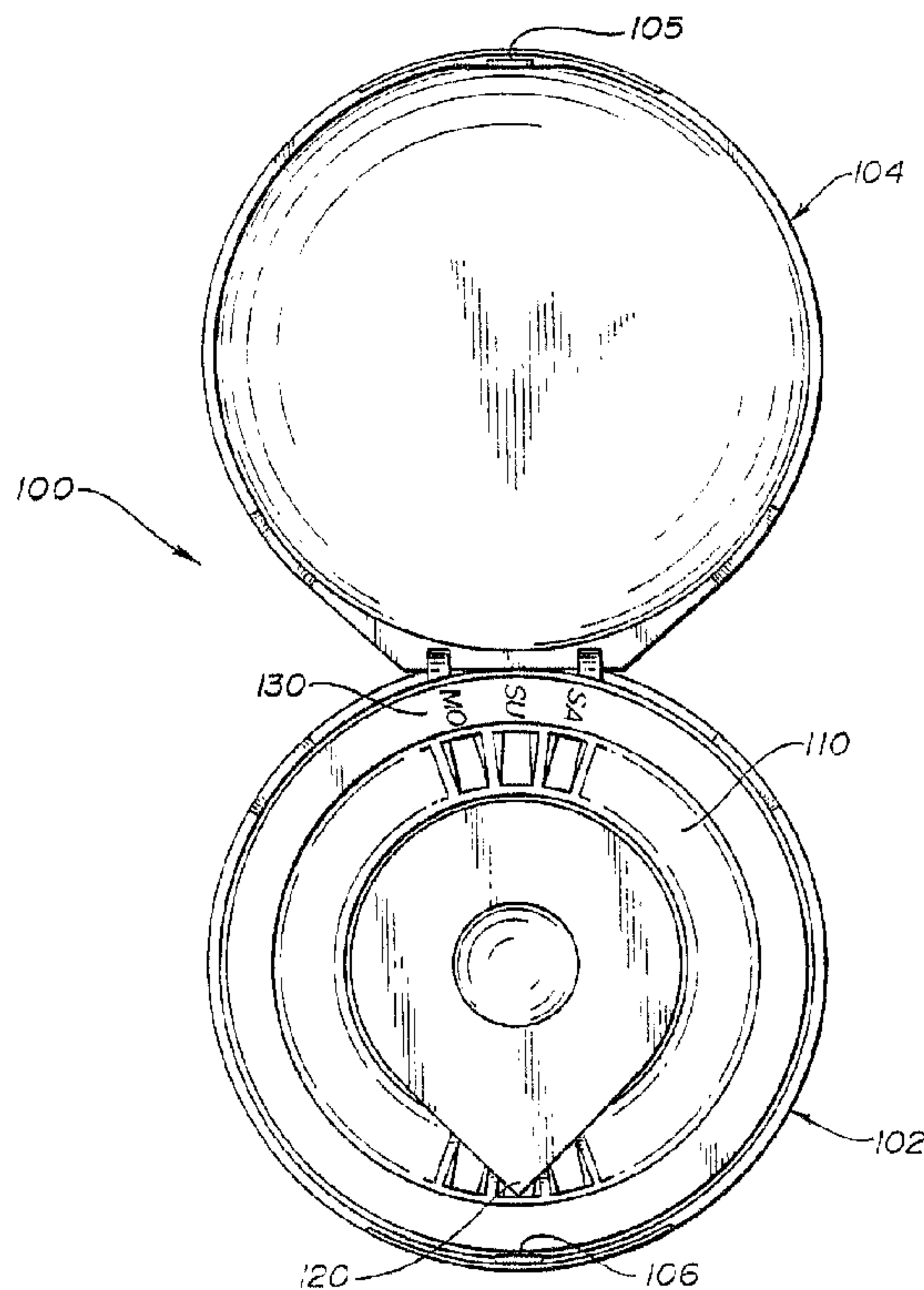




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 (72) Inventeurs/Inventors:
 Gerstman, Richard, US;
 Edstrom, Richard C., US;
 Hirst, Richard Norman, US
 (73) Propriétaire/Owner:
 ORTHO PHARMACEUTICAL CORPORATION, US
 (74) Agent: SWABEY OGILVY RENAULT

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 (54) Title: SELF-ADVANCING DISPENSER WITH ANY DAY START

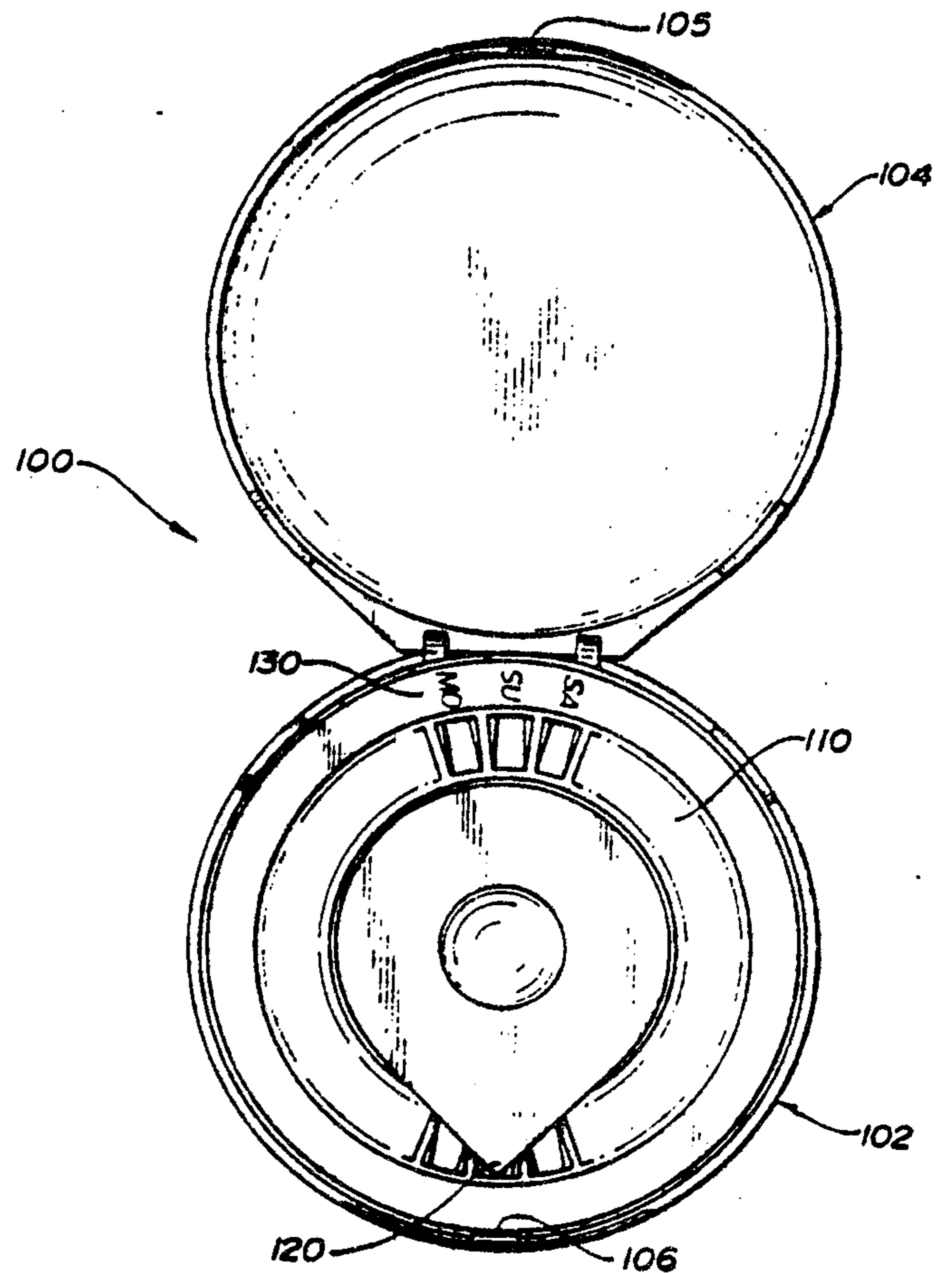


(57) **Abrégé/Abstract:**

This invention relates to apparatus and methods for dispensing a series of pills in a prescribed order. Although a variety of dispensers are available the designs are inadequate to serve the needs of the patient by assuring the medication is administered in the prescribed sequence. A pill package (110) is disposed within the dispenser (100) and is locked in place and cannot be removed. A plunger (120) is provided to facilitate the expulsion of a pill from the pill package. The pill package (110) automatically advances to the next dispensing position immediately after the expulsion of the proper pill. A calendar indicator (130) is provided for designating the period the pills are to be taken. The indicator can be present to indicate a specific day the first pill is to be taken. The indicator can also be set by the user to locate any day of the week the first pill is to be taken.

