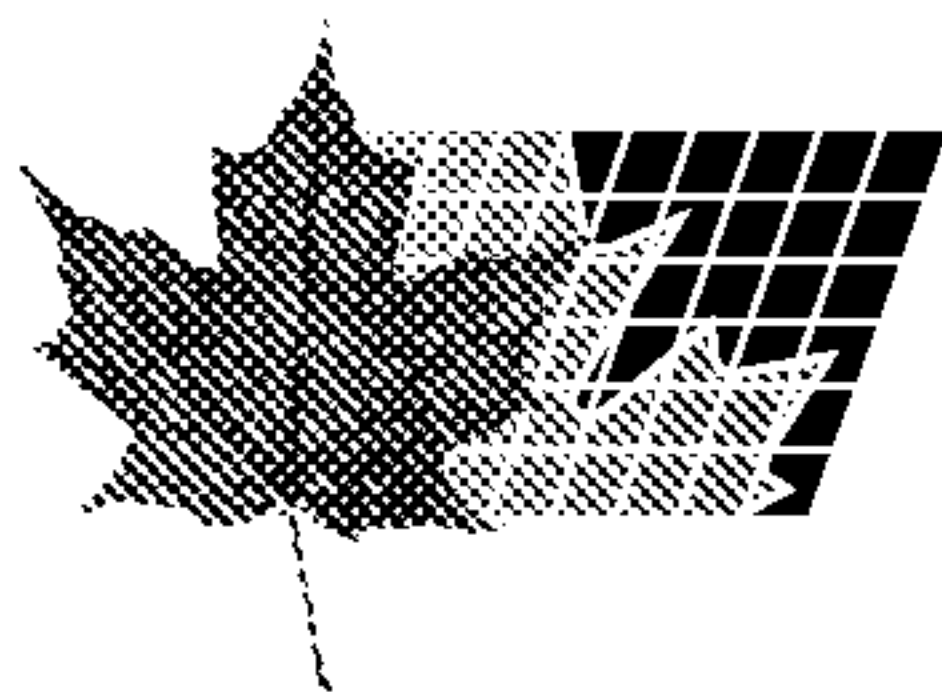




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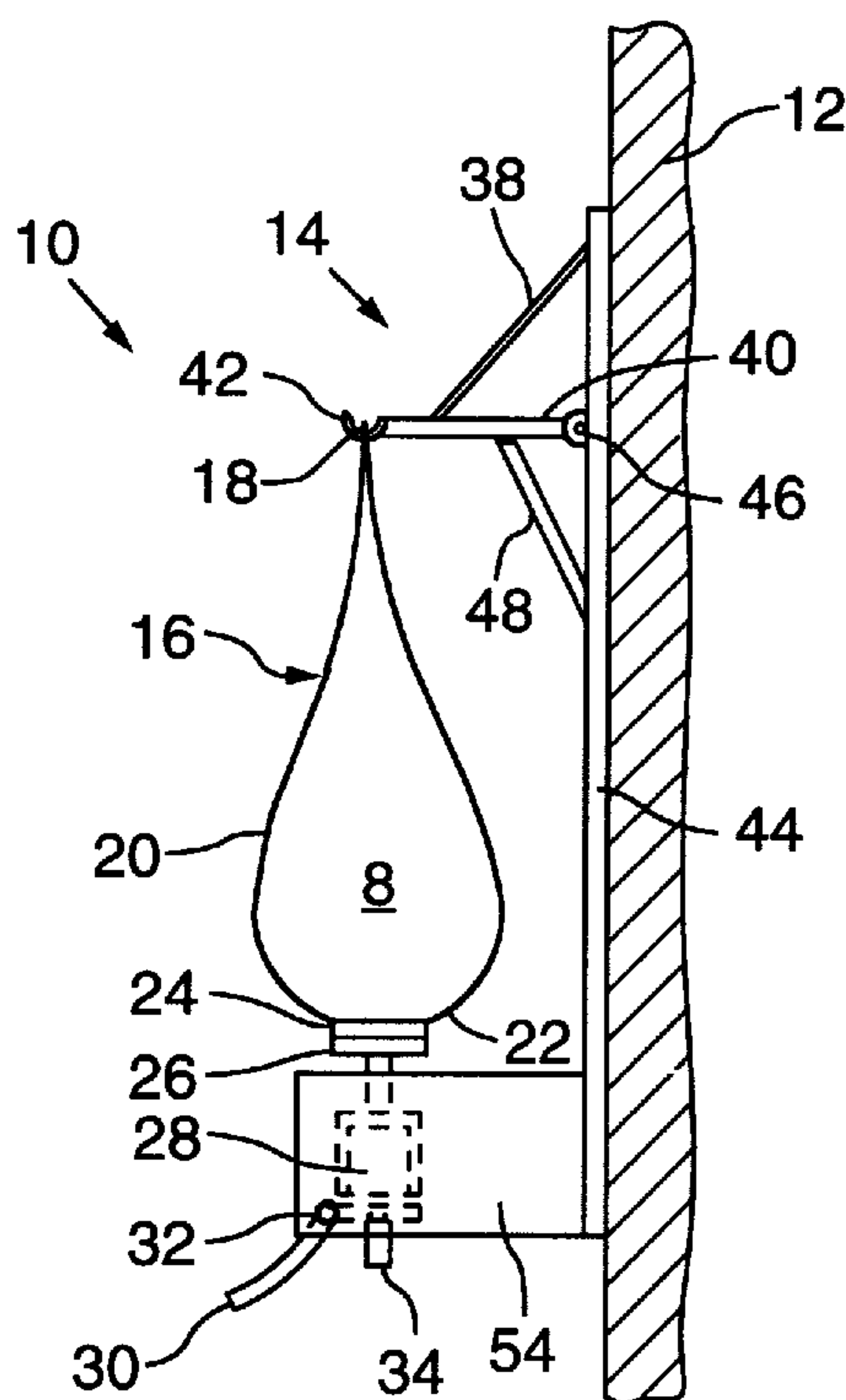
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(54) **SAC DISTRIBUTEUR DE FLUIDE**

(54) **BAG FLUID DISPENSER**



(57) An improved dispensing apparatus in which a collapsible bag has a lower outlet secured to the dispenser and an upper end supported above the outlet. An improvement arises in providing a system to draw the upper end of the bag upwardly to assist in ensuring all fluid in the bag may flow under gravity to the outlet.



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ABSTRACT OF THE DISCLOSURE

An improved dispensing apparatus in which a collapsible bag has a lower outlet secured to the dispenser and an upper end supported above the outlet. An improvement arises in providing a system to draw the upper end of the bag upwardly to assist in ensuring all fluid in the bag may flow under gravity to the outlet.

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"BAG FLUID DISPENSER"**SCOPE OF THE INVENTION**

This invention relates to fluid dispensers and more particularly to fluid dispensers utilizing collapsible bags containing fluids to be dispensed.

BACKGROUND OF THE INVENTION

Dispensers are known utilizing collapsible bags containing fluid to be dispensed, and in which the bag is held in a vertical position with an upper end supported by the dispenser above an outlet of the bag through which fluid is to exit. In such dispensers, the fluid in the bag flows towards the outlet under gravity.

A disadvantage of many such bag dispensers which has been appreciated by the present inventors is that known bags when full have their side walls distended outwardly and as the bag empties, slack develops in the side walls. As a result, as the bag is emptied, the side walls sag to hang downwardly below the outlet with the result that quantities of fluid become disposed where the side walls sag below the outlet, which fluid cannot be dispensed from the outlet.

SUMMARY OF THE INVENTION

To at least partially overcome these disadvantages of previously known devices, the present invention provides an improved dispenser in

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which the upper end of the bag is drawn upwardly as the fluid in the bag decreases.

An object of the present invention is to provide a dispenser for supporting bags which assists in reducing the amount of fluid which cannot be dispensed from the bag.

Another object is to provide a dispenser for dispensing fluids from collapsible bags which provides for visual inspection of the bag and labelling on the bag.

Another object is to provide a system for supporting bags so that they may be drawn upwardly.

Another object is to provide a construction for a collapsible bag for dispensing fluids which is adapted to be hung.

Another object is to provide a construction for an outlet for a bag which permits ease of filling and yet provides a convenient system for closure during storage and leak free installation in a dispensing apparatus.

Accordingly, in an aspect the present invention provides a dispensing apparatus comprising:

bag suspending means for supporting an upper end of a bag containing fluid to be dispensed, dispensing means for engaging an outlet from the bag disposed on the bag below the upper end through which fluid is to exit the bag,

wherein the bag suspending means draws the

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upper end of the bag upwardly.

In another aspect, the present invention provides in combination a dispensing apparatus and replaceable bag means containing fluid to be dispensed therefrom:

the bag means having an upper end and a lower end joined by collapsible side walls, hanging means on the upper end of the bag means,

outlet means on the lower end of the bag means for exit of said fluid from the bag means,

said dispensing apparatus having bag suspending means to suspend the bag by engaging the hanging means on the upper end of the bag means,

dispensing means for fixedly holding the outlet means at a height below the upper end of the bag means,

the bag suspending means drawing the hanging means upwardly to sufficiently tension the side walls between the lower end and the upper end of the bag means to direct fluid in the bag to assume positions disposed in the bag above the outlet means.

In another aspect, the invention provides a dispensing apparatus for dispensing fluid from a collapsible bag means having an upper end, a lower end and outlet means approximate the lower end,

the apparatus comprising:

upper securing means to hold the upper end of the bag means,

lower securing means to hold the lower end of the bag means below the upper end, and

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tensioning means to bias the upper securing means and the lower securing means away from each other.

In a further aspect, the invention provides a dispensing apparatus for dispensing fluid from a collapsible bag means having an upper end, a lower end, outlet means approximate the lower end, and collapsible side walls,

the apparatus comprising:

upper means to hold the upper end of the bag means,

lower means to hold the lower end of the bag means below the upper end,

tensioning means to draw portions of the side walls approximate the outlet means upwardly relative the outlet means.

BRIEF DESCRIPTION OF THE DRAWINGS

Further aspects and advantages of the present invention will be appreciated from the accompanying description taken together with the following drawings in which:

Figure 1 is a schematic side view of the first embodiment of a fluid dispenser in accordance with the present invention showing a fluid containing bag filled with fluid;

Figure 2 is a side view of the device of Figure 1 but with only about one-third of the fluid remaining in the bag;

Figure 3 is a side view of the device of

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Figure 1 with the bag containing only one-third of the fluid and with the elastic cord of the device of Figure 1 removed so as illustrate typical previous difficulties;

Figure 4 is a pictorial view of the dispenser in accordance with a second aspect of the present invention;

Figure 5 is a pictorial view of the dispenser of Figure 4 with its cover and dispensing bag removed;

Figure 6 is partially cut away view of the dispenser of Figures 4 and 5 shown engaging the upper end of a full bag;

Figures 7, 8 and 9 show similar partial side views of the dispenser of Figure 5 with, in Figure 7 the bag being full, in Figure 8 the bag being empty and in Figure 9 the upper end of the bag is being manually held ready for coupling to the dispenser;

Figure 10 shows a plan view of a blank for a bag illustrated in Figures 6 to 9;

Figure 11 shows a side view of a complete but empty bag formed from the blank of Figure 10;

Figure 12 shows a side view of the empty bag of Figure 11;

Figure 13 shows a side view of the bag of Figure 12 when full and suspended from its upper

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end;

Figure 14 shows an enlarged cross sectional exploded view of the outlet for the bag shown in Figures 11 to 13 secured to the lower end of the bag and the coupling adapted to secure the outlet to the dispenser of Figure 3;

Figure 15 shows a pictorial view of a stopper for the outlet shown in Figure 14;

Figure 16 is a cross sectional side view of the elements of Figure 14 with the outlet engaged on the coupling;

Figure 17 shows an enlarged cross sectional exploded view of a second embodiment of an outlet for a bag in accordance with the present invention; and

Figure 18 is a partial cross sectional side view showing the outlet of Figure 17 in combination with a further embodiment of a base of a housing adapted for use therewith.

DETAILED DESCRIPTION OF THE DRAWINGS

Throughout the drawings, same reference numerals are used to refer to similar elements.

Reference is made first to Figure 1 which shows the schematic view of a wall mounted dispenser 10 secured to a wall 12. The dispenser has a bag support device generally indicated 14 to support a bag 16 at its upper end with the lower end 22 of the

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bag having an outlet 24 adapted to be coupled via a coupling 26 to a base 54 of the dispenser. As is known, the base 54 includes as shown in dotted lines in Figure 1, a pump 28 which is operative to pump fluid 8 from within the bag 16 out of nozzle 34 as, for example, by downward pivoting of lever actuator 30 about its pivot 32. The bag 16 is of a type which has collapsible sides 20 which bulge outwardly in containing the fluid 8.

