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(54) **Title:** ELECTRONIC LABEL SYSTEM

(57) **Abstract:** An electronic label system comprises an electronic label for use with a powered rail. The electronic label includes a coupling arrangement so that it can physically couple to the powered rail. The powered rail includes electrical conductors for conveying power and optionally data to one or more electronic labels that are physically coupled thereto. In some embodiments, the electronic label includes electrical contacts that physically contact the electrical conductors of the powered rail to receive power and/or data therefrom. The powered rails are configured for one sided or two sided use.

ELECTRONIC LABEL SYSTEM

Statement of Related Cases

[0001] This case claims priority to U.S. Patent Application No. 61/911,833 filed December 4, 2013.

Field of the Invention

[0002] The present invention relates generally to electronic labels.

Background of the Invention

[0003] In most supermarkets, goods being offered for sale are presented to customers by placing the goods on shelves. Commonly, labels are placed on the front of the shelf, directly beneath the respective article. These shelf labels, which are typically made of a printable sheet material, contain information about the articles, such as a description of the item and its price. This approach provides a customer with ready access to information needed to make a purchasing decision.

[0004] Shelf rails, into which the shelf labels are ultimately placed, are mounted at the forward edge of the shelves. A shelf label, once printed, must be carried by an employee to the location of the corresponding good and then attached to the shelf rail.

[0005] Electronic shelf labels ("ESLs") are slowly being introduced in retail establishments, such as supermarkets, to replace conventional paper or plastic shelf labels. ESLs include an electronic display that is capable of presenting the type of information formerly appearing on conventional shelf labels. One advantage of ESLs is that this information can be altered at a distance, using, for example, infrared or radio communication. As a consequence, when the price of article must be changed, or a different article is to be placed a particular shelf location, the ESL dispenses with the need to physically exchange the shelf label. Rather, the information content appearing in an ESL's display can be updated from a central information system to reflect a changed price or a change in item. Labor cost is thereby reduced.

[0006] ESLs do have certain disadvantages. One disadvantage is that if the allocation of shelf space for a first article is changed, such as to allow more space for a second article on the same shelf, the location of the two ESLs corresponding to those articles might become offset from the actual position of the articles on the shelf. In that case, the ESLs still have to be physically moved.

[0007] The aforementioned disadvantage has been addressed via an electronic rail. In some rail systems, the rail spans the length of a shelf (*e.g.*, 1 meter, *etc.*) and incorporates plural ESLs. Adjoining edges of the ESLs on the rail are camouflaged, such as to give the impression of a single display. The arrangement of article descriptions within the length of the rail (and within the active areas of the ESLs received thereby) can be controlled via software.

[0008] Other systems for rail mounted ESLs are disclosed in U.S. Pat. No. 5,553,412, EP Publ. Pat. Appl. 2,425,750, and PCT Publ. Pat. Appl. WO 99/03174.

Brief Description of the Drawings

[0009] FIG. 1 depicts an electronic label system in accordance with the illustrative embodiment of the present invention.

[0010] FIG. 2 depicts a rear, three-quarters perspective view of an electronic label and a portion of the powered rail.

[0011] FIG. 3 depicts a rear perspective view of a portion of an electronic label coupling to a portion of the powered rail.

[0012] FIG. 4 depicts an electronic label coupled to the powered rail, and a key that is used to decouple same.

[0013] FIG. 5 depicts the key being inserted to two openings, wherein the key is used to decouple the electronic label from the powered rail.

[0014] FIG. 6 depicts an embodiment of a mounting arrangement for single-sided use of the powered rail, such as for mounting on a wall.

[0015] FIG. 7 depicts an embodiment of a mounting arrangement for effective doubled-sided use of the powered rail, such as for suspending the powered rails from the ceiling.

[0016] FIG. 8 depicts a three-quarters perspective view of a portion of the powered rail, showing an embodiment for coupling power and data to the powered rail.

[0017] FIG. 9 depicts a back view of an embodiment of an electronic label, wherein the electronic label is not intended for use with the powered rail, but rather for standalone use.

[0018] FIG. 10 depicts the electronic label of FIG. 9 with a bracket such as for mounting the electronic label directly to a wall.

Summary

[0019] The illustrative embodiment of the invention provides an electronic label system that addresses some of the shortcomings of the prior art. Among other features and benefits, the illustrative embodiment provides a system that :

- does not limit the height of the electronic label to the height of a powered rail;
- detachably locks an electronic label to a powered rail;
- is capable of providing data to the electronic label either wirelessly or via wire connection; and
- enables a powered rail to be used in a single- or doubled-sided configuration, thereby facilitating mounting to a wall or suspending from a ceiling.

Detailed Description

[0020] FIG. 1 depicts system **100** including plural tablet-type electronic labels **104** on powered rail **102**. Rail **102** includes decorative insert **103**. The color(s) of the decorative insert is user-selectable to coordinate with the store color scheme, *etc.*

[0021] Each electronic label **104** includes display **106**, such as an LCD, LED display, *etc.*, for displaying characters or graphics. In some embodiments, electronic label **104** is intended for use in a retail setting, such as a supermarket, a department store, and the like wherein the electronic label will display pricing and other information pertaining to products being offered for sale. In some other embodiments, the electronic label is

intended for use in an office. In some such office applications, the electronic label functions as more of traditional display/monitor, such as for presenting information about the company to visitors in an entrance foyer, *etc.*

[0022] In some embodiments, electronic label **104** also includes one or more of the following:

- a transceiver for receiving and transmitting wireless communications, such as via WiFi, BlueTooth, or Zigbee protocols.
- a temperature measurement device;
- device(s)/circuitry capable of monitoring signal strength of a received (wireless) signal; and
- device(s)/circuitry capable of monitoring the backlighting of the display.

In such embodiments, the electronic label is capable of reporting: its temperature and/or received signal strength and/or the status of backlighting to a central label-control system.