(54) Title: SELF-ADVANCING DISPENSER WITH ANY DAY START**(57) Abstract**

This invention relates to apparatus and methods for dispensing a series of pills in a prescribed order. Although a variety of dispensers are available the designs are inadequate to serve the needs of the patient by assuring the medication is administered in the prescribed sequence. A pill package (110) is disposed within the dispenser (100) and is locked in place and cannot be removed. A plunger (120) is provided to facilitate the expulsion of a pill from the pill package. The pill package (110) automatically advances to the next dispensing position immediately after the expulsion of the proper pill. A calendar indicator (130) is provided for designating the period the pills are to be taken. The indicator can be present to indicate a specific day the first pill is to be taken. The indicator can also be set by the user to locate any day of the week the first pill is to be taken.



SELF-ADVANCING DISPENSER WITH ANY DAY START

The present invention relates to apparatus and methods for dispensing a series of pills in a prescribed order. In a most preferred embodiment, the present invention provides apparatus and methods of dispensing a series of pills such that when the user operates the apparatus to dispense a pill, the next dose is advanced to the dispensing position. Additionally, in certain embodiments, the present invention provides adjustable means for indicating a time period whereby a regimen may begin upon any day of the week.

BACKGROUND OF THE INVENTION

There exist numerous types of medications which are dispensed in the form of a pill or tablet which must be administered in a specified sequence or "regimen". The most common example of this type of medication is an oral contraceptive. Although a variety of dispensers are available to dispense a sequence of pills, for numerous reasons the available designs are, to varying degrees, inadequate to best serve the needs of the patient by assuring the medication is administered in the prescribed sequence.

A currently available and popular dispenser is commonly known as a "Dialpak"; as its name implies, this device provides a sequence of pills arranged in an annular fashion within a substantially circular dispenser, whereby an individual pill is dispensed by properly positioning--"dialing"--a pill with respect to a dispensing means. There are numerous features and advantages of the Dialpak which it would be desirable to retain. For example, current Dialpak designs provide for

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individually capsulized or "blistered" pills allowing easy identification of calendar days, since each pill is contained in a set position and the pill package marked accordingly. Thus, the user easily determines the current point in the cycle by observing the number of pills remaining and their position within the pill package.

Although the currently available Dialpak has been accepted to some extent by patients and doctors, several limitations remain. First, it would be desirable to provide a dispenser which minimizes the number of steps or operations the patient must undertake to dispense the correct pill at the correct time--the dispenser should be as "automatic" as possible. This is to ensure the user properly dispenses the pills of a regimen. By minimizing the number and complexity of operations which the user must undertake to dispense a pill, the reliability and acceptance of the dispenser is enhanced. Simplicity leads to an assurance of dispensing accuracy.

Additionally, with the advent of phasic oral contraceptives, the first pill of which is administered a predetermined number of days after the menstrual cycle has ended, have created additional requirements. Currently, dispensers are pre-set to begin a regimen only on a prescribed day, usually Sunday. For phasic oral contraceptives, however, such an arrangement is inadequate, since the first pill must be taken at a prescribed time, not on a predetermined day. This precludes the pre-determination of the day of the week upon which the regimen begins. It is therefore further desirable to provide, in some instances, a dispenser having the flexibility to be used without adherence to a pre-determined start day.

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SUMMARY OF THE INVENTION

Accordingly, an improved dispenser for dispensing a series of different pills over a prescribed period is provided.

5 A pill package is disposed within the dispenser and is locked in place and cannot be removed. A plunger is provided to facilitate the expulsion of a pill from the pill package. Additionally, in a preferred embodiment, the pill package automatically advances to the next
10 dispensing position immediately after the release of a plunger, which expels the proper pill. A calendar indicator is provided for designating the period the particular pills are to be taken. During manufacture, this indicator can be preset to indicate a specific day
15 (e.g., Sunday) the first pill of the package is to be taken. However, in certain embodiments of the present invention, the indicator can be set by the user to locate any day of the week the first pill of the pill package is to be taken. This is preferably accomplished by aligning
20 the first pill with an opening in the dispenser or other means by which pills are dispensed.

The apparatus of the present invention is comprised of a cover and a base. Within the base is a dispensing slot
25 for dispensing a pill, a base ratchet for creating indexed rotational motion in one direction, and means for retaining coacting portions of the apparatus. The base ratchet means preferably has at least one flexible projection extending from the base and a plurality of
30 ratchet teeth disposed upon the base. The base engaging means is preferably at least one flexible projection extending from the base and at least one groove disposed within the base.

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The dispenser also houses a substantially cylindrical pill package containing a plurality of pills. The pill package preferably has first and second concentric ring members with radial ribs disposed therebetween defining a plurality of spaces for retaining the pills. The first concentric ring member also has a plurality of ratchet teeth disposed upon its exterior surface. The pill package further has a third concentric ring member, interior to the first and second with plurality of inwardly facing ratchet teeth disposed upon its surface; this third concentric ring member also has at least one groove disposed thereon. Frangible coverings are affixed to the pill package, to contain and preserve the pills therein. Finally, the pill package has means for engaging coating portions of the apparatus; which preferably comprises at least one groove disposed thereon.

To facilitate dispensing the pills, the present apparatus provides a plunger for dispensing a pill from the pill package. The plunger is constructed having a substantially circular portion with a plurality of triangular projections perpendicularly extending therefrom. Also, a substantially triangularly shaped projection extends laterally from the circular portion of the plunger, this projection has a boss projecting downwardly which, upon the application of force, will contact a pill and cause it to be dispensed. The plunger also has engaging means for retaining coating portions of the apparatus.

In order to determine the appropriate day or other time period upon which a regimen begins, a calendar indicator for designating the period a particular pill is to be taken is also provided. The calendar indicator is a substantially circular ring with calendar markings

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inscribed thereon. The calendar ring also has engaging means for retaining a coacting portion of the apparatus.

5 The dispenser components are assembled so that upon the application of a force urging the plunger into the base, the boss forces a pill through the frangible cover affixed to the pill package and through the dispensing slot means. At the same time, the triangular portions of the boss and the base ratchet means co-act so that upon
10 release of the plunger the pill package rotates a single increment, positioning the next pill to be taken over the dispensing slot means.

15 In certain embodiments of the dispenser of the present invention which allow the calendar to be set by the user to indicate any particular day as a start day, other novel features and structural elements are included. In such embodiments, the calendar indicator engaging means is at least one flexible projection and at least one engaging
20 tooth. Also, the pill package means further has a plurality of engaging projections. The interaction of the engaging tooth and the engaging projections provides indexed rotational motion between the calendar indicator means and the pill package means. The flexible projection
25 permits the calendar ring to be depressed and taken out of locking engagement with the projections. Thus, any of the calendar markings inscribed upon the calendar indicator can be positioned such that the first pill of the series is dispensed.

30

The present invention further provides a method of dispensing a series of pills over a prescribed period. First, a series of pills contained within a dispenser having a calendar indicator, a plunger and a dispensing
35 slot are provided. By depressing the plunger, the user

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causes a pill to be dispensed. Upon releasing the plunger the next pill of the series is positioned beneath the plunger. In certain embodiments, the user may also undertake the preliminary step of pre-setting the calendar indicator to correlate the first pill of the series with the time period at which the first pill is dispensed.

