zur Durchführung des erfindungsgemäßen Datenübertragungsverfahrens hat sich dabei ein Datenübertragungssystem bewährt, welches dadurch gekennzeichnet ist, daß der Sender ausgangsseitig einen Senderschwingkreis aufweist, dessen Dämpfung in Abhängigkeit von den zu übertragenden Daten mittels zugeordneter Schalteinrichtungen zwischen mindestens zwei verschiedenen Werten umschaltbar ist,

daß der Empfänger eingangsseitig einen Empfängerschwingkreis aufweist, der induktiv mit dem Senderschwingkreis gekoppelt ist und daß Auswerteeinrichtungen vorgesehen sind, mit deren Hilfe empfangsseitig die Schwingungsamplitude der gekoppelten Schwingkreise auswertbar ist.

Ein besonserer Vorteil von Verfahren und System gemäß der Erfindung besteht darin, daß für die Dauer der Datenübertragung zwei einfache Schwingkreise derart gekoppelt werden, daß sie vom Empfänger her gesehen wie ein einziger Schwingkreis wirken, in dem die Schwingungsamplitude in Abhängigkeit von den zu übertragenden Daten, bei denen es sich in aller Regel um digitale Daten handelt, verändert wird. Auf diese Weise gelingt es, auf die üblichen, vergleichsweise komplizierten Sende- und Empfangseinrichtungen zu verzichten und so zu einem preiswerten aber zuverlässigen Datenübertragungssystem zu kommen.

Obwohl grundsätzlich eine kapazitive Kopplung der beiden Schwingkreise möglich ist, wird es in Ausgestaltung der Erfindung bevorzugt, wenn die Schwingkreisspulen der Schwingkreise des Senders und des Empfängers für die Datenübertragung transformatorisch gekoppelt werden, da bei dieser Art der Koppelung durch die Ausbildung und Anordnung der Schwingkreisspulen in besonders einfacher und wirksamer Weise Einfluß auf die Form des die Kreise koppelnden elektromagnetischen Feldes genommen werden kann.

Weiterhin hat es sich als vorteilhaft erwiesen, wenn die Schalteinrichtungen einen Schalter umfassen, der parallel zu einem im Senderschwingkreis liegenden Widerstand geschaltet ist, da auf diese Art den Werten 1 und 0 der zu übertragenden digitalen Daten besonders einfach eine bestimmte Schwingungsamplitude zugeordnet werden kann, da der Widerstand entweder als Dämpfungselement wirksam oder durch den Schalter überbrückt ist.

Bei Transportsystemen ist es häufig ausreichend, wenn einem bestimmten Fahrzeug eine fest vorgegebene Kennung zugeordnet ist, die beim Passieren von Auswerteeinrichtungen abgetastet werden kann. Für diesen Einsatzfall ist es günstig, wenn die zu übertragenden Daten in einem Lesespeicher am Fahrzeug gespeichert sind, beispielsweise in einem sogenannten ROM, der als PROM oder als EPROM ausgebildet sein kann. Wenn außer der Kennung zusätzliche Daten, wie z.B. Zielinformationen, Ladegutinformationen etc. übertragen werden sollen, dann empfiehlt sich dagegen der Einsatz eines Schreib/Lese-Speichers - RAM = Speicher mit wahlfreiem Zugriff. Auf jeden Fall ist es häufig vorteilhaft, die zu übertragenden Daten in einem Speicher des Senders zu speichern.

Bei einem Datenübertragungssystem gemäß der Erfindung für ein Transportsystem mit längs mindestens einer Strecke verfahrbaren Fahrzeugen ist es in Ausgestaltung der Erfindung günstig, wenn der Sender an einem

Fahrzeug des Transportsystems montiert ist und wenn der Empfänger an einer vorgegebenen Position an der Strecke des Transportsystems angeordnet ist, wobei im Sender eine eigene Energiequelle vorgesehen sein kann, beispielsweise eine kleine (Puffer-)Batterie.

Weitere Einzelheiten und Vorteile der Erfindung werden nachstehend anhand von Zeichnungen noch näher erläutert. Es zeigen:

Fig. 1 ein schematisches Blockschaltbild eines Datenübertragungssystems gemäß der Erfindung und

Fig. 2 ein schematisches Schaltbild zur Verdeutlichung des Grundprinzips des erfindungsgemäßen Datenübertragungsverfahrens.

Im einzelnen zeigt Fig. 1 ein schematisches Blockschaltbild eines erfindungsgemäßen Datenübertragungssystems mit einem Sender 10 und einem Empfänger 12, die nachstehend aus Gründen, welche aus der nachfolgenden Beschreibung noch deutlich werden, als Codeträger 10 und Sende/Empfangseinheit 12 bezeichnet werden. Der Codeträger 10 überträgt die dort zuvor gespeicherten Daten zu der Sende/Empfangseinheit 12, wie dies durch den Pfeil D angedeutet ist. Der Codeträger 10 arbeitet also als ein Sender, der die in ihm gespeicherten Daten sendet, während die Sende/Empfangseinheit 12 als Empfänger für diese Daten dient. Ausgangsseitig ist die Sende/Empfangseinheit 12, wie dies durch eine Verbindungs-

leitung 14 angedeutet ist, mit einer Auswerteeinheit 16 verbunden, die eingangsseitig mit einer Speisespannungsquelle 18 - üblicherweise mit der Netzspannung - verbunden ist und als Ausgänge mehrere Steuerleitungen 20 und Datenleitungen 22 aufweist. Die Auswerteeinheit 16 empfängt die Daten von der Sende/Empfangseinheit 12 über die Leitung 14 und überträgt über diese Leitung 14 auch die erforderliche Energie von der Speisespannungsquelle zu der Sende/Empfangseinheit, wobei es sich versteht, daß die Leitung 14 mehradrig ist und daß die Auswerteeinheit 16 normalerweise ein Netzgerät enthält, um aus der Netzspannung geeignete Versorgungsspannungen für die Elemente der Auswerteeinheit 16 und der Sende/Empfangseinheit 12 zu erzeugen.

Bei dem Datenübertragungssystem gemäß Fig. 1 kann gegebenenfalls auch eine Datenübertragung von der Auswerteeinheit 16 über die Sende/Empfangseinheit 12 zu dem Codeträger 10 erfolgen, wie dies durch den gestrichelt eingezeichneten Pfeil D' angedeutet ist, um im Speicher des Codeträgers 10 neue Daten abzulegen. In diesem Fall wird als Speicher für den Codeträger 10 anstelle des üblicherweise verwendeten ROM, d.h. eines Lesespeichers, ein RAM, d.h. ein Schreib/Lese-Speicher mit wahlfreiem Zugriff verwendet.

Wie Fig. 2 zeigt, besitzen der Codeträger 10 und die Sende/Empfangseinheit 12 ausgangs- bzw. eingangsseitig jeweils einen Schwingkreis. Der Schwingkreis der Sende/Empfangseinheit 12 umfasst dabei eine Induktivität L1

und eine Kapazität C1, während der Codeträger 10 einen Schwingkreis mit einer Induktivität L2 und einer Kapazität C2 aufweist. Zusätzlich gehört zur Schaltung des Codeträgers 10 ein Widerstand R, zu dem ein Schalter S in Serie geschaltet ist. Der Schalter S wird, wie dies schematisch angedeutet ist, über einen Ausgang eines Speichers SP in Abhängigkeit von den dort gespeicherten Daten betätigt.

Die Induktivitäten bzw. Spulen L1, L2 sind über die dazwischenliegende Übertragungsstrecke Ü elektromagnetisch gekoppelt, und das gesamte System wirkt somit wie ein eisenloser Übertrager, wobei die Daten mittels eines konventionellen Amplitudendemodulators 24 am Schwingkreis L1, C1 der Einheit abgegriffen werden können.

Der Sender kann eine Batterie enthalten. Vorzugsweise sendet die Sende/Empfangseinheit 12 zu dem Codeträger 10, wie dies durch einen Pfeil E angedeutet ist, die Energie, die im Codeträger benötigt wird.

Nummer: 34 12 610
Int. Cl.³: G 08 C 17/00
Anmeldetag: 4. April 1984
Offenlegungstag: 17. Oktober 1985

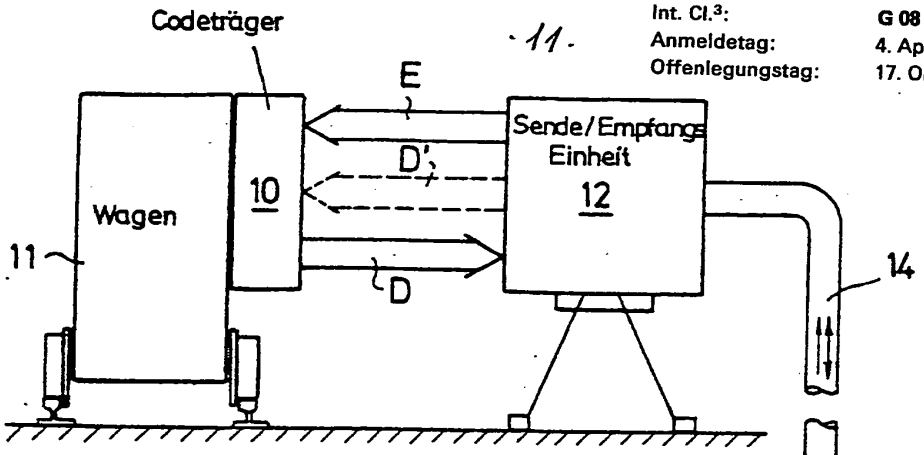
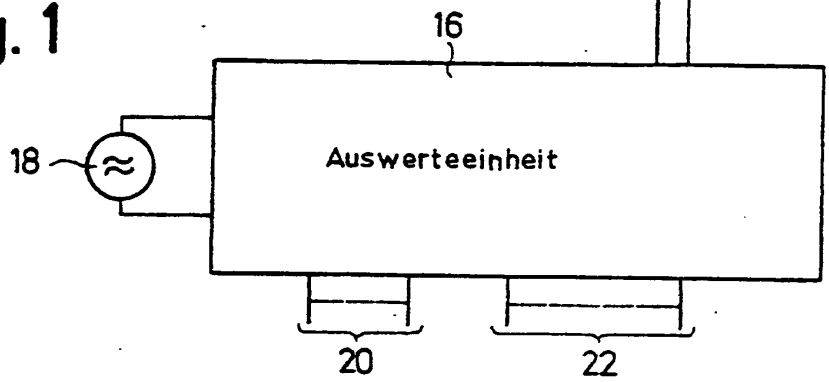


Fig. 1



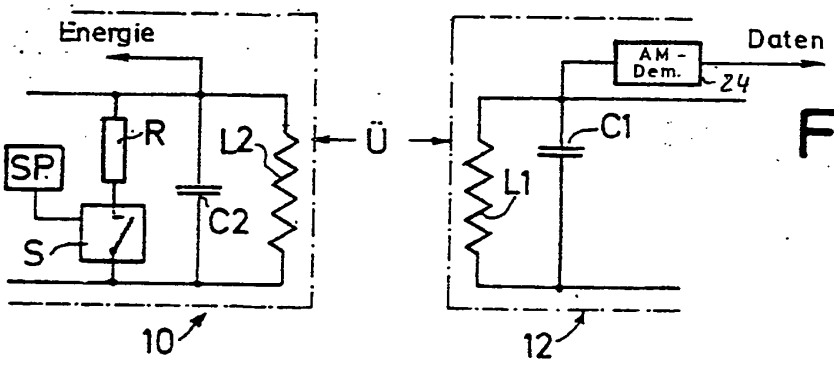


Fig. 2

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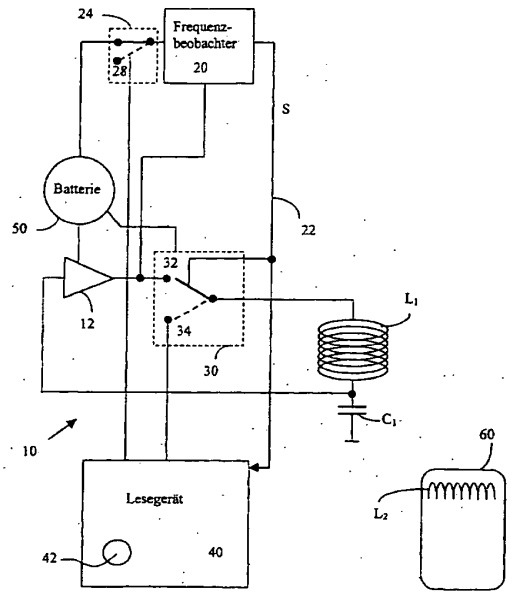
(56) Entgegenhaltungen:
DE 198 55 207 C1
DE 196 02 316 C1

Die folgenden Angaben sind den vom Anmelder eingereichten Unterlagen entnommen

Prüfungsantrag gem. § 44 PatG ist gestellt

(54) Mit einem Transponder betätigbare Schaltvorrichtung

(57) Vorgeschlagen wird eine mit einem Transponder (60) betätigbare Vorrichtung zur Erzeugung eines Schaltsignals (S). Die Vorrichtung basiert auf einem Schwingkreis (10) mit einer Kapazität (C_1), einer Erkennungsspule (L_1) sowie einem Oszillatorverstärker (12). An den Schwingkreis (10) ist ein Frequenzbeobachter (20) angeschaltet, der die in dem Schwingkreis (10) eingestellte Frequenz (f_1) auswertet und bei Feststellen einer Änderung ein Schaltsignal (S) abgibt. Eine Frequenzänderung in dem Schwingkreis (10) wird durch Annähern eines Transponders (60) bewirkt. Die Vorrichtung erlaubt eine nahezu leistungslose Transpondererkennung.



DE 102 06 676 A 1

Beschreibung

[0001] Die Erfindung geht aus von einer Vorrichtung nach der Gattung des Hauptanspruchs. Eine Vorrichtung dieser Art ist aus der DE 198 55 207 C1 bekannt. Darin ist eine Transponderleseeinrichtung beschrieben, die durch ein Schaltsignal einschaltbar ist, welches erzeugt wird, indem durch Heranführen eines ferromagnetischen Elementes an eine Erkennungsspule darin eine Spannung induziert wird. Die Erkennungsspule ist eigens für die Auslösung des Schaltvorganges vorgesehen und um einen Permanentmagneten herum ausgebildet. Das ferromagnetische Element ist zusammen mit dem Transponder auf einem Codeträger untergebracht, der beispielsweise ein Schlüssel sein kann. Die Vorrichtung erlaubt das Einschalten der Transponderleseeinrichtung durch bloßes Annähern des Codeträgers, ohne daß dieser einer eigenen Energieversorgung bedarf. Die Vorrichtung erfordert allerdings den ständigen Betrieb einer Verstärkerschaltung, die zur Verstärkung der in die Erkennungsspule induzierten Spannung eingesetzt wird. Dabei entstehen Leerlaufverluste, die von der Energieversorgung ständig ausgeglichen werden müssen. Der Betrieb der Vorrichtung setzt deshalb eine ausreichend große Energieversorgung voraus. Muß diese sehr klein dimensioniert werden, ist die Vorrichtung nicht oder nur bedingt einsetzbar.

[0002] Eine verbreitete Transponderanwendung bilden kontaktlose tragbare Datenträger, die mit einem Lesegerät zusammenwirken, das über eine Spule verfügt, mittels derer es einen in den Ansprechbereich gebrachten Transponder zum einen mit Energie versorgt, zum anderen ausliest. Um das Heranführen eines Transponders zu erkennen, erzeugt das Lesegerät zyklisch in kurzen zeitlichen Abständen ein Magnetfeld, das geeignet ist, einen gegebenenfalls in den Ansprechbereich gebrachten Transponder mit Energie zu versorgen. Zugleich sendet das Lesegerät in der Regel jeweils ein Abfragesignal, mit dem ein Transponder angesprochen wird. Die regelmäßige Erzeugung von Magnetfeld und Abfragesignal bedingt einen vergleichsweise hohen Energieverbrauch, der das Konzept ungeeignet macht für Anwendungen, in denen eine ausreichend große Energieversorgung nicht zur Verfügung gestellt werden kann.

[0003] Aus der DE 100 06 747 A1 ist weiterhin eine gattungsgemäße Vorrichtung entnehmbar, welche speziell auf das Problem des Energieverbrauchs ausgerichtet ist. Vorgeschlagen wird, ein tragbares Transponderelement mit einem Permanentmagneten zu versehen, welcher bei Annäherung an eine Leseeinrichtung einen darin angeordneten, durch einen Magneten gesteuerten Schalter betätigt. Die vorgeschlagene Vorrichtung minimiert den Energieverbrauch der Leseeinrichtung, da diese in Abwesenheit eines Transponders vollständig ausgeschaltet bleiben kann. Der Einbau eines Permanentmagneten bedingt allerdings konstruktive Maßnahmen an den damit auszustattenden Transponderelementen, die nicht immer ohne weiteres vorgenommen werden können. Schon wegen des Problems der mechanischen Integration eignet sich die Lösung beispielsweise nicht für kontaktlose Chipkarten. Häufig ist das von einem Permanentmagneten erzeugte Magnetfeld im Hinblick auf die praktische Nutzbarkeit der damit versehenen Transponder zudem unerwünscht. Dies gilt beispielsweise für tragbare Datenträger im Chipkartenformat, bei denen Information auf einem Magnetstreifen hinterlegt ist. Auch ist die Handhabung derartiger Transponder insofern beeinträchtigt, als sie von anderen, für Magnetfelder empfindlichen Schaltungen ferngehalten werden müssen.

[0004] Das "RFID-Handbuch" von K. Finkenzeller, Carl Hanser Verlag, 2. Auflage, 2000, beschreibt ausführlich die Grundlagen der Transpondertechnologie und gibt Beispiele

für Transponderanwendungen. Besonders im Kapitel 4 dieses Buches finden sich Grundlageninformationen und ergänzendene Erläuterungen zu der nachfolgend beschriebenen Erfindung. Auf diese Passagen im besonderen wie auf das Buch als ganzes wird ausdrücklich verwiesen, sie sollen Teil dieser Anmeldung sein.

[0005] Es ist Aufgabe der Erfindung, eine mit einem Transponder betätigbare Schaltungsvorrichtung anzugeben, die auf Seiten des geschalteten Schaltkreises einen möglichst geringen Energieverbrauch ermöglicht und dabei ohne Beschränkung einsetzbar ist.

[0006] Diese Aufgabe wird gelöst durch eine Vorrichtung mit Merkmalen des Hauptanspruchs. Erfindungsgemäß wird die Erzeugung eines Schaltsignales, und damit ein Schaltvorgang, ausgelöst, indem die Verstimmung der Resonanzfrequenz eines Schwingkreises festgestellt wird. Der Schwingkreis und die für die Erkennung benötigte Schaltung könnene nahezu leistungslos betrieben werden. Entsprechend weist die erfindungsgemäße Schaltvorrichtung einen außerordentlich geringen Energieverbrauch auf. Sie eignet sich deshalb in besonderer Weise zur Betätigung von Schaltkreisen, deren Energieversorgung aus einer begrenzten Energiequelle erfolgt. Insbesondere eignet sie sich zur Versorgung von aus kleinen Batterien gespeisten Schaltkreisen. Die weitgehende Unabhängigkeit von der Größe der zur Verfügung stehenden Energiequelle erlaubt eine freizügige Verwendung der Vorrichtung in einer Vielzahl von sonst nicht in Betracht kommenden Einbauorten. Unter anderem eignet sie sich zum Einbau in Türschließeinrichtungen, um ein transpondergestütztes, berührungsloses Türöffnen zu ermöglichen.

[0007] Die erfindungsgemäße Vorrichtung ist weiterhin sehr benutzerfreundlich, weil sie von einem Benutzer keinerlei besondere Handhabungsmaßnahmen erfordert. Die eingesetzten Transponder haben eine übliche Erscheinungsform und werden auf übliche Weise genutzt. Die übliche Ausführung der eingesetzten Transponder wirkt sich auch vorteilhaft auf ihre Herstellung aus, da keine besonderen konstruktiven Maßnahmen im Aufbau erforderlich sind. Ein weiterer Vorteil der erfindungsgemäßen Vorrichtung besteht insbesondere darin, daß transponderseitig die ohnehin vorhandene Spule des Transponders den Schaltvorgang auslöst, besondere Bauelemente mithin nicht erforderlich sind. Die Transponder können entsprechend kostengünstig ausgeführt werden.

[0008] Unter Bezugnahme auf die Zeichnung wird nachfolgend ein Ausführungsbeispiel der Erfindung näher erläutert.

Zeichnung

[0009] Es zeigen:

[0010] **Fig.** 1 ein Blockschaltbild einer Schaltvorrichtung,

[0011] **Fig.** 2 ein Ersatzschaltbild eines Teils der Schaltvorrichtung,

[0012] **Fig.** 3 ein Ersatzschaltbild eines Frequenzbeobachters,

[0013] **Fig.** 4 eine Nutzung der Schaltvorrichtung in einer Türschließeinrichtung.

Beschreibung

[0014] Grundelemente der in **Fig.** 1 gezeigten Schaltvorrichtung sind ein Schwingkreis **10**, ein an den Schwingkreis **10** angeschlossener Frequenzbeobachter **20**, ein in dem Schwingkreis **10** angeordneter, von dem Frequenzbeobachter **20** betätigter Schalter **30**, ein mit dem Schalter **30** und dem Frequenzbeobachter **20** verbundener Funktiosschalt-

kreis **40** sowie ein Transponder **60** zum Auslösen eines Schaltvorganges. Ein weiteres Grundelement ist daneben eine Energiequelle **50**, welche den Schwingkreis **10**, den Frequenzbeobachter **20** sowie den Schalter **30** mit Energie versorgt.

[0015] Der Schwingkreis **10** baut sich aus einer Erkennungsspule L_1, einer Kapazität C_1 sowie einem Oszillatorverstärker **12** auf. Weiterer Bestandteil des Schwingkreises **10** ist zudem der Schalter **30**. Die Erkennungsspule L_1 und die Kapazität C_1 bestimmen die Resonanzfrequenz f_1 des Schwingkreises **10**. Der Oszillatorverstärker **12** ist zweckmäßig als rückgekoppelter Transistorverstärker ausgeführt. Er erhält den Schwingkreis **10** in Resonanz auf der Resonanzfrequenz f_1 und gleicht die über die Erkennungsspule L_1 und die Kapazität C_1 sowie gegebenenfalls vorhandene weitere Bauelemente entstehenden Energieverluste aus. Er ist hierzu mit der Energiequelle **50** verbunden.

[0016] Der Frequenzbeobachter **20** beinhaltet eine Schaltung, die es erlaubt Änderungen der auf dem Schwingkreis **10** stehenden Resonanzfrequenz f_1 zu erkennen. Die Schaltung ist hierzu vorzugsweise als Amplitudenmeßeinrichtung, als Phasenmeßeinrichtung oder als Frequenzmeßeinrichtung ausgebildet. Erkennt der Frequenzbeobachter **20** eine Verstimmung der Resonanzfrequenz f_1 im Schwingkreis **10**, erzeugt er ein Schaltsignal S, welches über eine Steuerleitung **22** zum einen den Schalter **30** anspricht, zum anderen den Funktionsschaltkreis **40**.

[0017] Die Energieversorgung des Frequenzbeobachters **20** erfolgt aus der Energiequelle **50**, mit der er hierzu verbunden ist. Zweckmäßig erfolgt die Verbindung über einen Schalter **24**, der durch den Funktionsschaltkreis **40** betätigt wird. Mittels des Schalters **24** trennt der Funktionsschaltkreis **40** den Frequenzbeobachter **20** für die Dauer der Kommunikation mit einem Transponder **60** von der Energieversorgung **50**, nachdem er zuvor selbst durch ein Schaltsignal S eingeschaltet wurde. Nach Abschluß einer Kommunikation mit einem Transponder **60** schaltet der Funktionsschaltkreis **40** den Frequenzbeobachter **20** wieder ein, indem er ihn durch Umlegen des Schalters **24** wieder mit der Energiequelle **50** verbindet.

[0018] Der Schalter **30** kann von beliebiger Bauart sein. In seiner Grundstellung **32** schließt er, wie in **Fig. 1** angedeutet, den Schwingkreis **10**. Nach Erhalt eines Schaltsignales S über die Steuerleitung **22** wechselt er in die Position **34** und verbindet die Erkennungsspule L_1 mit dem Funktionsschaltkreis **40**.

[0019] Der Funktionsschaltkreis **40** kann grundsätzlich durch jede beliebige Schaltung gebildet sein, welche durch ein Schaltsignal S ansprechbar ist. Im Ausführungsbeispiel wird davon ausgegangen, daß der Funktionsschaltkreis **40** ein kontaklos arbeitendes Transponderlesegerät ist, welches im Anschluß an eine Kommunikation mit einem Transponder **60** eine Funktion auslöst oder nicht auslöst. Im Hinblick auf die mittels der beschriebenen Vorrichtung erzielbaren Vorteile wird ferner davon ausgegangen, daß der, im folgenden Lesegerät genannte, Funktionsschaltkreis **40** eine eigene Energiequelle **42** in Gestalt einer Batterie besitzt. Zur Durchführung einer Kommunikation mit einem Transponder **60** ist das Lesegerät **40** durch Bewegen des Schalters **30** in die Position **34** mit der Erkennungsspule L_1 verbindbar. Durch ein über die Steuerleitung **22** zugeführtes Steuersignal S wird es eingeschaltet. Weiterhin kann das Lesegerät **40** mit einem zwischen Energiequelle **50** und Frequenzbeobachter **20** angeordneten Schalter **24** verbunden sein, über den der Frequenzbeobachter **20** ein- und ausschaltbar ist, indem er mit der Energiequelle **50** verbunden bzw. nicht verbunden ist.

[0020] Die Energiequelle **50** hat zweckmäßig die Gestalt einer Batterie. Sie liefert die Energieversorgung für den Oszillatorverstärker **12**, den Frequenzbeobachter **20** und den Schalter **30**. Die Energiequelle **50** kann eine bauliche Einheit mit der Energiequelle **42** bilden und insbesondere auch von einer einzelnen Energiequelle, also etwa durch eine einzelne Batterie gebildet sein.

[0021] Der Transponder **60** ist von üblicher Bauart und fungiert beispielsweise als Träger für einen Code, der durch das Lesegerät **40** geprüft wird. Beispielsweise besitzt er die Gestalt eines tragbaren Datenträgers im Format einer Norm-Chipkarte. Daneben kann er auch in beliebigen anderen Bauformen vorliegen, etwa in Gestalt einer Armbanduhr oder eines Schreibgerätes. Wesentlicher Bestandteil des Transponders **60** im Hinblick auf die hier beschriebene Vorrichtung ist eine Transponderspule L_2. Durch sie läßt sich ein Schaltvorgang auslösen.

[0022] Funktionsgrundlage der in **Fig. 1** dargestellten Vorrichtung bildet eine magnetische Gegenkopplung M, die sich zwischen der Erkennungsspule L_1 und der Transponderspule L_2 einstellt, wenn beide in ausreichende Nähe zueinander gebracht werden. Die Gegenkopplung M stellt sich dabei ein, ohne daß es einer aktiven Mitwirkung des Transponders **60** bedarf, der Transponder **60** muß keine Energie bereitstellen. Durch die Gegenkopplung M wird eine Impedanz Z_T in die Erkennungsspule L_1 transformiert. Die Einkopplung der Impedanz Z_T hat zur Folge, daß sich die Resonanzbedingungen im Schwingreis **10** ändern. Dadurch ändert sich die Resonanzfrequenz f_1 des Schwingkreises **10**. Die eingekoppelte Impedanz Z_T ist dabei nicht abhängig von der Größe des in dem Schwingkreis **10** fließenden Stromes I_1. Dieser kann daher durch geeignete Dimensionierung der Schwingkreisbauelemente auf einen Wert von nahezu 0 eingestellt werden kann.

[0023] Für die eingekoppelte Impedanz Z_T gilt:

$$Z_T = \omega^2 k^2 L_1 L_2 (R_2 + j\omega L_2 + R_L/(1 + j\omega R_L C_2))^{-1} \quad (1)$$

wobei für die magnetische Kopplung M zwischen der Erkennungsspule L_1 und der Transponderspule L_2 gilt:

$$M = k\,(L_1\,L_2)^{1/2}.$$

[0024] Eine Ableitung der Beziehung (1) für die transformiert Impedanz Z_T findet sich in dem in der Einleitung angegebenen "RFID-Handbuch", K. Finkenzeller, 2. Auflage, 2000, insbesondere Kapitel 4.1.10. Unter besonderem Hinweis auf dieses Buch wird von einer detaillierten Ableitung an dieser Stelle abgesehen.

[0025] Zur Erläuterung der Bedeutung der Beziehung (1) zeigt **Fig. 2** ein Ersatzschaltbild des Schwingkreises **10** und des Transponders **60**. Der Schwingkreis **10** umfaßt die Erkennungsspule L_1, einen der Erkennungsspule L_1 zugeordneten ohmschen Widerstand R_1, einen rückgekoppelten Verstärker V als Oszillatorverstärker **12** sowie eine Gesamtkapazität C_1, die sich zusammensetzt aus einer ersten Teilkapazität C_{11} zur Herbeiführung einer Spannungsteilung für die Rückkopplung sowie einer zweiten Teilkapazität C_{12} zur Einstellung der Resonanzfrequenz. Die Bauelemente des Schwingkreises **10** sind vorzugsweise so dimensioniert, daß die Erkennungsspule L_1 und die Kapazität C_1 die Resonanzfrequenz f_1 des Schwingkreises **10** im wesentlichen alleine bestimmen.

[0026] Um einen möglichst großen Effekt zu erreichen, werden L_1 und C_1 vorzugsweise so gewählt, daß der unbelastete Schwingkreis **10** genau auf der Resonanzfrequenz eines korrespondierenden Transponders **60** arbeitet. In diesem Fall wird für Z_T ein maximaler Wert erreicht, wodurch die Erkennung einer Verstimmung durch den Frequenzbeobach-

ter **20** verbessert wird.

[0027] Angelehnt an gängige Transponderlösungen liegen typische im Schwingkreis **10** eingestellte und gleichermaßen vom Transponder **60** genutzte Resonanzfrequenzen f_1 unterhalb von 135 kHz. Grundsätzlich kommen aber auch beliebige andere Frequenzbereiche in Betracht, z. B. die für die ISO-Normen relevante Frequenz von 13,56 MHz.

[0028] Der Transponder **60** besteht aus der Transponderspule L_2, einer Spannungsquelle U_2, einer Transponderimpedanz Z_2 sowie einem ohmschen Widerstand R_2 der Transponderspule L_2. Die Transponderimpedanz Z_2 setzt sich dabei aus einem Lastwiderstand R_L sowie einer Kapazität C_2 zusammen. Die Spannungsquelle U_2 bildet die Spannung, die aufgrund der magnetischen Kopplung M durch den in der Erkennungsspule L_1 fließenden Strom I_1 in die Transponderspule L_2 induziert wird.

[0029] **Fig.** 3 zeigt ein Ersatzschaltbild eines möglichen Frequenzbeobachters **20**. Er ist an einem der Anschlußpunkte A an dem Schwingkreis **10** angeschaltet. Grundlage des gezeigten Frequenzbeobachters **20** bildet ein Differenzierglied, das eine Diode D_3, eine seriell nachgeschaltete Differenzierkapazität C_{31} sowie eine Parallelschaltung aus einem Widerstand R_3 und einer Kapazität C_{32} umfaßt, über welche der Ausgang der Diode D_3 mit Masse verbunden ist. Der Ausgang der Differenzierkapazität C_{31} bildet den Eingang einer Schmitt-Triggerschaltung S_T, an deren Ausgang ein gegebenenfalls erzeugtes Schaltsignal S anliegt.

[0030] Der Frequenzbeobachter **20** mit der in **Fig.** 3 wiedergegebenen Schaltung arbeitet wie folgt. Ist im unbelasteten Schwingkreis **10** in Abwesenheit eines Transponders **60** eine konstante Schwingung mit der Resonanzfrequenz f_1 eingestellt, liegt am Ausgang der Diode D_3 eine konstante Gleichspannung an, die zu der Amplitude der Schwingung im Schwingkreis **10** proportional ist. Über dem Widerstand R_B erzeugt sie einen – minimalen – Stromfluß I_3, dessen Größe durch entsprechende Dimensionierung des Widerstandes R_3 auf einen Wert von nahezu 0 einstellbar ist.

[0031] Wird nun ein Transponder **60** mit einer Transponderspule L_2 in das Feld der Erkennungsspule L_1 gebracht, bewirkt diese Annäherung die Einkopplung einer Impedanz Z_T gemäß der Beziehung (1) in den Schwingkreis **10**. Hierdurch ändern sich in dem Schwingkreis **10** die Resonanzfrequenz f_1 und die Amplitude der Schwingung. Am Ausgang der Diode D_3 entsteht dadurch vorübergehend eine sich entsprechend der Änderung der Amplitude verändernde Wechselspannung, welche an der Differenzierkapazität C_B als Spannungspuls erscheint und einen kurzfristigen, impulsartigen Stromfluß zu der Schmitt-Triggerschaltung S_T bewirkt. Diese wird durch den Spannungspuls veranlaßt, ein Schaltsignal S abzugeben. Das Schaltsignal S bewirkt nun zum einen das Umschalten des Schalters **30** in die Position **34**. Dadurch wird die Erkennungsspule L_1 mit dem Lesegrät **40** verbunden und dient diesem nachfolgend als Energieübertrager und Kommunikationseinrichtung zur Energieversorgung und Kommunikation mit dem Transponder **60**. Zum anderen schaltet das Schaltsignal S das Lesegerät **40** ein.

[0032] Ist ein Schalter **24** vorhanden, schaltet das Lesegerät **40**, nachdem es selbst eingeschaltet wurde, seinerseits den Frequenzbeobachter **20** aus, indem es den Schalter **24** in die Position **28** steuert. Anschließend kommuniziert das Lesegerät **40** über die Spule L_1 mit dem Transponder **60**. Nach Beendigung der Kommunikation mit einem Transponder **60** schaltet das Lesegerät **40** den Frequenzbeobachter **20** wieder ein.

[0033] **Fig.** 4 zeigt eine Anwendung der beschriebenen Schaltvorrichtung in einem Schließsystem für Türen. Dargestellt ist ein drehbarer Türknauf **70**, welcher auf einer Welle **72** sitzt, die in eine – nicht gezeigte – Tür geführt ist und dort durch Drehung die Entriegelung bzw. die Verriegelung der Tür durch Bewegen einer mechanischen Sperre ermöglicht. Der Türknauf **70** besitzt innenliegend einen ersten Hohlraum **74** zur Aufnahme einer ersten Batterie **50** zur Energieversorgung der Schaltvorrichtung sowie einer zweiten Batterie **42** zur Energieversorgung eines – nicht gezeigten – Lesegerätes **40**. Anstelle zweier Batterien **50**, **42** kann auch eine einzelne Batterie vorgesehen sein, die sowohl die Schaltvorrichtung wie das Lesegerät **40** versorgt. An der außenliegenden, nutzerzugewandten Endfläche besitzt der Türknauf **70** desweiteren einen zweiten Hohlraum **76**, in dem eine Erkennungsspule L_1 angeordnet ist. Die Erkennungsspule L_1 ist gemäß der in **Fig.** 1 dargestellten Variante über einen – ebenfalls nicht gezeigten – Schalter **30** mit dem Lesegerät **40** verbunden und dient nach Erkennen eines Transponders **60** zur Kommunikation damit sowie zu dessen Energieversorgung.

[0034] Der Türknauf **70** besteht aus einem metallischem Material. Um sicherzustellen, daß der Betrieb der Erkennungsspule **76** nicht durch Verluste durch Wirbelstrominduktion in das Türknaufmaterial beeinträchtigt wird, ist die Innenoberfläche des Hohlraumes **76** mit einer Abschirmung **78** belegt. Als Material für die Abschirmung **78** eignen sich z. B. Ferritmaterialien oder hochpermeable Metalle, etwa amorphe Metalle. Weiter kann vorgesehen sein, daß die Erkennungsspule **76** auf einen Ferritkern gewickelt ist. Diese Ausführungsvariante empfiehlt sich besonders, wenn die Resonanzfrequenz f_1 im unbelasteten Schwingkreis **10** kleiner ist als 135 kHz.

[0035] In einem weiteren, nicht gezeigten Hohlraum in dem Türknauf **70** ist das Lesegerät **40** angeordnet. Vorzugsweise nutzt das Lesegerät **40** zur Kommunikation mit einem Transponder **60**, wie **Fig.** 1 dargestellt, die Erkennungsspule L_1, die zu diesem Zweck nach erkannter Annäherung eines Transponders **60** über einen Schalter **30** auf das Lesegerät **40** geschaltet wird.

[0036] Unter Beibehaltung des grundlegenden Ansatzes, eine Schaltvorrichtung zu realisieren, welche durch Erkennen der Verstimmung einer Resonanzfrequenz f_1 in einem nahezu leistungslos betriebenen Schwingkreis **10** betätigt wird, erlaubt die vorgeschriebene Schaltvorrichtung eine Vielzahl von Ausgestaltungen. Dies gilt etwa für die bauliche Realisierung des Schwingkreises **10** und des Frequenzbeobachters **20**. Letzterer kann insbesondere durch jede andere Schaltung ersetzt werden, die es gestattet, unter Aufnahme einer geringstmöglichen Energiemenge die Resonanzbedingungen in einem Schwingkreises sowie deren Änderungen zu beobachten. Unter anderem kann der Frequenzbeobachter **20** beispielsweise auch unter Verwendung eines Pulsgenerators, etwa eines Monoflops mit einem Ausgangspuls konstanter Zeit, realisiert sein, dem ein Integrator und ein Schwellwertschalter nachgeschaltet sind. Eine weitere mögliche Ausführung beinhaltet einen auf die Resonanzfrequenz f_1 abgestimmten Bandpaßfilter, dem eine Gleichrichterschaltung sowie ein Schwellwertschalter nachgeschaltet sind. Denkbar ist ferner, nur eine Gleichrichterschaltung vorzusehen, der ein Schwellwertschalter oder ein Fensterdiskriminator nachgeschaltet ist. Im Schwingkreis **10** kann weiter der Abgriff für die Verstärkerrückkoppelung an anderen geeigneten Punkten, z. B. über die Spule erfolgen. Nicht notwendig ist weiter, daß die Erkennungsspule L_1 nach Ansprechen des Frequenzbeobachters **20** über einen Schalter **30** mit dem Lesegerät **40** verbunden wird. Ebenso kann vorgesehen sein, daß das Lesegerät **40** mit einer eigenen Spule versehen ist und ein von dem Frequenzbeobachter **20** gegebenenfalls ausgegebenes Schaltsignal S hen ist und ein von dem Frequenzbeobachter **20** gegebenenfalls ausgegebenes Schaltsignal S direkt das Lesegerät **40** einschaltet. Ein

Schalter **30** entfällt in dieser Ausführung. Eine Vielzahl von Realsierungsmöglichkeiten bietet sich ferner für den Schalter **24**. Er kann zum Beispiel innerhalb des Frequenzbeobachters **20** realisiert sein und seine Ansteuerung über die Signalleitung **22** erfolgen. Desweiteren ist die Verwendung der vorgeschlagenen Schaltvorrichtung nicht auf die beispielhaft beschriebene Anwendung in Türschließsystemen beschränkt. Sie eignet sich vielmehr für beliebige andere Schaltsituationen.

Patentansprüche

1. Mit einem Transponder betätigbare Schaltvorrichtung zur Erzeugung eines Schaltsignales, **gekennzeichnet durch**
einen Schwingkreis (**10**) mit einer Kapazität (C_1), einer Erkennungsspule (L_1) sowie einem Oszillatorverstärker (**12**),
wobei die Erkennungsspule (L_1) und die Kapazität (C_1) die Resonanzfrequenz (f_1) des Schwingkreises (**10**) bestimmen, und
einen Frequenzbeobachter (**20**), welcher die in dem Schwingkreis (**10**) eingestellte Frequenz (f_1) auswertet und bei Feststellen einer Änderung ein Schaltsignal (S) erzeugt.

2. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß das Schaltsignal (S) über eine Steuerleitung (**22**) zu einem Funktionsschaltkreis (**40**) geführt ist.

3. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß der Oszillatorverstärker (**12**) und der Frequenzbeobachter (**20**) von einer unabhängigen Energiequelle (**50**) mit Energie versorgt werden.

4. Schaltvorrichtung nach Anspruch 3 dadurch gekennzeichnet, daß der Frequenzbeobachter (**20**) trennbar mit der Energieversorgung (**50**) verbunden ist.

5. Schaltvorrichtung nach Anspruch 4 dadurch gekennzeichnet, daß die Trennbarkeit durch einen Schalter (**24**) realsiert ist, der von dem Funktionsschaltkreis (**40**) betätigt wird.

6. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß die Erkennungsspule (L_1) über einen Schalter (**30**) mit dem Funktionsschaltkreis (**40**) verbindbar ist.

7. Schaltvorrichtung nach Anspruch 6 dadurch gekennzeichnet, daß der Schalter (**30**) durch das Schaltsignal (S) des Frequenzbeobachters (**20**) betätigbar ist.

8. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß die Resonanzfrequenz (f_1) des Schwingkreises durch die Erkennungsspule (L_1) sowie durch eine zu diesem Zweck in den Schwingkreis (10 geschaltete Kapazität (C_1) definiert wird.

9. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß die Resonanzfrequenz (f_1) des Schwingkreis (**10**) übereinstimmt mit der Resonanzfrequenz eines Transponders (**60**).

10. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß der Frequenzbeobachter (**20**) ein Differenzierglied beinhaltet.

11. Schaltvorrichtung nach Anspruch 1 dadurch gekennzeichnet, daß der Frequenzbeobachter (**20**) dazu ausgebildet ist, eine Änderung der Phasenlage der in den Schwingkreis (**10**) eingestellten Resonanzschwingung zu erkennen.

12. Verwendung einer Schaltvorrichtung nach Anspruch 1 zum Einschalten eines Funktionsschaltkreises (**40**).

13. Verwendung nach Anspruch 12, dadurch gekennzeichnet, daß der Funktionsschaltkreis (**40**) aus einer begrenzten Energiequelle (**42**) mit Energie versorgt wird.

14. Funktionsauslösesystem mit einem Funktionsschaltkreis (**40**), welcher durch ein Schaltsignal (S) einschaltbar ist, dadurch gekennzeichnet, daß die Erzeugung des Schaltsignales (S) durch eine Schaltvorrichtung gemäß Anspruch 1 erfolgt.

15. Berechtigungserkennungssystem mit einem Transponderlesegerät (**40**), welches durch Kommunikation und einem Transponder (**60**) die Berechtigung eines Nutzers prüft, dadurch gekennzeichnet, daß das Transponderlesegerät (**40**) mit einer Schaltvorrichtung gemäß Anspruch 1 verbunden ist, welche das Transponderlesegerät (**40**) einschaltet, wenn ihr ein Transponder (**60**) präsentiert wurde.

16. Schließsystem für eine Tür, dadurch gekennzeichnet, daß es eine Schaltvorrichtung gemäß Anspruch 1 aufweist, welche ein Transponderlesegerät (**40**) einschaltet, das durch Kommunikation mit einem Transponder (**60**) die Berechtigung eines Nutzers zur Betätigung des Schließsystems prüft.

17. Schließsystem nach Anspruch 16 dadurch gekennzeichnet, daß die Erkennungsspule (L_1) in einem Türknauf (**70**) angeordnet ist.

18. Schließsystem nach Anspruch 16, dadurch gekennzeichnet, daß die Erkennungsspule (L_1) in einem Hohlraum (**76**) angeordnet ist, welcher an den Innenwänden zum Türknauf (**70**) hin mit einer Abschirmung (**78**) belegt ist.

19. Schließsystem nach Anspruch 16 dadurch gekennzeichnet, daß die Abschirmung (**78**) von einem Material gebildet ist, das Verluste durch in das Türknaufmaterial induzierte Wirbelströme verhindert.

