

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 April 2009 (30.04.2009)

PCT

(10) International Publication Number
WO 2009/055473 A1

(51) International Patent Classification:
B65H 26/00 (2006.01)

(US). RECKAMP, Steve [US/US]; 1158 Atcheson Avenue, Sun Prairie, WI 53590 (US).

(21) International Application Number:
PCT/US2008/080793

(74) Agent: BROOKMAN, Adam L.; BOYLE FREDRICKSON, S.C., 840 N. Plankinton Avenue, Milwaukee, WI 53203 (US).

(22) International Filing Date: 22 October 2008 (22.10.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/981,705 22 October 2007 (22.10.2007) US

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(71) Applicant (for all designated States except US): THE COLMAN GROUP, INC. [US/US]; 555 Koopman Lane, Elkhorn, WI 53121 (US).

(72) Inventors; and

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

(75) Inventors/Applicants (for US only): PELLAND, Mike [US/US]; N4626 Wildwood Lane, Princeton, WI 54967

[Continued on next page]

(54) Title: DISCRIMINATING WEB MATERIAL DISPENSER

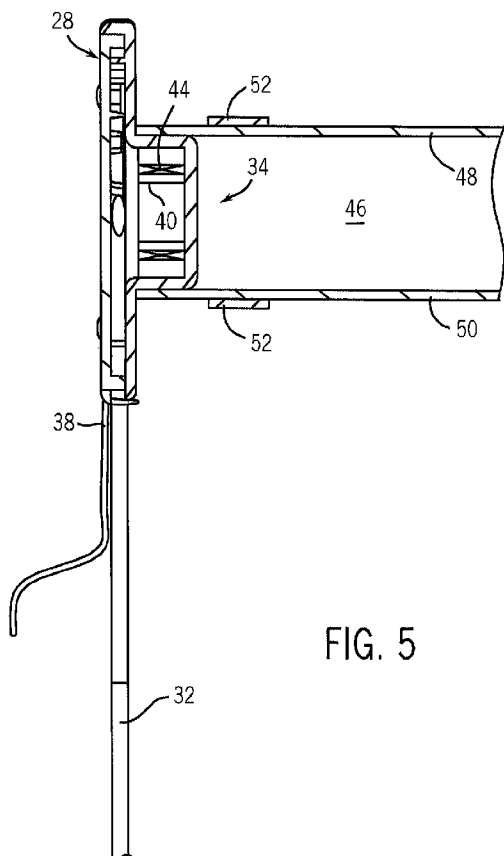


FIG. 5

(57) Abstract: An automatic product dispenser determines if the roll loaded into the dispenser is approved for use with the dispenser. The core of a roll contains a feature that alters an electromagnetic field created proximate the core. The alteration of the electromagnetic field may then be used to determine if the core, and thus the roll, is usable with the dispenser. The feature is designed such that it is damaged once product is completely dispensed from the roll thereby preventing replenishment and reuse of a spent roll.

WO 2009/055473 A1



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,
NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report*

DISCRIMINATING WEB MATERIAL DISPENSER

BACKGROUND OF THE INVENTION

The present invention is generally directed to product dispensers and, more particularly, to a dispenser having a lockout feature that prevents the dispensing of product
5 from a non-approved source.

Automatic towel and similar product dispensers have been developed to reduce the waste generally associated with manual dispensers. Automatic dispensers typically include a motor driven drive roller that advances web material, such as hand towel material,
10 from a web material roll. Early automatic dispensers required a user to depress a feed button to activate the drive roller. More recently, automatic dispensers have incorporated proximity sensor technology to allow hands-free or otherwise contact-free activation of the drive roller.

Conventional automatic dispensers advance web material from the web material roll according to predetermined settings that result in the same amount of web
15 material being dispensed regardless of the particular characteristics of the web material to be dispensed. For example, a conventional automatic towel dispenser will advance a fixed amount of web material from a web material roll independent of the absorbency of the web material. As a result, it is possible for too much or too little web material to be dispensed; both of which can lead to waste. When too much web material is dispensed, the excess
20 cannot be retrieved and reused and therefore creates waste. When too little web material is dispensed, a user will often retrigger the dispenser to dispense additional web material possibly resulting in additional waste.

Accordingly, a number of “smart” dispensers have been developed that are able to obtain information about certain characteristics of a web material roll, or the web
25 material wrapped therearound, and adjust the dispensing settings accordingly. One such dispenser is described in U.S. Pat. Pub. No. 2005/0171634. This publication describes a dispenser having a reader or scanner that communicates with an RFID “smart” chip or tag embedded in the core of a roll. The smart chip includes information relating to the type of product to be dispensed. For a roll of hand towel material, that information may include

absorbency, basis weight, and manufacturer. The scanner reads this information from the smart chip and communicates that information to a processor that adjusts performance settings accordingly. For example, the feed length may be adjusted based on the information contained in the smart chip. Additionally, the processor may disable the automatic drive or feed components if an unapproved or unrecognized roll is loaded into the dispenser. The automatic drive components may also be disabled if no information is gathered from the smart chip, which may occur when a roll absent a smart chip is loaded into the dispenser. This "lockout" feature is intended to reduce jamming of the dispenser, damage to the dispenser, and/or unsatisfactory dispensing of web material that may result from use of an unapproved or an unrecognized roll.

In addition to significantly adding to the cost of each roll and the dispenser itself by virtue of the necessary reader(s) and circuitry, such smart chips or RFID tags are only effective if the web material of the roll matches the information encoded in the smart tag. If there is a mismatch between the web material and the encoded information, the performance settings of the dispenser will not be tailored to the specifics of the web material to be dispensed. Further, the lockout feature is designed to prevent the use of unauthorized or unrecognized rolls with the automatic dispenser. If there is an inconsistency between the encoded information and the actual web material to be dispensed, the lockout feature may not function properly.

Another "smart" dispenser, which is described in U.S. Patent No. 7,040,566, uses a bar code-embedded roll and a bar code reader to determine if the roll is from an authorized source before the dispenser is activated to dispense material from the roll. The bar code reader is described as a phototransistor reflective object sensor that reads the bar code associated with a roll loaded into the dispenser and transmits a code signal to a controller that compares the code signal to a set of approved codes maintained in a computer readable database. If the code associated with the code signal does not match an approved code, the dispenser is automatically locked out from dispensing material from the loaded roll.

While such a smart dispenser is believed to be effective in preventing unauthorized rolls from being loaded into a dispenser, the cost and the collective size of the components can result in a significant increase in the overall cost, complexity, and size of the dispenser. For example, such a lockout system requires not only the aforementioned bar code reader/sensor and microcontroller but also an analog to digital converter for digitizing the analog output of the reader.

The above-described systems can also often be circumvented by removing the bar code or RFID tag and placing them on the core of a new roll or merely in appropriate proximity to the reader. The dispenser can then be loaded with an unapproved or unrecognized roll and be caused to operate as if an approved or recognized roll has been loaded. As a result, the waste management, performance and supply control advantages provided by the smart chips or RFID tags may not be realized.

