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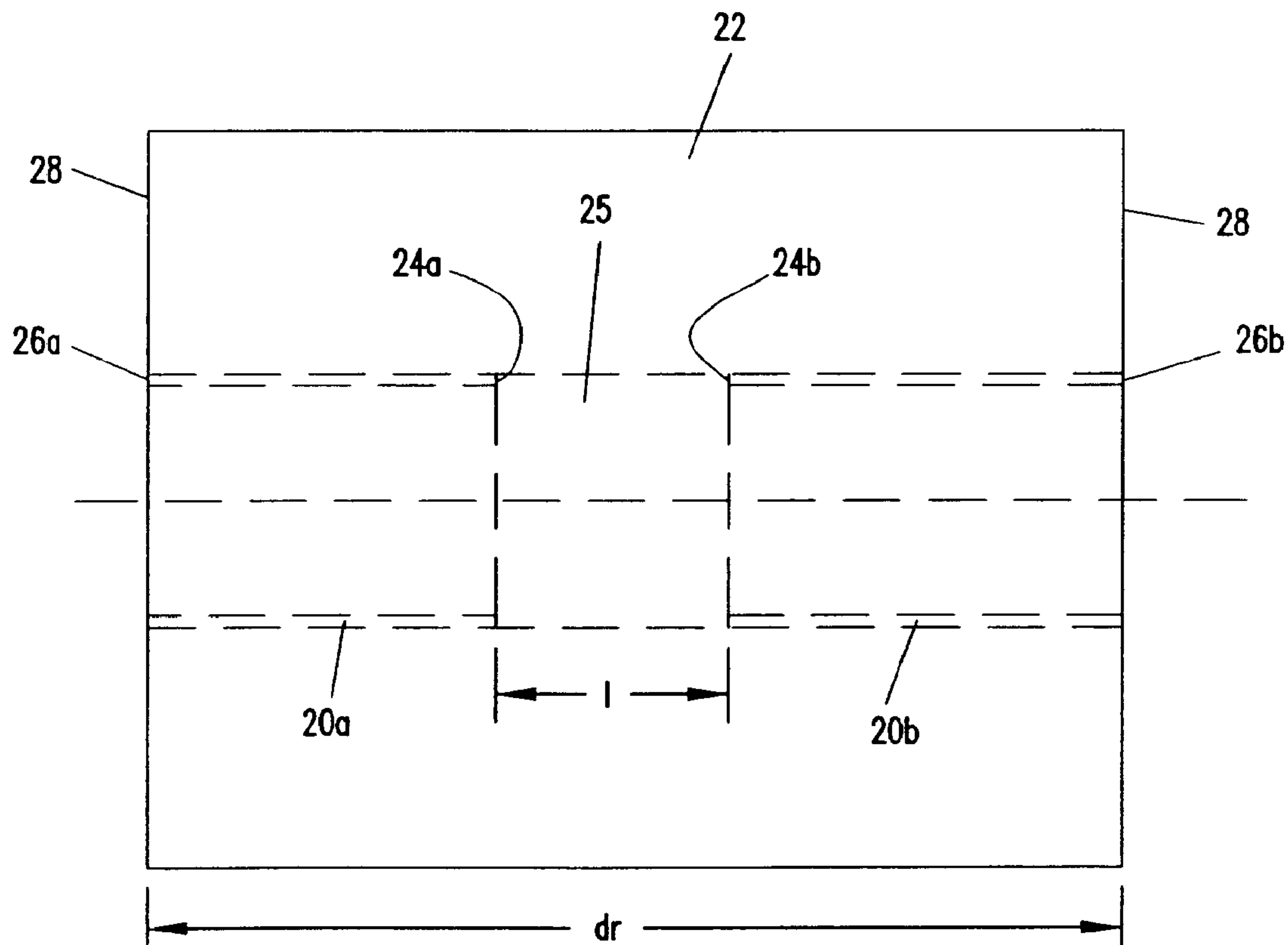
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(57) Abrégé/Abstract:

An improved web material dispenser that is designed to dispense web material, such as toilet tissue or the like. The dispenser is able to retain a roll containing tissue at a dispensing position until the tissue has been exhausted from the roll. The dispenser senses that the tissue is exhausted from the roll, and only then permits a reserve roll to be rotated into a dispensing position. Thus, the dispenser ensures that the tissue from each roll is used up before permitting access to a reserve roll. The invention also provides a new web material roll that utilizes a "double core", as well as a method of making the "double core".

Abstract

An improved web material dispenser that is designed to dispense web material, such as toilet tissue or the like. The dispenser is able to retain a roll containing tissue at a dispensing position until the tissue has been exhausted from the roll. The dispenser senses that the tissue is exhausted from the roll, and only then permits a reserve roll to be rotated into a dispensing position. Thus, the dispenser ensures that the tissue from each roll is used up before permitting access to a reserve roll. The invention also provides a new web material roll that utilizes a "double core", as well as a method of making the "double core".

DOUBLE CORE TISSUE ROLL, DISPENSER AND METHOD**Field**

This invention relates to the dispensing of web material such as toilet tissue, paper towels and the like, from rolls of web material contained within a dispenser. This invention further relates to improved rolls that contain web material for use with a dispenser, and to methods of forming such rolls. The inventive concepts will be described hereinafter primarily in relation to toilet tissue dispensers and toilet tissue rolls. It is to be realized that the inventive concepts described herein have applications to other types of web materials in addition to toilet tissue, including, but not limited to, paper towels.

Background

There has been continuing effort over the years to provide toilet tissue dispensers that store multiple rolls of toilet tissue and sequentially dispense the rolls. One of the advantages provided by these types of dispensers is that a reserve roll (or rolls) is available as a replacement for the roll that is currently in use.

To avoid tissue waste, it is important that the roll currently in use be depleted to its fullest extent before allowing the user to access a replacement roll. Devices that attempt to achieve such a result using a variety of methods are known in the prior art, as exemplified in U.S. Patents 3,294,329; 3,381,909; 3,387,902; 4,108,513; 4,522,346; 4,577,426; 5,310,129; 5,636,812; and 5,749,538.

There is, however, a continuing need for improved toilet tissue dispensers that inhibit access to a replacement roll until the roll currently in use is depleted.

Summary

The invention provides an improved web material dispenser that is designed to dispense web material, such as toilet tissue or the like. The web material dispenser comprises a housing, with a spider rotatably mounted within the housing for rotation about an axis extending through a center of the spider. A plurality of spools are connected to the spider and project therefrom in a direction parallel to the rotation of the spider axis. The spools are rotatable with the spider along a rotational

path spaced from the axis. A core stop is fixed to the housing, with the core stop crossing the rotational path of the spools to prevent rotation of the spider until the tissue has been substantially depleted or exhausted from the roll.

In addition to the web material dispenser, the invention provides an improved web material roll for use in the inventive web material dispenser described herein or in other web material dispensers, as well as a method of making the roll.

In one version as claimed, a web material roll includes first and second core sections, with the core sections being spaced apart from each other to define a gap therebetween. In addition, a web material is wound onto the core sections.

A method of forming a core for this type of web material roll comprises providing an elongate, generally cylindrical tube having a longitudinal axis; cutting the tube into a plurality of generally cylindrical sections, with each of the sections having a length approximately equal to a width of web material to be wound onto the roll; and removing a predetermined length from proximate the center of at least one of the sections to form first and second core sections, whereby the combined length of the first and second core sections is less than the width of the web material to be wound thereon.

These and various other advantages and features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof. However, for a better understanding of the invention, its advantages and objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying description, in which there is described a preferred embodiment of the invention.

Brief Description of the Drawings

Figure 1 is a front view of the web material dispenser, with the front housing portion open relative to the rear housing portion to show the interiors thereof and with the spider and core stop removed from the rear housing portion.

Figure 2 is a front view of the rear housing portion showing the spider and core stop.