Hierzu 3 Seite(n) Zeichnungen

Nummer: DE 102 06 676 A1
Int. Cl.[7]: H 04 B 1/59
Offenlegungstag: 28. August 2003

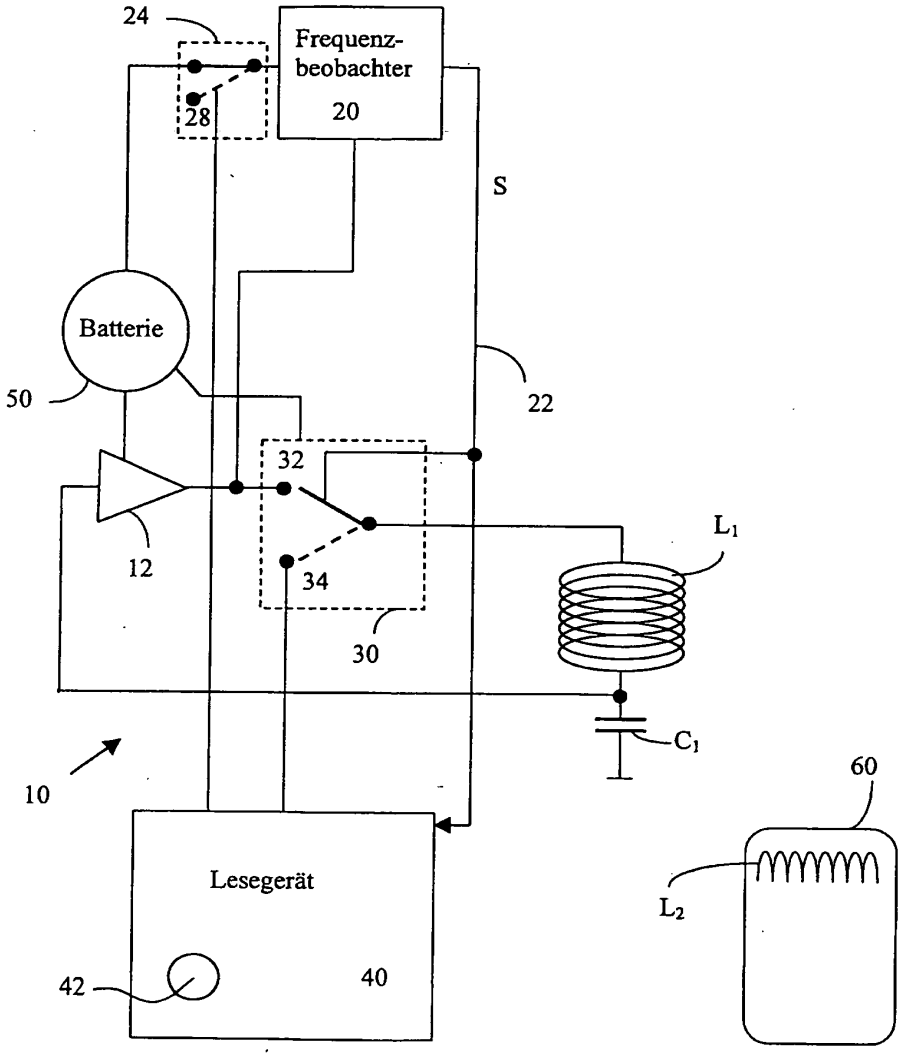


Fig. 1

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Offenlegungstag: 28. August 2003

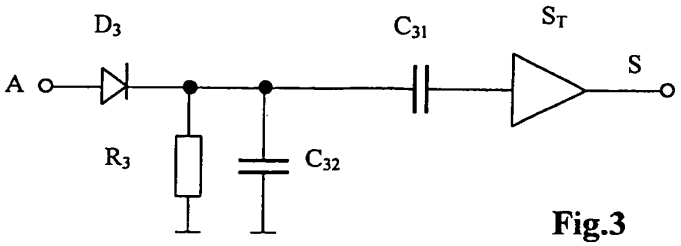

Fig.3

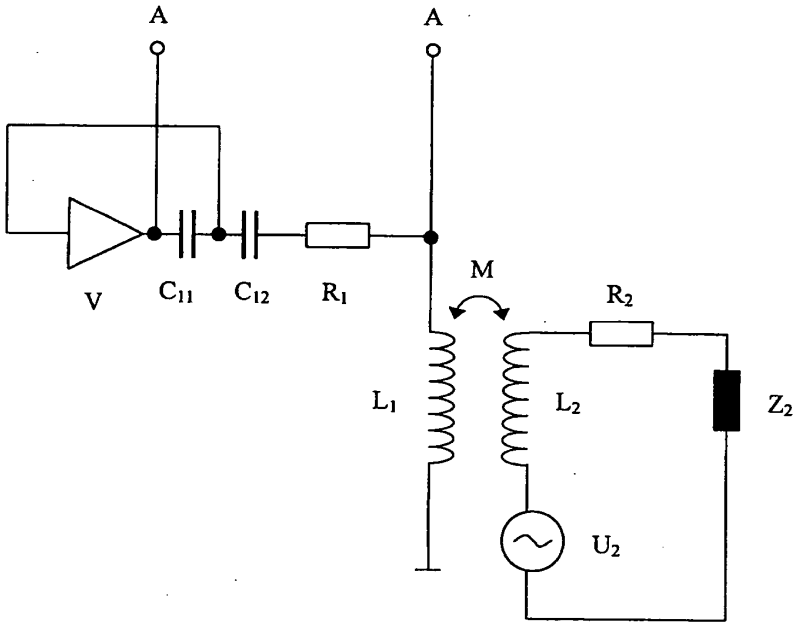

Fig.2

Nummer: DE 102 06 676 A1
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Offenlegungstag: 28. August 2003

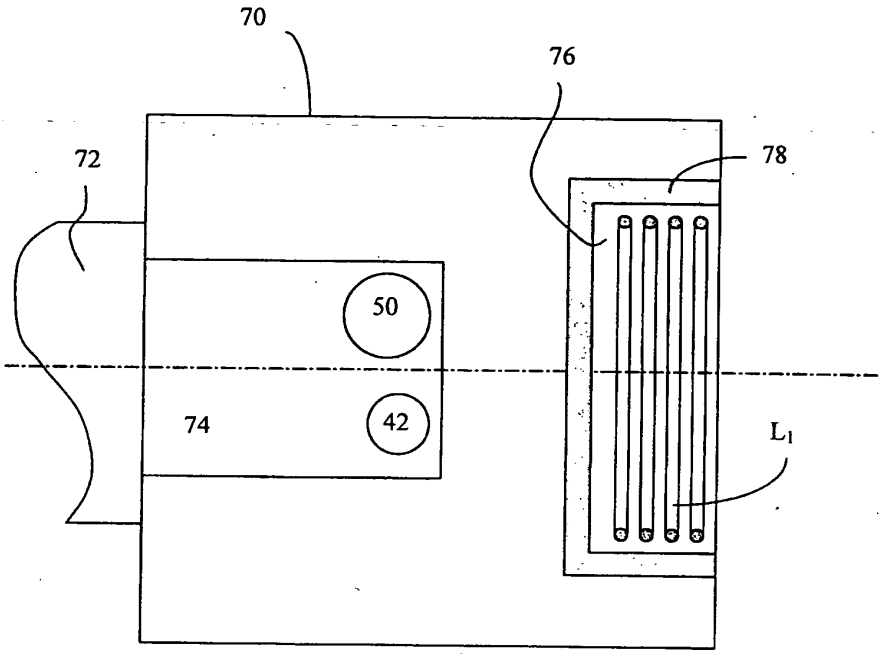

Fig.4

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gleich Patentinhaber

(56) Für die Beurteilung der Patentfähigkeit in Betracht gezogene Druckschriften:
DE 44 35 894 A1

(54) Berührungslos ansprechbarer Schalter

(57) Vorgestellt wird ein berührungslos ansprechbarer Schalter zur Aktivierung eines batteriebetriebenen berührungslos arbeitenden Identifikationssystems, das über einen fest angeordneten Sender, eine Elektronik zur Auswertung von Codeinformation und über mobile Codeträger mit Transponder verfügt.
Im aktivierten Zustand baut der Sender ein elektromagnetisches Feld auf, welches dem Transponder eines angenäherten Codeträgers Betriebsenergie liefert und durch Rückwirkung des Transponders moduliert wird und dadurch die Codeinformation des Transponders erhält.
Ein Permanentmagnet mit zugeordneter Spule ist in der Nähe des Senders angeordnet. Die Codeträger mit integriertem Transponder tragen zusätzlich ein ferromagnetisches Teil. Bei Annäherung des Codeträgers an den Permanentmagneten wird in dessen Spule eine Spannung induziert, die - verstärkt durch einen Operationsverstärker - ein Signal zur Aktivierung des Senders liefert. Der Sender wird wieder deaktiviert, sobald die Codeinformationen des Transponders nicht länger benötigt werden. Der Sender wird somit nur kurzzeitig aktiviert und benötigt im Ruhezustand keinen Strom. Diese stromsparende Auslegung ermöglicht es, das Identifikationssystem ohne Netzanschluß batteriebetrieben einzusetzen.
Der Codeträger kann vorteilhafterweise, ohne eigene Stromversorgung, handlich und robust gestaltet und wasserdicht gekapselt werden und bewirkt durch bloße Annäherung an den Magneten eine automatische Aktivierung des Senders.

DE 198 55 207 C 1

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Beschreibung

Die Erfindung betrifft einen berührungslos ansprechbaren Schalter zur Aktivierung eines berührungslos arbeitenden Identifikationssystems wie es im Oberbegriff des Patentanspruchs 1 beschrieben ist.

Berührungslos arbeitende Identifikationssysteme mit Codeträgern auf Transponder-Basis sind bekannt und in der Praxis z. B. in diversen netzbetriebenen Zutrittskontrollsystemen realisiert. Der Sender ist in diesen Fällen ständig aktiviert. Er verfügt deshalb permanent über ein elektromagnetisches Feld, welches dem Transponder eines an den Sender angenäherten Codeträgers Betriebsenergie liefert und durch Rückwirkung des Transponders moduliert wird und dadurch Codeinformationen vom Transponder empfängt. Der durch den permanent aktivierten Sender bewirkte andauernde Stromverbrauch von ca. 100 mA kann in einem netzbetriebenen System toleriert werden. Problematisch wird dieser Stromverbrauch jedoch, wenn das System batteriebetrieben ist, was besonders bei autark betriebenen elektronischen Schlössern und elektronischen Sicherheitsbeschlägen der Fall ist. In solchen Fällen hätte die Batterie nur eine inakzeptabel kurze Standzeit. Dies gilt in eingeschränkter Weise auch für Systeme, die zwar netzbetrieben sind, die aber bei Netzausfall über eine längere Zeit durch Akku versorgt werden müssen: z. B. in Einbruchmeldeanlagen, die VdS-Vorschriften unterliegen. Dort müßte dann der Akku unangemessen groß dimensioniert werden.

Eine mögliche Lösung ist in der DE 44 35 894 A1 vorgestellt. Beschrieben wird ein Verfahren zur Sicherung eines Kraftfahrzeuges und ein Sicherungssystem zur Durchführung des Verfahrens. Das Sicherungssystem weist ein elektronisches Schließsystem aus einem Transponder, 2 Induktionsspulen, einer Steuereinheit und einer elektronischen Wegfahrsperre sowie ein mechanisches Schließsystem auf. Der Transponder, der über jeweils eine Induktionsspule bei Bedarf mit Energie versorgt wird, sendet einen Identifikationscode aus, der induktiv zur Induktionsspule und von dieser zur Steuereinheit übertragen wird. Die Steuereinheit dekodiert diesen Identifikationscode, überprüft die Zugangsberechtigung und entriegelt bei positivem Ergebnis das mechanische Schließsystem bzw. die elektronische Wegfahrsperre. Die beiden Induktionsspulen werden jeweils nur bei Bedarf eingeschaltet. Das Einschalten der einen Induktionsspule geschieht durch einen Türgriffschalter, der automatisch bei Betätigung des Türgriffs mitbetätigt wird. Die andere Induktionsspule wird durch Betätigung des Zündschalters eingeschaltet. Die Induktionsspulen sind also normalerweise im Ruhezustand und werden nur bei Bedarf durch eine spezielle Betätigung "geweckt". Da nur während der kurzzeitigen Aktivierungsphase Strombedarf besteht, ist diese Lösung für Batteriebetrieb gut geeignet. Nachteilig bei dieser Lösung ist allerdings, daß die Aktivierung nur durch eine vorhergehende spezielle Betätigung ausgelöst werden kann. Vorteilhaft wäre es hingegen, wenn die bloße Annäherung des Transponders die Aktivierung auslösen würde.

Zwei mögliche Problemlösungen sind in den batteriebetriebenen elektronischen Sicherheitsbeschlägen der Firma HEWI (Heinrich Wilke GmbH in 34454 Arolsen) realisiert worden. Dort wird der Sender nur bei Bedarf aktiviert. Bei der Version mit "aktiven Identträgern" geschieht die Aktivierung mit Hilfe der im System benutzten Codeträger. Diese verfügen nicht nur über einen Transponder, sondern zusätzlich über einen batteriebetriebenen "Wecksender", der bei Annäherung des Codeträgers an das Schloß den Schloßsender aktiviert, so daß dann der Informationsaustausch zwischen Transponder und Schloßsender ablaufen kann. Diese Lösung ist stromsparend und deshalb für Batteriebetrieb geeignet. Nachteilig ist allerdings, daß die Codeträger relativ große Bauform benötigen und damit recht unhandlich werden. Außerdem verlieren sie ihre Weckfunktion, sobald die Spannung der Codeträger-Batterie zu gering wird.

Auch bei der HEWI-Version mit "passiven Identträgern" wird der Sender des Beschlags stromsparend nur bei Bedarf aktiviert und ist deshalb für Batteriebetrieb geeignet. Die Aktivierung geschieht in dieser Version durch Drehen des äußeren Drehknopfs des Beschlags. Dieser Drehknopf wird gleichzeitig zum Entriegeln und Öffnen bzw. zum Verriegeln des Schlosses benötigt. Diese Lösung hat den Vorteil, daß der Codeträger kompakt gestaltet und wasserdicht gekapselt werden kann, da er nur einen Transponder mit Antenne enthält. Nachteilig bei dieser Lösung ist allerdings die umständliche Art der Bedienung: das Schloß bzw. sein Sender muß erst durch Drehen am Drehknopf aktiviert werden, bevor Codeträger und Schloßsender ihren Informationsaustausch beginnen können.

Die Aufgabe der Erfindung besteht darin, einen berührungsfrei ansprechbaren Schalter zu schaffen, der durch bloße Annäherung des Codeträgers an den feststehenden Sender diesen ohne jede zusätzliche Tätigkeit automatisch aktiviert und trotzdem einen handlichen, robusten und wasserdicht kapselbaren Codeträger ohne eigene Stromversorgung ermöglicht.

Die Aufgabe wird vorteilhaft gelöst durch die im kennzeichnenden Teil des Patentanspruchs 1 aufgeführten Maßnahmen.

Eine weitere vorteilhafte Ausgestaltung der Erfindung besteht gemäß Patentanspruch 2 darin, daß durch einen angekoppelten Operationsverstärker die induzierte Spannung, die das Signal zur Aktivierung des Senders auslöst, verstärkt wird.

Durch die in Anspruch 3 beschriebenen Maßnahmen wird der Permanentmagnet in einfachst möglicher Bauform realisiert. Dies erfordert allerdings bei der Bedienung eine präzise Annäherung des Codeträgers an den Magneten.

Durch die in Anspruch 4 beschriebenen Maßnahmen wird erreicht, daß die Annäherung des Codeträgers an den Magneten weniger präzise durchgeführt werden muß.

Durch die in Anspruch 5 beschriebenen Maßnahmen wird erreicht, daß bei der Annäherung des Codeträgers an den Magneten auch ein gewisser seitlicher Versatz ohne Funktionsverlust toleriert werden kann.

Durch die in Anspruch 6 beschriebenen Maßnehmen wird erreicht, daß die Anforderungen an die Präzision der Annäherung weiter verringert werden – allerdings erkauft durch eine größere und kompliziertere Bauform des Magneten.

Einige Ausführungsbeispiele der Erfindung werden im folgenden anhand der Zeichnungen beschrieben. Es zeigen:

Fig. 1: Ausführung des Permanentmagneten als Stabmagnet mit umgebender Spule

Fig. 2: Codeträger in Schlüsselform mit Transponder und ferromagnetischer Zunge

Fig. 3: Schalter und Sender als Schaltdiagramm

Fig. 4: Ausführung des Permanentmagneten als U-Magnet mit Spule

Fig. 5: Ausführung des Permanentmagneten als E-Magnet mit Spule

Fig. 6: Ausführung des Permanentmagneten als Topfmagnet mit Spule.

In **Fig.** 1 ist der Permanentmagnet als Stabmagnet **1a** mit umgebender Spule **2a** dargestellt. Der Magnet wird in der Nähe des Senders **6** fest angeordnet. Die dargestellte Bauform als Stabmagnet ist besonders einfach und platzsparend. Da die magnetischen Feldlinien auf beiden Seiten des Stabmagneten **1a** verlaufen, können nur jene Feldlinien Wirkung haben, die auf jener Seite liegen, an welche der Codeträger **4**

angenähert wird. Dies hat den Nachteil, daß das ferromagnetische Teil **3** sehr nahe an den Stabmagneten **1a** herangebracht werden muß und daß die Annäherung des ferromagnetischen Teils **3** nur dann die gewünschte Spannung in der Spule **2a** induziert, wenn die Achse des Teils **3** weitgehend parallel zur Achse des Stabmagneten **1a** angenähert wird.

In **Fig. 2** wird ein Codeträger **4** in Schlüsselform mit angesetztem ferromagnetischen Teil **3** dargestellt. Der Kopf des Codeträgers **4** besteht aus nicht ferromagnetischem Material – vorzugsweise Kunststoff- und umschließt wasserdicht gekapselt einen Transponder **7** mit Antenne, in dessen Chip die Codeinformationen des Codeträgers **4** gespeichert sind. Fest mit dem Kopf des Codeträgers **4** verbunden ist das ferromagnetische Teil **3**, das sich in Form einer Schlüsselzunge erstreckt. Da der Codeträger **4** keine eigene Batterie benötigt, kann er in einer handlichen, kompakten, robusten und schlüsselähnlichen Form gestaltet werden, so daß er vom Benutzer problemlos am Schlüsselbund getragen werden kann.

In **Fig. 3** sind Schalter und Sender **6** im Schaltdiagramm dargestellt. Wird ein Codeträger **4** dem Permanentmagneten **1** und seiner zugeordneten Spule **2** angenähert, bewirkt das mit dem Codeträger **4** verbundene ferromagnetische Teil **3** eine Vergrößerung des Magnetflusses durch die Spule **2**, was durch die Flußänderung in der Spule **2** eine kleine Spannung induziert. Entfernt man den Codeträger **4** vom Magneten **1**, wird der Magnetfluß durch die Spule **2** verkleinert und es wird in der Spule **2** eine kleine Spannung in entgegengesetzter Richtung induziert. Die gewünschte Spannung (Annäherung oder Entfernung) wird durch einen Operationsverstärker **5** soweit verstärkt, daß sie sicher genügt, den Sender **6** zu aktivieren. Der aktivierte Sender **6** baut ein elektromagnetisches Feld auf, welches dem Transponder **7** Betriebsenergie liefert und durch Rückwirkung des Transponders **7** moduliert wird und dadurch Codeinformationen vom Transponder empfängt, welche in der Auswerteelektronik mit den dort als gültig gespeicherten Codeinformationen verglichen werden. Der Sender **6** wird desaktiviert, sobald die Codeinformationen des Transponders **7** nicht mehr benötigt werden. Die Deaktivierung des Senders **6** geschieht spätestens dann, wenn der Codeträger **4** das Feld des Senders **6** verläßt.

In **Fig. 4** wird der Permanentmagnet als zweischenkeliger U-Magnet **1b** mit zugeordneter Spule **2b** dargestellt. In dieser Bauform werden die magnetischen Feldlinien durch die beiden Schenkel des Magneten in jene Richtung geführt, aus der die Annäherung des Codeträgers **4** erfolgt. Verglichen mit der Ausführung als Stabmagnet **1a** wird hier eine größere Wirkung erzielt, so daß bereits bei größerem Abstand die gewünschte Spannung induziert wird. Aber auch bei dieser Bauform ist darauf zu achten, daß das ferromagnetische Teil **3** möglichst achsparallel zur Verbindungslinie der beiden Magnetschenkel angenähert wird.

In **Fig. 5** wird der Permanentmagnet als dreischenkeliger E-Magnet **1c** mit zugeordneter Spule **2b** dargestellt. Auch bei dieser Bauform ist darauf zu achten, daß das ferromagnetische Teil **3** möglichst achsparallel zur Verbindungslinie der Magnetschenkel angenähert wird. Verglichen mit der Bauform als U-Magnet **1b** ist hier allerdings bei gleicher Wirkung ein größerer seitlicher Versatz bei der Annäherung des Teils **3** erlaubt, so daß weniger Präzision beim Handling des Codeträgers **4** gefordert wird.

In **Fig. 6** wird der Permanentmagnet als Topfmagnet **1d** mit zugeordneter Spule **2b** dargestellt. Diese Bauform ist komplizierter und voluminöser als die anderen. Sie bietet allerdings den Vorteil, daß das ferromagnetische Teil **3** bei gleicher Wirkung in beliebiger Drehrichtung angenähert werden kann und daß noch größerer seitlicher Versatz bei der Annäherung toleriert werden kann. Diese Bauform ermöglicht also das im Vergleich komfortabelste Handling des Codeträgers **4**.

Patentansprüche

1. Berührungslos ansprechbarer Schalter zur Aktivierung eines vorzugsweise in Zutrittskontrollsystemen eingesetzten batteriebetriebenen oder akkugestützt netzbetriebenen berührungslos arbeitenden Identifikationssystems, welches über einen fest angeordneten Sender mit Antenne, über eine Auswerteelektronik und über mobile Codeträger mit Transponder und Antenne verfügt, wobei der Sender im aktivierten Zustand ein elektromagnetisches Feld aufbaut, welches dem Transponder eines an den Sender angenäherten Codeträgers Betriebsenergie liefert und durch Rückwirkung des Transponders moduliert wird und dadurch Codeinformationen vom Transponder empfängt, die in der Auswerteelektronik mit den dort als gültig gespeicherten Codeinformationen verglichen werden, **dadurch gekennzeichnet**, daß ein Permanentmagnet **1** mit einer ihm zugeordneten Spule **2** in der Nähe eines Senders **6** angeordnet ist, daß der Permanentmagnet **1** so magnetisiert ist, daß die magnetischen Feldlinien nach außen dringen, daß Codeträger **4** aus einem nicht ferromagnetischen Material bestehen und je einen Transponder **7** mit Antenne tragen, daß jeder Codeträger **4** zusätzlich ein ferromagnetisches Teil **3** trägt, daß bei Annäherung eines Codeträgers **4** mit seinem ferromagnetischen Teil **3** an den Permanentmagneten **1** oder bei der nachfolgenden Wieder-Entfernung der durch das ferromagnetische Teil **3** bewirkte geänderte Magnetfluß durch die Spule **2** eine Spannung induziert, die ein Signal zur Aktivierung des Senders **6** liefert, daß der Sender **6** im aktivierten Zustand durch Rückwirkung des Transponders **7** moduliert wird und dadurch Codeinformationen empfängt und daß der Sender **6** entweder dann deaktiviert wird, wenn die Codeinformation nicht länger benötigt wird oder spätestens dann, wenn der Codeträger **4** das Feld des Senders **6** verläßt.

2. Anordnung gemäß Anspruch 1, dadurch gekennzeichnet, daß an Spule **2** ein Operationsverstärker **5** angekoppelt ist, der die in der Spule **2** induzierte Spannung verstärkt.

3. Anordnung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Permanentmagnet als Stabmagnet **1a** mit zugehöriger Spule **2a** ausgebildet ist.

4. Anordnung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Permanentmagnet als U-Magnet **1b** mit zugehöriger Spule **2b** ausgebildet ist.

5. Anordnung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Permanentmagnet als E-Magnet **1c** mit zugehöriger Spule **2b** ausgebildet ist.

6. Anordnung gemäß Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Permanentmagnet als Topfmagnet **1d** mit zugehöriger Spule **2b** ausgebildet ist.

Hierzu 2 Seite(n) Zeichnungen

Nummer: DE 198 55 207 C1
Int. Cl.[7]: G 07 C 9/00
Veröffentlichungstag: 18. Mai 2000

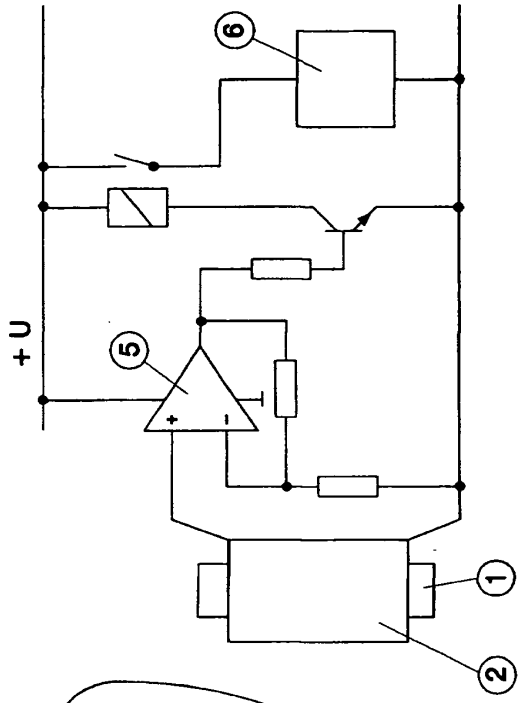

FIG. 3

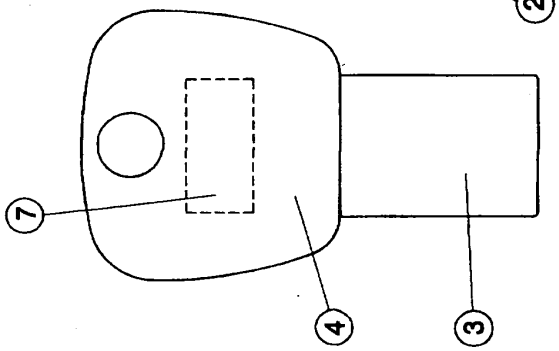

FIG. 2

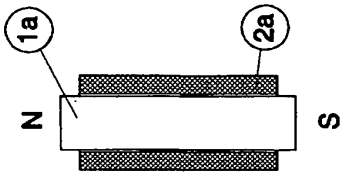

FIG. 1

Nummer: DE 198 55 207 C1
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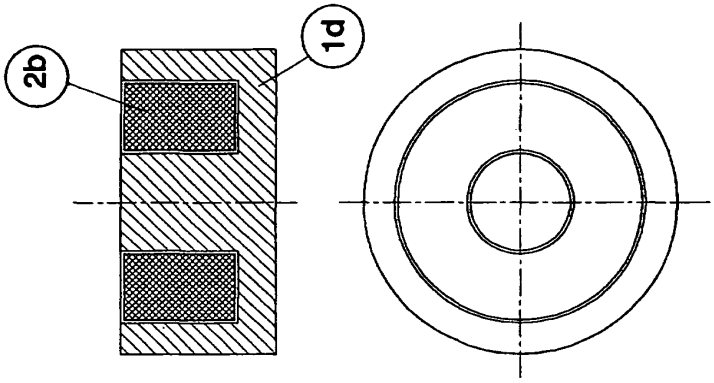

FIG. 6

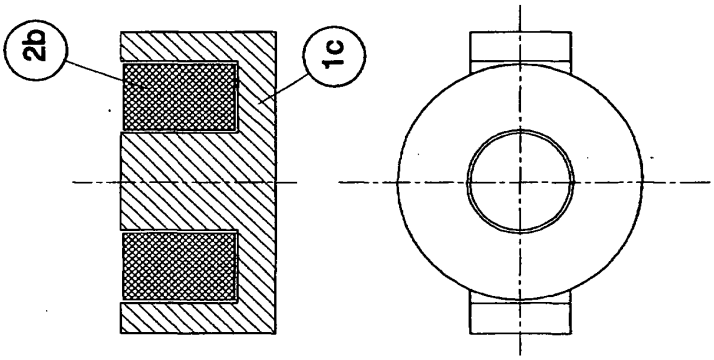

FIG. 5

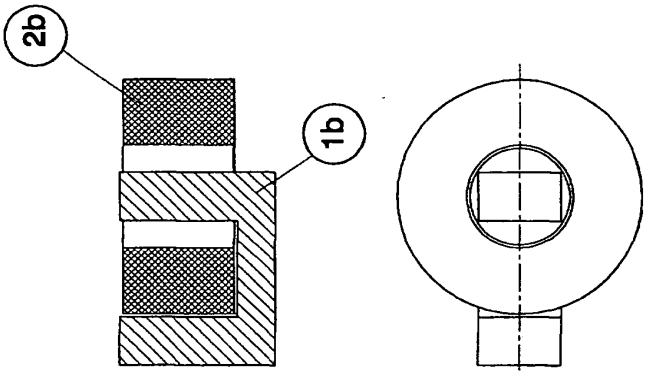

FIG. 4

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(11) EP 0 696 011 B1

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(54) **Apparatus and method for identifying multiple transponders**

Vorrichtung und Verfahren zur Identifizierung von mehreren Transpondern

Appareil et méthode pour l'identification d'une multiplicité de transpondeurs

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(56) References cited:
EP-A- 0 285 419
EP-A- 0 495 708
EP-A- 0 600 556
NL-A- 8 802 718

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EP 0 696 011 B1

Description

TECHNICAL FIELD OF THE INVENTION

[0001] This invention relates in general to the field of transponder systems. More particularly, the present invention relates to a method for identifying multiple transponders located in close proximity to one another, and to a transponder system as defined in the precharacterizing portion of Claim 7.

BACKGROUND OF THE INVENTION

[0002] Transponder arrangements have been used to detect and uniquely identify, in a contactless manner, objects, animals, or persons being present at selected locations. Transponder systems typically include an interrogation unit which transmits radio frequency pulses and a transponder unit which receives the pulses and responds with stored data in the form of a modulated radio frequency carrier. Because the transponders may be diminutive in size, transponder systems may be used in countless applications. For example, luggage being transported on a conveyor belt may be identified and routed according to the encoded destination at a routing point. Machine components may be identified and transported to specific stations on an assembly line. Movement and activity of animal stock with embedded transponder units may be monitored and recorded in an unobtrusive manner. Personnel may carry identification badges having a transponder unit to gain access to secured areas without having to use a card reader.

[0003] However, a problem arises when multiple transponders are simultaneously present within the inquiry field of an interrogation unit. If multiple transponder units exist in the inquiry field and responding simultaneously to the interrogation pulses of the interrogation unit, the responses may become garbled and unreadable. In particular, the resonant circuits of the transponders may interfere with the operation of other circuits so that no transponder response can be read.

[0004] An excess control equipment which comprises a transponder system as defined above is known from EP-A-0 285 419. The identity codes stored in the transponders comprise a plurality of fields each holding a selected information bit. The interrogation signal is controlled so as simultaneously to interrogate the fields of all transponders within range in a serial manner. A group reply signal sent back to the interrogation unit from any transponder having, in the field being interrogated, a bit matching that required by the interrogation signal. The interrogation unit is arranged to determine, from the series of received reply signals, the identity of each and every valid transponder within range. That document further discloses a binary tree search algorithm, which is used for identification of the transponders.

[0005] A similar binary tree search algorithm is known from NL-A-8 802 718.

SUMMARY OF THE INVENTION

[0006] In accordance with the present invention, apparatus and method for identifying a plurality of transponders are provided which eliminates or substantially reduces disadvantages associated with prior systems.

[0007] In one aspect of the invention, a method for identifying a plurality of transponders located within an inquiry field of an interrogation unit is provided, which comprises the steps defined in Claim 1.

[0008] In yet another aspect of the invention, a transponder system as defined in the precharacterizing portion of Claim 7 has the features of the characterizing portion of Claim 7.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] For a better understanding of the present invention, reference may be made to the accompanying drawings, in which:

FIGURE 1 is a simplified diagram showing multiple transponders located in an inquiry field of an interrogation unit;

FIGURE 2 is a simplified flowchart of the process of selectively reading the multiple transponders;

FIGURE 3 is a simplified block diagram of an interrogation unit; and

FIGURE 4 is a simplified block diagram of a transponder.

DETAILED DESCRIPTION OF THE INVENTION

[0010] The preferred embodiment of the present invention and its advantages are best understood by referring to FIGURES 1-4 of the drawings, like numerals being used for like and corresponding parts of the various drawings.

[0011] FIGURE 1 illustrates an exemplary scenario of multiple transponders 10-16, with identification codes A through D, being simultaneously present in an inquiry field 18 of an interrogation unit 20. Inquiry field 18 represents the area within which the interrogation or power pulses generated by interrogation unit 20 are readily receivable. Inquiry field 18 may contain a continuous modulated or unmodulated radio frequency signal. Transponders 10-16 are capable of receiving the interrogation pulses from interrogation unit 20 and respond thereto with stored data and their respective identification codes. As shown, a transponder 22 located outside of inquiry field 18 does not receive the interrogation pulse and therefore does not participate in transmission of its stored data.

[0012] In a typical transponder system, interrogation unit 20 sends an RF interrogation pulse. The interroga-

tion pulse energizes a transponder located within the inquiry field, and enables it to respond with stored data. However in the scenario shown in FIGURE 1, transponders 10-16 are located in close proximity to one another such that they interfere with one another's operations, and that the simultaneous responses from the transponders may not be readable by interrogation unit 20. As a result, the presence of transponders 10-16 are not properly detected.

[0013] Referring to FIGURE 2, a flowchart of the process in which a plurality of transponders located in an inquiry field are identified by dynamic selective addressing is shown. It may be advantageous to the understanding of the

TRANSPONDER	ID
A	X0001
B	X1000
C	X0100
D	X1100

present invention to also refer to a specific example of transponder identification codes as the logic flow is described. The exemplary identification codes of the transponders are as follows, where "X" represents the most significant bits of the identification code:

[0014] At the start of the algorithm, interrogation unit 20 sends an interrogation pulse, as shown in blocks 30 and 32. A read cycle is then initiated to receive the responses from the transponders, as shown in block 34. If the responses are unrecognizable or unreadable, then a determination is made that more than one transponder are present in inquiry field 18, as shown in block 36. If there are more than one transponder present, then an initiation of a counter, *COUNT*, and a selection bit string is performed. As shown in block 38, *COUNT* is initialized to zero, and the selection bit string is initialized with a zero bit. The identification codes of the transponders may be uniquely assigned 64-bit bit strings where, in most applications, the transmission of a small number of the least significant bits is sufficient to uniquely identify the transponders. In block 40, interrogation unit 20 sends an interrogation pulse including the bit string and the identification bit string of any successfully read transponders. The identification code or bit string of successfully read transponders may be stored in a memory and deleted after a predetermined time period to enable the detection of a re-entry into the inquiry field. In addition, selection bit strings that have been transmitted in the selection procedure are also stored in memory and deleted after a predetermined amount of time.

[0015] Upon reception of the interrogation pulse with the bit string, each transponder 10-16 compares the bit string with the least significant bits of its own unique identification code. In this case, since the bit string is "0", those transponders with identification codes ending in "0" respond to the interrogation pulse, and those transponders having identification codes ending in "1" do not respond. Therefore, transponder A with its identification code ending in "0001" is prevented from sending its reply, and transponders B through D send their responses and their identification codes. The read cycle of interrogation unit 20 once again tries to read the transponder responses, as shown in block 42. However, it discovers that there are more than one transponder present, as shown in block 44. In block 46, if the counter, *COUNT*, is not zero then it is reset. In block 48, a "0" is added to the most significant bit of the bit string to form "00". This new selection bit string is sent in the interrogation pulse, as shown in block 40, where the responses from transponders B through D again indicate multiple transponders with this identification code ending in "00", as shown in blocks 42 and 44. The bit string is again modified by adding another "0" to form "000". This time, the response to the interrogation pulse indicates only one transponder replied, since transponder B is the only transponder in this scenario to have the identification code ending in "000". Transponder B is therefore identified by the interrogation unit, and its identification code is stored in a memory.

[0016] The selection bit string must again be modified to progressively select the remaining transponders. Since it is determined, in block 44, that only one transponder responded to the "000" bit string, execution proceeds to block 50 where the bit string is examined to determine whether it is only one bit long. The bit string contains three bits presently, therefore execution proceeds to block 52. In blocks 52, the counter, *COUNTER*, is checked to determine whether it is greater than zero. If it is not, as in this case, then the counter is incremented by one in block 54, and execution proceeds to block 58, where the most significant bit of the bit string is inverted. The resultant bit string becomes "100". The new selection bit string is checked to determine whether it has been used previously. This bit string is then transmitted with the interrogation pulse. In addition, the identification code of the successfully read transponder, "000", is also sent to deselect transponder B. Note that although the format of the interrogation pulse is not explicitly described herein, it necessarily follows that some format is used in which the successfully read transponder identification codes may not be confused with the selection bit string.

[0017] In response to the selection bit string of "100", both transponders C and D respond, since both of their identification codes end with this bit string. The determination in block 44 is therefore answered in the affirmative, and the counter, *COUNT*, is reset in block 46. In block 48, a "0" is added to the selection bit string to form "0100". This new bit string is sent with the identification codes of successfully read transponders, resulting in suppressing responses from transponders A, B, and D, and the selection of transponder C. Transponder C is therefore detected and identified in block 42. In block

44, since only transponder C responded to the interrogation pulse, the bit string is examined to determine whether it is only one bit long. Since the answer is no, and *COUNT* is not greater than zero, *COUNT* is incremented, as shown in block 54. In block 58, the most significant bit of the selection bit string is inverted to form "1100". Since this new bit string has not been used previously, it is transmitted in an interrogation pulse resulting in the selection and identification of transponder D.

[0018] In block 44, since only transponder D responded to the interrogation pulse, execution proceeds to block 50, where it is determined that the bit string length is longer than one. In block 52, *COUNT* is checked to determined if it is greater than zero. Since it is, the least significant bit in the selection bit string is removed. The resultant selection bit string is "110". Because no transponder identification code has this bit string ending, no response is received, and the least significant bit of the bit string is removed again in block 56. The resultant bit string, "11" also does not solicit any response, causing the execution to go to block 50. Because the bit string is longer than one bit, and *COUNT* is still greater than zero, the least significant bit is again deleted to yield "1". When the selection bit string "1" is transmitted, transponder A responds since its least significant bit is "1". Therefore, transponder A is identified and read in block 42. In blocks 44 and 50, it is determined that there is not more than one transponder and the bit string length is only one bit long. Accordingly, execution stops. In this manner, all four transponders are identified and their respective data are read.

[0019] In summary, the selection bit string sequence generated by the procedure and the resultant transponder selection are as follows:

0	- selecting B, C, and D
00	- selecting B, C, and D
000	- selecting B
100	- selecting C, and D
0100	- selecting C
1100	- selecting D
110	- selecting none
11	- selecting none
1	- selecting A

[0020] Operating in this manner, a dynamically grown series of bit strings are used to exhaustively select and read the transponders present in the inquiry field. The transponders are deselected based on the bit string ending in their identification codes not matching those transmitted in the interrogation pulses. Alternatively stated, the transponders respond to the interrogation pulses only when their respective codes has the same bit string ending as those transmitted in the interrogation pulses. The bit strings are constructed and manipulated according to an algorithm which is capable of singling out all the transponders present in the inquiry field. Because the algorithm operates on bit strings, it accomplishes the task faster than one that selects and compares on a bit-by-bit basis. Furthermore, since the identification codes of successfully read transponders are also transmitted along with the selection bit string, a faster detection of yet undetected transponders is possible.

[0021] Referring to FIGURE 3, a simplified block diagram of an embodiment of an interrogation unit 70 is shown. Interrogation unit 70 includes a microprocessor 72 which is responsible for the control of the function sequences. Microprocessor 72 is coupled to a memory 74, which may include the aforementioned queue used for storing the identification codes of recognized transponders. Further included are a transmitter 76 and receiver 78. Transmitter 76 and receiver 78 may include a radio frequency (RF) oscillator (not shown) and a resonant circuit (not shown. For a description of the construction and operation of an embodiment of the interrogation unit, please refer to U.S. Patent No. 5,053,774, titled *Transponder Arrangement,* issued to Schuermann et al. on October 1, 1991.

[0022] FIGURE 4 is a simplified block diagram of an embodiment of a transponder 90. Transponder 90 includes a resonant circuit 92 coupled to an energy accumulator 94. Resonant circuit 92 may include a receiving coil (not shown) coupled in parallel with a first capacitor (not shown). Energy accumulator 94 may include a second capacitor (not shown) coupled in series with resonant circuit 92. A controller 96 with memory 98 are also provided. Controller 96 may receive input signals from a sensor (not shown) indicative of certain physical parameters of the environment, for example ambient temperature and pressure, and store it in memory 98 for transmission to the interrogation unit. The unique identification code of the transponder also may be stored in memory 98. In addition, a response formulator 100 may read memory 98 to formulate the code pattern responses to the interrogation pulses. A de-energizer circuitry 102 controlled by controller 96 is further provided for shorting, discharging, or by-passing energy accumulator 94 in response to receiving an interrogation pulse containing the least significant bits of its identification code. De-energizer circuitry 102 therefore acts to suppress the transponder's response so that it may not respond to the interrogation pulse. Details of an embodiment of the transponder circuitry are described in above-identified U.S. Patent No. 5,053,774, titled *Transponder Arrangement.*

[0023] Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made therein without departing from the scope of the invention as defined by the appended claims.

Claims

1. A method for identifying a plurality of transponders comprising the steps of:

   assigning a unique identification code to each one of said plurality of transponders;
   dynamically building and modifying a bit string and transmitting said bit string to said transponders;
   permitting responses from those transponders having identification code endings equal to said transmitted bit string;
   suppressing responses from those transponders having identification code endings different from said transmitted bit string;
   repeating said bit string building, modifying and transmitting step and response permitting and suppressing step until only one transponder response is received and said transponder identified thereby; and
   repeating said bit string building, modifying and transmitting step and response permitting and suppressing step until all of said plurality of transponders are identified; wherein said bit string building and modifying step comprises
   increasing the number of bits in said bit string by adding a bit of a predetermined logic value to a most significant bit position when more than one transponder responds to said transmitted bit string;
   inverting the logic value of a most significant bit after successfully identifying a transponder; and
   decreasing the number of bits in said bit string by deleting a bit from a least significant bit position when no more than one transponder responds to said transmitted bit string more than once successively.

2. The method, as set forth in Claim 1 further comprising the step of transmitting a bit string ending of those successfully identified transponders, and suppressing said responses from those transponders having identification code endings equal to said transmitted bit string ending.

3. The method, as set forth in Claim 1 or Claim 2, further comprising the step of comparing said transmitted bit string and least significant bits of each of said transponder identification codes.

4. The method, as set forth in any preceding claim, further comprising the step of storing said identification codes of successfully identified transponders.

5. The method, as set forth in Claim 4, further comprising the step of deleting said stored identification codes after a predetermined time period.

6. The method, as set forth in any preceding claim,further comprising the step of storing said transmitted bit strings.

7. A transponder system comprising:

   an interrogation unit (70) comprising:

      a processor (72) dynamically building and modifying a bit string;
      a transmitter (76) transmitting an interrogation pulse including said bit string receivable within an inquiry field (18); and
      a receiver (78) receiving a transponder response; and
      a plurality of transponders (10,...,16) located in close proximity with one another within said inquiry field (18), each transponder (10,...,16) comprising:

         a memory (98) storing a unique identification code;
         a circuit (92) receiving said interrogation pulse, said interrogation pulse including said bit string; and transmitting a response in response to least significant bits of said stored identification code being equal to said bit string;
         a controller (96) comparing said received bit string with said least significant bits of said identification code; and
         a de-energizer circuit (102) suppressing said receiving/transmitting circuit (92) from transmitting a response in response to said least significant bits of said identification code being unequal to said bit string;

   wherein building and modifying said bit string is accomplished by

      increasing the number of bits in said bit string by adding a bit of a predetermined logic value to a most significant bit position when more than one transponder responds to said transmitted bit string;

      inverting the logic value of a most significant bit after successfully identifying a transponder; and

      deleting a bit value at a predetermined bit position in said bit string after only one transponder responds to said transmitted bit string more than once successively; **characterized in that**

      said processor (72) decreases the number of bits in said bit string by deleting a bit from a least significant bit position when no more than one transponder responds to said transmitted bit string more than once successively; and that said receiving/

transmitting circuit (92) in each transponder (10,..., 16) is a resonant circuit.

8. The system, as set forth in Claim 7, wherein said interrogation unit (70) further comprises:

a memory (74) storing bit strings eliciting response from only one transponder.

Patentansprüche

1. Verfahren zum Identifizieren mehrerer Transponder, das die folgenden Schritte umfaßt:

Zuweisen eines eindeutigen Identifizierungscodes zu jedem der mehreren Transponder;

dynamisches Aufbauen und Modifizieren eines Bit-Strings und Senden des Bit-Strings zu den Transpondern;

Zulassen von Antworten von jenen Transpondern, deren Identifizierungscode-Endungen gleich dem gesendeten Bit-String sind;

Unterdrücken von Antworten von jenen Transpondern, deren Identifizierungscode-Endungen von dem gesendeten Bit-String verschieden sind;

Wiederholen des Schrittes des Aufbauens, Modifizierens und Sendens des Bit-Strings und des Schrittes des Zulassens und Unterdrükkens von Antworten, bis nur noch eine Transponderantwort empfangen wird und der Transponder dadurch identifiziert ist; und

Wiederholen des Schrittes des Aufbauens, Modifizierens und Sendens des Bit-Strings und des Schrittes des Zulassens und Unterdrükkens von Antworten, bis jeder der mehreren Transponder identifiziert ist; wobei der Schritt des Aufbauens und Modifizierens des Bit-Strings umfaßt:

Erhöhen der Anzahl von Bits in dem Bit-String durch Hinzufügen eines Bits mit vorgegebenem logischen Wert an der höchstwertigen Bitposition, wenn mehr als ein Transponder auf den gesendeten Bit-String antworten;

Invertieren des logischen Wertes des höchstwertigen Bits, nachdem ein Transponder erfolgreich identifiziert worden ist; und

Emiedrigen der Anzahl von Bits in dem Bit-String durch Löschen eines Bits an der niedrigstwertigen Bitposition, wenn nicht mehr als ein Transponder auf den gesendeten Bit-String mehr als einmal nacheinander antwortet.

2. Verfahren nach Anspruch 1, das ferner den Schritt des Sendens einer Bit-String-Endung jener erfolgreich identifizierten Transponder und des Unterdrückens der Antworten von jenen Transpondern, deren Identifizierungscode-Endungen gleich der gesendeten Bit-String-Endung ist, umfaßt.

3. Verfahren nach Anspruch 1 oder Anspruch 2, das ferner den Schritt des Vergleichens des gesendeten Bit-Strings mit den niedrigstwertigen Bits jedes der Transponder-Identifizierungscodes umfaßt.

4. Verfahren nach einem vorhergehenden Anspruch, das ferner den Schritt des Speicherns der Identifizierungscodes der erfolgreich identifizierten Transponder umfaßt.

5. Verfahren nach Anspruch 4, das ferner den Schritt des Löschens der gespeicherten Identifizierungscodes nach einer vorgegebenen Zeitperiode umfaßt.

6. Verfahren nach einem vorhergehenden Anspruch, das ferner den Schritt des Speicherns der gesendeten Bit-Strings umfaßt.

7. Transponder-System, das umfaßt:

eine Abfrageeinheit (70), die umfaßt:

einen Prozessor (72), der einen Bit-String dynamisch aufbaut und modifiziert;

einen Sender (76), der einen den Bit-String enthaltenden und innerhalb eines Abfragefeldes (18) empfangbaren Abfrageimpuls sendet; und

einen Empfänger (78), der eine Transponder-Antwort empfängt; und

mehrere Transponder (10, ..., 16), die sich innerhalb des Abfragefeldes (18) sehr nahe beieinander befinden, wobei jeder Transponder (10, ..., 16) umfaßt:

einen Speicher (98), der einen eindeutigen Identifizierungscode speichert;

eine Schaltung (92), die den den Bit-String enthaltenden Abfrageimpuls

empfängt; und als Antwort auf die Gleichheit zwischen nierigstwertigen Bits des gespeicherten Identifizierungscodes und dem Bit-String eine Antwort sendet;

einen Controller (96), der den empfangenen Bit-String mit den niedrigstwertigen Bits des Identifizierungscodes vergleicht; und

eine Aberregungsschaltung (102), die die Empfangs/Sende-Schaltung (92) als Antwort auf die Ungleichheit zwischen den niedrigstwertigen Bits des Identifizierungscodes und dem Bit-String davon abhält, eine Antwort zu senden; wobei das Aufbauen und Modifizieren des Bit-Strings erzielt wird durch

Erhöhen der Anzahl von Bits in dem Bit-String durch Hinzufügen eines Bits mit einem vorgegebenen logischen Wert an einer höchstwertigen Bitposition, wenn mehr als ein Transponder auf den gesendeten Bit-String antworten;

Invertieren des logischen Wertes eines höchstwertigen Bits, nachdem ein Transponder erfolgreich identifiziert worden ist; und

Löschen eines Bitwertes an einer vorgegebenen Bitposition in dem Bit-String, nachdem nur ein Transponder auf den gesendeten Bit-String mehr als einmal nacheinander geantwortet hat;

dadurch gekennzeichnet, daß

der Prozessor (72) die Anzahl von Bits in dem Bit-String erniedrigt, indem er ein Bit an der niedrigstwertigen Bitposition löscht, wenn nicht mehr als ein Transponder auf den gesendeten Bit-String mehr als einmal nacheinander antwortet; und

die Empfangs/Sende-Schaltung (92) in jedem Transponder (10, ..., 16) eine Resonanzschaltung ist.

8. System nach Anspruch 7, bei dem die Abfrageeinheit (70) ferner umfaßt:

einen Speicher (70), der Bit-Strings speichert, die eine Antwort von nur einem Transponder bewirken.