BRIEF DESCRIPTION OF THE INVENTION

The present inventors have found that the advantages provided by smart chips, bar code readers, or RFID tags can be realized while avoiding the pitfalls and costs associated therewith. More particularly, the present invention is directed to an automatic web material dispenser that determines if the roll loaded into the dispenser is approved for use with the dispenser. In one embodiment of the present invention, in order to achieve this result, it compares a baseline system frequency to the frequency after the roll has been loaded into the dispenser and determines if changed frequency is within a predetermined range. If so, then the roll is approved for use with the dispenser and the dispenser is activated. Preferably, the roll is designed with a frequency changing device or material that it is damaged once the web material is completely or substantially dispensed from the roll. Thus, the core cannot be reloaded with web material that may not be approved for use with the dispenser. Preferably, when the appropriate modified frequency is recognized, the system can be set to adjust for various particulars of the web material to be dispensed, such as brand name, type, size, and the like, that can be used to automatically tailor the performance settings of the dispenser.

It is therefore one object of the present invention to provide an automatic product dispenser having a lockout feature that cannot be easily circumvented.

It is a further object of the invention to provide a roll having a recognition device or material that cannot be transferred to other rolls.

5 Therefore, in accordance with one aspect of the present invention, an apparatus for dispensing product from a roll is disclosed. The apparatus includes a drive roller adapted to advance product from a roll. The roll to be loaded into the dispenser includes a frequency changing device or material that may be indicative of the product carried by the roll or merely the source or provider of the roll. The apparatus further includes a controller
10 associated with the drive roller and adapted to determine the frequency resulting from the presence of the frequency changing device or material of the roll, compare the system base frequency to the changed frequency and then, if the changed frequency matches a predetermined frequency, falls within a predetermined range, is changed a predetermined amount or percentage, permit the drive roller to advance the product from the roll. If the
15 changed frequency does not match the predetermined frequency, shift or range, then the drive motor will not be actuated, thereby preventing the dispensing system from operating to advance product from the roll.

In accordance with another aspect, the present invention includes a method of regulating product dispensing from a dispenser. The method includes determining if a roll
20 includes a frequency shifting device or material that fits the predetermined profile. If it does, then the dispensing particulars of the roll can be known and/or set.

According to another aspect, the present invention includes a roll of web material for use with an automatic dispensing device. The roll has a frequency shifting device or material identifying a brand or source of the roll associated therewith.

25 Other objects, features, and advantages of the invention will become apparent to those skilled in the art from the following detailed description and accompanying drawings. It should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not of limitation. Many changes and modifications may be made within

the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Preferred exemplary embodiments of the invention are illustrated in the accompanying drawings in which like reference numerals represent like parts throughout.

In the drawings:

FIG. 1 is an isometric view of an automatic towel dispenser;

10 FIG. 2 is a front elevation view of the automatic towel dispenser of FIG. 1 with the front cover removed;

FIG. 3 is an isometric view of a roll carrier assembly for use with the automatic towel dispenser of FIGS. 1-2;

FIG. 4 is front elevation view of the roll carrier assembly shown in FIG. 3;

15 FIGS. 5 and 6 are section views of a portion of the roll carrier assembly shown in FIGS. 3 and 4;

FIG. 7 is section view of a hub assembly according to another embodiment of the invention;

FIG. 8 is an exploded view of that shown in FIG. 7;

20 FIG. 9 is a schematic view of a control circuit associated with the product discriminating assembly; and

FIG. 10 is a perspective view of paper towel core according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

25 The present invention will be described with respect to an automatic towel dispenser for dispensing web material, but it is recognized that the invention is applicable to automatic dispensers adapted to automatically dispense other types of products, including other paper and non-paper products. Additionally, the invention is applicable with touch-

based and touchless automatic dispensers, such as those commercially available from The Colman Group, Inc. of Elkhorn, Wisconsin.

As will be explained in greater detail further below, the present invention is generally directed to a dispenser, such as a paper towel dispenser, that includes circuitry for generating an electromagnetic field generally around a roll mount. When an authorized roll is mounted onto the roll mount, the roll will cause a change in the frequency of the electromagnetic field. More particularly, the circuitry includes a frequency generator (oscillator) and a coil for creating the electromagnetic field and the roll includes a uniquely constructed closed loop. Thus, when the roll is loaded into the dispenser, the frequency generator will generate a new waveform having a changed frequency reflective of the mutual inductance between the coil and the closed loop. The new waveform, or one or more characteristics thereof, are result of the properties of the closed loop. The new waveform, or some form thereof, may then be analyzed to determine if the roll loaded into the dispenser is authorized for use with the dispenser. If so, the dispenser will dispense material from the roll. If not, operation of the dispenser will be locked out thereby preventing unintended or impermissible use of the dispenser.

An exemplary paper towel dispenser is shown in FIG. 1. Automatic towel dispenser 10 includes a back cover 12 designed to be wall-mounted and a front cover 14 coupled to the back cover 12 by a hinge 16. Paper towel or web material is fed from a web material roll (not shown) contained within the automatic towel dispenser 10 through dispensing slot 18 by a drive assembly 20, shown in FIG. 2. The clamshell design of the automatic towel dispenser 10 allows a roll to be loaded into the automatic towel dispenser 10 by unlocking the front cover 14 from the back cover 12 in a known manner and then rotating the front cover 14 downwardly about hinge 16.

As shown in FIG. 2, drive assembly 20 is mounted to the back cover 12 and includes a PC board and motor contained within housing 22 and operatively associated, in a known manner, with a drive roller assembly 24. The drive roller assembly 24 is designed to grab and forcibly advance web material from a roll of web material (not shown) through dispensing slot 18. The drive roller assembly 24 may be of conventional design, such as that

described in U.S. Pat. No. 7,168,653, the disclosure of which is incorporated herein by reference. As will be described in greater detail below, the motor may be controlled by a processor adapted to smartly control operation of the motor and drive roller assembly, including, when appropriate, disablement of the motor so as to lock out its functionality
5 when an unapproved roll is loaded into the automatic towel dispenser 10.

In one embodiment of the present invention, a continuous sheet of web material is advanced from a roll (not shown) that is preferably mounted on a carrier assembly 26 of the type that includes a pair of roll support plates 28, 30 that carry a guide wire 32, as shown further in FIGS. 3-4. Each support plate 28, 30 has an inwardly facing hub 34, 36,
10 respectively, that is designed to extend partially through the hollow core of the roll. The hubs 34, 36 have a generally circular cross-section to match that of the hollow core of the roll so that roll can smoothly rotate about the hubs 34, 36 as web material is advanced from the roll and dispensed through dispensing slot 18. As further shown in FIG. 2, a wire 38 extends from the hub 34 to an oscillator within housing 22. As will be explained, the
15 oscillator and a coil create an electromagnetic field generally about the hub 34.

