



US008690057B2

(12) **United States Patent**
Schoening et al.

(10) **Patent No.:** **US 8,690,057 B2**

(45) **Date of Patent:** **Apr. 8, 2014**

(54) **RADIO FREQUENCY IDENTIFICATION SYSTEM FOR TRACKING AND MANAGING MATERIALS IN A MANUFACTURING PROCESS**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,832,814	A	11/1998	Nakatani
6,600,418	B2	7/2003	Francis et al.
6,661,278	B1	12/2003	Gilliland
6,664,909	B1	12/2003	Hyde et al.
6,842,327	B1	1/2005	Diorio et al.
6,853,583	B2	2/2005	Diorio et al.
6,873,281	B1	3/2005	Esterberg et al.
6,909,389	B1	6/2005	Hyde et al.

(Continued)

FOREIGN PATENT DOCUMENTS

JP	2008-006516	1/2008
----	-------------	--------

OTHER PUBLICATIONS

International Search Report and Written Opinion for Application No. PCT/US2013/029408, dated Jun. 26, 2013.

Primary Examiner — Allyson Trail

(74) Attorney, Agent, or Firm — Marshall, Gerstein & Borun LLP

(71) Applicant: **A-1 Packaging Solutions, Inc.,** St. Charles, IL (US)

(72) Inventors: **Kenneth F. Schoening,** St. Charles, IL (US); **William J. Greaves,** Indianhead Park, IL (US)

(73) Assignee: **A-1 Packaging Solutions, Inc.,** St. Charles, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/857,616**

(22) Filed: **Apr. 5, 2013**

(65) **Prior Publication Data**

US 2013/0233922 A1 Sep. 12, 2013

Related U.S. Application Data

(63) Continuation of application No. PCT/US2013/029408, filed on Mar. 6, 2013.

(60) Provisional application No. 61/607,406, filed on Mar. 6, 2012, provisional application No. 61/708,518, filed on Oct. 1, 2012.

(51) **Int. Cl.**
G07F 19/00 (2006.01)

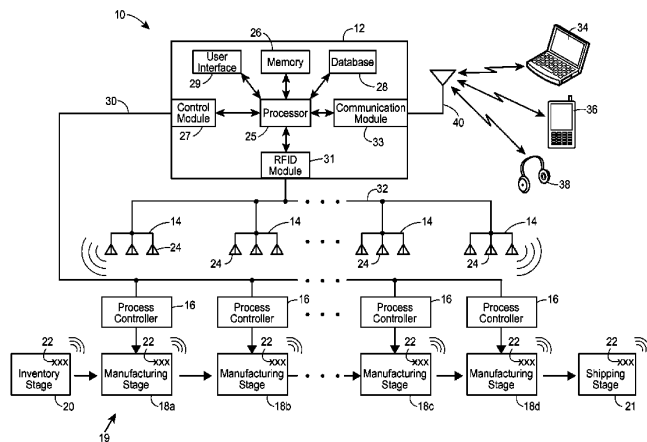
(52) **U.S. Cl.**
USPC **235/385; 340/10.41; 340/572.1**

(58) **Field of Classification Search**
USPC **235/385; 340/10.41, 572.1**
See application file for complete search history.

(57) **ABSTRACT**

A process management system uses a radio frequency identification (RFID) detection system in the form of, for example, a phased array antenna based RFID detection system to track and manage material storage and flow in a manufacturing process or plant. The process management system operates in conjunction with the various machines that implement manufacturing stages or steps of the manufacturing process to assure that the correct materials and processing procedures are used at or on the various production machines of the process to produce a particular product as defined by a job number or job order. The process management system is thereby able to increase the efficiencies of the plant and to increase the quality of the plant production by reducing or eliminating waste, manufacturing errors and shipping errors in the production facility.