Revendications

1. Procédé pour identifier une pluralité de transpondeurs comprenant les étapes consistant à :

affecter un code d'identification unique à chacun de ladite pluralité de transpondeurs;

construire et modifier de façon dynamique une suite de bits et transmettre ladite suite de bits auxdits transpondeurs;

permettre des réponses à partir de ceux des transpondeurs qui comportent des fins de code d'identification égales à ladite suite de bits transmises;

supprimer des réponses provenant de ceux des transpondeurs qui ont des fins de code d'identification différentes de ladite suite de bits transmises;

répéter ladite étape de construction, modification et transmission de la suite de bits et l'étape d'autorisation et de suppression de réponse jusqu'à ce que seule une réponse d'un transpondeur soit reçue et que ledit transpondeur soit ainsi identifié; et

répéter ladite étape de construction, de modification et de transmission de la suite de bits et ladite étape d'autorisation et de suppression de réponse jusqu'à ce que l'ensemble de ladite pluralité de transpondeurs soient identifiés; dans laquelle ladite étape de construction et de modification de la suite de bits comprend

l'augmentation du nombre de bits dans ladite suite de bits par addition d'un bit ayant une valeur logique prédéterminée à une position de bit de poids le plus élevé lorsque plus d'un transpondeur répond à ladite suite de bits transmise;

l'inversion de la valeur logique d'un bit de poids le plus élevé après l'identification réussie d'un transpondeur; et

la réduction du nombre de bits dans ladite suite de bit par suppression d'un bit à partir de la position de bits de poids le plus faible lorsqu'au plus un transpondeur répond plus d'une fois successivement à ladite suite de bits émise.

2. Procédé selon la revendication 1, comprenant en outre l'étape de transmission d'une fin de suite de bits de ces transpondeurs identifiés avec succès, et de suppression desdites réponses provenant des transpondeurs ayant des fins de codes d'identification identiques à ladite fin de suite de bits transmise.

3. Procédé selon la revendication 1 ou la revendication 2, comprenant en outre l'étape consistant à comparer ladite suite de bits transmise et des bits de poids le plus faible de chacun desdits codes d'identification de transpondeurs.

4. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre l'étape consistant à mémoriser lesdits codes d'identification de transpondeurs identifiés avec succès.

5. Procédé selon la revendication 4, comprenant en outre l'étape consistant à supprimer lesdits codes d'identification mémorisés après un intervalle de temps prédéterminé.

6. Procédé selon l'une quelconque des revendications précédentes, comprenant en outre l'étape consistant à mémoriser lesdites suites de bits transmises.

7. Système de transpondeur comprenant :

une unité d'interrogation (70) comprenant :

un processeur (72) construisant et modifiant de façon dynamique une suite de bits;

un émetteur (76) émettant une impulsion d'interrogation incluant ladite suite de bits pouvant être reçue dans une zone de demande (18); et

un récepteur (78) recevant une réponse du transpondeur; et

une pluralité de transpondeurs (10, ..., 16) situés à proximité directe les uns des autres dans ladite zone de demande (18), chaque transpondeur (10, ..., 16) comprenant :

une mémoire (98) mémorisant un code d'identification unique;

un circuit (92) recevant ladite impulsion d'interrogation, ladite impulsion d'interrogation incluant ladite suite de bits; et émettant une réponse en réponse à l'égalité entre des bits de poids le plus faible dudit code d'identification mémorisé et ladite suite de bits;

un contrôleur (96) comparant ladite suite de bits reçue auxdits bits de poids le plus faible dudit code d'identification; et

un circuit de désexcitation (102) empêchant ledit circuit d'émission/réception (92) d'émettre une réponse en réponse à l'inégalité entre lesdits bits de poids le plus faible dudit code d'identification et ladite suite de bits;

dans lequel la construction et la modification de ladite suite de bits sont accomplies par

accroissement du nombre de bits dans ladite suite de bits par addition d'un bit ayant une valeur logique prédéterminée à une position de bit de poids le plus élevé lorsque plus d'un transpondeur répond à ladite suite de bits transmise;

inversion de la valeur logique du bit de poids le plus élevé après une identification réussie d'un transpondeur; et

suppression d'une valeur de bit dans une position de bit prédéterminée dans ladite suite de bits après que seul un transpondeur ait répondu plus d'une fois successivement à ladite suite de bits émise;

caractérisé en ce que

ledit processeur (72) réduit le nombre de bits dans ladite suite de bits en supprimant un bit d'une position de bit de poids le plus faible lorsqu'au plus un transpondeur répond plus d'une fois successivement à ladite suite de bits émise; et que ledit circuit de réception/d'émission (92) dans chaque transpondeur (10, ..., 16) est un circuit résonnant.

8. Système selon la revendication 7, dans lequel ladite unité d'interrogation (70) comprend en outre :

une mémoire (74) mémorisant des suites de bits déclenchant une réponse à partir uniquement d'un transpondeur.

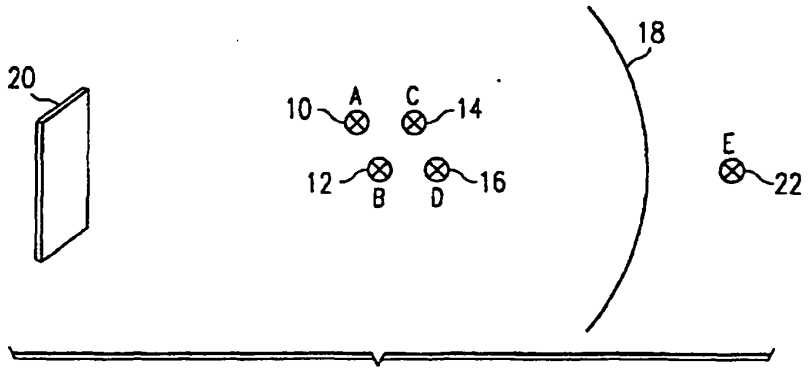

FIG. 1

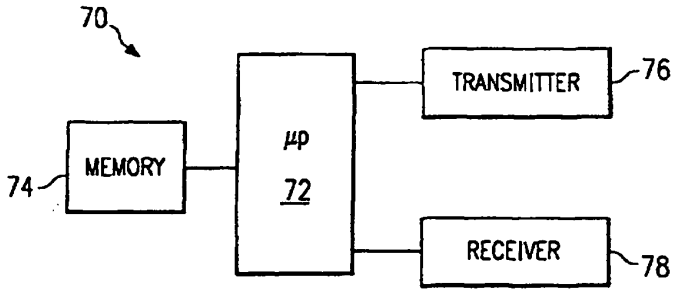

FIG. 3

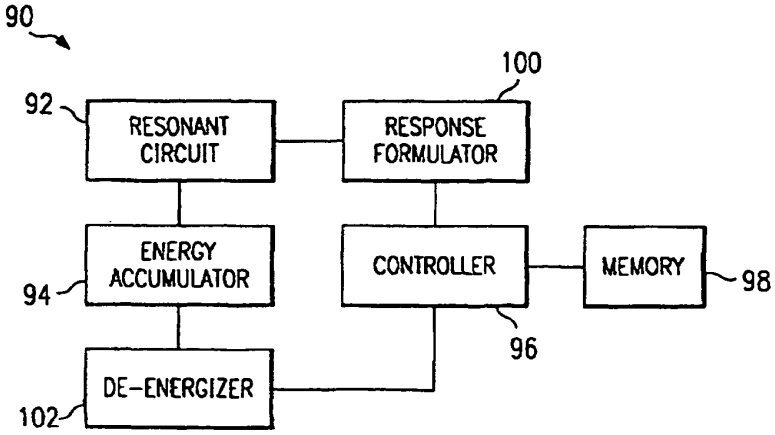

FIG. 4

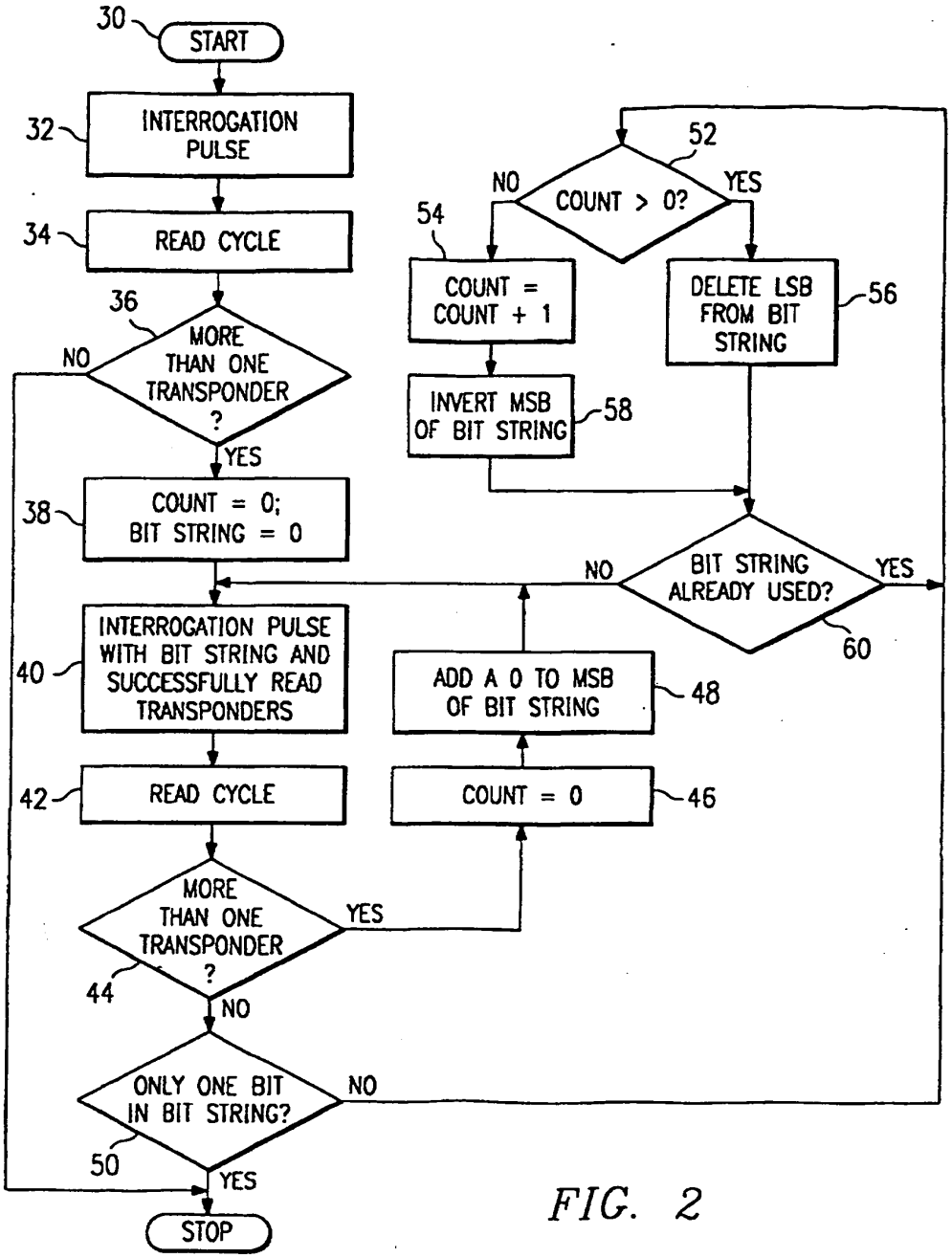
30
START
32
INTERROGATION PULSE
34
READ CYCLE
36
MORE THAN ONE TRANSPONDER ?
NO
YES
38
COUNT = 0; BIT STRING = 0
40
INTERROGATION PULSE WITH BIT STRING AND SUCCESSFULLY READ TRANSPONDERS
42
READ CYCLE
MORE THAN ONE TRANSPONDER ?
YES
44
NO
ONLY ONE BIT IN BIT STRING?
NO
50
YES
STOP
46
COUNT = 0
48
ADD A 0 TO MSB OF BIT STRING
BIT STRING ALREADY USED?
NO
YES
60
52
COUNT > 0?
NO
YES
54
COUNT = COUNT + 1
INVERT MSB OF BIT STRING
58
DELETE LSB FROM BIT STRING
56

FIG. 2

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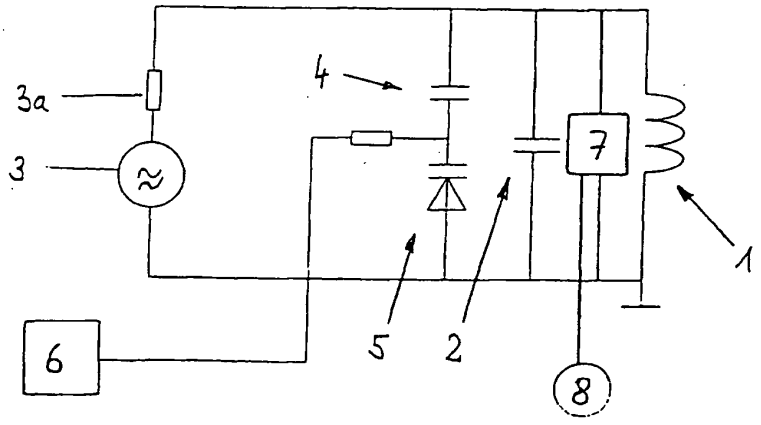
(54) Lesegerät für tragbare Datenträger

(57) Es wird ein Lesegerät mit einem Antennenkreis zur kontaktlosen Leistungsversorgung von Chipkarten mit einem Induktions-kreis beschrieben, das sich insbesondere auszeichnet durch eine Vorrichtung (7, 8) zum Erfassen und Überwachen der Resonanzfrequenz des Antennenkreises (1, 2) sowie zum Erzeugen einer Signalisierung, wenn die Resonanzfrequenz durch eine Mehrzahl von Chipkarten, die sich in dem Feld des Antennenkreises befinden, einen vorbestimmten Wert unterschreitet.

FIG. 1



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Beschreibung

[0001] Die Erfindung betrifft ein Lesegerät mit einem Antennenkreis zur kontaktlosen Leistungsversorgung von tragbaren Datenträgern, insbesonder Chipkarten, mit einem Induktionskreis gemäß dem Oberbegriff von Anspruch 1.

[0002] Tragbare Datenträger, im folgenden als Chipkarten bezeichnet, wobei auch andere Formen wie Uhren, Anhänger usw. gemeint sind, dieser Art weisen im allgemeinen elektronische Schaltkreise mit einem Prozessor, einem Speicher und anderen Bauelementen auf und dienen dazu, ihren Inhaber gegenüber einem Lesegerät zu identifizieren und zur Ausführung verschiedener Vorgänge zu berechtigen bzw. einen Informationsaustausch durchzuführen.

[0003] Zum Betrieb solcher Chipkarten muß den elektronischen Schaltkreisen eine Versorgungsspannung zugeführt werden. Es ist bekannt, die Versorgungsspannung von dem Lesegerät kontaktlos durch Induktion auf die Chipkarte zu übertragen. Zu diesem Zweck befindet sich auf der Chipkarte ein Induktionskreis, an den eine Schaltung zur Aufbereitung der induzierten Spannung sowie zur Zuführung dieser Spannung als Versorgungsspannung zu den Schaltkreisen angeschlossen ist.

[0004] Ein Problem kann dabei jedoch dann entstehen, wenn sich gleichzeitig zu viele Karten innerhalb der Reichweite eines Lesegerätes befinden. In diesen Fall wird der Antennenkreis des Lesegerätes zu stark bedämpft, so daß die Antennenspannung absinkt und die Sendeleistung des Lesegerätes möglicherweise nicht mehr ausreicht, um alle Karten zu versorgen. Ein Informationsaustausch und eine Erkennung der Karten ist dann nicht mehr sichergestellt.

[0005] Es wäre zwar möglich, ein Absinken der Antennenspannung zu überwachen. Diese Lösung ist allerdings nicht sehr zuverlässig, da die Antennenspannung auch durch die Versorgungsspannung des Lesegerätes beeinflußt wird, die insbesondere dann, wenn das Lesegerät durch eine Batterie gespeist wird, relativ stark schwanken kann. Ein weiterer Nachteil dieser Lösung besteht darin, daß nicht zwischen Chipkarten und anderen Teilen, die in das Sendefeld des Lesegerätes eingebracht werden und Wirbelstromverluste verursachen, unterschieden werden kann.

[0006] Der Erfindung liegt deshalb die Aufgabe zugrunde, ein Lesegerät der eingangs genannten Art zu schaffen, mit dem in zuverlässiger Weise eine Signalisierung erzeugt werden kann, wenn sich innerhalb seiner Reichweite so viele Chipkarten befinden, daß eine ausreichende Leistungsversorgung nicht mehr gewährleistet ist.

[0007] Gelöst wird diese Aufgabe bei einem Lesegerät, das einen Antennenkreis zur kontaktlosen Leistungsversorgung von Chipkarten mit einem Induktionskreis aufweist, gemäß Anspruch 1 dadurch, daß eine Vorrichtung zum Erfassen der Resonanzfrequenz des Antennenkreises sowie zum Erzeugen einer Signalisierung vorgesehen ist, wenn die Resonanzfrequenz durch eine Mehrzahl von Chipkarten, die sich in dem Feld des Antennenkreises befinden, einen vorbestimmten Wert unterschreitet.

[0008] Ein besonderer Vorteil dieser Lösung besteht darin, daß die Überwachung im wesentlichen unbeeinflußt von der Amplitude der Antennenspannung bleibt. Der Erfindung liegt die Erkenntnis zugrunde, daß die Resonanzfrequenz des Antennenkreises durch das Vorhandensein von Chipkarten nicht nur bedämpft, sondern in Abhängigkeit von der Anzahl der Chipkarten auch zu niedrigeren Werten verschoben wird.

[0009] Ein weiterer Vorteil dieser Lösung besteht darin, daß zwischen Chipkarten und anderen Gegenständen, wie zum Beispiel leitenden Folien oder Münzen, unterschieden werden kann, da diese Gegenstände nur eine weit geringere Frequenzverschiebung verursachen.

[0010] Die Unteransprüche haben vorteilhafte Weiterbildungen der Erfindung zum Inhalt.

[0011] Danach umfaßt die genannte Vorrichtung insbesondere eine erste Einrichtung zum Umschalten der Resonanzfrequenz des Antennenkreises von einem ersten niedrigen Wert, der im wesentlichen einer Betriebsfrequenz entspricht, auf einen zweiten höheren Wert, eine zweite Einrichtung zum Erfassen und Auswerten einer Änderung einer Spannungsamplitude in dem Antennenkreis beim Umschalten auf den zweiten Wert der Resonanzfrequenz und eine dritte Einrichtung zum Erzeugen der Signalisierung, wenn sich die Spannungsamplitude um einen vorbestimmten Wert vergrößert hat.

[0012] Weitere Einzelheiten, Merkmale und Vorteile der Erfindung ergeben sich aus der folgenden Beschreibung einer bevorzugten Ausführungsform anhand der Zeichnung. Es zeigt:

Fig. 1 ein Prinzipschaltbild eines Antennenkreises eines erfindungsgemäßen Lesegerätes;

Fig. 2 ein Diagramm zur Erläuterung der Frequenzverschiebung und

Fig. 3 verschiedene Spannungsverläufe zur Auswertung der erfaßten Frequenzverschiebung.

[0013] Ein Antennenkreis eines erfindungsgemäßen Lesegerätes umfaßt gemäß Figur 1 einen Schwingkreis aus einer Spule 1 und einem dazu parallelgeschalteten ersten Kondensator 2, der an eine entsprechende HF-Spannungsquelle 3 mit Vorwiderstand 3a angeschlossen ist, wobei die Frequenz der HF-Spannung die Betriebsfrequenz ist. Parallel zu dem Schwingkreis liegt eine Reihenschaltung aus einem zweiten Kondensator 4 und einer Kapazitätsdiode (Varicap-Diode) 5. Die Kapazitätsdiode ist an eine Einheit 6 zum Erzeugen und Umschalten zwischen einer niedrigen und einer hohen Sperrspannung angeschlossen.

[0014] Zum Erfassen und Auswerten einer Änderung der Spannungsamplitude in dem Antennenkreis ist eine Schaltungseinheit 7 vorgesehen, mit der eine Signalisierungseinrichtung 8 aktivierbar ist.

[0015] Im normalen Betrieb liegt an der Kapazitätsdiode die niedrige Sperrspannung an. Dies hat zur Folge, daß die Kapazität der Kapazitätsdiode 5 hoch ist und somit die Resonanzfrequenz des Schwingkreises einen niedrigen Wert aufweist, der so eingestellt ist, daß er im wesentlichen der Betriebsfrequenz entspricht oder geringfügig darüber liegt.

[0016] Mit dieser Frequenz wird die zur Versorgung der Chipkarten erforderliche HF-Leistung ausgesendet.

[0017] Mit bestimmten, vorzugsweise periodischen Zeitabständen, die frei wählbar sind, wird durch die Einheit 6 eine hohe Sperrspannung (Schaltspannung) an die Kapazitätsdiode 5 angelegt, so daß sich die Kapazität der Kapazitätsdiode 5 vermindert und die Resonanzfrequenz des Schwingkreises entsprechend erhöht. Figur 2 zeigt die dadurch eintretende Änderung der Spannungsamplitude in dem Antennenkreis.

[0018] Diese Änderung wird durch die Schaltungseinheit 7 überwacht und ausgewertet. Bei dem in Figur 2 gezeigten Betriebsfall vermindert sich die Spannungsamplitude durch Umschaltung auf die höhere Resonanzfrequenz von dem dort angedeuteten Amplitudenwert 1 auf den Amplitudenwert 2. Dies bedeutet, daß die niedrige Resonanzfrequenz im unmittelbaren Bereich der Betriebsfrequenz liegt, so daß sich nur eine oder wenige Chipkarten innerhalb der Reichweite des Lesegerätes befinden.

[0019] Wenn im Gegensatz dazu eine bestimmte Mindestanzahl von Chipkarten innerhalb der Reichweite des Lesegerätes überschritten wird, wird, wie oben erwähnt wurde, die (niedrige) Resonanzfrequenz nach unten verschoben. In diesem Fall führt ein Umschalten auf die höhere Resonanzfrequenz dazu, daß sich die Spannungsamplitude erhöht, da diese näher an der Betriebsfrequenz liegt.

[0020] Die Schaltungseinheit 7 aktiviert dann die Signalisierungseinrichtung 8, so daß diese zum Beispiel ein geeignetes Alarmsignal erzeugt, mit dem angezeigt wird, daß auf Grund der Vielzahl von Chipkarten eine ausreichende Leistungsversorgung nicht mehr sichergestellt ist.

[0021] Mit der Schaltungseinheit 7 ist also ein Phasenvergleich zwischen der an die Kapazitätsdiode 5 geführten hohen Sperrspannung und der Änderung der Spannungsamplitude in dem Antennenkreis durchzuführen. Dies ist in bekannter Weise mit Komparatoren und XOR-Gattern oder anderen Schaltungen leicht realisierbar.

[0022] Die Signalisierungseinrichtung 8 kann ein Alarmgeber oder eine beliebige andere Einrichtung sein, mit der ein Alarmsignal erzeugt und/oder das Lesegerät abgeschaltet und/oder eine andere Maßnahme getroffen wird, die von der jeweiligen Anwendung des Lesegerätes abhängt.

[0023] Anstelle der Umschaltung der Resonanzfrequenz ist es auch möglich, die Betriebsfrequenz des Antennenkreises geringfügig zu verstimmen, um die gleiche Information im Hinblick auf eine mögliche Verschiebung der Resonanzfrequenz zu erhalten.

[0024] Figur 3 zeigt den Zusammenhang zwischen den zeitlichen Spannungsverläufen und den Amplituden bei verschiedenen Betriebsfällen. Die Schaltspannung (A) wird periodisch zwischen dem hohen und dem niedrigen Wert umgeschaltet. Entsprechend verändert sich auch die Resonanzfrequenz (B) und wechselt zwischen dem hohen und dem niedrigen Wert. Wenn im normalen Betriebsfall (C) die Resonanzfrequenz bei oder geringfügig über der Betriebsfrequenz liegt, vermindert sich die Spannungsamplitude in dem Antennenkreises beim Umschalten auf die hohe Resonanzfrequenz. Wenn sich hingegen zu viele Chipkarten innerhalb der Reichweite des Antennenkreises befinden, so daß die (niedrige) Resonanzfrequenz nach unten verschoben wird und unterhalb der Betriebsfrequenz liegt (D), vergrößert sich durch ein Umschalten die Spannungsamplitude, da die höhere Resonanzfrequenz näher an der Betriebsfrequenz liegt.

[0025] Zur Ermittlung der Resonanzfrequenzverschiebung ist es auch möglich, den Antennenkreis automatisch abzustimmen und durch Auswertung des Regelvorgangs ein Signal zu erzeugen, mit dem eine unzulässige Verschiebung der Resonanzfrequenz nach unten angezeigt wird.

Patentansprüche

1. Lesegerät mit einem Antennenkreis zur kontaktlosen Leistungsversorgung von tragbaren Datenträgern, insbesonder von Chipkarten, mit einem Induktionskreis,
   gekennzeichnet durch eine Vorrichtung (7, 8) zum Erfassen der Resonanzfrequenz des Antennenkreises (1, 2) sowie zum Erzeugen einer Signalisierung, wenn die Resonanzfrequenz durch eine Mehrzahl von tragbaren Datenträgern, die sich in dem Feld des Antennenkreises befinden, einen vorbestimmten Wert unterschreitet.

2. Lesegerät nach Anspruch 1,
   dadurch gekennzeichnet, dass die Vorrichtung umfaßt:
   eine erste Einrichtung (5, 6) zum Umschalten der Resonanzfrequenz des Antennenkreises von einem ersten niedrigen Wert, der im wesentlichen einer Betriebsfrequenz entspricht, auf einen zweiten höheren Wert,
   eine zweite Einrichtung (7) zum Erfassen und Auswerten einer Änderung einer Spannungsamplitude in dem Antennenkreis beim Umschalten auf den zweiten Wert der Resonanzfrequenz und eine dritte Einrichtung (8) zum Erzeugen der Signalisierung,

wenn sich die Spannungsamplitude um einen vorbestimmten Wert vergrößert hat.

3. Lesegerät nach Anspruch 2, **dadurch gekennzeichnet,** dass die erste Einrichtung eine Kapazitätsdiode (5) und eine Schalteinheit (6) zum Erzeugen und Umschalten zwischen einer niedrigen und einer hohen Sperrspannung sowie zum Anlegen dieser Sperrspannungen an die Kapazitätsdiode aufweist.

4. Lesegerät nach Anspruch 2 oder 3, **dadurch gekennzeichnet,** dass die zweite Einrichtung (7) einen Phasenkomparator und ein XOR-Gatter aufweist.

FIG. 1

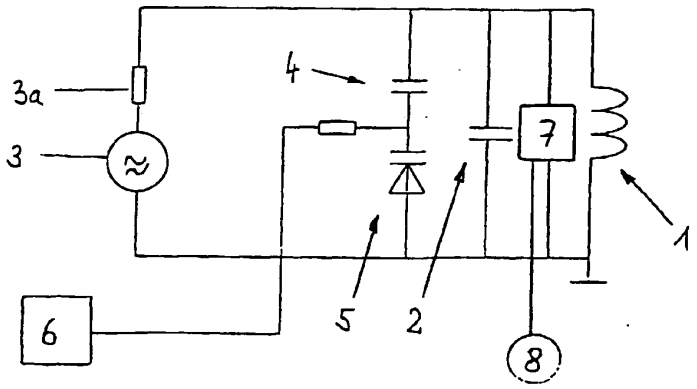


FIG. 2

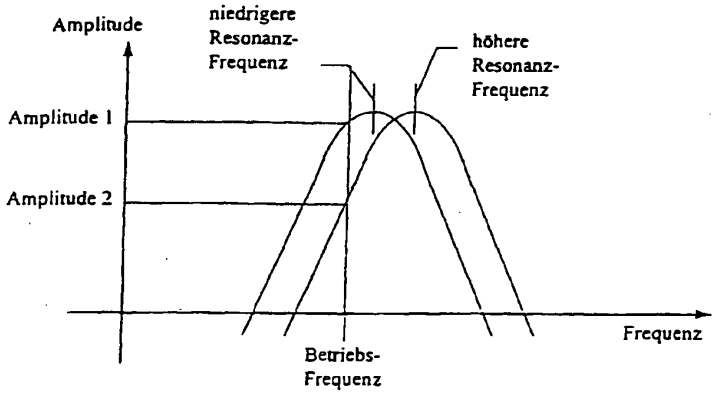
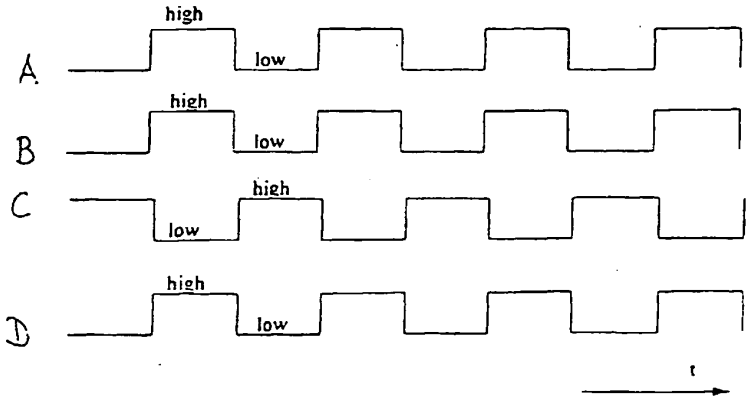


FIG. 3



Europäisches Patentamt

EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 99 10 1411

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG
A	US 3 299 424 A (J.P. VINDING) 17. Januar 1967 (1967-01-17) * Spalte 4, Zeile 28 - Zeile 43 *	1	G06K7/00
A	EP 0 768 540 A (TEXAS INSTRUMENTS DEUTSCHLAND) 16. April 1997 (1997-04-16) * Spalte 3, Zeile 9 - Zeile 15 * * Spalte 4, Zeile 25 - Zeile 36 *	1	
A	GB 2 163 324 A (ELECTROMATIC) 19. Februar 1986 (1986-02-19) * Seite 1, Zeile 28 - Zeile 40 *	1	
A	US 5 652 423 A (FUJIMOTO MASAHIRO ET AL) 29. Juli 1997 (1997-07-29) * Zusammenfassung * * Spalte 5, Zeile 22 - Zeile 40 *	1	
A	EP 0 696 011 A (TEXAS INSTRUMENTS DEUTSCHLAND) 7. Februar 1996 (1996-02-07) * Spalte 6, Zeile 12 - Zeile 22 *	1	
			RECHERCHIERTE SACHGEBIETE
			G06K

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
DEN HAAG	15. Juli 1999	Lindholm, A-M

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X : von besonderer Bedeutung allein betrachtet
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P : Zwischenliteratur

T : der Erfindung zugrunde liegende Theorien oder Grundsätze
E : älteres Patentdokument, das jedoch erst am oder nach dem Anmeldedatum veröffentlicht worden ist
D : in der Anmeldung angeführtes Dokument
L : aus anderen Gründen angeführtes Dokument

& : Mitglied der gleichen Patentfamilie, übereinstimmendes Dokument

EPO FORM 1503 03.82 (P04C03)

ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT ÜBER DIE EUROPÄISCHE PATENTANMELDUNG NR. EP 99 10 1411

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten europäischen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

15-07-1999

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
US 3299424 A	17-01-1967	KEINE	
EP 0768540 A	16-04-1997	JP 9218263 A	19-08-1997
GB 2163324 A	19-02-1986	AU 4619785 A	20-02-1986
		GB 2208058 A,B	15-02-1989
US 5652423 A	29-07-1997	JP 8007059 A	12-01-1996
		CN 1119774 A	03-04-1996
		EP 0689149 A	27-12-1995
		US 5804811 A	08-09-1998
EP 0696011 A	07-02-1996	US 5489908 A	06-02-1996
		CA 2153121 A	28-01-1996
		JP 8062328 A	08-03-1996

EPO FORM P0461

Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

J. ERNEST KENNEY
EUGENE MAR
RICHARD E. FICHTER
THOMAS J. MOORE
ERIC S. SPECTOR
FELIX J. D'AMBROSIO
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WONKI PARK*
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FACSIMILE COMMUNICATION

To: Office of Initial Patent Examination
703-305-9822

cc:

Re: U.S. Patent Appln. No. 10/565,732

From: J. Ernest Kenney

Total pages: 4

Date: August 8, 2006

Message: Errors were noted on the above-identified filing receipt. Please correct the filing receipt as shown on the attached copy of same and issue a CORRECTED FILING RECEIPT.

Thank you for your assistance.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPL NO.	FILING OR 371 (c) DATE	ART UNIT	FIL FEE RECD	ATTY.DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/565,732	06/30/2006	2635	1030	FINK3001JEK	6	16	2

CONFIRMATION NO. 1969

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314

FILING RECEIPT

OC000000019726232

Date Mailed: 07/25/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Should be "Unterföhring"

Klaus Finkenzeller, ~~Munich~~, GERMANY;

Power of Attorney: The patent practitioners associated with Customer Number **23364**.

Domestic Priority data as claimed by applicant

This application is a 371 of PCT/EP04/08537 07/29/2004

Foreign Applications

GERMANY 103 34 765.8 07/30/2003
If Required, Foreign Filing License Granted: 07/22/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is US10/565,732

Projected Publication Date: 11/02/2006

Non-Publication Request: No

Early Publication Request: No

Title

Communication device for establishing a data connection between intelligent appliances

Preliminary Class

340

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5 15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
10/565,732	Klaus Finkenzeller	FINK3001JEK

INTERNATIONAL APPLICATION NO.	
PCT/EP04/08537	
I.A. FILING DATE	PRIORITY DATE
07/29/2004	07/30/2003

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314

CONFIRMATION NO. 1969

371 ACCEPTANCE LETTER

OC000000019726233

Date Mailed: 07/25/2006

NOTICE OF ACCEPTANCE OF APPLICATION UNDER 35 U.S.C 371 AND 37 CFR 1.495

The applicant is hereby advised that the United States Patent and Trademark Office in its capacity as a Designated / Elected Office (37 CFR 1.495), has determined that the above identified international application has met the requirements of 35 U.S.C. 371, and is ACCEPTED for national patentability examination in the United States Patent and Trademark Office.

The United States Application Number assigned to the application is shown above and the relevant dates are:

06/30/2006	06/30/2006
DATE OF RECEIPT OF 35 U.S.C. 371(c)(1), (c)(2) and (c)(4) REQUIREMENTS	DATE OF COMPLETION OF ALL 35 U.S.C. 371 REQUIREMENTS

A Filing Receipt (PTO-103X) will be issued for the present application in due course. **THE DATE APPEARING ON THE FILING RECEIPT AS THE " FILING DATE" IS THE DATE ON WHICH THE LAST OF THE 35 U.S.C. 371 (c)(1), (c)(2) and (c)(4) REQUIREMENTS HAS BEEN RECEIVED IN THE OFFICE. THIS DATE IS SHOWN ABOVE.** *The filing date of the above identified application is the international filing date of the international application (Article 11(3) and 35 U.S.C. 363).* Once the Filing Receipt has been received, send all correspondence to the Group Art Unit designated thereon.

The following items have been received:

- Copy of the International Application filed on 01/24/2006
- Copy of the International Search Report filed on 01/24/2006
- Preliminary Amendments filed on 01/24/2006
- Oath or Declaration filed on 06/30/2006
- Request for Immediate Examination filed on 01/24/2006
- U.S. Basic National Fees filed on 01/24/2006
- Priority Documents filed on 01/24/2006

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

FREDERICK SMITH
Telephone: (703) 308-9140 EXT 210

PART 3 - OFFICE COPY

FORM PCT/DO/EO/903 (371 Acceptance Notice)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:	KLAUS FINKENZELLER	CONFIRMATION:	1969
SERIAL NO.:	10/565,732	GROUP ART UNIT:	
FILED:	January 24, 2006	EXAMINER:	
FOR:	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES	ATTY. REFERENCE:	FINK3001/JEK

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The below identified communication(s) or document(s) is(are) submitted regarding the above patent application:

- ☒ Notification of Missing Requirements
- ☒ Submission of Supplemental ADS
- ☒ Supplemental ADS
- ☒ Check in the Amount of **$130.00**
- ☒ Declaration
- ☐

☒ Please debit or credit **Deposit Account Number 02-0200** for any deficiency or surplus in connection with this communication.

☐ Small Entity Status is claimed.

☐ MESSAGE:

07/06/2006 LLANDGRA 00000013 10565732
01 FC:1617 130.00 OP

Customer 23364
Bacon & Thomas, PLLC
625 Slaters Lane, Fourth Floor
Alexandria, VA 22314
(703) 683-0500

Date: June 30, 2006

Respectfully submitted,

J. ERNEST KENNEY
Attorney for Applicant
Reg. No. 19,179

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
10/565,732	Klaus Finkenzeller	FINK3001JEK

INTERNATIONAL APPLICATION NO.	
PCT/EP04/08537	
I.A. FILING DATE	PRIORITY DATE
07/29/2004	07/30/2003

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625 SLATERS LANE
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ALEXANDRIA, VA 22314

Date 05/05/06 Atty SEK
Action Due Missing Req
Deadline 07/03/06
Final Deadline 12/03/06

CONFIRMATION NO. 1969

371 FORMALITIES LETTER

OC0000000018665850

Date Mailed: 05/03/2006

NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as a Designated / Elected Office (37 CFR 1.495).

- Copy of the International Application filed on 01/24/2006
- Copy of the International Search Report filed on 01/24/2006
- Preliminary Amendments filed on 01/24/2006
- Oath or Declaration filed on 01/24/2006
- Request for Immediate Examination filed on 01/24/2006
- U.S. Basic National Fees filed on 01/24/2006
- Priority Documents filed on 01/24/2006

The applicant needs to satisfy supplemental fees problems indicated below.

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date. The current oath or declaration does not comply with 37 CFR 1.497(a) and (b) in that it:
  - is not executed in accordance with either 37 CFR 1.66 or 37 CFR 1.68.

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.492(h) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fees required for this application is **$130** for a Large Entity:

- $130 Surcharge.

ALL OF THE ITEMS SET FORTH ABOVE MUST BE SUBMITTED WITHIN TWO (2) MONTHS FROM THE DATE OF THIS NOTICE OR BY 32 MONTHS FROM THE PRIORITY DATE FOR THE APPLICATION, WHICHEVER IS LATER. FAILURE TO PROPERLY RESPOND WILL RESULT IN ABANDONMENT.

The time period set above may be extended by filing a petition and fee for extension of time under the provisions of 37 CFR 1.136(a).

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

*A copy of this notice **MUST** be returned with the response.*

FREDERICK SMITH

Telephone: (703) 308-9140 EXT 210

PART 1 - ATTORNEY/APPLICANT COPY

U.S. APPLICATION NUMBER NO.	INTERNATIONAL APPLICATION NO.	ATTY. DOCKET NO.
10/565,732	PCT/EP04/08537	FINK3001JEK

FORM PCT/DO/EO/905 (371 Formalities Notice)

ATTORNEY/DOCKET NO: FINK3001/JEK

DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled:

COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES

the specification of which (check one):

☐ is attached hereto, or ☒ was filed on July 29, 2004 as U.S. Application Number or PCT International Application Number: PCT/EP2004/008537 and (if applicable) was amended on:

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1.56*. I hereby claim foreign priority benefits under *Title 35, United States Code §119* of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			PRIORITY CLAIMED	
Number	Country	Day/Month/Year Filed	Yes	No
103 34 765.8	GERMANY	30/July/2003	X	

☐ Additional Priority Application(s) Listed on Following Page(s)

I HEREBY CLAIM THE BENEFIT UNDER TITLE 35 U.S. CODE §119(E) OF ANY U.S. PROVISIONAL APPLICATIONS LISTED BELOW.	
Application Number	Day/Month/Year Filed

☐ Additional Provisional Application(s) Listed on Following Page(s)

I hereby claim the benefit under *Title 35, United States Code, §120* of any United States application(s) or PCT international application(s) designating The United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of *Title 35, United States Code, §112*, I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1.56* which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Number	Filing Date	Status - Patented, Pending or Abandoned
PCT/EP2004/008537	29/July/2004	Pending

☐ Additional US/PCT Priority Application(s) listed on Following Page(s)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under *section 1001 of title 18 of the United States Code* and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I (We) hereby appoint as my (our) attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: J. Ernest Kenney, Reg. No. 19,179; Eugene Mar, Reg. No. 25,893; Richard E. Fichter, Reg. No. 26,382; Thomas J. Moore, Reg. No. 28,974; Eric S. Spector, Reg. No. 22,495; Felix J. D'Ambrosio, Reg. No. 25,721; George A. Loud, Reg. No. 25,814; Benjamin E. Urcia, Reg. No. 33,805; and Justin J. Cassell, Reg. No. 46,205

I(we) authorize my(our) attorneys to accept and follow instructions from_____ regarding any matter related to the preparation, examination, grant and maintenance of this application, any continuation, continuation-in-part or divisional based thereon, and any patent resulting therefrom, until I(we) or my(our) assigns withdraw this authorization in writing.

Send correspondence to **Customer 23364**

BACON & THOMAS, PLLC
625 Slaters Lane - 4th Floor
Alexandria, VA 22314-1176

Telephone Calls to: **J. Ernest Kenney**
(703) 683-0500

FULL NAME OF FIRST OR SOLE INVENTOR **Klaus FINKENZELLER**	CITIZENSHIP GERMANY
RESIDENCE ADDRESS Georg Wopfner-Strasse 54 80939 München, Germany	POST OFFICE ADDRESS IS THE SAME AS RESIDENCE ADDRESS UNLESS OTHERWISE SHOWN BELOW
DATE 24.02.2006	SIGNATURE Klaus Finkenzeller

☐ *See following page(s) for additional joint inventors.*

(26MAY2000)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application
Klaus FINKENZELLER **Confirmation No. 1969**

Serial Number: 10/565,732 **Group Art Unit: Unassigned**

Filed: January 24, 2006 **Examiner: Unassigned**

Attorney Docket No. FINK3001/JEK

For: COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES

SUBMISSION OF SUPPLEMENTAL APPLICATION DATA SHEET

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

A Supplemental Application Data Sheet is submitted herewith to correct the inventor's mailing address.

Respectfully submitted,
BACON & THOMAS, PLLC

J. ERNEST KENNEY
Attorney for Applicant
Registration No. 19,179

Customer 23364

BACON & THOMAS, PLLC
625 Slaters Lane - 4th Floor
Alexandria, VA 22314-1176
Telephone: (703) 683-0500
Facsimile: (703) 683-1080

Date: June 30, 2006

Application Data Sheet
Application Information

Application type::	Regular
Subject matter::	
CD-ROM or CD-R::	None
Number of CD disks::	0
Number of copies of CDs::	0
Sequence submission?::	No
Computer readable form (CRF)?::	No
Number of copies of CRF::	0
Title::	COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES
Attorney docket number::	FINK3001/JEK
Request for early publication?::	No
Request for non-publication?::	No
Suggested drawing figure::	
Total drawing sheets::	6
Small entity?::	No

Applicant Information

Applicant authority type::	Inventor
Primary citizenship country::	GERMANY
Status:	Full capacity
Given name::	Klaus
Middle name::	
Family name::	FINKENZELLER
Name suffix::	
City of Residence::	~~München~~ Unterföhring
State or province of residence::	

Country of residence:: GERMANY

Street of mailing address:: ~~Georg-Wopfner-Strasse 54~~ Ahornstrasse 19

City of mailing address:: ~~München~~ Unterföhring

State or province of mailing address::

Country of mailing address:: GERMANY

Postal or zip code of mailing address:: ~~80939~~ 85774

Correspondence Information

Correspondence customer number:: 23364

Phone number:: 703-683-0500

Fax number:: 703-683-1080

E-mail address:: mail@baconthomas.com

Representative Information

Representative customer number:: 23364

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	an application claiming benefit under 35 USC 119(e)		
This application	National stage of	PCT/EP2004/008537	7/29/2004
This application	Continuation of		

Foreign Priority Information

Country::	Application number::	Filing Date::	Priority claimed::
GERMANY	103 34 765.8	7/30/2003	YES

Assignee Information

Assignee name::

DO/ EO WORKSHEET

Paralegal/ National Stage Division

U.S. Appl. No. 10/565732 International Appl. No. _____

Application filed by : ☐ 20 months ☑ 30 months

WIPO PUBLICATION INFORMATION :

Publication No.: WO2005/013520 Publication Language : ☐ English ☐ German ☐ Japanese ☐ Chinese ☐ Korean ☐ French ☐ Spanish ☐ Russian ☐ Other : _____

Publication Date : 10 Feb 05 Not Published : ☐ U.S. only designated ☐ EP request Published : ☐ EP request

INTERNATIONAL APPLICATION PAPERS IN THE APPLICATION FILE :

- ☑ International Application *(RECORD COPY)*
- ☐ Article 19 Amendments
- ☐ PCT/IPEA/409 IPER : ☐ EP ☐ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ ___
  - ☐ PCT/IPEA/409 IPER was NOT AVAILABLE at the time of paralegal review
- ☐ Annexes to 409
- ☑ Priority Document (s) No. 1
- ☐ PCT/IB/331
- ☐ Request form PCT/RO/101
- ☑ PCT/ISA/210 - Search Report : ☐ EP ☐ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ OTHER ___ ☐ NONE
- ☐ Search Report References
- ☐ Other : _____

RECEIPTS FROM THE APPLICANT *(other than checked above) :*

- ☐ Basic National Fee (*or authorization to charge*)
- ☑ 25 Description ☑ 4 Claims ☑ 1 Abstract
- ☑ Drawing Figure(s) - (# of drwgs. 6)
- ☐ Translation of Article 19 Amendments ☐ entered ☐ not entered :
  - ☐ not a page for page substitution
  - ☐ replaced by Article 34 Amendment
- ☐ Annexes to 409 ☐ entered ☐ not entered :
  - ☐ not a page for page substitution
  - ☐ no translation ☐ other : _____
- ☑ Application Data Sheet
- ☐ Power of Attorney/ Change of Address
- ☑ Preliminary Amendment(s) Filed on : 1. 24 Jan 06 2. _____ 3. _____
- ☐ Information Disclosure Statement(s) Filed on : 1. _____ 2. _____ 3. _____
- ☐ Assignment Document (forwarded to Assignment Branch) 1. _____
- ☐ Assignee PG Publication Notice
- ☐ Substitute Specification Filed on : 1. _____ 2. _____
- ☐ Verified Small Status Statement 1. _____
- ☑ Oath/ Declaration (executed) 30 Jun 06
  - ☐ unsigned ☐ no citizenship
- ☐ DNA Diskette ☐ Sequence Listing
- ☐ Other : _____

NOTES : ☐ I.A. used as Specification ☐ Other :

35 U.S.C. 371 - Receipt of Request (PTO-1390)
Date Acceptable Oath/ Declaration Received
Date of Completion of requirements under 35 U.S.C. 371
Date of Completion of ALL requirements
Date of Completion of DO/ EO 903 - Notification of Acceptance
Date of Completion of DO/ EO 905 - Notification of Missing Requirements
Date of Completion of DO/ EO 909 - Notification of Abandonment
Date of Completion of DO/ EO 916 - Notification of Defective Response
Date of Completion of DO/ EO 922 - Notification to Comply w/ Requirements for Patent Applications Containing Nucleotide and/or Amino Acid Sequence Disclosures
Date of Completion of DO/ EO 923

Rec'd PCT/PTO 24 JAN 2006
Rec'd PCT/PTO 30 JUN 2006
Rec'd PCT/PTO 30 JUN 2006
Rec'd PCT/PTO 30 JUN 2006

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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U.S. APPLICATION NUMBER NO.	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
10/565,732	Klaus Finkenzeller	FINK3001JEK

INTERNATIONAL APPLICATION NO.	
PCT/EP04/08537	
I.A. FILING DATE	PRIORITY DATE
07/29/2004	07/30/2003

23364
BACON & THOMAS, PLLC
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ALEXANDRIA, VA 22314

CONFIRMATION NO. 1969

371 FORMALITIES LETTER

OC000000018665850

Date Mailed: 05/03/2006

NOTIFICATION OF MISSING REQUIREMENTS UNDER 35 U.S.C. 371 IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

The following items have been submitted by the applicant or the IB to the United States Patent and Trademark Office as a Designated / Elected Office (37 CFR 1.495).

