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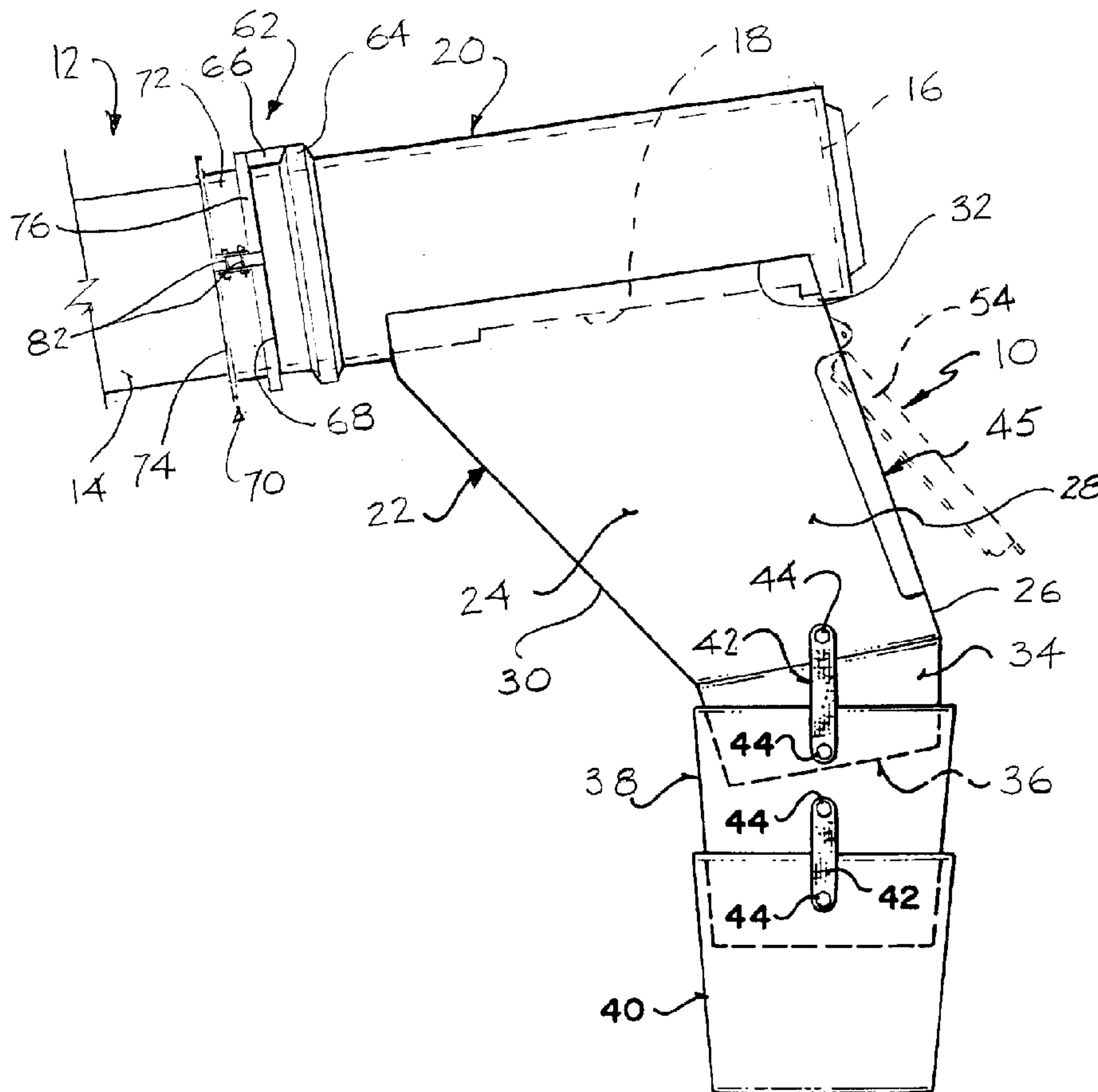
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(54) **GOULOTTE D'EVACUATION POUR TARIERE**

(54) **DISCHARGE SPOUT FOR AUGER**



(57) A spout is used for confining the grain flow from an auger. The auger may be a combine or grain cart unloading auger. The spout includes a chute that mounts on the auger tube. A pressure relief opening in the chute is normally closed by a gate which opens if the pressure in the chute builds up beyond a set level to prevent plugging of the auger and consequent auger damage. The chute is rotatably mounted on the auger tube so that it will swing out of the way on contact with another object, for example a truck box being loaded.



ABSTRACT OF THE INVENTION

A spout is used for confining the grain flow from an auger. The auger may be a combine or grain cart unloading auger. The spout includes a chute that mounts on the auger tube. A pressure relief opening in the chute is normally closed
5 by a gate which opens if the pressure in the chute builds up beyond a set level to prevent plugging of the auger and consequent auger damage. The chute is rotatably mounted on the auger tube so that it will swing out of the way on contact with another object, for example a truck box being loaded.

DISCHARGE SPOUT FOR AUGER

FIELD OF THE INVENTION

The present invention relates to auger discharge control and more particularly to a flow control spout for an auger, especially the unloading auger of a combine harvester.