Figure 1 shows bag support device 14 as comprising a support arm 40 having a hook 42 at its outer end to engage the upper end 18 of the bag. The support arm 40 is coupled to a vertical frame 44 of the dispenser for pivoting about pivot 46. A stop 48 is provided as a bracket fixed to the vertical frame 44 so as to prevent the support arm 40 from pivoting downward below the position shown in Figure 1. An elastic cord 38 is shown extending between the support arm 40 and the vertical frame 44 above the support arm 40 which elastic cord 38 is tensioned so as to attempt to pivot the support arm 40 upwardly about pivot 46.

Reference is now made to Figure 2 which shows the dispenser of Figure 1 however after substantial quantities of the fluid 8 have been pumped out of the bag 16. Figure 2 shows the bag with approximately one-third of the fluid 8 remaining. Significantly, in Figure 2, support arm 40 has been pivoted upwardly about pivot 46 thus drawing the upper end 18 of the bag upwardly so as to maintain the collapsible sides 20 of the bag in sufficient tension between the upper end of the bag and the lower end of the bag to direct fluid 8 in

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the bag 16 to assume positions disposed in the bag 16 above the outlet 24.

The operation of the device as shown in Figures 1 and 2 may be appreciated with reference to the device shown in Figure 3 which is identical to the device of Figure 2 and has the same amount of fluid 8 left in the bag 16 as in Figure 2 however with the exception that in Figure 3, the elastic cord 38 is not provided. As can be seen in Figure 3, due to the reduced amount of fluid 8 in the bag 16, the remaining fluid in the bag 16 has under the influence of gravity drawn the collapsible sides 20 downward as lowered pockets 36 containing fluid 18 disposed within the bag at a level below the outlet 24 of the bag. It is to be appreciated that under the conditions as shown in Figure 3, the fluid in the lower pockets 36 can not readily be pumped out of the dispenser. In contrast, with the device of the present invention as shown in Figure 2, by reason of the upper end 18 of the bag being drawn upwardly by the elastic cord 38, the collapsible sides 20 of the bag are maintained in a condition that they assist in preventing fluid being received in lowered pockets such as 36 shown in Figure 3. To the extent, the elastic cord 38 may be able to overcome the force of gravity acting on the fluid in the bag will to some extent, determine the extent to which lowered pockets 36 are prevented. It is to be appreciated, at least when substantially all the fluid 8 has been dispensed from the bag 16, that even a relatively weak elastic cord 38 may be of assistance in ensuring that the last portions of the fluid 8 may be drawn inwardly and upwardly by the collapsed sides to assist their feeding fluid by

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gravity to outlet 24.

Reference is now made to Figures 4 to 16 which illustrate a preferred second embodiment of the present invention. Figures 4 to 9 best show the mechanism for supporting and drawing the bag upwardly. Figures 10 to 16 best show the construction of the bag and its outlet and coupling of the outlet of the bag to the dispenser.

Figure 4 shows a dispenser 10 secured to a wall 12. The dispenser has a removable cover 50 which is secured to a housing generally indicated as 52. The cover 50 preferably has a window 52 which may or may not be covered with a transparent plastic pane to permit visual inspection of the bag 16 within the dispenser and, for example, to read the label of the bag indicated as the word "soap" as seen through window 52 in Figure 4.

Figure 5 shows the dispenser of Figure 4 with both the cover 50 and the bag 16 removed. Housing 52 has a base 54 which is schematically shown to carry the pump 28, the lever actuator 30 and the fluid dispensing nozzle 34. A coupling generally indicated as 26 is shown and will be described later to comprise a threaded collar 56 disposed coaxially about a feed tube 58 having an enlarged annular plug 60 at its upper end and with the feed tube 58 to connect the outlet 24 of the bag 16 to the pump 28.

Referring to Figure 5, the bag support device generally indicated 14 comprises a lower clamp arm 62 and an upper clamp arm 64 both mounted

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for pivoting on pivot rod 66 about pivot 46. A compressed coil spring 38 urges the lower clamp arm 62 upwardly. A lower stop 48 is provided to limit the extent to which the lower clamp arm 62 may pivot downwardly and an upper stop 68 is provided to limit the extent to which the lower clamp arm 62 may pivot upwardly.

As best seen in Figure 6, the upper clamp arm 64 is cut away at its rear so as to provide an opening 70 between two arms 72 with each arm terminating in cylindrical journal portions 73 extending about the pivot rod 66 and journalling the upper clamp arm for pivoting thereabout.

The lower clamp arm 62 has a central rearward arm 76 sized to be received within the opening 70 and ending with a cylindrical journal portion 77 extending about the pivot rod 66 between the arms 72 of the upper clamp arm 64 such as the lower clamp arm 62 is also mounted for pivoting about pivot rod 66.

A vertical frame 44 is shown as comprising side frames 80 and 82 connected by back frame 84 with openings in the side frames receiving the pivot rods 66 at pivot 46.

The upper stop 68 is provided as a foot on an upper bracket 86 whose rear end is secured to the frame back 84 and which extends outwardly and downwardly to present the upward stop 68 extending through the opening 70 in the upper clamp arm 64 to engage the upper surface of the lower clamp arm 62.

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A lower bracket 88 is secured to the frame back 84 below the lower clamp arm. The lower bracket 88 presents a spring support plate 90 to support the lower end of the spring 38. The lower bracket 88 then extends upwardly as an arm 92 to present the lower stop 48 to engage the under surface of lower clamp arm 62.

The spring 38 shown as a helical spring sized so that the spring is compressed and will bias the lower clamp arm 62 upwardly into upper stop 68. The spring 38 is preferably sufficiently strong that it will at all times tension the sides of the bag such that pockets 36 as shown in Figure 3 do not occur.

A preferred bag for use in accordance with the invention is shown in Figure 11 and will be understood as comprising a bag 16 of flexible plastic material having at its upper end 18, a hanger tube 94 retained therein and by which hanger tube 94 the bag 16 may conveniently be secured to the bag support device 14.

Figures 6 and 7 show the second embodiment of the dispenser with a full bag having its hanger tube engaged with the bag support device 14. As shown, the lower clamp arm 62 and the upper clamp arm 64 have complementary clamping surfaces indicated as 96 and 98 in Figure 6 such that with the hanger tube 94 of the bag 16 when disposed between surfaces 96 and 98, the weight of the bag will keep the lower clamp arm 62 and upper clamp arm 64 disposed in clamping engagement about the hanger tube 94.

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As best seen in Figure 7, with a full bag having its upper end 18 secured to the bag support device 14 by means of the hanger tube 94 being engaged by the clamping surfaces 96 and 98, the weight of the fluid in the bag is such that it compresses the spring 38 with the lower clamp arm 62 being limited in downward pivoting by its under surface engaging the lower stop 48. From the position of Figure 7, fluid may be disposed from the bag and as the fluid is dispensed, the weight of fluid in the bag will decrease to an extent when the spring 38 will pivot the lower clamp arm 62 upwardly. Upward pivoting of the lower clamp arm 62 is limited initially by the amount of slack in the sides of the bag and ultimately by the upper surface of the lower clamp arm 62 coming to engage the upper stop 68. As is to be appreciated and understood, the extent to which the lower clamp arm may be pivoted upwardly before stopped by the upper stop 68 will have to be chosen having regard to the relative size and configuration of the bag and the extent to which the bag needs to be drawn upwardly to ensure fluid in the bag may be dispensed from the outlet.

Figure 8 shows the position in which a spring 38 has pivoted the lower clamp arm 62 upwardly of maximum into engagement with the upper stop 62. In the position in Figure 8, when the fluid in the bag having substantially all been dispensed, to disengage the bag from the bag support device 24, a user may manually lift the upper clamp arm 64 upwardly which will permit the hanger tube 94 to be withdrawn from clamped engagement between the clamp surfaces 96 and 98. Similarly, in the position of Figure 9, it is possible that a new full

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bag 16 may be engaged with the bag support device by a user manually lifting the bag 16 to place the hanger tube 94 adjacent the clamp surface 96 of the lower clamp arm 62 and then manually drawing the upper clamp arm 64 downwardly until the clamp surface 98. Neither the upper stop 68 nor the lower stop 48 are necessarily required. Providing the lower stop 48 has the advantage of not unduly compressing spring 38 and of ensuring that a bag when full is supported even with a weaker spring with its upper end at a minimum height. Upper stop 68 assists in disengaging an empty bag and engaging a new full bag.

Reference is now made to Figures 10 to 13 which show a preferred construction for the bag 16 for use in association with the present invention. It is to be appreciated however that while a preferred form of the bag is disclosed, the invention is not limited for use with bags of this type.

Figure 10 shows a blank comprising a thin sheet of flexible plastic material 100 shown as having a hole 104 cut therefrom and a central fold line 102.

The bag is formed by securing an outlet 24 to the bag in sealed communication with the hole 104 and by folding the sheet 100 about the fold line 102 so as to provide a bag as generally seen in Figures 11 and 12 with two sides 20 which are substantially identical and coincident. After the bag is folded, the bag then has the two sides 20 or neat sealed together along lateral seals 106 on each side,

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diagonal seals 108 at each corner and two transverse seals 110 and 112 near its upper end. In this manner, the seals 112, 108 and 106 form a closed interior space which together with portions of the fold line 102 about the outlet 24 and the outlet 24 forms a closed cavity open only via the hole 104 in communication with the outlet.

The seals 112 and 110 are provided so as to provide a hollow passageway 114 therebetween. At least one side 20 has a cut line 116 extending between the heat seals 110 and 112 so as to provide access to this passageway 114 and permit the insertion therein of a short length of hollow tubing to comprise the hanger tube 94.

Figure 12 illustrates a side view of the empty bag 16 when drawn to a fully extended empty position and having a height between the exit 24 and the hanging tube 94 shown as L.

For ease of understanding, Figure 13 shows the bag of Figure 12 when filled with fluid, and the bag suspended by the hanger tube 94 and showing that the height of the bag between the exit 24 and the hanger tube 94 reduces to a height R which is less than the height L of the empty bag due to the volume of the fluid 8 in the bag drawing the flexible sidewalls 20 of the bag outwardly.

Reference is now made to Figures 14 to 16 which show a preferred construction for the outlet 24 for the bag and for the coupling 26 carried on the base 54 of the dispenser.

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The outlet 24 comprises a central outlet tube portion 120 having an annular flange 122 about its upper open end 124 with three equally circumferentially spaced retaining fingers 126 extending axially beyond the upper opening 124. The sheet 100 forming the bag is adapted to be secured to the annular flange 122 to form a fluid tight seal therewith. The outer tube portion 120 has a lower opening 128 about which a cylindrical socket member 130 is disposed. The socket member is sized so as to receive within its cylindrical bore 132 the enlarged annular plug 60 carried on the upper end of feed tube 58. The socket member 130 has external threads 134 to be engaged by internal threads 136 on the threaded collar 56. The threaded collar is axially slidable and rotatable about the feed tube 58. As best seen in Figure 16, with the enlarged annular plug 60 received within the bore 132 of the socket member, the threaded collar 56, which is free to move axially on the feed tube 58 and rotate thereabout, may manually be drawn upwardly to engage about the socket member 130 and then by rotation of the collar 56, while manually holding the outlet 24 against rotation urge the enlarged annular plug 60 into a sealed relationship within the bore 132 of the socket member 130.

The outlet 24 of a bag which has been manufactured and later filled, may after filling be provided with a stopper 140. Stopper 140 is best seen in Figure 15.

A bag having an outlet 24 attached but without the stopper 140 inserted may be inverted and then filled with a desired quantity of liquid. When

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filled, the stopper 140 may be axially slid into the outlet tube portion 120. The stopper 140 has at least one upper annular seal member 142 which is sized to engage in sealing relation the interior surfaces of the complementary cylindrical bore 121 of the tube portion 120 and form a seal substantially preventing flow of fluid out of the bag through the outlet. The stopper 140 has four axially extending locating vanes 144 to assist in accurate location and sliding of the stopper 140 into the outlet tube portion 120.

A bag 16 which has been filed with fluid has a stopper 140 inserted into the outlet tube portion 120 into the position as shown in Figure 14 with the upper annular seal member 142 disposed in bore 121 between the inlet opening 124 and the outlet opening 128. In this position, the lower end 146 of the stopper extends into the bore 132. In coupling the feed tube 58 to the outlet 24, the enlarged annular plug 60 is inserted into the bore 132 and preferably forms a substantially sealed relation inside the bore 132 once the plug 60 is inserted axially into the bore sufficiently that the upper surface 148 of the plug engages the lower end 146 of the stopper 140. In this regard, as best seen in Figure 16, the bore 150 through the plug 60 has an inlet 152 which is of a diameter smaller than the diameter of the vanes 144. On the annular plug 60 entering the bore 132 of the socket member and being moved axially therein as it assumes the coupling position shown in Figure 16, the stopper 140 is displaced from a position in which it seals the outlet tube portion 120 as shown in Figure 14 to a position in which the stopper 140 permits flow of

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fluid through the outlet tube portion 120 as seen in Figure 16. As seen in Figure 16, the stopper 140 has been moved upwardly within the outlet tube portion 120 such that its upper annular seal member 142 merely engages the upward projections 126 upwardly of the inlet 124 of the outlet tube portion 120 such that fluid may readily flow from the inside of the bag 16 under the upper annular seal member 142 and between the upper projection 126 as indicated by the arrow in Figure 16.