- Copy of the International Application filed on 01/24/2006
- Copy of the International Search Report filed on 01/24/2006
- Preliminary Amendments filed on 01/24/2006
- Oath or Declaration filed on 01/24/2006
- Request for Immediate Examination filed on 01/24/2006
- U.S. Basic National Fees filed on 01/24/2006
- Priority Documents filed on 01/24/2006

The applicant needs to satisfy supplemental fees problems indicated below.

The following items **MUST** be furnished within the period set forth below in order to complete the requirements for acceptance under 35 U.S.C. 371:

- Oath or declaration of the inventors, in compliance with 37 CFR 1.497(a) and (b), identifying the application by the International application number and international filing date. The current oath or declaration does not comply with 37 CFR 1.497(a) and (b) in that it:
  - is not executed in accordance with either 37 CFR 1.66 or 37 CFR 1.68.

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.492(h) of $130 for a non-small entity, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fees required for this application is **$130** for a Large Entity:

- $130 Surcharge.

ALL OF THE ITEMS SET FORTH ABOVE MUST BE SUBMITTED WITHIN TWO (2) MONTHS FROM THE DATE OF THIS NOTICE OR BY 32 MONTHS FROM THE PRIORITY DATE FOR THE APPLICATION, WHICHEVER IS LATER. FAILURE TO PROPERLY RESPOND WILL RESULT IN ABANDONMENT.

The time period set above may be extended by filing a petition and fee for extension of time under the provisions of 37 CFR 1.136(a).

Applicant is reminded that any communications to the United States Patent and Trademark Office must be mailed to the address given in the heading and include the U.S. application no. shown above (37 CFR 1.5)

*A copy of this notice **MUST** be returned with the response.*

FREDERICK SMITH

Telephone: (703) 308-9140 EXT 210

PART 2 - OFFICE COPY

U.S. APPLICATION NUMBER NO.	INTERNATIONAL APPLICATION NO.	ATTY. DOCKET NO.
10/565,732	PCT/EP04/08537	FINK3001JEK

FORM PCT/DO/EO/905 (371 Formalities Notice)

U.S. DEPARTMENT OF COMMERCE PATENT & TRADEMARK OFFICE

B/O Form PTO-1390 **Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing Under 35 USC 371**		*Attorney's Docket Number* FINK3001/JEK U.S. Application Number (if known) 10/565732
International Application Number PCT/EP2004/008537	International Filing Date July 29, 2004	Priority Date Claimed July 30, 2003

Title of Invention

COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES

Applicant(s) for DO/EO/US

Klaus FINKENZELLER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items under 35 USC 371:

1. ☒ This is a **FIRST** submission of items concerning a filing under *35 USC 371*.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under *35 USC 371*.
3. ☒ This express request to begin national examination procedures *(35 USC 371(f))* at any time rather than delay examination until the expiration of the applicable time limit set in *35 USC 371(b)* and PCT Articles 22 and 39(1).
4. ☒ The U.S. has been elected (Article 31).
5. ☒ A copy of the International Application as filed *35 USC 371(c)(2)*.
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English *(35 USC 371(c)(2))*.
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 USC 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 *(35 USC 371(c)(3))*.
9. ☒ An oath or declaration of the inventor(s) *(35 USC 371(c)(4))*. (☐ Executed ☒ Unexecuted)
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 *(35 USC 371(c)(5))*.

Items 11 to 16 below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under *37 CFR 1.97* and *1.98*.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with *37 CFR 3.28* and *3.31* is included.
13. ☒ A preliminary amendment.
14. ☒ An Application Data Sheet under 37 CFR 1.76.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English translation of the international application under 35 U.S.C. 154(d)(4)
20. ☐ Other items or information:

Application Number (if Known) 10/565732	*International Application Number* PCT/EP2004/008537	*Attorney's Docket Number* FINK3001/JEK

	Calculations	PTO USE
21. The following fees are submitted: ☒ a) Basic national fee.....$300.00 ☒ b) Examination fee $200.00	$500.00	
☒ c) Search Fee: ☐ If the written opinion of the ISA/US or the International preliminary examination report prepared b IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4) .....$0.00 ☐ Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority.....$100.00 ☒ International Search Report prepared by an ISA other than the US and provided to the Office or previously communicated to the US by the IB.....$400.00 ☐ All other situations.....$500.00	$400.00	
☐ Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing or computer program listing filed in an electronic medium). The fee is **$250** for each additional 50 sheets of paper or fractions thereof.		

Total Sheets	Extra sheets	Number of each additional 50 or fractions thereof (round up to a whole number)	RATE		
- 100 =	/50=		x $250.00		
Surcharge of **$130.00** for furnishing the oath or declaration later than 30 months from the earliest claimed priority date *(37 CFR 1.492(e))*.					

CLAIMS	NUMBER		NUMBER EXTRA	RATE		
Total Claims	16	-20 =		× $50.00		
Independent Claims	2	-3 =		× $200.00		
Multiple Dependent Claims (if applicable)				+ $360.00		
				TOTAL OF ABOVE CALCULATIONS	**$**	**900.00**
☐ Reduction by ½ for filing by small entity, if applicable. Small Entity Status is asserted pursuant to 37 CFR 1.27 for this application.						
				SUBTOTAL	**$**	**900.00**
Processing fee of **$130.00** for furnishing the English translation later than 30 months from the earliest claimed priority date *(37 CFR 1.492(f))*.						
				TOTAL NATIONAL FEE	**$**	**900.00**
Fee for recording the enclosed assignment *(37 CFR 1.21(h))*. The assignment must be accompanied by an appropriate cover sheet *(37 CFR 3.28, 3.31)*. **$40.00** per property.						
				TOTAL FEES ENCLOSED	**$**	**900.00**
			Amount to be:		Refunded:	
					Charged:	

a. ☒ A check in the amount of **$900.00** to cover the fees is enclosed.
b. ☐ Please charge my **Deposit Account Number 02-0200** in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.
c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to **Deposit Account Number 02-0200**. A duplicate copy of this sheet is enclosed.

Note: Where an appropriate time limit under *37 CFR 1.494* or *1.495* has not been met, a petition to revive *(37 CFR 1.137(a) or (b))* must be filed and granted to restore the application to pending status.

23364
Customer Number
Phone: (703) 683-0500

DATE: January 24, 2006

Respectfully submitted,
J. ERNEST KENNEY

Attorney for Applicant
Registration Number: 19,179

U.S. DEPARTMENT OF COMMERCE PATENT & TRADEMARK OFFICE

B/O Form PTO-1390 **Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing Under 35 USC 371**		*Attorney's Docket Number* FINK3001/JEK U.S. Application Number (if known) 10/565732
International Application Number PCT/EP2004/008537	International Filing Date July 29, 2004	Priority Date Claimed July 30, 2003

Title of Invention

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Application Number (if Known) 10/565732	*International Application Number* PCT/EP2004/008537	*Attorney's Docket Number* FINK3001/JEK

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Respectfully submitted,
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Communication apparatus for setting up a data connection between intelligent devices

[0001] This invention relates to the use of communication elements automatically setting up a data connection in intelligent devices designed for carrying out a data transmission, the data connection set-up being triggered by the approach of two intelligent devices. A concept for automatically setting up a data connection between intelligent devices is known from the specification ECMA/TC32/TG19/2003/12 under the name of "Near Field Communication" (NFC). The purpose of the concept is to make the set-up of a data connection between intelligent devices as simple as possible. The concept provides for two intelligent devices both designed for carrying out an NFC protocol automatically setting up a data connection when they come together at a distance of typically less than 0.2 meters. In a search mode one of the intelligent devices, the initiator, sends a search query which is answered by the second intelligent device, the target. In an immediately following data exchange the two intelligent devices agree on a data transmission mode according to which a data exchange is then effected between the data processing components of the intelligent devices involved.

[0002] Detection of whether another intelligent device is located within the response range of the NFC protocol is done in the search mode by cyclically emitting search queries. The parameters provided for the search queries are a transmitting frequency of 13.56 MHz and a magnetic field strength of at least 1.5 A/m up to a maximum of 7.5 A/m. The provided minimum field strength causes a relatively high constant power consumption in intelligent devices ready to carry out an NFC protocol. For devices with limited energy resources, especially for battery-operated devices, this results in a reduction of the possible service life. To reduce this undesirable effect, it can be provided to equip the intelligent devices with a switching device to be actuated by the user for activating the search mode of an NFC unit. However, this possibility at least partly cancels out the goal of particular ease of operation aimed at by the NFC concept, since at least the switching function must be actuated separately.

[0003] The standards ISO/IEC 14443 and ISO/IEC 15693 describe a method in which a reading device tries to produce a data connection with another intelligent de-

vice (contactless chip card/RFID transponder). For this purpose, the reading device emits a search signal – REQUEST – periodically with high field strength (e.g. 1.5 - 7.5 A/m according to ISO/IEC 14443) until an intelligent device comes into the response range of the reading device.

[0004] German patent application DE 102 06 676 discloses a switching apparatus to be actuated with a transponder, which can be operated almost non-dissipatively as long as no switching process is triggered. The device to be switched has for this purpose a coil which is part of an oscillating circuit which is operated as a substantially unloaded pure oscillating circuit in the detection mode. The resonant frequency tuned in the oscillating circuit is monitored by a frequency observer. When a transponder with a transponder coil is brought close to the detection coil, the resonant frequency of the oscillating circuit changes. This is detected by the frequency observer, which thereupon produces a switching signal which switches on the device to be switched. The proposed solution focuses on the direct change from detection mode to data transmission mode, i.e. on the direct, single-stage switch-on of an intelligent device by means of a coil support which serves primarily as a switching component.

[0005] The problem of the invention is to specify a communication apparatus for intelligent devices designed for automatic data connection set-up, which has minimal energy consumption without restricting the ease of use.

[0006] This problem is solved by an apparatus having the features of the main claim. The inventive communication apparatus has a communication element with a coil for emitting search signals, whereby the search signal mode is only commenced when a property change in a transmission oscillator set up by means of the same coil has been detected by means of a measuring device. Since transmission oscillator and measuring device can be operated almost non-dissipatively, the output of search signals for detecting the presence of corresponding intelligent devices must only be effected when a further intelligent device is possibly located within the response range of the coil. The energy requirement of the communication apparatus can thus be considerably reduced. The inventive solution is therefore in particular also suitable for intelligent devices with limited energy resources, e.g. for battery-operated devices. It is

particularly advantageous that an intelligent device equipped with an inventive communication apparatus can be handled just the same as if the device permanently emitted search queries. No special actions by a user are required. Advantageously, the use of an inventive communication apparatus also does not require any intervention in the execution of the data connection set-up after detection of a further intelligent device present.

[0007] In an advantageous development, it is provided that for carrying out a data transmission after the communication element is switched on an ohmic resistor is switched to the oscillating circuit to thereby increase the bandwidth of the transmission oscillator while reducing the quality factor.

[0008] In a further advantageous development of the communication apparatus, it is provided to influence the oscillating circuit in such a way that the resonant frequency changes by connecting suitable components after the communication element is switched on. This additionally ensures that other intelligent devices designed for automatic data connection set-up in the same way are not disturbed by a search mode.

[0009] In a further advantageous embodiment of the inventive communication apparatus, it is provided that the measuring device is put into operation only periodically. This permits the energy consumption of the communication apparatus to be reduced further. For realizing the periodic putting into operation, the communication apparatus expediently has a time controller, and a measurement result is evaluated by comparison with an average value obtained from preceding measurements.

[0010] The measuring device preferably has two oscillator devices for producing oscillation signals, one such oscillator device being coupled with the coil. Further, the measuring device can have circuit components for producing the control signal for the switching apparatus on the basis of a phase relation between said oscillation signals or signals derived therefrom. This permits very precise monitoring of the transmission oscillator to be obtained with comparatively little effort, and the presence of a further device within the response range of the coil to be reliably ascertained in this way.

[0011] An embodiment of the invention will hereinafter be explained in more detail with reference to the drawing, in which:

[0012] Fig. 1 shows the structure and arrangement of intelligent devices designed for automatic data connection set-up,

[0013] Fig. 2 shows a simplified equivalent circuit diagram of a communication apparatus,

[0014] Fig. 3 shows a flow chart of the operation of a communication apparatus,

[0015] Fig. 4 shows a flow chart of the operation of a communication apparatus provided with a time controller,

[0016] Fig. 5 shows a first embodiment of a circuit implementation of the measuring unit by means of a PLL circuit,

[0017] Fig. 6 shows a plurality of signal patterns within the measuring unit upon the approach of another device,

[0018] Fig. 7 shows a second embodiment of a circuit implementation of the measuring unit by means of a PLL circuit, and

[0019] Fig. 8 shows a circuit implementation of the functional blocks, voltage differentiator and threshold switch, from Fig. 5 or 7.

[0020] Fig. 1 shows intelligent devices 10, 20, 30 in different embodiments. All are designed to conduct a data exchange with one of the other intelligent devices 10, 20, 30 via a coil 13, 23, 33. All intelligent devices 10, 20, 30 referred hereinafter simply as devices have fundamentally the same kind of structure and consist of a data processing component 11, 21, 31 and a communication apparatus 1, 2, 3.

[0021] The data processing component 11, 21, 31 substantially brings about the intelligence of the devices 10, 20, 30 and comprises a central processor unit for executing data processing operations. The data processing component 11, 21, 31 moreover substantially determines the outer form of the devices 10, 20, 30. As indicated in Fig.

1, the device 10, 20, 30 can have e.g. the form of a portable computer 11 or a mobile telephone 21 or be realized in an RFID transponder with a chip 31, formed e.g. in a contactless chip card 30. The enumeration of possible forms of design is not final here. Besides those shown, the device 10, 20, 30 can likewise be realized e.g. in an article of daily use, such as a wrist watch, or a garment, such as a jacket, provided with electronic components, but also constitute a firmly installed reading device in a ticketing or access system.

[0022] The communication apparatus 1, 2, 3 comprises in each case a communication element 12, 22, a coil 13, 23, 33 connected to the communication element 12, 22, a measuring device 14, 24, connected to the coil 13, 23, 33, and a switching apparatus 15, 25 connected to the data processing component 11, 21, the communication element 12, 22 and the measuring device 14, 24. In practical implementation, the communication apparatus 1, 2, 3 is formed as a rule as one structural unit with the data processing component 11, 21 and is thus located e.g. in the housing of a portable computer 11, a mobile telephone 21 or is integrated in the chip 31 of a chip card 30.

[0023] The function of the communication element 12, 22 is to ascertain the presence of another device 10, 20, 30 within the response range of the coil 13, 23, 33. The communication element 12, 22 has means for executing software program routines and can be formed as an independent assembly. When another device 10, 20, 30 has been detected, the communication element 12, 22 further automatically sets up a data connection thereto and produces the data transmission mode for a subsequent data exchange between the particular data-processing components 11, 21, 31. In a particularly expedient embodiment, the communication element 12, 22 is designed to execute an NFC protocol as described in the stated publication ECMA/TC32-TG19/2003/12, or a contactless transmission protocol as described e.g. in the standards ISO/IEC 14443, ISO/IEC 15699 and ISO/IEC 18000-3.

[0024] The coil 13, 23, 33 is of the usual design and serves in the way known in the art to carry out a contactless data exchange with a corresponding device 10, 20, 30. As a rule, it is an integrated part of the device 10, 20, 30, as indicated in the execution as a chip card 30. Within the communication apparatus 1, 2, 3 the coil 13, 23, 33 is part of

a transmission oscillator 50 with a defined, characteristic resonant frequency which can depend on the operating state of the device 10, 20, 30.

[0025] The measuring device 14, 24 is connected to the coil 13, 23, 33 and detects a property of the transmission oscillator 50 formed with the coil 13, 23, 33. It can in particular be of the type as described in the stated German patent application DE 102 06 676.

[0026] The switching apparatus 15, 25 serves to switch on and off the communication element 12, 22 and the measuring device 14, 24. The switching on and off of one or both components 12, 22 or 14, 24 can be done indirectly via the data processing component 11, 21. The switching apparatus 15, 25 serves further to connect and disconnect single elements of the measuring device 14, 24. Furthermore, the switching apparatus 15, 25 can be used to switch other components (not shown) of a device 10, 20, 30.

[0027] Fig. 2 shows a simplified equivalent circuit diagram of a device 10, 20, 30. The data processing component 11, 22, and therefore the external appearance of the device 10, 20, is represented therein by an on/off switch 40 operable by a user for switching on and off the main energy supply 41 of the device 10, 20. The main energy supply 41 can be in particular a battery or an accumulator. Particularly a firmly installed reading device can also use a mains voltage as the main energy supply 41. The presence of the switch 40 depends on the form of the device; in certain embodiments, e.g. upon execution as a chip card 30, the switch 40 can be omitted. The device 30 is then either constantly on or is switched on by an equally acting mechanism adapted to the design.

[0028] The switching apparatus 15, 25 comprises two switches 42, 44 which are drivable by means of an actuator 43, as well as optionally a time controller 45. Actuator 43 and time controller 45 are connected to the main energy supply 41. The first switch 42 is placed between the main energy supply 41 and the communication element 12, 22, the second switch 44 between main energy supply 41 and measuring device 14, 25. The second switch 44 is actuated via the time controller 45 which is connected for this purpose to the actuator 43 and receives a switching signal therefrom.

The first switch 42 can be used to switch on and off not only the communication element 12, 22 but also further components (not shown) of the particular device 10, 20,30, as indicated by the connection 146. All components of the switching apparatus 15, 25 can be realized discretely, as circuits or also in the form of software programs. Actuator 43 and time controller 45 moreover expediently have a certain intelligence and are designed to execute software program routines.

[0029] The essential element of the measuring device 14, 24 is a measuring unit 46 which is switchable on and off by means of the switch 44 of the switching apparatus 15, 25. The measuring unit 46 is further connected to the actuator 43 of the switching apparatus 15, 25 as well as via a switch 47 to the coil 13, 23. The switch 47 is actuated by the actuator 43. It thereby connects the coil 13, 23 either to the measuring unit 46 or to the communication element 12, 22. The coil 13, 23 is furthermore connected to the communication element 12, 22. Like the switching apparatus 15, 25, the components of the measuring device 14, 24 can be realized discretely, as circuits or in the form of software programs. The measuring unit 46 is expediently likewise equipped with a certain intelligence and designed to execute software program routines. In embodiments of the device that are particularly restricted with regard to energy resources, e.g. upon execution in the form of a chip card 30, the measuring device can be omitted. The device 30 can then be detected by other devices 10, 20 but not detect other devices 10, 20, 30 itself.

[0030] Disposed in parallel with the coil 13, 23 is a capacitor 48 which forms together with the coil 13, 23 a transmission oscillator 50. The transmission oscillator 50 is connectable via the switch 47 to the communication element 12 or the measuring unit 46. In parallel with the transmission oscillator 50 but behind the switch 47 with respect to the transmission oscillator 50, a further capacitor 51 as well as a resistor 52 can be disposed. Both elements 51, 52 can be switched to the transmission oscillator 50 via the switch 47. The capacitor 51 causes a change in the resonant frequency of the transmission oscillator 50, the resistor 52 an increase in the bandwidth while simultaneously reducing the oscillating circuit quality factor. The mentioned passive components 47, 49, 51, 52 can be executed as discrete components but also in the form of assemblies with a corresponding external effect.

[0031] In an advantageous variant particularly suitable for devices 10, 20 with sufficient energy resources, the measuring unit 46 is formed as a frequency sweeper which sweeps the measuring frequency continuously over a predetermined frequency domain. The predetermined frequency domain comprises at least one frequency to which another device 10, 20, 30 is tuned.

[0032] Fig. 3 illustrates a first possible operating mode of a device 10, 20, 30. In accordance with the equivalent circuit diagram rendered in Fig. 2, it optionally has a capacitor 51 as well as a resistor 52 to influence the transmission oscillator 50.

[0033] Operation starts by the device 10, 20, 30 being switched on, step 100, e.g. by means of a switch 40 which actuates the main energy supply 41. Said switching-on also switches on the actuator 43. The latter then sets the switch 47 so that the coil 13, 23, 33 is connected to the communication element 12, 22 via the switch 47. At the same time, the setting of the switch 47 causes the resistor 52, step 102, and the capacitor 51, if present, to be switched to the transmission oscillator 50, step 104.

[0034] Connection of the resistor 52 results in a worsening of the quality factor Q of the transmission oscillator 50, but at the same time causes an increase in the bandwidth B available for a data transmission in the transmission oscillator 50, since it applies to the relation between quality factor Q and bandwidth B that $B \approx 1/Q$.

[0035] Connection of the capacitor 51 reduces the resonant frequency of the transmission oscillator 50 and sets it to a transmission frequency suitable for a data transmission, e.g. 13.56 MHz. The change makes the subsequent data transmission and the operation of the communication apparatus 1, 2, 3 insensitive to interference by magnetic fields of devices 10, 20, 30 of the same kind located in the vicinity and working in the detection mode, i.e. at a higher resonant frequency.

[0036] Furthermore, the actuator 43 switches on the communication element 12, 22, step 106. The communication element 12, 22 thereby goes into the search mode and cyclically emits a search signal via the coil 13, 23, 33 to receive a response from another device 10, 20, 30 possibly located within the response range of the coil 13, 23, 33.

[0037] If another device 10, 20, 30 is located within the response range of the coil 13, 23, 33 it reacts to the search signal by returning a response, whereupon the communication element 12, 22 puts the communication apparatus 1, 2, 3 in the data transmission mode. For this purpose, it sets up a data connection with the data processing component 11, 21, 31 of the answering device 10, 20, 30 using a suitable protocol, e.g. the above-mentioned protocols (NFC, 14443, ...), step 108.

[0038] After the data connection is set up, the data processing component 11, 21, 31 conducts a data exchange via the coil 13, 23, 33 in the known way with the corresponding data processing component 11, 21, 31 of the device 10, 20, 30 present, step 110.

[0039] The actuator 43 waits until the data exchange between the data processing components 11, 21, 31 of the devices 10, 20, 30 involved is completed, step 114. Detection that the data exchange is finished can be effected by reception of a corresponding signal from the data processing component 11 or the communication element 12 or also by cyclical execution of a check step in the actuator 43 itself. The communication element 12, 22 can be connected to the time controller 45 and the actuator 43 independently of the switch 42.

[0040] When the data exchange is finished, the actuator 42 puts the communication device 1, 2, 3 in the detection mode.

[0041] For this purpose, the actuator 43 separates the communication element 12, 22 from the main energy supply 41 by shifting the switch 42, step 116.

[0042] Further, the actuator 43 actuates the switch 47 and connects the measuring unit 46 to the transmission oscillator 50. The switch actuation further causes the resistor 52 and optionally the capacitor 51 to be switched out of the transmission oscillator 50 again, step 120, 122. Removal of the resistor 52 brings about in the transmission oscillator 50 an unloaded quality factor Q_0 which is determined in the ideal case only by the inductance of the coil 13, 23, 33, the oscillating circuit capacitor 48 and the input resistance of the coil 13, 23, 33. In accordance with the improved quality factor Q_0

the detection range increases in which other devices 10, 20, 30 present are detected in the detection mode.

[0043] The possible switching off of a capacitor 51 permits the frequency of the oscillating circuit 50 and thus the measuring frequency of the measuring unit 46 to be optionally increased and set e.g. in the range of 13.56 to 17 MHz. This has the consequence that the measuring unit 46 is not, or not as strongly, influenced by other intelligent devices located in the close vicinity and in the communication mode (i.e. transmit mode). Since signals of other reading devices could otherwise be misunderstood as the approach of an intelligent device, the obtained reduction of the detection of signals of other reading devices is advantageous. Likewise, any other devices 10, 20, 30 located in the vicinity which are in the data transmission mode are thus not disturbed during operation in the detection mode.

[0044] Further, the actuator 43 switches on the measuring unit 46 by actuating the switch 44 for producing the detection mode, step 124.

[0045] The measuring unit 46 then monitors a property of the transmission oscillator 50. For example, it monitors the frequency tuned in the transmission oscillator 50 while the latter is operated in resonance. If in this state the coil 13, 23, 33 of another device 10, 20, 30 is brought into the detection range of the coil 13, 23, 33, this causes a change of resonant frequency in the transmission oscillator 50, which is detected by the measuring unit 46, step 132. Alternatively, it is also possible to evaluate/measure the impedance of the transmitting oscillator 50 operated in resonance.

[0046] When the measuring unit 46 has detected a change in the observed oscillating circuit property, it transmits a corresponding control signal to the actuator 43, whereupon the actuator 43 executes the steps 102 ff. again and initiates the search or data transmission mode.

[0047] If the measuring device 46 allows sweeping of the oscillating circuit frequency, monitoring of the oscillating circuit property is effected over the total frequency domain swept. The frequency domain swept contains at least the resonant frequency of one kind of device with which a data connection can be set up. If the reso-

nant frequency of such a device 30 is e.g. 13.56 MHz, the sweep range can be for example between 13 and 18 MHz. If a change in the oscillating circuit property occurs at any frequency within the frequency domain swept, the measuring unit 46 transmits a control signal to the actuator 43 for executing the steps 102 ff.

[0048] Fig. 4 shows a variant for operating a communication apparatus built up according to Fig. 2. The operating variant can be designed as an alternative or also in addition to the operating mode illustrated in Fig. 3. The operating variant shown in Fig. 4 presupposes that the device 10, 20, 30 has a time controller 45 as indicated in Fig. 2.

[0049] Operation again starts by the device 10, 20 being switched on, step 100, e.g. by switching on the main energy supply 41 by means of a switch 40.

[0050] The communication apparatus 1, 2, 3 thereupon first goes into the search mode. For this purpose, the actuator 43 switches on the communication element 12, 22, step 202, which subsequently checks by cyclically outputting search signals whether another device 10, 20, 30 is located within the response range of the coil 13, 23, 33, step 204.

[0051] If the outputting of the search signal in step 204 is followed by a response from another device 10, 20, 30 present, the communication apparatus 1, 2, 3 changes to the data transmission mode after set-up of a data connection with the other device 10, 20, 30, and conducts a data exchange with the detected device 10, 20, 30, step 208.

[0052] If the search signal is not followed by a response, the actuator 43 switches off the communication element 12, 22 again, step 206.

[0053] Further, the actuator 43 activates the time controller 45 which thereupon switches on the measuring unit 46 in cyclical switch on and off operation for a predetermined time by driving the switch 44 accordingly, step 210. The measuring unit 46 then performs a measurement of the monitored oscillating circuit property and stores the measuring value, step 212. From all hitherto determined and stored measuring values it subsequently forms a measuring value average, step 214.

[0054] It compares the measuring value obtained in step 212 with the determined measuring value average, step 216. If the measuring value corresponds to the average, no other device 10, 20, 30 is located within the detection range of the transmission oscillator 50. The measuring unit 46 then performs no further function and is switched off by the action of the time controller 45, step 218. The measuring unit 46 subsequently remains off, while the time controller 45 waits for the expiration of a predetermined off time, step 220. The off time is expediently selected to be greater than the on time in which the measuring unit 46 performs the measurement.

[0055] During the waiting period the device 10, 20 can be switched off as a whole, e.g. by actuating the switch 40, step 222. When this case occurs, the working sequence ends, step 224.

[0056] If the predetermined off time expires without the device being switched off as a whole, the time controller 45 switches on the measuring unit 46 again by actuating the switch 44 and repeats the steps 210 ff.

[0057] If the check in step 216 yields that a measuring value found does not correspond to the determined measuring value average, another device 10, 20, 30 is located within the detection range of the oscillating circuit 50, step 226. The measuring unit 46 then transmits a corresponding control signal to the actuator 43, whereupon the actuator 43 puts the communication apparatus 1, 2, 3 in the search mode. For this purpose, it switches off the measuring unit 46 by actuating the switch 44, step 228, and switches on the communication element 12, 22 by actuating the switch 42, step 230.

[0058] The communication element 12, 22 then produces the data transmission mode, as described, in which the data exchange is then effected between the data processing components 11, 21 of the devices involved, step 208.

[0059] Fig. 5 shows a first embodiment of a circuit implementation of the measuring unit 46 by means of a PLL circuit. PLL stands for "phase locked loop" and means that a signal with a frequency is set relative to a signal with a reference frequency so exactly that the phase relation between the signals is permanently maintained. The first embodiment of the measuring unit 46 has a first oscillator 60 which produces a signal

with a frequency f1 and feeds it to a first frequency divider 61, which can be formed as an integer or binary divider and performs a frequency division with a division factor N. It is indicated by dashed lines that the coil 13, 23 is connected to the first oscillator 60. The connection can be effected in the way shown in Fig. 2 via the switch 47 and a common ground. The exact execution depends on the circuit design of the oscillator circuit used, as well as the circuit design of the communication element 12, 22 (transmitter final stage). Thus, oscillator circuits are known, e.g. Colpitts, in which a connection of the coil 13, 23 can be grounded (on the alternating voltage side). In this case, the switch 47 can be executed so that only one connection of the coil must be switched over to the measuring unit 46, as shown in Fig. 2 for example.

[0060] In another embodiment of the oscillator circuit 60, it can also be required that a second connection of the coil is connected not to ground but to the supply voltage (e.g. Colpitts circuit variant). In this case, a second switch 47b (not shown) may be necessary.

[0061] Likewise, oscillator circuits are known in which two connections of the coil must be connected to the oscillator circuit 60. In this case, too, an additional switch 47b (not shown) is required for switching over the coil 13, 23 between the measuring unit 46 and the communication element 12, 22.

[0062] The connection likewise shown in Fig. 2 of the measuring unit 46 to the switch 44 for switching the measuring unit 46 on and off is not shown in Fig. 5, since the energy supply of the individual components of the measuring unit 46 is omitted in Fig. 5 for reasons of clarity.

[0063] The measuring unit 46 further has a second oscillator 62 which feeds a signal with a frequency f2 to a second frequency divider 63 which performs a frequency division with a division factor M. The second frequency divider 63 is formed according to the first frequency divider 61 and connected on the output side to an input of a phase comparator 64. A further input of the phase comparator 64 has connected thereto the first frequency divider 61 with its output. The phase comparator 64 is followed by a low-pass filter 65 which feeds a voltage U both to an input of the second oscillator 62 and to an input of a voltage differentiator 66. The voltage differentiator 66 is con-

nected on the output side to an input of a threshold switch 67 which supplies at its output a switching voltage Us for the actuator 43 shown in Fig. 2. The components 60, 61, 62, 63, 64 and 65 of the measuring unit 46 form a modified PLL circuit whose operation will be explained more closely hereinafter in connection with the further components 66 and 67.

[0064] The first oscillator 60 is formed as an LC oscillator, the coil 13, 23 being used as the frequency-fixing inductor L. By suitable dimensioning of a frequency-fixing capacitor C the first oscillator 60 is so adjusted that it begins oscillating at the transmitting frequency used in the detection mode when another device 10, 20, 30 is absent. Optionally, the capacitor 51 can be used to employ a higher frequency. The first frequency divider 61 divides the frequency f1 of the signal produced by the first oscillator 60 using the division factor N, thereby producing a signal with a frequency f1/N. Since frequency division is advantageous but not compulsory, the first frequency divider 61 can also be omitted or have a division factor N = 1.

[0065] The second oscillator 62 is formed as a voltage-controlled oscillator, so that the frequency f2 of the signal produced by the second oscillator 62 depends on the fed voltage U. The signal with the frequency f2 is converted by the second frequency divider 63 to a signal with a frequency f2/M. Like the first frequency divider 61, the second frequency divider 63 can also be omitted or have a division factor M = 1. The signals output by the frequency dividers 61 and 63 are supplied to the phase comparator 64 which compares them with each other and outputs a signal dependent on the phase shift to the low-pass filter 65. The low-pass filter 65 suppresses the high-frequency signal components so that the voltage U output by the low-pass filter 65 is suitable as a control voltage for the second oscillator 62. Through the control properties of the PLL circuit, the frequency f2 of the second oscillator 62 is automatically so adjusted that a value f2 = f1 * M/N results and the two oscillators 60 and 62 are coupled in phase lock.

[0066] In an advantageous embodiment, a division factor of N > 1 is provided for the first frequency divider 61, and a division factor M = 1 for the second frequency divider 63. This results in the second oscillator 62 being operated at a lower frequency

than the first oscillator 60 and thus not being able to disturb the operation of the device 10, 20, 30 by its own signal. For example, the second oscillator 62 can be operated at a frequency f2 of 6.78 MHz for N = 2. It is also particularly favorable if the division factors N and M of the frequency dividers 61 and 63 have a non-integral relationship to each other, e.g. M/N = 5/6. This permits the frequency f2 of the second oscillator 62 to be selected so that no same-frequency interference having an especially negative effect is to be feared through any harmonic waves of the second frequency f2 and a parasitical irradiation of the second oscillator 62 into the coil 13, 23. It is irrelevant here whether the ratio M/N is selected to be smaller or greater than one.

[0067] When the measuring unit 46 is in the adjusted state, i.e. there is phase-locked agreement between the signals of the two frequency dividers 61 and 63, a constant value comes about for the voltage U output by the low-pass filter 65. When another device 10, 20, 30 approaches the coil 13, 23, the influence of the inductively coupled-in impedance of the other device 10, 20, 30 leads to a change of the phase and optionally the frequency of the first oscillator 60 and thus to a phase shift between the two input signals of the phase comparator 64. This leads to a change of the voltage U output by the low-pass filter 65 and thus to a change of the frequency f2 and the phase of the signal produced by the second oscillator 62 until the signals produced by the two oscillators 60 and 62 are coupled in phase lock again. The readjustment of the frequency f2 of the second oscillator 62 performed in this way and the associated detection of the presence of another device 10, 20, 30 will be explained more closely with reference to Fig. 6.

[0068] Fig. 6 shows a plurality of signal patterns within the measuring unit 46 upon the approach of another device 10, 20, 30. For all signal patterns the time t is plotted on the abscissa with the same scaling in each case so as to permit a direct comparison of the signal patterns. The upper diagram in Fig. 6 shows the time behavior of the voltage U output by the low-pass filter 65, i.e. the voltage U is plotted on the ordinate. In the middle diagram the temporal change of the voltage dU/dt is plotted on the ordinate, which is determined by the voltage differentiator 66 and output to the threshold switch 67. In the lower diagram the switching voltage Us produced by the threshold switch 67 is plotted on the ordinate.

[0069] One possibility for designing the functional blocks 66, 67 is shown in Fig. 8.

[0070] A low-pass filter is formed here by R4, R5, C2, whereby an average of a partial voltage of U comes about with a large time constant (e.g. 1 s) at the (-) input of an amplifier V1. Likewise, a partial voltage of U comes about at the (+) input of the amplifier V1 via R1, R2, R3.

[0071] When the voltage U e.g. quickly drops upon the approach of a coil 13, 23, 33, the voltage at the (+) input momentarily drops below the voltage at the (-) input, thus producing a switching signal Us until the voltage at the (-) input has adjusted to the new (average) value.

[0072] The voltage U can rise or also fall upon the approach of a coil 13, 23, 33. The exact behavior depends on the circuit used (Fig. 5, Fig. 7) and the practical execution thereof.

[0073] The approach of another device as of the time t = t1 results in the above-mentioned change of the hitherto constant voltage U of the low-pass filter 65. This is expressed in the upper diagram of Fig. 6 in an abrupt increase in the voltage U, which subsequently remains at a higher level. Since the value by which the voltage U changes can be relatively small, the voltage U itself is not used for driving the threshold switch 67, but rather the temporal change thereof dU/dt. As indicated by the middle diagram, the temporal change of the voltage dU/dt has a very pronounced maximum immediately after the time t = t1, which is well-suited for further processing. This maximum exceeds the response threshold of the threshold switch 67, which is shown by a dashed horizontal line. This has the consequence that the threshold switch 67 responds and produces the square pulse shown in the lower diagram. Because of the finite gradient with which the voltage U rises and the time for signal processing required by the threshold switch 67, the square pulse of the switching voltage Us starts at a slight time delay after the time t = t1. The square pulse is output by the measuring unit 46 to the actuator 43 for further processing.

[0074] Fig. 7 shows a second embodiment for a circuit implementation of the measuring unit 46 by means of a PLL circuit. The structure corresponds largely to the first

embodiment. However, unlike the first embodiment of the measuring unit 46, the second oscillator 62 is not executed as a voltage-controlled oscillator but as a stable-frequency quartz oscillator. The first oscillator 60 is now executed as a voltage-controlled LC oscillator. Adjustment of the frequency f1 is effected here via a voltage-dependent capacitance which, together with the inductance of the coil 13, 23, determines the frequency f1 of the first oscillator 60. Due to the different formation of the oscillators 60 and 62, the circuitry of the individual components of the measuring unit 46 is changed to the effect that the output of the low-pass filter 65 is connected to an input of the first oscillator 60. The second oscillator 62 does not receive an input signal. The changed structure results for the second embodiment of the measuring unit in the following operation.

[0075] Using an analogous control mechanism as described for the first embodiment, the frequency f1 of the first oscillator 60 is adjusted to a constant value which is fixed by the frequency f2 of the second oscillator 62 and the division factors N and M of the frequency dividers 61 and 63. By accordingly selecting the frequency f2 and the division factors N and M it is in particular possible to operate the first oscillator 60 constantly at a frequency f1 corresponding to the transmitting frequency used in the detection mode. Upon the approach of another device 10, 20, 30, the frequency f1 of the first oscillator 60 does not change despite the inductively coupled-in impedance. Nevertheless, a detectable change occurs in the voltage U upon the approach of another device 10, 20, 30, since the first oscillator 60 is readjusted with the help of the voltage U, thereby compensating the detuning of the first oscillator 60. On the basis of the voltage U a drive signal for the actuator 43 is produced in the above-described way.

[0076] According to Fig. 2, the measuring unit 46 and the communication element 12, 22 are executed as independent circuit components. The thus required switch 47 which switches over the coil 13, 23 between the measuring unit 46 and the communication element 12, 22 must be designed for high voltages and performances. Due to the voltage overshoot in resonance, very high RF voltages, occasionally even in the range of a few 100 V, can occur on the coil 13, 23. The required large-signal stable signal switchover can be realized in some cases only with an elaborate and expensive circuit,

depending on the transmit power. In a variation of the invention, it is therefore provided that the final stage of the communication element, which is preferably formed as a transistor circuit, is also used as the first oscillator 60 or the second oscillator 62 by a suitable switchover of operating point, amplification and the feedback of the output signal. Such a final stage already tends to oscillate upon a corresponding feedback.

[0077] The measuring unit 46 has high responsitivity, since even extremely small phase changes can be detected. Upon corresponding dimensioning of the measuring unit 46 and the coil 13, 23, other devices 10, 20, 30 can be detected even over a large distance of up to a few meters. This makes it possible, for example, to use the measuring unit 46 for theft protection of articles of sale. In this case, it is provided to use the switching voltage Us produced by the threshold switch 67 to trigger an alarm signal. The articles of sale can be provided for example with RF labels which have an oscillating circuit without a chip and are typically intended for a frequency domain of 8.2 MHz. Likewise, acoustomagnetic labels can also be used, the typical frequency domain then being below 60 kHz.

[0078] While retaining the basic idea of switching on a communication element that automatically sets up a data connection with a corresponding communication element of the same kind, only when the presence of such a corresponding communication element has already been ascertained, the above-described concept allows a number of embodiments. Thus, the structure of the intelligent devices 10, 20, 30 can deviate from that described here while having exactly the same functionality. Above all, the stated components can be replaced by other assemblies or circuits that act accordingly. Also, the breakdown of the intelligent devices and communication elements, switching apparatus, measuring device and data processing component selected for the description is arbitrary and can be done differently without affecting the functionality. In particular, the functionalities of actuator 43, time controller 45 and measuring unit 46 can be realized completely or partly in software form in the central processor unit of the device 10, 20, 30. Within limits, a simplified execution of the above-described invention is also conceivable. For example, the changing of the resonant frequency in the transmission oscillator 50 in the search mode and thus the necessity of providing the capacitor 51 can be omitted.

Claims

1. A communication apparatus for setting up a data connection between intelligent devices, having

a coil (13, 23, 33) which is part of a transmission oscillator (50) for carrying out a contactless data exchange,

a communication element (12, 22) which is connected to the coil (13, 23, 33) and the data processing component (11, 21) of an intelligent device (10, 20, 30) and which emits search signals via the coil (13, 23, 33) to receive a response from another intelligent device (10, 20, 30),

a measuring device (14, 24) for monitoring a property of the transmission oscillator (50) which outputs a control signal when ascertaining a change of the monitored property,

and a switching apparatus (15, 25) which is connected to the measuring device (14, 24) and the communication element (12, 22) and which switches on the communication element (12, 22) when it has received a control signal from the measuring device (14, 24).

2. The communication apparatus according to claim 1, characterized in that an assembly (52) is switchable to the transmission oscillator (50) via a switch (47), said assembly causing an increase in the bandwidth of the oscillating circuit (50).

3. The communication apparatus according to claim 2, characterized in that the assembly (52) is a resistive element.

4. The communication apparatus according to claim 1, characterized in that an assembly (51) is switchable to the transmission oscillator (50) via a switch (47), said assembly causing a change in the resonant frequency of the transmission oscillator (50).

5. The communication apparatus according to claim 4, characterized in that the assembly (51) causes a reduction in the resonant frequency.

6. The communication apparatus according to claim 4, characterized in that the assembly (51) comprises a capacitor.

7. The communication apparatus according to claim 1, characterized in that the measuring frequency of the measuring device (14) is sweepable over a predetermined frequency domain.

8. The communication apparatus according to claim 1, characterized in that the switching apparatus (15, 25) has a time controller (45) for cyclically switching the measuring device (14, 24) on and off.

9. The communication apparatus according to claim 8, characterized in that the time controller (45) keeps the on state of the measuring device (14, 24) shorter than the off state.

10. The communication apparatus according to claim 8, characterized in that the measuring device (14, 24) stores a measuring value obtained during a cyclical on phase.

11. The communication apparatus according to claim 8, characterized in that the measuring device (14, 24) emits a control signal to the switching apparatus (15, 25) when a measuring value deviates from the average of the measuring values stored with the previous on phases.

12. The communication apparatus according to claim 8, characterized in that when the intelligent device (10, 20, 30) is switched on the communication element (12, 22) is initially on and the measuring device (14, 24) off.

13. The communication apparatus according to claim 1, characterized in that the measuring device (14, 24) has a first oscillator device (60) coupled at least temporarily with the coil (13, 23, 33), for producing a first oscillation signal, and a second oscillator device (62) for producing a second oscillation signal.

14. The communication apparatus according to claim 13, characterized in that the measuring device (14, 24) has circuit components (64, 65, 66, 67) for producing

the control signal for the switching apparatus (15, 25) on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom.

15. A method for switching on a communication element designed to use a coil (13, 23, 33), which is part of a transmission oscillator (50), for automatically setting up a data connection with an intelligent device (10, 20, 30) likewise having a communication element (12, 22) and a coil (13, 23, 33), having the following steps:

monitoring a parameter of the transmission oscillator (50) by means of a measuring device (14, 24),

producing a control signal upon the occurrence of a change in the monitored property,

switching on the communication element (12, 22) by a switching apparatus (15, 25) due to the control signal.

16. The method according to claim 15, characterized in that the measuring frequency of the measuring unit (46) is swept over a given frequency domain during the monitoring of the property.

Abstract

The invention relates to a communication apparatus for automatically setting up a data connection between two intelligent devices (10, 20, 30). The apparatus comprises a coil (13, 23, 33) for carrying out a contactless data exchange which is part of a transmission oscillator (50), a communication element (12, 22) which is connected to the coil (13, 23, 33) and the data processing component (11, 21) of an intelligent device (10, 20, 30) and emits search signals via the coil (13, 23, 33) to receive a response from another intelligent device (10, 20, 30), a measuring device (14, 24) for monitoring a property of the transmission oscillator (50), which outputs a control signal when ascertaining a change in the monitored property, and a switching apparatus (15, 25) which is connected to the measuring device (14, 24) and the communication element (12, 22) and which switches on the communication element (12, 22) when it has received a control signal from the measuring device (14, 24).