Figure 3 is a side view of the core stop and the roll at the dispensing position, viewed generally in the direction 3-3 in Figure 2.

Figure 4 is a view similar to Figure 2 showing rotation of the spider upon depletion of the web material from the roll at the dispensing position.

5 Figure 5 is a cross-sectional view of the core stop and core taken along line 5-5 in Figure 4.

Figure 6 illustrates a dispenser using a second embodiment of a core stop.

10 Figure 7 is a side view of the core stop and the roll at the dispensing position, viewed generally in the direction 7-7 in Figure 6.

Figure 8 is a view similar to Figure 6 showing rotation of the spider upon depletion of the web material from the roll at the dispensing position.

Figure 9 is a cross-sectional view of the core stop and core taken along line 9-9 in Figure 8.

15 Figure 10 illustrates a tube that is used to form the core of the web material roll.

Figures 11 and 12 are a side view and a perspective view, respectively, of the web material roll utilizing a core that is formed from the tube in Figure 10.

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Detailed Description

The web material rolls and the methods of making the rolls will first be described by referring to Figures 10-12. The web material roll and related method described herein are specifically directed to rolls of toilet tissue. However, it is to be realized that the inventive concepts could be used in relation to other types of web material rolls that have a core and a web material wound onto the core, such as paper towel rolls. In addition, the inventive web material rolls are described as being used on the inventive web material dispensers described herein. It is to be realized that the web material rolls could be used with other types of web material dispensers in addition to the dispensers described herein.

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Figures 10-12 illustrate the toilet tissue roll and method of forming the core thereof. This roll uses what can be referred to as a "double core". Initially, as illustrated in Figure 10, an elongate, generally cylindrical tube 12 having a longitudinal axis A-A is provided. The tube 12 is then cut at points 14a, 14b, . . . 14n to form a plurality of equal length sections 16a, 16b, . . . 16n having a width approximately equal to the width of toilet tissue. A portion 18 (shown in hatched lines) proximate the center of each section 16a-n is then removed by cutting to form core two core sections 20a, 20b. The combined length of the core sections 20a, 20b is thus less than the width of the toilet tissue to be wound onto the core sections 20a, 20b. In one implementation, the portion 18 that is removed from each section 16a-n preferably has a length l of approximately 2.0 inches, so that the combined length of the core sections 20a, 20b is approximately 2.0 inches shorter in length than the tissue to be wound thereon. The tube 12 can have any convenient length from which a plurality of core sections can be formed, such as a length of approximately 115.0 inches.

Once the core sections 20a, 20b are formed, toilet tissue 22 is wound onto the core sections 20a, 20b with the core sections 20a, 20b being spaced apart from each other, as is evident from Figures 11 and 12 which illustrate a subsequently formed toilet tissue roll. As is further evident from Figures 11 and 12, the core sections 20a, 20b include ends 24a, 24b that face each other and which are spaced apart by approximately the distance l thereby forming a gap 25. The core sections 20a, 20b further include ends 26a, 26b that are even with the opposite side surfaces 28 of the tissue 22. Thus, there is a portion of the tissue 22 approximately midway between the side surfaces 28 that is not core supported due to the gap 25 between the ends 24a, 24b of the core sections 20a, 20b. The gap 25 between the core sections 20a, 20b remains until such time as the tissue 22 is substantially depleted from the roll.

As will be described below, the gap 25 between the core sections 20a, 20b facilitates sensing that the tissue is substantially depleted or exhausted from the roll. It is to be realized that the core sections 20a, 20b could be formed using methods other than that described above. For instance, instead of removing a single

portion at the center of each section, portions could be removed from each end of a section and the section then cut in half to thereby form the core sections.

One implementation of a web material dispenser 50 is illustrated in Figures 1-5. With reference to Figure 1, the dispenser 50 includes a rear housing portion 52 and a front housing portion 54 pivotally connected to the rear housing portion 52 at the bottom ends thereof via pivots 56. The housing portions 52, 54 include cooperating locking structures 58a, 58b at the top ends thereof, by which the housing portions 52, 54 can be locked together to form an enclosure for a plurality of rolls of toilet tissue.

The housing portions 52, 54 are generally circular in shape, with each including a generally circular end wall 60, 62 and a generally circular sidewall 64, 66. The end walls 60, 62 and sidewalls 64, 66 combine to form an interior space when the housing portion 54 is pivoted upward from the position shown in Figure 1 and connected to rear housing portion 52, via the locking structures 58a, 58b. When the housing portions 52, 54 are locked together, the end walls 60, 62 face each other and the sidewalls 64, 66 fit together to form an enclosure. A dispensing opening 70 is formed by the sidewalls 64, 66 at the bottoms thereof through which tissue from one of the tissue rolls is dispensed.

The end wall 60 of the housing portion 52 is further provided with a plurality of slots 72 by which the housing portion 52 can be mounted to a wall or other fixed structure using bolts, screws or other suitable fasteners.

With reference to Figures 2 and 4, a spider 78 is rotatably mounted on the rear housing portion 52 for rotation about a central axis **B** in a clockwise direction as shown by the arrows in Figures 2 and 4. The spider 78 is generally circular in shape and includes a central boss 80 projecting from the center thereof parallel to the rotation axis **B** and toward the front housing portion 54. The boss 80 is sized to rotatably fit over a cylindrical hub 82 (best seen in Figure 1) that projects from the end wall 60 of the rear housing portion 52 in the direction of the axis **B**. The boss 80 and hub 82 are preferably secured together via a snap fit connection that detachably connects the boss 80 and hub 82 together while permitting rotation of the boss 80, and thus the spider 78, on the hub 82.

In addition, an x-shaped formation 90, visible in Figures 1, 2 and 4, projects from the top end of the boss 80. Further, an actuation disk 92, shown in dashed lines in Figure 1, is rotatably mounted on the front housing portion 54. The disk 92 is disposed on the exterior side of the end wall 62 whereby the disk is
5 accessible from outside the housing 52, 54 by a user in order to rotate the spider 78. A plurality of circumferentially spaced fingers 94 project rearwardly from the disk 92 toward the rear housing portion 52, with a gap between each adjacent finger 94. The x-shaped formation 90 and the fingers 94 are sized such that they engage when the front housing portion 54 is pivoted to the closed position relative to the rear
10 housing portion 52, with x-shaped formation 90 disposed within the gaps between the fingers 94. With this construction, rotation of the disk 92 causes rotation of the spider 78. A pair of diametrically opposite fingers 94 each include a shoulder 96 formed thereon which fit over a boss 98 projecting from the interior surface of the end wall 62 so as to rotatably secure the disk 92 to the end wall 62.

15 Returning to Figures 2 and 4, the spider 78 is shown to include a plurality of spools 100a-d, in this instance four spools, projecting from the spider 78 parallel to the axis B, with the spools disposed adjacent to the circumference of the spider 78. The spools 100a-d are spaced at 90 degree intervals around the spider 78. However, it would be possible to use a larger or lesser number of spools, depending
20 upon the size of the tissue rolls and the needs of the consumer, in which case the spools would be spaced at intervals of 360 degrees divided by the number of spools. Each spool 100a-d is sized to receive thereon a tissue roll 102.

As shown in Figures 2 and 4, the circumference of the spider 78 is provided with a plurality of detents 104. Preferably, there is one detent 104 for each
25 spool 100a-d disposed on the spider 78. A resilient indexing finger 106 is fixed at a first end thereof to the rear housing portion 52 and the second end thereof extends toward the spider for engagement within one of the detents 104. When the end of the finger 106 engages in a detent 104, rotation of the spider 78 in a counterclockwise direction is prevented, and one roll 102 is held at a dispensing
30 position while a second roll 102 is at a reserve position (see Figure 2). However, rotation of the spider 78 in a clockwise direction is selectively permitted, as described below.