BRIEF DESCRIPTION OF THE DRAWINGS

10 Figure 1 is a top view of the apparatus of the present invention in the open position.

Figure 2 is a side view of the bottom housing of the apparatus of the present invention.

15 Figure 3 is a top view of Figure 2.

Figure 4 is a cross-sectional view of Figure 3, taken along line 4-4 as shown.

20 Figure 5 illustrates a top view of the pill package for use in the dispenser of the present invention.

25 Figure 6 is a cross-sectional view of Figure 5, taken along line 6-6 as shown.

Figure 7 is a side view of Figure 5.

30 Figure 8 shows a top view of a plunger for use in the dispenser of the present invention.

Figure 9 is a cross-sectional view of Figure 8, taken along line 9-9 as shown.

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Figure 10 depicts a calendar ring for use in the dispenser of the present invention.

5 Figure 11 is a cross-sectional view of Figure 10, taken along line 11-11 as shown.

Figure 12 is a side view of Figure 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

10

Referring to Figure 1, there is illustrated a dispenser 100 for dispensing a series of different pills over a prescribed period. A pill package 110 is disposed within the dispenser 100 and is locked in place and cannot be removed. A plunger 120 is provided to facilitate the expulsion of a pill from the pill package. Additionally, in a preferred embodiment, the pill package 110 automatically advances to the next dispensing position immediately after the expulsion of the proper pill. A daily indicator 130 is provided for designating the period the particular pills are to be taken. During manufacture, this indicator is preset to indicate a specific day (e.g., Sunday) the first pill of the package is to be taken. However, in certain embodiments of the present invention, the indicator 130 can be set by the user to locate any day of the week the first pill of the pill package is to be taken. This is preferably accomplished by aligning the first pill with an opening in the dispenser or other means by which pills are dispensed.

30

The pill dispenser 100 has a bottom housing 102 and a cover 104 that is hinged to the bottom housing 102. A tab 105 on the cover 104 engages a lip 106 on the inside, top surface of the bottom housing 102 to serve as a latch. A recess is provided in the vicinity of the latch on both

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the cover and bottom housing 102, to facilitate opening the cover.

As shown in Figure 2, the side wall 103 of the bottom housing 102 slopes downwardly and inwardly to the bottom wall 101. Referring to Figure 3, it is seen that in the bottom wall 101 of the bottom housing 102 there is formed a dispensing opening 112, through which the pills are dispensed when they are to be taken. In the vicinity of the dispensing opening 112, grooves 113,114 are cut inwardly from the edge of the bottom housing 102. By creating a pair of grooves 113,114 as shown, the material remaining between them now forms a resilient cantilevered member; on the upper edge of the resilient cantilevered member a boss 115 is formed. The boss 115 engages a notch on the pill package discussed below. The resilient cantilevered member cooperates with a spring latch; when it is depressed, it urges against the pill package spring latch, discussed below, to disengage the calendar wheel 130 thereby allowing the wheel to rotate.

Adjacent to the side wall 103 are a plurality of equally-spaced ratchets 150 which interact with pill package 110 (described below) to inhibit rotation in one direction. Concentric with and interior to the ratchets are a plurality of equally-spaced, upwardly extending flexible projections 155. These flexible projections 155 engage flexible, ratchet-shaped teeth on the pill package 110, as described below. The inter-engaging projections 155 and interacting portions of the pill package 110 thus provide directed rotation, preferably clockwise, of the pill package 110 relative to the bottom housing 102. The present invention thus prevents the user from inadvertently altering the sequence of pills being dispensed. Flexible projections 155 interact with

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portions of the plunger 120 to provide the force which rotates the pill package 110 relative to the base 102, when the plunger 120 is depressed to dispense a pill. Also visible are vertical grooves 158, which, as described
5 below, engage the plunger 120 and prevent relative rotation between those two dispenser components.

Referring now to Figure 4, it is seen that interior to the flexible projections 154 there is a central hub ring 156
10 designed to secure the plunger 120, preferably by means of an inwardly extending lip 157 on the top surface of the hub ring 156. The lip 157 retains the plunger 120 by means of circumferentially-spaced, resilient hooks extending downward from the plunger 120, described below.
15 On the inside surface of the bottom housing hub ring, are circumferentially-spaced, vertical grooves 158 which retain splines disposed upon the outside surface of a portion of the plunger 120, thereby preventing rotation of the plunger 120.

20

In Figure 5, there is illustrated a pill package 110, made in accordance with certain aspects of the present invention, which is comprised of a rotatable cylindrical set of three concentric rings 160,162,164. The two outer
25 rings 160,162 are held together by equally spaced ribs 161, the same height as the rings 160,162 thereby defining slots in which the pills are placed. Also visible in Figure 5 is an interlock 167 and a tongue 169. The interlock 167 prevents the pill package 110 from rotating
30 while the calendar wheel 130 is independently adjusted, as discussed below. In a preferred embodiment, when the plunger 120 is depressed a first time, the interlock 167 is broken and the pill package 110 may rotate relative to the base 102. Once the pill package 110 rotates a first
35 time, the tongue 169 is moved away from the boss 116

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formed on the base 102, discussed above, so that the calendar wheel 130 may not be further adjusted or altered for any reason.

5 As seen by reference to Figure 6, the cylindrical pill package preferably has a bottom covering of sealable, frangible foil 166 and preferably has a top covering of a clear, frangible material 168. These cover materials 166,168 may cover either the entire pill package, as
10 shown, or may only cover the slots in which the pills are disposed. In Figure 6, it is also seen how the pill package 110 is held in position within the bottom housing 102 by the engagement of a series of flexible projections 154, extending upward from the bottom housing 102 into a
15 groove 165 in the lower wall of the inner ring 164.

The inner ring 164 is concentric with and interior to the pill package slots and is connected at the lower level to the middle ring 162. The inner ring 164 is comprised of a
20 series of flexible tongues 163 whose top surfaces, if viewed from above, as shown in Figure 5, are inwardly extending ratchet-shaped teeth. The number of flexible tongues 163 corresponds to the number of pill package slots which contain the pills, so that indexing movement
25 of the tray from one flexible tongue 163 to the next will place succeeding pills in a position to be dispensed. This type of construction permits the pill package 110 to be sequentially moved, relative to the bottom housing 102, preferably in a clockwise direction, to place each
30 succeeding pill in a dispensing position aligned with the dispensing opening 112 in the bottom housing 102.

In order to select the initial day of the regimen, a series of teeth 165 are disposed upon the outer ring 160
35 of the pill package 110. As illustrated in Figure 5,

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there are preferably seven teeth, one for each day of the week. A side view of the pill package 110, illustrated in Figure 7, shows its profile and the placement of the teeth 165 which engage the calendar ring for indexing. The function of the teeth 165 is explained below in reference to the calendar ring 130 and Figures 10 through 12.

Referring to Figure 8, there is illustrated a plunger 120 for use in the pill dispenser 100 of the present invention. The plunger 120 is generally circular, with one triangularly-shaped projection 170 which extends laterally, away from the plunger's sides. The projection 170 serves to assist in the expulsion of the pill by means of a generally rectangularly-shaped boss 172 on the bottom surface of the triangular projection 170. The boss 172 is so shaped as to be slightly smaller than the space defined in the pill package 110 which retains the pills. When assembled into a dispenser 100, the boss 172 is oriented so that it is directly above the space in the pill package 110 which is itself over the dispensing opening 112 in the bottom housing 102. When the patient depresses the plunger 120, the boss 172 breaks the clear frangible seal 168 on the top surface of the pill package 110, contacts the pill and drives it through the foil seal 166, thereby expelling the pill.