Preferably, a bag 16 which has been filled with liquid may be stored in an inverted position with the stopper 140 located in a sealing relation as shown in Figure 14. It is preferable that a seal closure cap (not shown) having a configuration substantially the same as threaded collar 56 but having a completely sealed annular end would be secured to the socket member 130 to seal the same and prevent contamination and reduce the likelihood of leakage.

A preferred bag in accordance with the present invention as shown in Figures 10 to 13 is formed from a sheet of plastic foil or laminate comprising an inner layer of 60 microns to 200 microns PE and an outer layer of about 12 microns PET. PE is polyethylene. PET is polyethylene terephthalates. A preferred method of a manufacturing the bag is to be have a continuous roll of such foil punched with spaced holes 104 and fed as a continuous length to a machine to injection mold in place an outlet of polyethylene material which will become fused and/or welded to the PE inside layer, thus ensuring a good seal.

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Alternatively, the sheet 100 about the hole 104 could be secured by adhesives or directing welding to the annular flange 122 of the outlet 124.

While the present invention shows a preferred bag 16 having a hanger tube 94, it is to be appreciated that many other systems may be used for coupling the bag to the bag support device 14 including openings, holes, grooves and/or slots in the upper end of the bag to be engaged by suitable complementary arrangements on the bag support device 14. The use of the hanger tube 94 disposed within a pocket in the bag is a convenient system however it is to be appreciated that other rigid handle members could be formed as by snap-fitting pairs of locking half handles through holes provided in the bag or by being injection molded or fused thereon in place.

It is preferred that the bag may be formed with merely one opening, that is, the outlet 24 through which fluids may be both injected into the bag and removed therefrom without further manufacture of the bag other than to insert the stopper 140. Of course, this kind of bag could be configured with other outlets and other stopper means, as for example, to have a second opening via which the fluid may be injected.

It is to be appreciated that various systems may be provided so as to adjust the vertical distance the upper end of the bag may be drawn upwardly and the force which draws the upper end of the bag upwardly.

The preferred embodiments show the upper

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end of the tube and particularly the hanger tube 94 as disposed directly vertically above the outlet 24 and while this is preferred, it is not necessary. A device substantially in accordance with the present invention could also function with for example the upper end of the bag disposed substantially adjacent the frame back 84 or disposed either spaced forwardly or rearwardly of the location of the hanger tube 94 as shown in the drawings.

An advantage of the invention in accordance with the present invention is that since a bag may have its upper end drawn upward at all times so that the sides of the bag are substantially tensioned to prevent lowered pockets forming as shown in Figure 3, the dispenser as shown in Figure 4 may be provided with a window 54 through which a visual inspection of the bag will readily determine whether or not a bag may be empty and as well will permit instructions, labelling, and the like which may be printed on the flat sides 20 of the bag to be readily read and understood whether or not the bag may be full, partially empty or completely empty.

The preferred embodiment of Figures 4 to 16 shows the outlet 24 as having a threaded socket member adapted to be engaged by the threaded collar 56 to couple the outlet of the bag to the dispenser. It is to be appreciated many other coupling systems including bayonet type and the like may be used. In use of the device in accordance with the present invention, it is preferred that the upper end of the bag will be coupled to the bag support device 14 first and thereafter the outlet 24 will then be coupled to the base 54 of the dispenser, although

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this is not necessary.

The preferred embodiment of Figures 4 to 16 illustrates the outlet 24 as being adapted for coupling via the coupling 26 to a pump 28. It is within the scope of the present invention that the outlet 24 may form a portion of the pump and/or the entire pump assembly. In this regard, constructions of pumps and couplings for pumps and covers thereto as disclosed in the applicant's U.S. patents 5,282,552 issued February 1, 1994 and 5,373,970 issued December 20, 1994 may be incorporated in conjunction with the bag and dispensing device in accordance with the present invention.

Reference is now made to Figure 17 which shows an outlet 24 for use in accordance with the present invention and incorporating a pump of the type illustrated in Figure 11 of U.S. patent 5,282,522.

As seen in Figure 17, the outlet tube portion 120 has an inner bore 121 of a smaller diameter than the bore 132 of the socket member 130. A piston 150 has an inner flexing disk 152 sealably engaging the bore 121 and permitting fluid flow downwardly therepast only. An outer flexing disk 154 sealably engages bore 132 and permits fluid flow outwardly therepast only. Sealing disk 156 engages bore 132 and prevents any fluid flow therepast. On moving the piston 150 inwardly, fluid is urged from a chamber 162 between disks 152 and 154 into a chamber 162 between disks 154 and 156 and then out

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of the pump via radially extending opening 164 which connects chamber 162 with an axially extending passage 166 opening to the outlet nozzle 34.

Figure 17 shows a removable closure cap 200 threadably engaged on the socket portion 130. The upper end of flange 122 of the outlet tube portion 120 preferably has the foil 100 for the bag welded directly thereto.

Reference is now made to Figure 18 which shows the device of Figure 17 with the closure cap 200 removed ready for insertion into the base 54 of a housing in accordance with the device of Figure 6 of U.S. patent 5,373,970. With the closure cap removed and the upper end of the bag supported on the bag support device, the outlet assembly 24 of Figure 17 may be slid rearwardly to engage the base 54. In this regard, Figure 17 shows the socket member 130 as having an enlarged annular boss 172 carrying a slot 174. The base 54 has a support web 176 with an opening 178 adapted to be received in the slot 174 to fixedly secure the outlet 24 to the base 54. As shown, the support web 176 preferably has a resilient entrance catch 180 which will resiliently deflect to the side outwardly from the opening 178 to permit insertion of the outlet assembly 24 into and out of the opening 178 under manually applied force.

As taught by U.S. patent 5,373,970, by such simple sliding of the outlet assembly 24 into the base 54 shown in Figure 18, fingers 190 and 192 and the lever actuator 30 come to engage the flange 194 on the piston 150 so that actuation of the lever

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actuator 30 will move the piston inwardly and outwardly and thereby pump fluid from the bag.

Figure 17 shows an embodiment in which each bag may be provided with the totally disposable pump, it is to be appreciated that a bag as shown in Figure 17 could be provided without the piston 150 and instead have a removable stopper such as 140 shown in Figure 15 provided in bore 121 of the outlet tube portion 120. To couple the outlet to the dispenser, a piston 150 which may be a reusable part of the dispenser could be pushed upwardly into the bores 131 and 121 thus suitably displacing the stopper 140 inwardly and permitting fluid flow therepast.

It is to be appreciated that the bag and dispenser may be adapted to have a permanent pump and dispenser or a disposable bag in the bag or other configurations as, for example, with only part of the pump being provided on the bag and dispensed after one use.

The illustrated embodiments show a system in which the lower end of the bag is secured to the dispenser via the outlet. The lower end may be secured to the dispenser otherwise, as for example, by the lower corners of the bag on either side of the outlet. Alternate bags could have a similar hanger tube 90 secured in the lower end with the outlet adjacent thereto on one side.

The illustrated embodiments show the bag being tensioned by drawing the upper end upwardly. Suitable tensioning of the bag arises by relative

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movement of the upper end and the lower end away from each other. Thus, tensioning may be provided by drawing the lower end downwardly. In this regard, as seen in Figure 1, either in addition to or alternatively two elastic cord 38 drawing the upper end of the bag upwardly, the pump and its coupling could be mounted for spring loaded movement downward relative to the dispenser housing so as to draw the outlet downwardly. While it is preferred that the bag be tensioned by engaging the bag and applying tensioning at its upper or lower end, tensioning forces could be applied between the upper end and the lower end, for example, by having means for securing of tensioning means on the side walls. With portions of the side walls approximate the outlet drawn upwardly, a similar advantageous result could be obtained. Engaging the bag on its side walls between the ends would be less preferred as requiring a more complex bag construction.

As used herein, the term "fluid" means any flowable matter and includes liquids, flowable pastes and flowable solids such as dry flowable powders and the like.

While the invention has been described with reference preferred embodiments, the invention is not so limited. Any modifications and variations will now occur to a person skilled in the art. For a definition of the invention, reference is made to the appended claims.

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WHAT WE CLAIM IS:

1. In combination, dispensing apparatus and replaceable bag means containing fluid to be dispensed therefrom:
 the bag means having an upper end and a lower end joined by collapsible side walls,
 hanging means on the upper end of the bag means,
 outlet means on the lower end of the bag means for exit of said fluid from the bag means,
 said dispensing apparatus having bag suspending means to suspend the bag by engaging the hanging means on the upper end of the bag means,
 dispensing means for fixedly holding the outlet means at a height below the upper end of the bag means,
 tensioning means to sufficiently tension the side walls between the lower end and the upper end of the bag means to direct fluid in the bag to assume positions disposed in the bag above the outlet means.
2. A combination as claimed in claim 1 wherein the dispensing means holds the outlet means generally vertically below the hanging means such that the bag means extends substantially vertically therebetween.
3. A combination as claimed in claim 2 wherein tensioning means operates to draw portions of the side walls approximate the outlet means upwardly relative the outlet means.
4. A combination as claimed in claim 1 wherein the tensioning means comprises spring means for biasing the suspending means upwardly

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thereby to draw opposite sides of the bag together and direct fluid in the bag to positions disposed in the bag above the outlet; and

including stop means preventing the bag suspending means from permitting the upper end of the bag to assume a position below a minimum height position.

5. The combination as claimed in claim 4 wherein the dispensing means holds the outlet means generally vertically below the hanging means such that the bag extends substantially vertically therebetween.

6. The combination as claimed in claim 1 wherein the bag means comprises a bag means with two substantially identical flexible side walls joined to each other at their periphery.

7. The combination as claimed in claim 6 wherein the bag means has an outlet disposed in the center of the lower end of the bag means and seams joining the edges of the side walls together which seams extend at an angle from the outlet means upwardly to assist in directing fluid in the bag towards the outlet means.