30 Claims, 7 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

6,950,342 B2	9/2005	Lindhorst et al.	7,420,469 B1	9/2008	Oliver
6,954,159 B1	10/2005	Cooper et al.	7,423,539 B2	9/2008	Hyde et al.
6,958,646 B1	10/2005	Colleran et al.	D578,114 S	10/2008	Oliver
6,965,142 B2	11/2005	Diorio et al.	7,432,814 B2	10/2008	Dietrich et al.
6,977,527 B1	12/2005	Hyde	7,436,308 B2	10/2008	Sundstrom et al.
7,026,935 B2	4/2006	Diorio et al.	7,448,547 B2	11/2008	Esterberg
7,030,786 B2	4/2006	Kaplan et al.	7,472,835 B2	1/2009	Diorio et al.
7,038,544 B2	5/2006	Diorio et al.	7,482,251 B1	1/2009	Paulsen et al.
7,038,603 B2	5/2006	Diorio et al.	D586,336 S	2/2009	Oliver
7,042,701 B2	5/2006	Diorio et al.	D587,691 S	3/2009	Oliver
7,049,872 B2	5/2006	Diorio et al.	7,525,438 B2	4/2009	Hyde et al.
7,049,964 B2	5/2006	Hyde et al.	D592,192 S	5/2009	Oliver
7,061,324 B2	6/2006	Diorio et al.	7,528,724 B2	5/2009	Horch
7,071,507 B2	7/2006	Diorio et al.	7,528,728 B2	5/2009	Oliver et al.
7,102,438 B1	9/2006	Colleran et al.	7,541,843 B1	6/2009	Hyde et al.
7,107,022 B1	9/2006	Thomas et al.	7,561,866 B2	7/2009	Oliver et al.
7,116,240 B2	10/2006	Hyde	7,592,897 B2	9/2009	Diorio et al.
7,120,550 B2	10/2006	Diorio et al.	7,616,120 B1	11/2009	Humes et al.
7,123,171 B2	10/2006	Kaplan et al.	D605,641 S	12/2009	Oliver
7,145,203 B2	12/2006	Wang	D606,056 S	12/2009	Oliver
7,145,370 B2	12/2006	Bernard et al.	D606,057 S	12/2009	Oliver
7,149,118 B2	12/2006	Diorio et al.	7,633,376 B2	12/2009	Diorio et al.
7,177,182 B2	2/2007	Diorio et al.	7,633,377 B2	12/2009	Sadr
7,183,926 B2	2/2007	Diorio et al.	7,651,882 B1	1/2010	Bockorick et al.
7,187,237 B1	3/2007	Diorio et al.	D610,576 S	2/2010	Oliver
7,187,290 B2	3/2007	Hyde et al.	7,667,231 B2	2/2010	Hyde et al.
7,199,663 B2	4/2007	Diorio et al.	7,667,589 B2	2/2010	Desmons et al.
7,212,446 B2	5/2007	Diorio et al.	7,667,652 B2	2/2010	Gevargiz et al.
7,215,251 B2	5/2007	Hyde	D611,037 S	3/2010	Oliver
7,221,596 B2	5/2007	Pesavento et al.	D613,276 S	4/2010	Oliver
D543,976 S	6/2007	Oliver	7,696,882 B1	4/2010	Rahimi et al.
7,233,274 B1	6/2007	Kuhn	D617,320 S	6/2010	Oliver
D546,819 S	7/2007	Oliver	7,733,227 B1	6/2010	Pesavento et al.
D546,820 S	7/2007	Oliver	D620,484 S	7/2010	Oliver
D546,821 S	7/2007	Oliver	D620,928 S	8/2010	Oliver
D546,822 S	7/2007	Oliver	7,768,248 B1	8/2010	Hyde
D547,306 S	7/2007	Oliver	7,768,406 B1	8/2010	Peach et al.
D547,754 S	7/2007	Oliver	7,808,387 B1	10/2010	Kuhn