Referring to FIG. 5, the hub 34 provides a housing for a bobbin 40 around which a coil (wire winding) 44 may be wrapped. When the coil 44 is energized, an electromagnetic field is generated. As noted above, the hub 34 is received by one end of the hollow core 46 of the roll. The core 46 has an inner surface 48 and an outer surface 50. The
20 outer surface 50 is impregnated or otherwise carries a continuous ring of conductive material 52. Alternately, the conductive material 52 could be placed on the inner surface 48, or both the inner and outer surfaces 48, 50, or impregnated in the core material. In the illustrated embodiment, the conductive material 52 is arranged in the form of a ring that envelopes a portion of the outer surface 50 of the core 46. The conductive ring of material 52 (or
25 alternatively, a closed circuit (not shown) or other type of closed loop) is designed to modify the base system frequency as it interacts with the electromagnetic field of the coil. For example, the conductive material 52 for a given core may include one or more of copper, gold, nickel and silver. The width, thickness, purity, type and location of the conductive

material can affect the degree of frequency shift or change. In one embodiment, the amount of frequency changing device or material can be used to identify the brand of the roll.

In one embodiment, the closed loop 52 is formed as a ring of conductive material around a portion of a roll core 46. It is recognized, however, that in alternate
5 embodiments, the closed loop 52 may be arranged in other patterns to uniquely identify the roll . For example, multiple rings of conductive material 52 could be used. In one embodiment, one type of conductive material 52 is used, but is recognized that mixtures of various types of conductive material 52 could be used. Regardless of the contents of the conductive material 52 and how it is placed on the roll, the resulting frequency can uniquely
10 identify the brand, source, or some other defining characteristic of the roll so that a determination can be made as to whether the roll may be used with the automatic towel dispenser 10. The resulting frequency may also identify the type of material, the size of the roll, and other parameters that may be useful in establishing operating parameters for the automatic towel dispenser 10.

15 FIGS. 6 and 7 show a hub assembly 54 according to another embodiment of the invention. Hub assembly 54 includes a support plate 56 to which a bobbin 58 is affixed in a known manner. A coil winding 60 is mounted to the bobbin 58, and a cover 62 having an opening 64 fits over the bobbin 58 and thus coil 60. An end cap 66 snaps into or is otherwise retained by the bobbin 58. The end cap 66 fits within the hollow core of the roll.
20 In one embodiment, the shape of the end cap 66 and the core of the roll are matched such at rolls having cores with non-complementary shapes cannot be used with the dispenser.

As shown in FIG. 8, the system of the present invention includes a control logic circuit 68 which includes an oscillator 70 which together with coil 44 generates an electromagnetic field proximate the coil 44 and thus a roll positioned over the hub 34. The
25 oscillator 70 and the coil 44 generate the electromagnetic field at a predetermined frequency which establishes a base system frequency. When a roll having an inductive element, e.g., a ring of conductive material, associated therewith is brought into proximity of coil 44, preferably by mounting the roll on the hub 34, the mutual inductance between the coil 44 and the inductive element will cause the oscillator to generate a waveform of a different

frequency than that of the base system frequency. The output of the oscillator, i.e., waveform, is input to a frequency sampler 72 (e.g., an op-amp, logic gate, comparator, etc.) which effectively determines the frequency of the new waveform generated by the oscillator. The frequency, in effect, is representative of the mutual inductance generated by placement of the roll onto the hub. A microprocessor 74 analyzes the output of the comparator and, more particularly, compares the frequency, or some characteristic value thereof, to a reference value 76. The reference value corresponds to a value indicative of an authorized roll. In this regard, the microprocessor 74 includes, or access memory, containing one or more reference values representative of various authorized roll types, brands, etc.

It will be appreciated that the aforementioned comparison can take many forms. For example, the comparison can be done by measuring the percent of change of the mutual inductance relative to the system frequency, i.e., output of the oscillator before the roll is placed on or proximate the hub. If the comparison yields a match against the reference, the control logic circuit energizes the system enabling the drive motor to drive the drive roller and dispense web material, as indicated by block 76. If there is no match, the system is not energized and no material can be dispensed, as represented by block 78. The automatic towel dispenser 10 may include an indicator LED, for example that is illuminated when the lockout feature is activated.

If an unauthorized roll core is loaded on the carrier assembly, the measured frequency or other value will not match the reference frequency or value thus indicating that an unauthorized roll has been loaded on the carrier. It is recognized that the web material dispenser 10 may be adapted to drive multiple types of rolls. Thus, in one preferred embodiment, the automatic dispenser includes a database that is loaded with multiple reference frequencies or values. It is further contemplated that suitable diagnostic tools may be used to provide in-field updates to the database.

At least five preferred embodiments are contemplated for providing the closed loop on or in association with the roll of web material in order to provide a means to cause a frequency change in accordance with the present invention. In the first embodiment, a roll core is coated or impregnated with at least one ring of conductive material. The core can be

coated on the inside, on the outside or have the conductive material impregnated somewhere between the inside and outside of the core. In the second embodiment, an insert is provided which can removably or permanently placed inside the core. The insert can be in the form of a plastic or paperboard plug that includes a ring of conductive material or other closed loop.

5 In a third embodiment of the present invention, a label in the form of a ring impregnated with conductive material can be affixed to the side of the roll of web material. In a fourth embodiment of the present invention, the web material itself can be coated or impregnated with conductive material to form a ring giving the appearance of, for example, a colored stripe used to indicate the end of a roll of register tape. In the fifth embodiment, a removable
10 paper or other band coated or impregnated with a conductive material that encircles the roll of web material at the time of mounting of the web material in the dispenser could be used. In such case, the band would be removed prior to threading the dispenser for feeding the dispenser, but after the activation of the dispenser had occurred. In this embodiment, upon activation, the dispenser would preferably be set up to dispense an amount of a paper
15 commensurate with that on the roll, prior to reactivation.

Further, in a preferred embodiment, and with reference to FIG. 9, a web material roll 88 has a core 90 that is partially treated with conductive material, such as ring 92. Glue or similar adhesive 94 is then used to secure the tail 96 of web material to the exterior surface of the core 90. The adhesive 94 is applied so as to overlay the ring 92 of
20 conductive material. This allows the conductive ring 92 to be damaged when the tail 96 of web towel material is pulled from the core 90. Thus, the frequency altering effect of the core will no longer result in match with the reference frequency or value. This prevents the core from being re-loaded with web material not designed to be dispensed by the dispenser. In one preferred embodiment, the ring 92 includes conductive material that is applied as paint
25 to the outer surface of the core 90. Alternately, the conductive material could be sprayed, rolled, or stamped on the core. Also, electro-static techniques could be used to apply the conductive material. In yet another example, the core could be dipped in conductive paint or other fluid or even impregnated in the adhesive used to attach to roll tail.

Additionally, while the invention has been described with respect to a web material dispenser that advances a continuous sheet of paper towel from a roll, it is contemplated that the present invention may be used with web dispensers that dispense other types of paper products, such as toilet paper, and tissue papers. Coreless rolls and dispensers without support hubs may be used with the present invention. Further, the present invention may be used with non-paper dispensers.

Many changes and modifications could be made to the invention without departing from the spirit thereof. The scope of these changes will become apparent from the appended claims.