(Fig. 2)

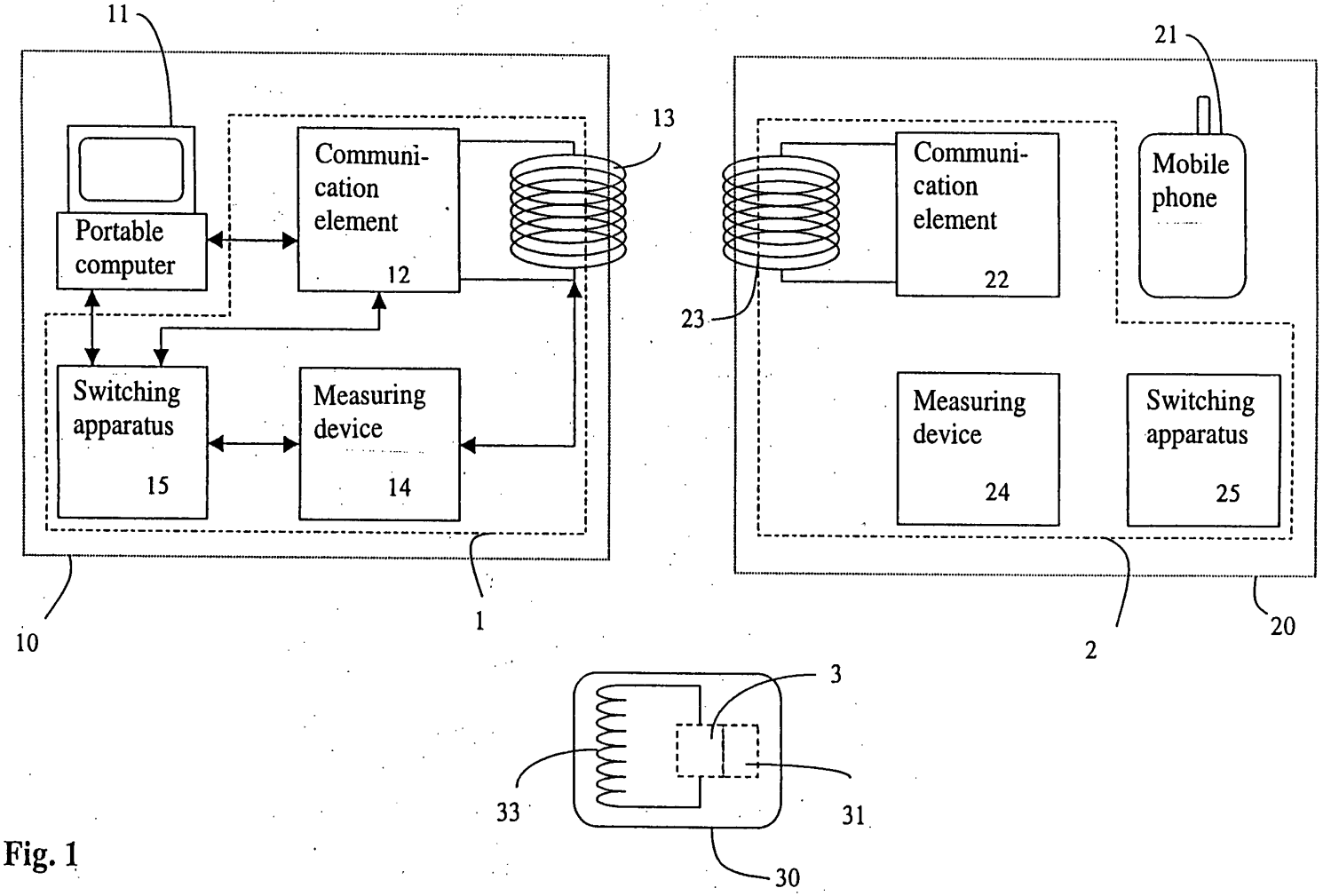


Fig. 1

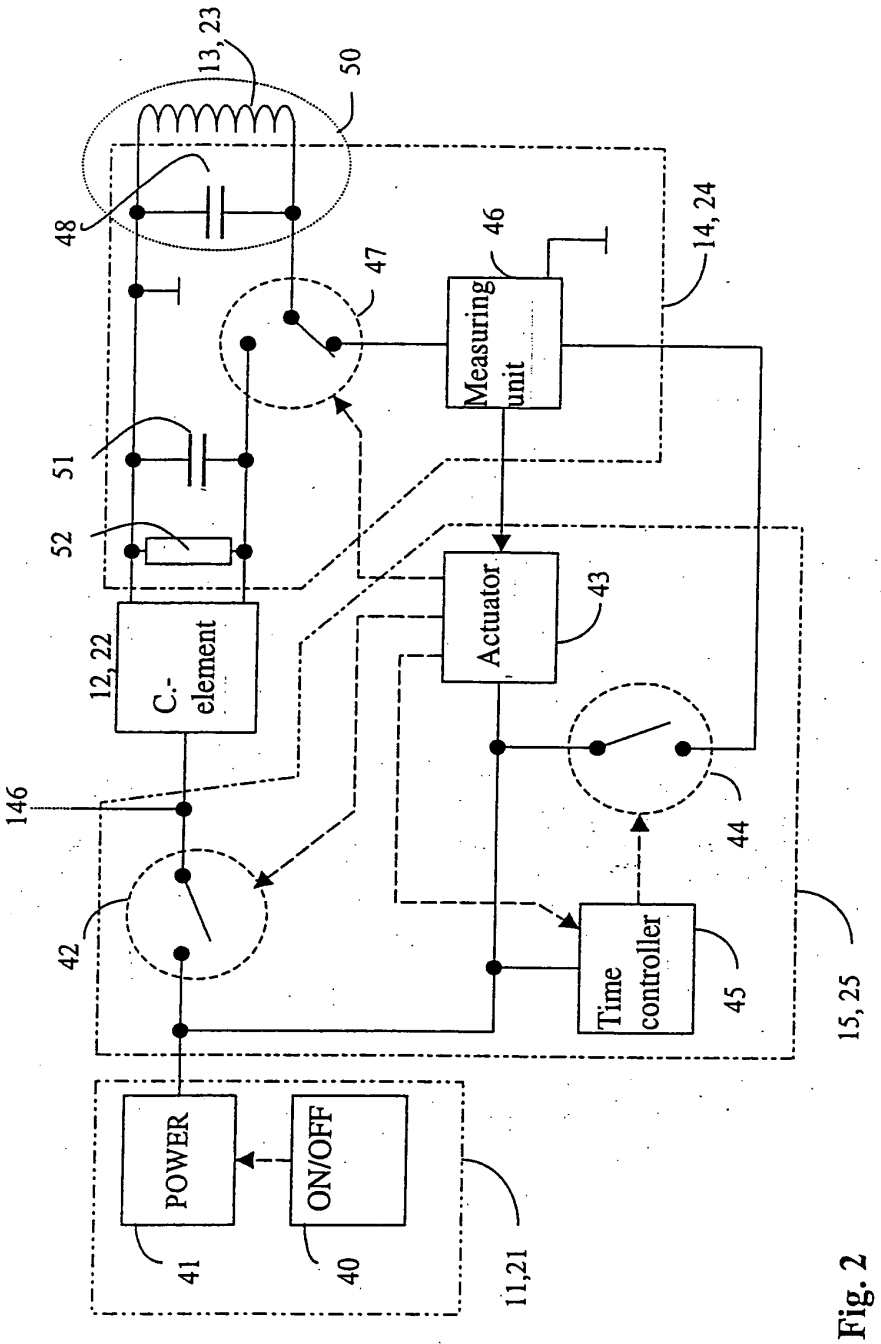

13, 23
50
48
47
46
Measuring unit
14, 24
51
52
12, 22
C.-element
Actuator
43
146
42
44
Time controller
45
15, 25
POWER
ON/OFF
41
40
11,21

Fig. 2

Fig. 3

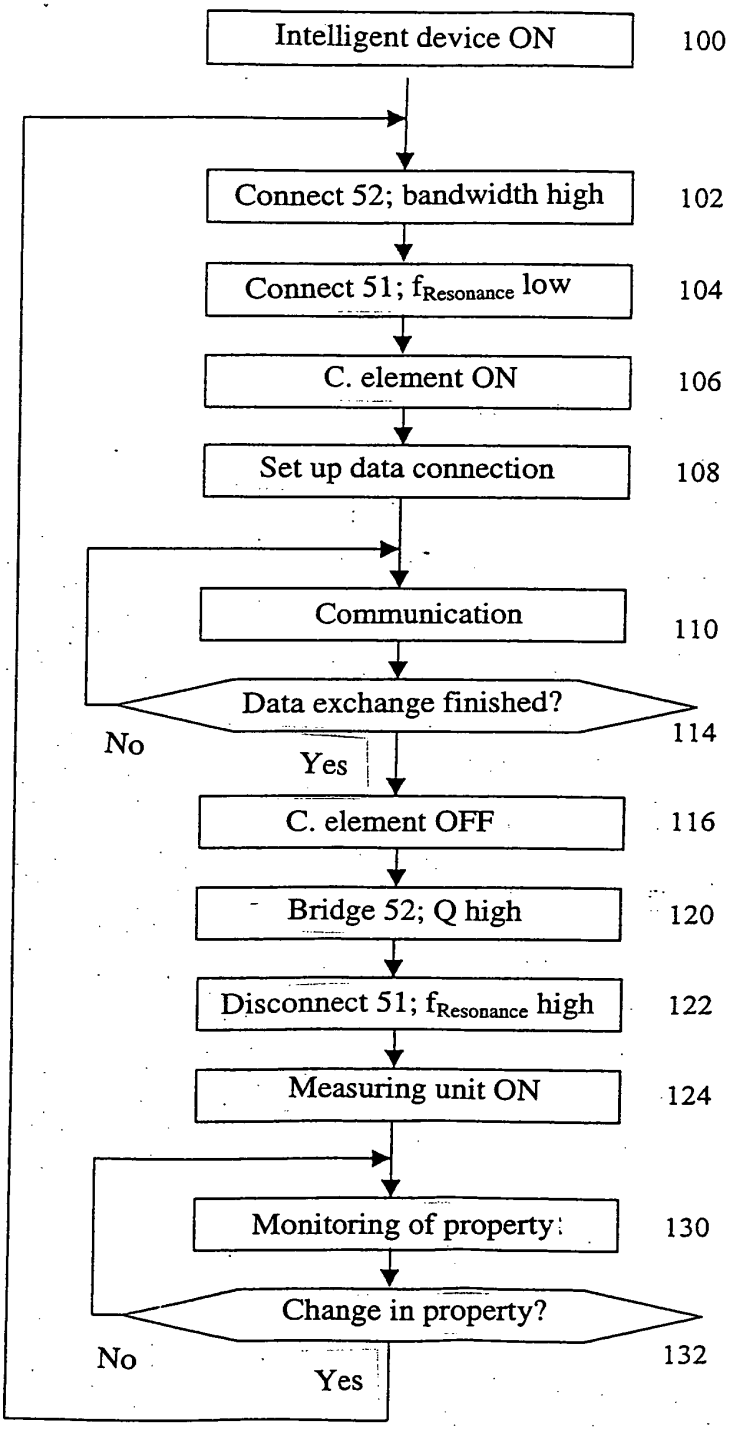
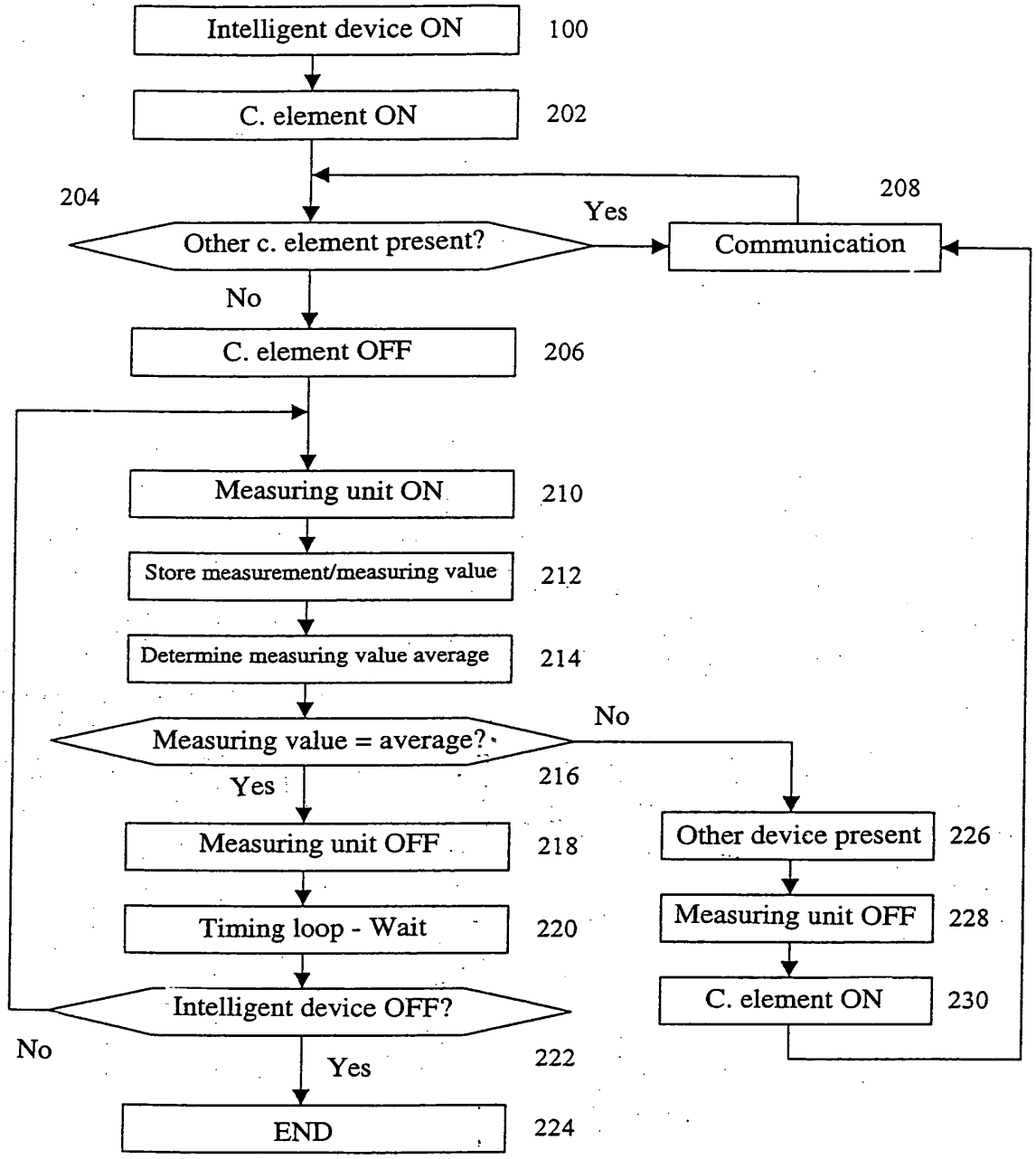

Intelligent device ON
100
Connect 52; bandwidth high
102
Connect 51; $f_{Resonance}$ low
104
C. element ON
106
Set up data connection
108
Communication
110
Data exchange finished?
114
No
Yes
C. element OFF
116
Bridge 52; Q high
120
Disconnect 51; $f_{Resonance}$ high
122
Measuring unit ON
124
Monitoring of property
130
Change in property?
132
No
Yes

Fig. 4


Intelligent device ON
100
C. element ON
202
204
208
Yes
Other c. element present?
Communication
No
C. element OFF
206
Measuring unit ON
210
Store measurement/measuring value
212
Determine measuring value average
214
No
Measuring value = average?
216
Yes
Measuring unit OFF
218
Other device present
226
Timing loop - Wait
220
Measuring unit OFF
228
Intelligent device OFF?
C. element ON
230
No
Yes
222
END
224

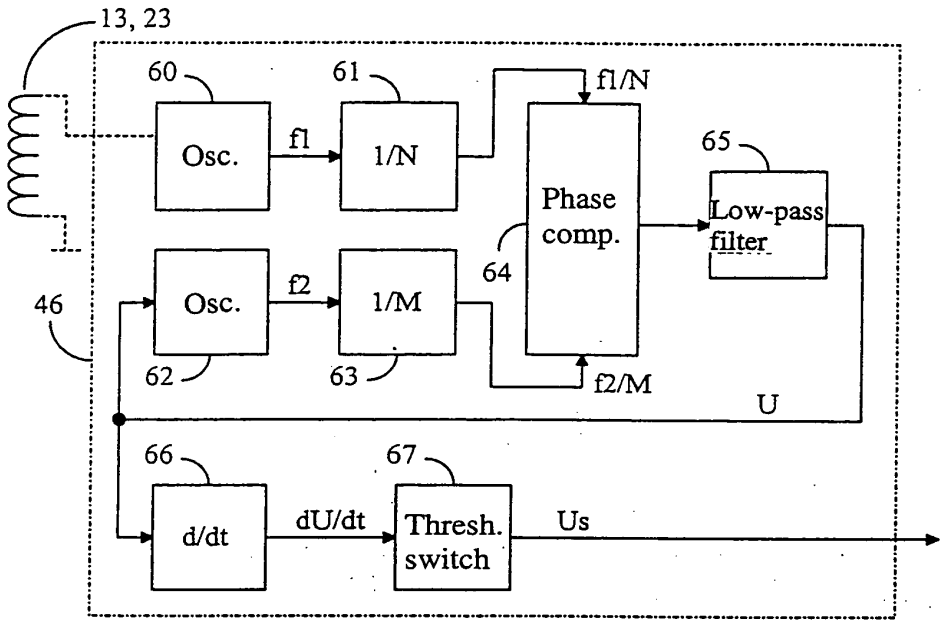

13, 23
60
61
f1/N
Osc.
f1
1/N
Phase comp.
65
Low-pass filter
64
46
Osc.
f2
1/M
62
63
f2/M
U
66
67
d/dt
dU/dt
Thresh. switch
Us

Fig. 5

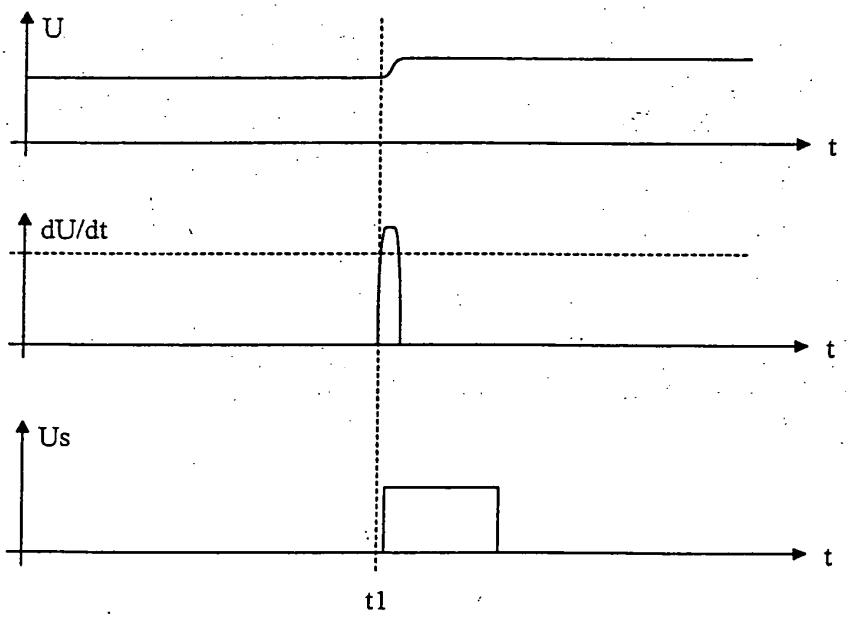

U
t
dU/dt
t
Us
t
t1

Fig. 6

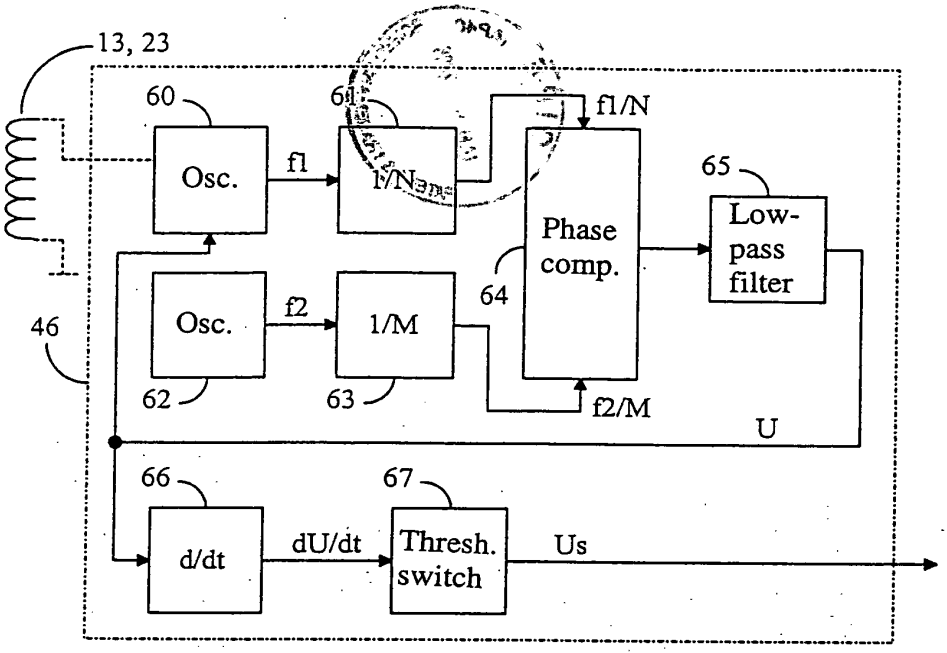

13, 23
60
61
f1/N
Osc.
f1
1/N
Phase comp.
65
Low-pass filter
64
Osc.
f2
1/M
46
62
63
f2/M
U
66
67
d/dt
dU/dt
Thresh. switch
Us

Fig. 7

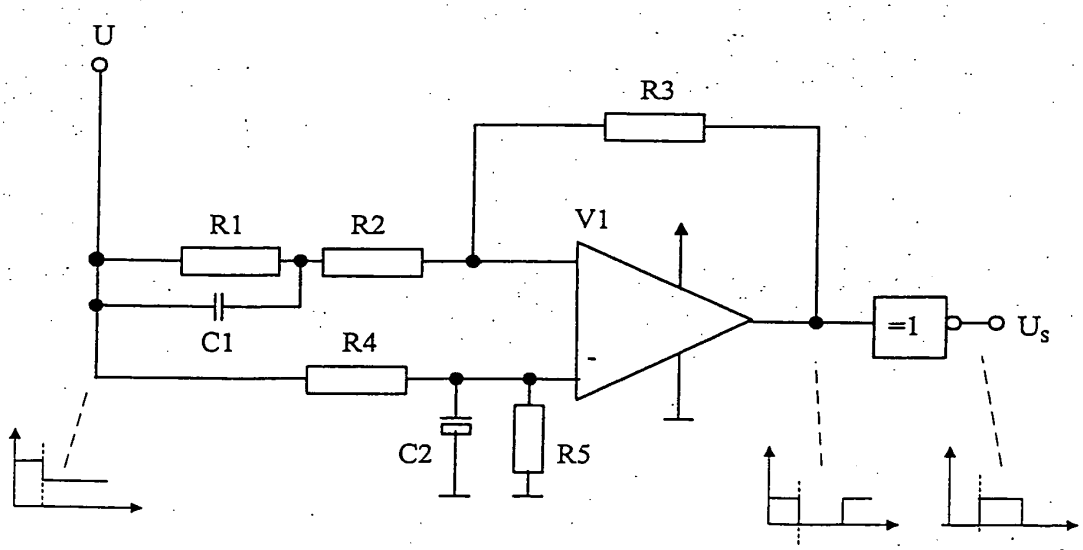

U
R3
R1
R2
V1
C1
R4
=1
Us
C2
R5

Fig. 8

ATTORNEY/DOCKET NO: FINK3001/JEK

DECLARATION FOR PATENT APPLICATION AND APPOINTMENT OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention (Design, if applicable) entitled:

COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES

the specification of which (check one):

☐ is attached hereto, or ☒ was filed on July 29, 2004 as U.S. Application Number or PCT International Application Number: PCT/EP2004/008537 and (if applicable) was amended on:

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1.56*. I hereby claim foreign priority benefits under *Title 35, United States Code §119* of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)			PRIORITY CLAIMED	
Number	Country	Day/Month/Year Filed	Yes	No
103 34 765.8	GERMANY	30/July/2003	X	

☐ Additional Priority Application(s) Listed on Following Page(s)

I HEREBY CLAIM THE BENEFIT UNDER TITLE 35 U.S. CODE §119(E) OF ANY U.S. PROVISIONAL APPLICATIONS LISTED BELOW.	
Application Number	Day/Month/Year Filed

☐ Additional Provisional Application(s) Listed on Following Page(s)

I hereby claim the benefit under *Title 35, United States Code, §120* of any United States application(s) or PCT international application(s) designating The United States of America listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of *Title 35, United States Code, §112*, I acknowledge the duty to disclose information which is material to patentability as defined in *Title 37, Code of Federal Regulations, §1.56* which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

Application Number	Filing Date	Status - Patented, Pending or Abandoned
PCT/EP2004/008537	29/July/2004	Pending

☐ Additional US/PCT Priority Application(s) listed on Following Page(s)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under *section 1001 of title 18 of the United States Code* and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: I (We) hereby appoint as my (our) attorneys, with full powers of substitution and revocation, to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: J. Ernest Kenney, Reg. No. 19,179; Eugene Mar, Reg. No. 25,893; Richard E. Fichter, Reg. No. 26,382; Thomas J. Moore, Reg. No. 28,974; Eric S. Spector, Reg. No. 22,495; Felix J. D'Ambrosio, Reg. No. 25,721; George A. Loud, Reg. No. 25,814; Benjamin E. Urcia, Reg. No. 33,805; and Justin J. Cassell, Reg. No. 46,205

I(we) authorize my(our) attorneys to accept and follow instructions from_____ regarding any matter related to the preparation, examination, grant and maintenance of this application, any continuation, continuation-in-part or divisional based thereon, and any patent resulting therefrom, until I(we) or my(our) assigns withdraw this authorization in writing.

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DATE	SIGNATURE

☐ *See following page(s) for additional joint inventors.*

(26MAY2000)

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re U.S. Patent Application
Klaus FINKENZELLER

Examiner: Unassigned

Group Art Unit: Unassigned

Serial Number: Unassigned
Filed: Herewith

Attorney Docket: FINK3001/JEK

For: COMMUNICATION APPARATUS FOR SETTING UP A DATA CONNECTION BETWEEN INTELLIGENT DEVICES

PRELIMINARY AMENDMENT BEFORE EXAMINATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

Prior to examination of the above-identified application that accompanies this paper, please amend the application as shown below.

AMENDMENTS

AMENDMENTS TO THE CLAIMS

The amendments to the claims appear in the following pages under the heading "LIST OF CURRENT CLAIMS". The claim listing replaces all previous versions of the claims presented in this application, and indicates any currently presented amendments and the status of each of the listed claims.

The amendments to the claims of this application, which originated in a foreign country, are submitted before examination on the merits and are not intended to have a narrowing effect for the purpose of patentability, but rather are made for one or more of the following reasons: (i) to remove drawing reference numerals unnecessary under U.S. practice; (ii) to remove or reduce multiple dependent claims to reduce the filing fee; (iii) to revise the original language originating in a foreign country to better conform to customary English usage and style for U.S. patent claiming; (iv) to revise original non-U.S. claim terminology into more appropriate

English claim terms having a scope of meaning consistent with the original intended language in preparation for U.S. examination; (iv) to remove limitations having an effect in a foreign country which is different and unintended under U.S. practice (i.e., changing "consisting of" to "comprising"); (v) to remove or amend original claim language that could be regarded as alternative expressions that are acceptable under foreign patent practice but possibly subject to objection under U.S. practice, typically having a broadening or neutral effect in the amended claim; and/or (vi) to improve the clarity or meaning of the original language.

In the case of amendments effectively changing an original claim element expressed as a "means plus function" that could raise a presumption of claim expression under 35 U.S.C. 112, 6th paragraph to a structural expression or to an expression removing the presumption of a "means-plus-function" statement, it is not intended to narrow the claim so amended for purposes of patentability, but rather to place the claim in a form considered to be intended by the applicant from a foreign country where claim limitations described in terms of means-plus-function do not have the same effect as under U.S. practice. Thus, such amendments are intended to establish a full range of equivalents to the claim elements so amended under the U.S. doctrine of equivalents and beyond the range associated with "means-plus-function" expressions according to 35 U.S.C. 112, 6th paragraph, just as if the claim so amended was presented originally in its amended form.

All rights are reserved to the original disclosed and claimed subject matter and any cancellation of claims is made without prejudice or disclaimer.

LIST OF CURRENT CLAIMS

1. (Currently Amended) A communication apparatus for setting up a data connection between intelligent devices, ~~having~~ comprising:

~~a coil (13, 23, 33) which is part of~~ a transmission oscillator ~~(50)~~ for carrying out a contactless data exchange, said oscillator including a coil;

a communication element ~~(12, 22)~~ which is connected to the coil ~~(13, 23, 33)~~ and the data processing component ~~(11, 21)~~ of an intelligent device ~~(10, 20, 30)~~ and which emits search signals via the coil ~~(13, 23, 33)~~ to receive a response from another intelligent device ~~(10, 20, 30)~~,

a measuring device ~~(14, 24)~~ for monitoring a property of the transmission oscillator ~~(50)~~ which outputs a control signal when ascertaining a change of the monitored property,

and a switching apparatus ~~(15, 25)~~ which is connected to the measuring device ~~(14, 24)~~ and the communication element ~~(12, 22)~~ and which switches on the communication element ~~(12, 22)~~ when it has received a control signal from the measuring device ~~(14, 24)~~.

2. (Currently Amended) The communication apparatus according to claim 1, including ~~characterized in that~~ an assembly ~~(52)~~ that is switchable to the transmission oscillator ~~(50)~~ via a switch ~~(47)~~, said assembly causing an increase in the bandwidth of the oscillating circuit ~~(50)~~.

3. (Currently Amended) The communication apparatus according to claim 2, wherein ~~characterized in that~~ the assembly ~~(52)~~ is a resistive element.

4. (Currently Amended) The communication apparatus according to claim 1, including ~~characterized in that~~ an assembly ~~(51) is~~ switchable to the transmission oscillator ~~(50)~~ via a switch ~~(47)~~, said assembly causing a change in the resonant frequency of the transmission oscillator ~~(50)~~.

5. (Currently Amended) The communication apparatus according to claim 4, wherein ~~characterized in that~~ the assembly is arranged to enable ~~(51) causes~~ a reduction in the resonant frequency.

6. (Currently Amended) The communication apparatus according to claim 4, wherein ~~characterized in that~~ the assembly ~~(51)~~ comprises a capacitor.

7. (Currently Amended) The communication apparatus according to claim 1, wherein ~~characterized in that~~ the measuring frequency of the measuring device ~~(14)~~ is sweepable over a predetermined frequency domain.

8. (Currently Amended) The communication apparatus according to claim 1, wherein ~~characterized in that~~ the switching apparatus ~~(15, 25)~~ has a time controller ~~(45)~~ for cyclically switching the measuring device ~~(14, 24)~~ on and off.

9. (Currently Amended) The communication apparatus according to claim 8, wherein ~~characterized in that~~ the time controller ~~(45)~~ keeps the on state of the measuring device ~~(14, 24)~~ shorter than the off state.

10. (Currently Amended) The communication apparatus according to claim 8, wherein ~~characterized in that~~ the measuring device ~~(14, 24)~~ stores a measuring value obtained during a cyclical on phase.

11. (Currently Amended) The communication apparatus according to claim 10 [[8]], wherein ~~characterized in that~~ the measuring device ~~(14, 24)~~ emits a control signal to the switching apparatus ~~(15, 25)~~ when a measuring value deviates from the average of the measuring values stored with the previous on phases.

12. (Currently Amended) The communication apparatus according to claim 8, wherein, ~~characterized in that~~ when the intelligent device ~~(10, 20, 30)~~ is switched on,

the communication element ~~(12, 22)~~ is initially on and the measuring device ~~(14, 24)~~ off.

13. (Currently Amended) The communication apparatus according to claim 1, wherein ~~characterized in that~~ the measuring device ~~(14, 24)~~ has a first oscillator device ~~(60)~~ coupled at least temporarily with the coil ~~(13, 23, 33)~~, for producing a first oscillation signal, and a second oscillator device ~~(62)~~ for producing a second oscillation signal.

14. (Currently Amended) The communication apparatus according to claim 13, wherein ~~characterized in that~~ the measuring device ~~(14, 24)~~ has circuit components ~~(64, 65, 66, 67)~~ for producing the control signal for the switching apparatus ~~(15, 25)~~ on the basis of a phase relation between the first and second oscillation signals or signals derived therefrom.

15. (Currently Amended) A method for switching on a communication element configured ~~designed~~ to use a coil ~~(13, 23, 33)~~, which is part of a transmission oscillator ~~(50)~~, for automatically setting up a data connection with an intelligent device ~~(10, 20, 30)~~ likewise having a communication element ~~(12, 22)~~ and a coil ~~(13, 23, 33)~~, comprising ~~having~~ the following steps:

monitoring a parameter of the transmission oscillator ~~(50)~~ by means of a measuring device ~~(14, 24)~~,

producing a control signal upon the occurrence of a change in the monitored property,

switching on the communication element ~~(12, 22)~~ by a switching apparatus ~~(15, 25) due~~ in response to the control signal.

16. (Currently Amended) The method according to claim 15, wherein ~~characterized in that~~ the measuring frequency of the measuring unit ~~(46)~~ is swept over a given frequency domain during the monitoring of the property.

REMARKS

Examination of the application as-amended is respectfully requested.

Respectfully submitted,
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Dated: January 24, 2006

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Application Data Sheet
Application Information

Application type::	Regular
Subject matter::	
CD-ROM or CD-R::	None
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Number of copies of CRF::	0
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Applicant Information

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Representative Information

Representative customer number:: 23364

Domestic Priority Information

Application::	Continuity Type::	Parent Application::	Parent Filing Date::
This application	an application claiming benefit under 35 USC 119(e)		
This application	National stage of	PCT/EP2004/008537	7/29/2004
This application	Continuation of		

Foreign Priority Information

Country::	Application number::	Filing Date::	Priority claimed::
GERMANY	103 34 765.8	7/30/2003	YES

Assignee Information

Assignee name::

Kommunikationsvorrichtung zum Aufbau einer Datenverbindung zwischen intelligenten Geräten

Die Erfindung betrifft die Nutzung von selbsttätig eine Datenverbindung einrichtenden Kommunikationselementen in zur Durchführung einer Datenübertragung eingerichteten, intelligenten Geräten, wobei die Datenverbindungseinrichtung durch Annäherung zweier intelligenter Gerät ausgelöst wird. Ein Konzept für die selbsttätige Einrichtung einer Datenverbindung zwischen intelligenten Geräten ist aus der Spezifikation ECMA/TC32/TG19/2003/12 unter der Bezeichnung „Near Field Communication" (NFC) bekannt. Zweck des Konzeptes ist es, die Einrichtung einer Datenverbindung zwischen intelligenten Geräten so einfach wie möglich zu machen. Das Konzept sieht hierzu vor, daß zwei intelligente Geräte, die beide zur Durchführung eines NFC-Protokolles eingerichtet sind, bei gegenseitiger Annäherung auf eine Distanz von typischerweise weniger als 0,2 Metern automatisch eine Datenverbindung aufbauen. In einem Suchmodus sendet dabei eines der intelligenten Geräte, der Initiator, eine Suchanfrage, die von dem zweiten intelligenten Gerät, dem Target, beantwortet wird. In einem unmittelbar folgenden Datenaustausch verständigen sich die beiden intelligenten Geräte auf einen Datenübertragungsmodus, gemäß dem anschließend ein Datenaustausch zwischen den Datenverarbeitungskomponenten der beteiligten intelligenten Geräte erfolgt.

Das Erkennen, ob sich ein anderes intelligentes Gerät im Ansprechbereich des NFC-Protokolles befindet, erfolgt im Suchmodus durch zyklisches Aussenden von Suchanfragen. Als Parameter für die Suchanfragen sind eine Sendefrequenz von 13,56 MHz und eine magnetische Feldstärke von mindestens 1,5 A/m bis maximal 7,5 A/m vorgesehen. Die vorgesehene Mindestfeldstärke bedingt in zur Durchführung eines NFC-Protokolles bereiten intelligenten Geräten eine relativ große ständige Leistungsaufnahme. Für Ge-

räte mit beschränkten Energieressourcen, besonders für batteriebetriebene Geräte hat das eine Verringerung der möglichen Betriebsdauer zufolge. Um diesen unerwünschten Effekt zu verkleinern kann vorgesehen sein, die intelligenten Geräte mit einer von dem Nutzer zu betätigenden Schalteinrichtung zu versehen, mittels derer der Suchmodus einer NFC-Einheit aktiviert wird. Diese Möglichkeit hebt allerdings das durch das NFC-Konzept angestrebte Ziel einer besonders einfachen Bedienbarkeit zumindest zum Teil wieder auf, da zumindest die Schaltfunktion gesondert betätigt werden muß.

In den Standards ISO/IEC 14443 und ISO/IEC 15693 wird ein Verfahren beschrieben, in welchem ein Lesegerät versucht mit einem anderen intelligenten Gerät (kontaktlose Chipkarte/RFID-Transponder) eine Datenverbindung herzustellen. Hierzu sendet das Lesegerät ein Suchsignal - REQUEST - periodisch mit hoher Feldstärke (z. B. 1,5 - 7,5 A/m gemäß ISO/IEC 14443) aus, solange bis ein intelligentes Gerät in den Ansprechbereich des Lesegerätes gelangt.

Aus der deutschen Patentanmeldung DE 102 06 676 ist eine mit einem Transponder betätigbare Schaltvorrichtung bekannt, die, solange ein Schaltvorgang nicht ausgelöst wird, nahezu leistungslos betrieben werden kann. Das zu schaltende Gerät verfügt hierzu über eine Spule, die Teil eines Schwingkreises ist, der im Erkennungsbetrieb als im wesentlichen unbelasteter reiner Schwingkreis betrieben wird. Die im Schwingkreis stehende Resonanzfrequenz wird dabei von einem Frequenzbeobachter überwacht. Wird ein Transponder mit einer Transponderspule an die Erkennungsspule angenähert, ändert sich die Resonanzfrequenz des Schwingkreises. Dies wird von dem Frequenzbeobachter erkannt, der daraufhin ein Schaltsignal erzeugt, welches das zu schaltende Gerät einschaltet. Die vorgeschlagene Lösung konzentriert sich auf den direkten Wechsel vom Erkennungsmodus in den

Datenübertragungsmodus, d.h. auf das direkte, einstufige Einschalten eines intelligenten Gerätes mittels eines Spulenträgers, der vor allem als Schaltelement dient.

Aufgabe der Erfindung ist es, eine Kommunikationsvorrichtung für zum automatischen Datenverbindungsaufbau eingerichtete, intelligente Geräte anzugeben, die ohne Einschränkung der Nutzungsfreundlichkeit einen möglichst geringen Energieverbrauch aufweist.

Diese Aufgabe wird gelöst durch eine Vorrichtung mit den Merkmalen des Hauptanspruchs. Die erfindungsgemäße Kommunikationsvorrichtung verfügt über ein Kommunikationselement mit einer Spule zur Abgabe von Suchsignalen, wobei der Suchsignalbetrieb jedoch erst aufgenommen wird, wenn zuvor mittels einer Meßeinrichtung eine Eigenschaftsänderung in einem mittels derselben Spule eingerichteten Übertragungsschwingkreis erkannt wurde. Da Übertragungsschwingkreis und Meßeinrichtung sich nahezu leistungslos betreiben lassen, muß die Ausgabe von Suchsignalen zum Erkennen der Anwesenheit korrespondierender intelligenter Geräte nur erfolgen, wenn sich möglicherweise ein weiteres intelligentes Gerät im Ansprechbereich der Spule befindet. Der Energiebedarf der Kommunikationsvorrichtung läßt sich dadurch erheblich reduzieren. Die erfindungsgemäße Lösung eignet sich daher insbesondere auch für intelligente Geräte mit beschränkten Energieressourcen, etwa für batteriebetriebene Geräte. Besonders vorteilhaft ist, daß die Handhabung eines mit einer erfindungsgemäßen Kommunikationsvorrichtung ausgestatteten intelligenten Gerätes genauso erfolgen kann, als ob das Gerät dauerhaft Suchanfragen aussendete. Besondere Handlungen durch einen Nutzer sind nicht erforderlich. Vorteilhaft muß zur Nutzung einer erfindungsgemäßen Kommunikationsvorrichtung

auch in die Durchführung des Datenverbindungsaufbaus nach Erkennung eines weiteren anwesenden intelligenten Gerätes nicht eingegriffen werden.

In vorteilhafter Weiterbildung ist vorgesehen, daß für die Durchführung einer Datenübertragung nach Einschalten des Kommunikationselementes ein ohmscher Widerstand in den Schwingkreis geschaltet wird, um damit bei Verringerung der Güte die Bandbreite des Übertragungsschwingkreises zu erhöhen.

In einer weiteren vorteilhaften Weiterbildung der Kommunikationsvorrichtung ist vorgesehen, den Schwingkreis nach Einschalten des Kommunikationselementes durch Zuschalten geeigneter Bauelemente so zu beeinflussen, daß sich die Resonanzfrequenz ändert. Dadurch wird zusätzlich sichergestellt, daß andere intelligente Geräte, die auf gleiche Weise zum automatischen Datenverbindungsaufbau eingerichtet sind, durch einen Suchbetrieb nicht gestört werden.

In einer weiteren vorteilhaften Ausgestaltung der erfindungsgemäßen, Kommunikationsvorrichtung ist vorgesehen, daß die Meßeinrichtung nur periodisch in Betrieb gesetzt wird. Der Energieverbrauch der Kommunikationsvorrichtung läßt sich dadurch weiter verringern. Zur Realisierung des periodischen Inbetriebsetzens besitzt die Kommunikationsvorrichtung zweckmäßig eine Zeitsteuerung und erfolgt die Bewertung eines Meßergebnisses durch Vergleich mit einem aus vorgehenden Messungen gewonnenen Durchschnittswert.

Die Meßeinrichtung weist vorzugsweise zwei Oszillatoreinrichtungen zur Erzeugung von Schwingungssignalen auf, von denen eine mit der Spule gekoppelt ist. Weiterhin kann die Meßeinrichtung Schaltungskomponenten zur

Erzeugung des Steuersignales für die Schaltvorrichtung auf Basis einer Phasenbeziehung zwischen diesen Schwingungssignalen oder daraus abgeleiteten Signalen aufweisen. Dadurch läßt sich mit vergleichsweise geringem Aufwand eine sehr präzise Überwachung des Übertragungsschwingkreises erreichen und auf diese Weise die Anwesenheit eines weiteren Geräts im Ansprechbereich der Spule zuverlässig feststellen.

Unter Bezugnahme auf die Zeichnung wird nachfolgend ein Ausführungsbeispiel der Erfindung näher erläutert.

Es zeigen:

Fig. 1 Aufbau und Anordnung von zum automatischen Datenverbindungsaufbau eingerichteten intelligenten Geräten,

Fig. 2 ein vereinfachtes Ersatzschaltbild einer Kommunikationsvorrichtung,

Fig. 3 ein Flußdiagramm des Betriebes einer Kommunikationsvorrichtung,

Fig. 4 ein Flußdiagramm des Betriebes einer mit einer Zeitsteuerung versehenen Kommunikationsvorrichtung,

Fig. 5 ein erstes Ausführungsbeispiel für eine schaltungstechnische Realisierung der Meßeinheit mittels einer PLL-Schaltung,

Fig. 6 mehrere Signalverläufe innerhalb der Meßeinheit bei Annäherung eines anderen Geräts,

Fig. 7 ein zweites Ausführungsbeispiel für eine schaltungstechnische Realisierung der Meßeinheit mittels einer PLL-Schaltung und

Fig. 8 eine schaltungstechnische Realisierung der Funktionsböcke Spannungsdifferentiator und Schwellwertschalter aus den Fig. 5 oder 7.

Fig. 1 zeigt intelligente Geräte 10, 20, 30 in unterschiedlichen Ausgestaltungen. Alle sind dazu eingerichtet, über eine Spule 13, 23, 33 einen Datenaustausch mit einem der anderen intelligenten Geräte 10, 20, 30 zu führen. Alle im folgenden einfach als Gerät bezeichneten intelligenten Geräte 10, 20, 30 sind grundsätzlich gleichartig aufgebaut und bestehen aus einer Datenverarbeitungskomponente 11, 21, 31 und einer Kommunikationsvorrichtung 1, 2, 3.

Die Datenverarbeitungskomponente 11, 21, 31 bewirkt wesentlich die Intelligenz der Geräte 10, 20, 30 und beinhaltet eine zentrale Prozessoreinheit zur Ausführung von Datenverarbeitungsoperationen. Die Datenverarbeitungskomponente 11, 21, 31 bestimmt zudem maßgeblich die äußere Gestalt der Geräte 10, 20, 30. Wie in Fig. 1 angedeutet, kann das Gerät 10, 20, 30 z. B. die Gestalt eines tragbaren Rechners 11 oder eines Handys 21 besitzen oder in einem, etwa in einer kontaktlosen Chipkarte 30 ausgebildeten RFID-Transponder mit einem Chip 31 realisiert sein. Die Aufzählung möglicher Gestaltungsformen ist dabei nicht abschließend. Neben den dargestellten kann das Gerät 10, 20 ,30 ebenso z. B. in einem Gebrauchsgegenstand, etwa einer Armbanduhr, oder einem mit elektronischen Komponenten versehenen Kleidungsstück, etwa einer Jacke, realisiert sein, aber auch ein fest installiertes Lesegerät in einem Ticketing- oder Zutrittsystem darstellen.

Die Kommunikationsvorrichtung 1, 2, 3 beinhaltet jeweils ein Kommunikationselement 12, 22, eine mit dem Kommunikationselement 12, 22 verbundene Spule 13, 23, 33, eine mit der Spule 13, 23, 33 verbundene Meßeinrichtung 14, 24 sowie eine Schaltvorrichtung 15, 25, welche mit der Datenverarbeitungskomponente 11, 21, dem Kommunikationselement 12, 22 und der Meßeinrichtung 14, 24 verbunden ist. In praktischer Realisierung ist die Kommunikationsvorrichtung 1, 2, 3 in der Regel baulich als Einheit mit der Datenverarbeitungskomponente 11, 21 ausgebildet und befindet sich also z.B. im Gehäuse eines tragbaren Rechners 11, eines Handys 21 oder ist im in Chip 31 einer Chipkarte 30 integriert.

Funktion des Kommunikationselementes 12, 22 ist, die Anwesenheit eines anderen Gerätes 10, 20, 30 im Ansprechbereich der Spule 13, 23, 33 festzustellen. Das Kommunikationselement 12, 22 besitzt Mittel zur Ausführung von Softwareprogrammroutinen und kann als selbständige Baugruppe ausgebildet sein. Wurde ein anderes Gerät 10, 20, 30 erkannt, richtet das Kommunikationselement 12, 22 ferner selbsttätig eine Datenverbindung zu diesem ein und stellt den Datenübertragungsmodus für einen nachfolgenden Datenaustausch zwischen den jeweiligen datenverarbeitenden Komponenten 11, 21, 31 her. In einer besonders zweckmäßigen Ausgestaltung ist das Kommunikationselement 12, 22 dazu eingerichtet, ein NFC-Protokoll, wie es in der genannten Veröffentlichung ECMA/TC32-TG19/2003/12 beschrieben ist oder ein kontaktloses Übertragungsprotokoll wie es z. B. in den Normen ISO/IEC 14443, ISO/IEC 15699 und ISO/IEC 18000-3 beschrieben ist, durchzuführen.

Die Spule 13, 23, 33 ist von üblicher Bauart und dient in an sich bekannter Weise zur Durchführung eines berührungslosen Datenaustausches mit einem korrespondierenden Gerät 10, 20, 30. In der Regel ist sie, wie in der

Ausführung als Chipkarte 30 angedeutet, integrierter Bestandteil des Gerätes 10, 20, 30. Innerhalb der Kommunikationsvorrichtung 1, 2, 3 ist die Spule 13, 23, 33 Teil eines Übertragungsschwingkreises 50 mit einer definierten, charakteristischen Resonanzfrequenz, die vom Betriebszustand des Gerätes 10, 20, 30 abhängen kann.

Die Meßeinrichtung 14, 24 ist mit der Spule 13, 23, 33 verbunden und erfaßt eine Eigenschaft des mit der Spule 13, 23, 33 gebildeten Übertragungsschwingkreises 50. Sie kann insbesondere von dem Typ sein, wie er in der genannten deutschen Patentanmeldung DE 102 06 676 beschrieben ist.

Die Schaltvorrichtung 15, 25 dient zum Ein- und Ausschalten des Kommunikationselementes 12, 22 und der Meßeinrichtung 14, 24. Das Ein- und Ausschalten einer oder beider Komponenten 12, 22 bzw. 14, 24 kann dabei indirekt über die Datenverarbeitungskomponente 11, 21 erfolgen. Die Schaltvorrichtung 15, 25 dient weiter dazu, einzelne Elemente der Meßeinrichtung 14, 24 zu- und abzuschalten. Desweiteren können mittels der Schaltvorrichtung 15, 25 andere, nicht dargestellte Komponenten eines Gerätes 10, 20, 30 geschaltet werden.

Fig. 2 zeigt ein vereinfachtes Ersatzschaltbild eines Gerätes 10, 20, 30. Die Datenverarbeitungskomponente 11, 22, mithin die äußere Erscheinungsform des Gerätes 10, 20 wird darin durch einen von einem Benutzer betätigbaren Ein-/Ausschalter 40 repräsentiert, mittels dessen die Hauptenergieversorgung 41 des Gerätes 10, 20 ein- und ausschaltbar ist. Die Hauptenergieversorgung 41 kann insbesondere eine Batterie oder ein Akkumulator sein. Insbesondere ein fest installiertes Lesegerät kann aber auch auf eine Netzspannung als Hauptenergieversorgung 41 zurückgreifen. Das Vorhandensein des Schalters 40 richtet sich dabei nach der Gestalt des Gerätes; in bestimmten

Ausführungsvarianten, etwa bei Ausführung als Chipkarte 30, kann der Schalter 40 entfallen. Das Gerät 30 ist dann entweder ständig eingeschaltet oder wird durch einen gleichwirkenden, an die Bauform angepaßten Mechanismus eingeschaltet.

