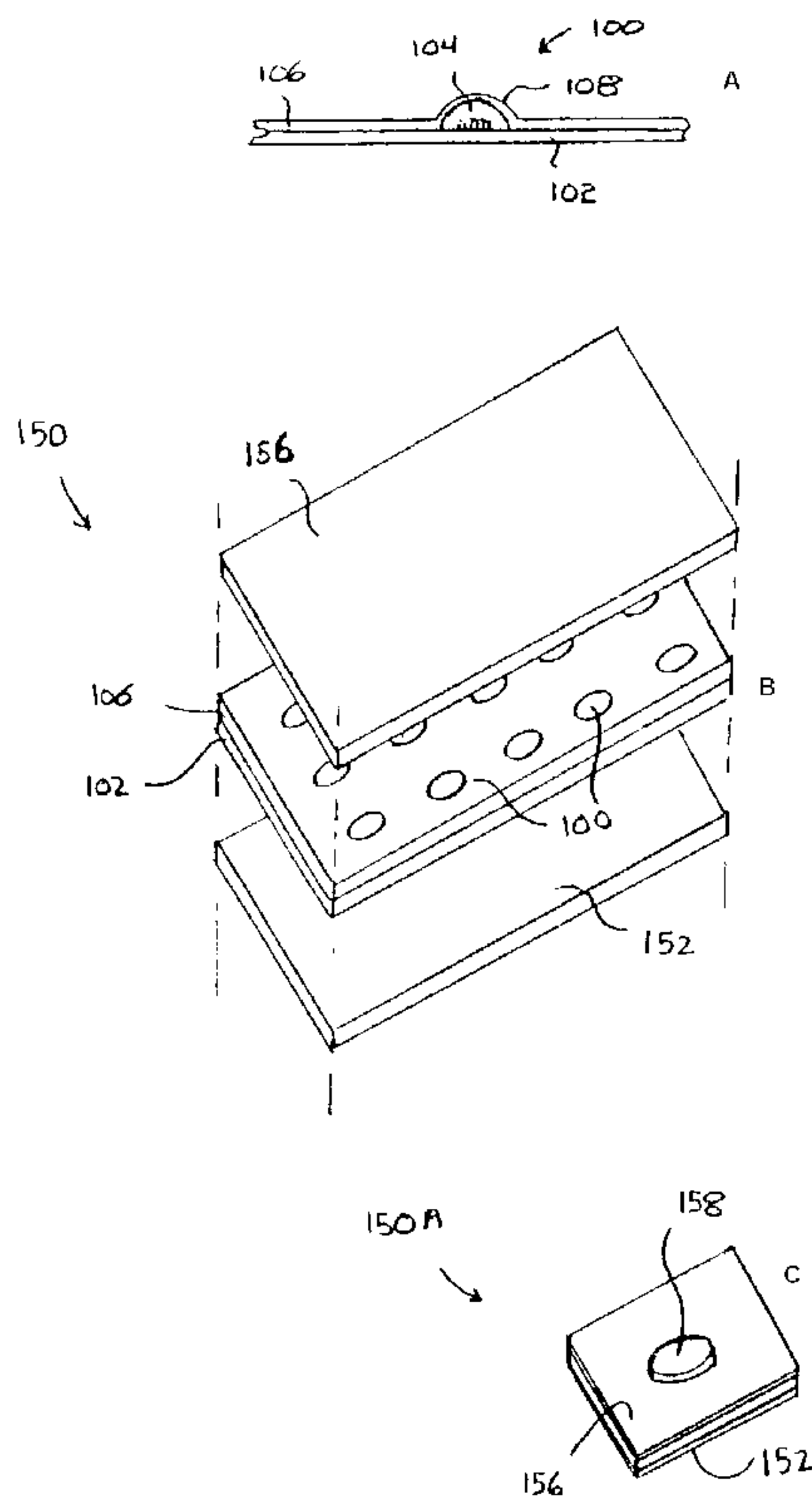




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 (54) Title: **MEDICATION DISPENSER FOR FLAT DOSAGE FORMS**



(57) **Abrégé/Abstract:**

A dispenser for storing/dispensing pharmaceutical dosages that are provided in a stamp-like dosage form. In some embodiments, the present dispenser includes a housing (202) for retaining a plurality of stacked, individual "stamp-like" pharmaceutical dosages (150). Within the housing (202) is a bias element (210) that urges the dosages (150) towards a dosage delivery port (204) of the housing (202). From the dosage delivery port (204), dosages (150) are dispensed through an aperture (214). In other embodiments, the dispenser includes a cylindrical main body (706) for retaining pharmaceutical dosage (150) having stamp-like dosage form (150) that are collectively organized in a roll (600). A dosage delivery port (704) depending from the cylindrical main body (706) receives dosages (150) one at a time therefrom.

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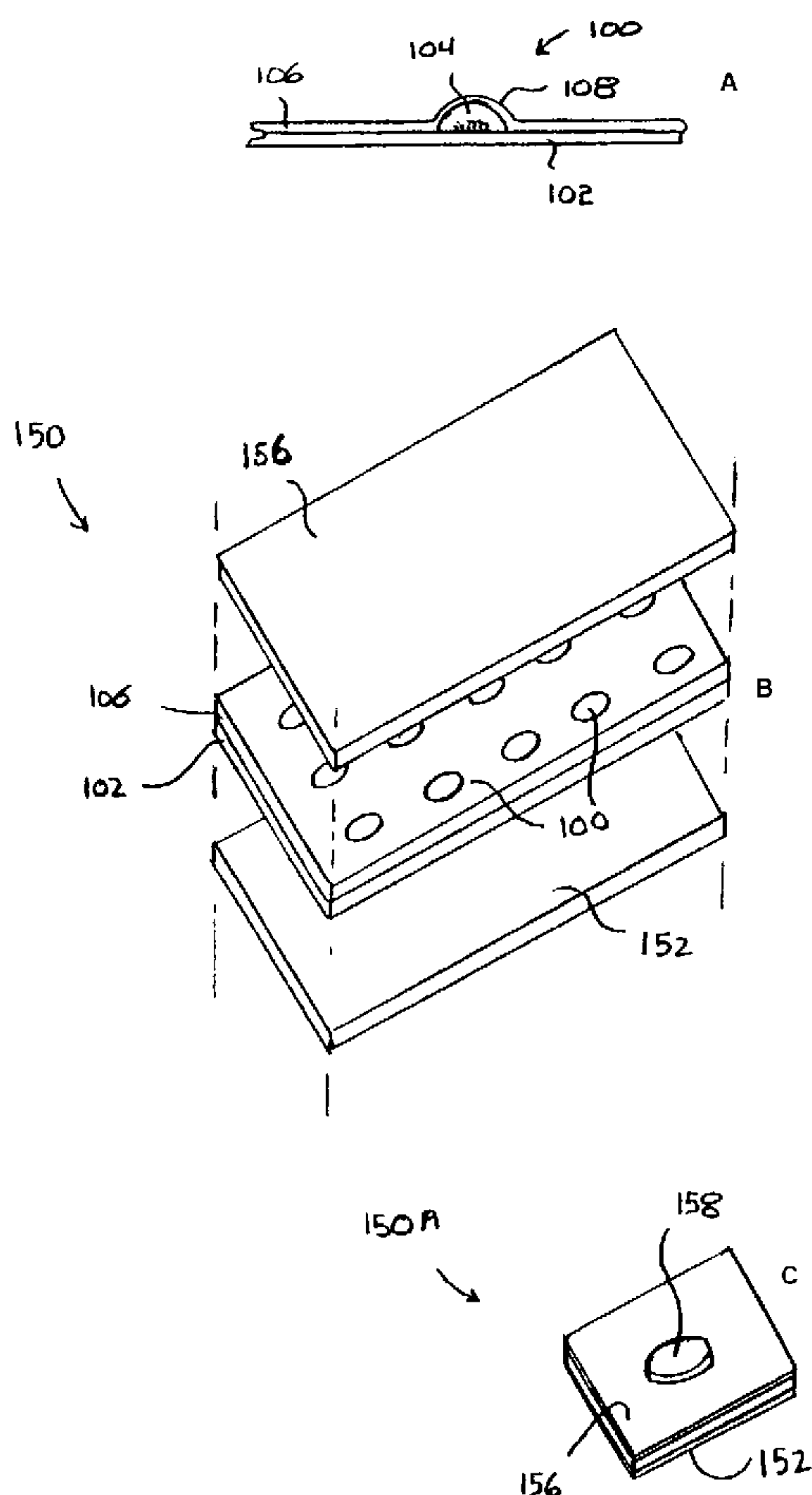
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(54) Title: MEDICATION DISPENSER FOR FLAT DOSAGE FORMS



(57) Abstract: A dispenser for storing/dispensing pharmaceutical dosages that are provided in a stamp-like dosage form. In some embodiments, the present dispenser includes a housing (202) for retaining a plurality of stacked, individual "stamp-like" pharmaceutical dosages (150). Within the housing (202) is a bias element (210) that urges the dosages (150) towards a dosage delivery port (204) of the housing (202). From the dosage delivery port (204), dosages (150) are dispensed through an aperture (214). In other embodiments, the dispenser includes a cylindrical main body (706) for retaining pharmaceutical dosage (150) having stamp-like dosage form (150) that are collectively organized in a roll (600). A dosage delivery port (704) depending from the cylindrical main body (706) receives dosages (150) one at a time therefrom.

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MEDICATION DISPENSER FOR DISPENSING FLAT DOSAGE FORMS

Field of the Invention

The present invention relates generally to medication dispensers. More particularly, the present invention relates to reusable medication dispensers for dispensing medications having a relatively "flat" dosage form.

Background of the Invention

"Child-proof" medicine containers are a standard method for dispensing prescription drugs. The popularity of such containers is due, of course, to the difficulty that opening such containers presents to children. Ironically, these containers also pose difficulties for groups of people who are most likely to require the medicine that is stored therein. In particular, the aged, the handicapped, stroke victims, arthritis sufferers, individuals that have tremors and those recovering from accidents, surgery or serious disease conditions, among other individuals, may have trouble opening such child-proof medicine containers.

In response to this problem, specialized medication dispensers have been developed. Medication dispensers typically include one or more chambers for storing medicine(s) and various mechanisms for dispensing the medication. In some cases, the dispensers include motors so that when a user pushes a button, a pill is dispensed (*see, e.g.*, U.S. Pat. No. 5,810,198). Some medicine dispensers include electronics that warn a user when it is time to take a pill, some restrict the dispensing of medication to certain prescribed times, and others automatically control delivery of multiple medications (*see, e.g.*, U.S. Pat. Nos. 5,752,620, 4,310,103, and 5,752,621).

Most medication dispensers are designed to dispense small solid dosage forms such as tablets or capsules. If the final dosage form of a medication deviates from those common forms,

dispensing may be problematic or impossible via standard dispensers. With the advent of new dosage forms, new types of medication dispensers are required.