A core stop 110 is further fixed to the rear housing portion 52 and extends along a radial axis toward the boss 80 of the spider 78 and into the rotation path of the spools 100a-d and rolls 102. The rotation path of the spools 100a-d is shown in dashed lines in Figure 4, and includes an outer rotation path P_o defined by the radially outermost point of the spools 100a-d as the spider rotates, an inner rotation path P_i defined by the radially innermost point of the spools, and a central rotation path P_c defined by the central point of the spools. As used herein, rotation path is meant to include at least one of the paths P_o , P_c , and P_i .

The core stop 110, as best seen in Figure 5, includes a first portion 112 extending parallel to the spools 100a-d and a second portion 114 that extends perpendicular to the spools. The second portion 114 extends toward and crosses the outer, central and inner rotation paths of the spools 100a-d and includes a bottom edge 116 that is spaced a distance d above the spider 154. Further, as illustrated in Figure 3, the second portion 114 includes a front surface 118 that is sloped toward the bottom edge 116 in the direction of rotation of the spider 78.

With reference to Figures 2-5, a "double core" type of roll, such as the roll described in Figures 11 and 12, is loaded onto each spool 100a-d. The rolls 102 are shown as being mounted onto the spools 100a-d such that the core sections 20a are above the core sections 20b. However, the rolls 102 could be mounted such that the core sections 20b are positioned above the core sections 20a.

As shown in Figure 3, the distance d_t between the side surfaces 28 of the tissue 22 is greater than the distance d between the bottom edge 116 of the second portion 114 of the core stop 110 and the spider 78. Thus, the tissue 22 will contact the second portion 114 of the core stop 110, if a user tries to rotate the spider 78, and thereby prevent clockwise rotation of the spider 78. The tissue 22 will retain the core sections 20a, 20 in their spaced apart condition until such time as the tissue 22 has been substantially depleted or exhausted from the roll, and rotation of the spider 78 will be prevented. It is important to realize that the distance d is greater than the length of the spools 100a-d, as evident from Figure 5, such that, during rotation of the spider 78, the spools can travel under the bottom edge 116 of the core stop 110.

However, referring to Figures 4 and 5, once the tissue 22 has been substantially depleted or exhausted, if a user rotates the spider 78 in a clockwise direction, the angled front surface 118 will cause the core section 20a to be forced downward toward the core section 20b. Thus, as evident from Figure 5, the core sections 20a, 20b and the spool 100a can travel under the bottom edge 116 to permit the spider 78 to be rotated so as to bring the next reserve tissue roll into the dispensing position.

Thus, the core stop 110 acts as a means for sensing that the tissue has been exhausted from the roll currently at the dispensing position. Once the tissue has been exhausted, the spider can be manually rotated in the clockwise direction to bring the reserve roll to the dispensing position. Since the reserve roll has tissue thereon, the tissue contacts the core stop 110 and prevents further rotation of the spider until the reserve roll is itself exhausted of tissue.

Figures 6-9 illustrate another embodiment of a dispenser 150. The dispenser 150 is similar to the dispenser 50 of Figures 1-5, except that the dispenser 150 uses a different core stop 152. The core stop 152 in Figures 6-9 is configured to function with the gap 25 between the core sections 20a, 20b in order to sense the depletion of tissue from the roll.

With reference to Figure 9, it is seen that the core stop 152 includes a vertical portion 154 extending parallel to the spools. A finger 156 projects from the vertical portion 154 approximately midway along the length thereof, and extends along a radial axis toward the boss 80 of the spider 78. In this embodiment, the distal end of the finger 156 preferably extends at least past the outer rotation path P_o , defined by the radially outermost point of the spools 100a-d, but no further than the central rotation path P_c . Preferably, the end of the finger is located adjacent the central rotation path, although the end could be located between the outer and central paths as well. Each spool 100a-d is formed with a cut-out 158 that, when a roll 102 is mounted on each spool, is positioned adjacent the gap 25. The cut-out 158 is defined over approximately one-half of the circumference of each spool.

The core stop 152 functions as follows. When tissue 22 in the roll 102, the tissue 22 will contact the finger 156 and rotation of the spider 78 is prevented. The spider will be prevented from rotating as long as tissue remains on

the roll. However, once the tissue 22 has been substantially depleted or exhausted, the cut-out 158 will be uncovered, and the finger 156 can then pass through the cut-out 158 in the spool 100a to permit rotation of the spider to bring the next reserve roll to the dispensing position. Thus, in this embodiment, the core sections 20a, 20b
5 remain generally spaced apart.

It is contemplated that rotation of the spider 78 could be caused by a user when a small amount of tissue remains on the roll, in which case sufficient force would need to be applied to overcome the force of the tissue that remains covering the gap 25 and the cut-out 158. Under most circumstances, the force
10 required to produce such a rotation would be sufficiently large so as to deter rotation until the tissue has been substantially depleted or exhausted.

It is to be realized that the dispensers 50, 150 described herein could be utilized with tissue rolls other than those described herein and still be in accordance with the principles of the invention. Furthermore, the tissue rolls
15 described herein could be utilized on dispensers other than those described herein and still be in accordance with the principles of the invention.

The above specification, examples and data provide a complete description of the manufacture and use of the composition of the invention. Since many embodiments of the invention can be made without departing from the spirit
20 and scope of the invention, the invention resides in the claims hereinafter appended.

WE CLAIM:

1. A method of forming a core for a web material roll, comprising:
providing an elongate, generally cylindrical tube having a longitudinal axis;
cutting the tube into a plurality of generally cylindrical sections, each section having a length approximately equal to a width of web material to be wound onto the roll; and
removing a predetermined length from a region proximate the center of at least one of the sections to form first and second core sections, whereby the combined length of the first and second core sections is less than the width of the web material to be wound thereon.