[0023] In the illustrative embodiment depicted in FIG. 1, the “height” of all electronic labels **104** exceeds the height of powered rail **102**. This is accomplished by virtue of the way in which electronic labels **104** couple to powered rail **102** and advantageously removes any limitations on the maximum height of a label, as typically imposed in prior-art systems. It will be appreciated, however, that powered rail **102** can be used in conjunction with electronic labels **104** having height(s) that are less than that of powered rail **102**.

[0024] As discussed in conjunction with FIGs. 2-5, electronic labels **104** are removably coupled to powered rail **102**.

[0025] FIG. 2 depicts a back three-quarters perspective view of electronic label **104** and powered rail **102**. Back surface **208** of electronic label **104** includes transversely oriented upper channel **210** and catch **212** and transversely oriented lower channel **214**. Front surface **220** of powered rail **102** includes upper rail **222** and lower rail **224**. Rails **222** and **224** project forward of the rest of front surface **220** of powered rail **102**.

[0026] To engage electronic label **104** to powered rail **102**, coupler **212** is positioned over upper edge **223** of upper rail **222** and lowered onto it. Upper edge **223** of upper rail

222 thus supports electronic label **104**. Upper and lower channels **210** and **214** on back surface **208** of the electronic label receive respective upper and lower rails **222** and **224** of the electronic rail **102** such that back surface **208** of electronic label **104** abuts or very nearly abuts decorative insert **103** of powered rail **102**.

[0027] FIG. 2 also depicts upper channel **228** and lower channel **232** disposed on back surface **226** of powered rail **102**. Upper channel **228** receives mounts **230** by which powered rail **102** can be attached to a wall. See also FIGs. 4 and 6.

[0028] Referring now to both FIG. 2 and FIG. 3, an additional channel **234** is disposed at the bottom edge of powered rail **102**. Channel **234** is used to route power and signals to and from electronic labels **104**. More particularly, wire block **236** having four wires lanes **238** is disposed in channel **234**. Each wire lane **238** contains an electrical conductor **340** that is capable of conducting power (two of the four conductors **314**) or data (two of the four conductors **314**) to and from electronic labels **104**.

[0029] Electrical contacts **216** are disposed on locking/coupling arrangement **215** located on back **208** of electronic label **104**. These contacts are electrically coupled to appropriate electrical circuitry of electronic label **104**. In the illustrative embodiment, there are four such electrical contacts **212** for electrically coupling to four conductors **340** within wire lanes **238** of wire block **236**. Electrical contacts **216** are offset from one another as appropriate so that each contact **216** is positioned to engage a unique one of wire lanes **238** and, hence, a unique conductor **340**. FIG. 2 depicts all four electrical contacts; in FIG. 3, two of electrical contacts **212** are obscured.

[0030] In some embodiments, electronic labels **104** are operated wirelessly; in such embodiments, the two conductors intended for data transfer are not used. Rather, these unused conductors are available for use as redundant power conductors.

[0031] FIG. 4 depicts, via a back view, electronic label **104** coupled to powered rail **102**. Also depicted is key **446** that is used to decouple electronic label **104** from rail **102**. Key **446** is required because upon coupling electronic label **104** to powered rail **102**, the electronic label locks thereto. Referring now to both FIG. 4 and FIG. 5, key **446** includes two “teeth” or prongs **448A** and **448B**. The prongs are appropriately dimensioned and spaced apart

from one another to engage “key holes” **444A** and **444B** in locking/coupling arrangement **215**.

[0032] FIG. 5 depict two prongs **448A** and **448B** of key **446** being inserted into respective key holes **444A** and **444B** in locking/coupling arrangement **215** disposed near lower channel **214** on back **208** of electronic label **104**. Inserting the prongs disengages locking/coupling arrangement **215** so that electronic label **104** can be removed from powered rail **102**.

[0033] FIG. 6 depicts mount **230** that is attached to a wall, for example. As previously disclosed, and as also depicted in FIGs. 2 and 4, mount **230** is dimensioned and arranged to be received channel **228** disposed on back surface **226** of powered rail **102**. Also depicted in FIG. 6 is “half-channel” **650**, which is discussed in conjunction with FIG. 7.

[0034] FIG. 7 depicts two powered rails **102-1** and **102-2** mounted together in “back-to-back” fashion. When mounted back-to-back, half channels **650-1** and **650-2** of powered rails **102-1** and **102-2** form top channel **752**. This arrangement facilitates (1) ceiling mounting and (2) enables electronic labels **104** to be displayed coupled to the “front” and the “back” of the dual rail. In the illustrative embodiment, to suspend the dual powered-rails from the ceiling, mount **756** is seated in top channel **752**, wherein tabs **756** are disposed under “lips” formed at the upper edge of channel **752**. Poles (not depicted) of a desired length extend from mount **756** and attach to the ceiling, thereby enabling the dual rail to be suspended.

[0035] FIG. 8A depicts a front three-quarters perspective view of the dual powered rail arrangement shown in FIG. 7. Each powered rail **102-1** and **102-2** receives PCB **862** at an end cap **860** (for clarity, only rail **102-1** is shown with PCB **862** coupled thereto. FIG. 8B depicts PCB **862** in further detail. PCB **862** includes a first group of four electrical leads **864** and a second group of four electrical leads **866**, which are electrically coupled to one another. First group of electrical leads **864** receives power and data from sources thereof. Second group of electrical leads **866** deliver the power and data to electrical conductors **340** in wire lanes **238**.

[0036] FIG. 9 depicts an alternative embodiment of an electronic label in accordance with the present teachings. Electronic label **904** depicted in FIG. 9 is particularly well suited

for office locations, wherein only a single electronic label is used in a particular area. Electronic label **904** includes port **970**, which is disposed in on back **208** of the electronic label. Port **970** provides an alternative way for an electronic label to receive power and/or data, as appropriate for the particular type of port. That is, for electronic label **904**, power (and optionally data) is not received via electrical contacts **216** disposed near the bottom of the electronic label, as delivered via electrical conductors **340** on the powered rail **102**.