Figure 8 further illustrates that the inside surface of the plunger 120 contains a plurality of downwardly extending triangular projections 174, located between the inside surface of the side wall ring and the central hub of the plunger 120. These projections 174 are located directly above and in contact with the flexible projections 155 described above in reference to the bottom housing 102 illustrated in Figures 2-4. Upon depressing the plunger, these triangular projections 174 deflect the

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flexible projections 155, in order to engage one rearward set of flexible ratchets 163 described above. The projections 155 then lodge in a "spring" position on the flat side of the ratchets 163, thus in a "ready" position. When released, the plunger 120 rises, preferably due to its being elevated by the projections 174 in contact with the flexible projection 155, as the projection 155 rises to its upright position. A spring or other arrangement may be substituted to produce this result. The flexible projections 155 return to their upright positions thus driving the pill package forward in a one dose increment by means of pushing against the rear surface of the flexible ratchet 163.

Referring now to Figure 9, it can be seen that the central hub of the plunger 120 is comprised of a plurality of circumferentially-spaced, resilient hooks 176 which engage the lip 157, noted above in reference to Figure 4, to retain the plunger 120. On the outside surface of the central hub of the plunger, are splines 178 which engage vertical grooves 158 on the inside surface of the bottom housing so as to prevent relative rotation between them.

As illustrated by Figure 10, the pill dispenser 100 of the present invention preferably has a generally cylindrical calendar wheel 130 which, in certain embodiments of the present invention, is adjustable relative to the pill package 110. Thus, the proper day can be indicated for taking the first pill of the regimen that is pre-positioned to be in alignment with the plunger boss 172 and the dispenser opening 112 in the bottom housing 102. The top surface of the calendar wheel 130 is preferably marked sequentially with the days of the week or other indication of a cycle or time period.

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Referring to Figure 11, it is seen that the inner side wall defines a plurality of flexible fingers 182,184; the distal end of each is comprised of an engaging hook. Certain of these fingers 184 are further comprised of an engagement tooth cut across the face of the engaging hook. The engagement tooth interacts with the pill package teeth 165 in an indexing manner, as described above. To facilitate such indexing, the teeth 165 of the outer wall of the outer ring 160 of the pill package 110 are shaped and spaced to correspond with and engage the engagement teeth cut on at least the distal end of one finger 184 on the calendar wheel. As explained above, the number of teeth 165 corresponds to the number of pill package spaces and the pills in said package, so that indexing movement of the calendar wheel brings the appropriate day indicated on the top surface of the calendar wheel into alignment with the first pill to be taken. The flexible fingers 182,184 previously noted are shaped to retain this inter-engagement. Upon downward pressure on the top surface of the calendar wheel 130, the flexible fingers 182,184 bend allowing the calendar wheel to be downwardly displaced, thereby affecting disengagement of the calendar wheel teeth on at least one flexible finger 184 from the corresponding pill package teeth 165. The calendar wheel 130 can be rotated to line up the desired starting day with the first pill to be expelled. When pressure is let off, the calendar wheel 130 springs back, engaging the teeth and locking the calendar wheel 130 in position. Figure 12 depicts a side view of Figure 10, that is, the lower half of the calendar ring 130 which was sectioned in Figure 11. The weekday cogs 186 engage the tongue 169 on the pill package 110, described above. When one of the cogs 186 is engaged with

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the tongue 169, the calendar wheel 130 cannot rotate with respect to the pill package 110.

Although certain preferred embodiments of the present
5 invention have been described with particularity, other
embodiments which possess the same features and advantages
will be apparent to those of ordinary skill. Accordingly,
reference should be made to the appended claims to
determine the scope of the present invention.

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What is Claimed is:

1. Apparatus for dispensing a series of pills over a prescribed period, comprising:

5

(a) a cover;

(b) base means, comprising:

10

(i) dispensing slot means for dispensing a pill;

(ii) base ratchet means for creating indexed rotational motion in one direction; and

15

(iii) base engaging means for retaining a coacting portion of the apparatus;

(c) a substantially cylindrical pill package means having two substantially circular faces, the pill package means containing a plurality of pills and comprising:

20

(i) a first and second concentric ring members, said ring members having radial ribs disposed therebetween defining a plurality of spaces for retaining the pills, wherein said first concentric ring member further comprises a plurality of ratchet teeth disposed upon an exterior surface;

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(ii) a third concentric ring member, interior to the first and second ring members, comprising a plurality of inwardly facing ratchet teeth disposed upon a surface of the third ring member, the third concentric ring member further comprising at least one groove disposed thereon;

5

10

(iii) a frangible covering affixed to the two substantially circular faces of the pill package means; and

(iv) pill package engaging means for retaining a coacting portion of the apparatus;

15

(d) plunger means for dispensing a pill from the pill package, comprising:

20

(i) a substantially circular portion, further comprising a plurality of triangular projections perpendicularly disposed to the circular portion;

25

(ii) a substantially triangularly shaped projection extending laterally from the circular portion, the projection further comprising a boss projecting therefrom; and

(iii) plunger engaging means for retaining a coacting portion of the apparatus; and

30

(e) calendar indicator means for designating the period a particular pill is to be taken, comprising:

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(i) a substantially circular calendar ring, further comprising calendar markings inscribed thereon; and

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(ii) calendar indicator engaging means for retaining a coacting portion of the apparatus,

5 whereby upon the application of a force urging the plunger into the base, the boss forces a pill through the frangible cover affixed to the pill package and through the dispensing slot means, and the triangular portions of the boss and the base ratchet means co-act to rotate the pill package a single increment, positioning the next pill
10 to be taken over the dispensing slot means.

2. The apparatus of claim 1, wherein said base ratchet means is comprised of at least one flexible projection extending from the base and a plurality of ratchet teeth
15 disposed upon the pill package.

3. The apparatus of claim 1, wherein the base engaging means is comprised of at least one flexible projection extending from the base and at least one groove disposed
20 within the pill package.

4. The apparatus of claim 1, wherein the pill package engaging means is comprised of at least one groove disposed within the pill package.
25

5. The apparatus of claim 1, wherein the calendar indicator engaging means is comprised of at least one flexible projection and at least one engaging tooth, and wherein the pill package means further comprises a
30 plurality of engaging projections, whereby the interaction of the engaging tooth and the engaging projections provides indexed rotational motion between the calendar indicator means and the pill package means and the flexible projection permits the any of the calendar
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markings inscribed upon the calendar indicator to be positioned such that the first pill of the series.