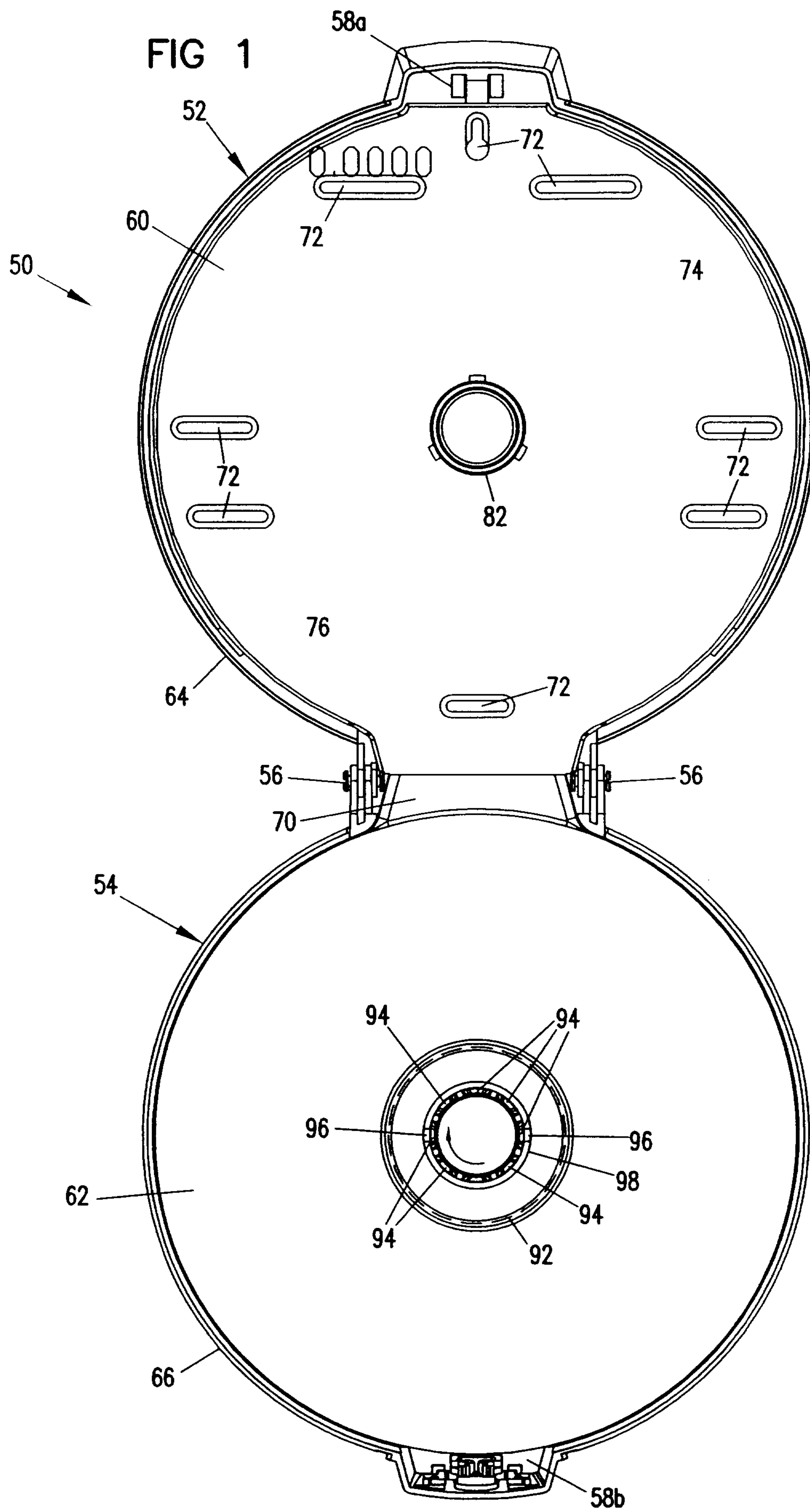


FIG. 2

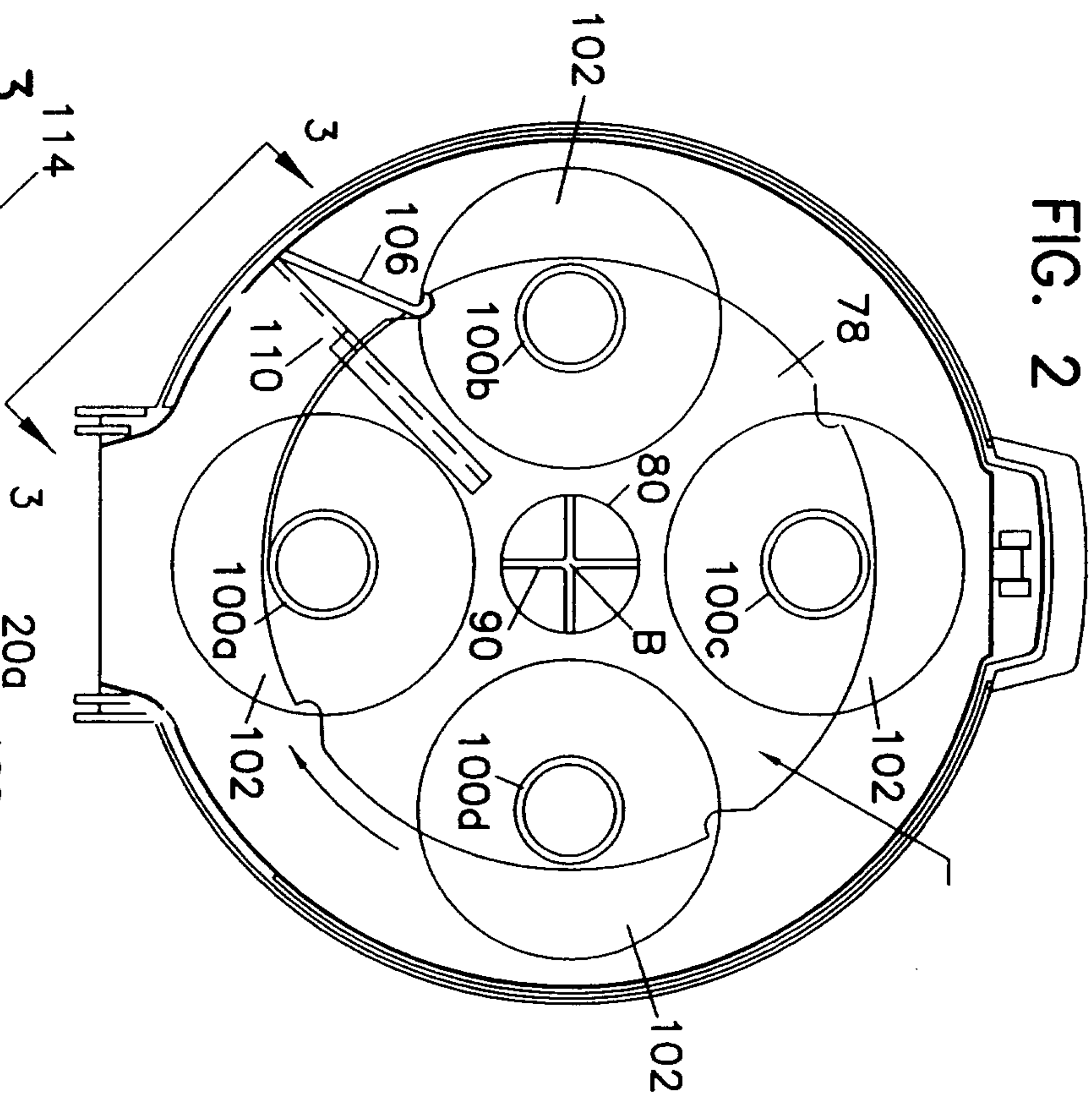


FIG. 4

