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Kühnert

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[54] **METHOD AND APPARATUS FOR THE PROTECTION OF PEOPLE OR OBJECTS**

0378301	7/1990	European Pat. Off. .
3119112	5/1981	Germany .
3618416	5/1986	Germany .
3733808	10/1987	Germany .
2248331	4/1992	United Kingdom .
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Attorney, Agent, or Firm—Diller, Ramik & Wight

[21] Appl. No.: **347,139**

[22] Filed: **Nov. 23, 1994**

[57] **ABSTRACT**

[51] Int. Cl.⁶ **G08B 13/22; G08B 21/00**

[52] U.S. Cl. **340/573; 340/539; 340/568**

[58] Field of Search **340/539, 573, 340/568**

An alarm signal is triggered in the event of a prohibited approach or removal of people or objects which affords reliable and unobtrusive protection of such people or objects while retaining unhindered mobility. A signal is transmitted by a transmitter 14 which causes the blockage of an alarm signal until the distance between the transmitter 14 and the receiver 2 is greater or smaller than a predetermined value or the transmission between the transmitter 14 and the receiver 2 is interrupted. It is also possible to gain a representative distance signal corresponding to the distance between the two security elements which causes a corresponding change of pitch or volume of the alarm signal.

[56] **References Cited**

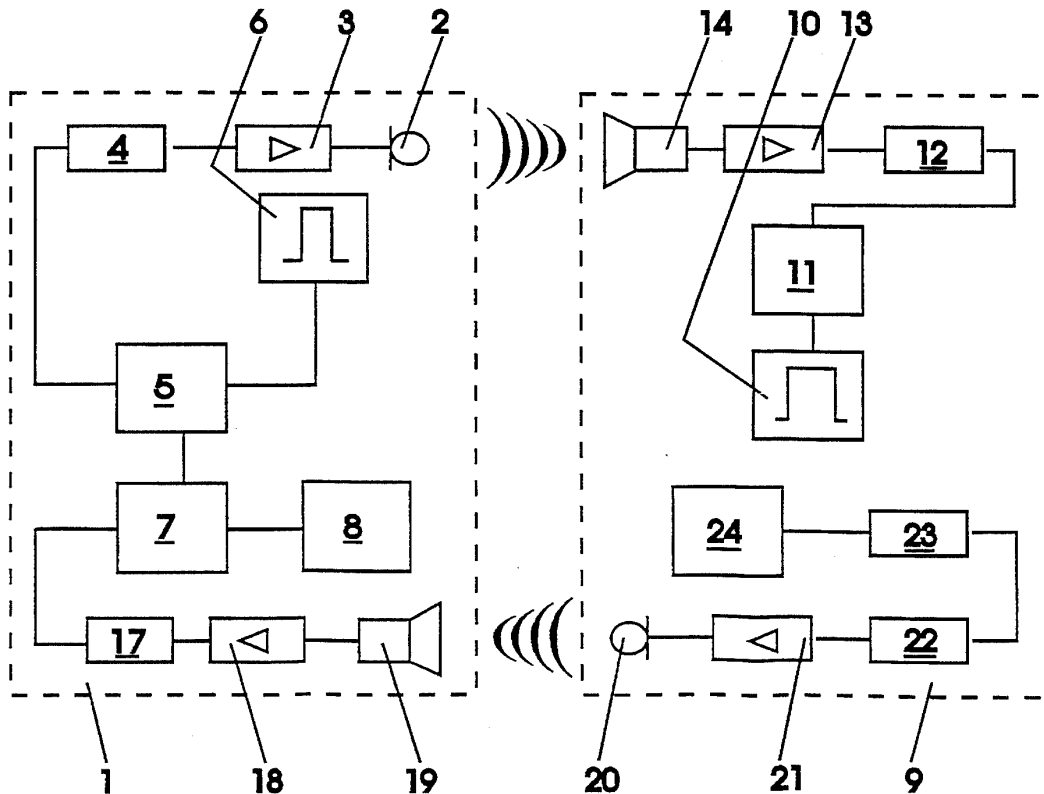
U.S. PATENT DOCUMENTS

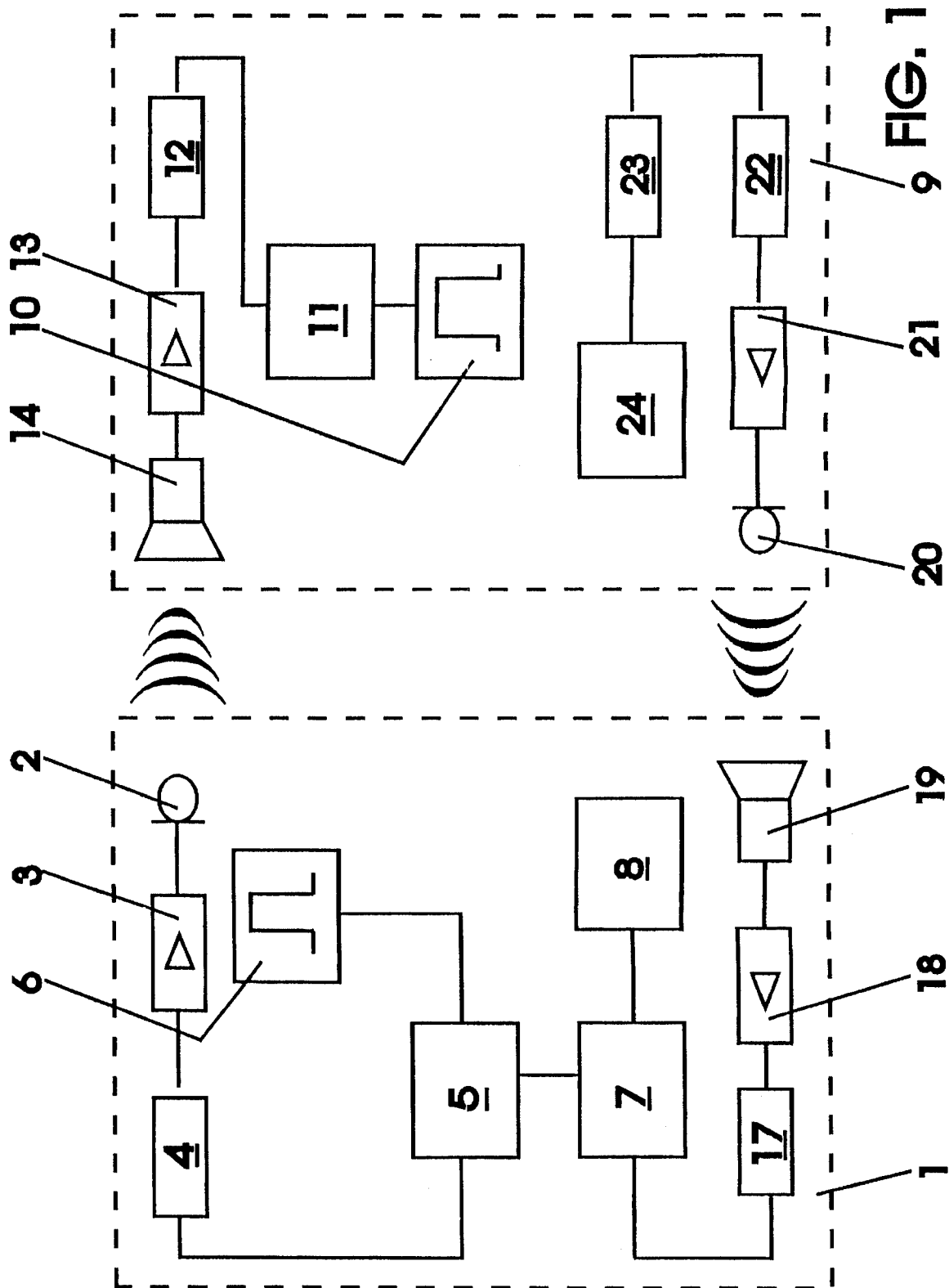
4,675,656	6/1987	Narcisse	340/539
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0073681 3/1983 European Pat. Off. .