FIG-1

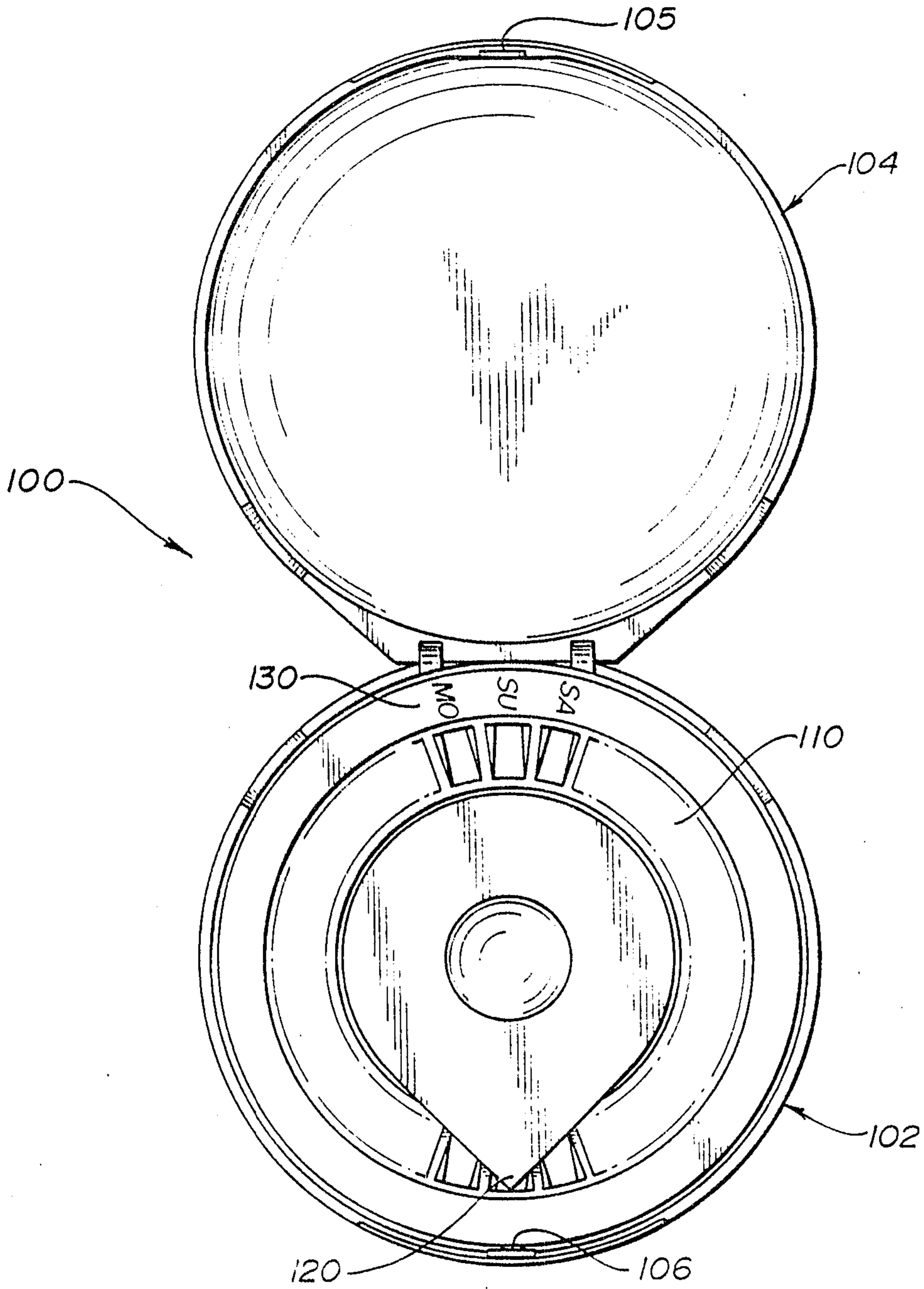


FIG-3

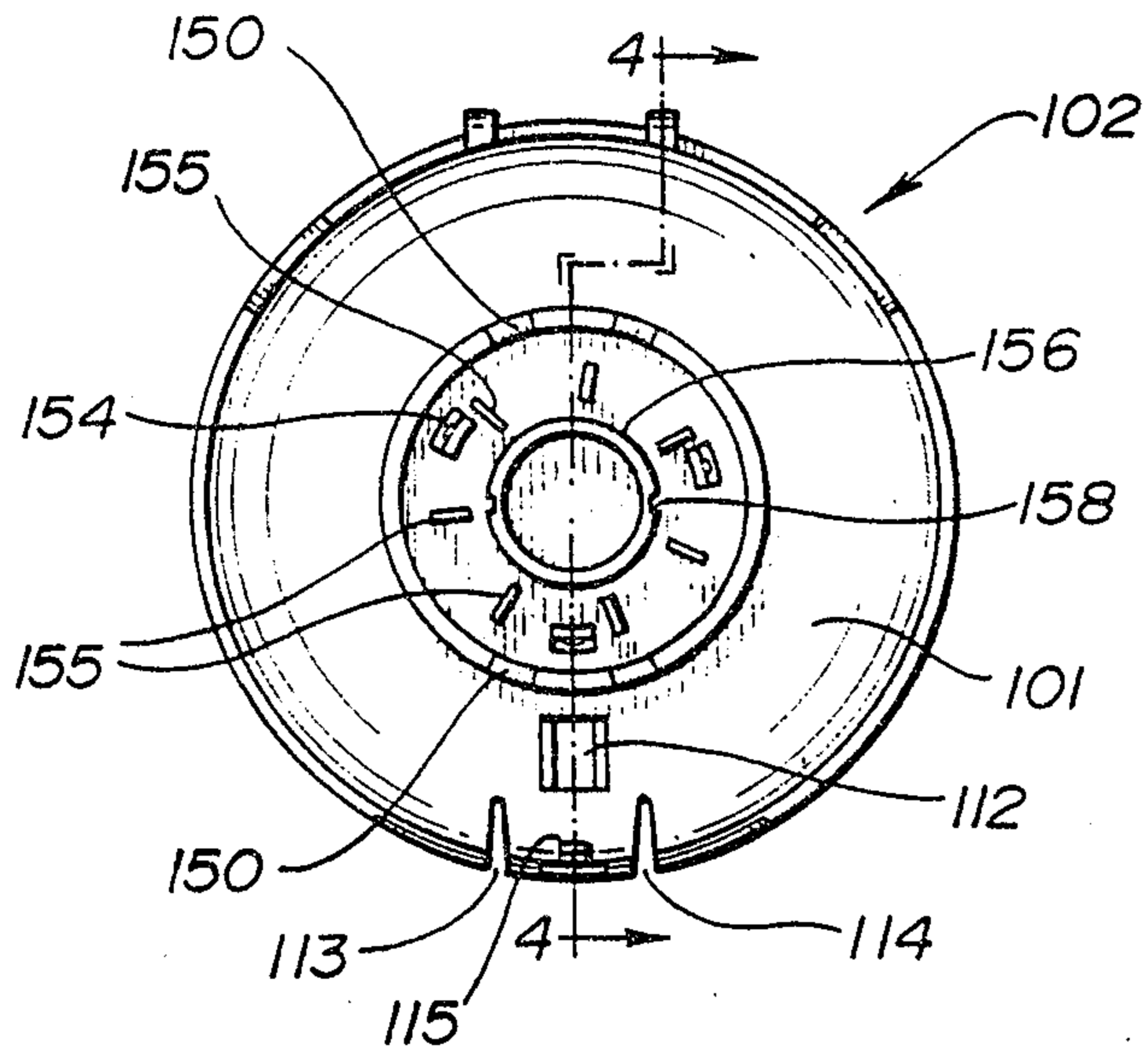


FIG-2

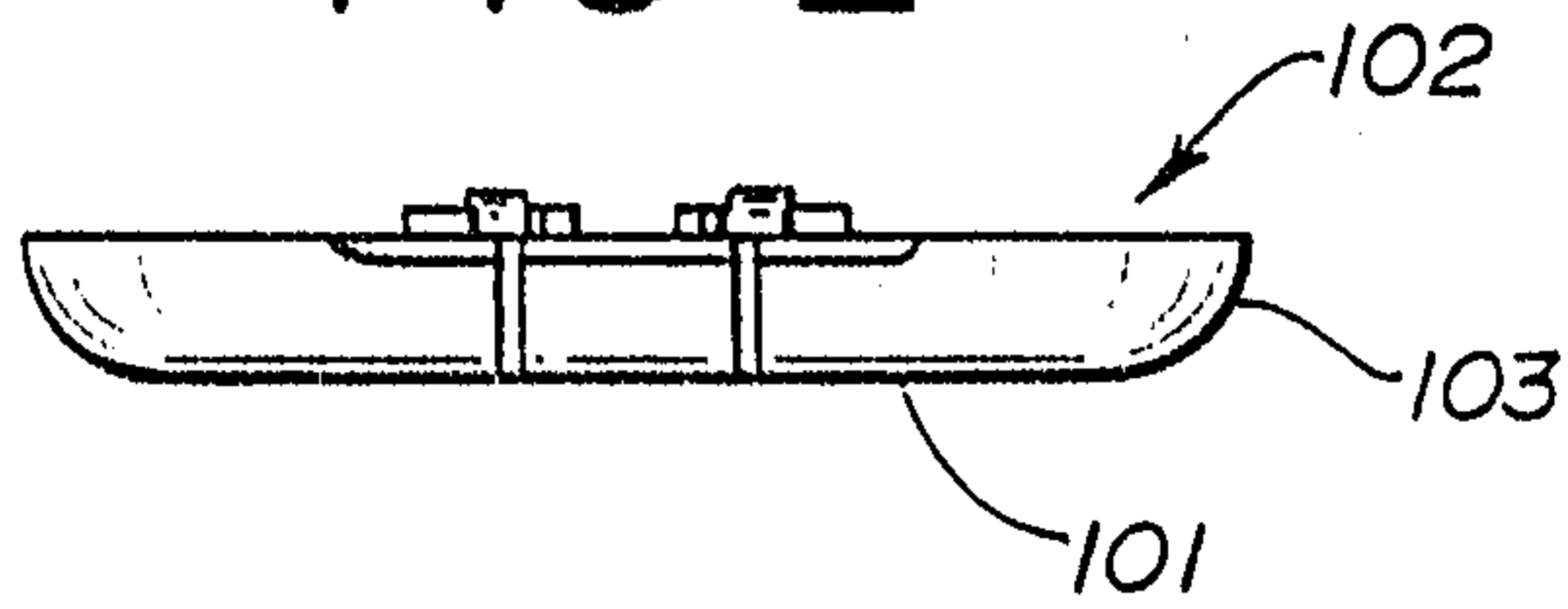