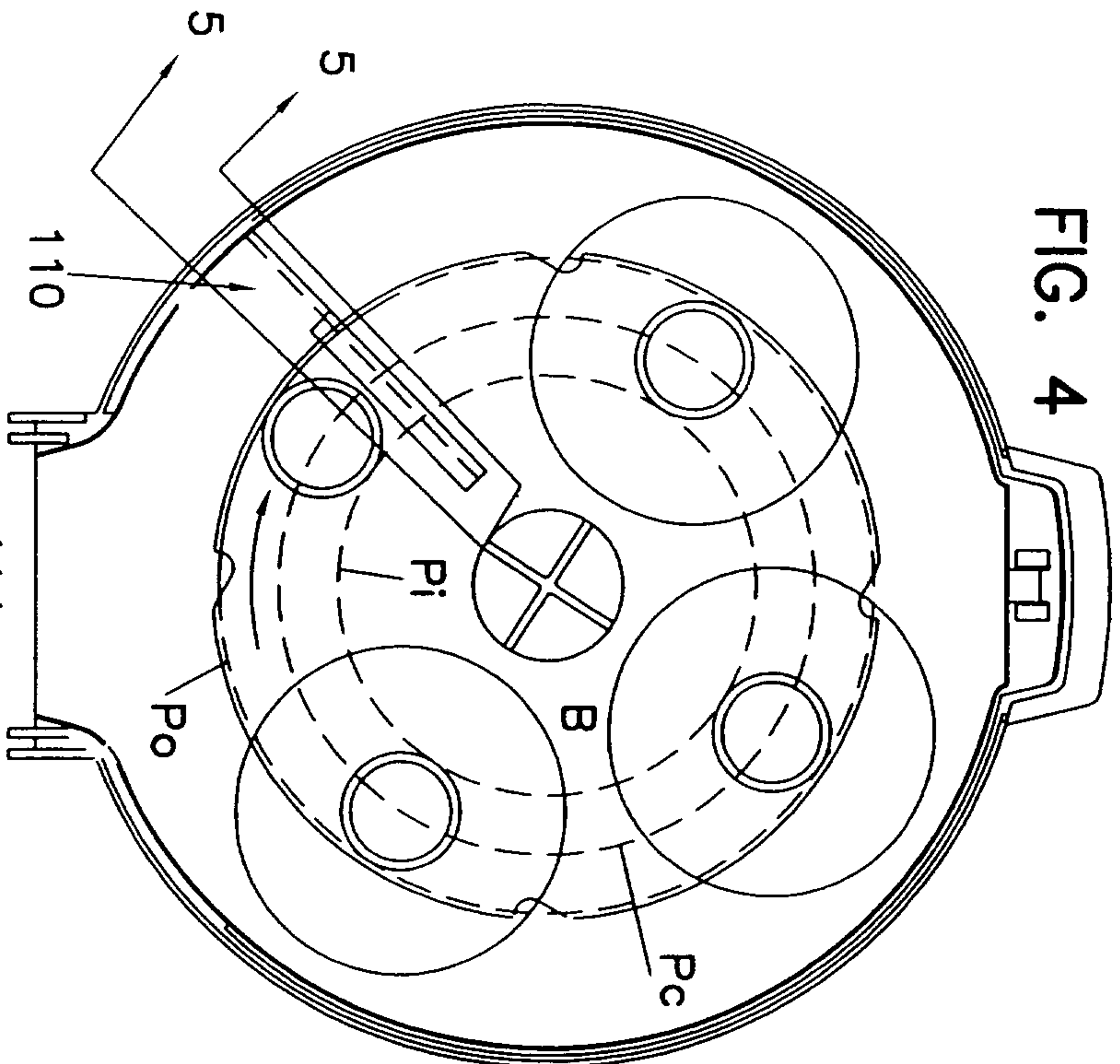


FIG. 3

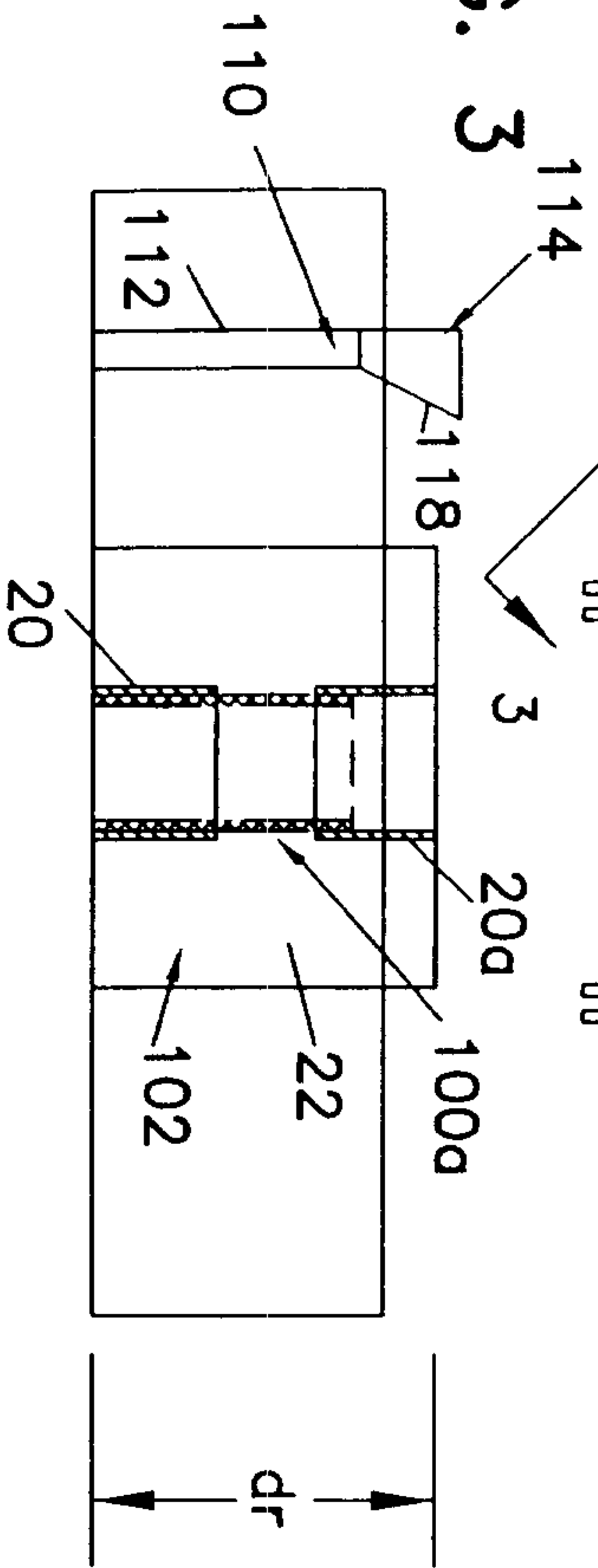


FIG. 5

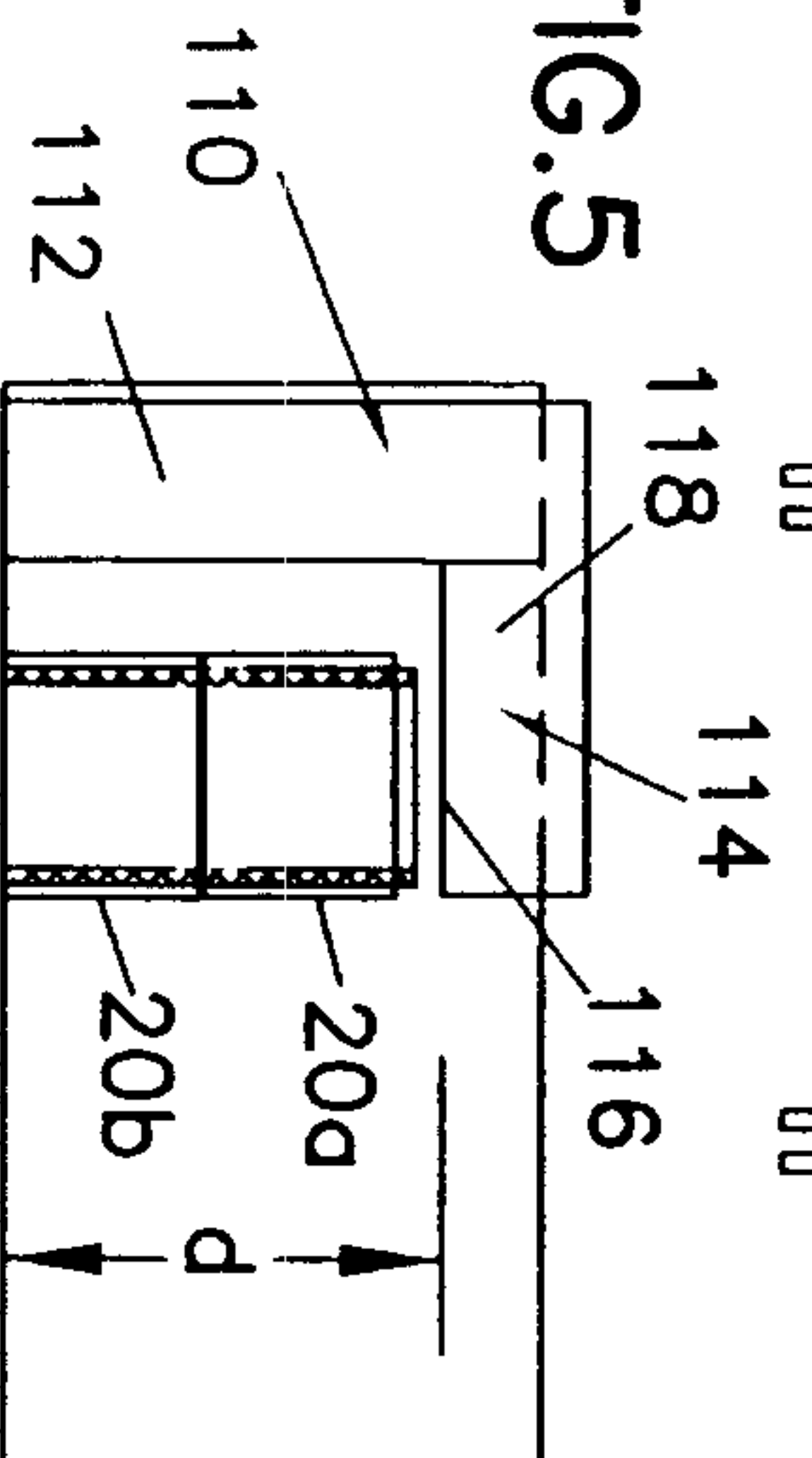