[0037] In some embodiments, port **970** is a USB port, for receiving a male USB connector. Such a connection can be used for both power and data transmission. In embodiments in which the electronic label includes wireless telecommunications capability, data can of course be received and transmitted wirelessly. In some embodiments, electronic label **104** includes both port **970** as well as contacts **216** for coupling to electrical conductors **340**.

[0038] FIG. 10 depicts a mounting bracket for use in conjunction with electronic label **904**. Mounting bracket **1072** couples to back **208** of electronic label **904**. Bracket **1072** includes end tabs **1076A** and **1076B** that are received in respective upper **210** and lower **214** channels on back **208** of electronic label **904**. Bracket **1072** has central opening **1074** to provide access to port **970**. Holes **1078** are used to mount bracket **1072** to a wall or stand, *etc.*

What is claimed:

1. An electronic label system comprising:

an electronic label having a display on a first side thereof and a coupling arrangement disposed on a second side thereof, the coupling arrangement including:

- (a) a coupler that is dimensioned and arranged to couple to a part of an element that supports the electronic label;
- (b) a transversely-oriented first coupling channel disposed proximate to the coupler, the first coupling channel for receiving a portion of the element that supports the electronic label;

the electronic label further comprising circuitry for receiving power and optionally data from sources thereof.

2. The electronic label system of claim 1 further comprising a first powered rail, wherein the first powered rail is the element that supports the electronic label and provides power thereto, wherein the powered rail further comprises:

a transversely-oriented support member disposed on a first side of the first powered rail and proximate to a top edge thereof, wherein the support member is the part of the element that supports the electronic label and is received by the first coupling channel, the coupler resting on an upper edge of the support member;

a first mounting channel disposed on a second side of the first powered rail and proximate to a top edge thereof, the first mounting channel for receiving a mounting element that mounts the first powered rail to a support surface; and

an electrical channel disposed on the bottom of the first powered rail, the electrical channel including electrical conductors for conveying at least one of power and data to the electronic label; and wherein

the electronic label further comprises a plurality of electrical contacts, one for each electrical conductor in the electrical channel, wherein each electrical contacts is positioned to physically couple to a respective one of the electrical conductors in the electrical channel of the first powered rail.

3. The electronic label system of either claim 1 or claim 2, further comprising a USB port for receiving at least one of power and data.

4. The electronic label system of claims 1, 2, or 3, wherein the electronic label comprises a transceiver for receiving and transmitting data wirelessly.

5. The electronic label system of claims 1-4, further comprising a locking/coupling arrangement that locks the electronic label and the powered rail together.

6. The electronic label system of claims 2-5, further comprising a second powered rail, wherein the second side of the first powered rail and a second side of the second powered rail are placed in abutting relation thereby forming a second mounting channel, the second mounting channel disposed on top of the first and second powered rails.

7. The electronic label system of claim 6 further comprising a mount that is dimensioned and arranged to couple to the second mounting channel, wherein the mount includes poles that extend away from the mount and are used to couple the mount to a ceiling.

8. The electronic label system of claims 2-7 wherein the first powered rail comprises a decorative insert on a first side thereof.

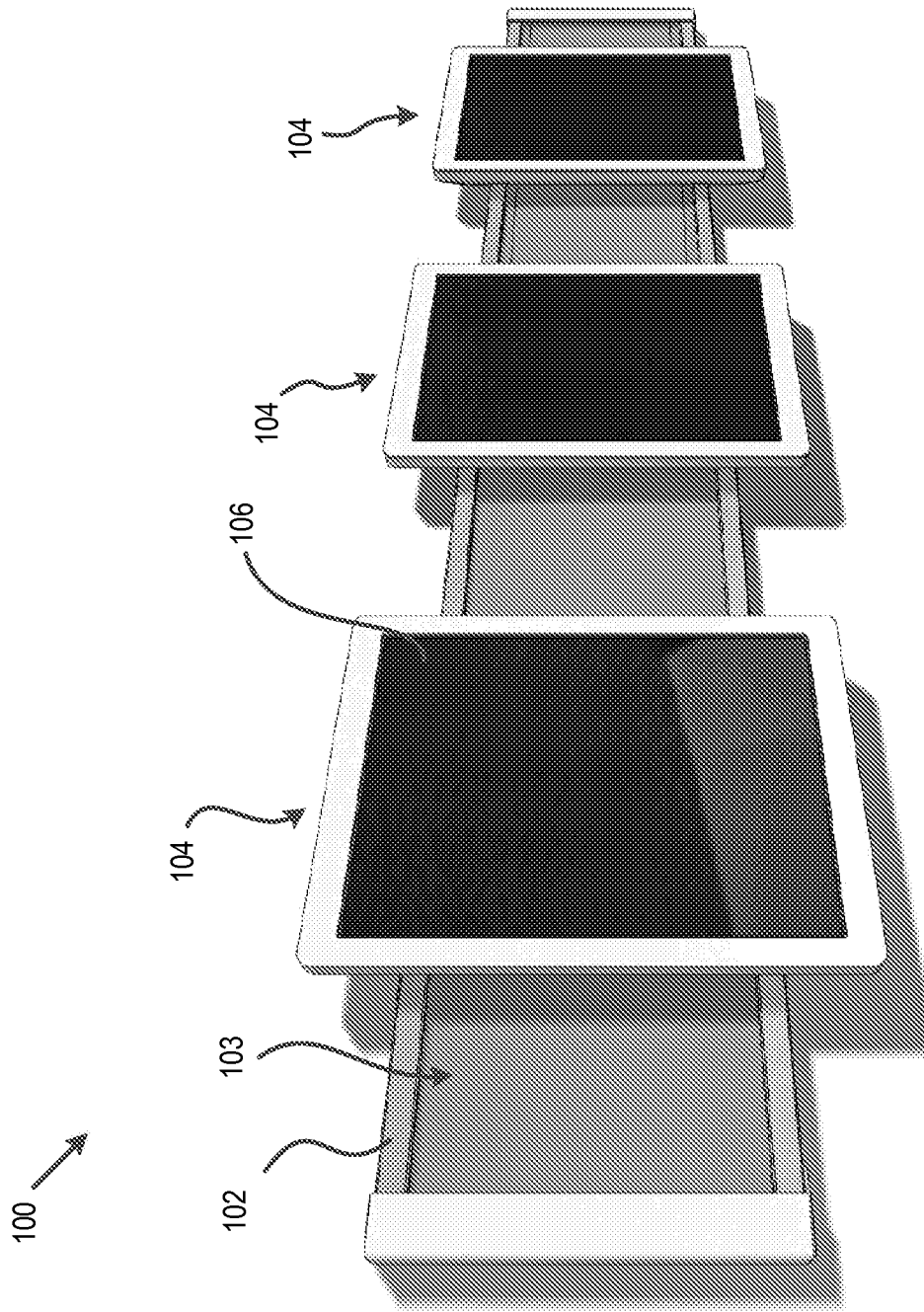
9. The electronic label system of claims 2-8 wherein the first powered rail further comprises:

an end cap disposed at at least one end of the first powered rail; and

a pcb comprising a first group of electrical leads and a second group of electrical leads, wherein the first group of electrical leads receives power and data from sources thereof and the second group of electrical leads deliver the power and data to the electrical conductors in the electrical channel.

10. The electronic label system of claims 2-8 wherein a height of the electronic label exceeds a height of the powered rail.

FIG. 1



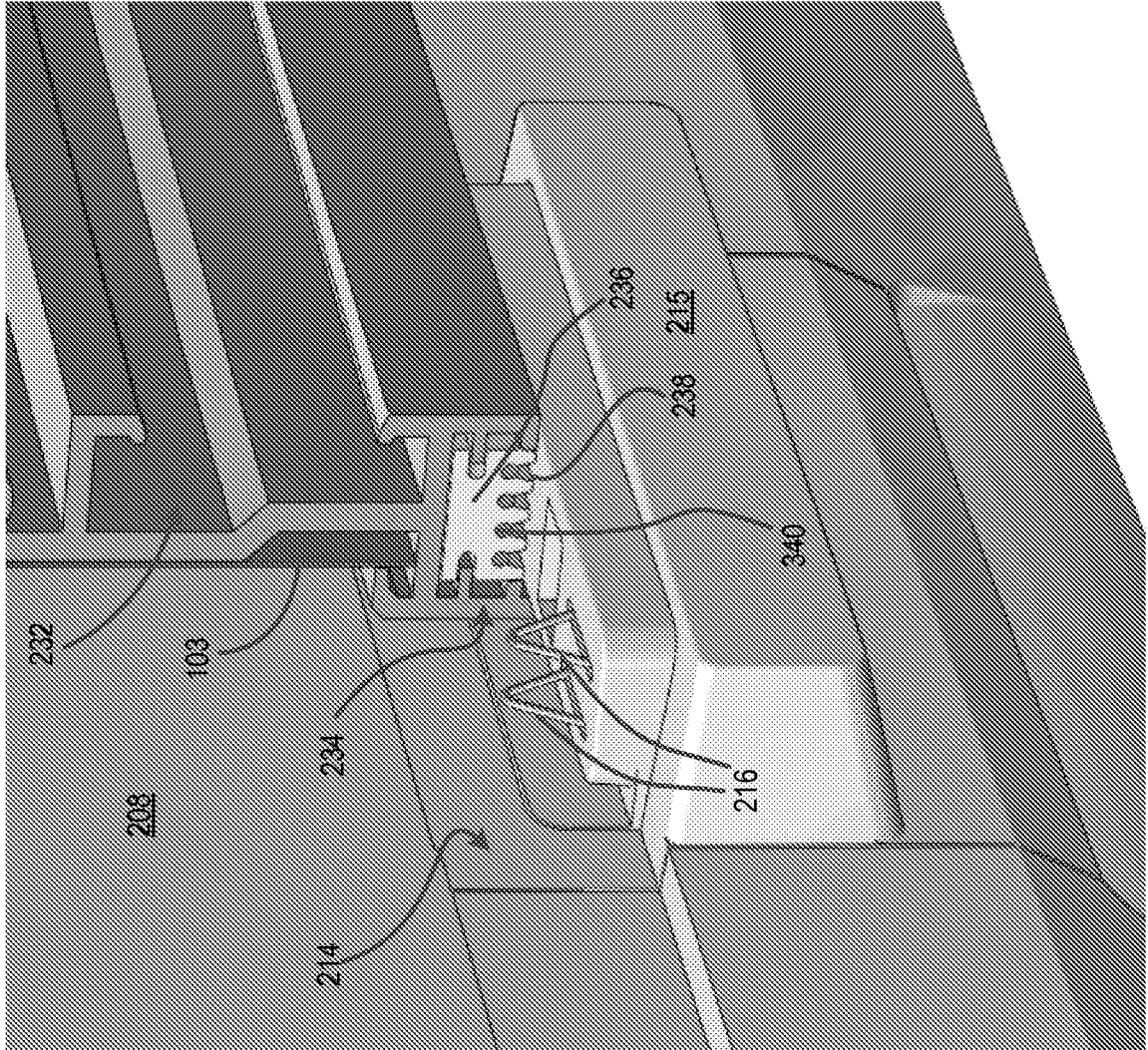


FIG. 3

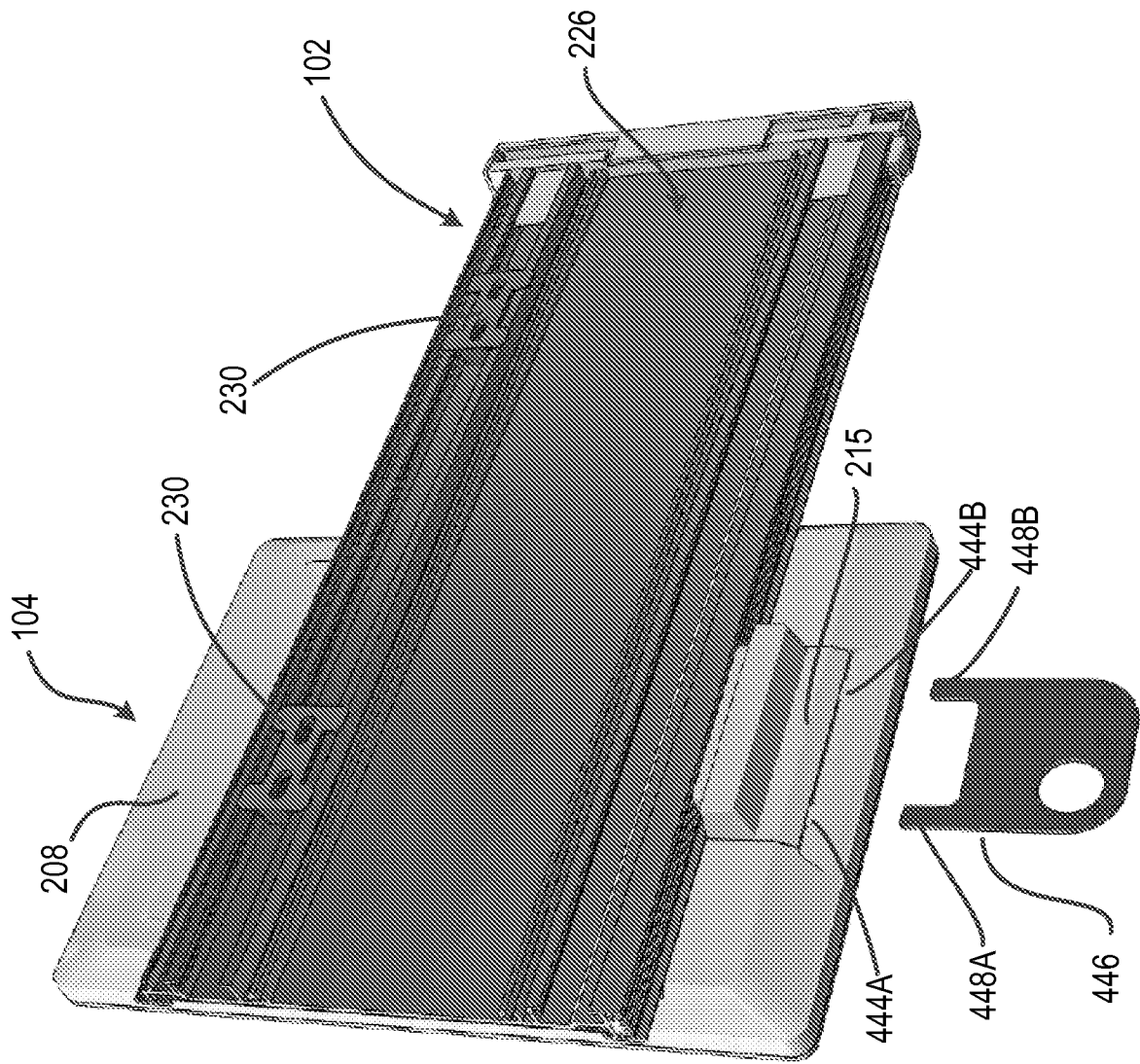