Die Schaltvorrichtung 15, 25 beinhaltet zwei Schalter 42, 44, die mittels einer Stelleinheit 43 ansteuerbar sind, sowie ggfs. eine Zeitsteuerung 45. Stelleinheit 43 und Zeitsteuerung 45 sind mit der Hauptenergieversorgung 41 verbunden. Der erste Schalter 42 ist zwischen der Hauptenergieversorgung 41 und dem Kommunikationselement 12, 22 plaziert, der zweite Schalter 44 zwischen Hauptenergieversorgung 41 und Meßeinrichtung 14, 25. Der zweite Schalter 44 wird über die Zeitsteuerung 45 betätigt, die hierzu mit der Stelleinheit 43 verbunden ist und von dieser ein Schaltsignal erhält. Durch den ersten Schalter 42 können, wie durch die Verbindung 146 angedeutet, neben dem Kommunikationselement 12, 22 weitere, nicht dargestellte Komponenten des jeweiligen Gerätes 10, 20, 30 ein- und ausgeschaltet werden. Alle Bauelemente der Schaltvorrichtung 15, 25 können diskret, als Schaltungen oder auch in Form von Softwareprogrammen realisiert sein. Stelleinheit 43 und Zeitsteuerung 45 besitzen zweckmäßig zudem eine gewisse Intelligenz und sind zur Ausführung von Softwareprogrammroutinen eingerichtet.

Wesentliches Element der Meßeinrichtung 14, 24 ist eine Meßeinheit 46, die mittels des Schalters 44 der Schaltvorrichtung 15, 25 ein- und ausschaltbar ist. Die Meßeinheit 46 ist weiter mit der Stelleinheit 43 der Schaltvorrichtung 15, 25 sowie über einen Schalter 47 mit der Spule 13, 23 verbunden. Der Schalter 47 wird von der Stelleinheit 43 betätigt. Er verbindet dabei die Spule 13, 23 entweder mit der Meßeinheit 46 oder mit dem Kommunikationselement 12, 22. Die Spule 13, 23 ist desweiteren mit dem Kommunikationsele-

ment 12, 22 verbunden. Wie die Schaltvorrichtung 15, 25 können die Bauelemente der Meßeinrichtung 14, 24 diskret, als Schaltungen oder in Form von Softwareprogrammen realisiert sein. Die Meßeinheit 46 ist zweckmäßig ebenfalls mit einer gewissen Intelligenz ausgestattet und zur Ausführung von Softwareprogrammroutinen eingerichtet. In hinsichtlich der Energieressourcen besonders beschränkten Ausführungen des Gerätes, etwa bei Ausführung in der Form einer Chipkarte 30, kann die Meßeinrichtung entfallen. Das Gerät 30 kann dann von anderen Geräten 10, 20 erkannt werden, nicht aber selbst andere Geräte 10, 20, 30 erkennen.

Parallel zur Spule 13, 23 ist eine Kapazität 48 angeordnet, die zusammen mit der Spule 13, 23 einen Übertragungsschwingkreis 50 bildet. Der Übertragungsschwingkreis 50 ist über den Schalter 47 an das Kommunikationselement 12 oder die Meßeinheit 46 anschaltbar. Parallel zu dem Übertragungsschwingkreis 50, in Bezug auf den Übertragungsschwingkreis 50 jedoch hinter dem Schalter 47, kann eine weitere Kapazität 51 sowie ein Widerstand 52 angeordnet sein. Beide Elemente 51, 52 können über den Schalter 47 in den Übertragungsschwingkreis 50 geschaltet werden. Die Kapazität 51 bewirkt dabei eine Änderung der Resonanzfrequenz des Übertragungsschwingkreises 50, der Widerstand 52 eine Erhöhung der Bandbreite bei gleichzeitiger Verringerung der Schwingkreisgüte. Die erwähnten passiven Bauelemente 47, 49, 51, 52 können als diskrete Bauelemente aber auch in Gestalt von Baugruppen mit entsprechender Außenwirkung ausgeführt sein.

In einer besonders für Geräte 10, 20 mit hinreichend großen Energieressourcen geeigneten, vorteilhaften Variante ist die Meßeinheit 46 als Frequenzwobbler ausgebildet, der die Meßfrequenz kontinuierlich über eine vorbestimmten Frequenzbereich streichen läßt. Der vorbestimmte Frequenz-

bereich umfaßt zumindest eine Frequenz, auf die ein anderes Gerät 10, 20, 30 abgestimmt ist.

Fig. 3 veranschaulicht eine erste mögliche Betriebsart eines Gerätes 10, 20, 30. Entsprechend dem in Fig. 2 wiedergegebenen Ersatzschaltbild verfügt es ggfs. über eine Kapazität 51 sowie einen Widerstand 52, um den Übertragungsschwingkreis 50 zu beeinflussen.

Der Betrieb setzt ein, indem das Gerät 10, 20, 30 eingeschaltet wird, Schritt 100, etwa mittels eines Schalters 40, welcher die Hauptenergieversorgung 41 betätigt. Durch das Einschalten wird auch die Stelleinheit 43 eingeschaltet. Diese stellt darauf den Schalter 47 so ein, daß die Spule 13, 23, 33 über den Schalter 47 mit dem Kommunikationselement 12, 22 verbunden ist. Zugleich werden durch die Einstellung des Schalters 47 der Widerstand 52, Schritt 102, und falls vorhanden, die Kapazität 51 in den Übertragungsschwingkreis 50 geschaltet, Schritt 104.

Das Zuschalten des Widerstandes 52 hat eine Verschlechterung der Güte Q des Übertragungsschwingkreises 50 zur Folge, bewirkt aber, da für den Zusammenhang zwischen Güte Q und Bandbreite B gilt: $B \approx 1/Q$, zugleich eine Erhöhung der für eine Datenübertragung zur Verfügung stehenden Bandbreite B in dem Übertragungsschwingkreis 50.

Durch die Zuschaltung der Kapazität 51 verringert sich die Resonanzfrequenz des Übertragungsschwingkreises 50 und wird auf eine für eine Datenübertragung geeignete Übertragungsfrequenz, z.B. 13,56 MHz, eingestellt. Durch die Umstellung werden die nachfolgende Datenübertragung und der Betrieb der Kommunikationsvorrichtung 1, 2, 3 unempfindlich gegen Störungen durch magnetische Felder von in der Nachbarschaft befindli-

chen, gleichartigen Geräten 10, 20, 30, die im Erkennungsmodus, d.h. bei einer höheren Resonanzfrequenz arbeiten.

Desweiteren schaltet die Stelleinheit 43 das Kommunikationselement 12, 22 ein, Schritt 106. Das Kommunikationselement 12, 22 geht dadurch in den Suchmodus über und sendet über die Spule 13, 23, 33 zyklisch ein Suchsignal aus, um von einem gegebenenfalls im Ansprechbereich der Spule 13, 23, 33 befindlichen anderen Gerät 10, 20, 30 eine Antwort zu erhalten.

Befindet sich ein anderes Gerät 10, 20, 30 im Ansprechbereich der Spule 13, 23, 33, reagiert es auf das Suchsignal durch Rücksenden einer Antwort, auf die hin das Kommunikationselement 12, 22 die Kommunikationsvorrichtung 1, 2, 3 in den Datenübertragungsmodus bringt. Hierzu baut es unter Verwendung eines geeigneten Protokolles, etwa der zuvor erwähnten Protokolle (NFC, 14443, ...), eine Datenverbindung zu der Datenverarbeitungskomponente 11, 21, 31 des antwortenden Gerätes 10, 20, 30 auf, Schritt 108.

Nach Einrichtung der Datenverbindung führt die Datenverarbeitungskomponente 11, 21, 31 mit der korrespondierenden Datenverarbeitungskomponente 11, 21, 31 des anwesenden Gerätes 10, 20, 30 über die Spule 13, 23, 33 in bekannter Weise einen Datenaustausch durch, Schritt 110.

Die Stelleinheit 43 wartet, bis der Datenaustausch zwischen den Datenverarbeitungskomponenten 11, 21, 31 der beteiligten Geräte 10, 20, 30 abgeschlossen ist, Schritt 114. Die Feststellung, daß der Datenaustausch beendet ist, kann durch Erhalt eines entsprechenden Signales von der Datenverarbeitungskomponente 11 oder dem Kommunikationselement 12 oder auch durch zyklische Ausführung eines Kontrollschrittes in der Stelleinheit 43 selbst er-

folgen. Das Kommunikationslement 12,22 kann unabhängig von dem Schalter 42 mit der Zeitsteuerung 45 und der Stelleinheit 43 verbunden sein.

Ist der Datenaustausch beendet, bringt die Stelleinheit 42 die Kommunikationseinrichtung 1, 2, 3 in den Erkennungsmodus.

Hierzu trennt die Stelleinheit 43 durch Verstellen des Schalters 42 das Kommunikationselement 12, 22 von der Hauptenergieversorgung 41, Schritt 116.

Weiter betätigt die Stelleinheit 43 den Schalter 47 und verbindet die Meßeinheit 46 mit dem Übertragungsschwingkreis 50. Durch die Schalterbetätigung werden ferner der Widerstand 52 und ggf. die Kapazität 51 wieder aus dem Übertragungsschwingkreis 50 geschaltet, Schritt 120, 122. Das Entfernen des Widerstandes 52 bewirkt, daß sich in dem Übertragungsschwingkreis 50 eine Leerlaufgüte Q_0 einstellt, die im Idealfall nur durch die Induktivität der Spule 13, 23, 33, die Schwingkreiskapazität 48 sowie den Eingangswiderstand der Spule 13, 23, 33 bestimmt wird. Entsprechend der verbesserten Güte Q_0 vergrößert sich der Erkennungsbereich, in dem im Erkennungsmodus andere anwesende Geräte 10, 20, 30 erkannt werden.

Durch das mögliche Ausschalten einer Kapazität 51 kann die Frequenz des Schwingkreises 50, und damit die Meßfrequenz der Meßeinheit 46 ggf. erhöht und z. B. in dem Bereich 13,56 bis 17 MHz eingestellt werden. Dies hat zur Folge, daß die Meßeinheit 46 von anderen, in der näheren Umgebung befindlichen und im Kommunikationsmodus (d.h. Sendebetrieb) befindlichen intelligenten Geräten, nicht oder nicht so stark beeinflußt wird. Da Signale anderer Lesegeräte ansonsten als Annähern eines intelligenten Gerätes mißverstanden werden könnten, ist die erzielte Verringerung der Detektion von Signalen anderer Lesegeräte vorteilhaft. Ebenso werden somit beim Be-

trieb im Erkennungsmodus gegebenenfalls in der Nähe befindliche andere Geräte 10, 20, 30, die sich im Datenübertragungsmodus befinden, nicht gestört.

Weiter schaltet die Stelleinheit 43 zur Herstellung des Erkennungsmodus die Meßeinheit 46 durch Betätigen des Schalters 44 ein, Schritt 124.

Die Meßeinheit 46 überwacht anschließend eine Eigenschaft des Übertragungsschwingkreises 50. Beispielsweise überwacht sie die in dem Übertragungsschwingkreis 50 stehende Frequenz, während dieser in Resonanz betrieben wird. Wird in diesem Zustand die Spule 13, 23, 33 eines anderen Gerätes 10, 20, 30 in den Erkennungsbereich der Spule 13, 23, 33 gebracht, bewirkt dies eine Änderung der Resonanzfrequenz im Übertragungsschwingkreis 50, welche von der Meßeinheit 46 erkannt wird, Schritt 132. Alternativ wäre auch eine Auswertung/Messung der Impedanz des in Resonanz betriebenen Übertragungsschgwingkreises 50 möglich.

Hat die Meßeinheit 46 eine Änderung in der beobachteten Schwingkreiseigenschaft erkannt, übermittelt sie der Stelleinheit 43 ein entsprechendes Steuersignal, woraufhin die Stelleinheit 43 wieder die Schritte 102 ff. ausführt und den Such- bzw. den Datenübertragungsmodus einleitet.

Erlaubt die Meßeinrichtung 46 ein Wobbeln der Schwingkreisfrequenz, erfolgt die Überwachung der Schwingkreiseigenschaft über den gesamten überstrichenen Frequenzbereich. Der überstrichene Frequenzbereich enthält zumindest die Resonanzfrequenz einer Art von Geräten, zu der eine Datenverbindung aufgebaut werden kann. Liegt die Resonanzfrequenz eines solchen Gerätes 30 etwa bei 13,56 MHz, kann der Wobbelbereich beispielsweise zwischen 13 und 18 MHz liegen. Tritt bei einer beliebigen Frequenz inner-

halb des überstrichenen Frequenzbereiches eine Änderung der Schwingkreiseigenschaft auf, übermittelt die Meßeinheit 46 der Stelleinheit 43 ein Steuersignal zur Ausführung der Schritte 102 ff.

Fig. 4 zeigt eine Variante zum Betrieb einer gemäß Fig. 2 aufgebauten Kommunikationsvorrichtung. Die Betriebsvariante kann alternativ oder auch ergänzend zu der in Fig. 3 veranschaulichten Betriebsweise eingerichtet werden. Vorausgesetzt für die in Fig. 4 gezeigte Betriebsvariante ist, daß das Gerät 10, 20, 30 über eine Zeitsteuerung 45 verfügt, wie sie in Fig. 2 angedeutet ist.

Der Betrieb setzt wiederum ein, indem das Gerät 10, 20 eingeschaltet wird, Schritt 100, etwa durch Einschalten der Hauptenergieversorgung 41 mittels eines Schalters 40.

Die Kommunikationsvorrichtung 1, 2, 3 geht daraufhin zunächst in den Suchmodus. Hierzu schaltet die Stelleinheit 43 das Kommunikationselement 12, 22 ein, Schritt 202, das nachfolgend durch zyklisches Absetzen von Suchsignalen prüft, ob sich ein anderes Gerät 10, 20, 30 im Ansprechbereich der Spule 13, 23, 33 befindet, Schritt 204.

Geht auf das Absetzen des Suchsignals in Schritt 204 eine Antwort von einem anderen anwesenden Gerät 10, 20, 30 ein, wechselt die Kommunikationsvorrichtung 1, 2, 3 nach Einrichtung einer Datenverbindung zu dem anderen Gerät 10, 20, 30 in den Datenübertragungsmodus und führt einen Datenaustausch mit dem erkannten Gerät 10, 20, 30 durch, Schritt 208.

Geht auf das Suchsignal keine Antwort ein, schaltet die Stelleinheit 43 das Kommunikationselement 12, 22 wieder aus, Schritt 206.

Weiter aktiviert die Stelleinheit43 die Zeitsteuerung 45, die daraufhin die Meßeinheit 46 im Rahmen zyklischen Ein- und Ausschaltbetriebes für eine vorbestimmte Zeit durch entsprechendes Ansteuern des Schalters 44 einschaltet, Schritt 210. Die Meßeinheit 46 führt darauf eine Messung der überwachten Schwingkreiseigenschaft durch und speichert den Meßwert, Schritt 212. Aus allen bis dahin ermittelten und gespeicherten Meßwerten bildet sie nachfolgend einen Meßwertdurchschnitt, Schritt 214.

Mit dem ermittelten Meßwertdurchschnitt vergleicht sie den in Schritt 212 gewonnenen Meßwert, Schritt 216. Entspricht der Meßwert dem Durchschnitt, so befindet sich kein anderes Gerät 10, 20, 30 im Erkennungsbereich des Übertragungsschwingkreises 50. Die Meßeinheit 46 führt dann keine weitere Funktion aus und wird durch Einwirkung der Zeitsteuerung 45 ausgeschaltet, Schritt 218. Die Meßeinheit 46 bleibt danach ausgeschaltet, während die Zeitsteuerung 45 den Ablauf einer vorbestimmten Ausschaltzeit abwartet, Schritt 220. Die Ausschaltzeit ist zweckmäßig größer gewählt als die Einschaltzeit, in der die Meßeinheit 46 die Messung ausführt.

Während der Wartezeit kann das Gerät 10, 20 als Ganzes, etwa durch Betätigen des Schalters 40, ausgeschaltet werden, Schritt 222. Tritt dieser Fall ein, endet der Betriebsablauf, Schritt 224.

Läuft die vorbestimmte Ausschaltzeit ab, ohne daß das Gerät insgesamt ausgeschaltet wurde, schaltet die Zeitsteuerung 45 durch Betätigen des Schalters 44 die Meßeinheit 46 erneut ein und wiederholt die Schritte 210 ff..

Ergibt sich bei der Prüfung in Schritt 216, daß ein gefundener Meßwert nicht dem ermittelten Meßwertdurchschnitt entspricht, so befindet sich ein ande-

res Gerät 10, 20, 30 im Erkennungsbereich des Schwingkreises 50, Schritt 226. Die Meßeinheit 46 übermittelt der Stelleinheit 43 dann ein entsprechendes Steuersignal, auf das hin die Stelleinheit 43 die Kommunikationsvorrichtung 1, 2, 3 in den Suchmodus bringt. Sie schaltet hierzu durch Betätigen des Schalters 44 die Meßeinheit 46 aus, Schritt 228, und das Kommunikationselement 12, 22 durch Betätigen des Schalters 42 ein, Schritt 230.

Das Kommunikationselement 12, 22 stellt anschließend wie beschrieben den Datenübertragungsmodus her, in welchem dann der Datenaustausch zwischen den Datenverarbeitungskomponenten 11, 21 der beteiligten Geräte erfolgt, Schritt 208.

Fig. 5 zeigt ein erstes Ausführungsbeispiel für eine schaltungstechnische Realisierung der Meßeinheit 46 mittels einer PLL-Schaltung. PLL steht für Phase Locked Loop und bedeutet, daß ein Signal mit einer Frequenz relativ zu einem Signal mit einer Bezugsfrequenz so genau eingestellt wird, daß die Phasenbeziehung zwischen den Signalen permanent erhalten bleibt. Das erste Ausführungsbeispiel der Meßeinheit 46 weist einen ersten Oszillator 60 auf, der ein Signal mit einer Frequenz f1 erzeugt und in einen ersten Frequenzteiler 61 einspeist, der als ein ganzzahliger oder binärer Teiler ausgebildet sein kann und eine Frequenzteilung mit einem Teilungsfaktor N vornimmt. Durch gestrichelte Linien ist angedeutet, daß an den ersten Oszillator 60 die Spule 13, 23 angeschlossen ist. Der Anschluß kann in der in Fig. 2 dargestellten Weise über den Schalter 47 und eine gemeinsame Masse erfolgen. Die genaue Ausführung hängt von der schaltungstechnischen Ausgestaltung der verwendeten Oszillatorschaltung, sowie der schaltungstechnischen Ausgestaltung des Kommunikationselements 12,22 (Senderendstufe) ab. So sind Oszillatorschaltungen bekannt, z. B. Collpits, bei denen ein Anschluß der Spule 13,23 (wechselspannungsseitig) an Masse gelegt werden kann. In die-

sem Falle kann der Schalter 47 so ausgeführt werden, daß lediglich ein Anschluß der Spule auf die Meßeinheit 46 umgeschaltet werden muß, wie es beispielsweise in Fig. 2 dargestellt ist.

Bei einer anderen Ausgestaltung der Oszillatorschaltung 60 kann es auch erforderlich sein, daß ein zweiter Anschluß der Spule nicht mit der Masse, sondern mit der Versorgungsspannung verbunden wird (z. B. Schaltungsvariante Collpits). In diesem Falle kann ein zweiter Schalter 47b (nicht abgebildet) nötig sein.

Ebenso sind Oszillatorschaltungen bekannt, bei denen beide Anschlüsse der Spule mit der Oszillatorschaltung 60 verbunden sein müssen. Auch in diesem Falle ist ein zusätzlicher Schalter 47b (nicht abgebildet) zur Umschaltung der Spule 13, 23 zwischen der Meßeinheit 46 und dem Kommunikationselement 12,22 nötig.

Der in Fig. 2 ebenfalls dargestellte Anschluß der Meßeinheit 46 an den Schalter 44, über den die Meßeinheit 46 ein- und ausgeschaltet werden kann, ist in Fig. 5 nicht eingezeichnet, da die Energieversorgung der einzelnen Komponenten der Meßeinheit 46 aus Gründen der Übersichtlichkeit in Fig. 5 nicht dargestellt ist.

Die Meßeinheit 46 weist weiterhin einen zweiten Oszillator 62 auf, der ein Signal mit einer Frequenz f2 in einen zweiten Frequenzteiler 63 einspeist, der eine Frequenzteilung mit einem Teilungsfaktor M vornimmt. Der zweite Frequenzteiler 63 ist entsprechend dem ersten Frequenzteiler 61 ausgebildet und ausgangsseitig mit einem Eingang eines Phasenkomparators 64 verbunden. An einen weiteren Eingang des Phasenkomparators 64 ist der erste Frequenzteiler 61 mit seinem Ausgang angeschlossen. Dem Phasenkomparator

64 ist ein Tiefpaßfilter 65 nachgeschaltet, der eine Spannung U sowohl in einen Eingang des zweiten Oszillators 62 als auch in einen Eingang eines Spannungsdifferentiators 66 einspeist. Der Spannungsdifferentiator 66 ist ausgangsseitig mit einem Eingang eines Schwellwertschalters 67 verbunden, der an seinem Ausgang eine Schaltspannung Us für die in Fig. 2 dargestellte Stelleinheit 43 bereitstellt. Durch die Komponenten 60, 61, 62, 63, 64 und 65 der Meßeinheit 46 wird eine abgewandelte PLL-Schaltung ausgebildet, deren Funktionsweise im Zusammenhang mit den weiteren Komponenten 66 und 67 im folgenden näher erläutert wird.

Der erste Oszillator 60 ist als LC-Oszillator ausgebildet, wobei die Spule 13, 23 als frequenzbestimmende Induktivität L herangezogen wird. Durch geeignete Dimensionierung einer frequenzbestimmenden Kapazität C wird der erste Oszillator 60 so abgeglichen, daß er bei Abwesenheit eines anderen Geräts 10, 20, 30 auf der im Erkennungsmodus verwendeten Sendefrequenz zum Schwingen kommt. Optional kann der Kondensator 51 eingesetzt werden, um eine höhere Frequenz zu verwenden. Durch den ersten Frequenzteiler 61 wird die Frequenz f1 des vom ersten Oszillator 60 erzeugten Signales unter Verwendung des Teilungsfaktors N geteilt und dadurch ein Signal mit einer Frequenz f1/N erzeugt. Da die Frequenzteilung zwar vorteilhaft, aber nicht zwingend erforderlich ist, kann der erste Frequenzteiler 61 auch entfallen bzw. einen Teilungsfaktor N = 1 aufweisen.

Der zweite Oszillator 62 ist als ein spannungsgesteuerter Oszillator ausgebildet, so daß die Frequenz f2 des vom zweiten Oszillator 62 erzeugten Signales von der eingespeisten Spannung U abhängt. Das Signal mit der Frequenz f2 wird vom zweiten Frequenzteiler 63 in ein Signal mit einer Frequenz f2/M umgewandelt. Analog zum ersten Frequenzteiler 61 kann auch der zweite Frequenzteiler 63 entfallen bzw. einen Teilungsfaktor M = 1 auf-

weisen. Die von den Frequenzteilern 61 und 63 ausgegebenen Signale werden dem Phasenkomparator 64 zugeführt, der sie miteinander vergleicht und ein von der Phasenverschiebung abhängiges Signal an den Tiefpaßfilter 65 ausgibt. Der Tiefpaßfilter 65 unterdrückt die hochfrequenten Signalanteile, so daß sich die vom Tiefpaßfilter 65 ausgegebene Spannung U als Steuerspannung für den zweiten Oszillator 62 eignet. Durch die Regeleigenschaften der PLL-Schaltung wird die Frequenz f2 des zweiten Oszillators 62 automatisch so eingestellt, daß sich ein Wert f2 = f1 * M/N ergibt und beide Oszillatoren 60 und 62 phasenstarr gekoppelt sind.

In einer vorteilhaften Ausgestaltung werden für den ersten Frequenzteiler 61 ein Teilungsfaktor N > 1 und für den zweiten Frequenzteiler 63 ein Teilungsfaktor M = 1 vorgesehen. Dies führt dazu, daß der zweite Oszillator 62 bei einer niedrigeren Frequenz als der erste Oszillator 60 betrieben wird und so den Betrieb des Gerätes 10, 20, 30 nicht durch sein Eigensignal stören kann. Beispielsweise kann der zweite Oszillator 62 für N = 2 bei einer Frequenz f2 von 6,78 MHz betrieben werden. Besonders günstig ist es auch, wenn die Teilungsfaktoren N und M der Frequenzteiler 61 und 63 in einem nicht ganzzahligen Verhältnis zueinander stehen, z. B. M/N = 5/6. Dadurch kann die Frequenz f2 des zweiten Oszillators 62 so gewählt werden, daß auch durch eventuelle Oberwellen der zweiten Frequenz f2 sowie einer parasitären Einstrahlung des zweiten Oszillators 62 in die Spule 13, 23 gleichfrequente Störungen, die sich besonders negativ auswirken, nicht zu befürchten sind. Dabei ist es unerheblich, ob das Verhältnis M/N kleiner oder größer eins gewählt wird.

Befindet sich die Meßeinheit 46 im eingeregelten Zustand, d. h. besteht zwischen den Signalen der beiden Frequenzteiler 61 und 63 eine phasenstarre Übereinstimmung, so stellt sich für die vom Tiefpaßfilter 65 ausgegebene

Spannung U ein konstanter Wert ein. Nähert sich der Spule 13, 23 ein anderes Gerät 10, 20, 30, so führt der Einfluß der induktiv eingekoppelten Impedanz des anderen Geräts 10, 20, 30 zu einer Veränderung der Phase und ggf. der Frequenz des ersten Oszillators 60 und damit zu einer Phasenverschiebung zwischen den beiden Eingangssignalen des Phasenkomparators 64. Dies führt zu einer Änderung der vom Tiefpaßfilter 65 ausgegebenen Spannung U und damit zu einer Änderung der Frequenz f2 und der Phase des vom zweiten Oszillator 62 erzeugten Signales bis die von den beiden Oszillatoren 60 und 62 erzeugten Signale wieder phasenstarr gekoppelt sind. Die auf diese Weise durchgeführte Nachregelung der Frequenz f2 des zweiten Oszillators 62 und die daran geknüpfte Erkennung der Anwesenheit eines anderen Geräts 10, 20 30 werden anhand von Fig. 6 näher erläutert.

Fig. 6 zeigt mehrere Signalverläufe innerhalb der Meßeinheit 46 bei Annäherung eines anderen Geräts 10, 20, 30. Bei allen Signalverläufen ist auf der Abszisse jeweils die Zeit t mit gleicher Skalierung aufgetragen, so daß ein direkter Vergleich der Signalverläufe möglich ist. Im oberen Diagramm der Fig. 6 ist der zeitliche Verlauf der vom Tiefpaßfilter 65 ausgegebene Spannung U dargestellt, d. h. auf der Ordinate ist die Spannung U aufgetragen. Im mittleren Diagramm ist auf der Ordinate die zeitliche Änderung der Spannung dU/dt aufgetragen, die vom Spannungsdifferentiator 66 ermittelt und an den Schwellwertschalter 67 ausgegeben wird. Im unteren Diagramm ist auf der Ordinate die vom Schwellwertschalter 67 erzeugte Schaltspannung Us aufgetragen.

Eine Möglichkeit zur Ausgestaltung der Funtionsblöcke 66, 67 ist in der Fig. 8 dargestellt.

Hierbei wird durch R4, R5, C2 ein Tiefpassfilter gebildet, wobei sich ein Mittelwert einer Teilspannung von U mit einer großen Zeitkonstante (z.B. 1 s) am (-)-Eingang eines Verstärkers V1 einstellt. Ebenso stellt sich über R1, R2, R3 eine Teilspannung von U am (+)-Eingang des Verstärkers V1 ein.

Sinkt z. B. die Spannung U beim Annähern einer Spule 13, 23, 33 rasch ab, so fällt die Spannung am (+)-Eingang kurzzeitig unter die Spannung am (-)-Eingang und erzeugt so ein Schaltsignal U_S, solange bis sich die Spannung am (-)-Eingang auf den neuen (Mittel-)Wert eingestellt hat.

Die Spannung U kann bei Annäherung einer Spule 13, 23, 33 ansteigen oder auch abfallen. Das genaue Verhalten hängt von der verwendeten Schaltung (Fig. 5, Fig. 7) und deren praktischer Ausführung ab.

Die Annäherung eines anderen Geräts ab der Zeit t = t1 hat die bereits erwähnte Änderung der bis dahin konstanten Spannung U des Tiefpaßfilters 65 zur Folge. Dies äußert sich im oberen Diagramm der Fig. 6 in einem sprunghaften Anstieg der Spannung U, die danach auf einem höheren Niveau verharrt. Da der Wert, um den sich die Spannung U ändert, relativ klein sein kann, wird für die Ansteuerung des Schwellwertschalters 67 nicht die Spannung U selbst, sondern deren zeitliche Änderung dU/dt herangezogen. Wie aus dem mittleren Diagramm hervorgeht, weist die zeitliche Änderung der Spannung dU/dt unmittelbar nach der Zeit t = t1 ein stark ausgeprägtes Maximum auf, das gut für eine weitere Verarbeitung geeignet ist. Dieses Maximum überschreitet die Ansprechschwelle des Schwellwertschalters 67, die durch eine gestrichelte horizontale Linie dargestellt ist. Dies hat zur Folge, daß der Schwellwertschalter 67 anspricht und den im unteren Diagramm dargestellten Rechteckimpuls erzeugt. Infolge der endlichen Steigung, mit der die Spannung U ansteigt und der vom Schwellwertschalter 67

benötigten Zeit für die Signalverarbeitung, beginnt der Rechteckimpuls der Schaltspannung Us mit einer geringfügigen zeitlichen Verzögerung nach der Zeit t = t1. Der Rechteckimpuls wird von der Meßeinheit 46 zur Weiterverarbeitung an die Stelleinheit 43 ausgegeben.

Fig. 7 zeigt ein zweites Ausführungsbeispiel für eine schaltungstechnische Realisierung der Meßeinheit 46 mittels einer PLL-Schaltung. Der Aufbau entspricht weitgehend dem ersten Ausführungsbeispiel. Allerdings ist der zweite Oszillator 62 im Gegensatz zum ersten Ausführungsbeispiel der Meßeinheit 46 nicht als ein spannungsgesteuerter Oszillator sondern als ein frequenzstabiler Quarzoszillator ausgeführt. Der erste Oszillator 60 ist nunmehr als ein spannungsgesteuerter LC-Oszillator ausgeführt. Die Einstellung der Frequenz f1 erfolgt dabei über eine spannungsabhängige Kapazität, welche zusammen mit der Induktivität der Spule 13, 23 die Frequenz f1 des ersten Oszillators 60 bestimmt. Bedingt durch die andersartige Ausbildung der Oszillatoren 60 und 62 ist die Verschaltung der einzelnen Komponenten der Meßeinheit 46 dahingehend geändert, daß der Ausgang des Tiefpaßfilters 65 mit einem Eingang des ersten Oszillators 60 verbunden ist. Der zweite Oszillator 62 erhält kein Eingangssignal. Aus dem geänderten Aufbau ergibt sich für das zweite Ausführungsbeispiel der Meßeinheit folgende Funktionsweise:

Durch einen analogen Regelmechanismus, wie für das erste Ausführungsbeispiel beschrieben, wird die Frequenz f1 des ersten Oszillators 60 auf einen konstanten Wert geregelt, der durch die Frequenz f2 des zweiten Oszillators 62 und die Teilungsfaktoren N und M der Frequenzteiler 61 und 63 festgelegt wird. Dabei ist es durch eine entsprechende Wahl der Frequenz f2 und der Teilungsfaktoren N und M insbesondere möglich, den ersten Oszillator 60 konstant bei einer Frequenz f1 zu betreiben, die der im Erkennungsmodus

verwendeten Sendefrequenz entspricht. Bei einer Annäherung eines anderen Geräts 10, 20, 30 ändert sich die Frequenz f1 des ersten Oszillators 60 trotz der induktiv eingekoppelten Impedanz nicht. Gleichwohl kommt es bei einer Annäherung eines anderen Geräts 10, 20, 30 zu einer detektierbaren Änderung der Spannung U, da der erste Oszillator 60 mit Hilfe der Spannung U nachgeregelt wird und dadurch die Verstimmung des ersten Oszillators 60 ausgeglichen wird. Auf Basis der Spannung U wird in der bereits beschriebenen Weise ein Ansteuersignal für die Stelleinheit 43 erzeugt.

Gemäß Fig. 2 sind die Meßeinheit 46 und das Kommunikationselement 12, 22 als eigenständige Schaltungsteile ausgeführt. Der dadurch erforderliche Schalter 47, der die Spule 13, 23 zwischen der Meßeinheit 46 und dem Kommunikationselement 12, 22 umschaltet, muß dabei für große Spannungen und Leistungen ausgelegt sein. Durch die Spannungsüberhöhung in Resonanz können an der Spule 13, 23 sehr hohe HF-Spannungen, mitunter sogar im Bereich einiger 100 V auftreten. Die erforderliche großsignalfeste Signalumschaltung ist je nach Sendeleistung ggf. nur mit einer aufwendigen und teuren Schaltung zu realisieren. In einer Abwandlung der Erfindung ist daher vorgesehen, daß die Endstufe des Kommunikationselements, die vorzugsweise als eine Transistorschaltung ausgebildet ist, durch eine geeignete Umschaltung von Arbeitspunkt, Verstärkung und der Rückkopplung des Ausgangssignales auch als den ersten Oszillator 60 bzw. den zweiten Oszillator 62 einzusetzen. Eine derartige Endstufe neigt bei einer entsprechenden Rückkopplung ohnehin zum Schwingen.

Die Meßeinheit 46 weist eine hohe Ansprechempfindlichkeit auf, da selbst kleinste Phasenänderungen noch erkannt werden können. Bei entsprechender Dimensionierung der Meßeinheit 46 und der Spule 13, 23 können andere Geräte 10, 20, 30 auch auf eine große Entfernung von bis zu einigen Metern

detektiert werden. Dadurch ist es beispielsweise möglich, die Meßeinheit 46 zur Diebstahlsicherung von Verkaufsartikeln einzusetzen. In diesem Fall ist vorgesehen, die vom Schwellwertschalter 67 erzeugte Schaltspannung Us zum Auslösen eines Alarmsignales zu verwenden. Die Verkaufsartikel können beispielsweise mit RF-Etiketten versehen sein, die einen Schwingkreis ohne einen Chip aufweisen und typischerweise für einen Frequenzbereich von 8,2 MHz vorgesehen sind. Ebenso können auch akustomagnetische Etiketten eingesetzt werden, wobei der typische Frequenzbereich dann unterhalb von 60 kHz liegt.

Unter Beibehaltung des Grundgedankens, ein Kommunikationselement, das automatisch eine Datenverbindung zu einem korrespondierenden gleichartigen Kommunikationselement aufbaut, nur einzuschalten, wenn zuvor die Anwesenheit eines solchen korrespondierenden Kommunikationselementes bereits festgestellt wurde, gestattet das vorbeschriebene Konzept eine Reihe von Ausgestaltungen. So kann bei völlig gleicher Funktionalität der Aufbau der intelligenten Geräte 10, 20, 30 von dem Beschriebenen abweichen. Vor allem können die genannten Bauelemente durch entsprechend wirkende andere Baugruppen oder Schaltungen ersetzt werden. Auch ist die für die Beschreibung gewählte Aufteilung der intelligenten Geräte und Kommunikationselemente, Schallvorrichtung, Meßeinrichtung und Datenverarbeitungskomponente willkürlich und kann ohne Einfluß auf die Funktionalität anders gefaßt werden. Insbesondere können die Funktionalitäten von Stelleinheit 43, Zeitsteuerung 45 und Meßeinheit 46 ganz oder teilweise in Softwareform in der zentralen Prozessoreinheit des Gerätes 10, 20, 30 realisiert sein. In gewissem Rahmen ist auch eine vereinfachte Ausführung der vorbeschriebenen Erfindung denkbar. Beispielsweise kann im Suchmodus das Ändern der Resonanzfrequenz im Übertragungsschwingkreis 50 und damit die Notwendigkeit zur Bereitstellung der Kapazität 51 entfallen.

Patentansprüche

1. Kommunikationsvorrichtung zur Einrichtung einer Datenverbindung zwischen intelligenten Geräten mit

einer Spule (13, 23, 33), die Teil eines Übertragungsschwingkreises (50) ist, zur Durchführung eines berührungslosen Datenaustausches,

einem Kommunikationselement (12, 22), das mit der Spule (13, 23, 33) und der Datenverarbeitungskomponente (11, 21) eines intelligenten Gerätes (10, 20, 30) verbunden ist und das über die Spule (13, 23, 33) Suchsignale aussendet, um von einem anderen intelligenten Gerät (10, 20, 30) eine Antwort zu erhalten,

einer Meßeinrichtung (14, 24) zur Überwachung einer Eigenschaft des Übertragungsschwingkreises (50), welche bei Feststellen einer Änderung der überwachten Eigenschaft ein Steuersignal ausgibt,

und einer Schaltvorrichtung (15, 25), die mit der Meßeinrichtung (14, 24) und dem Kommunikationselement (12, 22) verbunden ist und die das Kommunikationselement (12, 22) einschaltet, wenn sie von der Meßeinrichtung (14, 24) ein Steuersignal erhalten hat.

2. Kommunikationsvorrichtung nach Anspruch 1, dadurch **gekennzeichnet**, daß in den Übertragungsschwingkreis (50) über einen Schalter (47) eine Baugruppe (52) schaltbar ist, welche eine Erhöhung der Bandbreite des Schwingkreises (50) bewirkt.

3. Kommunikationsvorrichtung nach Anspruch 2, dadurch **gekennzeichnet**, daß die Baugruppe (52) ein Widerstandselement ist.

4. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß in den Übertragungsschwingkreis (50) über einen Schalter (47) eine Baugruppe (51) schaltbar ist, welche eine Änderung der Resonanzfrequenz des Übertragungsschwingkreises (50) bewirkt.

5. Kommunikationsvorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Baugruppe (51) eine Senkung der Resonanzfrequenz bewirkt.

6. Kommunikationsvorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Baugruppe (51) eine Kapazität beinhaltet.

7. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Meßfrequenz der Meßeinrichtung (14) über einen vorbestimmten Frequenzbereich wobbelbar ist.

8. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Schaltvorrichtung (15, 25) eine Zeitsteuerung (45) aufweist, mittels derer die Meßeinrichtung (14, 24) zyklisch ein- und ausschaltbar ist.

9. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Zeitsteuerung (45) den Einschaltzustand der Meßeinrichtung (14, 24) kürzer hält als den Ausschaltzustand.

10. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Meßeinrichtung (14, 24) einen während einer zyklischen Einschaltphase gewonnen Meßwert speichert.

11. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Meßeinrichtung (14, 24) ein Steuersignal an die Schaltvorrich-

tung (15, 25) abgibt, wenn ein Meßwert vom Mittelwert der mit den vorhergehenden Einschaltphasen gespeicherten Meßwerte abweicht.

12. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß bei Einschalten des intelligenten Gerätes (10, 20, 30) zunächst das Kommunikationselement (12, 22) eingeschaltet und die Meßeinrichtung (14, 24) ausgeschaltet ist.

13. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Meßeinrichtung (14, 24) eine mit der Spule (13, 23, 33) wenigstens zeitweise gekoppelte erste Oszillatoreinrichtung (60) zur Erzeugung eines ersten Schwingungssignales und eine zweite Oszillatoreinrichtung (62) zur Erzeugung eines zweiten Schwingungssignales aufweist.

14. Kommunikationsvorrichtung nach Anspruch 13, dadurch gekennzeichnet, daß die Meßeinrichtung (14, 24) Schaltungskomponenten (64, 65, 66, 67) zur Erzeugung des Steuersignales für die Schaltvorrichtung (15, 25) auf Basis einer Phasenbeziehung zwischen dem ersten und zweiten Schwingungssignal oder daraus abgeleiteten Signalen aufweist.

15. Verfahren zum Einschalten eines Kommunikationselementes, das unter Verwendung einer Spule (13, 23, 33), die Teil eines Übertragungsschwingkreises (50) ist, zum automatischen Aufbau einer Datenverbindung zu einem intelligenten Gerät (10, 20, 30) eingerichtet ist, welches ebenfalls über ein Kommunikationselement (12, 22) und einer Spule (13, 23, 33) verfügt, mit folgenden Schritten:

Überwachen einer Kenngröße des Übertragungsschwingkreises (50) mittels einer Meßeinrichtung (14, 24),

Erzeugen eines Steuersignales bei Auftreten einer Änderung der überwachten Kenngröße,

Einschalten des Kommunikationselementes (12, 22) durch eine Schaltvorrichtung (15, 25) aufgrund des Steuersignales.

16. Verfahren nach Anspruch 15, dadurch **gekennzeichnet**, daß die Meßfrequenz der Meßeinheit (46) während der Überwachung der Kenngröße über einen vorgegeben Frequenzbereich gewobbelt wird.