FIG. 6

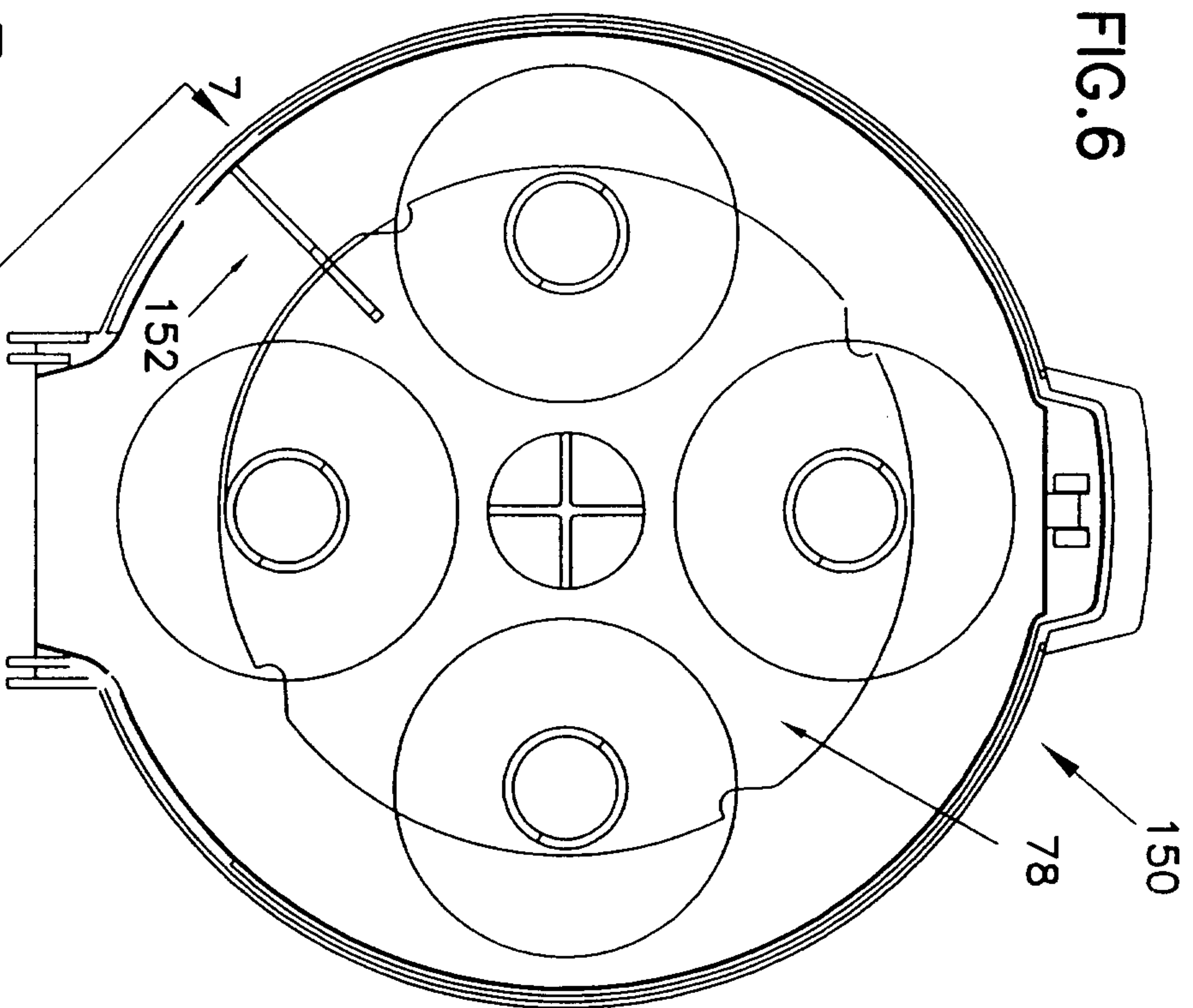


FIG. 7

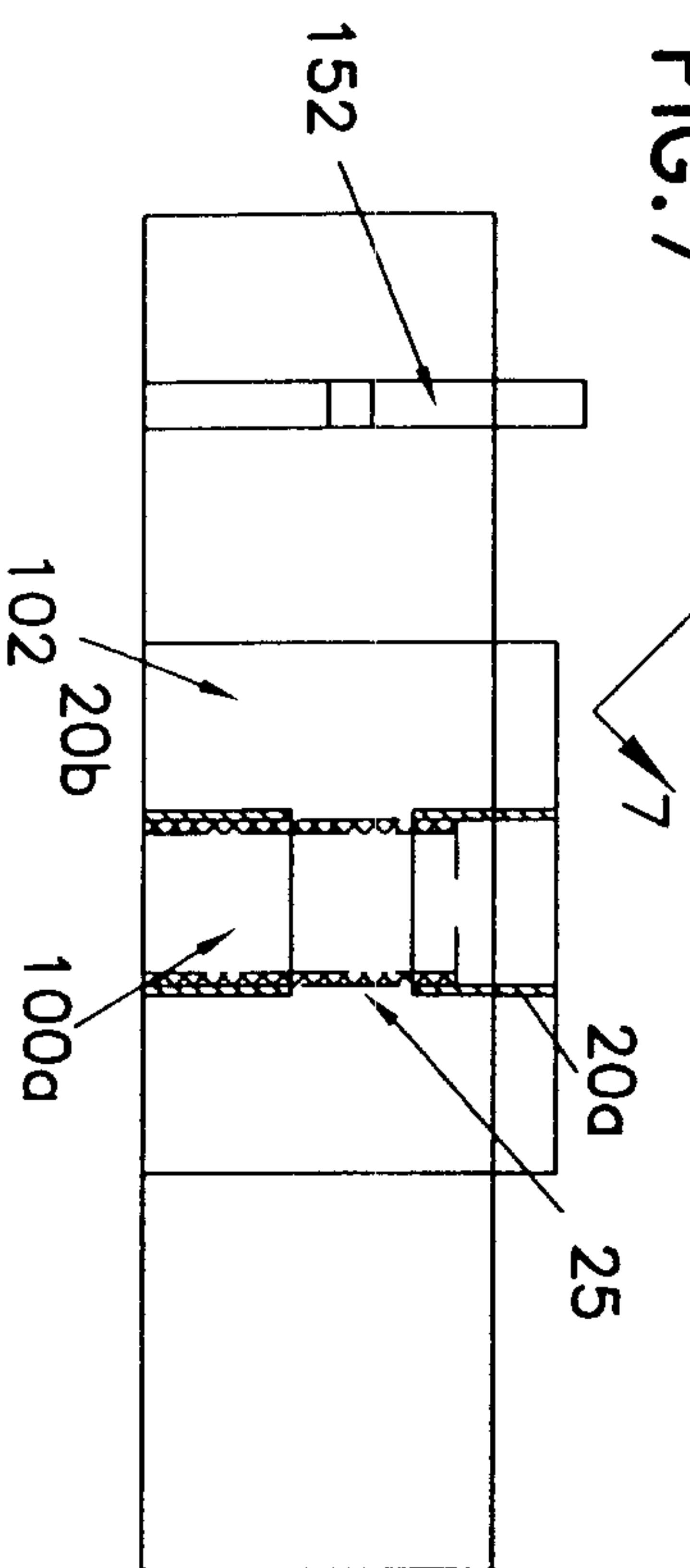