BACKGROUND

Grain or seed is delivered from a combine harvester to the box of a grain truck by a delivery auger on the combine. The auger has a discharge at the end of the auger tube through which the grain is delivered. Because the grain is delivered at a high flow rate, there is a considerable spreading of the grain or seed as it leaves the auger discharge. This in turn leads to "splash", spillage and wind loss. This may be controlled by a spout according to international patent application PCT/CA 98/ 00760. In use this spout is attached to the end of the auger to provide containment of the grain flow. It includes a chute having a receiving opening larger than the auger tube discharge opening and an outlet opening smaller than the receiver opening. A convergent peripheral wall extends from the inlet opening towards the outlet opening. When mounted on the auger tube, the receiving opening confronts the auger tube discharge opening and the peripheral wall slopes outwardly and downwardly from the end of the auger tube and under the discharge opening.

The sloping peripheral wall intercepts scattered flow from the auger discharge, and condenses the flow in a direction with an outward component. This produces a concentrated flow without excessive back pressure in the auger.

If, through inadvertence of an operator or any other cause, the grain or seed is allowed to rise to the level of the spout discharge, the spout discharge may become closed, allowing the grain or seed to build up in the spout and causing plugging of the auger. Plugging will cause damage to the auger and its drive.

Another potential problem may arise if the pout is positioned too low with respect to a truck being loaded and the truck hits the spout, causing possible damage.

5 The present invention is concerned with improvements in the spout that address these concerns.

SUMMARY

According to one aspect of the present invention there is provided a spout for an auger having an auger tube with an auger tube discharge opening, the spout comprising:

10 a chute having:

a receiving opening;

an outlet opening; and

a peripheral wall extending from the receiving opening

towards the outlet opening, the peripheral wall including

15 a pressure relief portion, and

a pressure relief mount mounting the pressure relief

portion for movement from a normal closed position in

which the peripheral wall is closed between the

receiving and outlet openings to a pressure relieving

20 open position opening the peripheral wall in response to

an opening force greater than a predetermined release

force acting on the pressure relief portion from within

the chute; and

a chute mount for mounting the chute on the auger tube with the

25 receiving opening confronting the auger tube discharge opening.

If the pressure inside the chute builds up to an undesirable level for any

reason, the pressure relief portion of the peripheral wall will be opened to discharge grain and relieve the pressure.

The pressure relief portion of the wall is preferably a gate closing an opening in a front end of the peripheral wall adjacent the end of the auger tube. This
5 positioning of the gate limits the force that will normally be applied from the material being delivered, as much of that material will engage the back side of the chute.

With the gate positioned at the front, the pressure relief mount is preferably a hinge connecting a top edge of the gate on the remainder of the chute. Where necessary, for example where the gate is a light weight gate, a gate release is
10 used for retaining the gate in the closed position. The release is responsive to the opening force on the gate exceeding the predetermined release force to release the gate for movement to the open position. The release may be a magnetic catch or any other suitable release mechanism. Examples are mechanical trips and hook and loop fasteners of the type sold under the trademark "Velcro". In some embodiments, with
15 a sufficiently massive gate mounted appropriately, gravity will hold the gate closed.

According to another aspect of the present invention there is provided a spout for an auger having an auger tube with an auger tube discharge opening on a bottom side of the auger tube, the spout comprising:

a chute having:

20 a receiving opening;
an outlet opening; and
a convergent peripheral wall extending from the inlet opening towards the outlet opening; and

a chute mount for mounting the chute on the auger tube for rotation
25 about the auger tube from a normal position in which the receiving opening confronts the auger tube discharge opening and the peripheral

wall depends from the auger tube, and a released position in which the peripheral wall extends laterally from the auger tube.

With this arrangement, engagement of the spout with an external object, for example a truck box, will rotate the spout to a sideways orientation to clear the
5 obstruction with minimal, and preferably no, damage.

In preferred embodiments, the chute mount includes a substantially cylindrical hood for engagement over the outer end of the auger tube. A retainer holds the hood in place on the tube. The retainer may include a first component mounted on the auger tube and a second component mounted on the chute and
10 rotatable on the first component. The auger mounted first component is conveniently made as a split sleeve that may be clamped onto the auger tube. An outwardly projecting lug may be provided on the first component for engagement in an inwardly opening, annular channel in the second component. A channel leads from the
15 annular channel to an inner end of the chute mount so that the spout can be mounted by turning it to one side and sliding the channel over the lug until the lug bottoms out in the annular channel. It is also preferred that the first component of the retainer has a flange to engage the inner end of the chute mount to limit its travel along the auger tube.

BRIEF DESCRIPTION OF THE DRAWINGS

20 In the accompanying drawings, which illustrate exemplary embodiments of the present invention:

Figure 1 is a side elevation of a spout according to the present invention;

Figure 2 is a plan view of the spout of Figure 1;

25 Figure 3 is an outer end view of the spout;

Figure 4 is a cross section along line 4 - 4 of Figure 3;

Figure 5 is an exploded isometric of the pressure relief assembly;

Figure 6 is a side view of the retainer;

Figure 7 is an outer end view of the retainer; and

Figure 8 is a cross section along line 8 - 8 of Figure 2.

5 **DETAILED DESCRIPTION**

Referring to the accompanying drawings and especially to Figures 1 through 5, there is illustrated a spout 10 for use on a combine unloading auger 12. The auger has an auger tube 14 with an outer end 16 and a discharge opening 18 on the bottom side of the tube, adjacent the outer end.

10 The spout 10 includes a hood 20 that extends over the end of the auger tube and along the auger tube, beyond the discharge opening 18. A chute 22 depends from the hood, below the discharge opening. A peripheral wall 24 of the chute includes an outer end portion 26, two side portions 28 and an inner end portion 30. The peripheral wall slopes outwardly from the end of the auger tube, with the
15 outer end portion 26 extending beyond the end of the auger tube and the inner end portion 30 extending under the discharge opening of the auger tube.