Summary of the Invention

5 A dispenser for dispensing medications having a flat or "stamp-like" final dosage form is disclosed. In some embodiments, a dispenser in accordance with the present teachings includes a housing for retaining a plurality of stacked individual pharmaceutical dosages. Within the housing and beneath the dosages is a bias element, such as a helical spring, that urges the dosages towards a dispensing end of the housing. The housing also includes a dosage delivery port that
10 receives the pharmaceutical dosages one at a time from the interior of the housing.

In other embodiments, a dispenser in accordance with the present teachings includes a cylindrical main body for retaining a plurality of stamp-like dosages that are collectively organized in a roll. A dosage delivery port depending from the cylindrical main body receives dosages one at a time therefrom.

15 The dispensing operation for both stacked and rolled dosages can be carried out manually, manually with mechanical assist, or automatically via appropriate actuating mechanisms. In further embodiments, the present dispenser includes electronics that (1) alert a user of a scheduled dosage, and/or (2) dispense a dosage at a prescribed time or at a prescribed time interval, and/or (3) maintain a dosage record.

20

Brief Description of the Drawings

FIG. 1A depicts an electrostatically deposited pharmaceutical dosage form.

FIG. 1B depicts a strip of stamp-like dosage forms.

FIG. 1C depicts an individual stamp-like dosage form.

FIGS. 2A and 2B depict an embodiment of a dispenser in accordance with the present teachings.

FIG. 3 depicts a further embodiment of a dispenser in accordance with the present teachings wherein the dosages are contained within a removable magazine.

5 **FIG. 4** depicts an additional embodiment of a dispenser wherein the dosages are dispensed via a manual actuator.

FIGS. 5A and 5B depict yet another embodiment of a dispenser in accordance with the present teachings wherein the pharmaceutical dosages are dispensed via a mechanized actuator.

10 **FIG. 6** depicts pharmaceutical dosages having a stamp-like dosage form wherein the dosages are collectively organized in the form of a roll.

FIG. 7 depicts an embodiment of a dispenser in accordance with the present teachings for manually dispensing the rolled dosages of FIG. 6.

FIG. 8 depicts a further embodiment of a dispenser that is configured for mechanized dispensing of the rolled dosages of FIG. 6.

15 **FIG. 9** depicts an illustrative electronically-driven mechanized actuator for dispensing the rolled dosages of FIG. 6.

FIG. 10 depicts a simplified block diagram of electronics for imparting dosing, alarm and dose monitoring capabilities to the present dispenser.

20

Detailed Description

The assignee of the present application has described a method and an apparatus for making a pharmaceutical unit dosage form or a diagnostic form using electrostatic deposition of biologically- or pharmaceutically-active ingredients. *See*, International Application PCT/US99/12772, incorporated by reference herein.

In accordance with PCT/US99/12772, unit dosage forms are fabricated by electrostatically depositing pharmaceutically-active powder(s) onto a pharmaceutical-grade substrate and then bonding a cover layer to the substrate over the powder(s). FIG. 1A depicts such a unit dosage form **100**. The unit dosage form comprises pharmaceutically-active powder **104** that is disposed between substrate **102** and cover layer **106**. Active powder **104** is advantageously disposed underneath bubble **108** in cover layer **106**.

In some embodiments, unit dosage forms **100** are incorporated into a secondary package to form any of a number of different “final” or “finished” dosage forms that are disclosed in PCT/US99/12772 or elsewhere. One final dosage form described in PCT/US99/12772 is referred to (therein and herein) as a “stamp” or “stamp-type” or “stamp-like” dosage form. The designation “stamp” acknowledges the resemblance of a diced (*i.e.*, individual) dosage to a postage stamp.

In one embodiment, a stamp-like final dosage form comprises a unit dosage form **100** that is sealed between two polymer-based outer layers **152** and **156** (*i.e.*, the “secondary package”). (*See* FIGS. 1B and 1C.) Typically, many of such unit dosage forms **100** are sealed within the secondary package forming a strip **150** of such stamp-like dosage forms, as depicted via an “exploded” view in FIG. 1B. FIG. 1C depicts an individual dosage form **150C**, such as results from dicing strip **150** to separate the individual dosages. In embodiments in which unit dosage form **100** includes bubble **108** (FIG. 1A), layer **156** that overlies cover layer **106** advantageously includes bubble **158** that receives bubble **108**.

Stamp-like dosage forms have shapes that are characteristically flat. The diced stamp-like dosage form **150A** is advantageously rectangular as shown in FIG. 1C, but it can also be circular or have any suitable shape, as desired. As will become clearer later in this *Specification*, stamp-like dosages forms may advantageously be organized into a 1 x N strip. In embodiments in which stamp-like dosage forms are not diced into individual dosages (*e.g.*, when they are organized in a

1 x N strip), the secondary package advantageously has perforations (not shown) between adjacent dosage forms to facilitating removing an individual dosage from the collection thereof.

It will be appreciated that due to its physical configuration, the stamp-like dosage form, whether diced into individual dosage forms or grouped in a strip (both referenced hereinafter by the call out "150"), is not suitable for use in the typical prior art medication dispensers, such as are discussed in the *Background* section. The present invention provides several embodiments of a dispenser **200** that is suitable for dispensing pharmaceutical dosages that are configured in stamp-like dosage form **150**.

As used herein, the term "**stamp-like dosage form**" includes, in addition to dosage form **150** described above, other final dosage forms that are relatively flat in shape, but that may or may not be electrostatically deposited. In other words, it is *not* intended that the appended *Claims* be limited in scope to dosages that are formed via electrostatic deposition and/or to dosages that are sealed into a secondary package. That is, any dosage form that may suitably be dispensed from the present dispenser is considered to be a stamp-like dosage form as that term is used within this *Description* and the appended *Claims*. Those skilled in the art will be able to recognize other dosage forms that may suitably be used in conjunction with the present dispenser. Moreover, it will be recognized that while in some embodiments, the dosage comprises a single therapeutic agent, in other embodiments, the dosage comprises multiple therapeutic agents as may be used by patients on more than one therapy. Hereinafter, the term "dosage" and "dosage form" will be used synonymously.

FIGS. 2A (exterior view) and 2B (interior view) depict a first embodiment of medicine dispenser **200** for dispensing pharmaceuticals having a stamp-like final dosage form. Dispenser **200** comprises housing **202** having dosage delivery port **204**. The dosage delivery port **204** receives pharmaceutical dosages **150**, one at a time, from the interior of dispenser **200** through portal **206** located at dispensing end **208** of housing **202**.

Dosages are urged towards portal **206** via a bias element **210**. In the illustrated embodiments, bias element **210** is a helical spring that is placed in compression by dosages **150**.

The interior of housing **202** must be suitably configured to retain dosages **150** in a substantially orderly stack so that each dosage **150** is capable of being delivered to portal **206** and then to dosage delivery port **204**. In one embodiment, guides (not shown) within housing **202** maintain dosages **150** in stacked arrangement. In another embodiment, the open space within housing **202** takes the form of a shaft (not depicted) that restricts the movement of stacked dosages **150** to only one direction, which is upwards toward dispensing end **208**.

Dosage delivery port **204** has a receiving surface **212** that receives dosages **150**, one at a time, from portal **206**. Receiving surface **212** leads to aperture **214**, which is the site from which dosages **150** are dispensed from dispenser **200**.

In the embodiment illustrated in FIGS. 2A and 2B, dosages **150** are manually advanced to receiving surface **212** and from there to aperture **214**. To facilitate such manual operation, dosage delivery port **204** includes access way **218** through which a user can engage, with a finger, a dosage that is cued in portal **206**. Access way **218** is formed in top **216** of housing **202**.

Access way **218** is advantageously narrower across than dosages **150**. In particular, in the illustrated embodiment, top **216** extends inwardly beyond the side edges of receiving surface **212** thereby forming lips **220**. Channels **222** are defined between lip **220** and receiving surface **212** on both sides of dosage delivery port **204**. The "side" edges of dosages **150** engage channels **222** so that, among any other benefits, dosages will not fall out of dispenser **200** if it is inverted.

Moreover, the resilience of bias element **210** forces the top-most dosage **150** against the underside of lips **220**. Such upward pressure reduces the likelihood that dosages **150** could fall out of dispenser **200**.

Dispenser **200** advantageously includes ergonomic features. For example, in the illustrated embodiment, housing **202** includes ergonomic handgrip **224** configured to minimize strain on a user's hand/wrist.

In a second embodiment depicted in FIG. 3, dispenser **200** includes magazine **326** that stores a stack of dosages **150**. Magazine **326**, which is advantageously removable from housing **202**, ensures that dosages **150** remain in an orderly stack within housing **202** for problem-free dispensing. Additionally, it is easier and more convenient to load magazine **326** with dosages **150** (when the magazine is removed from housing **202**), than to load a plurality of such dosages directly into the interior of housing **202** as is required for the embodiment depicted in FIGS. 2A and 2B.

In the illustrated embodiment, bias element **210** is disposed within magazine **326**. In other embodiments, magazine **326** is physically configured so that bias element **210** is not contained within magazine **326**, but, rather, is disposed beneath it. This is accomplished in one embodiment by providing an opening (not shown) in the bottom of magazine **326** that receives bias element **210** and allows it to engage the bottom of the stack of dosages **150**. In another embodiment (not depicted), the bottom of magazine **326** is configured to slide within the sidewalls thereof. As dosages are removed from magazine **326** through portal **206**, the force imparted by bias element **210** forces the movable bottom of the magazine, and the overlying dosages **150**, upwardly. The slideable bottom of magazine **326** nears dispensing end **208** of housing **202** as the full complement of dosages **150** is dispensed therefrom.

In the previous embodiments, dosages **150** are manually advanced to receiving surface **212** and from there to aperture **214**. FIG. 4 depicts an embodiment of dispenser **200** according to the present teachings in which a plunger **428** advances a dosage **150** from portal **206** to dosage delivery port **204**.

Plunger **428** does not include any mechanism that provides a mechanical advantage or that changes the direction of a manually applied actuating force. A user simply pushes plunger **428**, which, in turn, advances dosage **150** from portal **206** into dosage delivery port **204**. Plunger **428** is suitably configured, as desired, to advance a dosage either part of the way or completely through aperture **214** of dosage delivery port **204**. Dispenser **200** depicted in FIG. 4 can be used with or without magazine **326**.

FIGS. 5A and 5B depict an embodiment of dispenser **200** comprising a mechanized actuator **530**. Actuator **530** includes arm **532** that is operatively connected to solenoid **534** or like device. A power supply (not shown) supplies power to solenoid **534**. When a user pushes button **536**, power is sent to solenoid **534**, which in turn drives arm **532** into dosage **150** thereby moving it from portal **206** into dosage delivery port **204**. To provide sufficient space for actuator **530**, housing **202** may be somewhat larger than for the previously described embodiments. Magazine **326** is advantageously used for storing dosages **150** within housing **202**.