10 Claims, 3 Drawing Sheets





9 FIG. 1

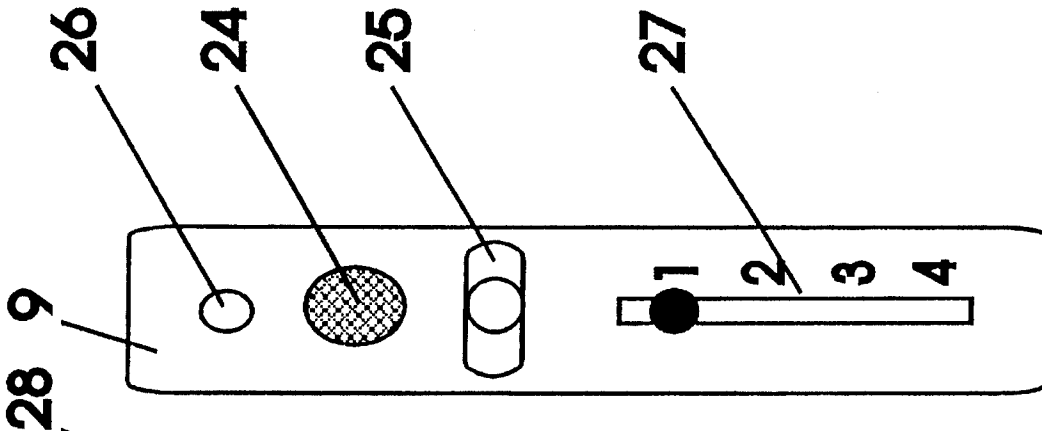


FIG. 2c

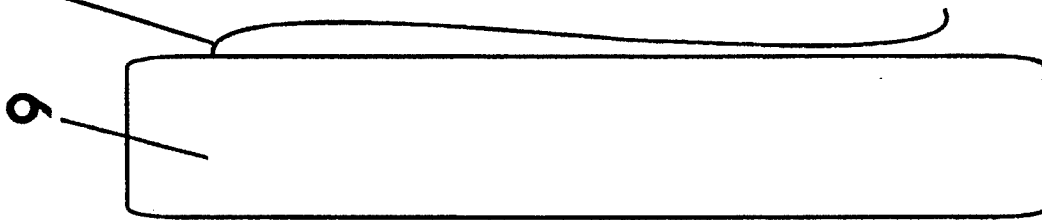


FIG. 2b

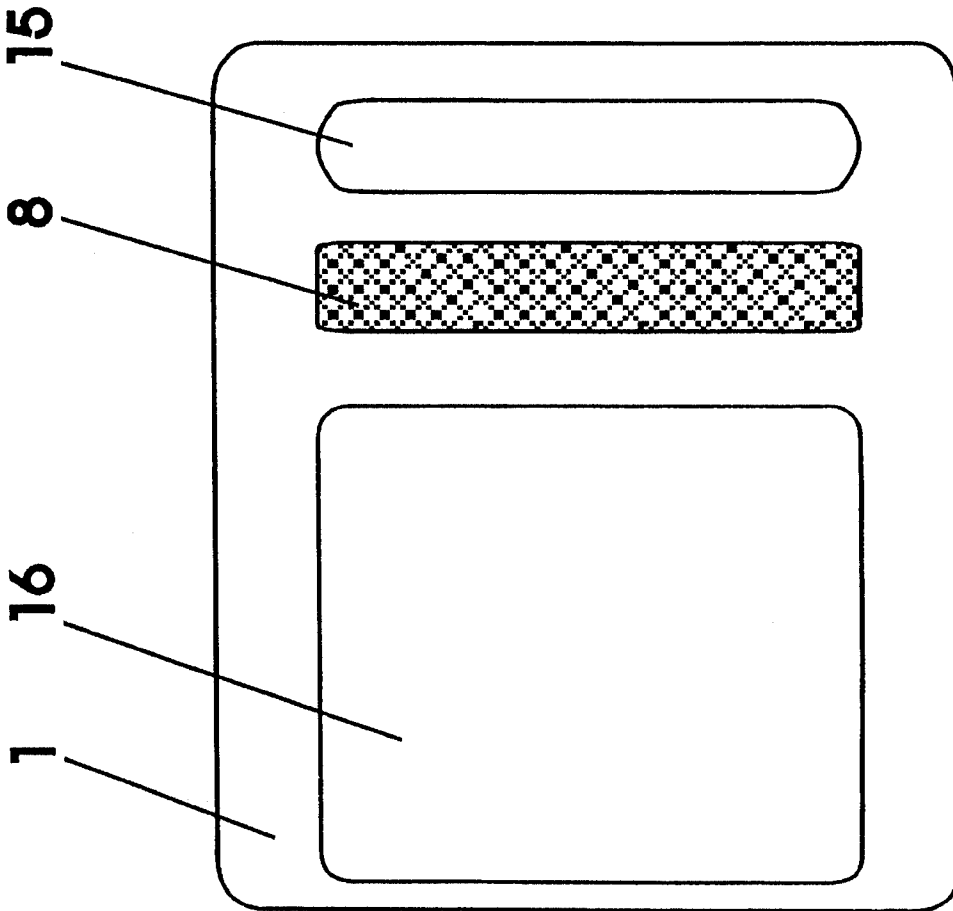


FIG. 2a

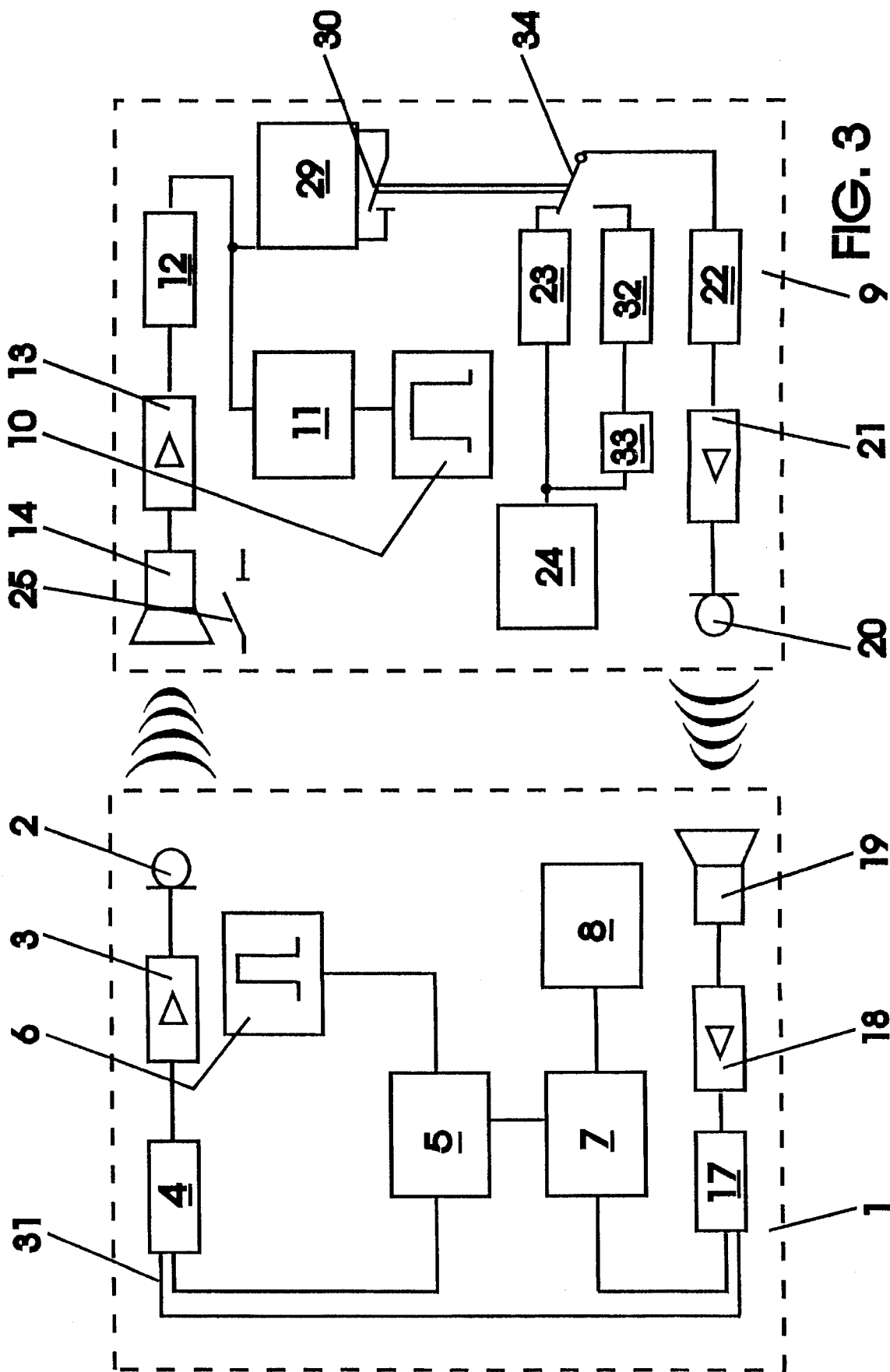


FIG. 3

METHOD AND APPARATUS FOR THE PROTECTION OF PEOPLE OR OBJECTS

BACKGROUND OF THE INVENTION

The invention relates to a method of and apparatus for the protection of people or objects whereby an alarm signal is actuated in case of a prohibited approach or removal of people or objects, whereby a signal is transmitted by a transmitter, causing a blockage of the release of the alarm signal until the distance between the transmitter and the receiver falls below or exceeds a predetermined value or in case of an interruption of the transmission between the transmitter and the receiver by means of which a representative distance signal is determined from a reception signal received by a receiver which corresponds to the distance between the transmitter and the receiver and which is compared to a preadjustable reference value, causing the triggering of the alarm signal in case of a positive or negative deviation from said reference value.