CLAIMS

We claim:

1. An apparatus for dispensing product from a roll, the apparatus comprising:
a drive roller adapted to advance product from a roll;
5 a field generator configured to generate an electromagnetic field proximate a portion of the roll; and
a controller associated with the field generator and adapted to determine if an alteration of the electromagnetic field by the roll substantially matches an expected alteration of the electromagnetic field for an authorized roll placed on the drive roller, and if the altered
10 electromagnetic field substantially matches the expected alteration, then permit the drive roller to advance the product from the roll.
2. The apparatus of claim 1 wherein the field generator includes a coil and an oscillator, and wherein the controller drives the oscillator to provide a waveform that is
15 emitted by the coil, the waveform having a characteristic frequency, and compares the waveform as modified by the roll, to determine if the roll is authorized for use with the apparatus.
3. The apparatus of claim 2 wherein the roll comprises a ring of conductive
20 material.
4. The apparatus of claim 3 wherein the conductive material is arranged on the roll in a predefined pattern.
- 25 5. The apparatus of claim 3 wherein the conductive material comprises metallic material.
6. The apparatus of claim 3 wherein the roll includes a roll core and web material wrapped around the roll core.

7. The apparatus of claim 6 wherein the roll core cannot provide an alteration to the electromagnetic field that substantially matches the expected alteration when product is substantially completely removed from the roll core.

5

8. The apparatus of claim 6 wherein the expected alteration is defined by the amount of conductive material in the ring of conductive material formed on the roll core.

9. The apparatus of claim 8 wherein the conductive material includes
10 conductive paint applied to an exterior surface of the roll core.

10. The apparatus of claim 1 wherein the alteration of the electromagnetic field provides information identifying at least one of roll brand, roll type, and roll size.

15 11. The apparatus of claim 1 wherein the controller is further configured to provide a user-discernible indication that the drive roller has been locked out.

12. A method of regulating product dispensing from a dispenser, the method comprising:

20 creating an electromagnetic field having a characteristic frequency proximate a roll loaded into the dispenser and configured to be incrementally advanced by a drive motor;

detecting a change to the characteristic frequency, the change created by the presence of a closed loop associated with the roll;

comparing the changed frequency to a verification frequency; and

25 enabling motorized advancement of the product if the changed frequency substantially matches the verification frequency.

13. The method of claim 12 wherein creating the electromagnetic field includes driving an oscillator to feed a signal having the characteristic frequency to a coil proximate the roll.

5 14. The method of claim 13 further comprising controlling a drive motor to advance the product a predefined amount based on the changed frequency associated with the loaded roll.

10 15. The method of claim 13 further comprising determining a roll brand from the changed frequency.

 16. The method of claim 15 further comprising determining a roll type, or a roll size, from the changed frequency.

15 17. A roll of web material for use with an automatic dispensing device, the roll comprising:

 a closed loop corresponding to a source of the roll; and

 wherein the closed loop is marred when the web material has been at least partially dispensed from the roll.

20

 18. The roll of claim 17 wherein the roll includes a core having an outer surface, a portion of which comprises a closed loop of conductive material for changing a system base frequency a predetermined amount.

25 19. The roll of claim 18 wherein the closed loop of conductive material is formed as a ring around a portion of the core.