FIG. 8

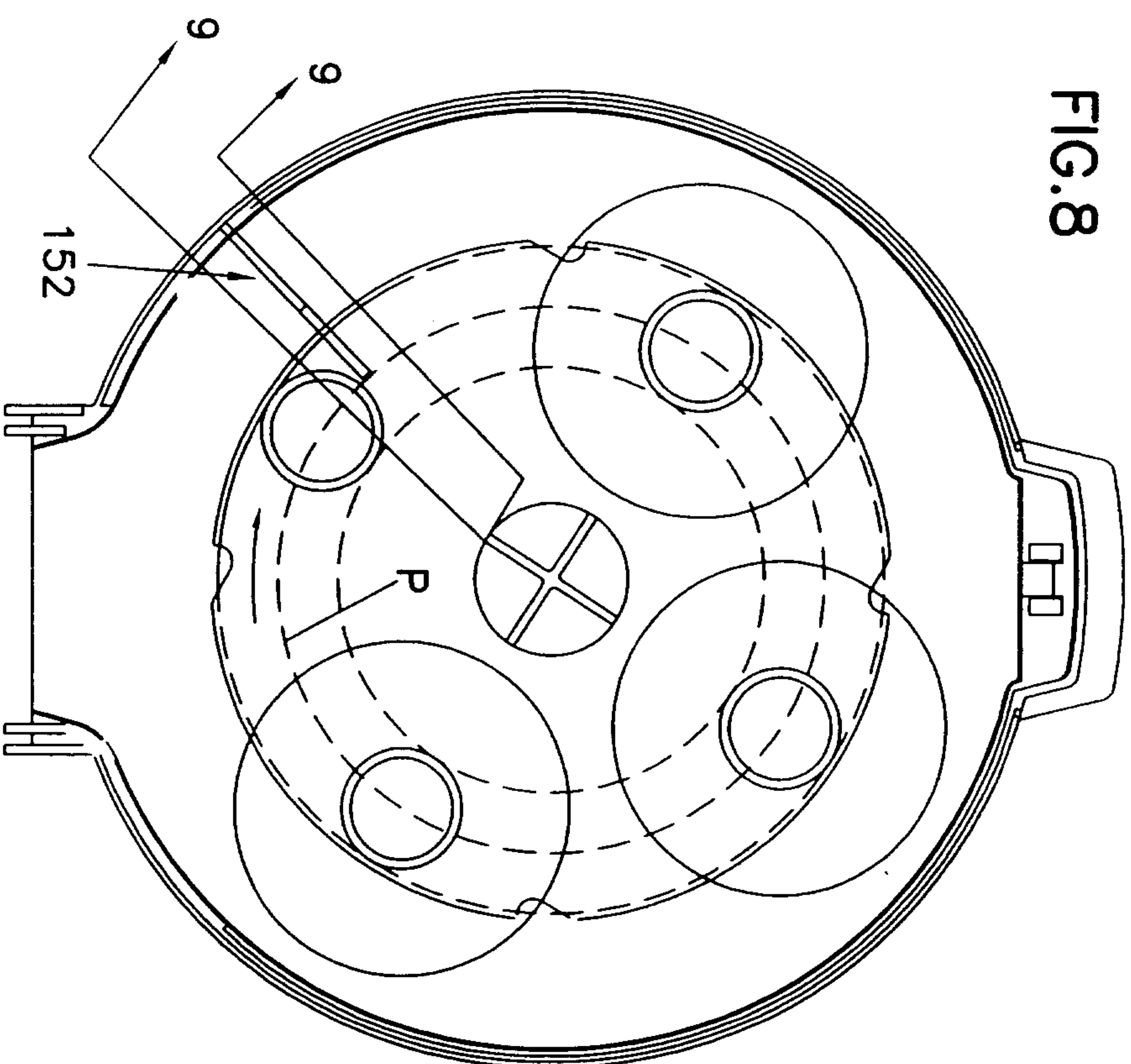


FIG. 9

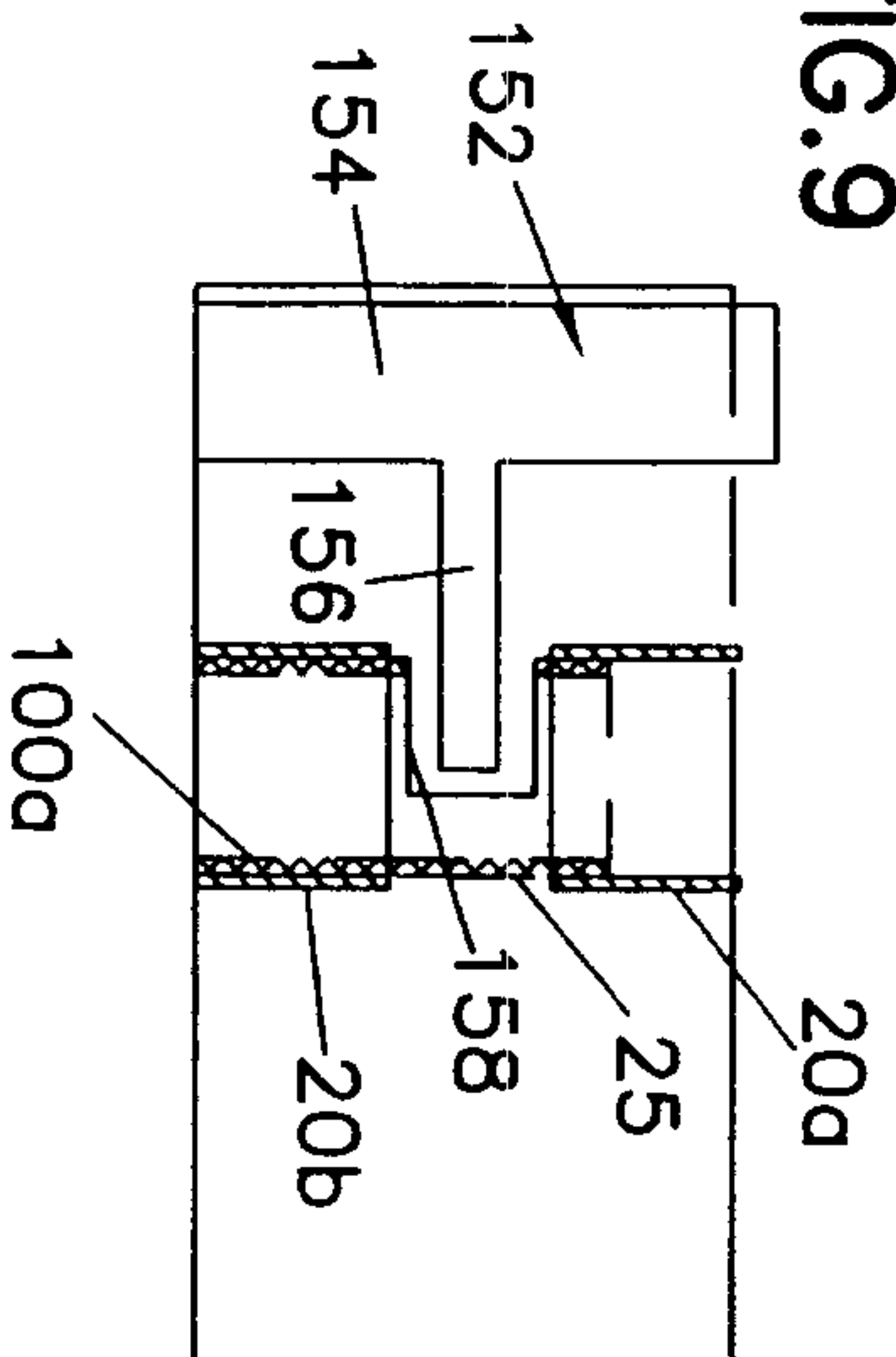