FIG-4

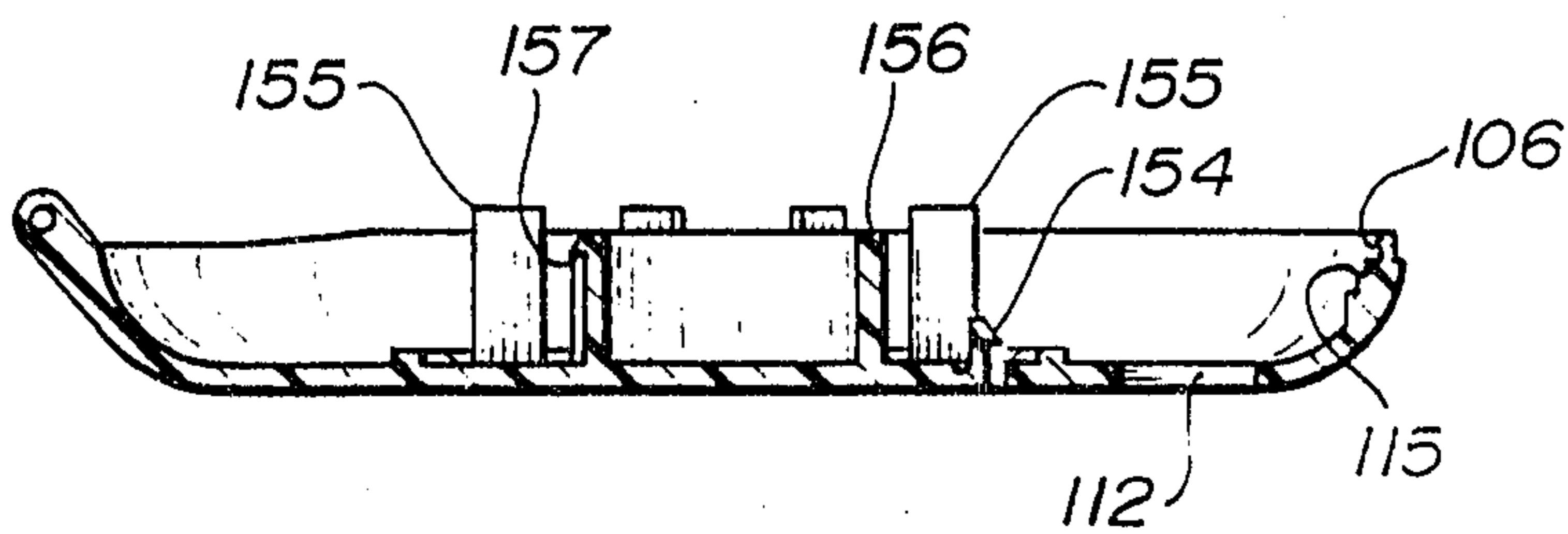


FIG-7

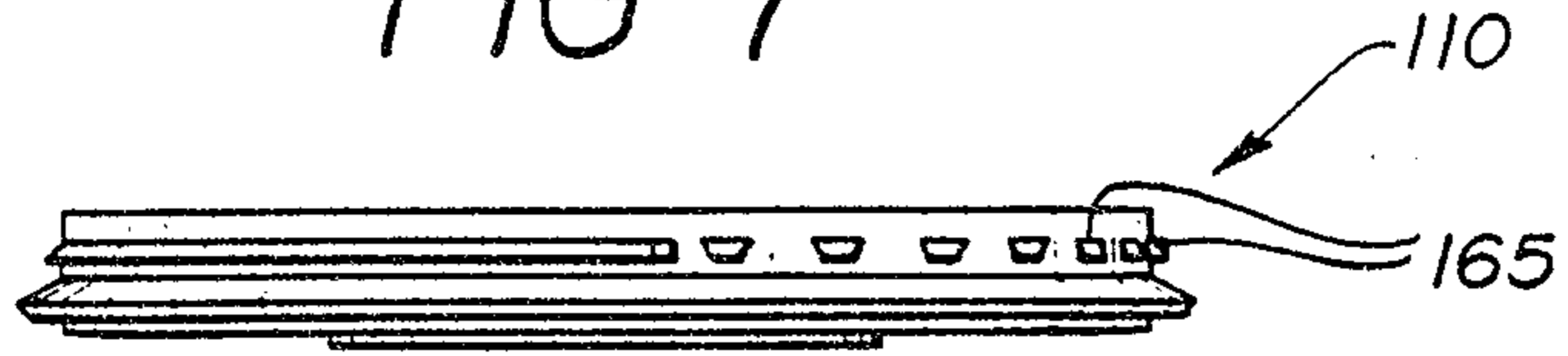


FIG-5

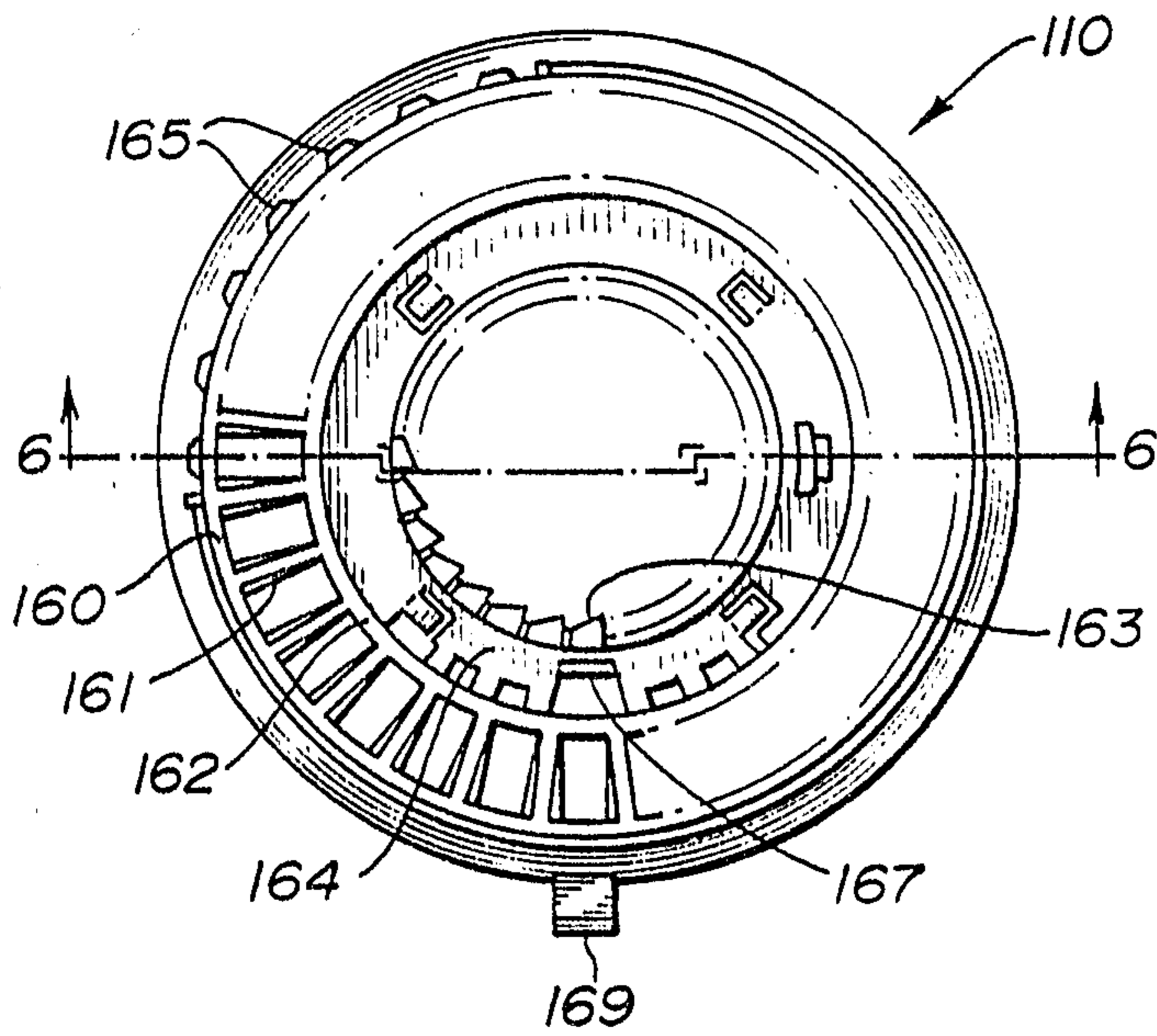