Furthermore, the invention relates to an apparatus for the protection of people or objects comprising a first security element which is attachable to the protected object and a second, portable or arbitrarily attachable second security element, where a wireless connection or a wire connection between the first and the second security element exists, and a device for giving the alarm that is located in or close to one of the security elements which is triggered by a change of the distance between the two security elements or by an interruption of the connection.

Different processes and apparatuses concerning the protection of people are known that give an automatically or manually triggered alarm signal.

Such an apparatus in the form of a signaling device is known that is connected to the object to be secured by means of a flexible cord. This device can be activated by means of a personal code. In the activated status this apparatus sounds an alarm signal upon movement of the secured object and therefore of the device takes place.

It is of a disadvantage that every time when the object is to be secured the activation has to be carried out. Next to the fact that this is rather time consuming and that a deactivation has to be carried out, since otherwise unpleasant false alarms are actuated, one often refrains from an activation, so that a protection is not given. For example, in case of a short term set down of luggage at a check-in counter or a railway station, where danger of theft is rather high, the protection is often not carried out for the sake of convenience.

Furthermore, an apparatus is known consisting of a main device and peripheral devices for signaling. The main device is provided with a power supply and is connected to the peripheral devices for signaling in such a manner that an alarm signal on the main device is triggered if one of the peripheral devices sends a signal to the main device, which is the case, in case of a movement in the environment of detection of the signaling device.

With this apparatus, depending on the field of use, a protection of objects or people can be carried out, but the use is always restricted to a stationary use and only gives signal in case of a movement in the environment of detection. A marking, for example for locating a stolen object, cannot be carried out.

Further alarm devices are known which are preferably used for the protection of doors. To achieve this, two protection elements are used that are fastened to the door or

for example, a magnetic coupler. If this connection is broken which is the case when the door is opened, an alarm signal is triggered. An activation/deactivation of the alarm apparatus and the turning off of the alarm signal is achieved by means of a personal code. The triggering of the alarm signal can be adjusted with the time lag.

Such an apparatus is usually restricted to a stationary use and usually used for objects that are very near to one another since only this enables the connection of the two security elements.

From the DE-OS 36 18 416 a further apparatus for the surveillance of luggage or the like is known which consists of a first security element, constructed as satellite devices, and a second security element in form of a central unit. The first protection element and the second protection element are in wireless communication.

Therewith, the central unit transmits signals to the satellite devices which cause returning signals to be emitted from the satellite devices which comprise a code corresponding to the satellite device.

This apparatus has the disadvantage that next to a continuous transmission from the satellite devices, which has the disadvantage of a high energy consumption, the central unit can only evaluate if an object is within the area of surveillance or not. If they are outside of the area of surveillance or if the transmission is interrupted, a search for the lost objects is no longer possible.

The known apparatuses generally comprise two security elements which are in wireless communication with one another. Therewith, one security element is arbitrarily attachable to the protected object or to the person that is to be protected and the other protection element is situated in a room that represents the area of surveillance or is carried by a person once to secure the object.

In EP-A-0 073 681 a solution is described with a transmitter, located in a security element, which transmits a pulsing ultrasonic signal to a receiver in a second security element. The apparatus in the second security element functions as a so called transmitter, with which the received signal is amplified and transmitted to the first security element via a transmitter. There, a receiver is present that passes the received impulse signals to an evaluation circuit. There, the received signal is evaluated in such a manner that an integration of the reception impulses takes place which render a preadjusted value within a predetermined time span. This is normally the case when the distance between the two security elements is too large or the connection is interrupted.

The surveillance-alarm system according to GB-A-2 248 331 functions in a similar manner. Hereby, a request signal from the base unit is sent to a portable transmission unit. This transmits a signal to the receiver in the base unit that evaluates a distance signal from the reception signal, which corresponds to the distance between the base station and the transmission unit. After comparison with the preadjusted value an alarm is actuated if a distance is evaluated that is greater than the preadjusted value.

The U.S. Pat. No. 4,871,997 describes an approach-sensor-apparatus. Hereby, it is possible to miniaturize the security elements, at least one security element, down to a size of a credit card. This apparatus also consists of two parts. One part is carried in a brief case, a wallet or another object that is to be secured. The other part is, for example, attached to a belt, so that alarm is triggered if the brief case

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