At the top, the chute has a receiving opening 32 circumscribed by the peripheral wall 24. In the normal position illustrated in solid line in Figures 3 the receiving opening confronts the discharge opening 18 of the auger tube. At the
20 bottom end of the peripheral wall is a frusto-conical discharge collar 34 leading to a chute outlet opening 36 that is off-set outwardly with respect to the receiving opening. Both the inner end portion 30 and outer end portion 26 of the peripheral wall 24 slope outwardly with respect to the auger tube, with the inner end portion 30 converging towards the outer end portion 26 so that the chute tapers from the receiving opening
25 32 to the discharge collar 34. The collar is inclined with respect to the flow leaving the upper, convergent section of the chute, so that the grain flow will be re-directed

down into a grain box.

At the outlet end of the chute are two frusto-conical extension tubes 38 and 40. The wide upper end of the upper extension tube 38 is positioned over the frusto-conical discharge collar 34 of the peripheral wall 24 while the lower end extension tube 40 similarly fits over the lower end of the upper extension 38. The extensions are connected to one another and to the chute 22 by straps 42 from the chute to the upper extension tube and from the upper extension tube to the lower extension on opposite sides of the spout. The straps are held in place using bolts 44. This extension is thus flexible and hangs vertically from the end of the chute to ensure that the condensed flow of grain leaving the chute is protected against wind scatter as it falls vertically into a truck box.

A pressure relief assembly 45 is provided in the outer end portion 26 of the chute peripheral wall. This includes pressure relief opening 46 that is generally rectangular with rounded corners. Around the opening, the wall has a recess 48. At the top, this extends into a rectangular hinge recess 50 between two hinge lugs 51. At the bottom end of the opening is a small catch recess 52. A gate panel 54 extends across the pressure relief opening and seats in the recess 48 to close the opening. At the top, the gate has an extension that seats in the hinge recess 50. This is shaped into a hinge rib 55 aligned with the lugs 51. A hinge pin 56 extends through the lugs and the rib to form with them a hinge 58 with a lateral axis about which the gate may pivot to an open position shown in broken line in Figure 1. The catch recess 52 accommodates a magnetic catch 60 which holds the gate closed. The force needed to keep the gate closed for normal operation of the spout is small, amounting to only a few pounds. When a body of grain or seed builds up in the chute for any reason, the pressure exerted by that material is sufficient to open the gate and allow the excess material to flow out without damaging the spout, the auger or the

auger drive.

The spout is mounted on the auger tube using a chute mount 62 at the inner end of the spout. The mount includes an annular, inwardly opening channel 64 spaced from the inner end of the hood 20. A second access channel 66 extends from
5 the channel 64 to the inner end 68 of the hood. The channels 64 and 66 cooperate with a retainer 70 mounted on the auger tube. The retainer includes a split sleeve 72 that wraps around the auger tube. At the inner end of the sleeve is a stiffening flange 74, while partway along the sleeve is a support flange 76 that engages and supports the inner end 68 of the hood 20. Near the outer end of the sleeve, spaced from the
10 support flange 76, is an outwardly projecting guide lug 78. This lug is dimensioned to slide in the channels 64 and 66. It is spaced from the support flange 76 by the same amount as the spacing between the channel 64 and the end 68 of the hood. The retainer 70 is clamped to the auger tube using two clamp flanges 80 on opposite sides of the opening in the split sleeve 72 and bolts 82.

15 The spout is installed on an auger tube with the retainer oriented so that the lug 78 projects to one side of the auger. The channel 66 is along the top of the hood, so the hood and chute are turned sideways to align the channel with the lug. The hood is slid over the auger tube until the inner end abuts the flange 76 and the lug is in the annular channel 64. When the chute is released, it will rotate to the
20 upright, normal position under gravity. Any engagement of the chute with a passing object, for example a truck box, will cause the chute to rotate on the auger tube to clear the obstruction. Once cleared, the chute will rotate to the normal position under gravity.

25 While one particular embodiment of the present invention has been described in the foregoing, it is to be understood that other embodiments are possible within the scope of the invention and are intended to be included herein. Thus, for

example, the pressure relief may be mounted on any part of the chute, not only on the outer end portion of the wall. Where the gate has sufficient mass, the catch may be omitted. Other modifications within the scope of the invention will occur to those skilled in the art. The invention is therefore be considered limited solely by the scope
5 of the appended claims.

CLAIMS

1. A spout for an auger having an auger tube with an auger tube discharge opening, the spout comprising:

a chute having:

5

a receiving opening;

an outlet opening; and

a peripheral wall extending from the receiving opening

towards the outlet opening, the peripheral wall including

a pressure relief portion, and

10

a pressure relief mount mounting the pressure relief

portion for movement from a normal closed position in

which the peripheral wall is closed between the receiving

and outlet openings to a pressure relieving open position

opening the peripheral wall in response to an opening

15

force greater than a predetermined release force acting on

the pressure relief portion from within the chute; and

a chute mount for mounting the chute on the auger tube with the receiving opening confronting the auger tube discharge opening.

2. A spout according to Claim 1 wherein the pressure relief mount

20

comprises a hinge connecting a top edge of the pressure relief portion on the remainder of the chute.

3. A spout according to Claim 1 or 2 including a catch normally retaining the pressure relief portion in the closed position and responsive to said opening force exceeding said predetermined release force to release the pressure relief portion for

25

movement to the open position.