FIG-6

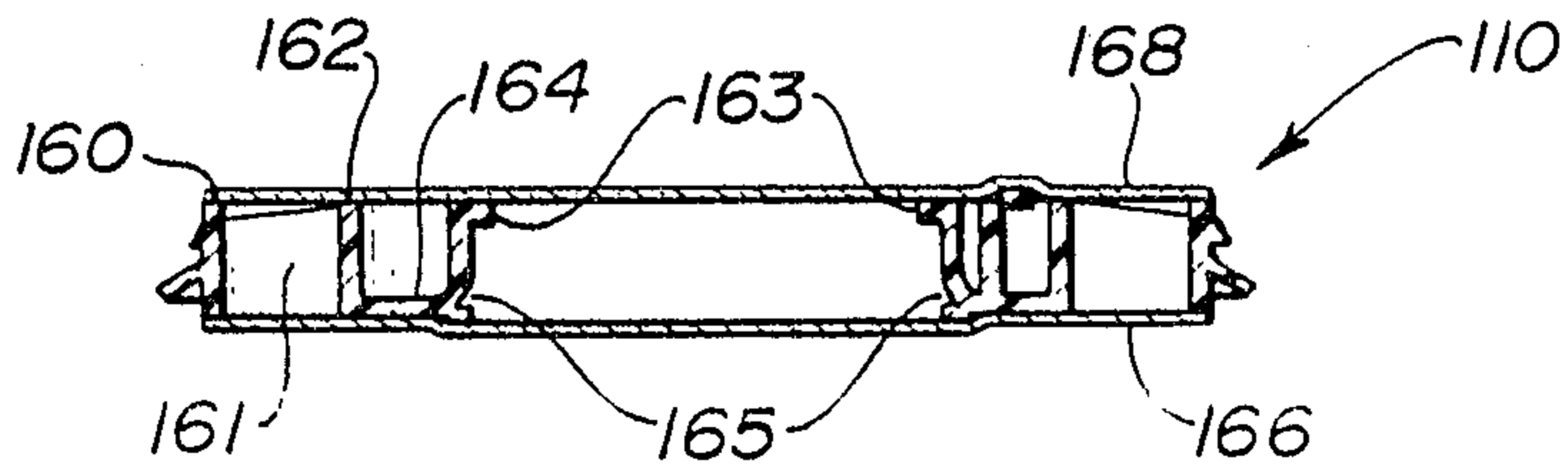


FIG-8

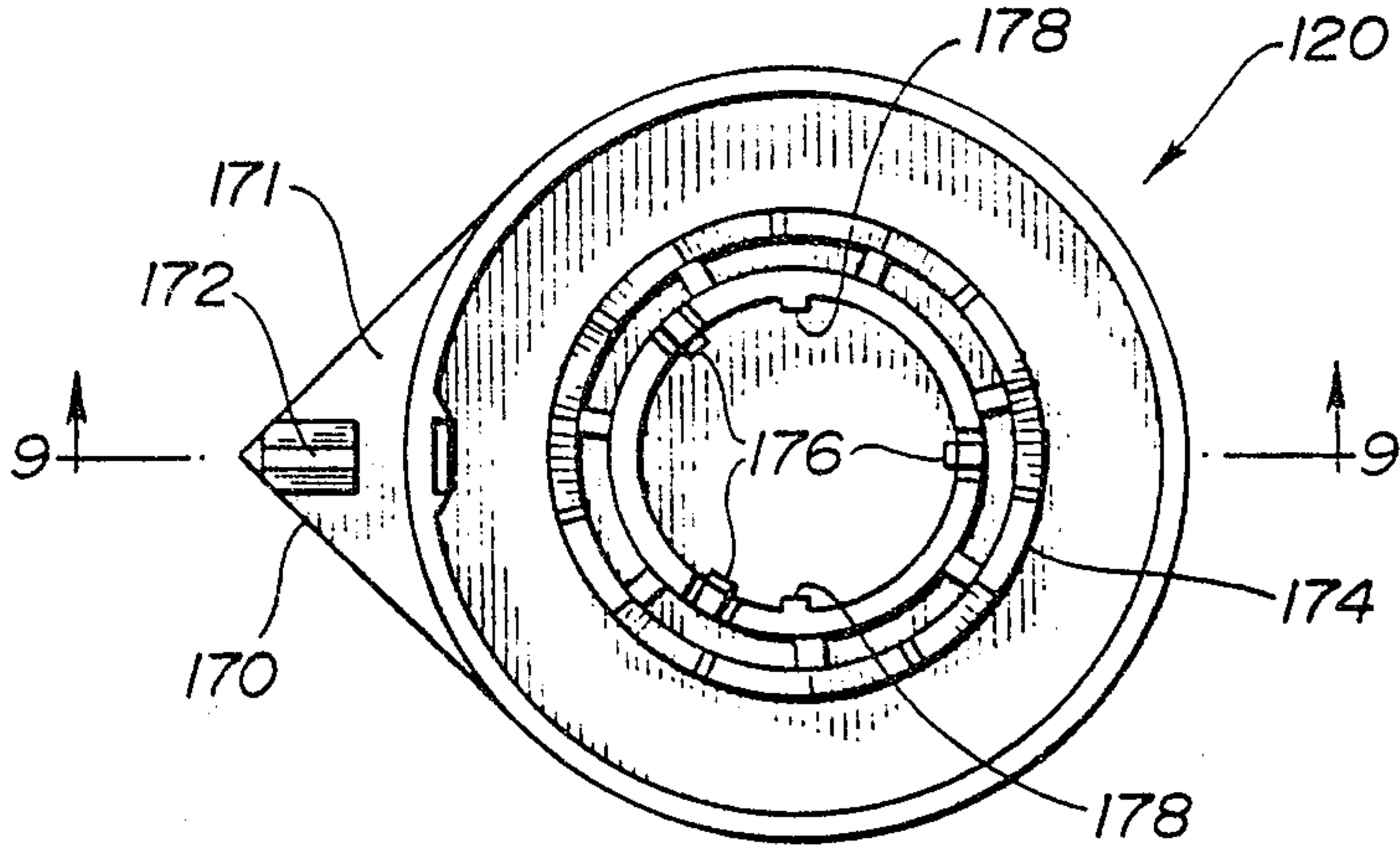


FIG-9

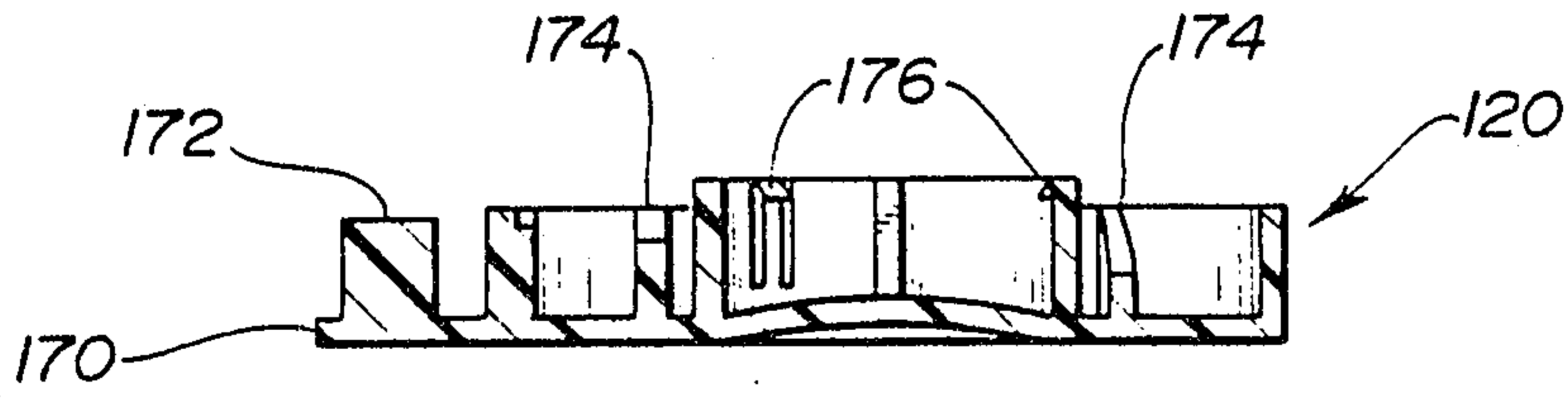