7,242,614 B2	7/2007	Diorio et al.	7,830,262 B1	11/2010	Diorio et al.
7,245,213 B1	7/2007	Esterberg et al.	7,830,322 B1	11/2010	Oliver et al.
7,246,751 B2	7/2007	Diorio et al.	7,872,582 B1	1/2011	Diorio
D548,225 S	8/2007	Oliver	7,873,326 B2	1/2011	Sadr
7,253,719 B2	8/2007	Diorio et al.	7,907,899 B1	3/2011	Oliver
7,257,033 B2	8/2007	Wang et al.	7,917,088 B2	3/2011	Hyde et al.
7,262,092 B2	8/2007	Diorio et al.	7,920,046 B1	4/2011	Aiouaz et al.
7,263,001 B2	8/2007	Wang et al.	7,969,236 B1	6/2011	Hyde et al.
7,283,037 B2	10/2007	Diorio et al.	7,973,643 B2	7/2011	Hyde et al.
7,283,390 B2	10/2007	Pesavento	7,973,645 B1	7/2011	Moretti et al.
7,289,358 B2	10/2007	Pesavento et al.	7,978,005 B1	7/2011	Hyde et al.
7,304,579 B2	12/2007	Diorio et al.	7,982,611 B1	7/2011	Picasso et al.
7,307,528 B2	12/2007	Glidden et al.	7,990,249 B1	8/2011	Hyde et al.
7,307,534 B2	12/2007	Pesavento	7,999,675 B2	8/2011	Diorio et al.
7,312,622 B2	12/2007	Hyde et al.	8,044,774 B1	10/2011	Diorio
7,315,067 B2	1/2008	Wang	8,044,801 B1	10/2011	Hyde et al.
D562,810 S	2/2008	Oliver	8,063,740 B1	11/2011	Diorio et al.
D563,397 S	3/2008	Oliver	8,072,311 B2	12/2011	Sadr et al.
7,375,398 B2	5/2008	Wang et al.	8,072,327 B2	12/2011	Enyedy et al.
7,380,190 B2	5/2008	Hara et al.	8,072,329 B1	12/2011	Srinivas et al.
D570,337 S	6/2008	Oliver	8,077,013 B2	12/2011	Cooper
7,382,257 B2	6/2008	Thomas et al.	8,082,556 B1	12/2011	Aiouaz et al.
7,388,420 B2	6/2008	Diorio et al.	8,115,590 B1	2/2012	Diorio et al.
7,388,468 B2	6/2008	Diorio et al.	8,115,597 B1	2/2012	Oliver et al.
7,389,101 B2	6/2008	Diorio et al.	8,115,632 B1	2/2012	Rahimi et al.
7,391,329 B2	6/2008	Humes et al.	8,120,488 B2	2/2012	Bloy
7,394,324 B2	7/2008	Diorio et al.	8,120,494 B1	2/2012	Aiouaz et al.
7,400,255 B2	7/2008	Horch	8,134,451 B1	3/2012	Diorio
7,403,122 B1	7/2008	Koeppe et al.	8,154,385 B2	4/2012	Aiouaz et al.
7,405,659 B1	7/2008	Hyde	8,159,367 B2	4/2012	Hofer et al.
7,405,660 B2	7/2008	Diorio et al.	8,174,367 B1	5/2012	Diorio
D574,369 S	8/2008	Oliver	8,174,369 B2	5/2012	Jones et al.
D574,370 S	8/2008	Oliver	8,188,927 B1	5/2012	Koeppe et al.
7,408,466 B2	8/2008	Diorio et al.	8,193,912 B1	6/2012	Gutnik et al.
7,408,809 B2	8/2008	Diorio et al.	8,201,748 B2	6/2012	Koeppe et al.
			8,224,610 B2	7/2012	Diorio et al.
			8,228,175 B1	7/2012	Diorio et al.
			8,237,562 B1	8/2012	Picasso et al.
			8,244,201 B2	8/2012	Oliver et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