 20. The roll of claim 17 wherein the closed loop of conductive material identifies a type of the roll.

21. The roll of claim 17 wherein the closed loop of conductive material further identifies a size of the roll.

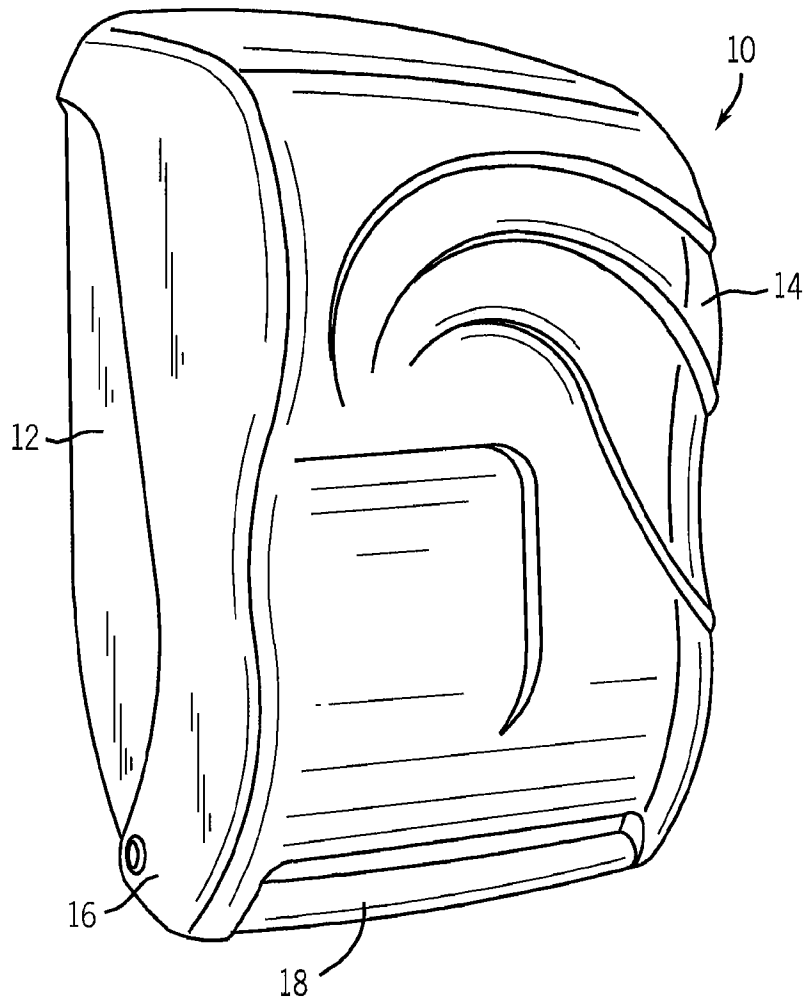


FIG. 1

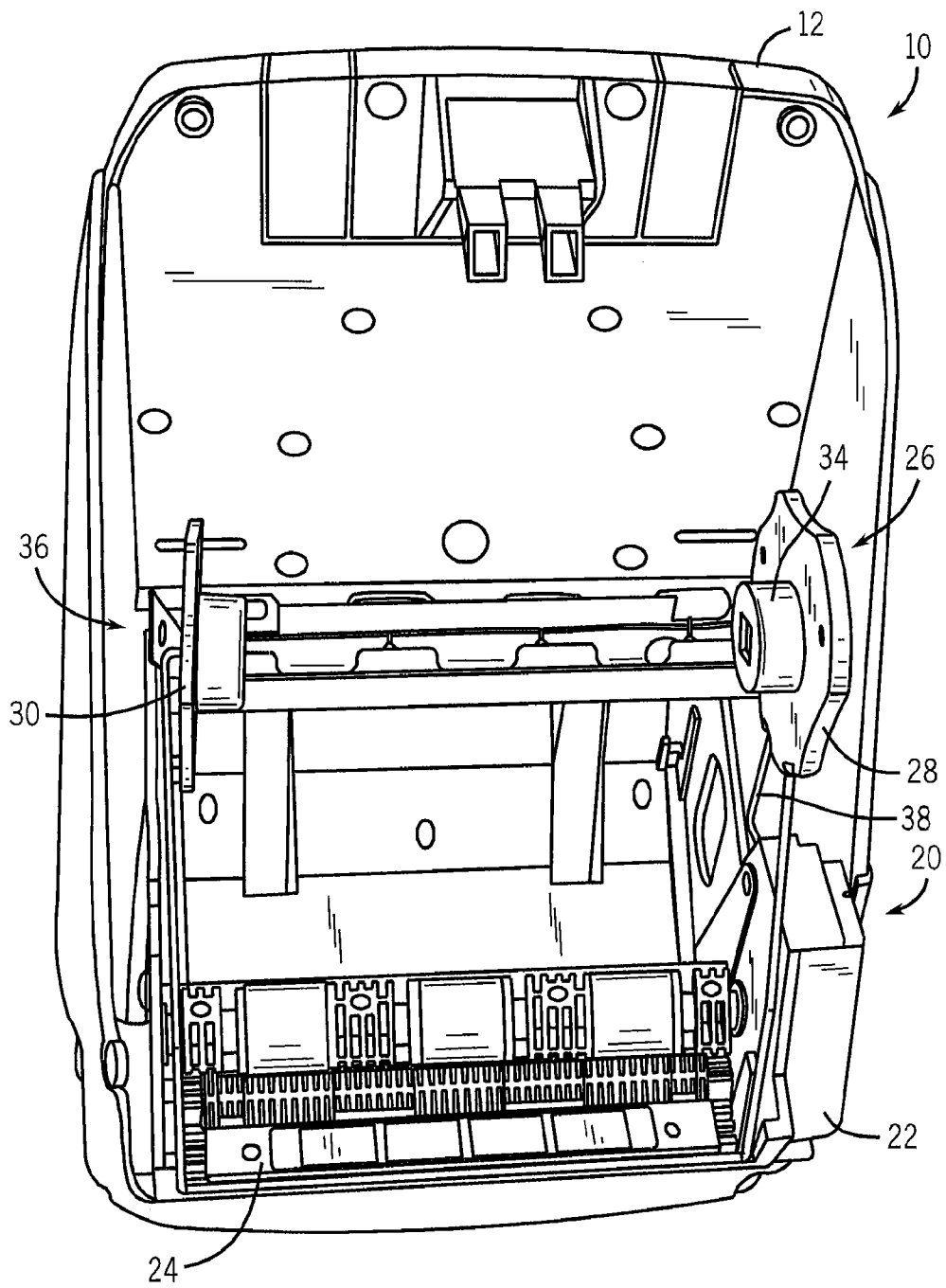
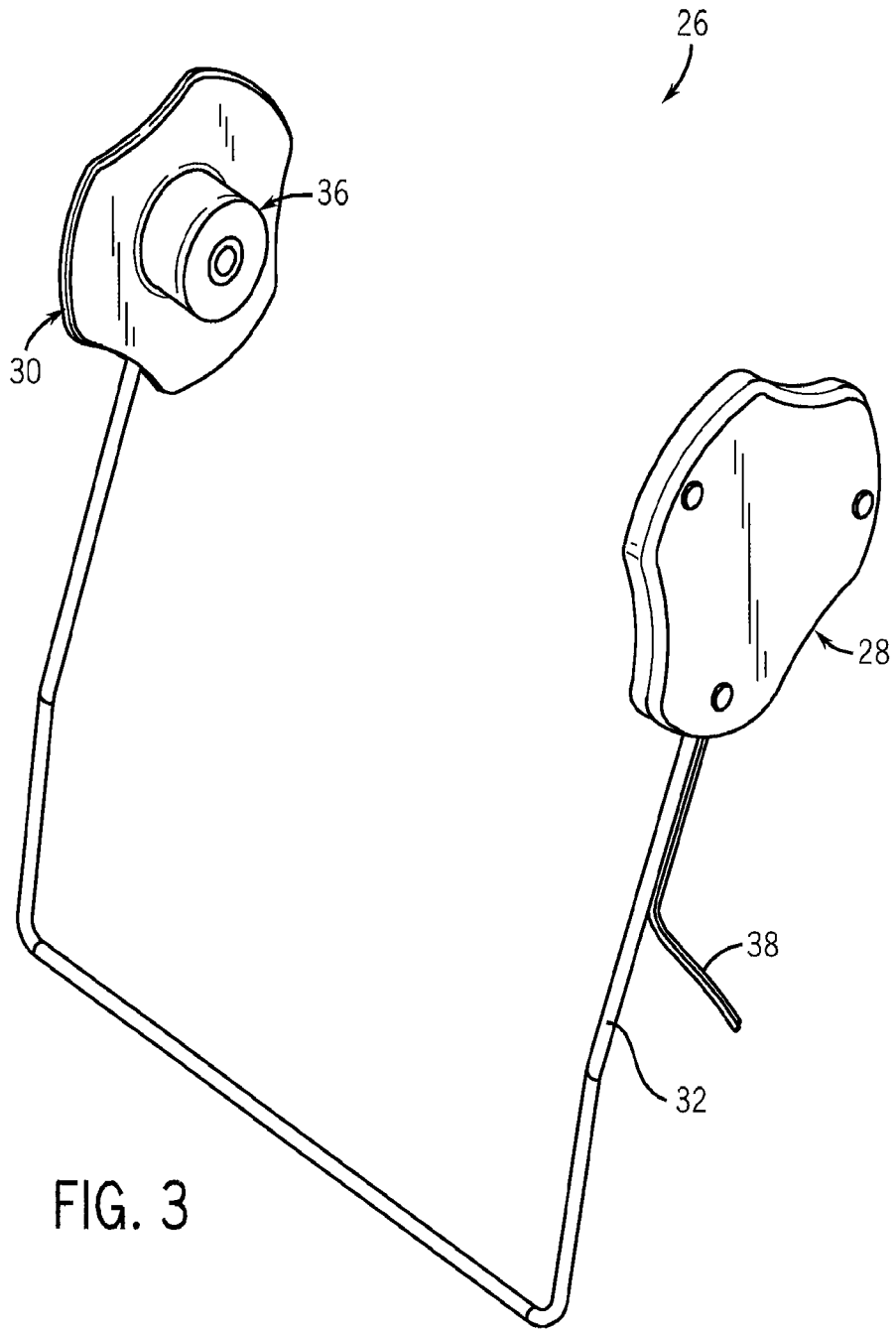
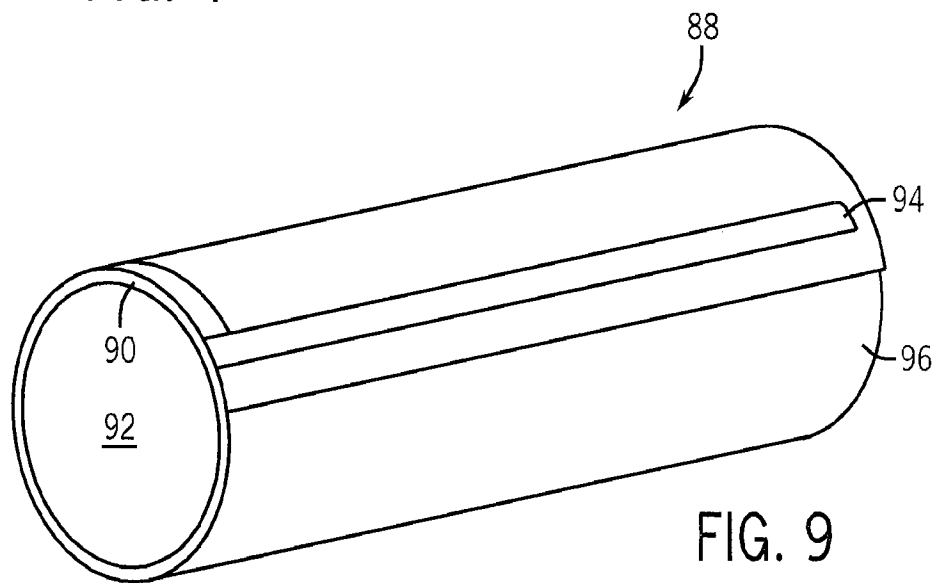
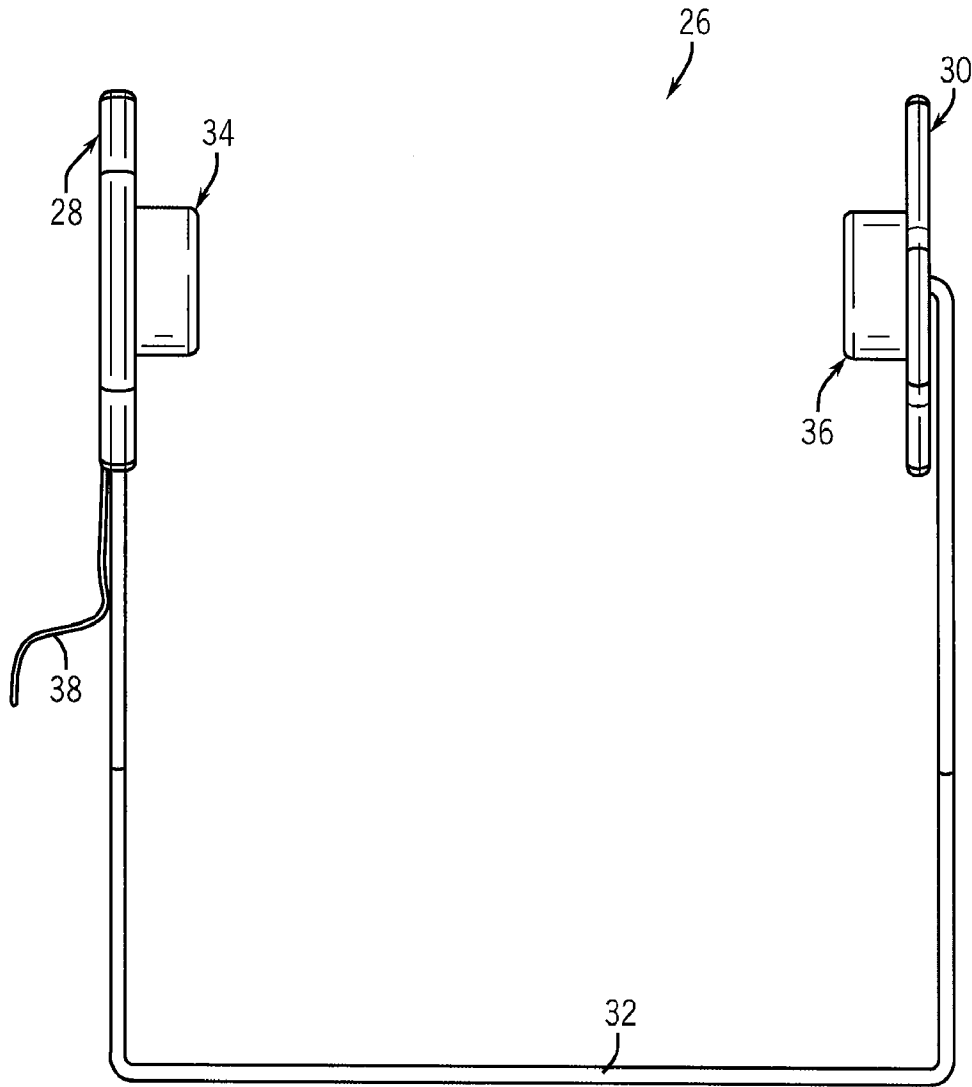