FIG-10

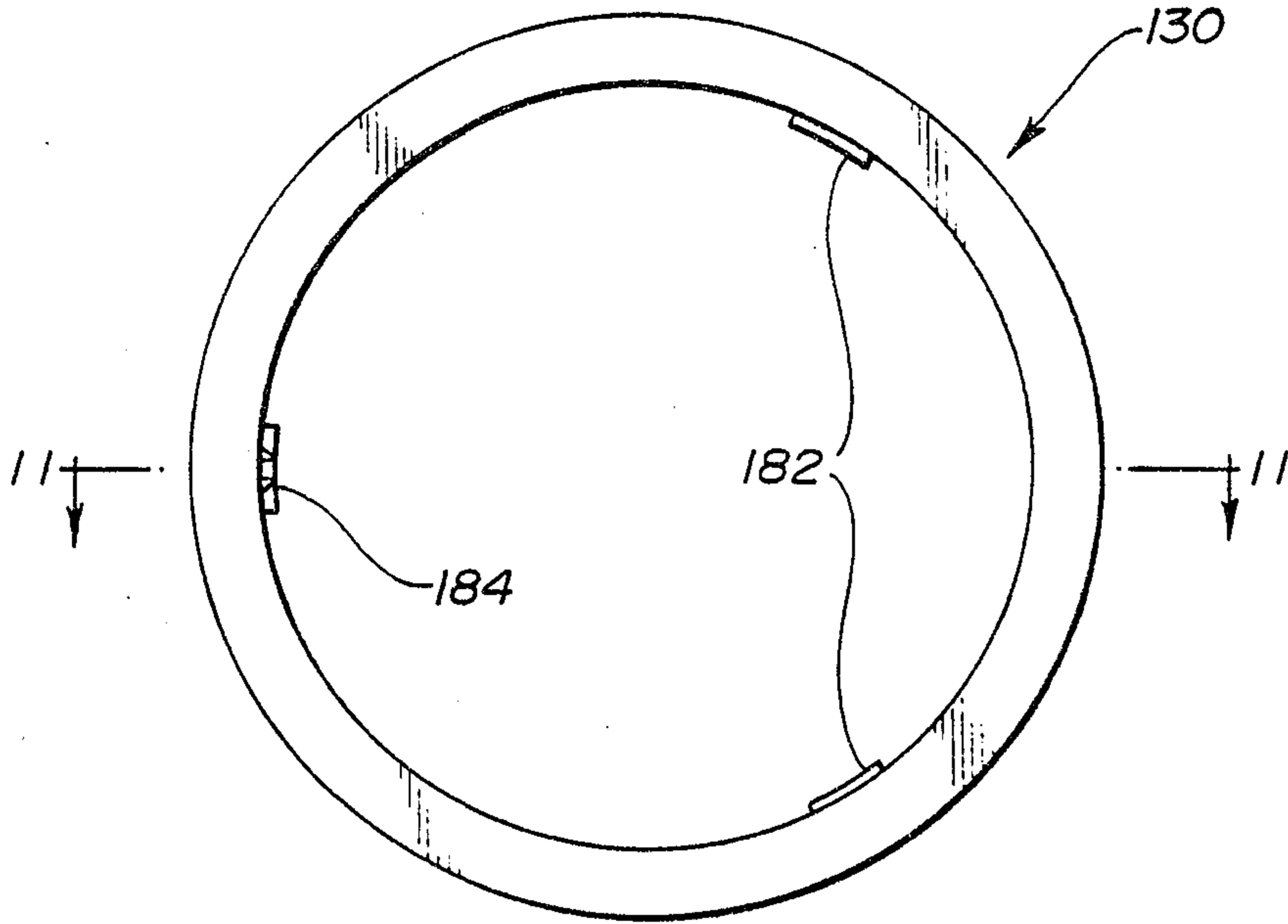


FIG-11

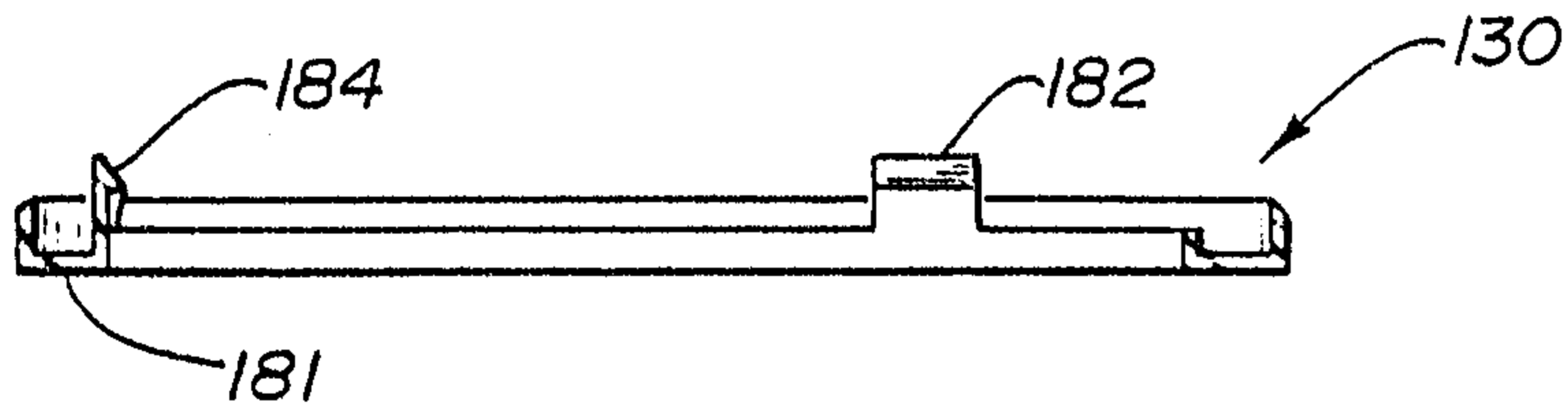


FIG-12



SUBSTITUTE SHEET