In some embodiments (not depicted), the mechanized actuator is manually “powered” (*i.e.*, the actuating force is supplied by a user). In such embodiments, actuator **530** comprises mechanical linkages (not depicted) that drive arm **532** into dosage **150** using a force that is applied by a user to button **536**. Alternatively, other actuating arrangements that will occur to those skilled in the art may suitably be used.

The previous embodiments of dispenser **200** were directed to diced stamp-like dosage forms (*see*, FIG. 1C). In further embodiments, the present dispenser is configured for dispensing a strip of stamp-like dosage forms **150**.

FIG. 6 depicts a roll **600** of stamp-like dosage forms **150**. Perforations **602** separate each individual dosage **150** to facilitate separating such dosages. In other embodiments (not shown), individuals dosage forms can be disposed on a carrier sheet (*e.g.*, using a weak adhesive), rather than being linked by their secondary package to adjacent dosage forms as depicted in FIG. 6.

FIG. 7 depicts an embodiment of medicine dispenser **700** for dispensing a roll **600** of dosages **150**. Dispenser **700** comprises housing **702** having cylindrical main body **706** suitable for receiving roll **600**. Dosage delivery port **704** depends from cylindrical main body **706**. Dosages **150** are received at dosage delivery port **704** one at a time from cylindrical main body **706**. Dosage delivery port **704** includes aperture **714**, which is the site from which dosages **150** are dispensed from dispenser **700**.

In the embodiment illustrated in FIG. 7, dosages **150** are manually advanced to dosage delivery port **704** and to aperture **714**. To facilitate such manual operation, dosage delivery port **704** includes access way **718** through which a user can engage, with a finger, a dosage that is cued in dosage delivery port **704**. Access way **718** is formed in top **716** of housing **702**.

Access way **718** in top **716** is advantageously narrower across than pharmaceutical dosages **150**. In particular, in the illustrated embodiment, top **716** extends inwardly beyond the side edges of aperture **714** forming lips **720**. The "side" edges of dosages **150** advantageously underlie lips **720** so that, among any other benefits, the end of roll **600** nearest aperture **714** will remain within the dispenser until such time as dosage **150** is dispensed.

A side **722** of housing **702** is advantageously removable or otherwise allows access to the interior of housing **702** to allow insertion of roll **600** of dosages **150**. In some embodiments, housing **702** contains a removable cartridge (not shown) that receives roll **600** for storage therein.

In the previous embodiment, dispenser **700** did not include any mechanism for advancing dosages **150** toward the dosage delivery port/aperture. In such an embodiment, dosages are dispensed, for example, by inserting a finger through access way **718**, engaging dosage **150**, and sliding it forward towards aperture **714**. FIG. 8 (exterior view) and FIG. 9 (interior view) depict an embodiment of dispenser **700** according to the present teachings comprising a drive mechanism **730** for advancing dosages **150** toward dosage delivery port **704** and aperture **714** for dispensing.

The illustrative dispenser **700** depicted in FIG. 8 is very similar in external configuration to the dispenser depicted in FIG. 7. Since dispenser **700** of FIG. 8 has drive mechanism **730**, access way **718** for manually engaging dosages **150** is not required. The dispenser of FIG. 8 includes button **744** that activates the drive mechanism.

5 In an illustrative depicted in FIG. 9, drive mechanism **730** comprises first roller **732A**, second roller **732B** and motor **740**, interrelated as shown. Each roller comprises two wheels (*e.g.*, **734B** and **736B**) that are rigidly connected by an axle (*e.g.*, **738B**). Drive shaft **742** is connected to motor **740** and turns when the motor is energized. A power supply (not shown) supplies power to motor **740**.

10 Wheels **734A** and **736A** (the latter not shown) of roller **732A** engage undersurface **604** (*see* FIG. 6) of the carrier sheet or secondary package of the dosage forms. Likewise, wheels **734B** and **736B** of roller **732B** engage top surface **606** (*see* FIG. 6) of the secondary package of the dosage forms. Drive shaft **742** operatively engages wheel **734A**.

When a user pushes button **744**, power is sent to motor **740**. The motor rotates drive shaft
15 **742**, which, in turn, drives wheel **734A**. Wheel **734A**, which must maintain sufficient frictional engagement with undersurface **604**, drives dosage forms **150** towards through dosage delivery port **704** and aperture **714**. Sufficient frictional engagement is maintained by sandwiching dosage forms **150** between the first and second roller **732A** and **732B**.

In some embodiments, drive mechanism **730** is manually "powered" (*i.e.*, the actuating
20 force is supplied by a user). In one such embodiment (not depicted), the drive mechanism comprises the two rollers as shown, but not motor **740**. Rather, a crank engages, either directly, or through mechanical linkages, one of the rollers. As the crank is turned by hand, the rollers advance dosages **150** through aperture **714**. In another embodiment (not depicted), roll **600** of dosages **150** can be wound around a hub, the hub having a crank engaged thereto. As a user turns
25 the crank, the hub turns, thereby advancing dosages **150**.

The operation of dispensers **200** and **700** can be enhanced by one or more advanced dispensing features. Such features include, among others, alerting the user to dispense a dosage, timed dispensing, and compliance record keeping. To that end, in further embodiments in accordance with the present teachings, dispensers **200** and **700** include dosing/alarm/monitoring electronics **800**, a figurative embodiment of which is depicted in FIG. 10.

In the embodiment depicted in FIG. 10, electronics **800** includes processor **802**, memory **804**, timer **806** and alarm **808**. “Dosing” electronics (*i.e.*, the functionality required for timed dosing) and “monitoring” electronics (*i.e.*, the functionality required for dosage monitoring and recording) include processor **802**, memory **804** and timer **806**.

In some embodiments, memory **804** is used to store program code for operating the processor **802**, to store a user-defined dosing schedule and to store compliance/monitoring data. Memory **804** may comprise at least two separate memory devices since the program code should be in permanent memory while the dosing schedule and compliance data advantageously reside in programmable/erasable memory.

The dosing schedule, which is advantageously programmed by a user into memory **804**, can specify that a dosage is to be dispensed at a specific time (*e.g.*, 8:00 a.m.) or, alternatively, can specify that dosages are to be delivered according to a time interval (*e.g.*, every 4 hours). Timer **806** is used in conjunction with the dosing schedule to implement timed dosing.

In accordance with the dosing schedule, processor **802** sends an appropriate actuating signal to the actuator/drive mechanism **530/730** (more properly, to the actuator or mechanism “driver,” not depicted). The signal energizes actuator/drive mechanism **530/730** and a dosage is dispensed. Processor **802** advantageously updates the compliance record with information concerning the dispensed dosage (*e.g.*, the time dispensed, *etc.*). Compliance data can be read out of memory **804** in known fashion.

To automatically dispense dosages according to a defined schedule, dispenser 200 or 700 must include sufficient automation (*e.g.*, actuators, power supply, *etc.*) Thus, dosing electronics can only be used with suitably automated embodiments of the present dispenser. On the other hand, “alarm” electronics, which in some embodiments includes timer 806 and alarm 808, can be
5 used in conjunction with substantially non-automated embodiments of the present dispenser.

It is understood that the functionality represented by processor 802, memory 804 and the timer and alarm may be suitably combined into fewer than four discrete devices. Those skilled in the art will know how to implement such dosing, alarm and monitoring electronics.

It is to be understood that the above-described embodiments are merely illustrative of the
10 invention and that many variations can be devised by those skilled in the art without departing from the scope of the invention. It is therefore intended that such variations be included within the scope of the following claims and their equivalents.

We claim:

- 1 1. A dose dispenser, comprising:
2 a housing for retaining a plurality of stacked individual dosages, each of
3 said dosages being provided in a stamp-like dosage form;
4 a bias element disposed within said housing, said bias element operative to urge said
5 stacked dosages one at a time towards a dispensing end of said
6 housing; and
7 a dosage delivery port that receives said dosages one at a time from said
8 dispensing end of said housing.

- 1 2. The dose dispenser of claim 1 wherein said housing is physically adapted for
2 ergonomic engagement with a user's hand.

- 1 3. The dose dispenser of claim 1 wherein said dosage delivery port comprises:
2 a flat receiving surface for receiving said dosages from said dispensing
3 end of said housing;
4 a first channel defining a first edge of said flat receiving surface;
5 a second channel defining a second edge of said flat surface; and
6 an aperture defined by an end of said first channel, an end of said second channel and an
7 end of said receiving surface, wherein said dosages are dispensed from said
8 aperture.

- 1 4. The dose dispenser of claim 1 comprising an actuator that advances
2 said dosages, one at a time, into said dosage delivery port.

1 5. The dose dispenser of claim 1 further comprising a magazine for
2 receiving said plurality of stacked individual dosages, wherein said magazine is removably
3 disposed within said housing.

1 6. The dose dispenser of claim 5 further comprising an actuator that
2 advances said dosages, one at a time, into said delivery port.

1 7. The dose dispenser of claim 6 wherein said actuator is electrically
2 actuated.

1 8. The dose dispenser of claim 7 further comprising dosing electronics that are
2 operable, in conjunction with said actuator, to dispense said individual dosages at specified times
3 or at specified time intervals.

1 9. The dose dispenser of claim 1 further comprising alarm electronics that alert a
2 user that it is time to dispense a dosage.

1 10. The dose dispenser of claim 7 further comprising monitoring electronics that
2 record dispensing statistics.

1 11. A dose dispenser comprising:
2 a cylindrical main body for retaining a plurality of dosages, wherein:
3 each of said dosages is provided in a stamp-like dosage form, and
4 said plurality of dosages are collectively organized in a roll; and
5 a dosage delivery port depending from said cylindrical main body and operative to
6 receive said dosages from said cylindrical
7 main body.

1 12. The dose dispenser of claim 11 wherein said dosage delivery port has
2 an aperture through which said dosages are dispensed.

1 13. The dose dispenser of claim 12 wherein said dosage delivery port comprises:
2 an end wall in which said aperture is defined;
3 two side walls that join said end wall to said cylindrical main body; and
4 a top wall that abuts said two said walls and said end wall.

1 14. The dose dispenser of claim 13, said top wall having an access way that
2 extends from said aperture towards said cylindrical main body, wherein said access way has a size
3 suitable for providing access by a user's finger to a dosage that is within said dosage delivery
4 port.

1 15. The dose dispenser of claim 13, further comprising a drive mechanism that
2 engages said dosages, wherein said drive mechanism is operative, when actuated, to drive said
3 dosages through said aperture.

1 16. The dose dispenser of claim 15 wherein said drive mechanism is manually
2 actuated by a crank that is driven by a user.

1 17. The dose dispenser of claim 15 wherein said drive mechanism is electrically
2 actuated.

1 18. The dose dispenser of claim 17 further comprising a dispensing button that, when
2 engaged by a user, causes said electrical actuation of said drive mechanism.