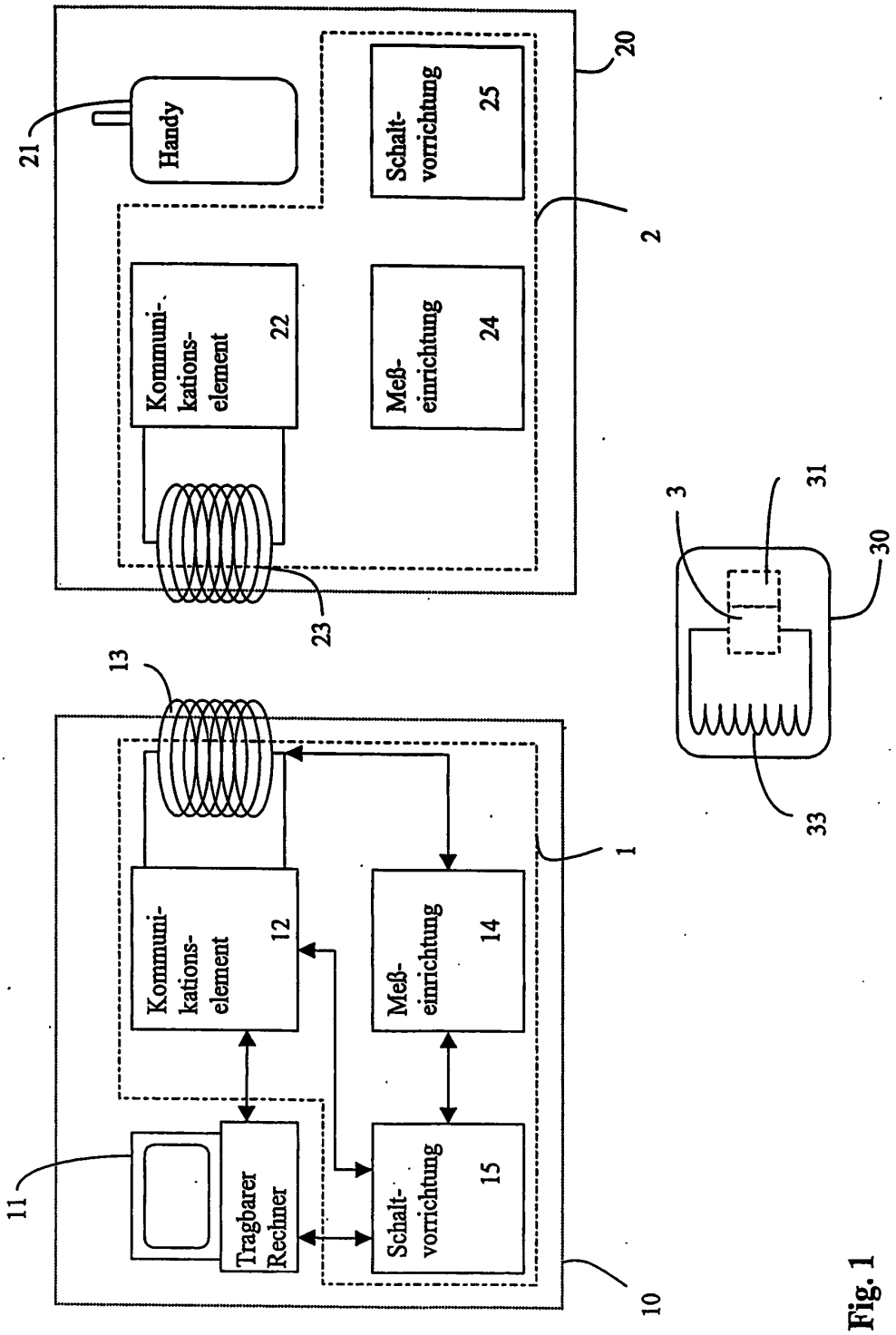

Handy
21
Schalt-
vorrichtung
25
20
2
Kommuni-
kations-
element
22
Meß-
einrichtung
24
23
13
Kommuni-
kations-
element
12
Meß-
einrichtung
14
1
11
Tragbarer
Rechner
Schalt-
vorrichtung
15
10
3
31
30
33

Fig. 1

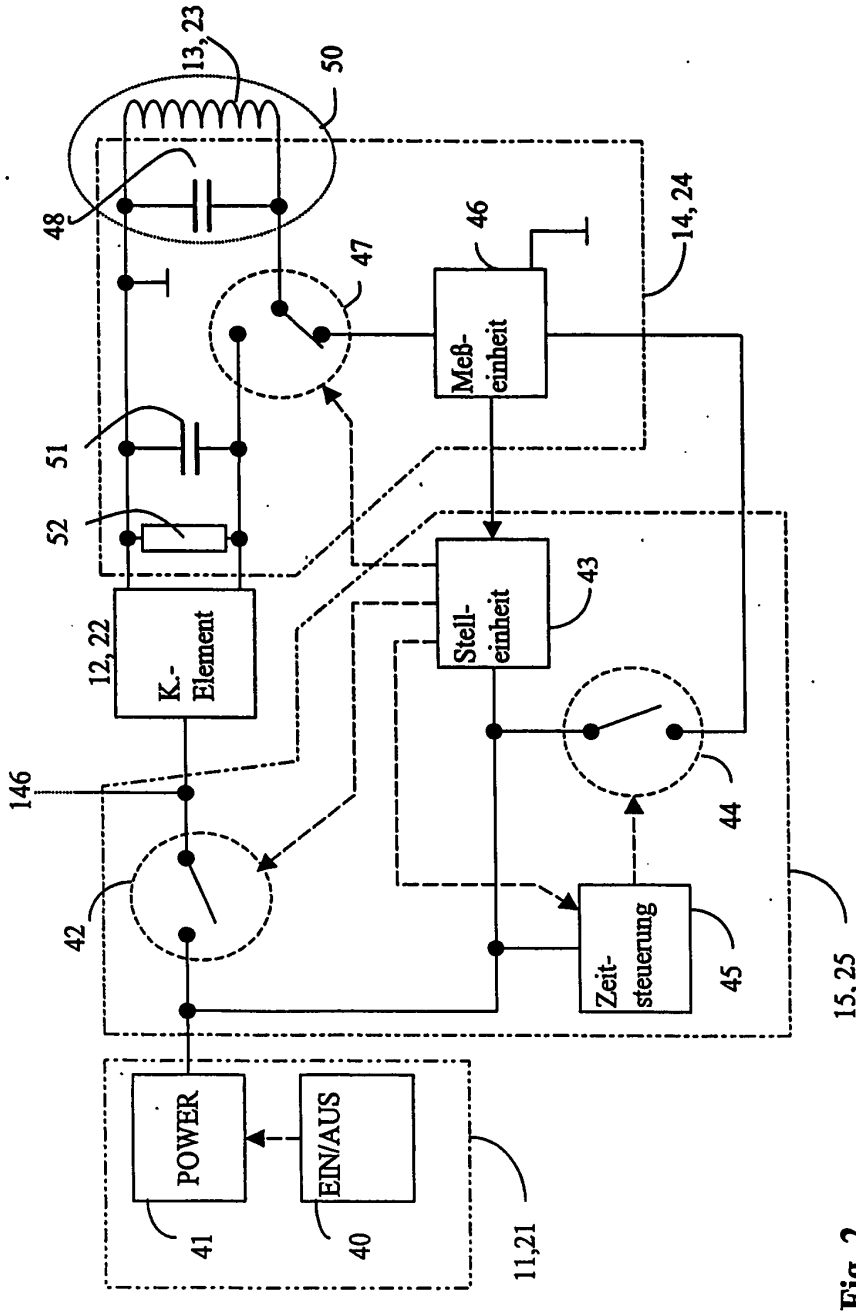

13, 23
50
48
47
46
14, 24
Meß-einheit
51
52
12, 22
K.-Element
Stell-einheit
43
146
44
42
Zeit-steuerung
45
15, 25
POWER
EIN/AUS
41
40
11,21

Fig. 2

Fig. 3

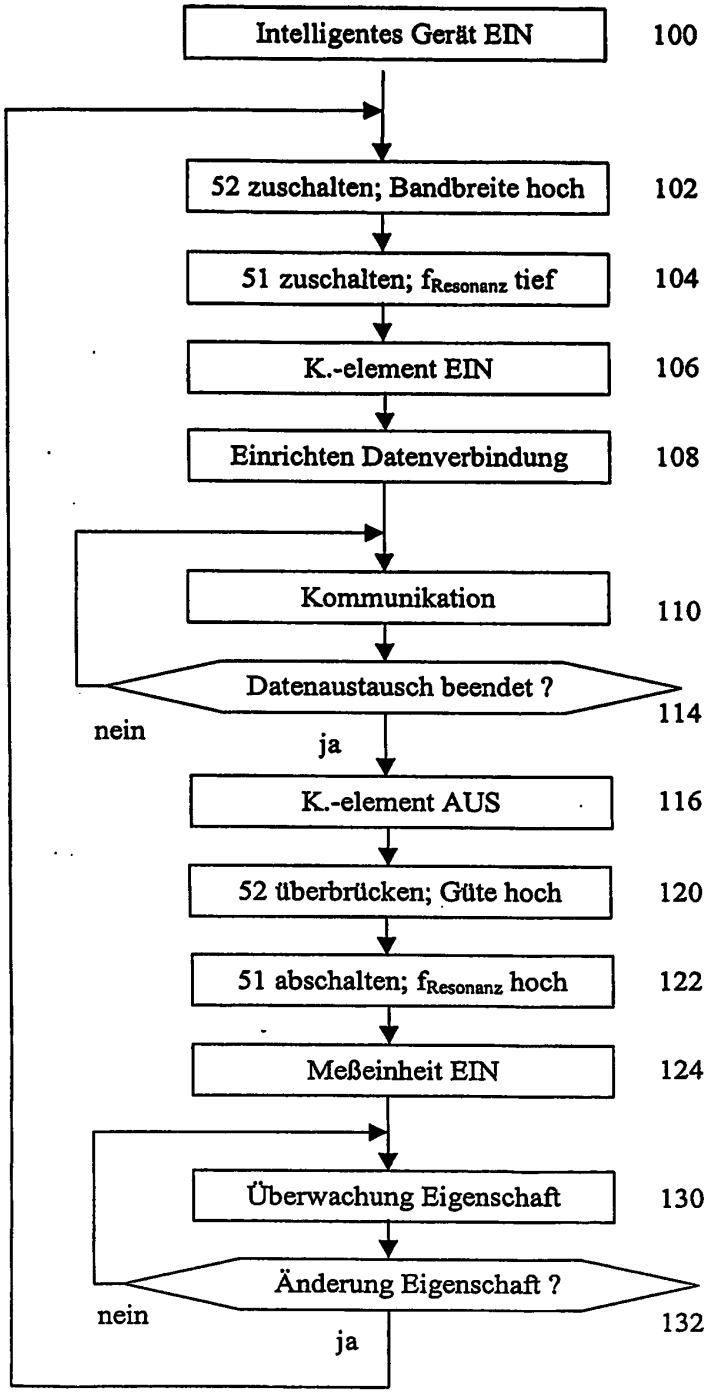
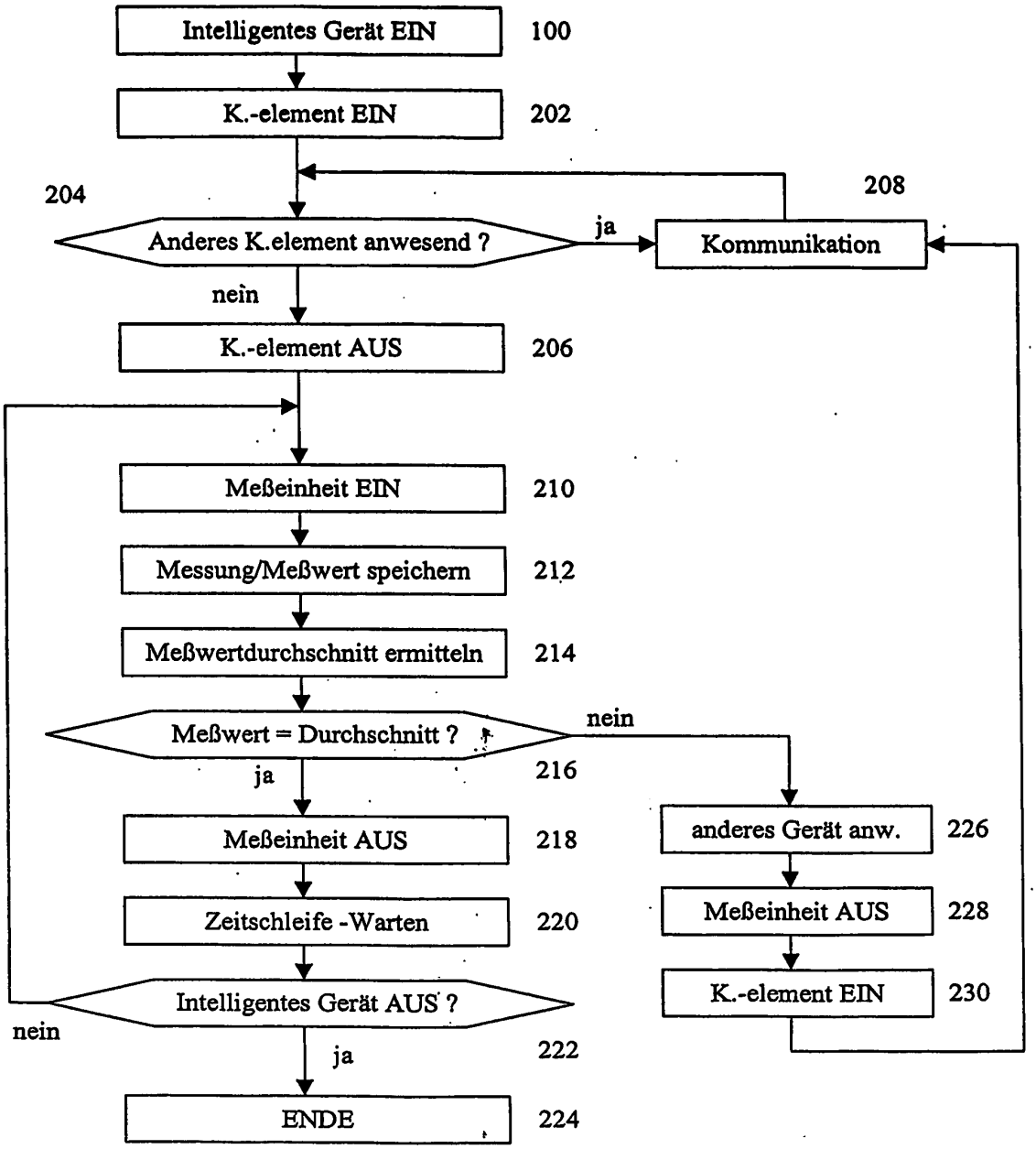

Intelligentes Gerät EIN
100
52 zuschalten; Bandbreite hoch
102
51 zuschalten; $f_{Resonanz}$ tief
104
K.-element EIN
106
Einrichten Datenverbindung
108
Kommunikation
110
Datenaustausch beendet ?
114
nein
ja
K.-element AUS
116
52 überbrücken; Güte hoch
120
51 abschalten; $f_{Resonanz}$ hoch
122
Meßeinheit EIN
124
Überwachung Eigenschaft
130
Änderung Eigenschaft ?
132
nein
ja

Fig. 4


Intelligentes Gerät EIN
100
K.-element EIN
202
204
208
Anderes K.element anwesend ?
ja
Kommunikation
nein
K.-element AUS
206
Meßeinheit EIN
210
Messung/Meßwert speichern
212
Meßwertdurchschnitt ermitteln
214
Meßwert = Durchschnitt ?
nein
216
ja
Meßeinheit AUS
218
anderes Gerät anw.
226
Zeitschleife -Warten
220
Meßeinheit AUS
228
Intelligentes Gerät AUS ?
K.-element EIN
230
nein
ja
222
ENDE
224

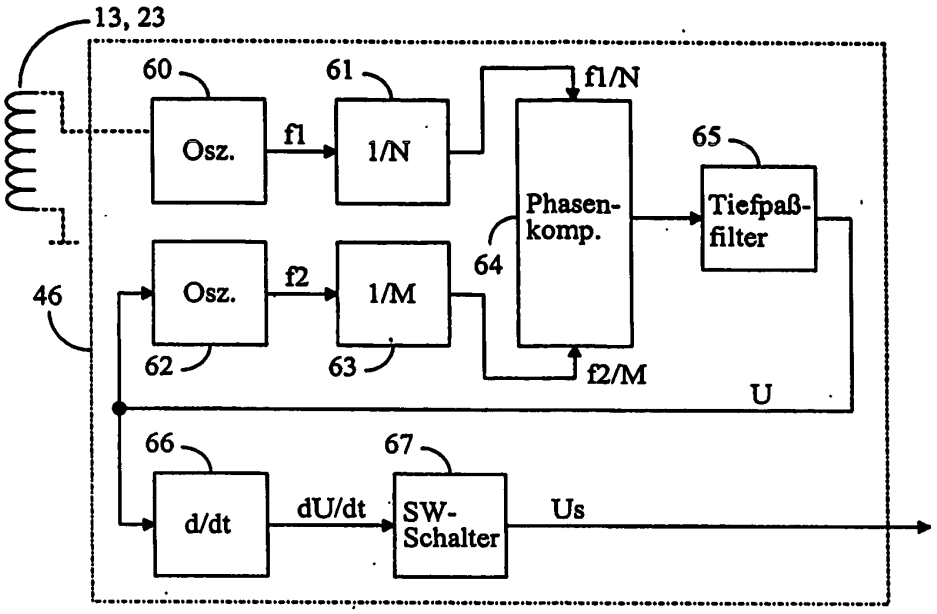

13, 23
60
61
f1/N
Osz.
f1
1/N
65
Phasen-
komp.
Tiefpaß-
filter
64
Osz.
f2
1/M
46
62
63
f2/M
U
66
67
d/dt
dU/dt
SW-
Schalter
Us

Fig. 5

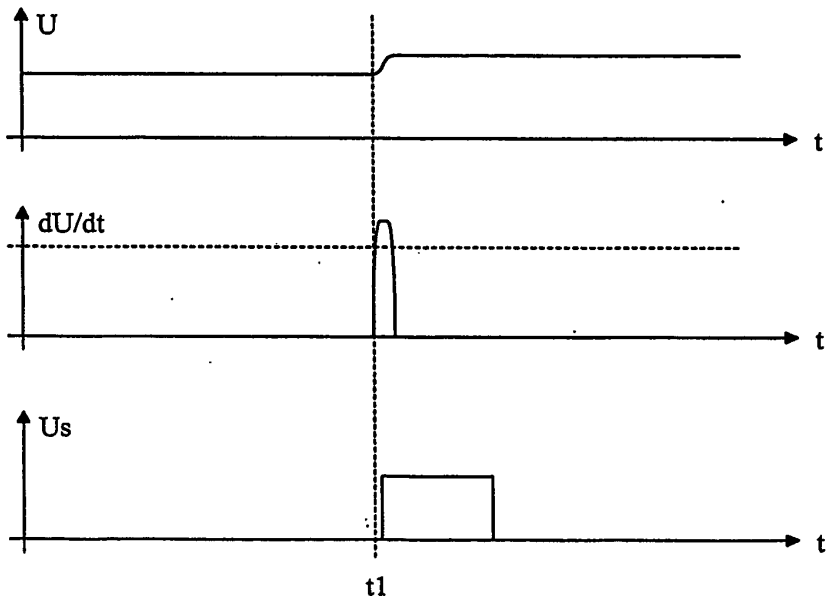

U
t
dU/dt
t
Us
t
t1

Fig. 6

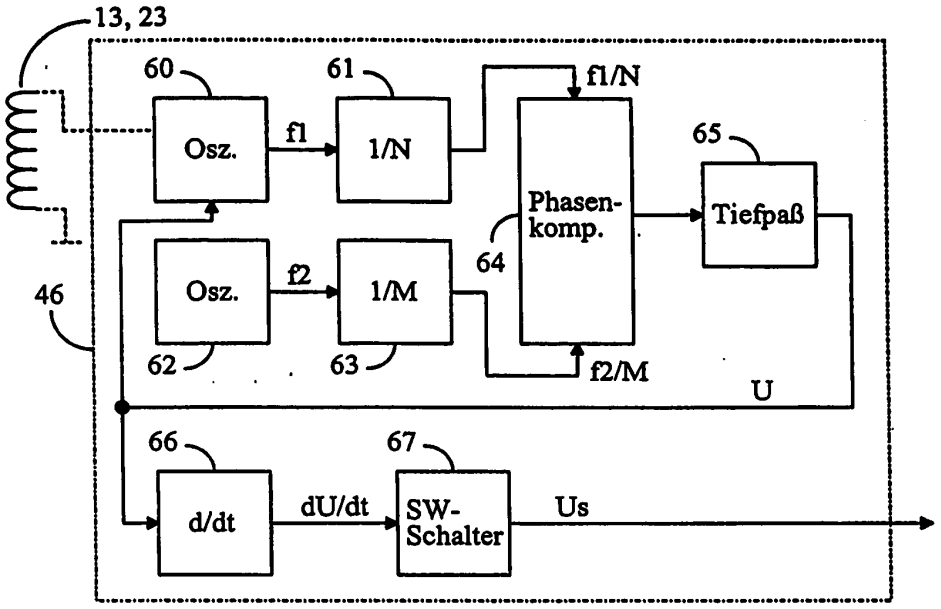

13, 23
60
61
f1/N
Osz.
f1
1/N
65
Phasen-
komp.
Tiefpaß
64
Osz.
f2
1/M
46
62
63
f2/M
U
66
67
d/dt
dU/dt
SW-
Schalter
Us

Fig. 7

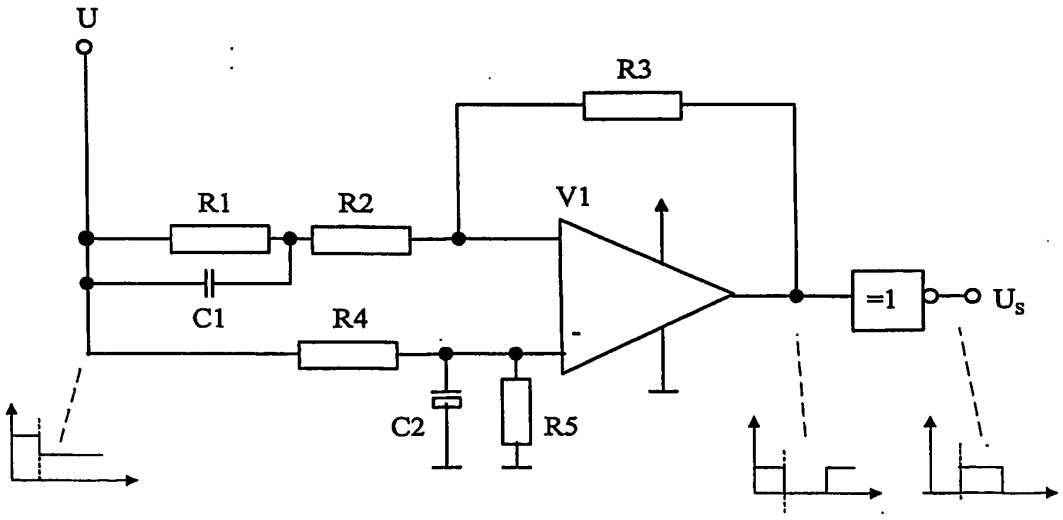

U
R3
R1
R2
V1
C1
R4
=1
Us
C2
R5

Fig. 8

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/008537

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04B5/00 G06K7/00 G06K19/07

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06K H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 696 011 A (TEXAS INSTRUMENTS DEUTSCHLAND) 7 February 1996 (1996-02-07) column 3, line 7 - line 16 column 6, line 23 - line 37; figure 3 ---	1-6,15
Y	DE 198 55 207 C (MEISTER KLAUS ; MEYERS PIERRE (DE)) 18 May 2000 (2000-05-18) column 1, line 50 - line 56 column 2, line 19 - line 25 column 3, line 20 - line 41; figure 3 ---	1-6,15
P,X	DE 102 06 676 A (GIESECKE & DEVRIENT GMBH) 28 August 2003 (2003-08-28) cited in the application	1,15
L	Priorität/priority paragraphs '0014!-'0019!; figure 1 paragraph '0006! --- -/--	1,15

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 November 2004	05/11/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax (+31–70) 340–3016	Sieben, S

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/008537

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 024 451 A (SIEMENS AG) 2 August 2000 (2000-08-02) paragraphs '0011!-'0022!; figure 2 ---	1-16
A	DE 34 12 610 A (BALLUFF GEBHARD FEINMECH) 17 October 1985 (1985-10-17) claim 1 page 9, last paragraph -page 10, paragraph 1; figure 2 -----	1-3

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/008537

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EP 0696011 A	07-02-1996	US 5489908 A	06-02-1996
		CA 2153121 A1	28-01-1996
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Form PCT/ISA/210 (patent family annex) (January 2004)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2004/008537

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
IPK 7 H04B5/00 G06K7/00 G06K19/07

Nach der internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
IPK 7 G06K H04B

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)
EPO-Internal

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	EP 0 696 011 A (TEXAS INSTRUMENTS DEUTSCHLAND) 7. Februar 1996 (1996-02-07) Spalte 3, Zeile 7 - Zeile 16 Spalte 6, Zeile 23 - Zeile 37; Abbildung 3 ---	1-6,15
Y	DE 198 55 207 C (MEISTER KLAUS ; MEYERS PIERRE (DE)) 18. Mai 2000 (2000-05-18) Spalte 1, Zeile 50 - Zeile 56 Spalte 2, Zeile 19 - Zeile 25 Spalte 3, Zeile 20 - Zeile 41; Abbildung 3 ---	1-6,15
P,X	DE 102 06 676 A (GIESECKE & DEVRIENT GMBH) 28. August 2003 (2003-08-28) in der Anmeldung erwähnt	1,15
L	Priorität/priority Absätze '0014!-'0019!; Abbildung 1 Absatz '0006! --- -/--	1,15

[X] Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

[X] Siehe Anhang Patentfamilie

* Besondere Kategorien von angegebenen Veröffentlichungen :
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"X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann allein aufgrund dieser Veröffentlichung nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden
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"&" Veröffentlichung, die Mitglied derselben Patentfamilie ist

Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
1. November 2004	05/11/2004

Name und Postanschrift der internationalen Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Sieben, S

Formblatt PCT/ISA/210 (Blatt 2) (Januar 2004)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2004/008537

C.(Fortsetzung) ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie°	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
A	EP 1 024 451 A (SIEMENS AG) 2. August 2000 (2000-08-02) Absätze '0011!-'0022!; Abbildung 2	1-16
A	DE 34 12 610 A (BALLUFF GEBHARD FEINMECH) 17. Oktober 1985 (1985-10-17) Anspruch 1 Seite 9, letzter Absatz -Seite 10, Absatz 1; Abbildung 2	1-3

Formblatt PCT/ISA/210 (Fortsetzung von Blatt 2) (Januar 2004)

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen
PCT/EP2004/008537

Im Recherchenbericht angeführtes Patentdokument		Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
EP 0696011	A	07-02-1996	US	5489908 A	06-02-1996
			CA	2153121 A1	28-01-1996
			DE	69528558 D1	21-11-2002
			DE	69528558 T2	06-03-2003
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			WO	03069538 A1	21-08-2003
EP 1024451	A	02-08-2000	EP	1024451 A1	02-08-2000
DE 3412610	A	17-10-1985	DE	3412610 A1	17-10-1985

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
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10. Februar 2005 (10.02.2005)

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(22) Internationales Anmeldedatum: 29. Juli 2004 (29.07.2004)

(25) Einreichungssprache: Deutsch

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(30) Angaben zur Priorität:
103 34 765.8 30. Juli 2003 (30.07.2003) DE

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(72) Erfinder; und

(75) Erfinder/Anmelder *(nur für US)*: FINKENZELLER, Klaus [DE/DE]; Georg Wopfner-Strasse 54, 80939 München (DE).

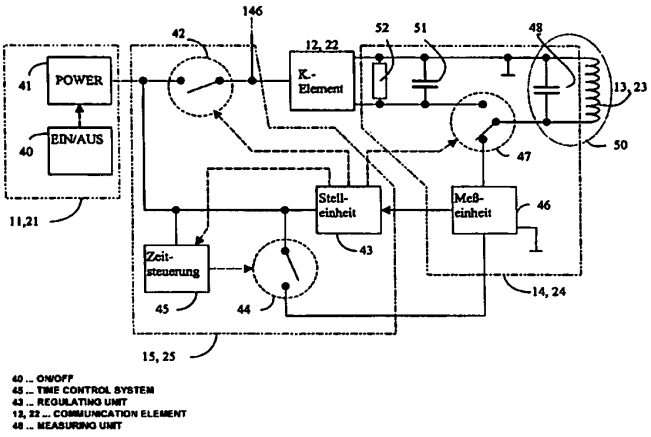
(74) Anwalt: KLUNKER.SCHMITT-NILSON.HIRSCH; Winzererstrasse 106, 80797 München (DE).

(81) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare nationale Schutzrechtsart)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,

[Fortsetzung auf der nächsten Seite]

(54) Title: COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES

(54) Bezeichnung: KOMMUNIKATIONSVORRICHTUNG ZUM AUFBAU EINER DATENVERBINDUNG ZWISCHEN INTELLIGENTEN GERÄTEN



(57) Abstract: The invention relates to a communication device for automatically establishing a data connection between two intelligent appliances (10, 20, 30). Said device comprises a coil (13, 23, 33) which is used to carry out a contactless data exchange and is part of a transmission resonant circuit (50), a communication element (12, 22) that is connected to the coil (13, 23, 33) and the data processing component (11, 21) of an intelligent appliance (10, 20, 30) and sends searching signals by means of the coil (13, 23,33), in order to obtain a response from another intelligent appliance (10, 20, 30), a measuring device (14, 24) which is used to monitoring a characteristic of the transmission resonant circuit (50) and emits a control signal when a change in the monitored characteristic is established, and a switching device (15, 25) that is connected to the measuring device (14,24) and the communication element (12, 22) and switches the communication element (12, 22) on when it has obtained a control signal from the measuring device (14, 24).

(57) Zusammenfassung: Die Erfindung betrifft eine Kommunikationsvorrichtung zur automatischen Einrichtung einer Datenverbindung zwischen zwei intelligenten Geräten (10, 20, 30). Die Vorrichtung umfasst eine Spule (13, 23, 33) zur Durchführung eines berührungslosen Datenaustausches, welche Teil eines

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CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Bestimmungsstaaten** *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Veröffentlicht:
— *mit internationalem Recherchenbericht*

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

Übertragungsschwingkreises (50) ist, ein Kommunikationselement (12, 22), das mit der Spule (13, 23, 33) und der Datenverarbeitungskomponente (11, 21) eines intelligenten Gerätes (10, 20, 30) verbunden ist und über die Spule (13, 23,33) Suchsignale aussendet, um von einem anderen intelligenten Gerät (10, 20, 30) eine Antwort zu erhalten, eine Messeinrichtung (14, 24) zur Überwachung einer Eigenschaft des Übertragungsschwingkreises (50), welche bei Feststellen einer Änderung der überwachten Eigenschaft ein Steuersignal ausgibt, sowie eine Schaltvorrichtung (15, 25), die mit der Messeinrichtung (14,24) und dem Kommunikationselement (12, 22) verbunden ist und die das Kommunikationselement (12, 22) einschaltet, wenn sie von der Messeinrichtung (14, 24) ein Steuersignal erhalten hat.

PCT/EP2004/008537

BUNDESREPUBLIK DEUTSCHLAND

Prioritätsbescheinigung über die Einreichung einer Patentanmeldung

Aktenzeichen:	103 34 765.8
Anmeldetag:	30. Juli 2003
Anmelder/Inhaber:	Giesecke & Devrient GmbH, 81677 München/DE
Bezeichnung:	Kommunikationsvorrichtung zum Aufbau einer Datenverbindung zwischen intelligenten Geräten
IPC:	G 08 C, H 04 B, G.06 F

Die angehefteten Stücke sind eine richtige und genaue Wiedergabe der ursprünglichen Unterlagen dieser Patentanmeldung.

München, den 10. August 2004
Deutsches Patent- und Markenamt
Der Präsident
Im Auftrag

Wehner

A 9161
03/00
EDV-L

Kommunikationsvorrichtung zum Aufbau einer Datenverbindung zwischen intelligenten Geräten

Die Erfindung betrifft die Nutzung von selbsttätig eine Datenverbindung einrichtenden Kommunikationselementen in zur Durchführung einer Datenübertragung eingerichteten, intelligenten Geräten, wobei die Datenverbindungseinrichtung durch Annäherung zweier intelligenter Gerät ausgelöst wird. Ein Konzept für die selbsttätige Einrichtung einer Datenverbindung zwischen intelligenten Geräten ist aus der Spezifikation ECMA/TC32/TG19/2003/12 unter der Bezeichnung „Near Field Communication" (NFC) bekannt. Zweck des Konzeptes ist es, die Einrichtung einer Datenverbindung zwischen intelligenten Geräten so einfach wie möglich zu machen. Das Konzept sieht hierzu vor, daß zwei intelligente Geräte, die beide zur Durchführung eines NFC-Protokolles eingerichtet sind, bei gegenseitiger Annäherung auf eine Distanz von typischerweise weniger als 0,2 Metern automatisch eine Datenverbindung aufbauen. In einem Suchmodus sendet dabei eines der intelligenten Geräte, der Initiator, eine Suchanfrage, die von dem zweiten intelligenten Gerät, dem Target, beantwortet wird. In einem unmittelbar folgenden Datenaustausch verständigen sich die beiden intelligenten Geräte auf einen Datenübertragungsmodus, gemäß dem anschließend ein Datenaustausch zwischen den Datenverarbeitungskomponenten der beteiligten intelligenten Geräte erfolgt. Das Erkennen, ob sich ein anderes intelligentes Gerät im Ansprechbereich des NFC-Protokolles befindet, erfolgt im Suchmodus durch zyklisches Aussenden von Suchanfragen. Als Parameter für die Suchanfragen sind eine Sendefrequenz von 13,56 MHz und eine magnetische Feldstärke von mindestens 1,5 A/m bis maximal 7,5 A/m vorgesehen. Die vorgesehene Mindestfeldstärke bedingt in zur Durchführung eines NFC-Protokolles bereiten intelligenten Geräten eine relativ große ständige Leistungsaufnahme. Für Geräte mit beschränkten Energieressourcen, besonders für batteriebetriebene Geräte hat das eine Verringerung

der möglichen Betriebsdauer zufolge. Um diesen unerwünschten Effekt zu verkleinern kann vorgesehen sein, die intelligenten Geräte mit einer von dem Nutzer zu betätigenden Schalteinrichtung zu versehen, mittels derer der Suchmodus einer NFC-Einheit aktiviert wird. Diese Möglichkeit hebt allerdings das durch das NFC-Konzept angestrebte Ziel einer besonders einfachen Bedienbarkeit zumindest zum Teil wieder auf, da zumindest die Schaltfunktion gesondert betätigt werden muß.

Aus der deutschen Patentanmeldung DE 102 06 676 ist eine mit einem Transponder betätigbare Schaltvorrichtung bekannt, die, solange ein Schaltvorgang nicht ausgelöst wird, nahezu leistungslos betrieben werden kann. Das zu schaltende Gerät verfügt hierzu über eine Spule, die Teil eines Schwingkreises ist, der im Erkennungsbetrieb als im wesentlichen unbelasteter reiner Schwingkreis betrieben wird. Die im Schwingkreis stehende Resonanzfrequenz wird dabei von einem Frequenzbeobachter überwacht. Wird ein Transponder mit einer Transponderspule an die Erkennungsspule angenähert, ändert sich die Resonanzfrequenz des Schwingkreises. Dies wird von dem Frequenzbeobachter erkannt, der daraufhin ein Schaltsignal erzeugt, welches das zu schaltende Gerät einschaltet. Die vorgeschlagene Lösung konzentriert sich auf den direkten Wechsel vom Erkennungsmodus in den Datenübertragungsmodus, d.h. auf das direkte, einstufige Einschalten eines intelligenten Gerätes mittels eines Spulenträgers, der vor allem als Schaltelement dient.

Aufgabe der Erfindung ist es, eine Kommunikationsvorrichtung für zum automatischen Datenverbindungsaufbau eingerichtete, intelligente Geräte anzugeben, die ohne Einschränkung der Nutzungsfreundlichkeit einen möglichst geringen Energieverbrauch aufweist.

Diese Aufgabe wird gelöst durch eine Vorrichtung mit den Merkmalen des Hauptanspruchs. Die erfindungsgemäße Kommunikationsvorrichtung verfügt über ein Kommunikationselement mit einer Spule zur Abgabe von Suchsignalen, wobei der Suchsignalbetrieb jedoch erst aufgenommen wird, wenn zuvor mittels einer Meßeinrichtung eine Eigenschaftsänderung in einem mittels derselben Spule eingerichteten Übertragungsschwingkreis erkannt wurde. Da Übertragungsschwingkreis und Meßeinrichtung sich nahezu leistungslos betreiben lassen, muß die Ausgabe von Suchsignalen zum Erkennen der Anwesenheit korrespondierender intelligenter Geräte nur erfolgen, wenn sich tatsächlich ein weiteres intelligentes Gerät im Ansprechbereich der Spule befindet. Der Energiebedarf der Kommunikationsvorrichtung läßt sich dadurch erheblich reduzieren. Die erfindungsgemäße Lösung eignet sich daher insbesondere auch für intelligente Geräte mit beschränkten Energieressourcen, etwa für batteriebetriebene Geräte. Besonders vorteilhaft ist, daß die Handhabung eines mit einer erfindungsgemäßen Kommunikationsvorrichtung ausgestatteten intelligenten Gerätes genauso erfolgen kann, als ob das Gerät dauerhaft Suchanfragen aussendete. Besondere Handlungen durch einen Nutzer sind nicht erforderlich. Vorteilhaft muß zur Nutzung einer erfindungsgemäßen Kommunikationsvorrichtung auch in die Durchführung des Datenverbindungsaufbaus nach Erkennung eines weiteren anwesenden intelligenten Gerätes nicht eingegriffen werden.

In vorteilhafter Weiterbildung ist vorgesehen, daß für die Durchführung einer Datenübertragung nach Einschalten des Kommunikationselementes ein ohmscher Widerstand in den Schwingkreis geschaltet wird, um damit bei Verringerung der Güte die Bandbreite des Übertragungsschwingkreises zu erhöhen.

In einer weiteren vorteilhaften Weiterbildung der Kommunikationsvorrichtung ist vorgesehen, den Schwingkreis nach Einschalten des Kommunikationselementes durch Zuschalten geeigneter Bauelemente so zu beeinflussen, daß sich die Resonanzfrequenz ändert. Dadurch wird zusätzlich sichergestellt, daß andere intelligente Geräte, die auf gleiche Weise zum automatischen Datenverbindungsaufbau eingerichtet sind, durch einen Suchbetrieb nicht gestört werden.

In einer weiteren vorteilhaften Ausgestaltung der erfindungsgemäßen, Kommunikationsvorrichtung ist vorgesehen, daß die Meßeinrichtung nur periodisch in Betrieb gesetzt wird. Der Energieverbrauch der Kommunikationsvorrichtung läßt sich dadurch weiter verringern. Zur Realisierung des periodischen Inbetriebsetzens besitzt die Kommunikationsvorrichtung zweckmäßig eine Zeitsteuerung und erfolgt die Bewertung eines Meßergebnisses durch Vergleich mit einem aus vorgehenden Messungen gewonnenen Durchschnittswert.

Unter Bezugnahme auf die Zeichnung wird nachfolgend ein Ausführungsbeispiel der Erfindung näher erläutert.

Es zeigen:

Fig. 1 Aufbau und Anordnung von zum automatischen Datenverbindungsaufbau eingerichteten intelligenten Geräten,

Fig. 2 ein vereinfachtes Ersatzschaltbild einer Kommunikationsvorrichtung,

Fig. 3 ein Flußdiagramm des Betriebes einer Kommunikationsvorrichtung,

Fig. 4 ein Flußdiagramm des Betriebes einer mit einer Zeitsteuerung versehenen Kommunikationsvorrichtung.

Fig. 1 zeigt intelligente Geräte 10, 20, 30 in unterschiedlichen Ausgestaltungen. Alle sind dazu eingerichtet, über eine Spule 13, 23, 33 einen Datenaustausch mit einem der anderen intelligenten Geräte 10, 20, 30 zu führen. Alle im folgenden einfach als Gerät bezeichneten intelligenten Geräte 10, 20, 30 sind grundsätzlich gleichartig aufgebaut und bestehen aus einer Datenverarbeitungskomponente 11, 21, 31 und einer Kommunikationsvorrichtung 1, 2, 3.

Die Datenverarbeitungskomponente 11, 21, 31 bewirkt wesentlich die Intelligenz der Geräte 10, 20, 30 und beinhaltet eine zentrale Prozessoreinheit zur Ausführung von Datenverarbeitungsoperationen. Die Datenverarbeitungskomponente 11, 21, 31 bestimmt zudem maßgeblich die äußere Gestalt der Geräte 10, 20, 30. Wie in Fig. 1 angedeutet, kann das Gerät 10, 20, 30 z. B. die Gestalt eines tragbaren Rechners 11 oder eines Handys 21 besitzen oder in einem, etwa in einer kontaktlosen Chipkarte 30 ausgebildeten RFID-Transponder mit einem Chip 31 realisiert sein. Die Aufzählung möglicher Gestaltungsformen ist dabei nicht abschließend. Neben den dargestellten kann das Gerät 10, 20 ,30 ebenso z. B. in einem Gebrauchsgegenstand, etwa einer Armbanduhr, oder einem mit elektronischen Komponenten versehenen Kleidungsstück, etwa einer Jacke, realisiert sein.

Die Kommunikationsvorrichtung 1, 2, 3 beinhaltet jeweils ein Kommunikationselement 12, 22, eine mit dem Kommunikationselement 12, 22 verbundene Spule 13, 23, 33, eine mit der Spule 13, 23, 33 verbundenen Meßeinrichtung 14, 24 sowie eine Schaltvorrichtung 15, 25, welche mit der Datenverarbeitungskomponente 11, 21, dem Kommunikationselement 12, 22 und der

Meßeinrichtung 14, 24 verbunden ist. In praktischer Realisierung ist die Kommunikationsvorrichtung 1, 2, 3 in der Regel baulich als Einheit mit der Datenverarbeitungskomponente 11, 21 ausgebildet und befindet sich also z.B. im Gehäuse eines tragbaren Rechners 11, eines Handys 21 oder ist im in Chip 31 einer Chipkarte 30 integriert.

Funktion des Kommunikationselementes 12, 22 ist, die Anwesenheit eines anderen Gerätes 10, 20, 30 im Ansprechbereich der Spule 13, 23, 33 festzustellen. Das Kommunikationselement 12, 22 besitzt Mittel zur Ausführung von Softwareprogrammroutinen und kann als selbständige Baugruppe ausgebildet sein. Wurde ein anderes Gerät 10, 20, 30 erkannt, richtet das Kommunikationselement 12, 22 ferner selbsttätig eine Datenverbindung zu diesem ein und stellt den Datenübertragungmodus für einen nachfolgenden Datenaustausch zwischen den jeweiligen datenverarbeitenden Komponenten 11, 21, 31 her. In einer besonders zweckmäßigen Ausgestaltung ist das Kommunikationselement 12, 22 dazu eingerichtet, ein NFC-Protokoll durchzuführen, wie es in der genannten Veröffentlichung ECMA/TC32-TG19/2003/12 beschrieben ist.

Die Spule 13, 23, 33 ist von üblicher Bauart und dient in an sich bekannter Weise zur Durchführung eines berührungslosen Datenaustausches mit einem korrespondierenden Gerät 10, 20, 30. In der Regel ist sie, wie in der Ausführung als Chipkarte 30 angedeutet, integrierter Bestandteil des Gerätes 10, 20, 30. Innerhalb der Kommunikationsvorrichtung 1, 2, 3 ist die Spule 13, 23, 33 Teil eines Übertragungsschwingkreises 50 mit einer definierten, charakteristischen Resonanzfrequenz, die vom Betriebszustand des Gerätes 10, 20, 30 abhängen kann.

Die Meßeinrichtung 14, 24 ist mit der Spule 13, 23, 33 verbunden und erfaßt eine Eigenschaft des mit der Spule 13, 23, 33 gebildeten Übertragungsschwingkreises 50. Sie kann insbesondere von dem Typ sein, wie er in der genannten deutschen Patentanmeldung DE 102 06 676 beschrieben ist.

Die Schaltvorrichtung 15 dient zum Ein- und Ausschalten des Kommunikationselementes 12, 22 und der Meßeinrichtung 14, 24. Das Ein- und Ausschalten einer oder beider Komponenten 12, 22 bzw. 14, 24 kann dabei indirekt über die Datenverarbeitungskomponente 11, 21 erfolgen. Die Schaltvorrichtung 15 dient weiter dazu, einzelne Elemente der Meßeinrichtung 14, 24 zu- und abzuschalten. Desweiteren können mittels der Schaltvorrichtung 15 andere, nicht dargestellte Komponenten eines Gerätes 10, 20, 30 geschaltet werden.

Fig.2 zeigt ein vereinfachtes Ersatzschaltbild eines Gerätes 10, 20, 30. Die Datenverarbeitungskomponente 11, 22, mithin die äußere Erscheinungsform des Gerätes 10, 20 wird darin durch einen von einem Benutzer betätigbaren Ein-/Ausschalter 40 repräsentiert, mittels dessen die Hauptenergieversorgung 41 des Gerätes 10, 20 ein- und ausschaltbar ist. Die Hauptenergieversorgung 41 kann insbesondere eine Batterie oder ein Akkumulator sein. Das Vorhandensein des Schalters 40 richtet sich dabei nach der Gestalt des Gerätes; in bestimmten Ausführungsvarianten, etwa bei Ausführung als Chipkarte 30, kann der Schalter 40 entfallen. Das Gerät 30 ist dann entweder ständig eingeschaltet oder wird durch einen gleichwirkenden, an die Bauform angepaßten Mechanismus eingeschaltet.

Die Schaltvorrichtung 15, 25 beinhaltet zwei Schalter 42, 44, die mittels einer Stelleinheit 43 ansteuerbar sind, sowie eine Zeitsteuerung 45. Stelleinheit 43 und Zeitsteuerung 45 sind mit der Hauptenergieversorgung 41 verbunden.

Der erste Schalter 42 ist zwischen der Hauptenergieversorgung 41 und dem Kommunikationselement 12, 22 plaziert, der zweite Schalter 44 zwischen Hauptenergieversorgung 41 und Meßeinrichtung 14, 25. Der zweite Schalter 44 wird über der Zeitsteuerung 45 betätigt, die hierzu mit der Stelleinheit 43 verbunden ist und von dieser ein Schaltsignal erhält. Durch den ersten Schalter 42 können, wie durch die Verbindung 46 angedeutet, neben dem Kommunikationselement 12, 22 weitere, nicht dargestellte Komponenten des jeweiligen Gerätes 10, 20, 30 ein- und ausgeschaltet werden. Alle Bauelemente der Schaltvorrichtung 15, 25 können diskret, als Schaltungen oder auch in Form von Softwareprogrammen realisiert sein. Stelleinheit 43 und Zeitsteuerung 45 besitzen zweckmäßig zudem eine gewisse Intelligenz und sind zur Ausführung von Softwareprogrammroutinen eingerichtet.

Wesentliches Element der Meßeinrichtung 14, 24 ist eine Meßeinheit 46, die mittels des Schalters 44 der Schaltvorrichtung 15, 25 ein- und ausschaltbar ist. Die Meßeinheit 46 ist weiter mit der Stelleinheit 43 der Schaltvorrichtung 15, 25 sowie über einen Schalter 47 mit der Spule 13, 23 verbunden. Der Schalter 47 wird von der Stelleinheit 43 betätigt. Er verbindet dabei die Spule 13, 23 entweder mit der Meßeinheit 46 oder mit dem Kommunikationselement 12, 22. Die Spule 13, 23 ist desweiteren mit dem Kommunikationselement 12, 22 verbunden. Wie die Schaltvorrichtung 15, 25 können die Bauelemente der Meßeinrichtung 14, 24 diskret, als Schaltungen oder in Form von Softwareprogrammes realisiert. Die Meßeinheit 46 ist zweckmäßig ebenfalls mit einer gewissen Intelligenz ausgestattet und zur Ausführung von Softwareprogrammroutinen eingerichtet. In hinsichtlich der Energieressourcen besonders beschränkten Ausführungen des Gerätes, etwa bei Ausführung in der Form einer Chipkarte 30, kann die Meßeinrichtung entfallen. Das Gerät 30 kann dann von anderen Geräten 10, 20 erkannt werden, nicht aber selbst andere Geräte 10, 20, 30 erkennen.

Parallel zur Spule 13, 23 ist eine Kapazität 48 angeordnet, die zusammen mit der Spule 13, 23 einen Übertragungsschwingkreis 50 bildet. Der Übertragungsschwingkreis 50 ist über den Schalter 47 an das Kommunikationselement 12 oder die Meßeinheit 46 anschaltbar. Parallel zu dem Übertragungsschwingkreis 50, in Bezug auf den Übertragungsschwingkreis 50 jedoch hinter dem Schalter 47, sind eine weitere Kapazität 51 sowie ein Widerstand 52 angeordnet. Beide Elemente 51, 52 können über den Schalter 47 in den Übertragungsschwingkreis 50 geschaltet werden. Die Kapazität 51 bewirkt dabei eine Änderung der Resonanzfrequenz des Übertragungsschwingkreises 50, der Widerstand 52 eine Erhöhung der Bandbreite bei gleichzeitiger Verringerung der Schwingkreisgüte. Die erwähnten passiven Bauelemente 47, 49, 51, 52 können als diskrete Bauelemente aber auch in Gestalt von Baugruppen mit entsprechender Außenwirkung ausgeführt sein.

In einer besonders für Geräte 10, 20 mit hinreichend großen Energieressourcen geeigneten, vorteilhaften Variante ist der Übertragungsschwingkreis 50 als Frequenzwobbler ausgebildet, der die Schwingkreisfrequenz kontinuierlich über eine vorbestimmten Frequenzbereich streichen läßt. Der vorbestimmte Frequenzbereich umfaßt zumindest eine Frequenz, auf die ein anderes Gerät 10, 20, 30 abgestimmt ist.

Fig. 3 veranschaulicht eine erste mögliche Betriebsart eines Gerätes 10, 20, 30. Entsprechend dem in Fig. 2 wiedergegebenen Ersatzschaltbild verfügt es über eine Kapazität 51 und einen Widerstand 52, um den Übertragungsschwingkreis 50 zu beeinflussen.

Der Betrieb setzt ein, indem das Gerät 10, 20, 30 eingeschaltet wird, Schritt 100, etwa mittels eines Schalters 40, welcher die Hauptenergieversorgung 41

betätigt. Durch das Einschalten wird auch die Stelleinheit 43 eingeschaltet. Diese stellt darauf den Schalter 47 so ein, daß die Spule 13, 23, 33 über den Schalter 47 mit dem Kommunikationselement 12, 22 verbunden ist. Zugleich werden durch die Einstellung des Schalters 47 der Widerstand 52, Schritt 102, und die Kapazität 51 in den Übertragungsschwingkreis 50 geschaltet, Schritt 104.

Das Zuschalten des Widerstandes 52 hat eine Verschlechterung der Güte Q des Übertragungschwingkreises 50 zur Folge, bewirkt aber, da für den Zusammenhang zwischen Güte Q und Bandbreite B gilt: $B \approx 1/Q$, zugleich eine Erhöhung der für eine Datenübertragung zur Verfügung stehenden Bandbreite B in dem Übertragungsschwingkreis 50.

Durch die Zuschaltung der Kapazität 51 verringert sich die Resonanzfrequenz des Übertragungsschwingkreises 50 und wird auf eine für eine Datenübertragung geeignete Übertragungsfrequenz, z.B. 13,56 MHz, eingestellt. Durch dir Umstellung werden die nachfolgende Datenübertragung und der Betrieb der Kommunikationsvorrichtung 1, 2, 3 unempfindlich gegen Störungen durch magnetische Felder von in der Nachbarschaft befindlichen, gleichartigen Geräten 10, 20, 30, die im Erkennungsmodus, d.h. bei einer höheren Resonanzfrequenz arbeiten.

Desweiteren schaltet die Stelleinheit 43 das Kommunikationselement 12, 22 ein, Schritt 106. Das Kommunikationselement 12, 22 geht dadurch in den Suchmodus über und sendet über die Spule 13, 23, 33 zyklisch ein Suchsignal aus, um von einem gegebenenfalls im Ansprechbereich der Spule 13, 23, 33 befindlichen anderen Gerät 10, 20, 30 eine Antwort zu erhalten.

Befindet sich ein anderes Gerät 10, 20, 30 im Ansprechbereich der Spule 13, 23, 33, reagiert es auf das Suchsignal durch Rücksenden einer Antwort, auf die hin das Kommunikationselement 12, 22 die Kommunikationsvorrichtung 1, 2, 3 in den Datenübertragungsmodus bringt. Hierzu baut es unter Verwendung eines geeigneten Protokolles, etwa des erwähnten NFC-Protokolles, eine Datenverbindung zu der Datenverarbeitungskomponente 11, 21, 31 des antwortenden Gerätes 10, 20, 30 auf, Schritt 108.