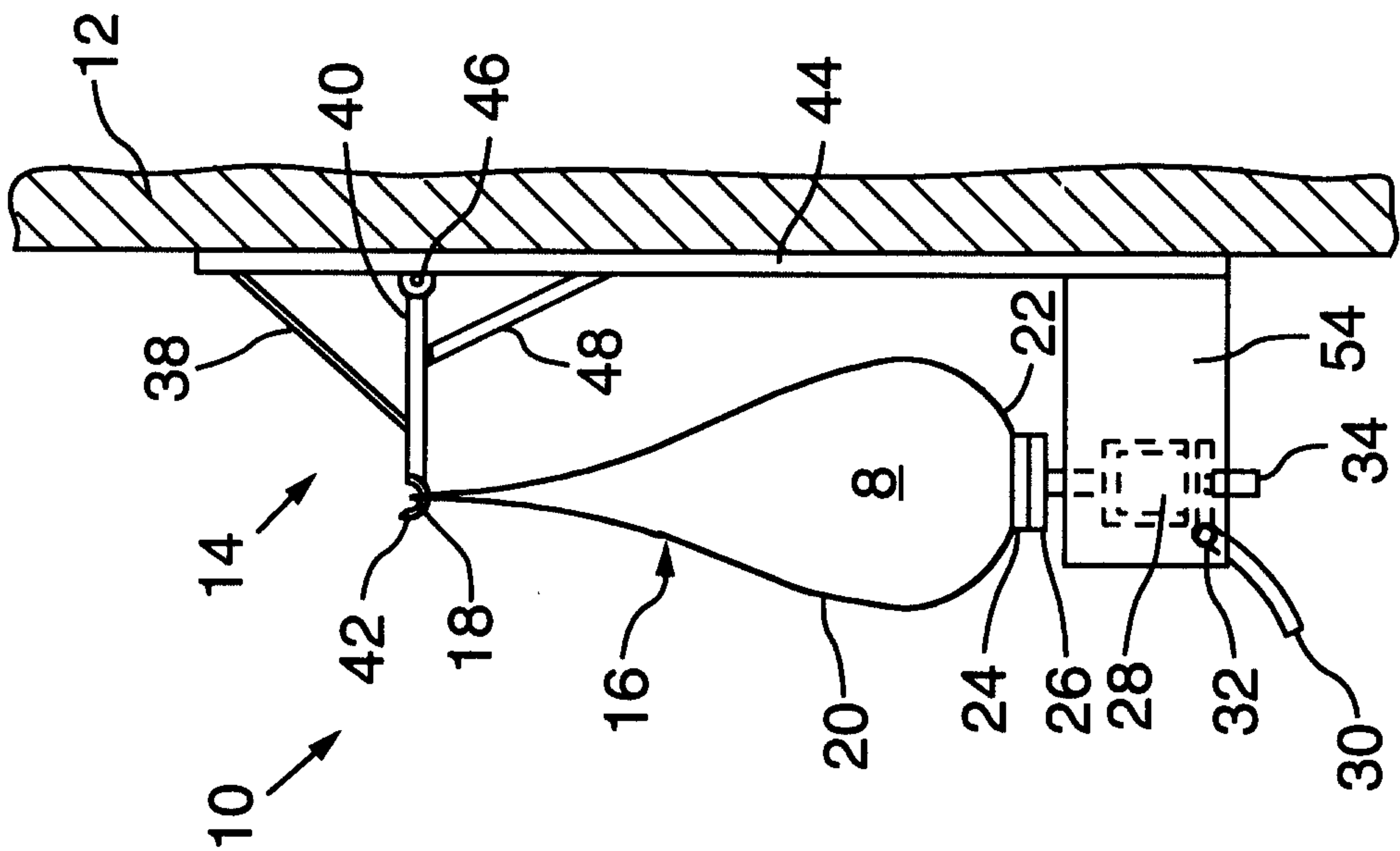


FIG.1

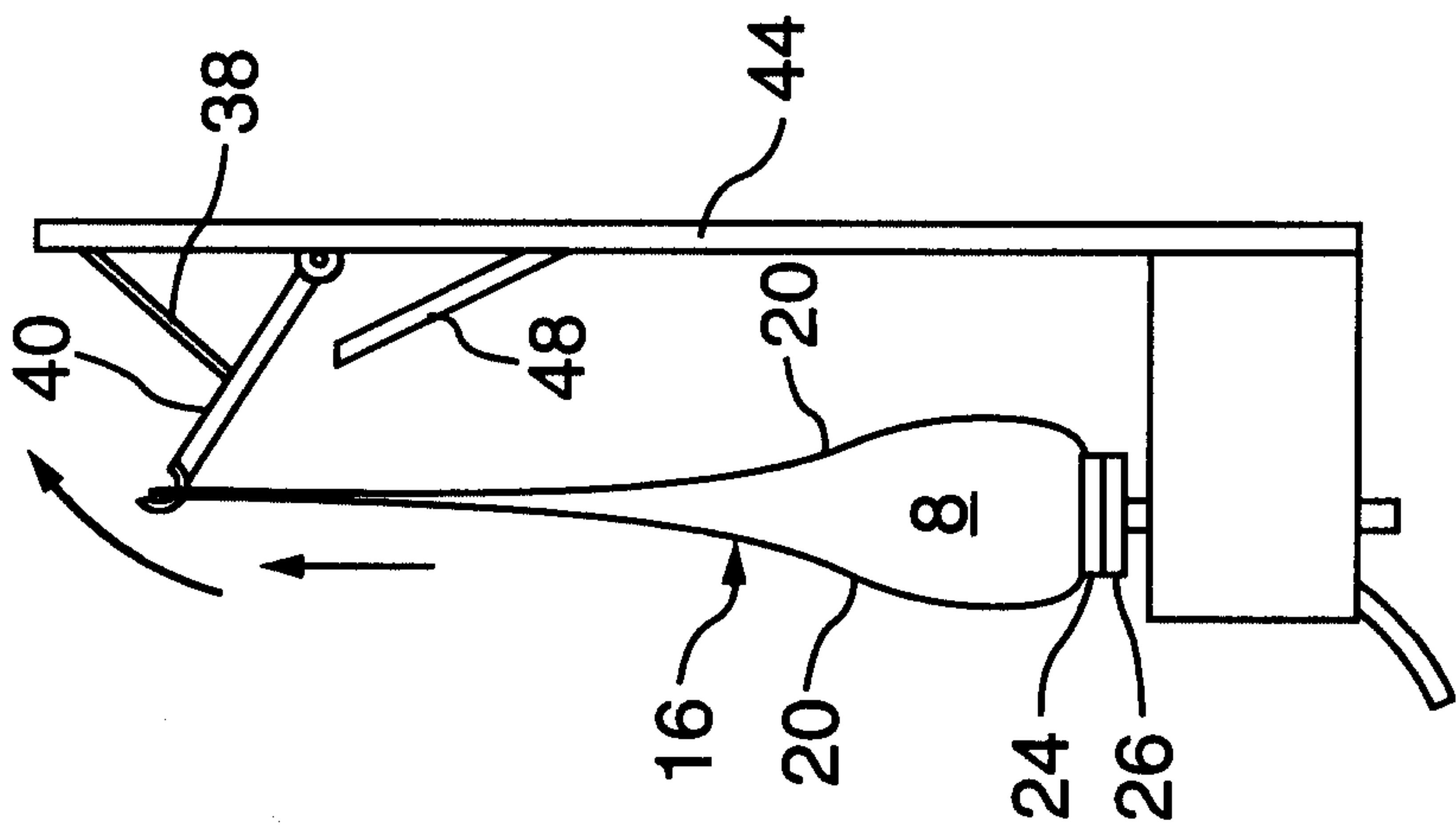


FIG.2

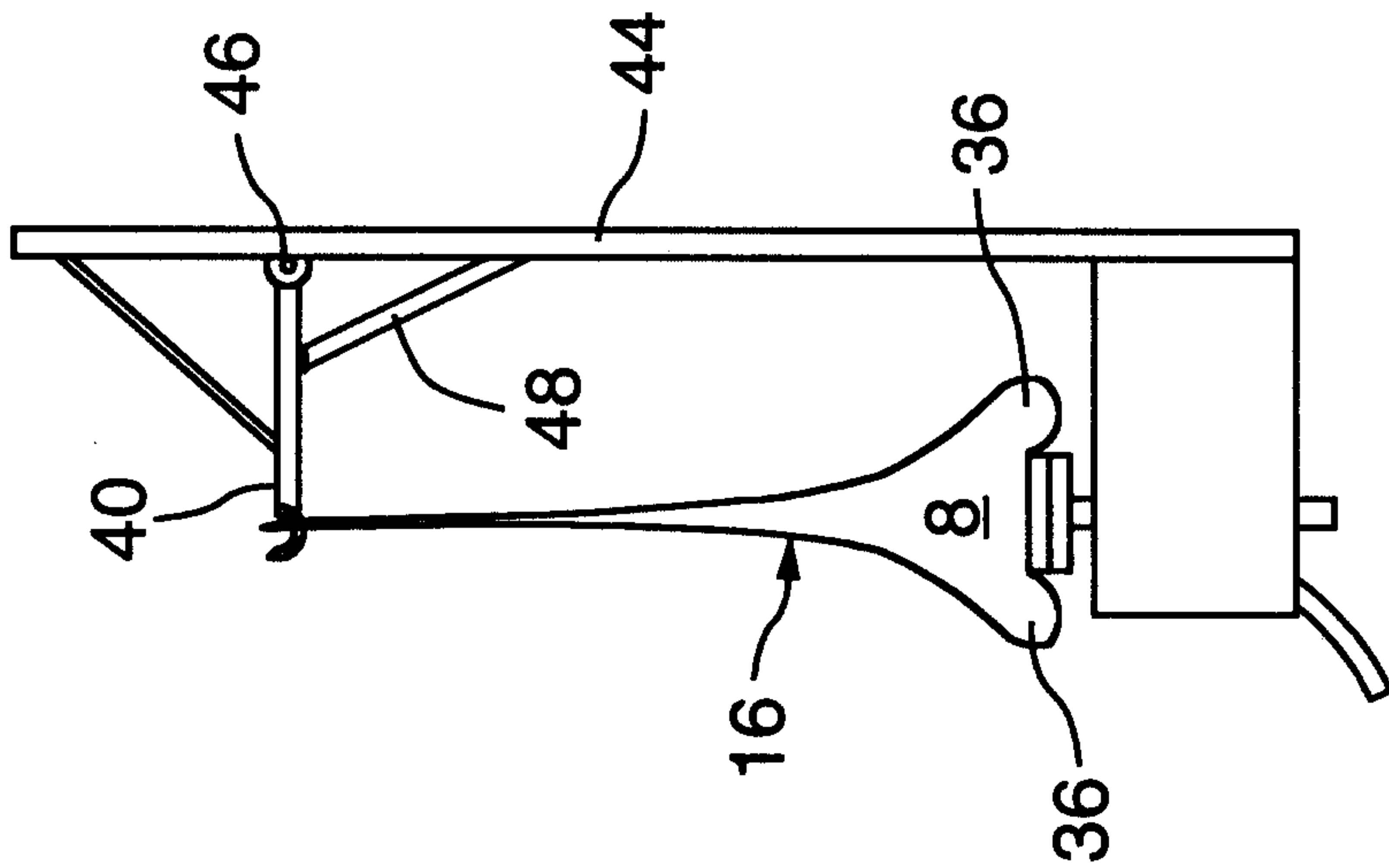


FIG.3

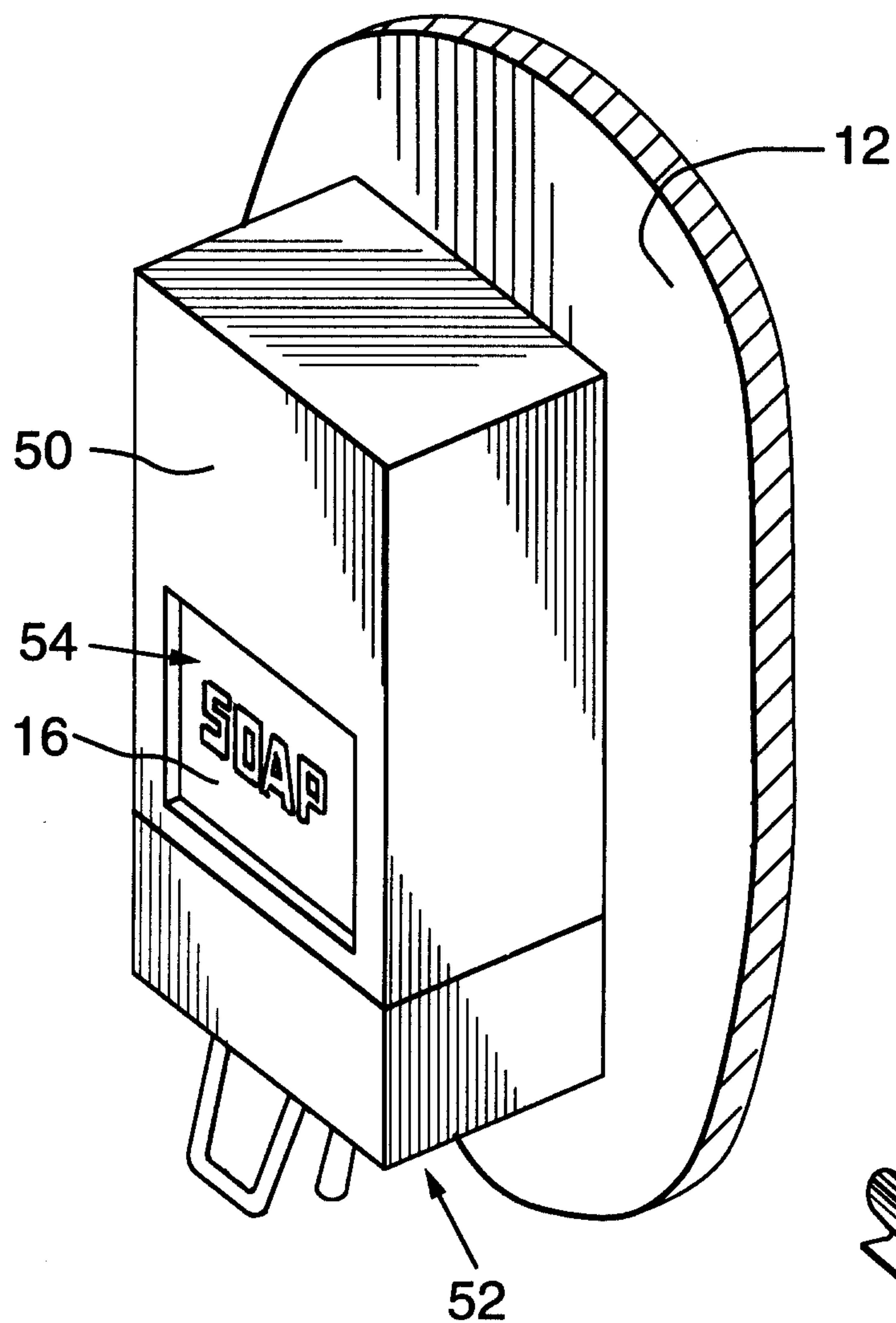