FIG. 10

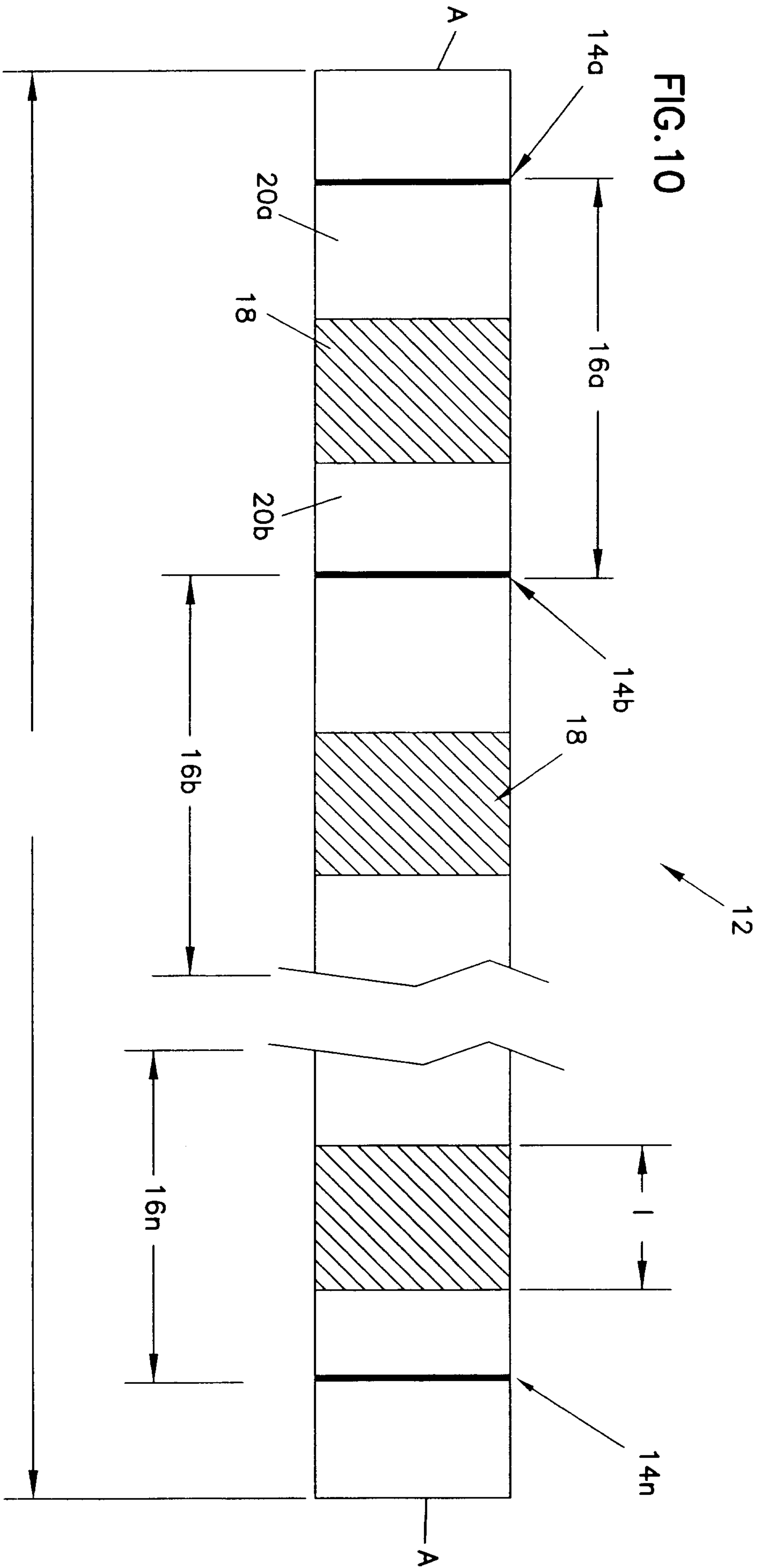


FIG. 12

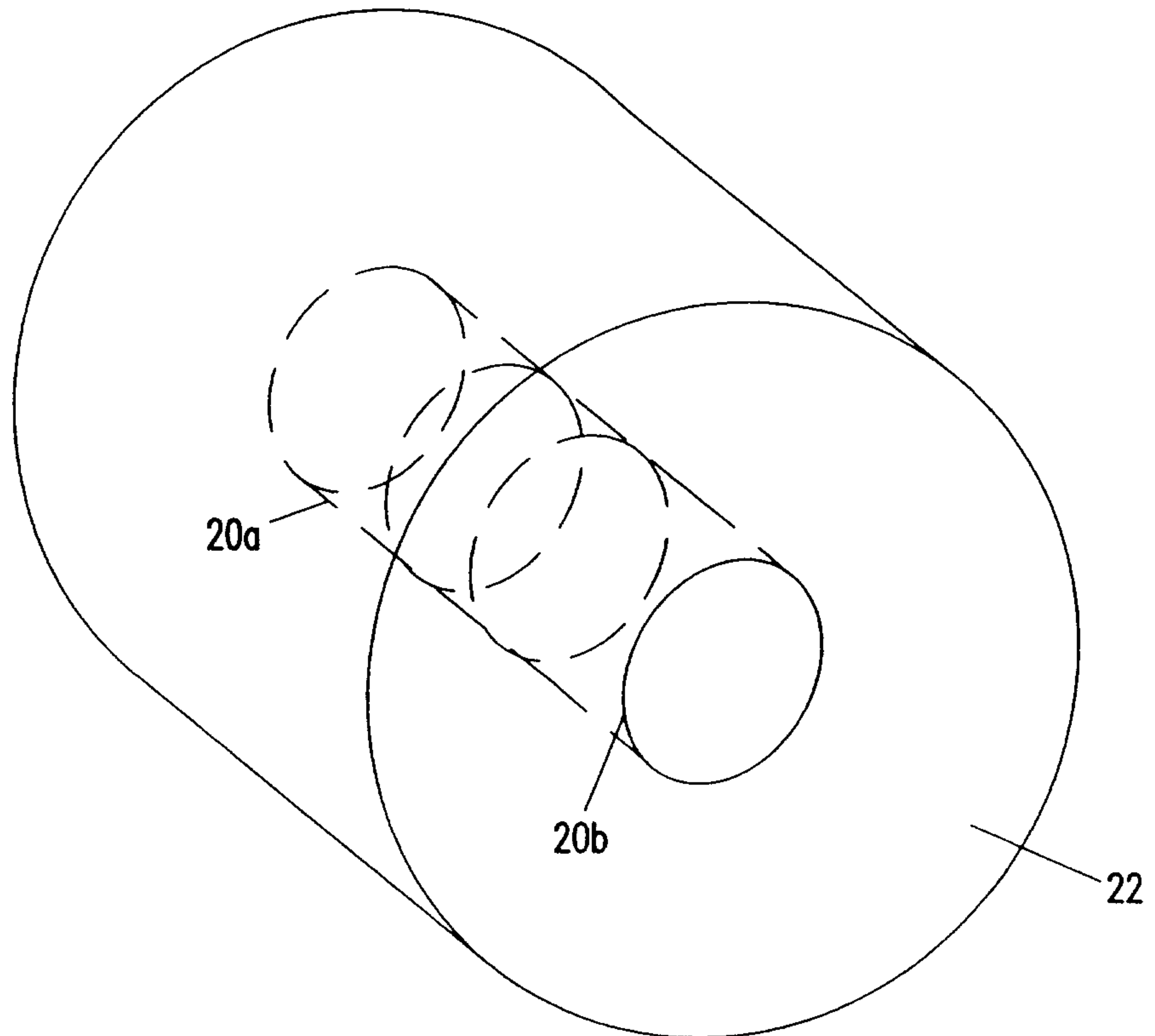


FIG. 11