4. A spout according to Claim 3 wherein the catch comprises a magnetic catch.
5. A spout according to any one of Claims 1 to 4 wherein the peripheral wall includes a pressure relief opening and the pressure relief portion of the
5 peripheral wall is a pressure relief gate.
6. A spout according to Claim 5 wherein the pressure relief opening is in a front end of the peripheral wall and the chute mount is for mounting the chute on the auger tube with the front end of the peripheral wall adjacent to and extending across a discharge end of the auger tube.
- 10 7. A spout according to any one of Claims 1 to 6 wherein the chute mount comprises a rotary coupling mounting the spout on the auger tube for free rotation about the auger tube.
8. A spout for an auger having an auger tube with an auger tube discharge opening on a bottom side of the auger tube, the spout comprising:
15 a chute having:
a receiving opening;
an outlet opening; and
a convergent peripheral wall extending from the inlet opening towards the outlet opening; and
20 a chute mount for mounting the chute on the auger tube for rotation about the auger tube from a normal position in which the receiving opening confronts the auger tube discharge opening and the peripheral wall depends from the auger tube, and a released position in which the peripheral wall extends laterally from the auger tube.
- 25 9. A spout according to Claim 8 wherein the auger tube discharge opening is adjacent an outer end of the auger tube and the chute mount includes a

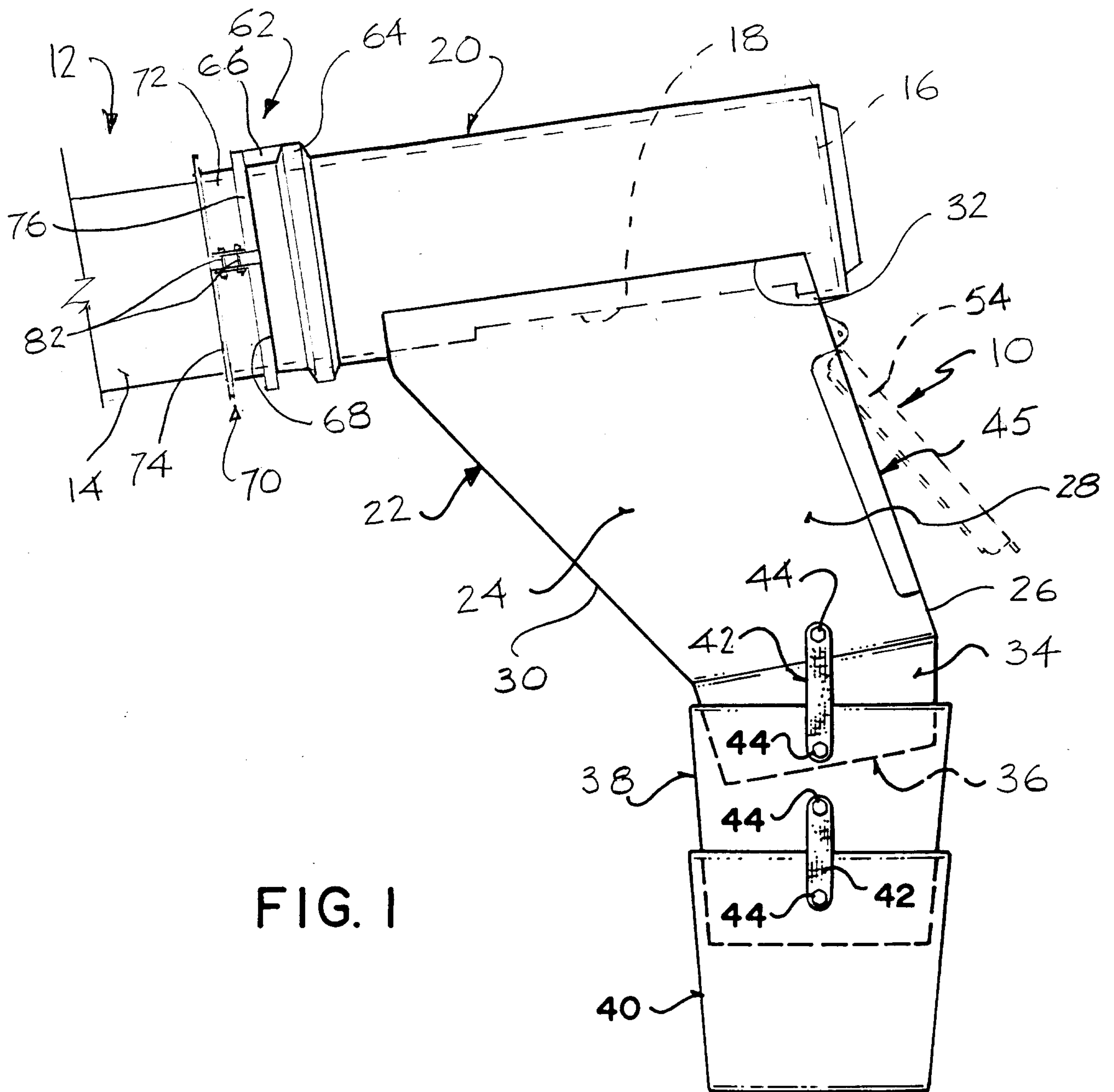
substantially cylindrical hood mounted on the chute at the receiving opening for engagement over the outer end of the auger tube.

10. A spout according to Claim 8 or 9 wherein the chute mount includes a
retainer first component mountable on the auger tube and a retainer second
5 component mounted on the chute, the second component being rotatably engagable
on the first component for rotation of the chute between the normal and released
positions.