Nach Einrichtung der Datenverbindung führt die Datenverarbeitungskomponente 11, 21, 31 mit der korrespondierenden Datenverarbeitungskomponente 11, 21, 31 des anwesenden Gerätes 10, 20, 30 über die Spule 13, 23, 33 in bekannter Weise einen Datenaustausch durch, Schritt 110.

Die Stelleinheit 43 wartet, bis der Datenaustausch zwischen den Datenverarbeitungskomponenten 11, 21, 31 der beteiligten Geräte 10, 20, 30 abgeschlossen ist, Schritt 114. Die Feststellung, daß der Datenaustausch beendet ist, kann durch Erhalt eines entsprechenden Signales von der Datenverarbeitungskomponente 11 oder dem Kommunikationselement 12 oder auch durch zyklische Ausführung eines Kontrollschrittes in der Stelleinheit 43 selbst erfolgen.

Ist der Datenaustausch beendet, bringt die Stelleinheit 42 die Kommunikationseinrichtung 1, 2, 3 in den Erkennungsmodus.

Hierzu trennt die Stelleinheit 43 durch Verstellen des Schalters 42 das Kommunikationselement 12, 22 von der Hauptenergieversorgung 41, Schritt 116.

Weiter betätigt die Stelleinheit 43 den Schalter 47 und verbindet die Meßeinheit 46 mit dem Übertragungsschwingkreis 50. Durch die Schalterbetätigung

werden ferner der Widerstand 52 und die Kapazität 51 wieder aus dem Übertragungsschwingkreis 50 geschaltet, Schritt 120, 122. Das Entfernen des Widerstandes 52 bewirkt, daß sich in dem Übertragungsschwingkreis 50 eine Leerlaufgüte Q_0 einstellt, die im Idealfall nur durch die Induktivität der Spule 13, 23, 33, die Schwingkreiskapazität 48 sowie den Eingangswiderstand der Spule 13, 23, 33 bestimmt wird. Entsprechend der verbesserten Güte Q_0 vergrößert sich der Erkennungsbereich, in dem im Erkennungsmodus andere anwesende Geräte 10, 20, 30 erkannt werden.

Das Wegschalten der zusätzlichen Kapazität 51 bewirkt, daß sich die Resonanzfrequenz des Übertragungsschwingkreises 50 gegenüber der Resonanzfrequenz im Datenübertragungsmodus erhöht. Aufrgund der geänderten Resonanzfrequenz werden beim Betrieb im Erkennungsmodus gegebenenfalls in der Nähe befindliche andere Geräte 10, 20, 30, die sich im Datenübertragungsmodus befinden, nicht gestört.

Weiter schaltet die Stelleinheit 43 zur Herstellung des Erkennungsmodus die Meßeinheit 46 durch Betätigen des Schalters 44 ein, Schritt 124.

Die Meßeinheit 46 überwacht anschließend eine Eigenschaft des Übertragungsschwingkreises 50. Beispielsweise überwacht sie die in dem des Übertragungsschwingkreis 50 stehende Frequenz, während dieser in Resonanz betrieben wird. Wird in diesem Zustand die Spule 13, 23, 33 eines anderen Gerätes 10, 20, 30 in den Erkennngsbereich der Spule 13, 23, 33 gebracht, bewirkt dies eine Änderung der Resonanzfrequenz im Übertragungsschwingkreis 50 und darüber eine vorübergehende Änderung der Amplitude des Übertragungsschwingkreises 50, welche von der Meßeinheit 46 erkannt wird, Schritt 132.

Hat die Meßeinheit 46 eine Änderung in der beobachteten Schwingkreiseigenschaft erkannt, übermittelt sie der Stelleinheit 43 ein entsprechendes Steuersignal, woraufhin die Stelleinheit 43 wieder die Schritte 102 ff. ausführt und den Such- bzw. den Datenübertragungsmodus einleitet.

Erlaubt der Übertragungsschwingkreis 50 ein Wobbeln der Schwingkreisfrequenz, erfolgt die Überwachung der Schwingkreiseingenschaft über den gesamten überstrichenen Frequenzbereich. Der überstrichene Frequenzbereich enthält zumindest die Resonanzfrequenz einer Art von Geräten, zu der eine Datenverbindung aufgebaut werden kann. Liegt die Resonanzfrequenz eines solchen Gerätes 30 etwa bei 13,56 MHz, kann der Wobbelbereich beispielsweise zwischen 13 und 18 MHz liegen. Tritt bei einer beliebigen Frequenz innerhalb des überstrichenen Frequenzbereiches eine Änderung der Schwingkreiseigenschaft auf, übermittelt die Meßeinheit 46 der Stelleinheit 43 ein Steuersignal zur Ausführung der Schritte 102 ff.

Fig. 4 zeigt eine Variante zum Betrieb einer gemäß Fig. 2 aufgebauten Kommunikationsvorrichtung. Die Betriebsvariante kann alternativ oder auch ergänzend zu der in Fig. 3 veranschaulichten Betriebsweise eingerichtet werden. Vorausgesetzt für die in Fig. 4 gezeigte Betriebsvariante ist, daß das Gerät 10, 20, 30 über eine Zeitsteuerung 45 verfügt, wie sie in Fig. 2 angedeutet ist.

Der Betrieb setzt wiederum ein, indem das Gerät 10, 20 eingeschaltet wird, Schritt 100, etwa durch Einschalten der Hauptenergieversorgung 41 mittels eines Schalters 40.

Die Kommunikationsvorrichtung 1, 2, 3 geht daraufhin zunächst in den Suchmodus. Hierzu schaltet die Stelleinheit 43 das Kommunikationselement

12, 22 ein, Schritt 202, das nachfolgend durch zyklisches Absetzen von Suchsignalen prüft, ob sich ein anderes Gerät 10, 20, 30 im Ansprechbereich der Spule 13, 23, 33 befindet, Schritt 204.

Geht auf das Absetzen des Suchsignals in Schritt 204 eine Antwort von einem anderen anwesenden Gerät 10, 20, 30 ein, wechselt die Kommunikationsvorrichtung 1, 2, 3 nach Einrichtung einer Datenverbindung zu dem anderen Gerät 10, 20, 30 in den Datenübertragungsmodus und führt einen Datenaustausch mit dem erkannten Gerät 10, 20, 30 durch, Schritt 208.

Geht auf das Suchsignal keine Antwort ein, schaltet die Stelleinheit 43 das Kommunikationselement 12, 22 wieder aus, Schritt 206.

Weiter aktiviert die Stelleinheit43 die Zeitsteuerung 45, die daraufhin die Meßeinheit 46 im Rahmen zyklischen Ein-und Ausschaltbetriebes für eine vorbestimmte Zeit durch entsprechendes Ansteuern des Schalters 44 einschaltet, Schritt 210. Die Meßeinheit 46 führt darauf eine Messung der überwachten Schwingkreiseigenschaft durch und speichert den Meßwert, Schritt 212. Aus allen bis dahin ermittelten und gespeicherten Meßwerten bildet sie nachfolgend einen Meßwertdurchschnitt, Schritt 214.

Mit dem ermittelten Meßwertdurchschnitt vergleicht sie den in Schritt 212 gewonnenen Meßwert, Schritt 216. Entspricht der Meßwert dem Durchschnitt, so befindet sich kein anderes Gerät 10, 20, 30 im Erkennungsbereich des Übertragungsschwingkreises 50. Die Meßeinheit 46 führt dann keine weitere Funktion aus und wird durch Einwirkung der Zeitsteuerung 45 ausgeschaltet, Schritt 218. Die Meßeinheit 46 bleibt danach ausgeschaltet, während die Zeitsteuerung 45 den Ablauf einer vorbestimmten Ausschaltzeit

abwartet, Schritt 220. Die Ausschaltzeit ist zweckmäßig größer gewählt als die Einschaltzeit, in der die Meßeinheit 46 die Messung ausführt.

Während der Wartezeit kann das Gerät 10, 20 als Ganzes, etwa durch Betätigen des Schalters 40, ausgeschaltet werden, Schritt 222. Tritt dieser Fall ein, endet der Betriebsablauf, Schritt 224.

Läuft die vorbestimmte Ausschaltzeit ab, ohne daß das Gerät insgesamt ausgeschaltet wurde, schaltet die Zeitsteuerung 45 durch Betätigen des Schalters 44 die Meßeinheit 46 erneut ein und wiederholt die Schritte 210 ff..

Ergibt sich bei der Prüfung in Schritt 216, daß ein gefundener Meßwert nicht dem ermittelten Meßwertdurchschnitt entspricht, so befindet sich ein anderes Gerät 10, 20, 30 im Erkennungsbereich des Schwingkreises 50, Schritt 226. Die Meßeinheit 46 übermittelt der Stelleinheit 43 dann ein entsprechendes Steuersignal, auf das hin die Stelleinheit 43 die Kommunikationsvorrichtung 1, 2, 3 in den Suchmodus bringt. Sie schaltet hierzu durch Betätigen des Schalters 44 die Meßeinheit 46 aus, Schritt 228, und das Kommunikationselement 12, 22 durch Betätigen des Schalters 42 ein, Schritt 230.

Das Kommunikationselement 12, 22 stellt anschließend wie beschrieben den Datenübertragungsmodus her in, welchem dann der Datenaustausch zwischen den Datenverarbeitungskomponenten 11, 21 der beteiligten Geräte erfolgt, Schritt 208.

Unter Beibehaltung des Grundgedankens, ein Kommunikationselement, das automatisch eine Datenverbindung zu einem korrespondierenden gleichartigen Kommunikationselement aufbaut, nur einzuschalten, wenn zuvor die Anwesenheit eines solchen korrespondierenden Kommunikationselementes

bereits festgestellt wurde, gestattet das vorbeschriebene Konzept eine Reihe von Ausgestaltungen. So kann bei völlig gleicher Funktionalität der Aufbau der intelligenten Geräte 10, 20, 30 von dem Beschriebenen abweichen. Vor allem können die genannten Bauelemente durch entsprechend wirkende andere Baugruppen oder Schaltungen ersetzt werden. Auch ist die für die Beschreibung gewählte Aufteilung der intelligenten Geräte und Kommunikationselemente, Schallvorrichtung, Meßeinrichtung und Datenverarbeitungskomponente willkürlich und kann ohne Einfluß auf die Funktionalität anders gefaßt werden. Insbesondere können die Funktionalitäten von Stelleinheit 43, Zeitsteuerung 45 und Meßeinheit 46 ganz oder teilweise in Softwareform in der zentralen Prozessoreinheit des Gerätes 10, 20, 30 realisiert sein. In gewissem Rahmen ist auch eine vereinfachte Ausführung der vorbeschriebenen Erfindung denkbar. Beispielsweise kann im Suchmodus das Ändern der Resonanzfrequenz im Übertragungsschwingkreis 50 und damit die Notwendigkeit zur Bereitstellung der Kapazität 51 entfallen.

Patentansprüche

1. Kommunikationsvorrichtung zur Einrichtung einer Datenverbindung zwischen intelligenten Geräten mit

einer Spule (13, 23, 33), die Teil eines Übertragungsschwingkreises (50) ist, zur Durchführung eines berührungslosen Datenaustausches,

einem Kommunikationselement (12, 22), das mit der Spule (13, 23, 33) und der Datenverarbeitungskomponente (11, 21) eines intelligenten Gerätes (10, 20, 30) verbunden ist und das über die Spule (13, 23, 33) Suchsignale aussendet, um von einem anderen intelligenten Gerät (10, 20, 30) eine Antwort zu erhalten,

eine Meßeinrichtung (14, 24) zur Überwachung einer Eigenschaft des Übertragungsschwingkreises (50), welche bei Feststellen einer Änderung der überwachten Eigenschaft ein Steuersignal ausgibt,

und einer Schaltvorrichtung (15, 25), die mit der Meßeinrichtung (14, 24) und dem Kommunikationselement (12, 22) verbunden ist und die das Kommunikationselement (12, 22) einschaltet, wenn sie von der Meßeinrichtung (14, 24) ein Steuersignal erhalten hat.

2. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß in den Übertragungsschwingkreis (50) über einen Schalter (47) eine Baugruppe (52) schaltbar ist, welche eine Erhöhung der Bandbreite des Schwingkreises (50) bewirkt.

3. Kommunikationsvorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Baugruppe (52) ein Widerstandselement ist.

4. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß in den Übertragungsschwingkreis (50) über einen Schalter (47) eine Baugruppe (51) schaltbar ist, welche eine Änderung der Resonanzfrequenz des Übertragungsschwingkreises (50) bewirkt.

5. Kommunikationsvorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Baugruppe (51) eine Senkung der Resonanzfrequenz bewirkt.

6. Kommunikationsvorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Baugruppe (51) eine Kapazität beinhaltet.

7. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Resonanzfrequenz des Übertragungsschwingkreises (50) über einen vorbestimmten Frequenzbereich wobbelbar ist.

8. Kommunikationsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Schaltvorrichtung (15, 25) eine Zeitsteuerung (45) aufweist, mittels derer die Meßeinrichtung (14, 24) zyklisch ein- und ausschaltbar ist.

9. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Zeitsteuerung (45) den Einschaltzustand der Meßeinrichtung (14, 24) kürzer hält als den Ausschaltzustand.

10. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Meßeinrichtung (14, 24) einen während einer zyklischen Einschaltphase gewonnen Meßwert speichert.

11. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß die Meßvorrichtung (14, 24) ein Steuersignal an die Schaltvorrich-

tung (15, 25) abgibt, wenn ein Meßwert vom Mittelwert der mit den vorhergehenden Einschaltphasen gespeicherten Meßwerte abweicht.

12. Kommunikationsvorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß bei Einschalten des intelligenten Gerätes (10, 20, 30) zunächst das Kommunikationselement (12, 22) eingeschaltet und die Meßvorrichtung (14, 24) ausgeschaltet ist.

13. Verfahren zum Einschalten eines Kommunikationselementes, das unter Verwendung einer Spule (13, 23, 33), die Teil eines Übertragungsschwingkreises (50) ist, zum automatischen Aufbau einer Datenverbindung zu einem intelligenten Gerät (10, 20, 30) eingerichtet ist, welches ebenfalls über ein Kommunikationselement (12, 22) und einer Spule (13, 23, 33) verfügt, mit folgenden Schritten:

Überwachen einer Kenngröße des Übertragungsschwingkreises (50) mittels einer Meßvorrichtung (14, 24),

Erzeugen eines Steuersignales bei Auftreten einer Änderung der überwachten Kenngröße,

Einschalten des Kommunikationselementes (12, 22) durch eine Schaltvorrichtung (15, 25) aufgrund des Steuersignales.

14. Verfahren nach Anspruch 13, dadurch gekennzeichnet, daß die Resonanzfrequenz des Übertragungsschwingkreis (50) während der Überwachung der Kenngröße über einen vorgegeben Frequenzbereich gewobbelt wird.

Zusammenfassung

Die Erfindung betrifft eine Kommunikationsvorrichtung zur automatischen Einrichtung einer Datenverbindung zwischen zwei intelligenten Geräten (10, 20, 30). Die Vorrichtung umfaßt eine Spule (13, 23, 33) zur Durchführung eines berührungslosen Datenaustausches, welche Teil eines Übertragungsschwingkreises (50) ist, ein Kommunikationselement (12, 22), das mit der Spule (13, 23, 33) und der Datenverarbeitungskomponente (11, 21) eines intelligenten Gerätes (10, 20, 30) verbunden ist und über die Spule (13, 23, 33) Suchsignale aussendet, um von einem anderen intelligenten Gerät (10, 20, 30) eine Antwort zu erhalten, eine Meßeinrichtung (14, 24) zur Überwachung einer Eigenschaft des Übertragungsschwingkreises (50), welche bei Feststellen einer Änderung der überwachten Eigenschaft ein Steuersignal ausgibt, sowie eine Schaltvorrichtung (15, 25), die mit der Meßeinrichtung (14, 24) und dem Kommunikationselement (12, 22) verbunden ist und die das Kommunikationselement (12, 22) einschaltet, wenn sie von der Meßeinrichtung (14, 24) ein Steuersignal erhalten hat.

(Fig. 2)

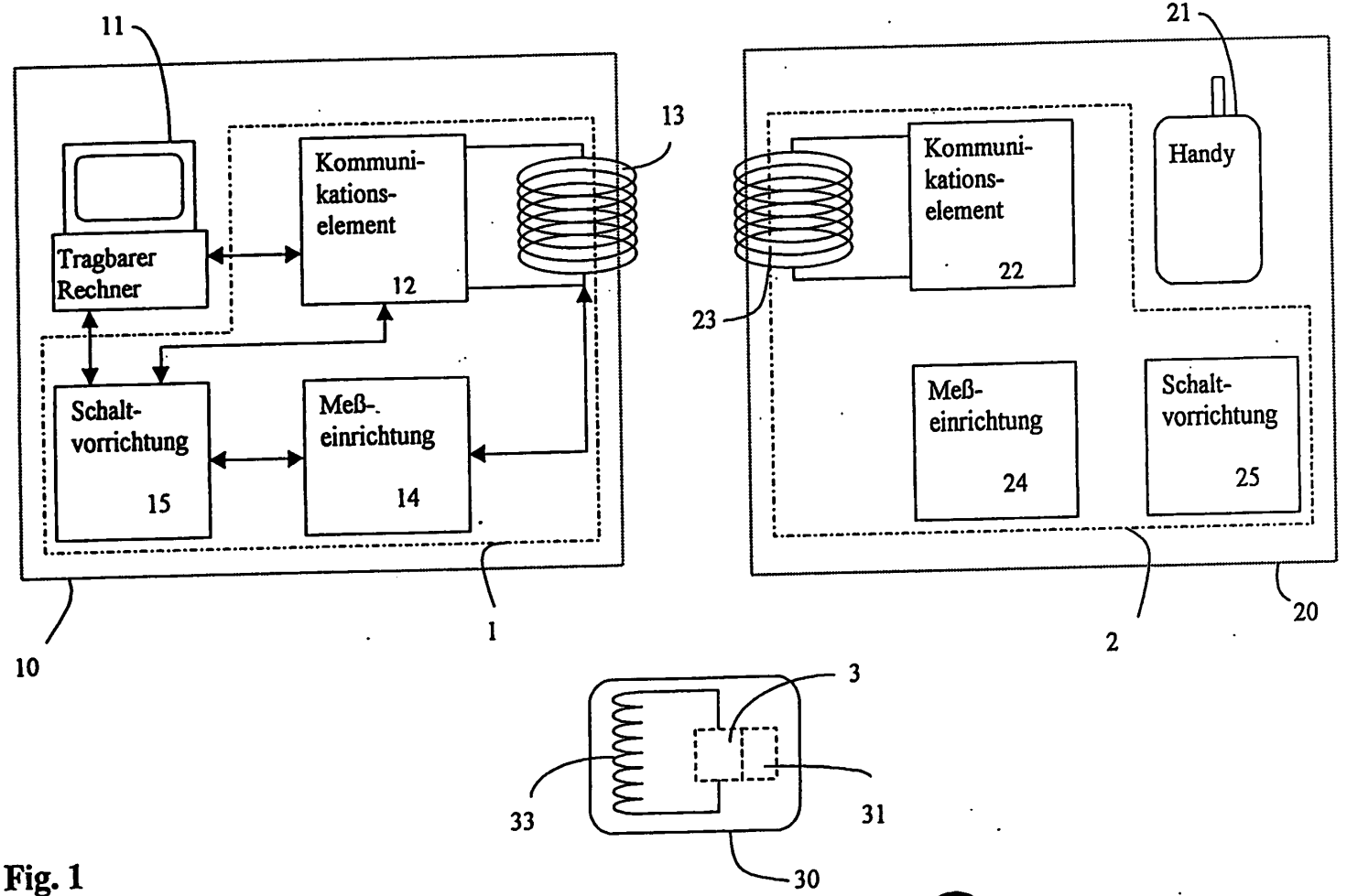


Fig. 1

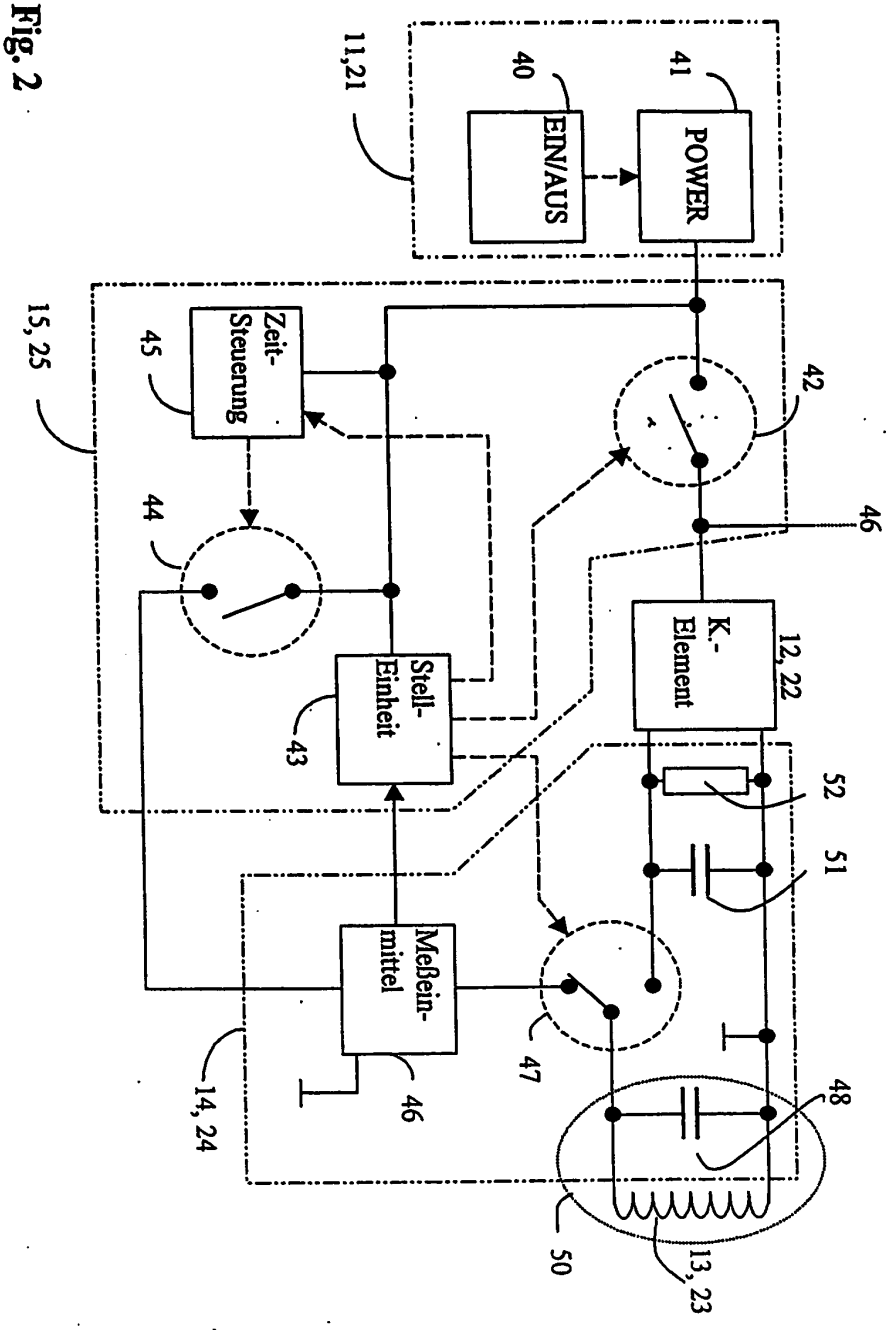

11,21
40
EIN/AUS
41
POWER
15, 25
Zeit-
Steuerung
45
42
46
44
K.-
Element
12, 22
Stell-
Einheit
43
52
51
Meßein-
mittel
47
48
14, 24
46
50
13, 23

Fig. 2

Fig. 3

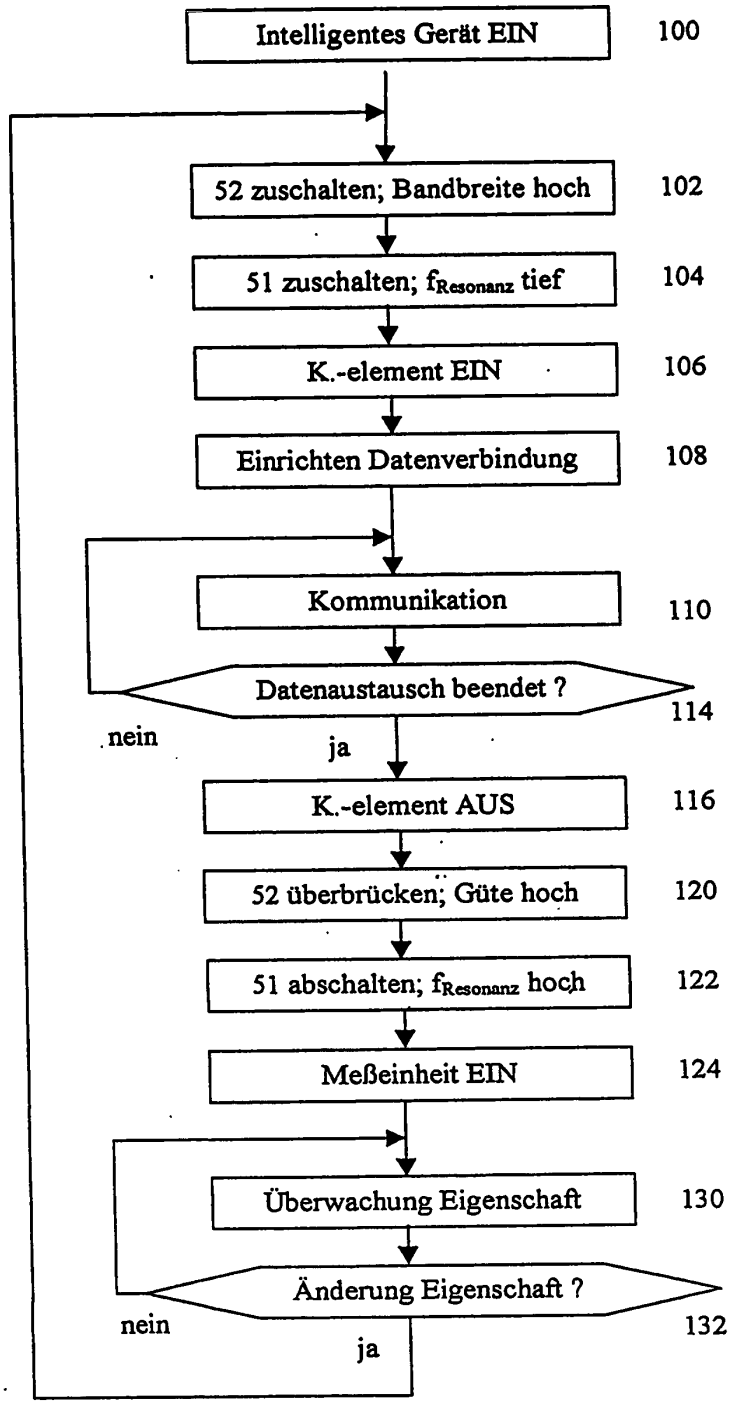
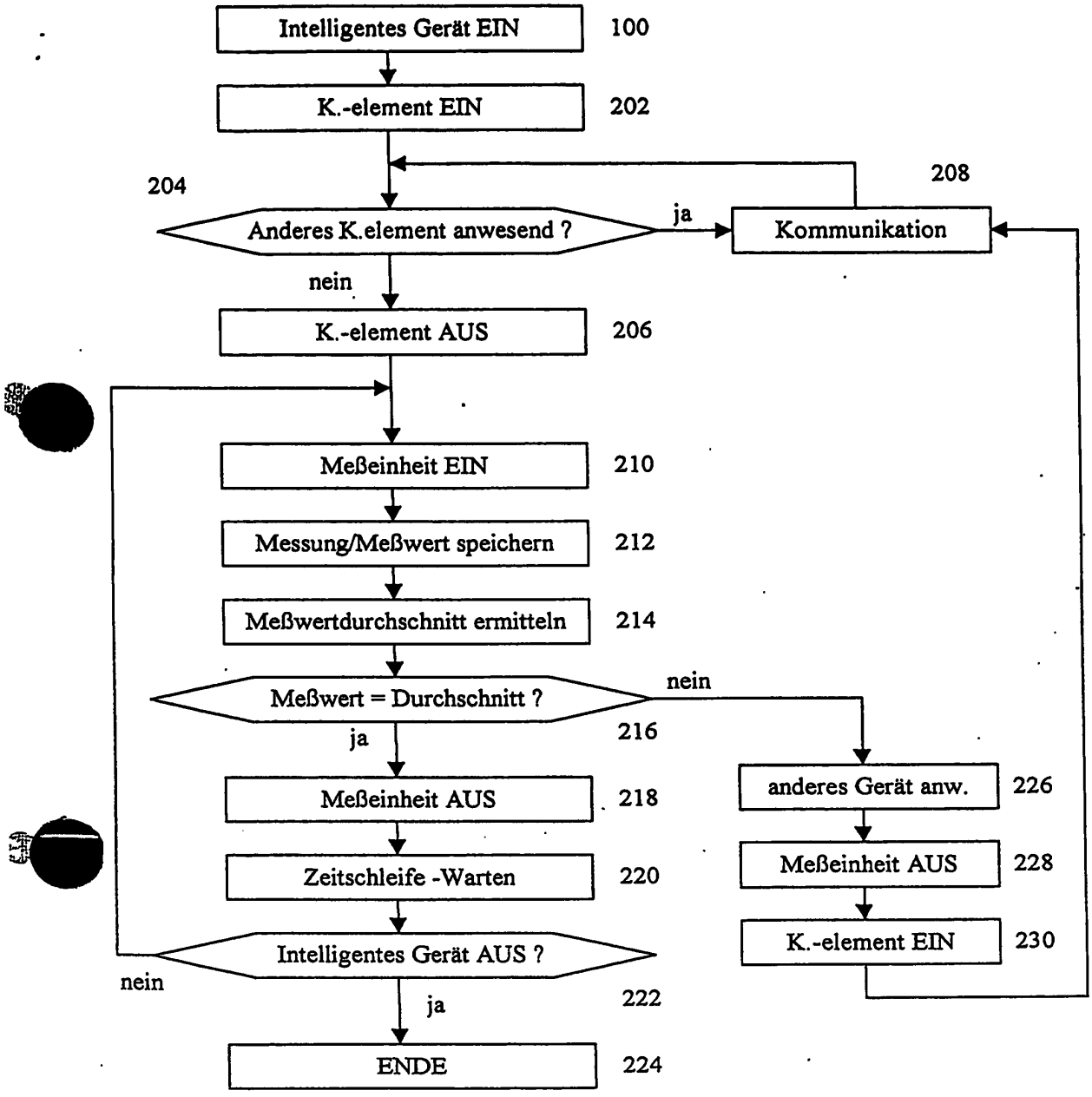

Intelligentes Gerät EIN
100
52 zuschalten; Bandbreite hoch
102
51 zuschalten; $f_{Resonanz}$ tief
104
K.-element EIN
106
Einrichten Datenverbindung
108
Kommunikation
110
Datenaustausch beendet ?
114
nein
ja
K.-element AUS
116
52 überbrücken; Güte hoch
120
51 abschalten; $f_{Resonanz}$ hoch
122
Meßeinheit EIN
124
Überwachung Eigenschaft
130
Änderung Eigenschaft ?
132
nein
ja

Fig. 4


Intelligentes Gerät EIN
100
K.-element EIN
202
204
208
Anderes K.element anwesend ?
ja
Kommunikation
nein
K.-element AUS
206
Meßeinheit EIN
210
Messung/Meßwert speichern
212
Meßwertdurchschnitt ermitteln
214
Meßwert = Durchschnitt ?
nein
216
ja
Meßeinheit AUS
218
anderes Gerät anw.
226
Zeitschleife -Warten
220
Meßeinheit AUS
228
Intelligentes Gerät AUS ?
K.-element EIN
230
nein
ja
222
ENDE
224

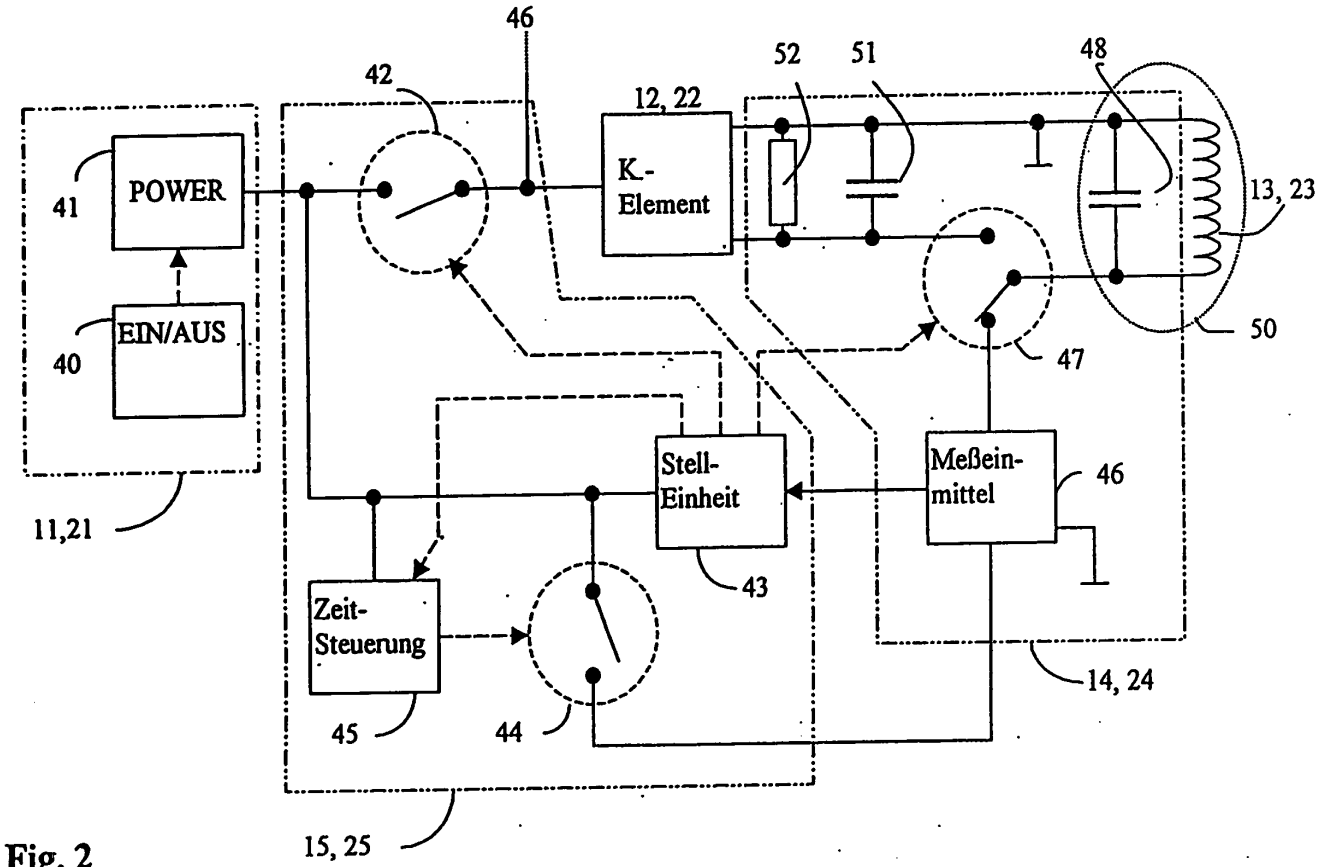


Fig. 2

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

To:

UNITED STATES PATENT AND TRADEMARK OFFICE
Commissioner for Patents,
P.O.Box 1450
Alexandria VA 22313 -1450
ETATS-UNIS D'AMERIQUE

PCT

INTERNATIONAL APPLICATION STATUS FORM
(IASF)

Date of issue of this IASF:
(the information contained in this IASF reflects the status of the international application as of this date)
09 February 2006 (09.02.2006)

I - INTERNATIONAL APPLICATION		
I-1	International application number:	PCT/EP2004/008537
I-2	International filing date:	29 July 2004 (29.07.2004)
I-3	Earliest priority date:	30 July 2003 (30.07.2003)
I-4	Title of the invention:	COMMUNICATION DEVICE FOR ESTABLISHING A DATA CONNECTION BETWEEN INTELLIGENT APPLIANCES
I-5	International Patent Classification:	[7] H04B 5/00, G06K 7/00, 19/07
I-6	Language of filing:	German
I-7	The State for which the Office acts as a designated Office has been designated in the international application:	Yes
I-7-1	Indication of the State(s) designated in the international application in respect of which the Office acts as a designated Office (only where the designated Office is a regional Office):	Not applicable
I-7-2	The international application has been considered withdrawn in a declaration made by the receiving Office on (date):	Not applicable
I-7-3	The international application or the designation of the State for which the Office acts as a designated Office has been withdrawn by the applicant (date on which withdrawal became effective):	Not applicable
I-7-4	Kind of protection or treatment:	Patent
I-7-4-1	Identification of parent application or parent grant:	Not applicable
I-8	Date of receipt of record copy by the International Bureau:	18 August 2004 (18.08.2004)
I-9	Applicant(s) and/or inventor(s) for the State(s) for which the Office acts as a designated Office	
I-9-1	Applicant and/or inventor	
I-9-1-1	Data currently on record	
I-9-1-1-1	Applicant's and/or inventor's name:	FINKENZELLER, Klaus
I-9-1-1-2	Address:	Georg Wopfner-Strasse 54 80939 München Germany
I-9-1-1-3	State of nationality:	DE
I-9-1-1-4	State of residence:	DE
I-9-1-1-5	This person is:	Applicant and inventor

I-9-1-2	Data previously on record (in case of a change recorded by the International Bureau under Rule 92*bis*):	No data previously on record available for inclusion in this IASF; any such data is available from the IB.
I-9-1-3	Indication of the State(s) designated in the international application for the purposes of which the person is an applicant and/or inventor (only where the designated Office is a regional Office):	Not applicable
I-10	The international application contains sequence listings and/or tables filed under Section 801(a) of the Administrative Instructions:	No
I-11	The following declaration(s) referred to in Rule 4.17 made for the purposes of the State(s) for which the Office acts as a designated Office was (were) contained in the international application as filed or received by the International Bureau before the expiration of the time limit under Rule 26*r*.1:	
I-11-1	Declaration(s) as to the identity of the inventor (Rules 4.17 (i) and 51*bis*.1(a)(i)):	Not applicable
I-11-2	Declaration(s) as to the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51*bis*.1(a)(ii)):	Not applicable
I-11-3	Combined declaration(s) as to the identity of the inventor (Rules 4.17(i) and 51*bis*.1(a)(i)) and the applicant's entitlement, as at the international filing date, to apply for and be granted a patent (Rules 4.17(ii) and 51*bis*.1(a)(ii)) :	Not applicable
I-11-4	Declaration(s) as to the applicant's entitlement, as at the international filing date, to claim the priority of the earlier application (Rules 4.17(iii) and 51*bis*.1(a)(iii)):	Not applicable
I-11-5	Declaration(s) of inventorship (onlyfor the purposes of the designation of the United States of America) (Rules 4.17 (iv) and 51*bis*.1(a)(iv)):	Not applicable
I-11-6	Declaration(s) as to non-prejudicial disclosures or exceptions to lack of novelty (Rules 4.17(v) and 51*bis*.1(a)(v)):	Not applicable
II - PRIORITY CLAIM(S)		
II-1	Number of earlier application:	103 34 765.8
II-1-1	Filing date of earlier application:	30 July 2003 (30.07.2003)
II-1-2	Country in which, or regional Office or receiving Office with which earlier application was filed (where the earlier application is an ARIPO application, indication of the country party to the Paris Convention or Member of the World Trade Organization for which that earlier application was filed):	DE
II-1-3	Priority document received at the International Bureau on:	27 August 2004 (27.08.2004)
II-1-4	Priority document submitted or transmitted in compliance with Rule 17.1(a) or (b) (only where priority document was received at the International Bureau):	Yes
II-1-5	Applicant has requested the receiving Office to prepare and transmit the priority document in compliance with Rule 17.1(b) (only where no priority document was received at the International Bureau):	Not applicable
II-1-6	Priority claim withdrawn by a notice from the applicant (date on which withdrawal became effective; if the notice of withdrawal was received by the International Bureau after completion of technical preparations for international publication, such withdrawal will not have been reflected in the pamphlet) (Rule 90*bis*.3):	Not applicable
II-1-7	Declaration by the receiving Office or the International Bureau that priority claim is considered, for the purposes of the procedure under the Treaty, not to have been made (date of declaration) (Rule 26*bis*.2(b)):	Not applicable

III - INTERNATIONAL SEARCH REPORT		
III-1	International Searching Authority carrying out the international search:	ISA/EP
III-2	International search report or declaration under Article 17 (2)(a) received by the International Bureau:	Yes
III-3	Corrected version(s) of the international search report (if any) received by the International Bureau:	Not applicable
IV - REFERENCE TO DEPOSITED BIOLOGICAL MATERIAL		**Not applicable**
V - INTERNATIONAL PUBLICATION		
V-1	International publication number:	WO 2005/013506 (A1)
V-2	International publication date:	10 February 2005 (10.02.2005)
V-3	Language of publication:	German
V-4	Number of figure of drawing published together with the abstract:	2+T
V-5	Republication(s) (republication date(s) and reason(s)):	Not applicable
VI - INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (CHAPTER I)		
VI-1	International preliminary report on patentability (Chapter I) issued by the International Bureau on:	Not applicable
VI-2	Corrected version(s) of the international preliminary report on patentabilty (Chapter I) (if any) issued by the International Bureau on:	Information not available for inclusion in this IASF
VII - INTERNATIONAL PRELIMINARY EXAMINATION		
VII-1	A demand electing the State(s) for which the Office acts as an elected Office has been received by the International Preliminary Examining Authority (where the elected Office is a regional Office, indication of the State(s) elected in respect of which the Office acts as an elected Office):	No

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. +41 22 740 14 35

Authorized officer
Agnes Wittmann-Regis

e-mail pct.cor@wipo.int
Telephone No. +41 22 338 83 38

DO/ EO WORKSHEET

Paralegal/ National Stage Division

U.S. Appl. No. 10/565732 International Appl. No. _____

Application filed by : ☐ 20 months ☑ 30 months

WIPO PUBLICATION INFORMATION :

Publication No.: WO2005/013526 Publication Language : ☐ English ☐ German ☐ Japanese ☐ Chinese ☐ Korean ☐ French ☐ Spanish ☐ Russian ☐ Other : _____

Publication Date : 10 Feb 05 Not Published : ☐ U.S. only designated ☐ EP request Published : ☐ EP request

INTERNATIONAL APPLICATION PAPERS IN THE APPLICATION FILE :

- ☑ International Application *(RECORD COPY)*
- ☐ Article 19 Amendments
- ☐ PCT/IPEA/409 IPER : ☐ EP ☐ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ ___
  - ☐ PCT/IPEA/409 IPER was NOT AVAILABLE at the time of paralegal review
- ☐ Annexes to 409
- ☑ Priority Document (s) No. 1
- ☐ PCT/IB/331
- ☐ Request form PCT/RO/101
- ☑ PCT/ISA/210 - Search Report : ☐ EP ☐ JP ☐ SE ☐ AU ☐ US ☐ FR ☐ CN ☐ ES ☐ RU ☐ AT ☐ KR ☐ OTHER ___ ☐ NONE
- ☐ Search Report References
- ☐ Other : _____

RECEIPTS FROM THE APPLICANT *(other than checked above) :*

- ☐ Basic National Fee *(or authorization to charge)*
- ☑ 25 Description ☑ 4 Claims ☑ 1 Abstract
- ☑ Drawing Figure(s) - (# of drwgs. 6)
- ☐ Translation of Article 19 Amendments ☐ entered ☐ not entered :
  - ☐ not a page for page substitution
  - ☐ replaced by Article 34 Amendment
- ☐ Annexes to 409 ☐ entered ☐ not entered :
  - ☐ not a page for page substitution
  - ☐ no translation ☐ other : _____
- ☑ Application Data Sheet
- ☐ Power of Attorney/ Change of Address
- ☑ Preliminary Amendment(s) Filed on : 1. 24 Jan 06 2. _____ 3. _____
- ☐ Information Disclosure Statement(s) Filed on : 1. _____ 2. _____ 3. _____
- ☐ Assignment Document (forwarded to Assignment Branch) 1. _____
- ☐ Assignee PG Publication Notice
- ☐ Substitute Specification Filed on : 1. _____ 2. _____
- ☐ Verified Small Status Statement 1. _____
- ☐ Oath/ Declaration (executed)
  - ☐ unsigned ☐ no citizenship
- ☐ DNA Diskette ☐ Sequence Listing
- ☐ Other : _____

NOTES : ☐ I.A. used as Specification ☐ Other :

35 U.S.C. 371 - Receipt of Request (PTO-1390)
Date Acceptable Oath/ Declaration Received — Rec'd PCT/PTO 24 JAN 2006
Date of Completion of requirements under 35 U.S.C. 371
Date of Completion of ALL requirements
Date of Completion of DO/ EO 903 - Notification of Acceptance
Date of Completion of DO/ EO 905 - Notification of Missing Requirements
Date of Completion of DO/ EO 909 - Notification of Abandonment
Date of Completion of DO/ EO 916 - Notification of Defective Response
Date of Completion of DO/ EO 922 - Notification to Comply w/ Requirements for Patent Applications Containing Nucleotide and/or Amino Acid Sequence Disclosures
Date of Completion of DO/ EO 923

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 10/765732

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))							300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))							400
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))							200
TOTAL CLAIMS (37 CFR 1.16(i))	16 minus 20 =	*	X =		OR	X =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	X =			X =	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
			TOTAL			TOTAL	

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X =		OR	X =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X =		OR	X =	
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

MULTIPLE DEPENDENT CLAIM FEE CALCULATION SHEET

(FOR USE WITH FORM PTO-875)

SERIAL NO. 10/565732

FILING DATE

APPLICANT(S)

CLAIMS

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
1	1					
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TOTAL IND.	2	⬇		⬇		⬇
TOTAL DEP.	14	⬅		⬅		⬅
TOTAL CLAIMS	16					

	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT	
	IND.	DEP.	IND.	DEP.	IND.	DEP.
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TOTAL IND.		⬇		⬇		⬇
TOTAL DEP.		⬅		⬅		⬅
TOTAL CLAIMS						

PTO - 1360 (REV. 11/04)

U.S. DEPARTMENT of COMMERCE
Patent and Trademark Office

PTO/SB/06 (12-04)
Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number: 10/750,752

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))							300
SEARCH FEE (37 CFR 1.16(k), (l), or (m))							400
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))							200
TOTAL CLAIMS (37 CFR 1.16(i))	16 minus 20 =	* 0	x =		OR	x =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	* 0	x =		OR	x =	
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	900

APPLICATION AS AMENDED – PART II

Preamend 1-24-06

AMENDMENT A	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDI-TIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDI-TIONAL FEE ($)
Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0	x =		OR	x =	
Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
1,15					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDI-TIONAL FEE ($)	OR	RATE ($)	ADDI-TIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))							OR		
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.