1 19. The dose dispenser of claim 18 wherein said drive mechanism comprises:
2 a first roller that abuts, in frictional engagement, a first surface of said dosages;
3 a second roller that abuts, in frictional engagement, a second surface of said dosages;
4 wherein, said first and second rollers sandwich said dosages therebetween;
5 a motor that is operatively engaged to said first roller; and
6 a power source for driving said motor.

1 20. The dose dispenser of claim 17 further comprising dosing electronics dosing
2 electronics that are operable, in conjunction with said drive mechanism, to dispense said
3 individual dosages at specified times or at specified time intervals.

1 21. The dose dispenser of claim 11 further comprising alarm electronics that alert a
2 user that it is time to dispense a dosage.

1 22. The dose dispenser of claim 17 further comprising monitoring electronics that
2 record dispensing statistics.

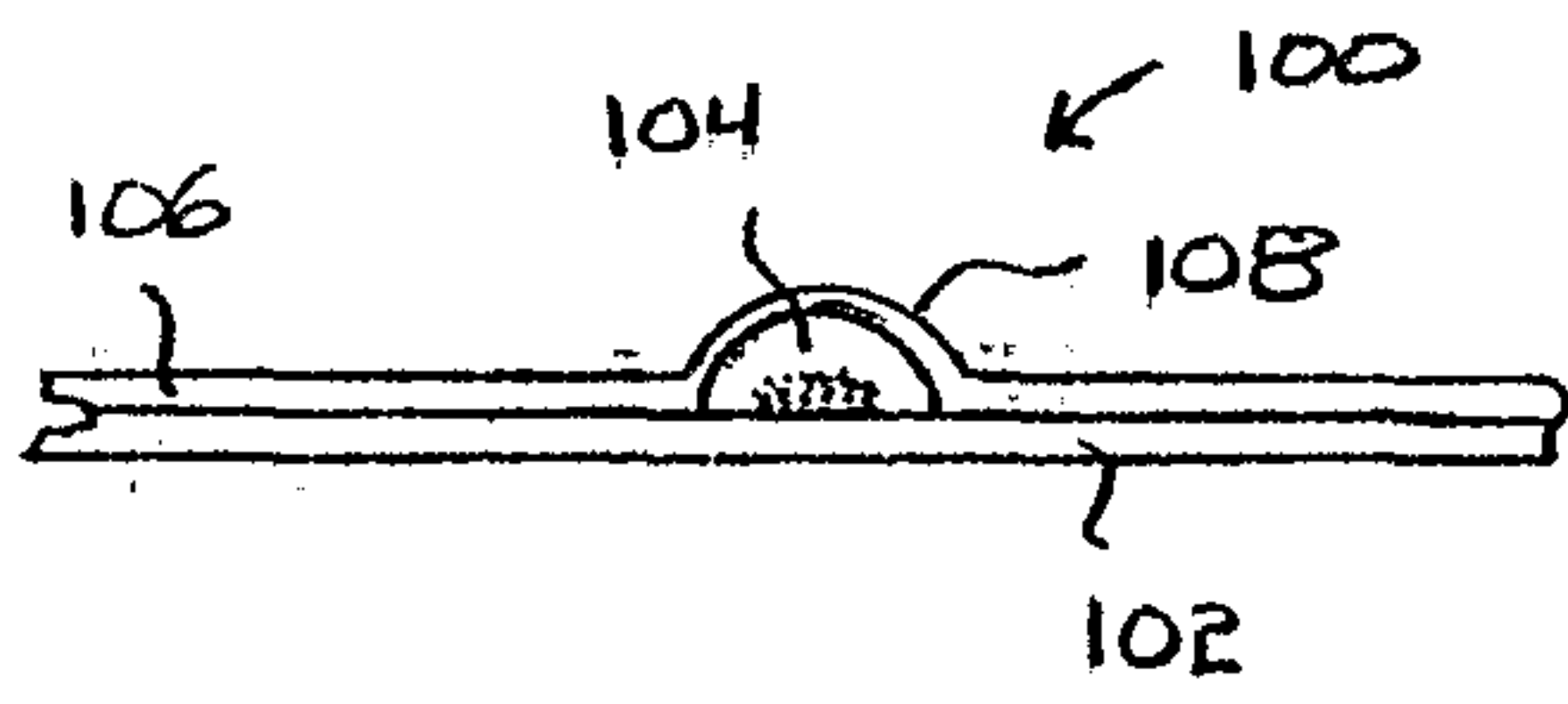


FIG. 1A

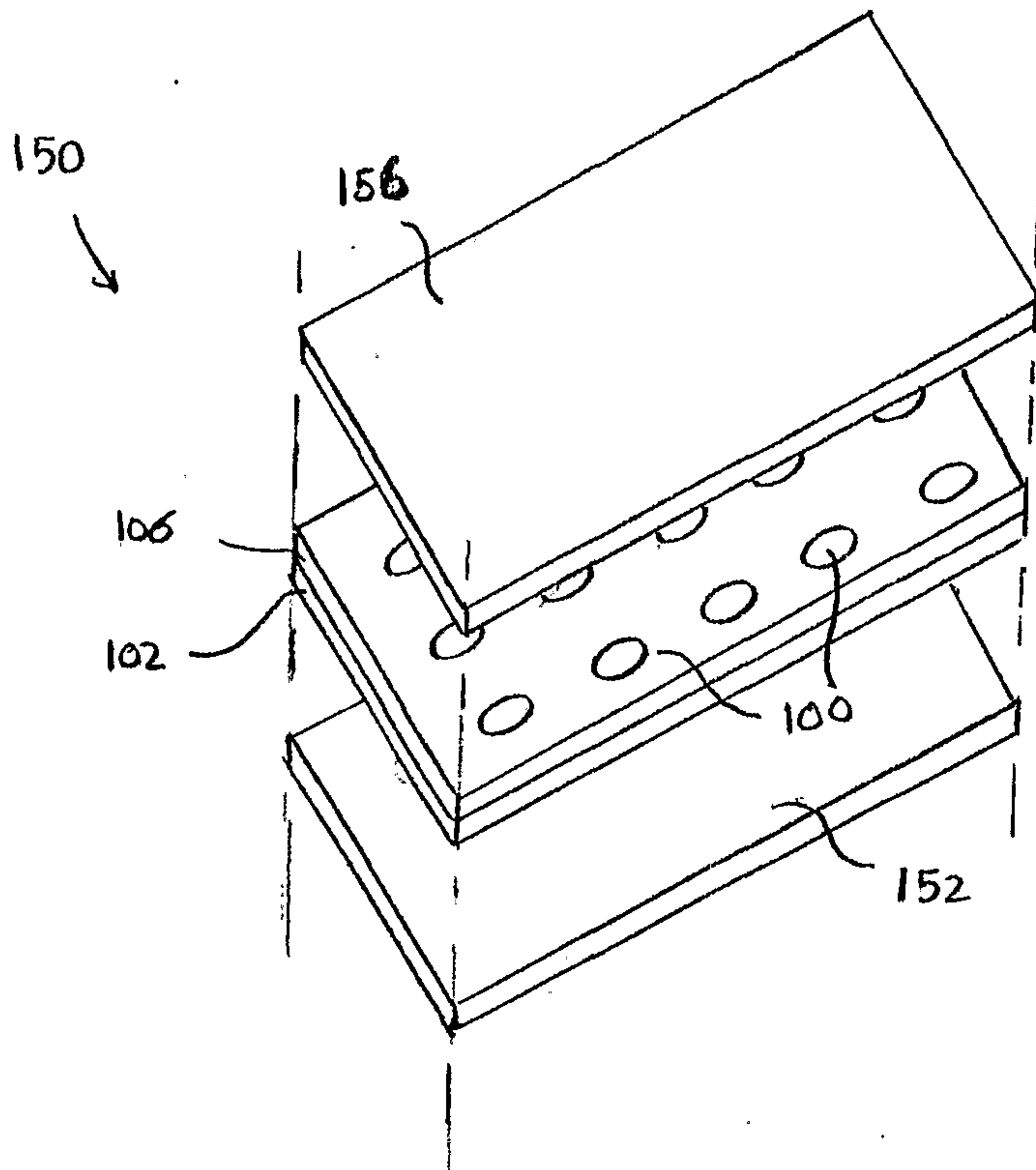


FIG. 1B

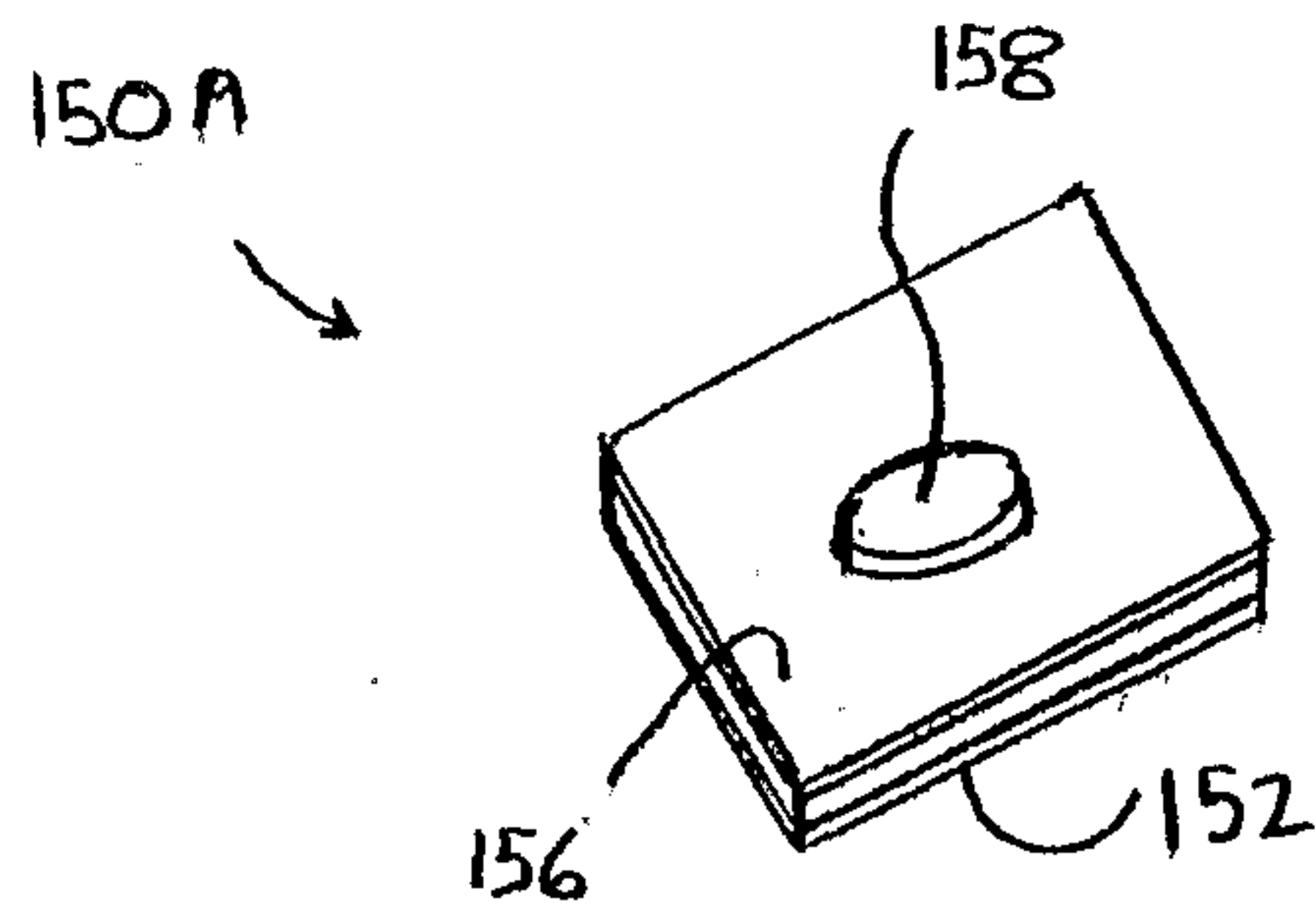
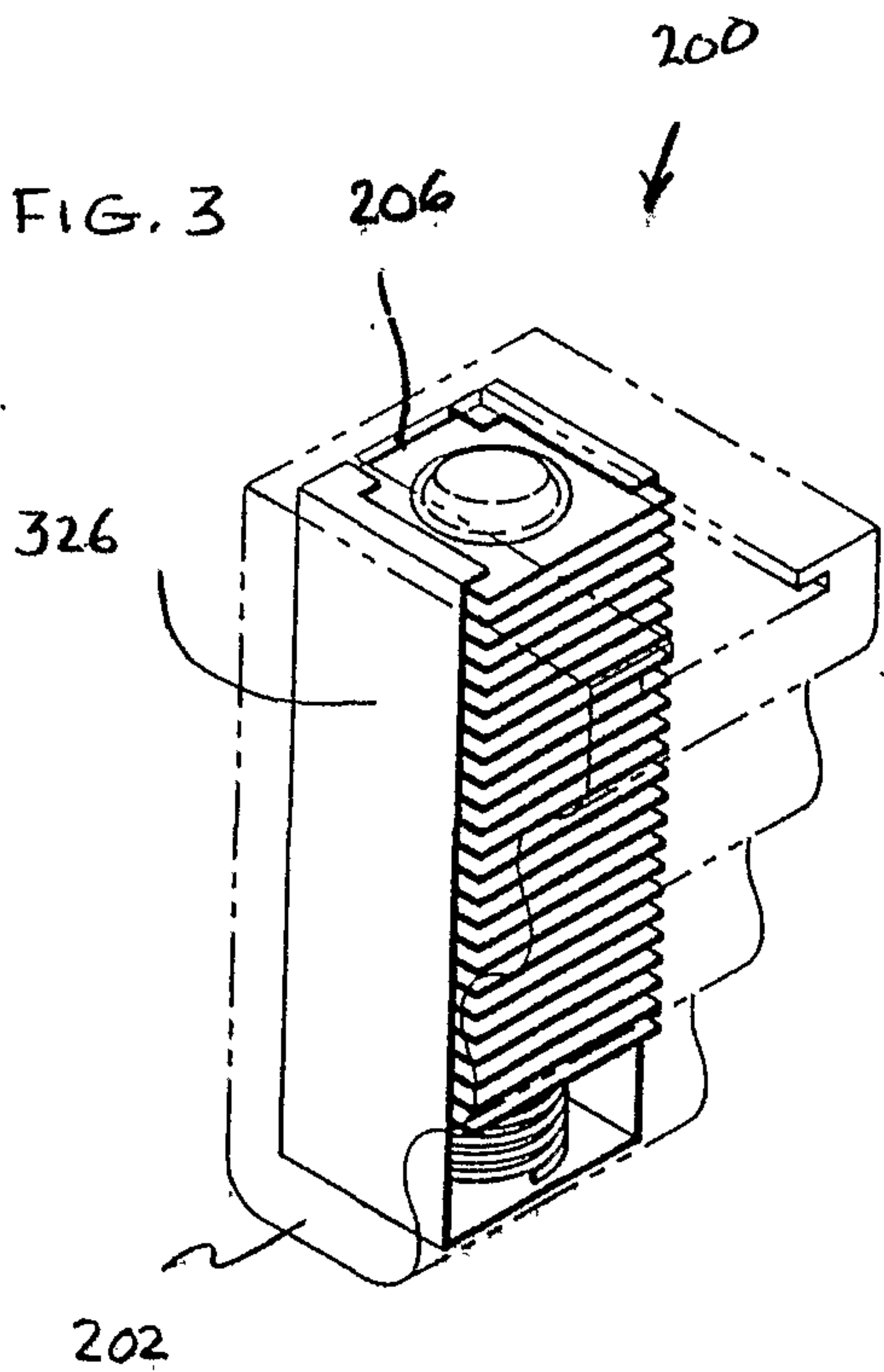
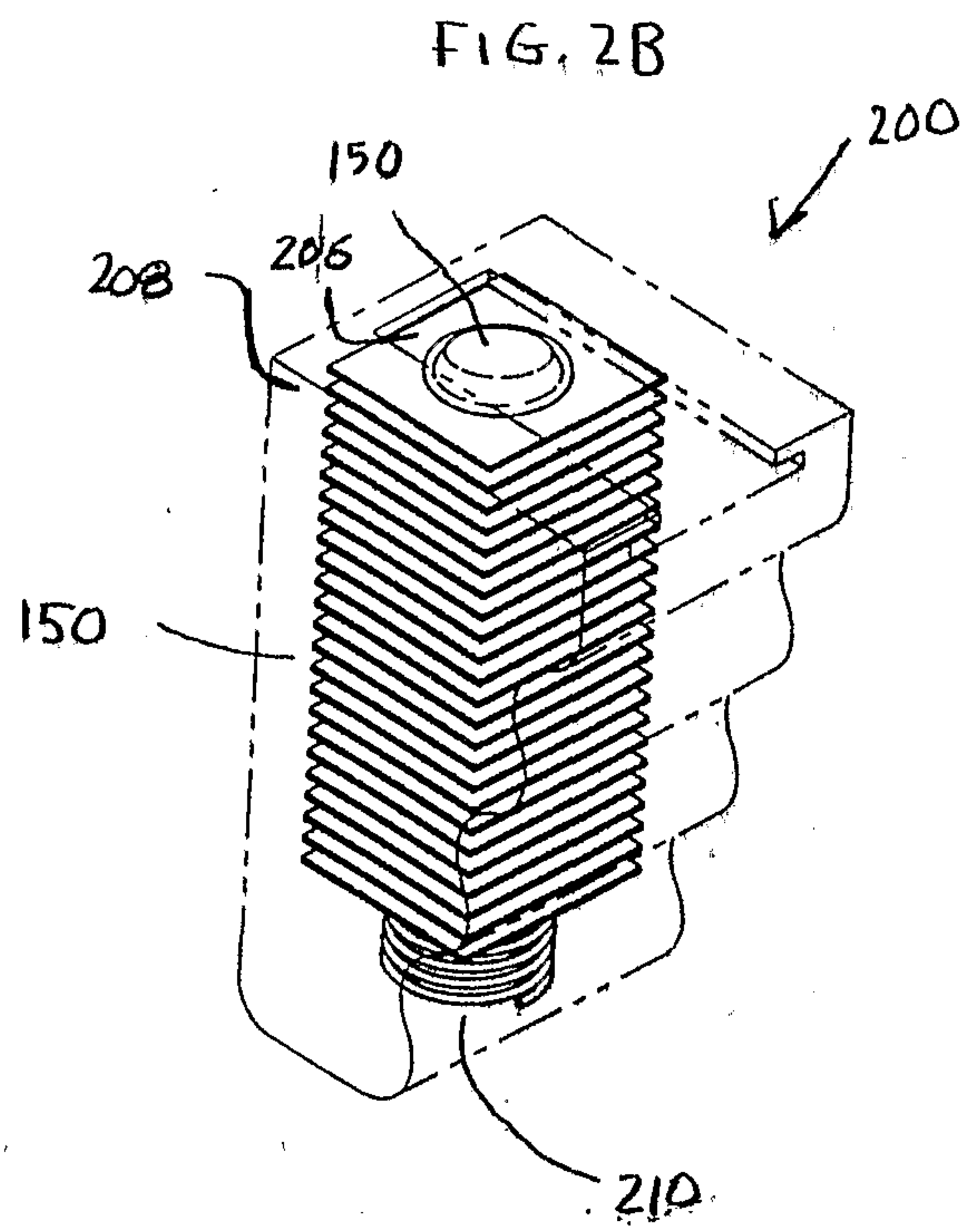
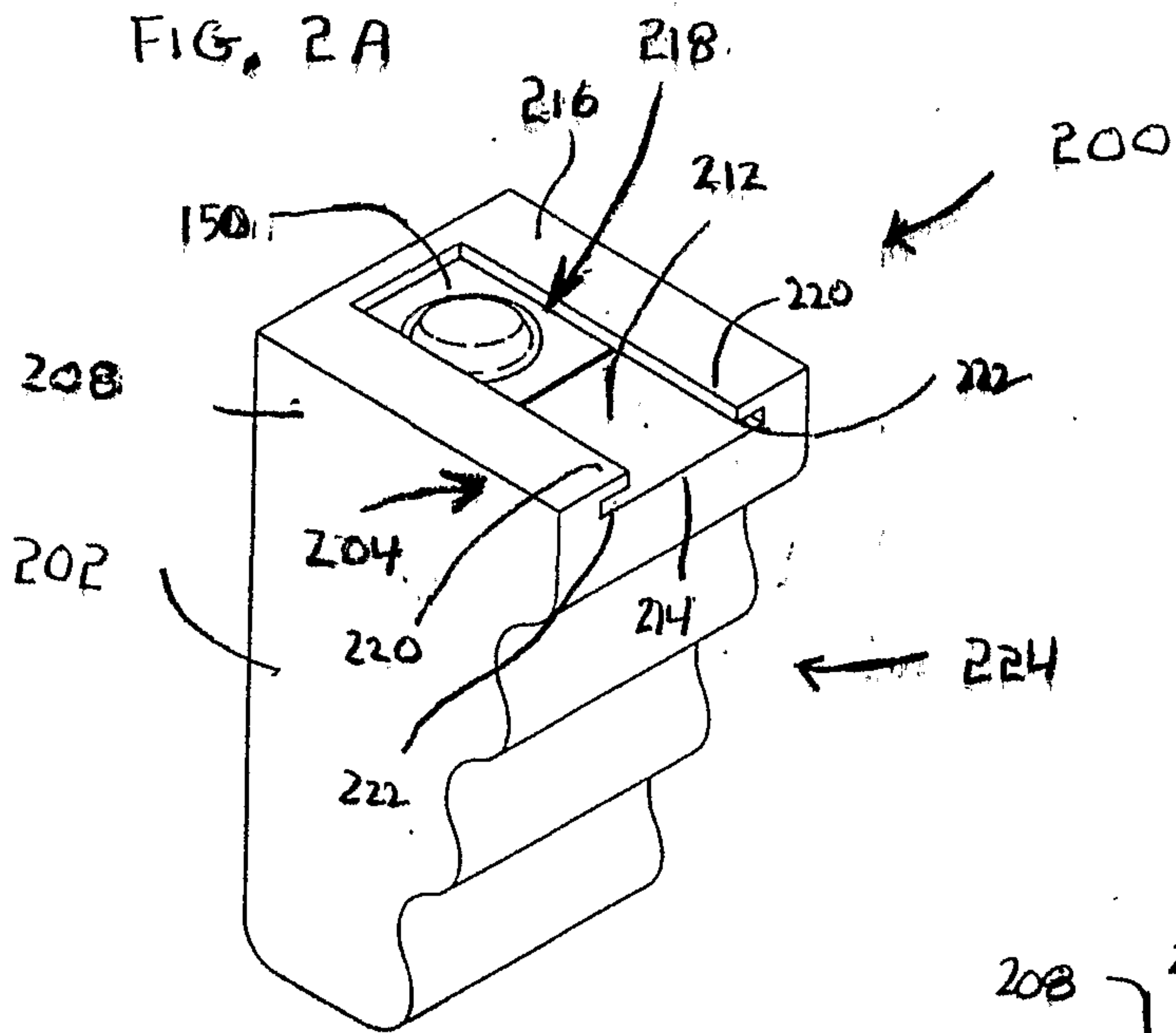