11. A spout according to Claim 10 wherein the retainer first component
comprises a split sleeve and a connector for clamping the sleeve onto the auger
10 tube.

12. A spout according to Claim 10 or 11 wherein the retainer first
component includes an outwardly projecting lug and the retainer second component
includes an inwardly opening, annular channel engagable with the lug.

13. A spout according to Claim 12 wherein the retainer second component
15 includes an inwardly open channel leading from the annular channel to an inner end
of the chute mount for the passage of the lug therethrough.



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By: **ADE & COMPANY**

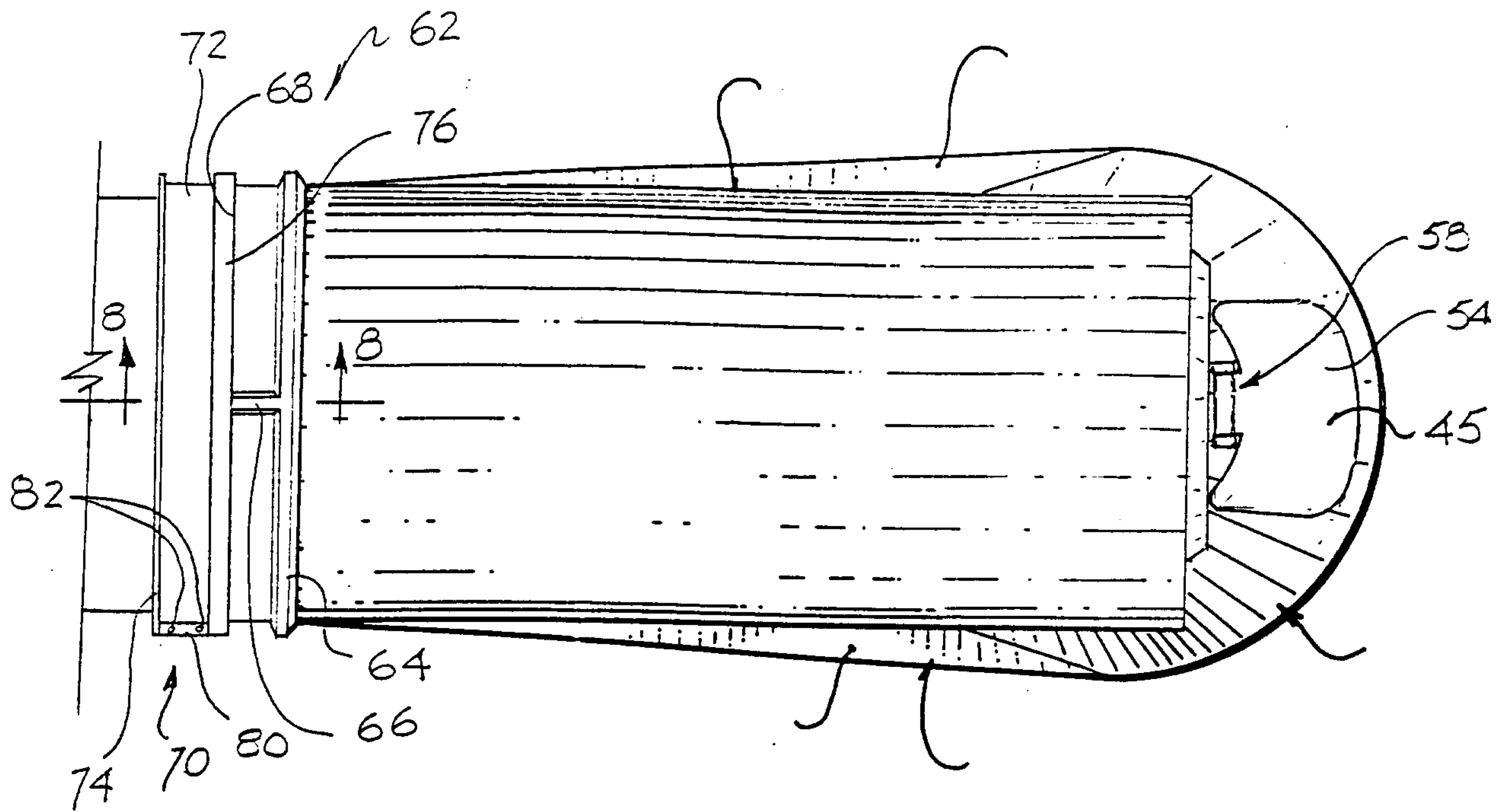


FIG. 2

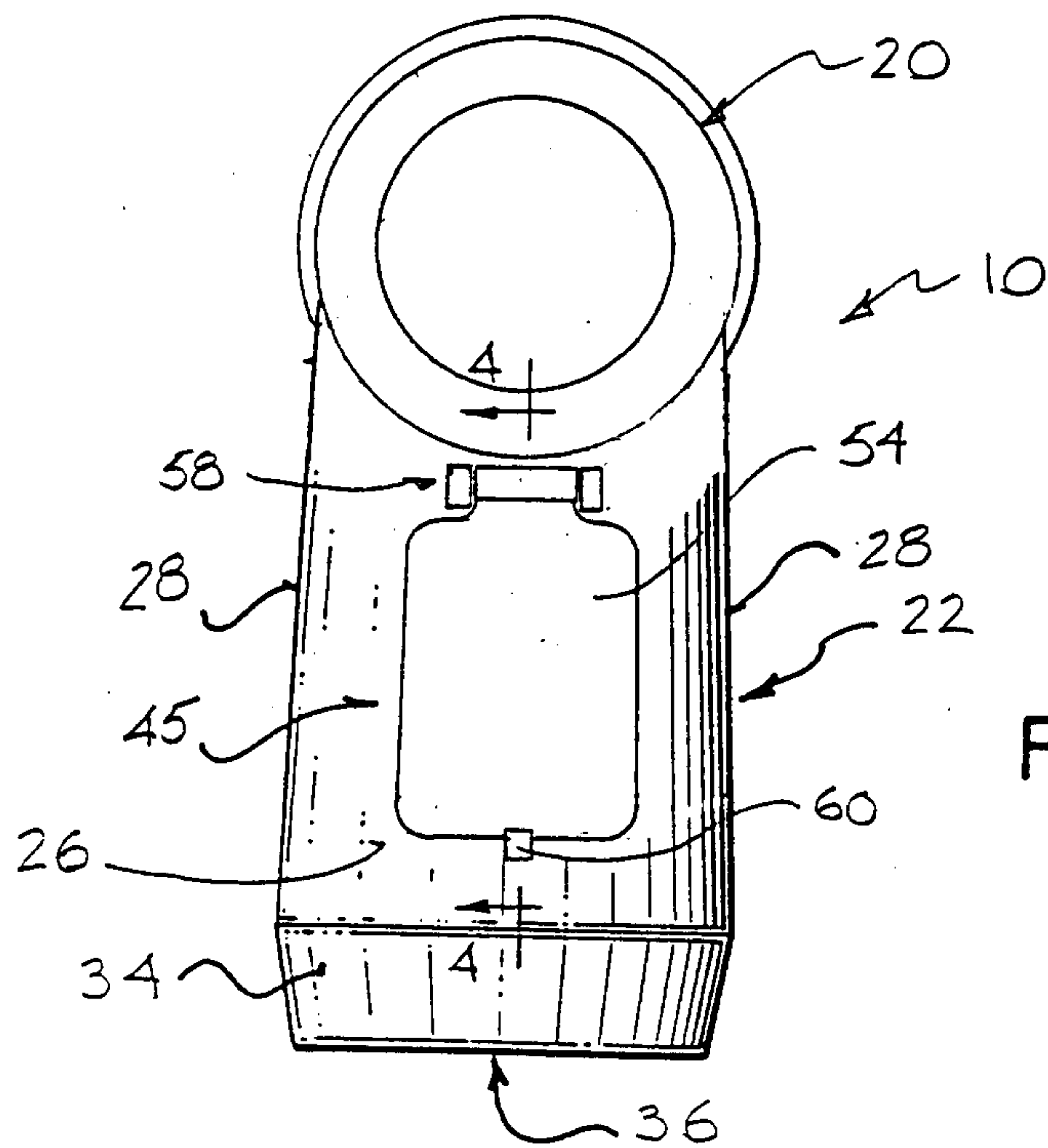
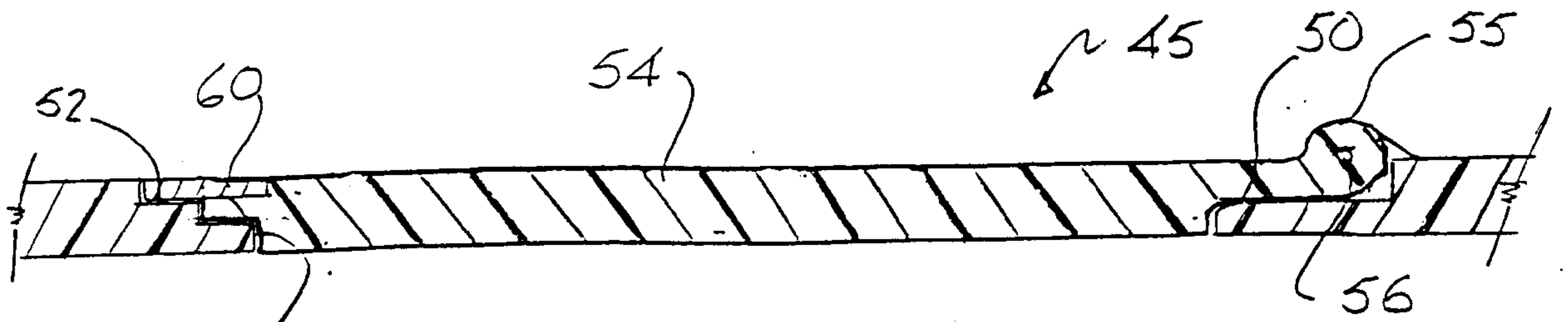