8,260,241 B1	9/2012	Hyde	2007/0046439 A1 *	3/2007	Takaku et al.	340/10.41
8,279,045 B2	10/2012	Diorio et al.	2007/0106574 A1 *	5/2007	Kappel et al.	705/28
8,294,582 B1	10/2012	Humes et al.	2008/0042838 A1	2/2008	Levin et al.	
8,325,014 B1	12/2012	Sundstrom et al.	2010/0207738 A1	8/2010	Bloy	
8,325,042 B1	12/2012	Hyde et al.	2010/0219953 A1	9/2010	Bloy	
8,326,256 B1	12/2012	Kuhn	2010/0225480 A1	9/2010	Bloy et al.	
8,332,656 B2	12/2012	Jones et al.	2010/0310019 A1	12/2010	Sadr	
8,344,823 B2	1/2013	Bloy et al.	2011/0032079 A1	2/2011	Bloy et al.	
8,344,857 B1	1/2013	Oliver et al.	2011/0063113 A1	3/2011	Hook et al.	
8,344,858 B2	1/2013	Bloy	2011/0090059 A1	4/2011	Sadr	
8,350,665 B1	1/2013	Sundstrom et al.	2011/0090061 A1	4/2011	Hofer et al.	
8,354,917 B2	1/2013	Diorio et al.	2011/0090062 A1	4/2011	Hofer et al.	
8,390,425 B1	3/2013	Cooper et al.	2011/0254664 A1	10/2011	Sadr et al.	
8,390,430 B1	3/2013	Sundstrom et al.	2011/0279261 A1	11/2011	Gauger et al.	
8,390,431 B1	3/2013	Diorio	2012/0112913 A1	5/2012	Bloy	
8,391,785 B2	3/2013	Hyde et al.	2012/0139704 A1	6/2012	Sadr et al.	
8,395,482 B2	3/2013	Sadr et al.	2012/0188058 A1	7/2012	Lee et al.	
8,400,271 B2	3/2013	Sadr	2012/0212331 A1	8/2012	Jones et al.	
8,421,631 B2	4/2013	Bloy et al.	2012/0257733 A1 *	10/2012	Kosseifi et al.	379/93.17
8,427,315 B2	4/2013	Aiouaz et al.	2012/0275546 A1	11/2012	Divsalar	
8,428,515 B1	4/2013	Oliver	2013/0049925 A1 *	2/2013	Subramanian	340/3.1
			2013/0093572 A1	4/2013	Bloy et al.	
			2013/0099898 A1	4/2013	Bloy	
			2013/0099901 A1	4/2013	Jones et al.	