FIG. 1C



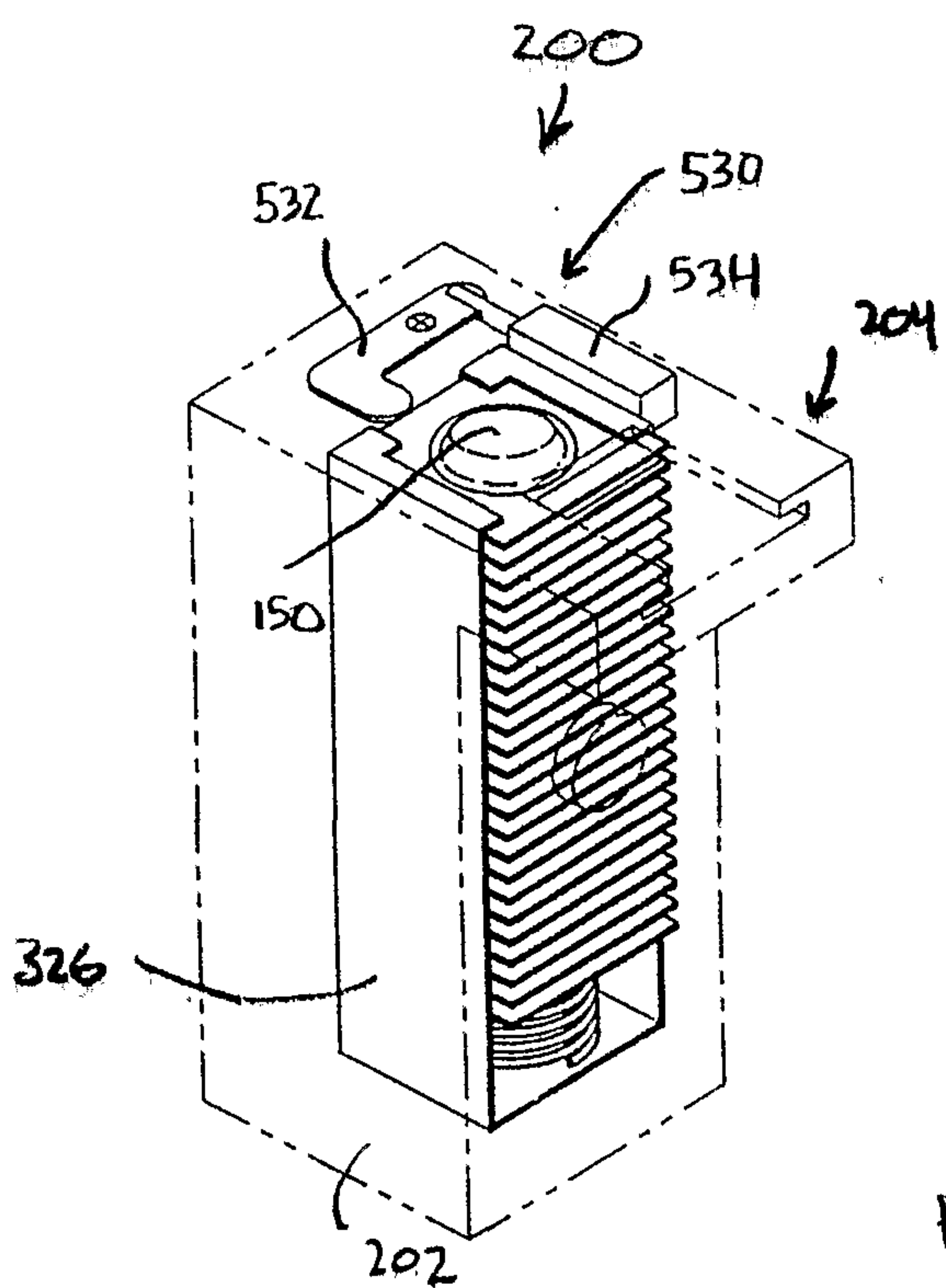
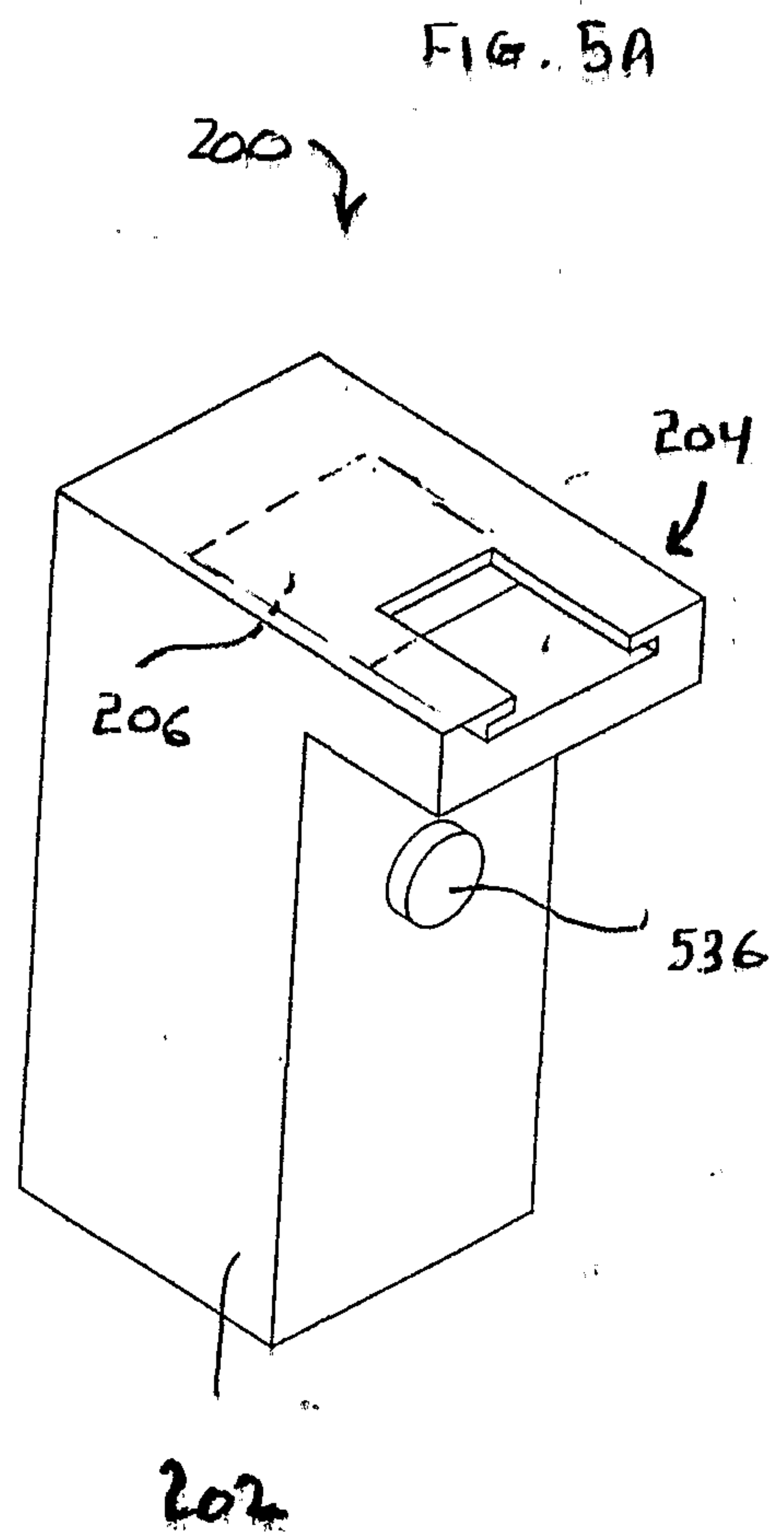
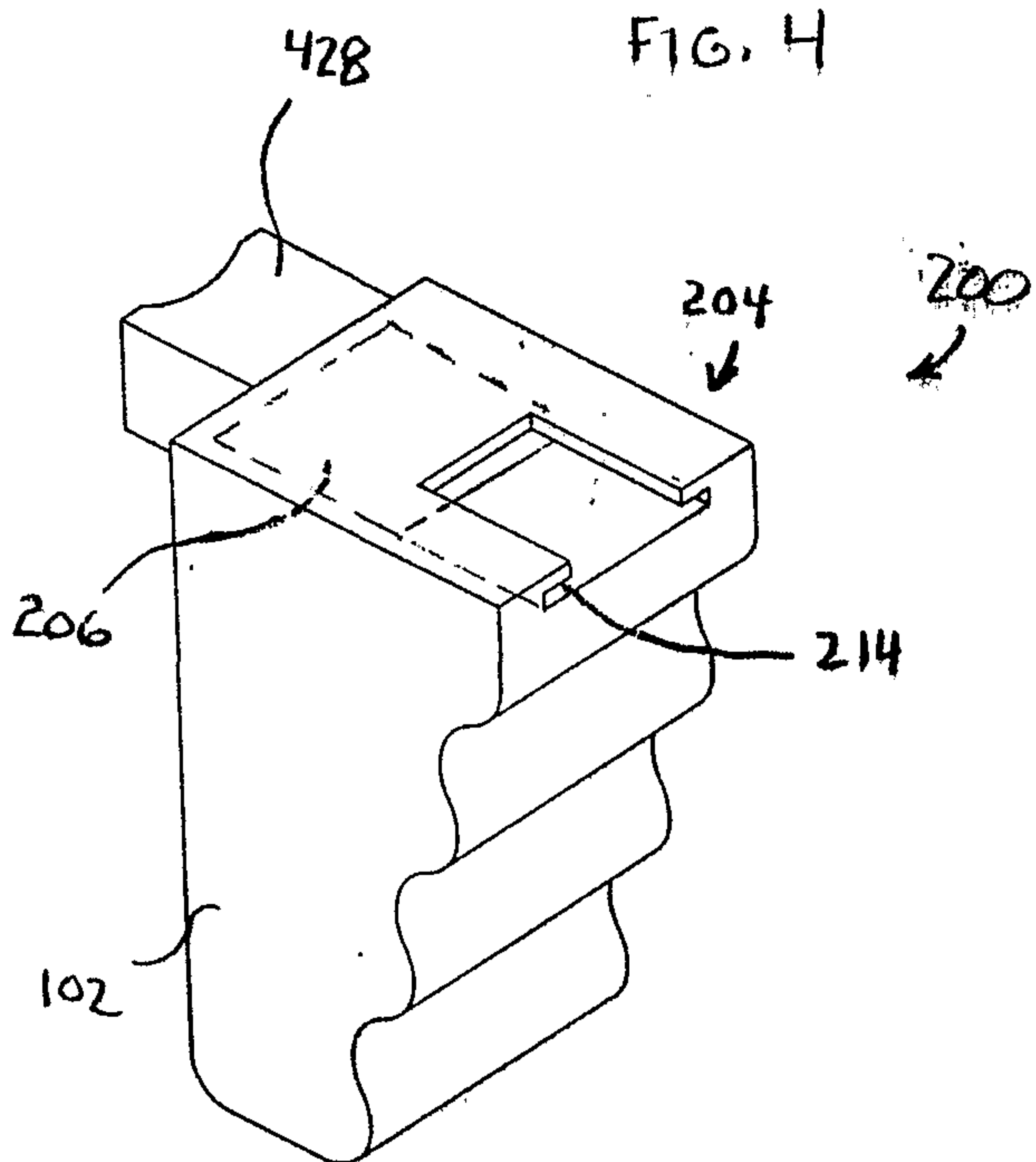