FIG. 4

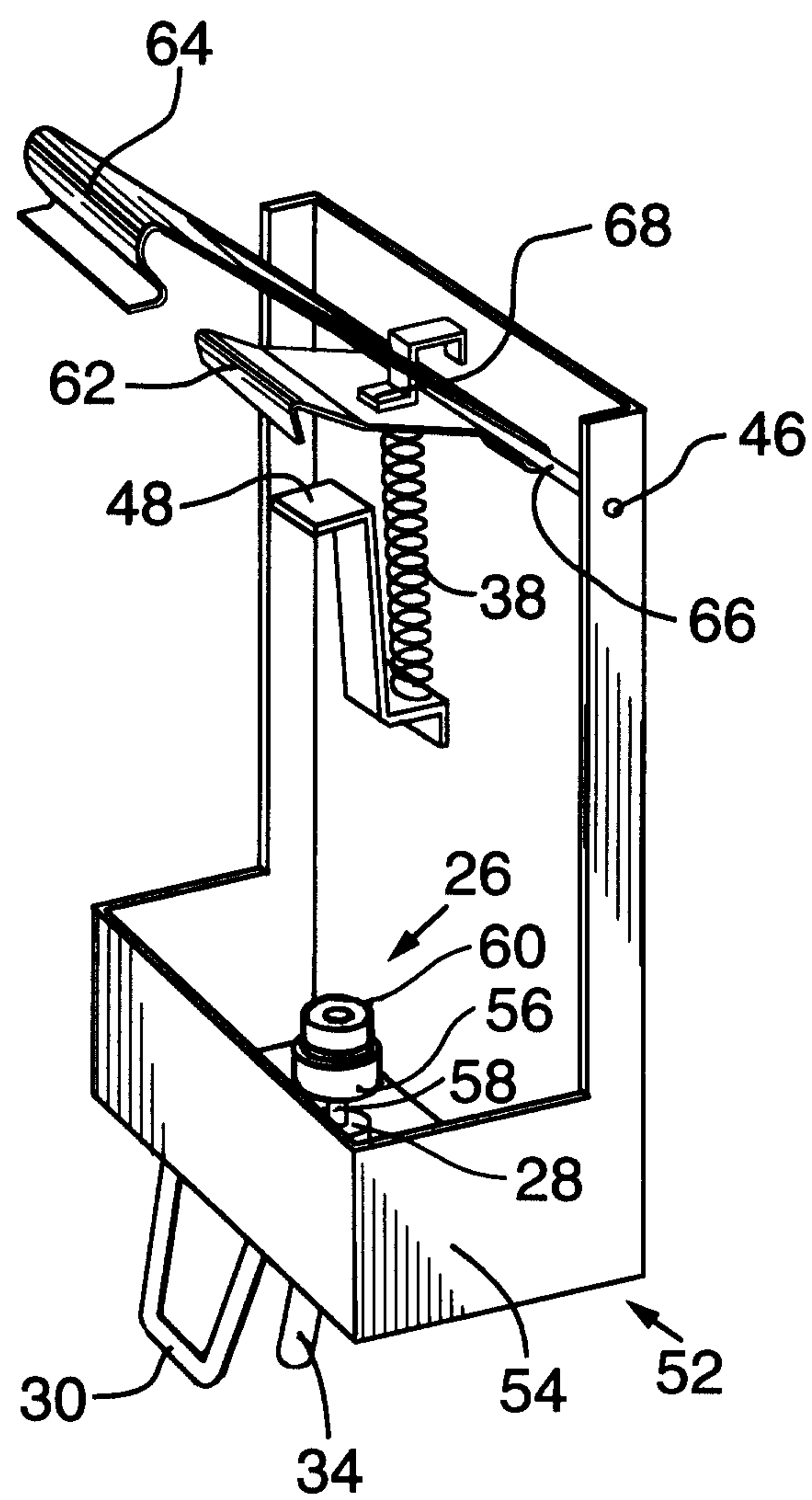


FIG. 5

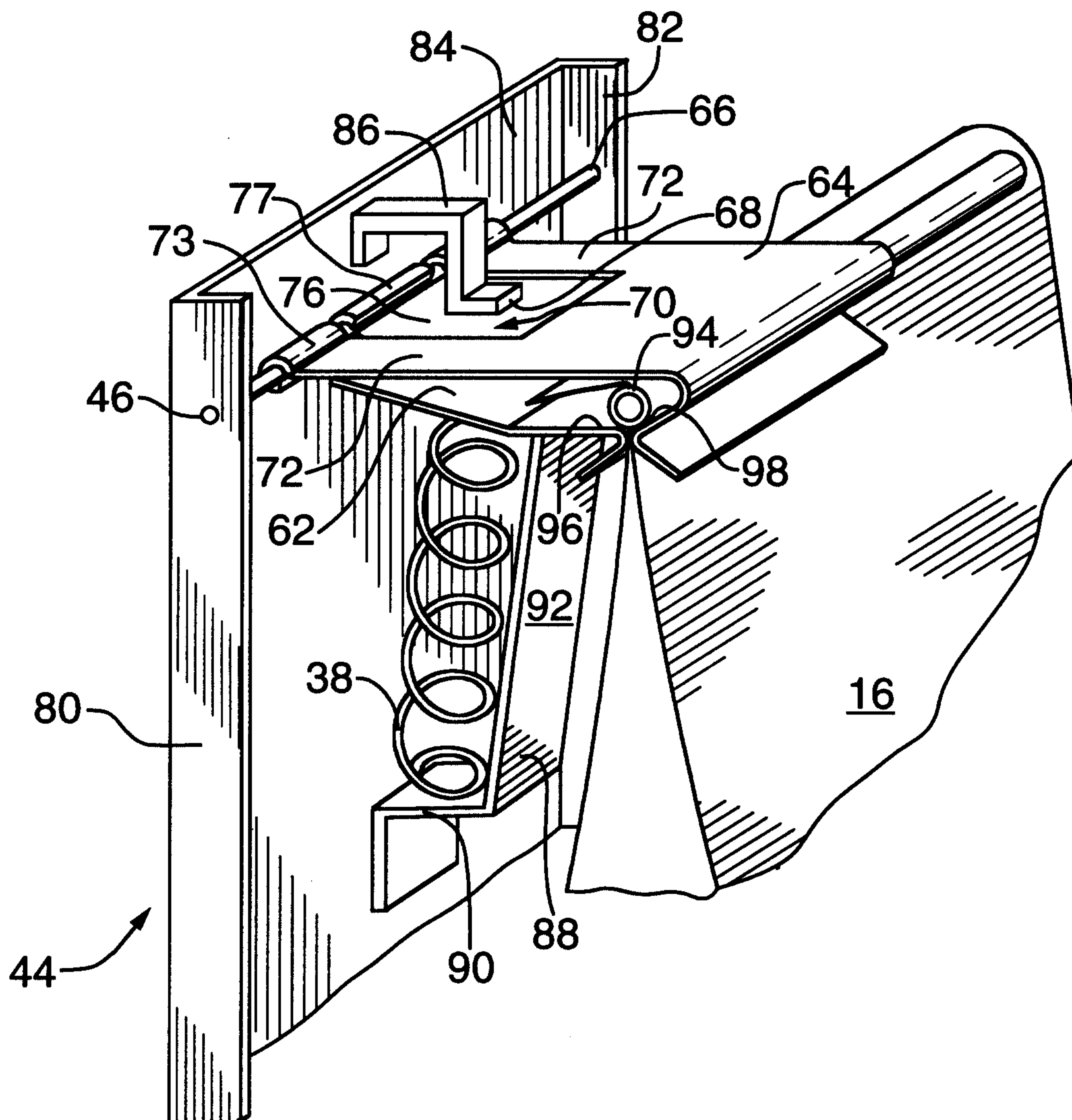


FIG.6

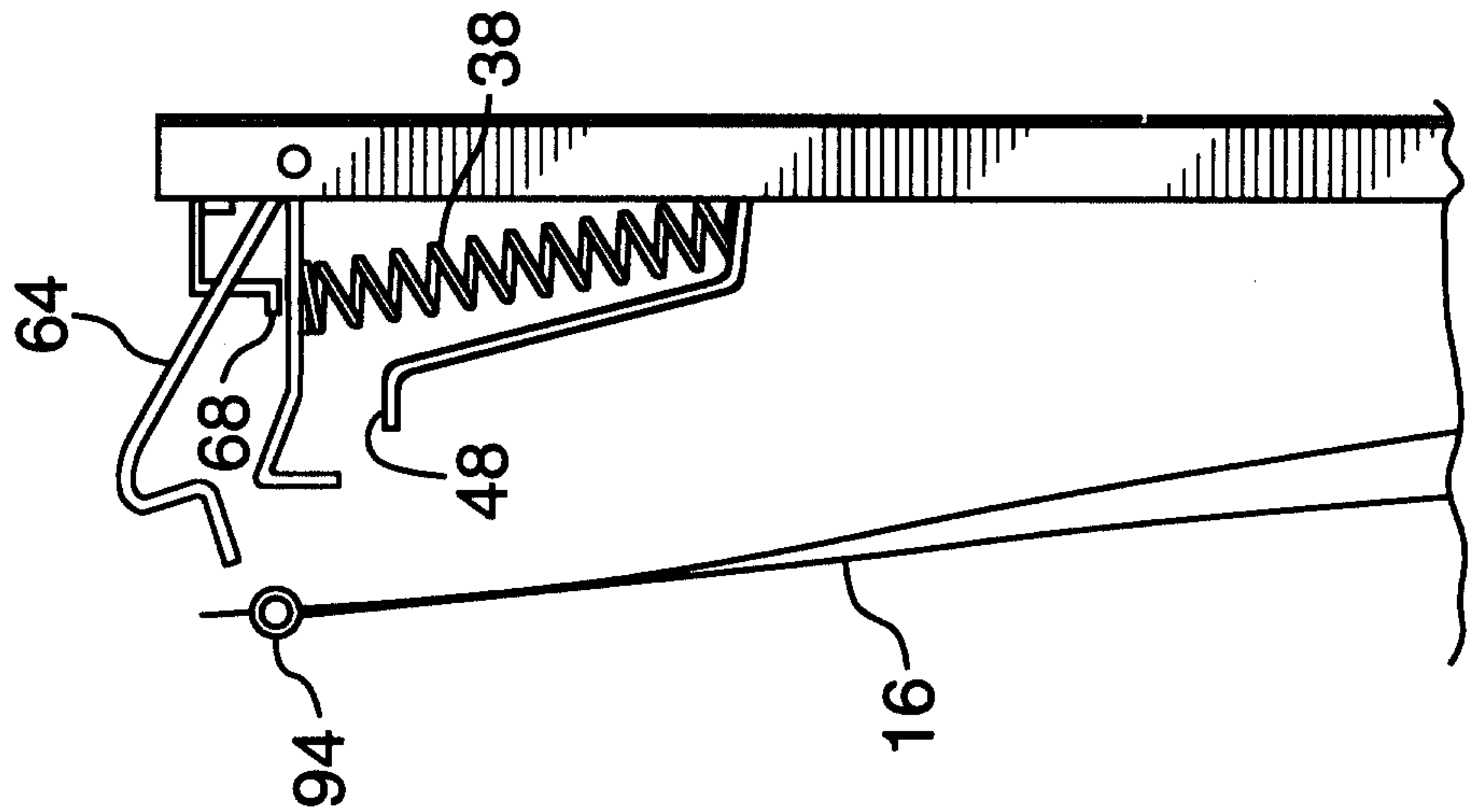


FIG.7