FIG. 3

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46 FIG. 4

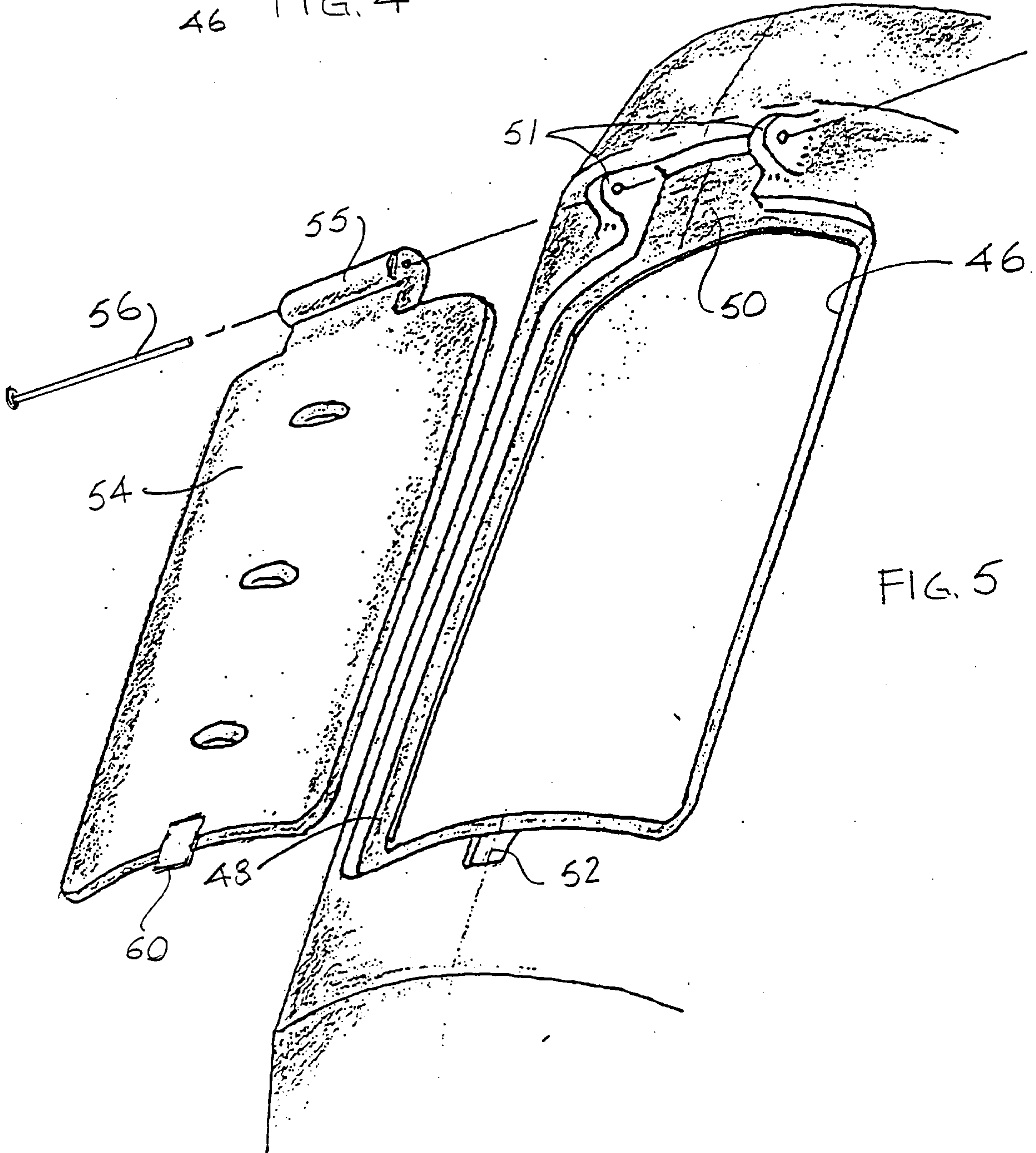


FIG. 5

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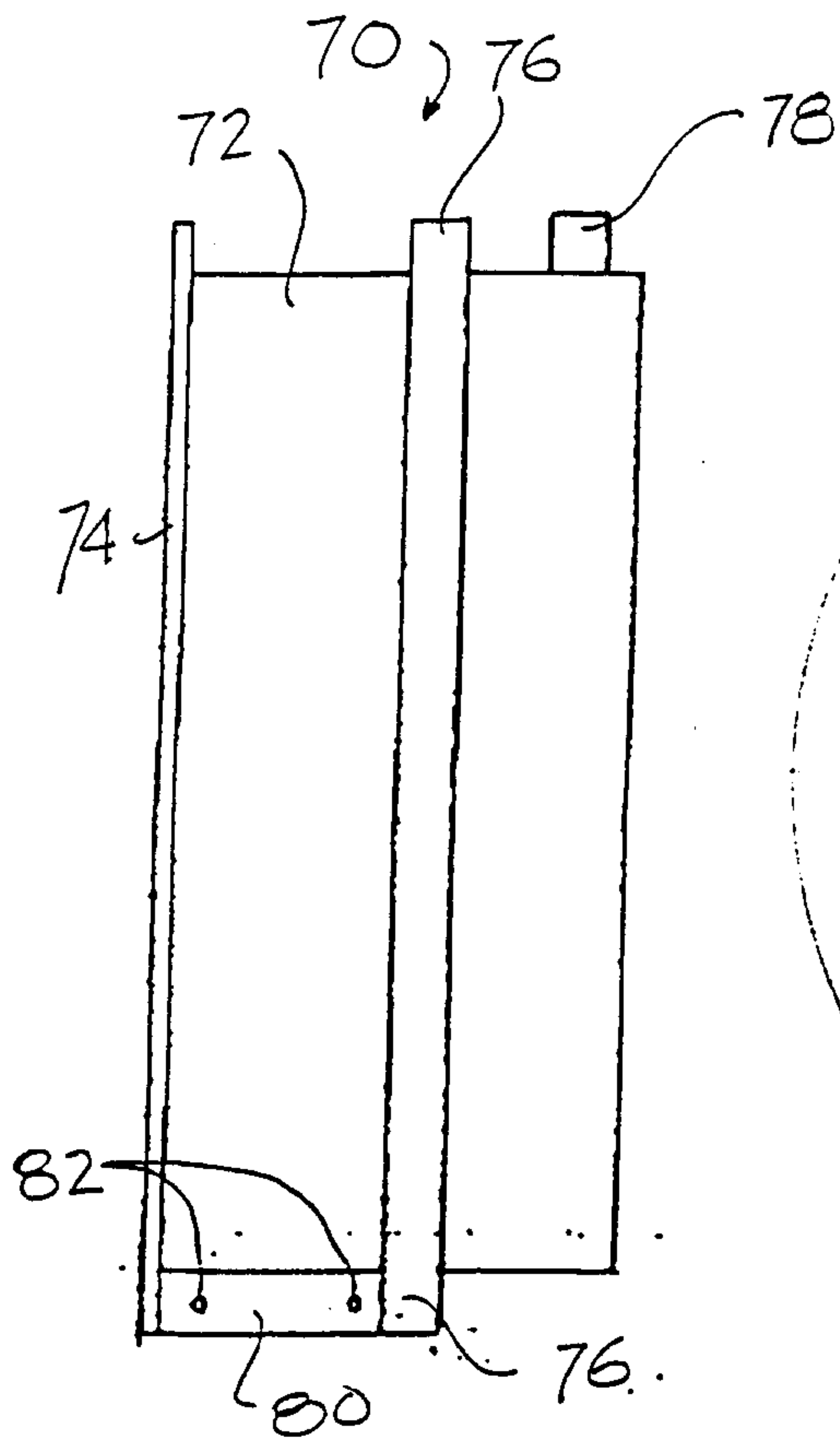