FIG. 4

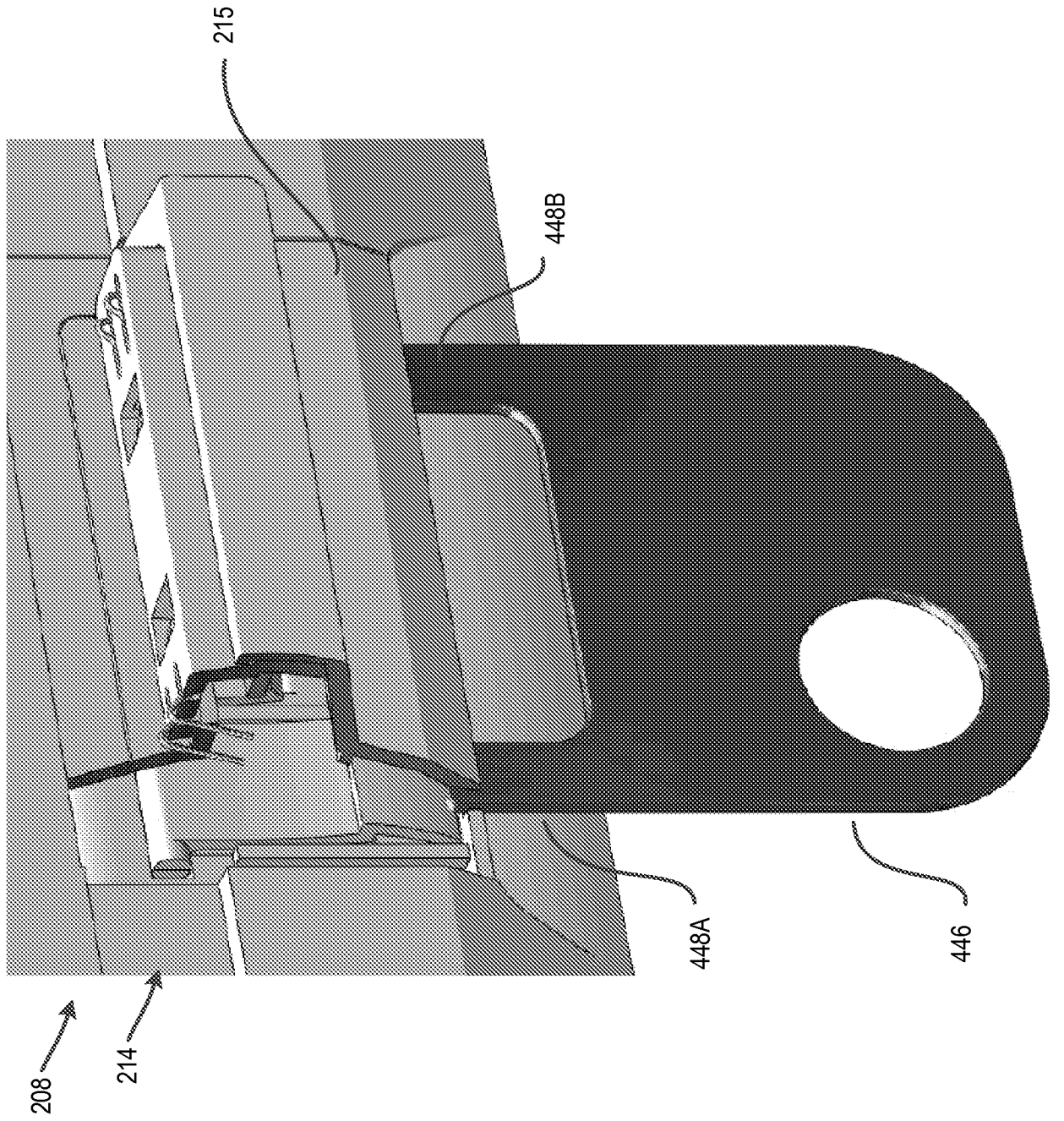
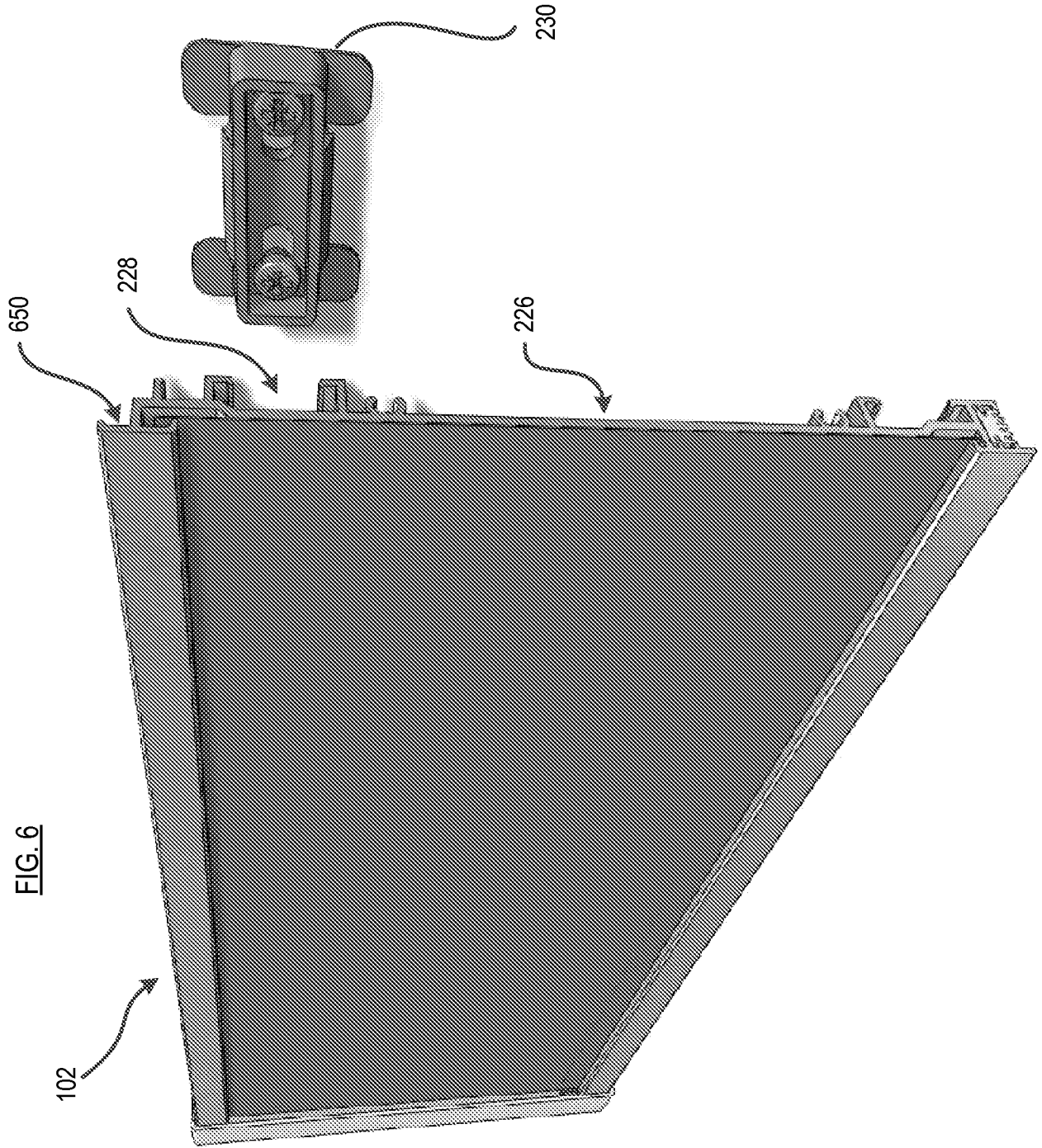
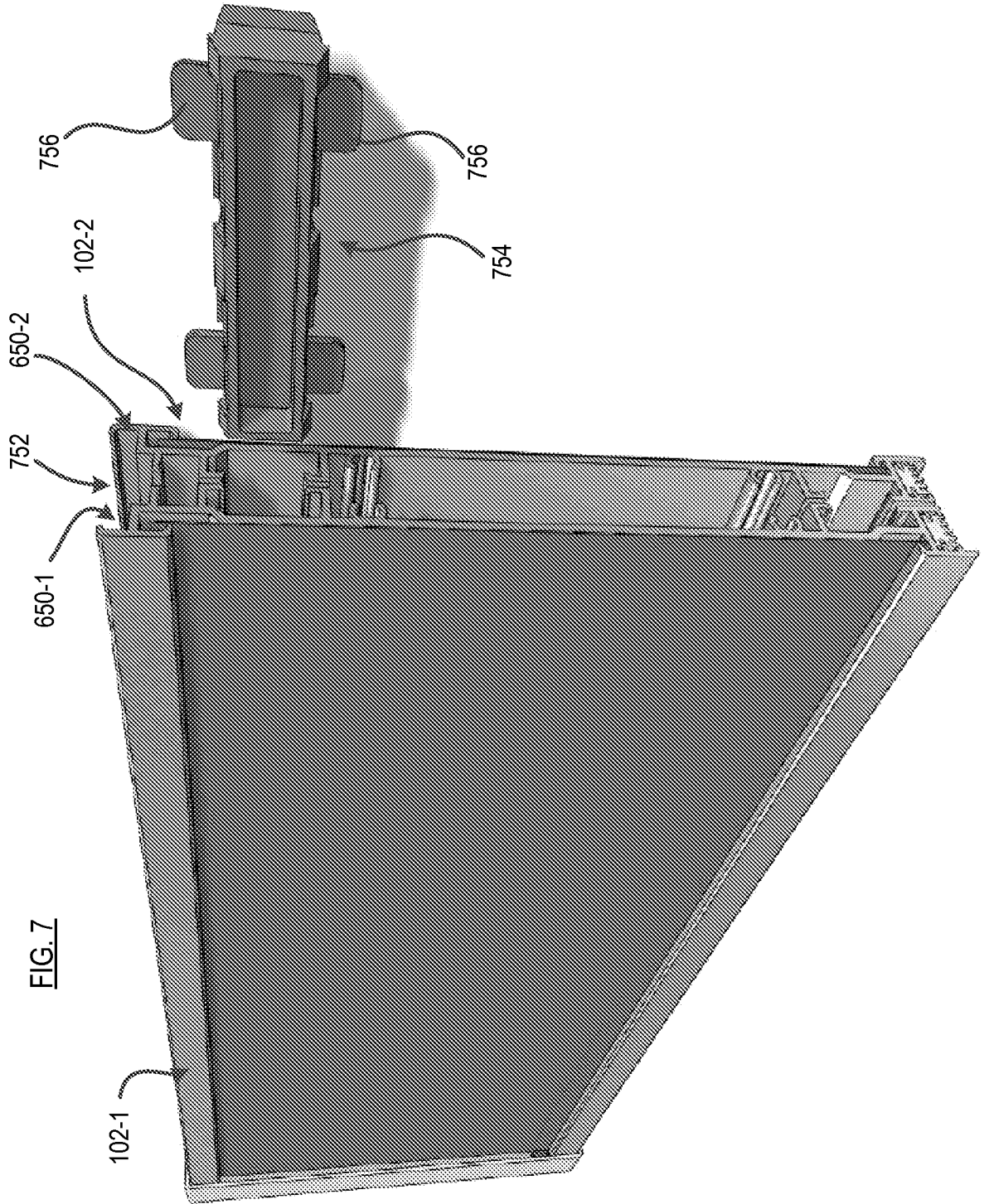
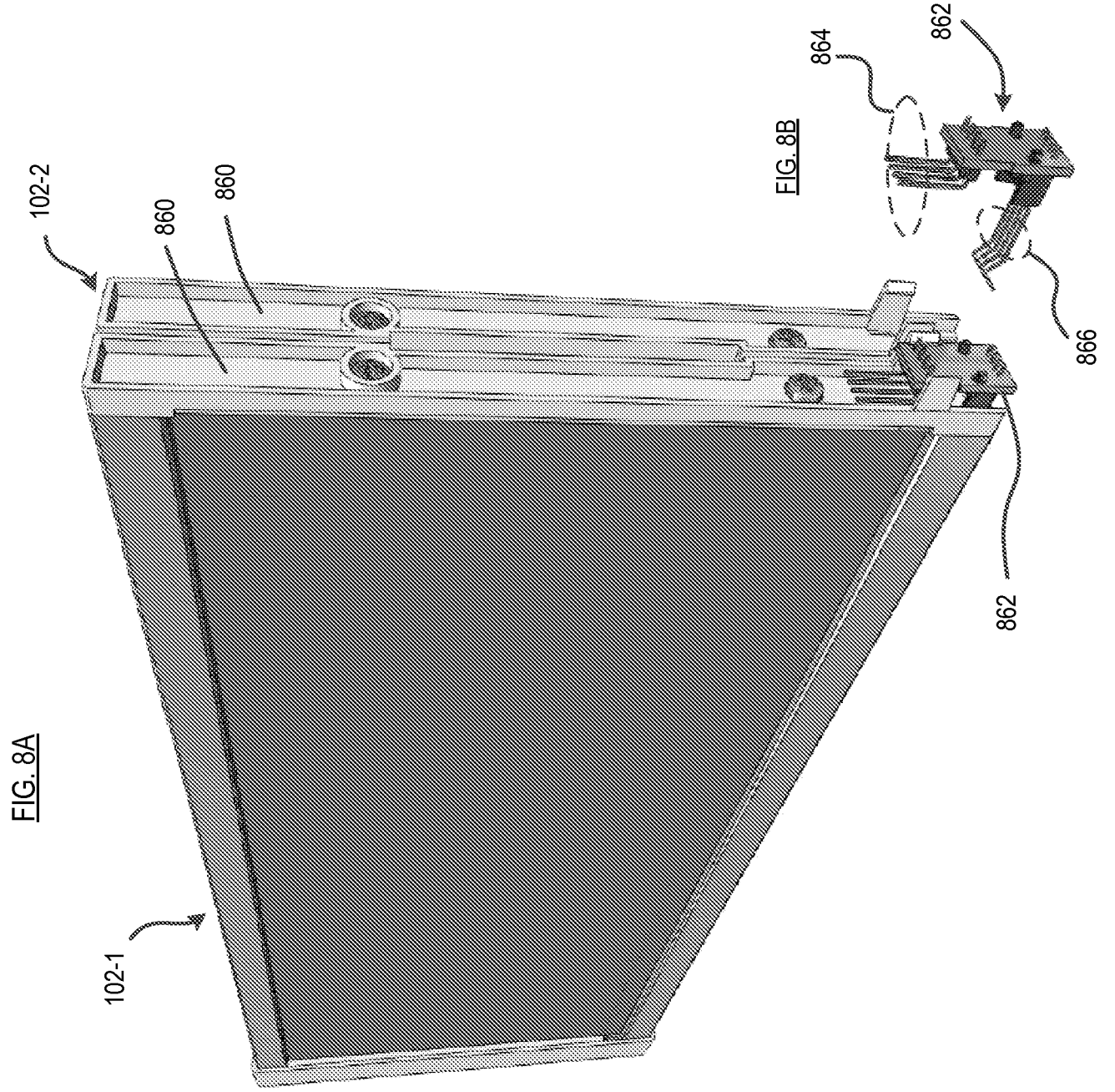