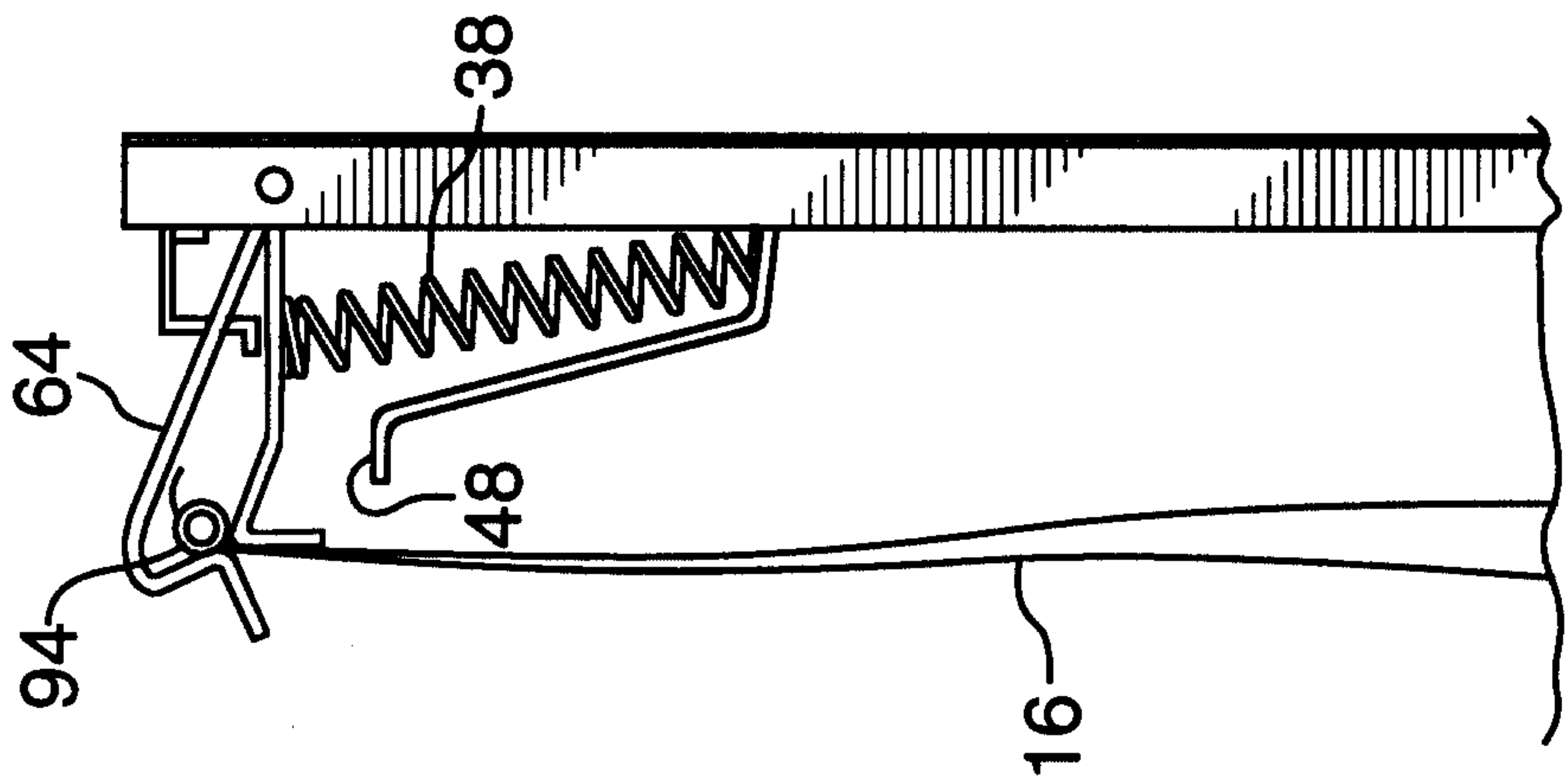


FIG.8

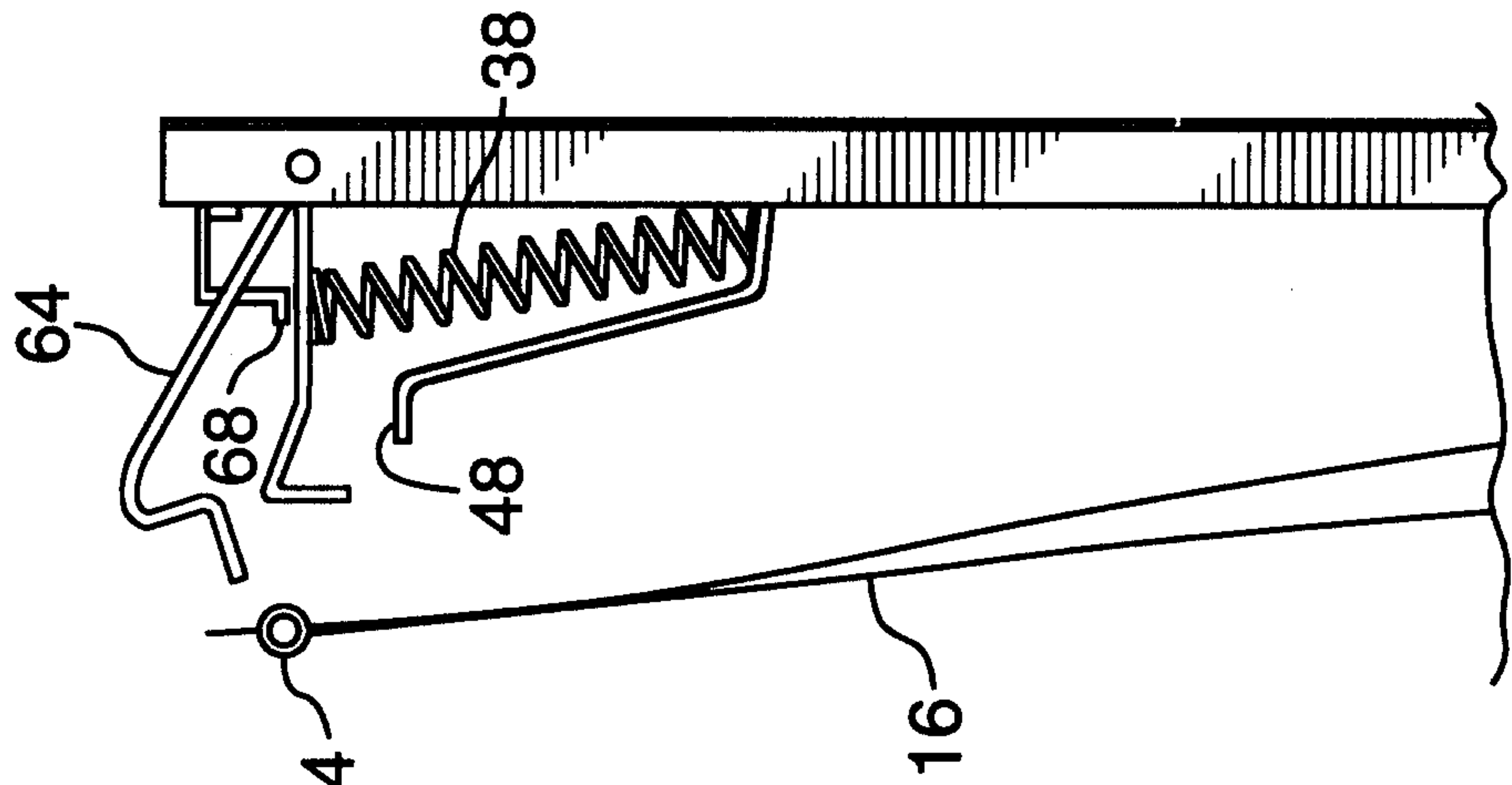


FIG.9

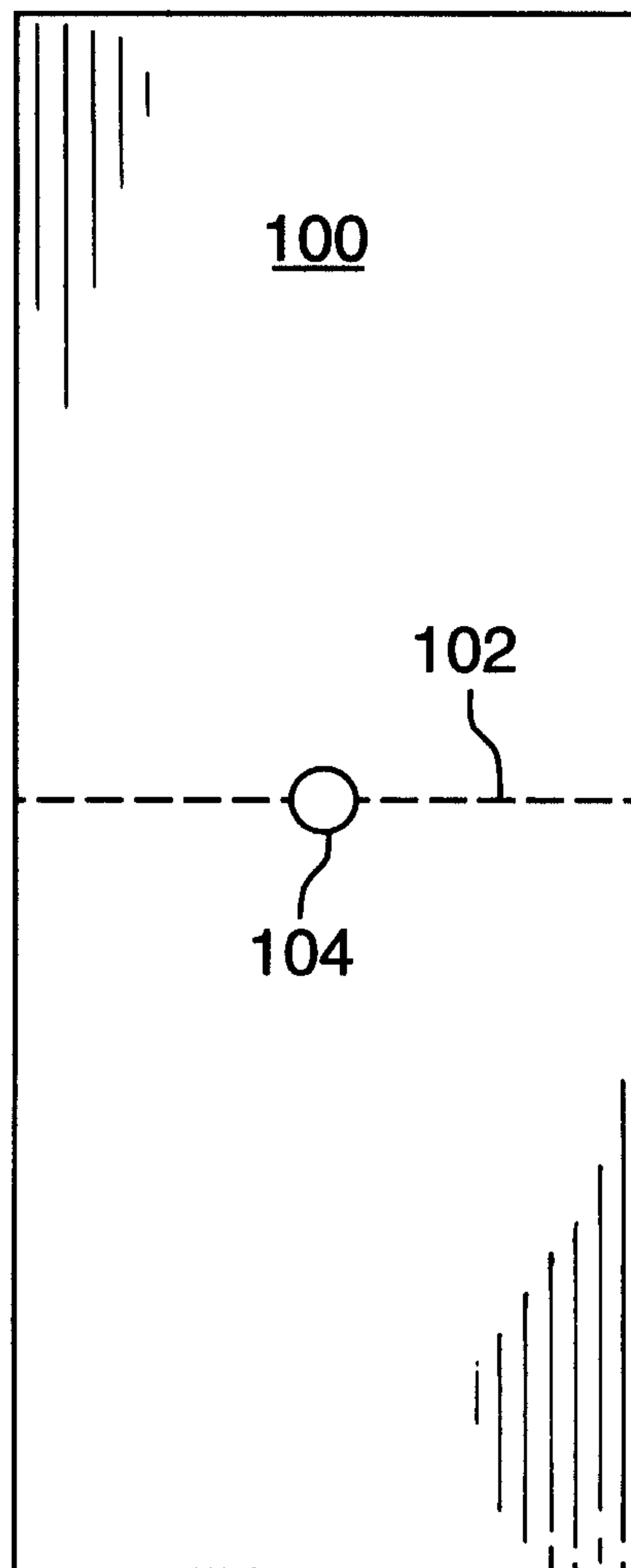


FIG.10

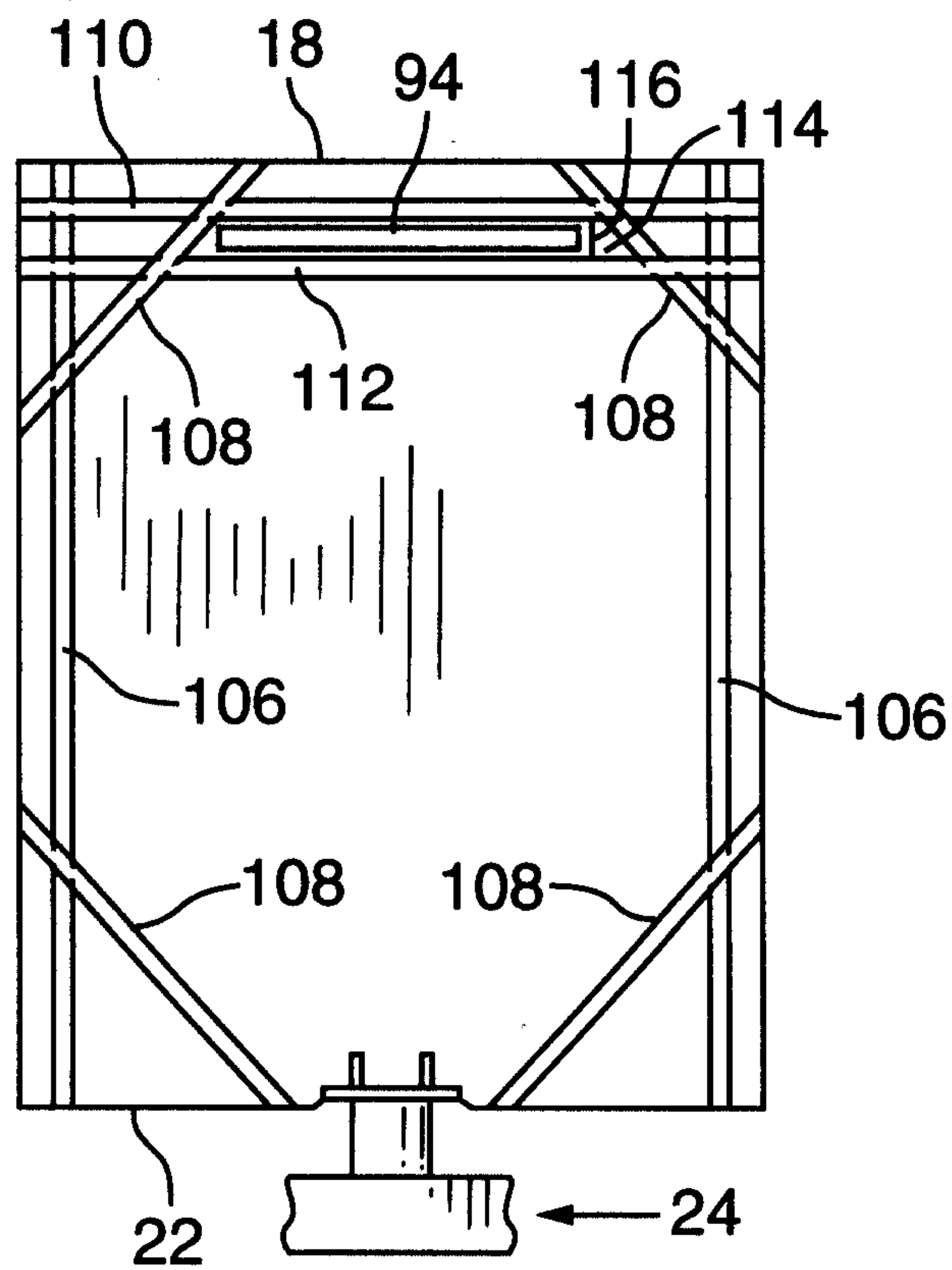