FIG. 2



4 / 8



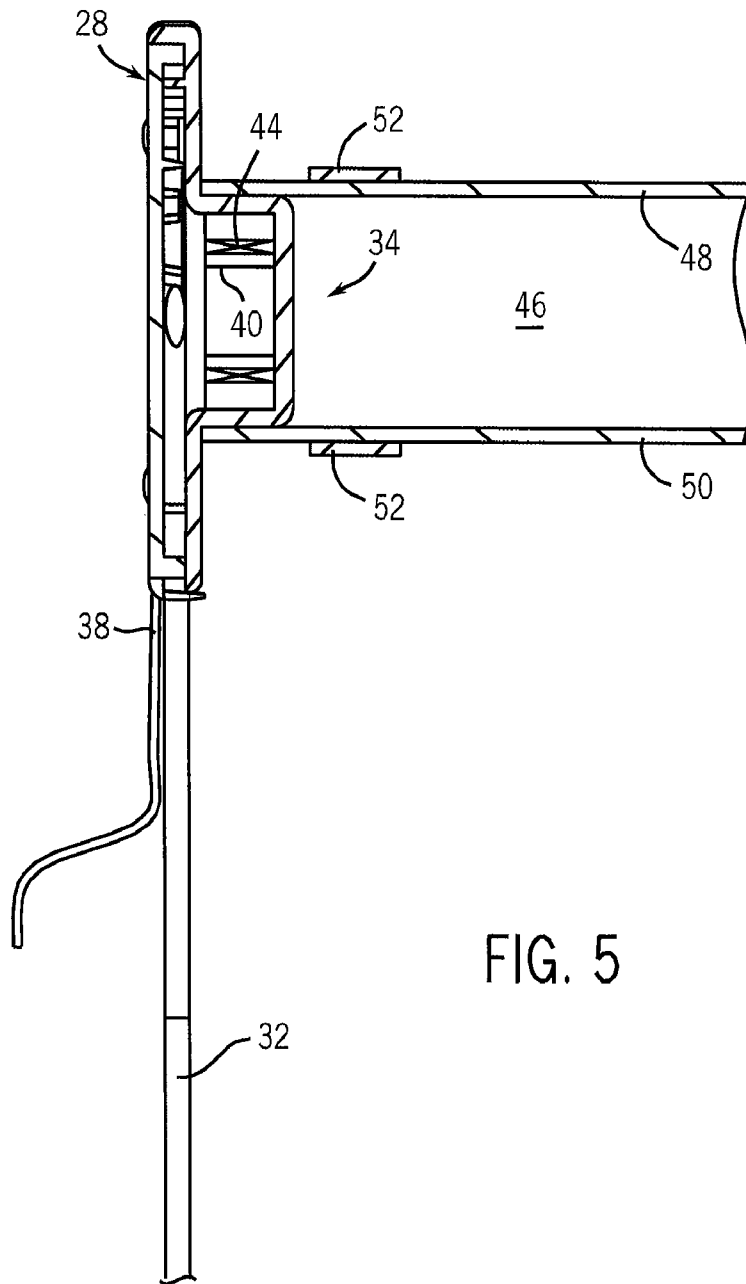
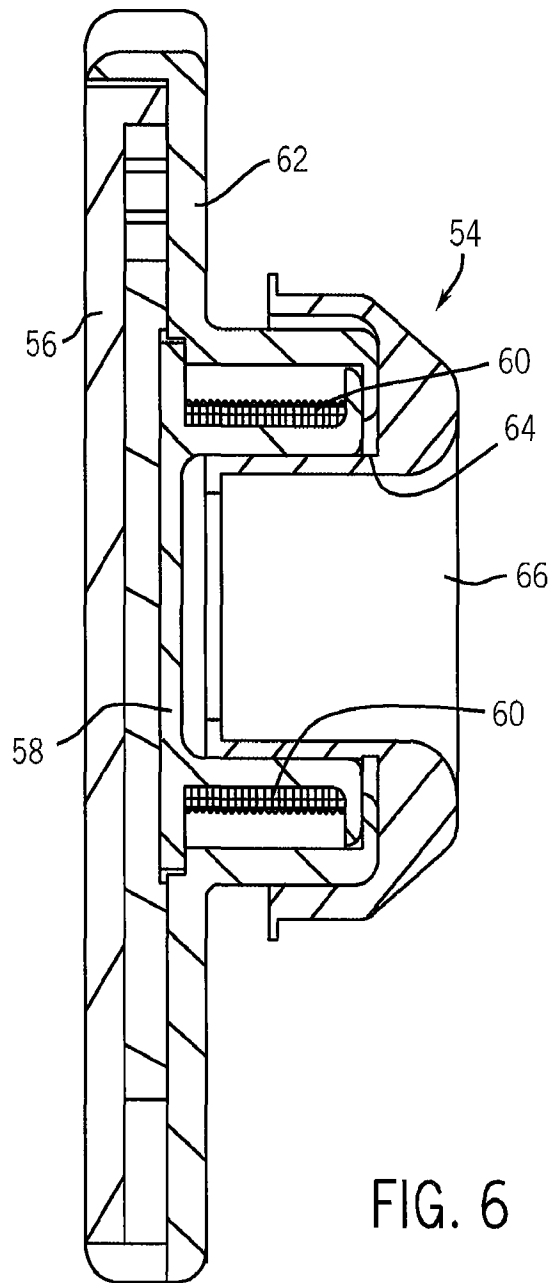