FIG. 5







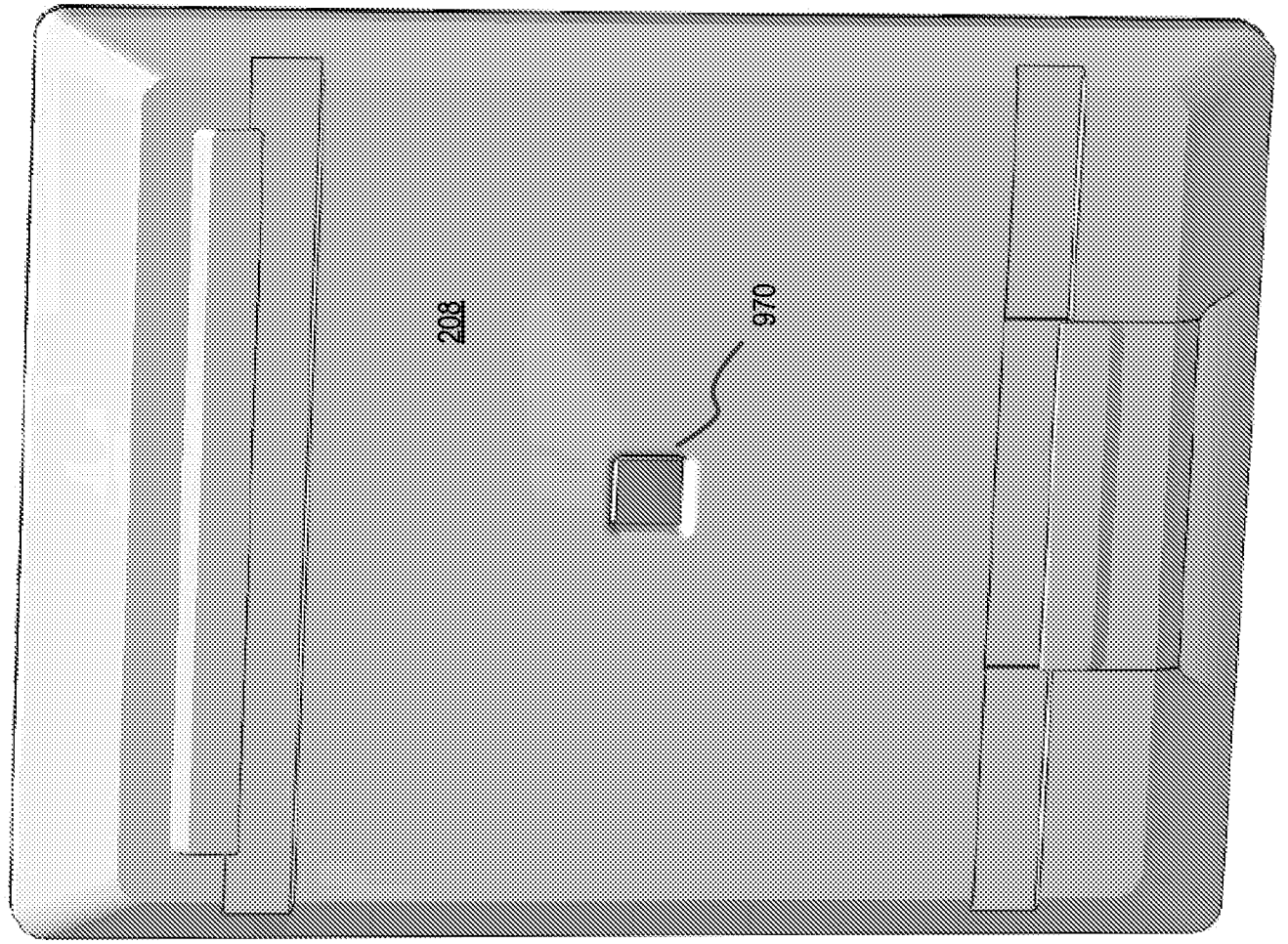


FIG. 9