FIG.11

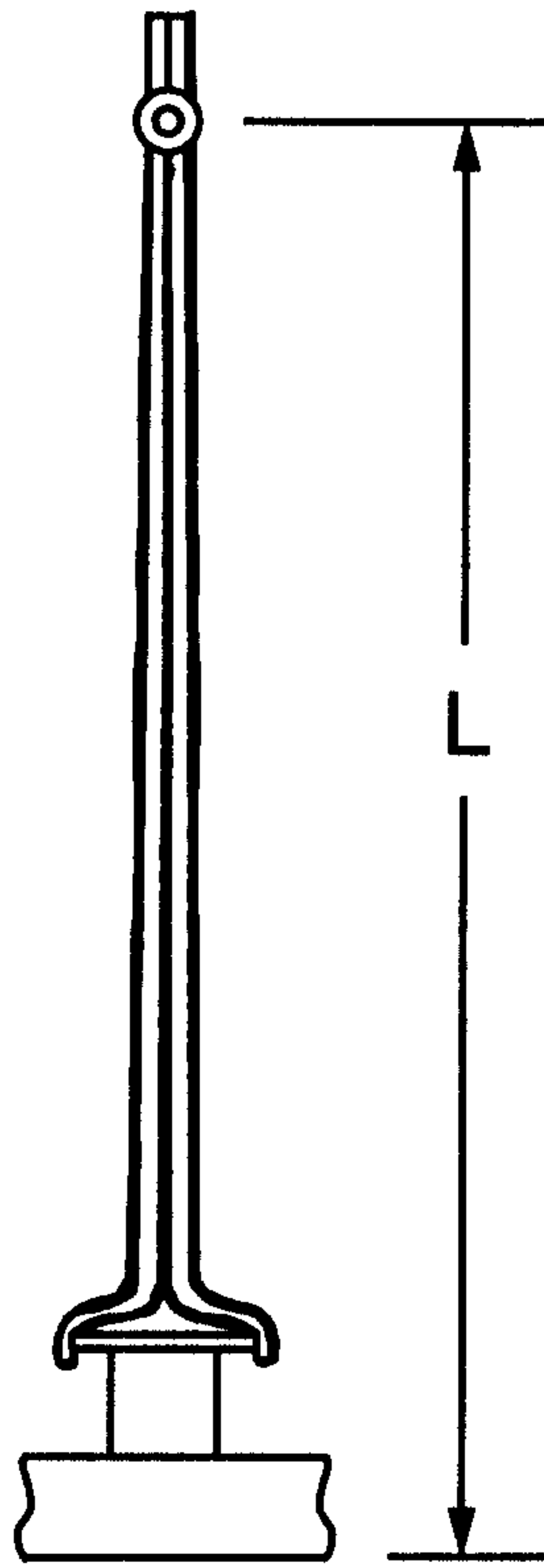


FIG.12

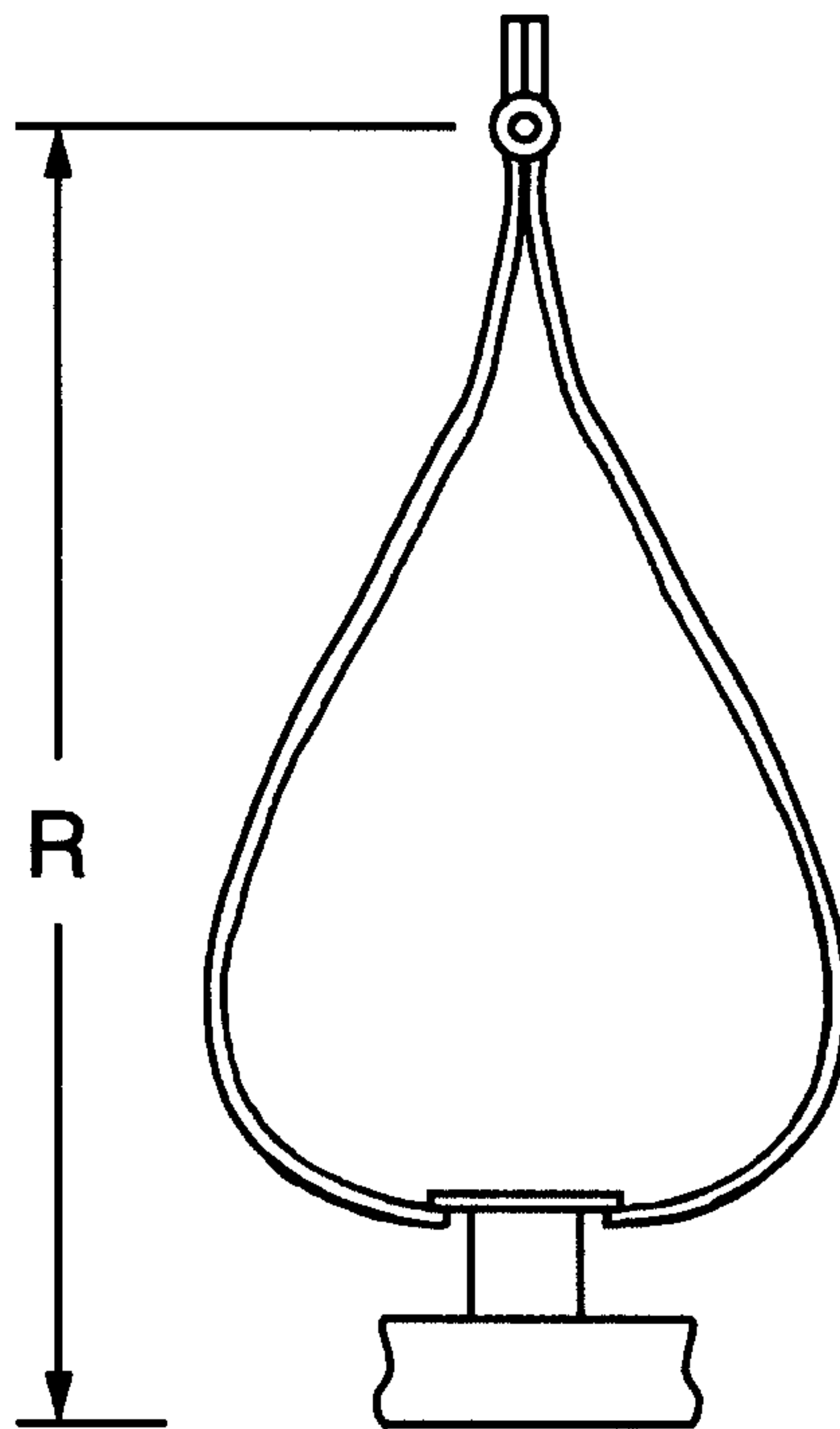


FIG.13

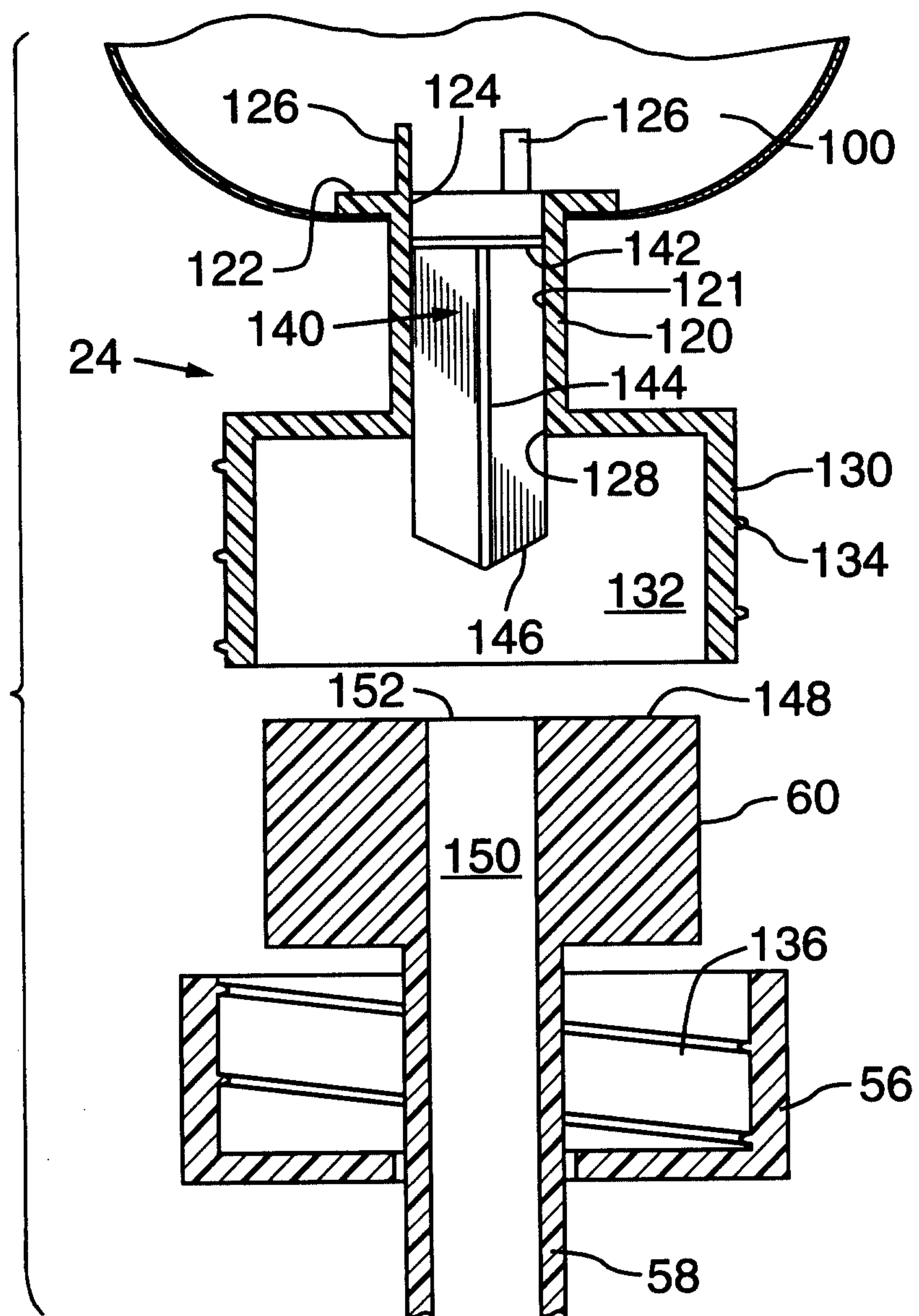


FIG.14

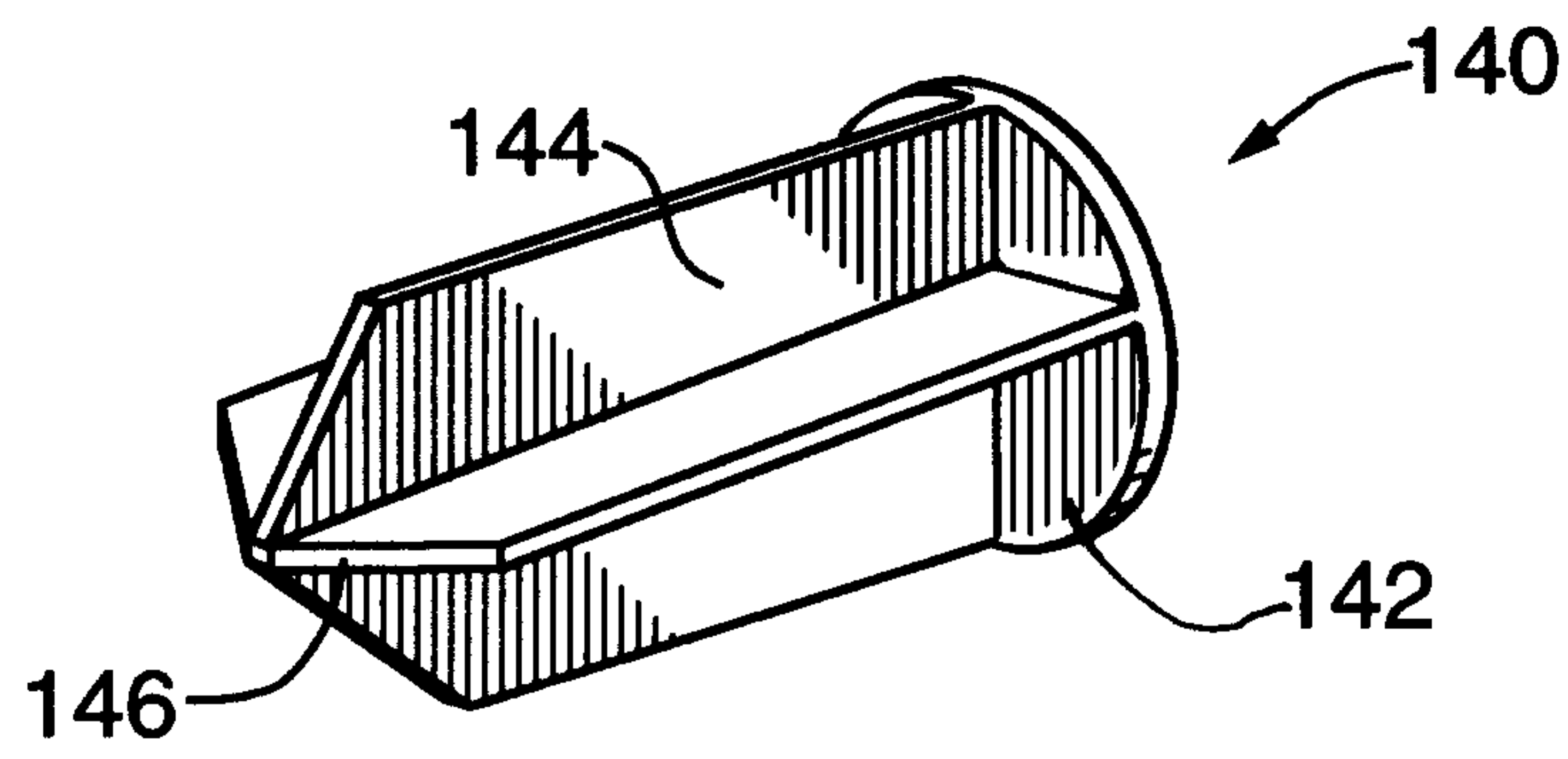