FIG. 5B

FIG. 6

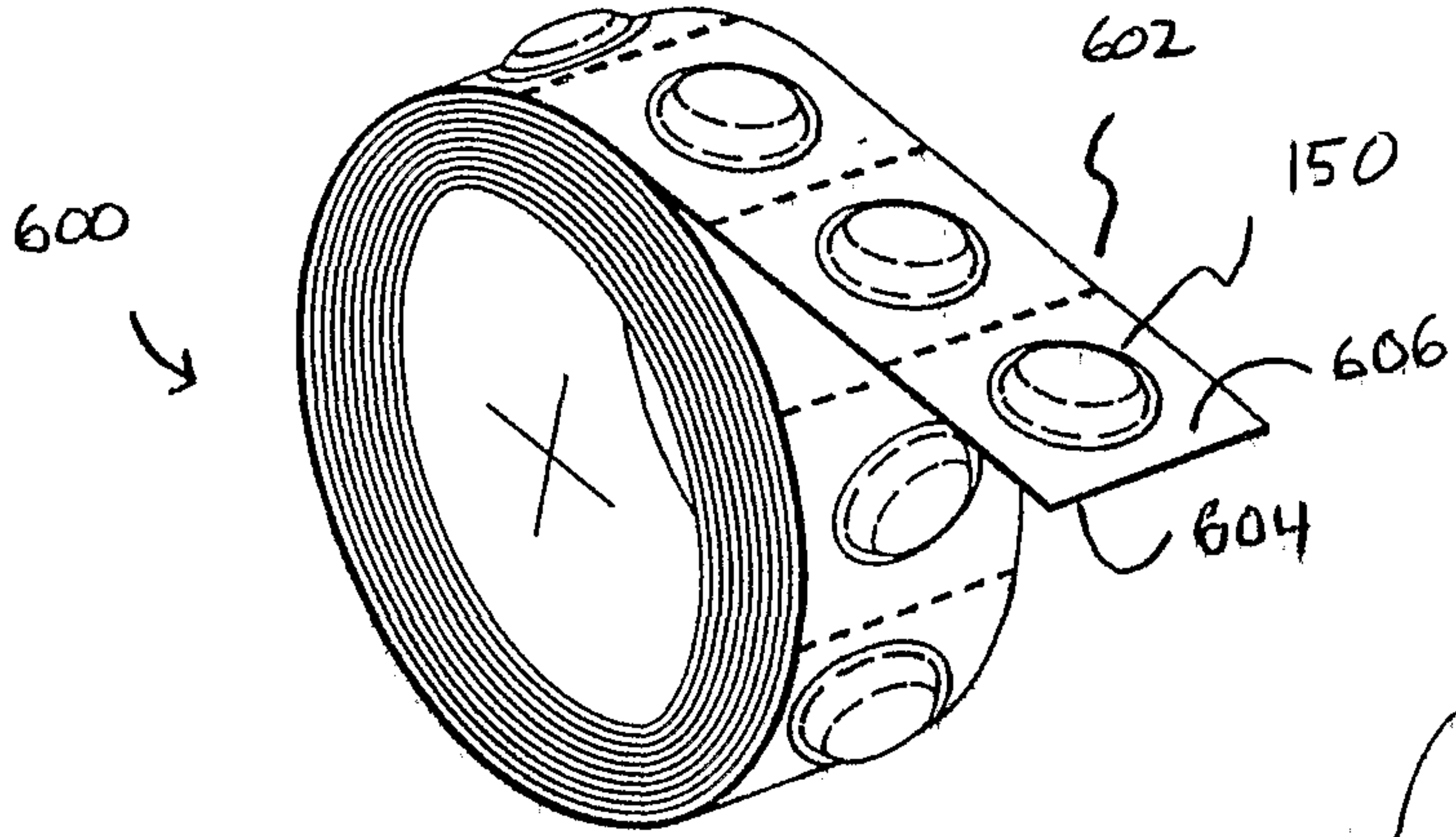


FIG. 7

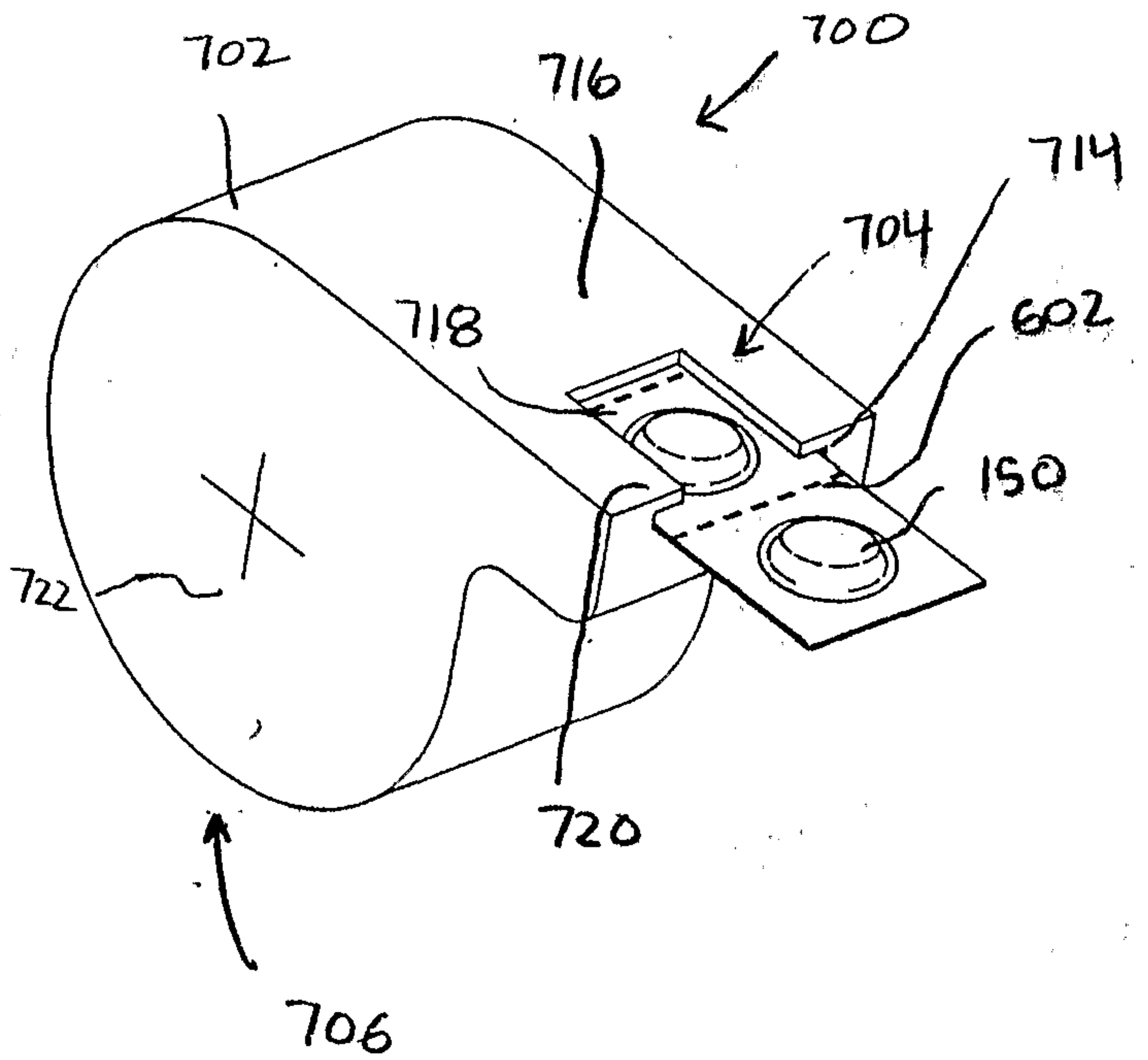


FIG. 8