* cited by examiner

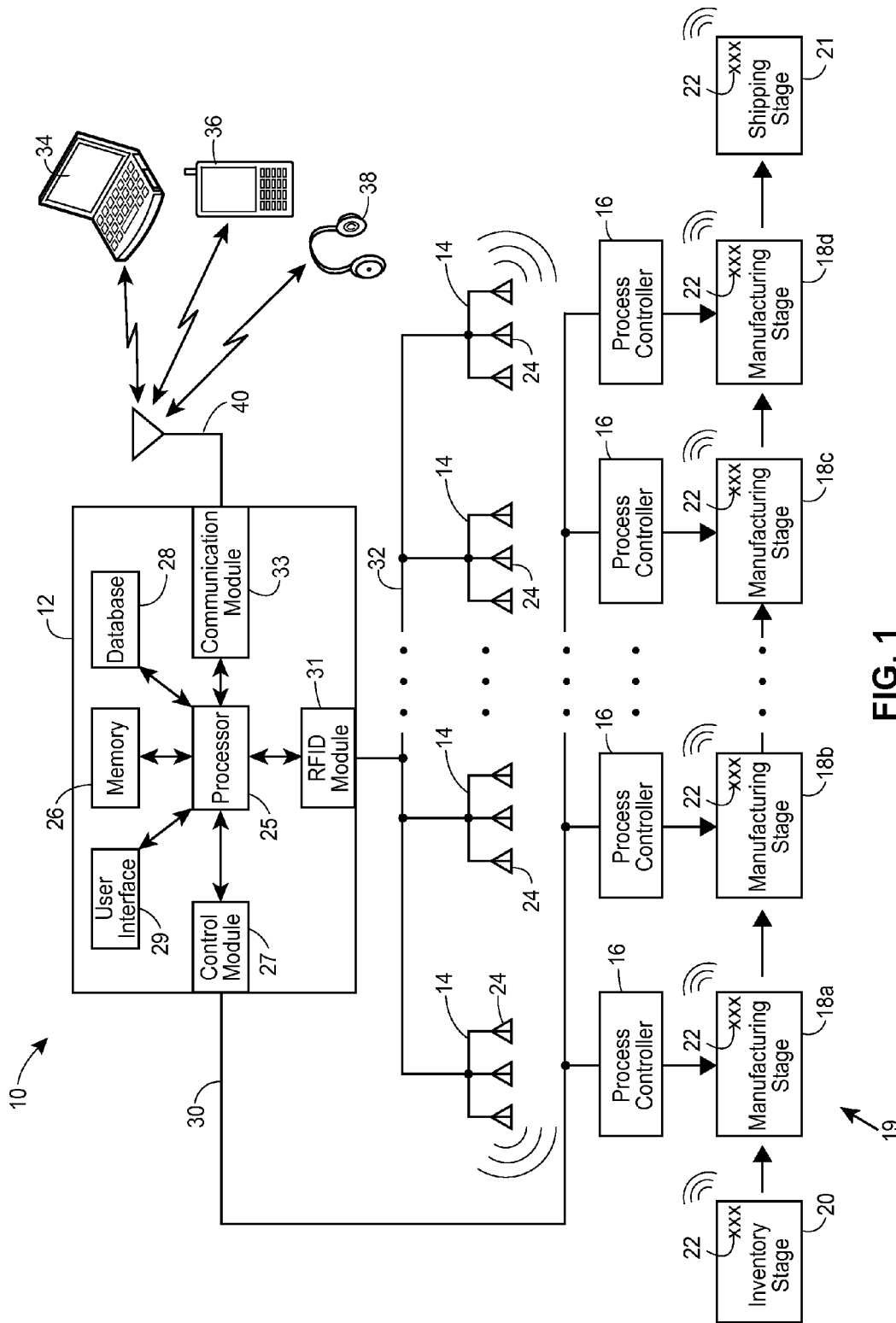


FIG. 1

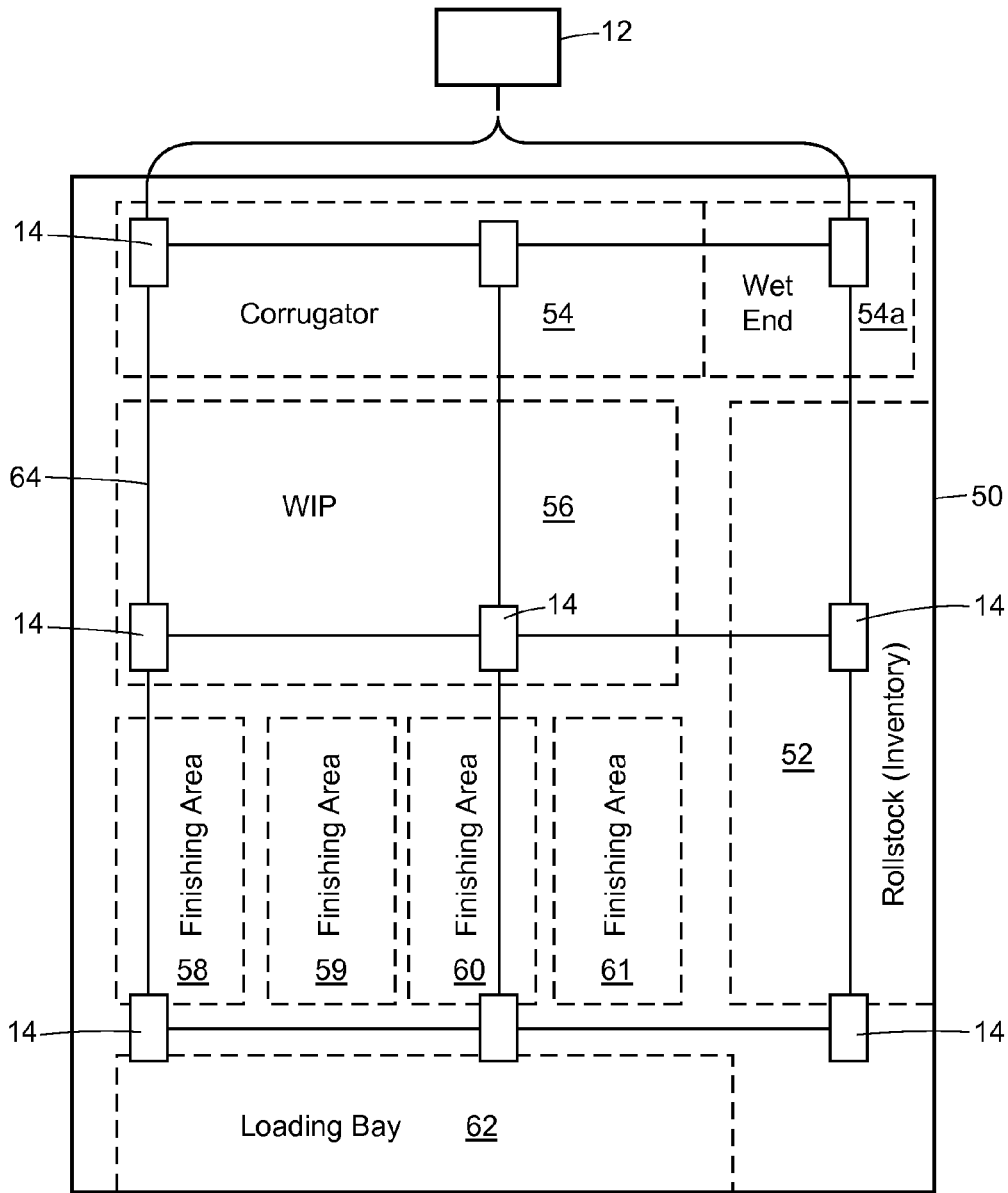


FIG. 2

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.