FIG. 15

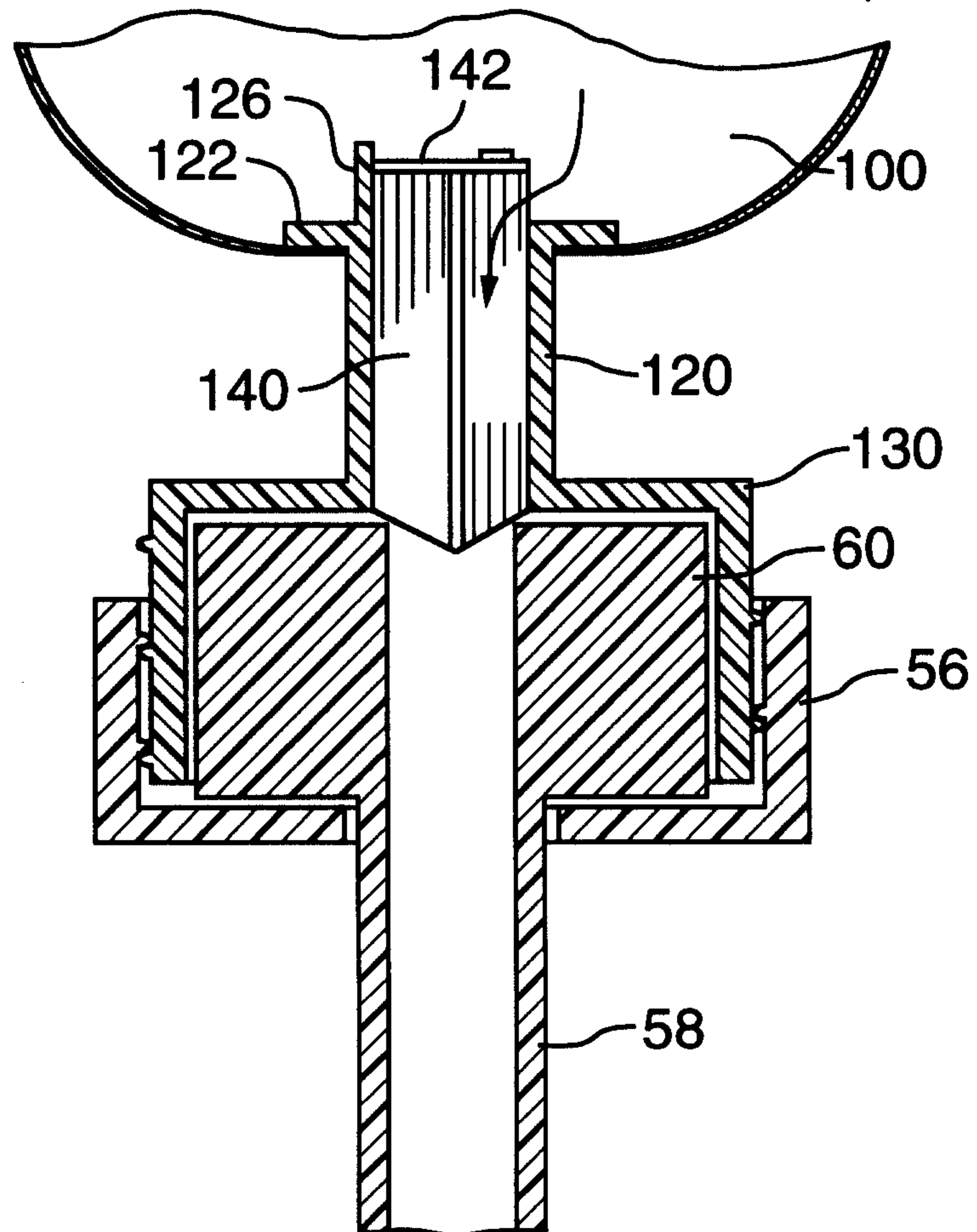


FIG. 16

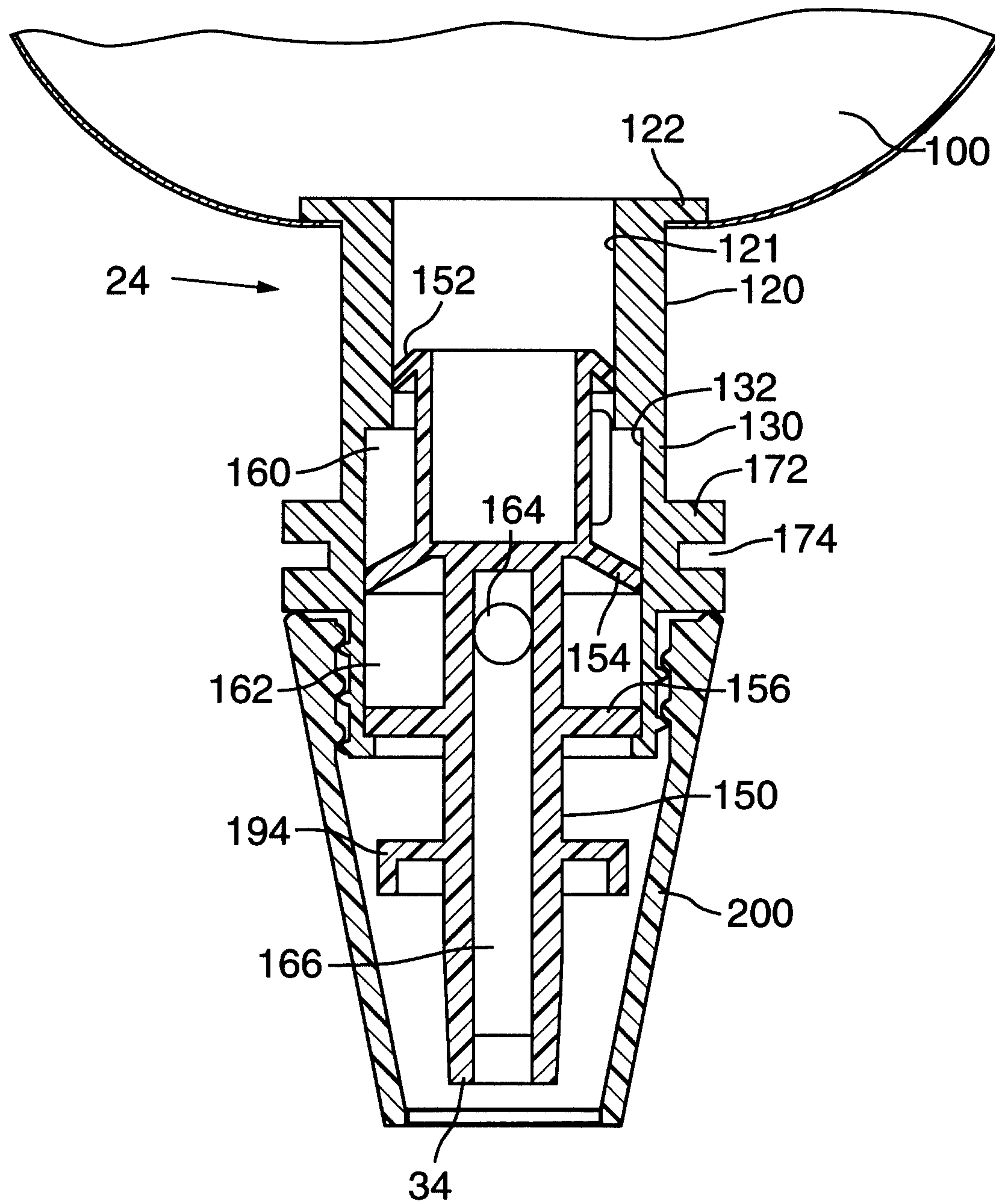


FIG.17

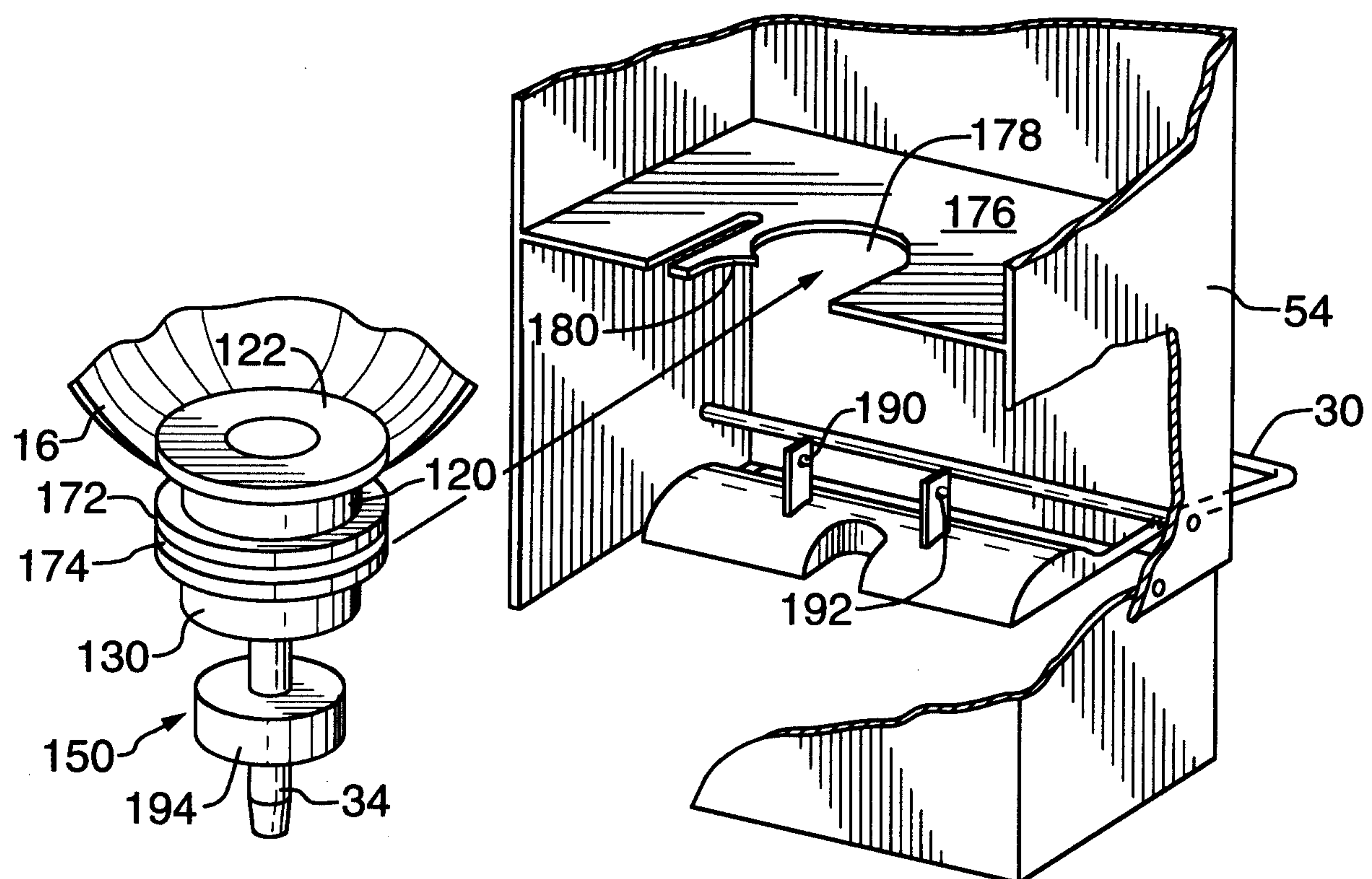


FIG.18