FIG. 5



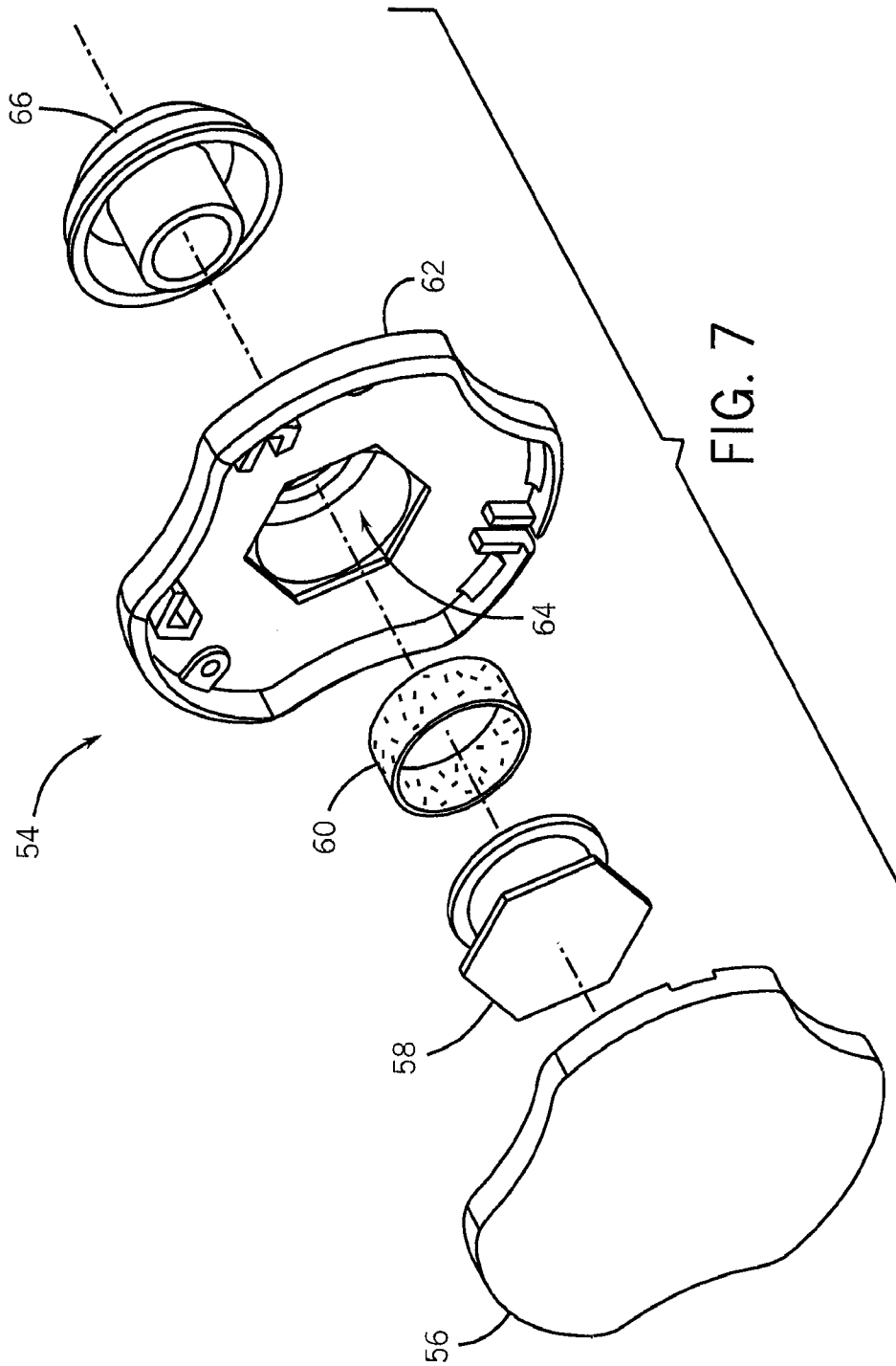


FIG. 7

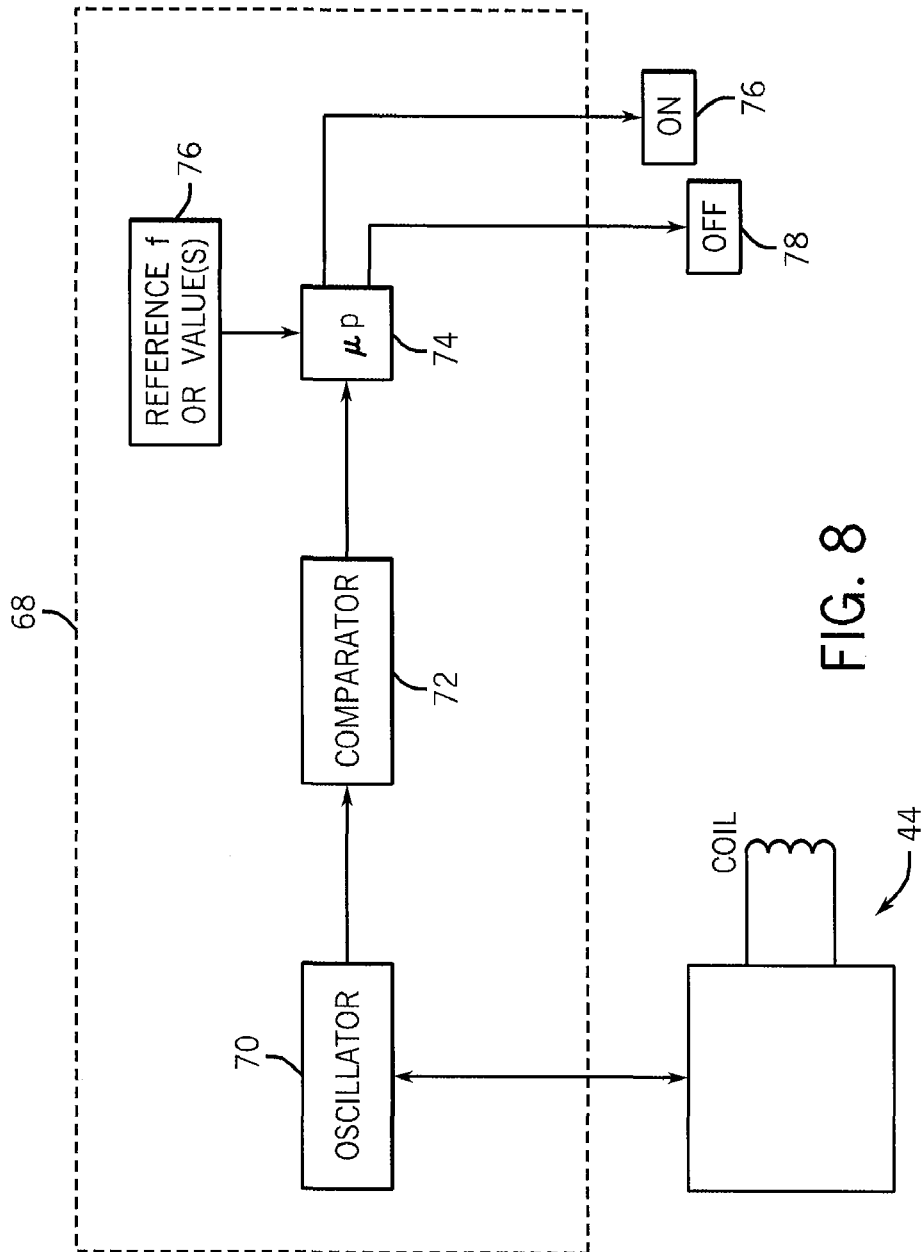


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 08/80793

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - B65H 26/00 (2008.04) USPC - 242/563 According to International Patent Classification (IPC) or to both national classification and IPC</p>														
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC(8) - B65H 26/00 (2008.04); USPC - 242/563</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC - 242/550-614.1, 312/351.1-351.14</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PubWEST (PGPB,USPT,EPAB,JPAB), Google Search Terms Used: dispenser, roll, web, paper, identification, determine, product, electromagnetic, magnetic, field, wave, waveform, frequency, conduct, conductive, metal, metallic, paint, pattern, loop, ring, brand, type, size, conductor, material, empty, exhausted.</p>														
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X --- Y</td> <td>US 2006/0173576 A1 (GOERG et al.) 3 August 2006 (03.08.2006) Para [0110]-[0111], [0115]</td> <td>17-21 ----- 10, 14-16</td> </tr> <tr> <td>Y</td> <td>US 7,040,566 B1 (RODRIAN et al.) 9 May 2006 (09.05.2006) abstract; col 18, ln 41 - col 19, ln 4, col 19, ln 27-36, col 20, ln 37-48, col 21, ln 35-52, col 26, ln 20-32</td> <td>1-16</td> </tr> <tr> <td>Y</td> <td>US 2005/0072874 A1 (DENEN et al.) 7 April 2005 (07.04.2005) Para [0075]-[0080]</td> <td>1-16</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X --- Y	US 2006/0173576 A1 (GOERG et al.) 3 August 2006 (03.08.2006) Para [0110]-[0111], [0115]	17-21 ----- 10, 14-16	Y	US 7,040,566 B1 (RODRIAN et al.) 9 May 2006 (09.05.2006) abstract; col 18, ln 41 - col 19, ln 4, col 19, ln 27-36, col 20, ln 37-48, col 21, ln 35-52, col 26, ln 20-32	1-16	Y	US 2005/0072874 A1 (DENEN et al.) 7 April 2005 (07.04.2005) Para [0075]-[0080]	1-16
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.												
X --- Y	US 2006/0173576 A1 (GOERG et al.) 3 August 2006 (03.08.2006) Para [0110]-[0111], [0115]	17-21 ----- 10, 14-16												
Y	US 7,040,566 B1 (RODRIAN et al.) 9 May 2006 (09.05.2006) abstract; col 18, ln 41 - col 19, ln 4, col 19, ln 27-36, col 20, ln 37-48, col 21, ln 35-52, col 26, ln 20-32	1-16												
Y	US 2005/0072874 A1 (DENEN et al.) 7 April 2005 (07.04.2005) Para [0075]-[0080]	1-16												
<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>														
<p>* Special categories of cited documents:</p> <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"I" 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</td> </tr> <tr> <td>"E" earlier application or patent but published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"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</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"I" 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	"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed			
"A" document defining the general state of the art which is not considered to be of particular relevance	"I" 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													
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone													
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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													
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family													
"P" document published prior to the international filing date but later than the priority date claimed														
<p>Date of the actual completion of the international search 2 December 2008 (02.12.2008)</p>		<p>Date of mailing of the international search report 16 DEC 2008</p>												
<p>Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer: Lee W. Young</p> <p>PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>												