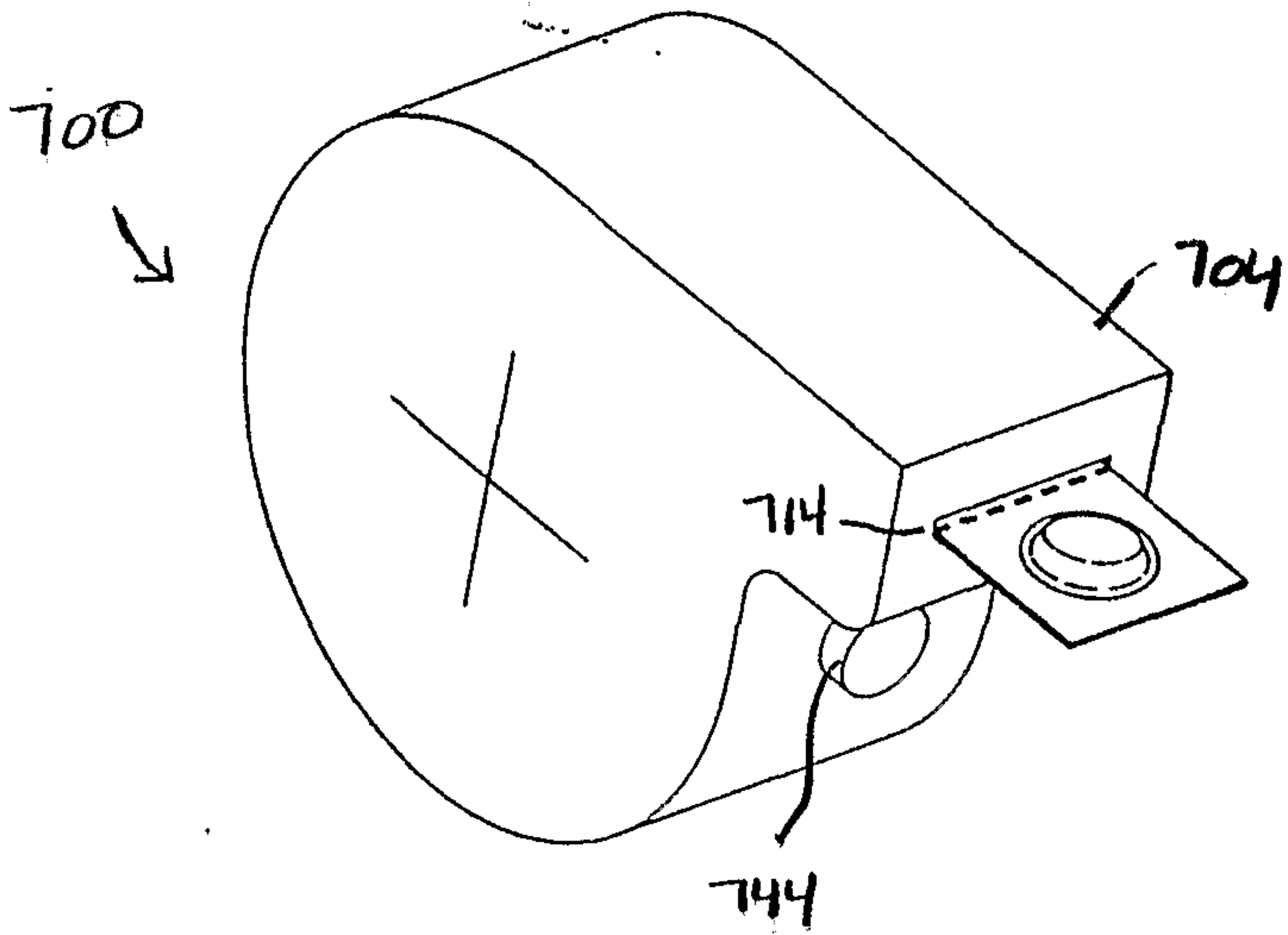
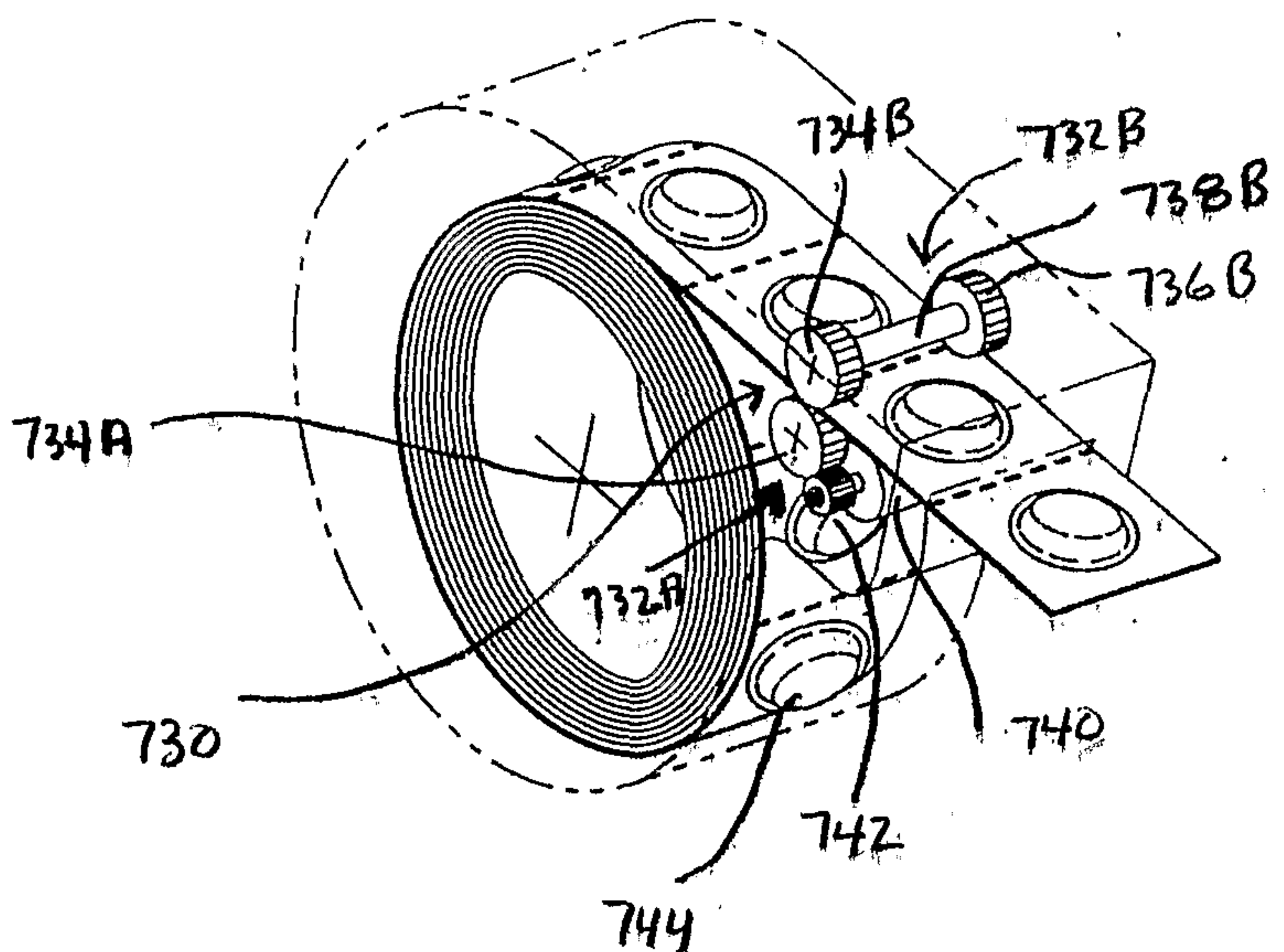


FIG. 9



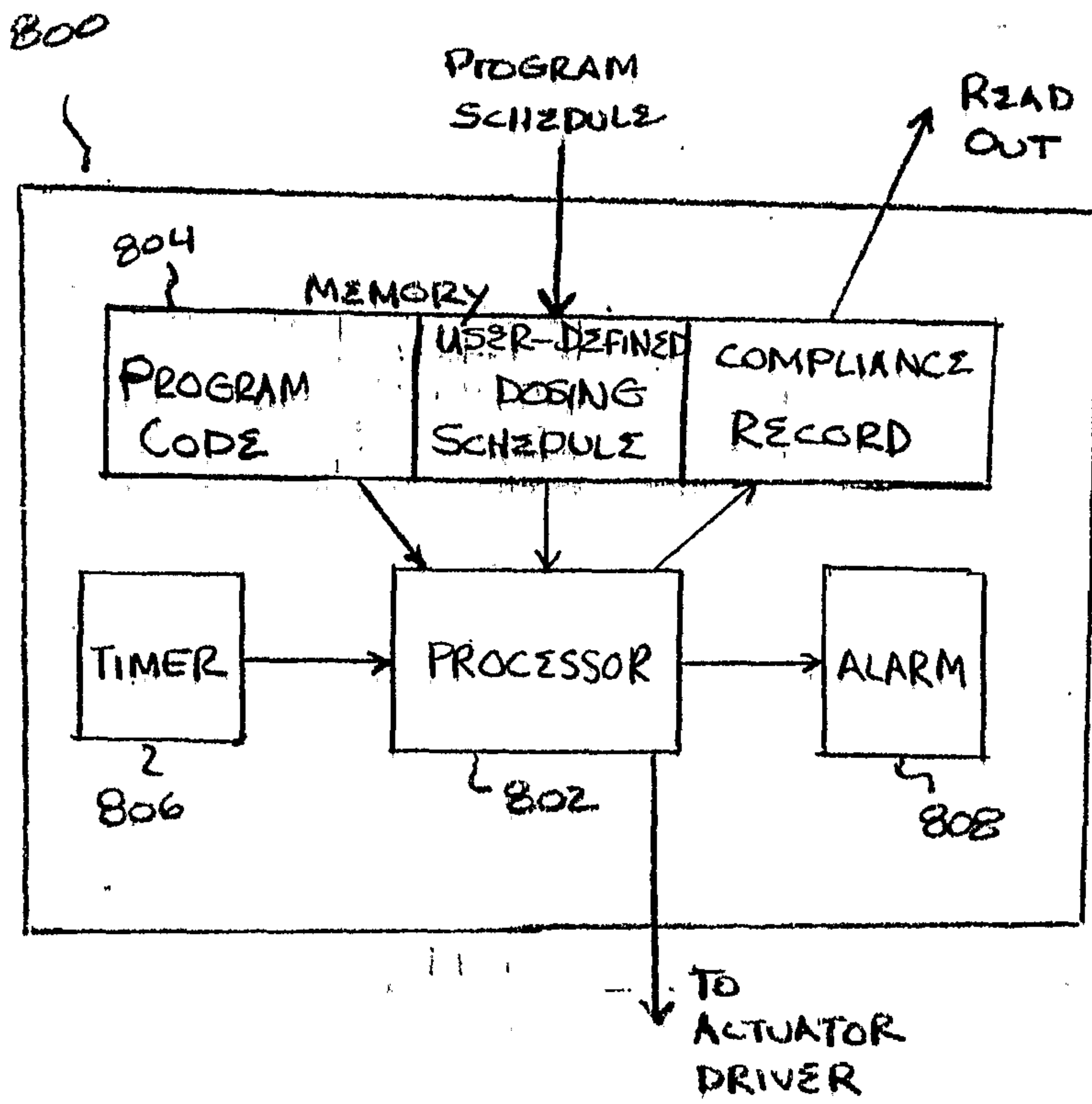


FIG. 10