FIG. 6

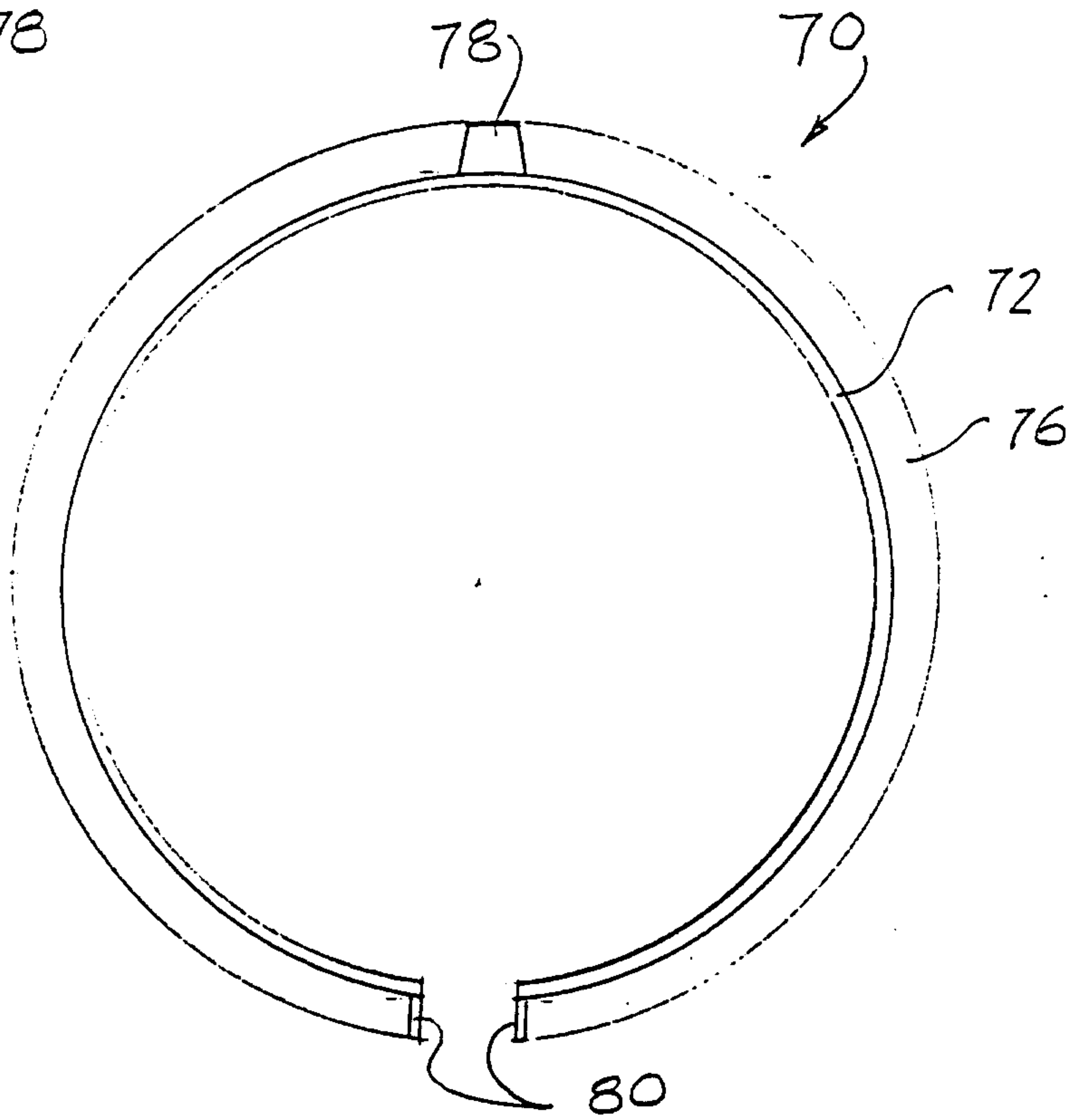


FIG. 7

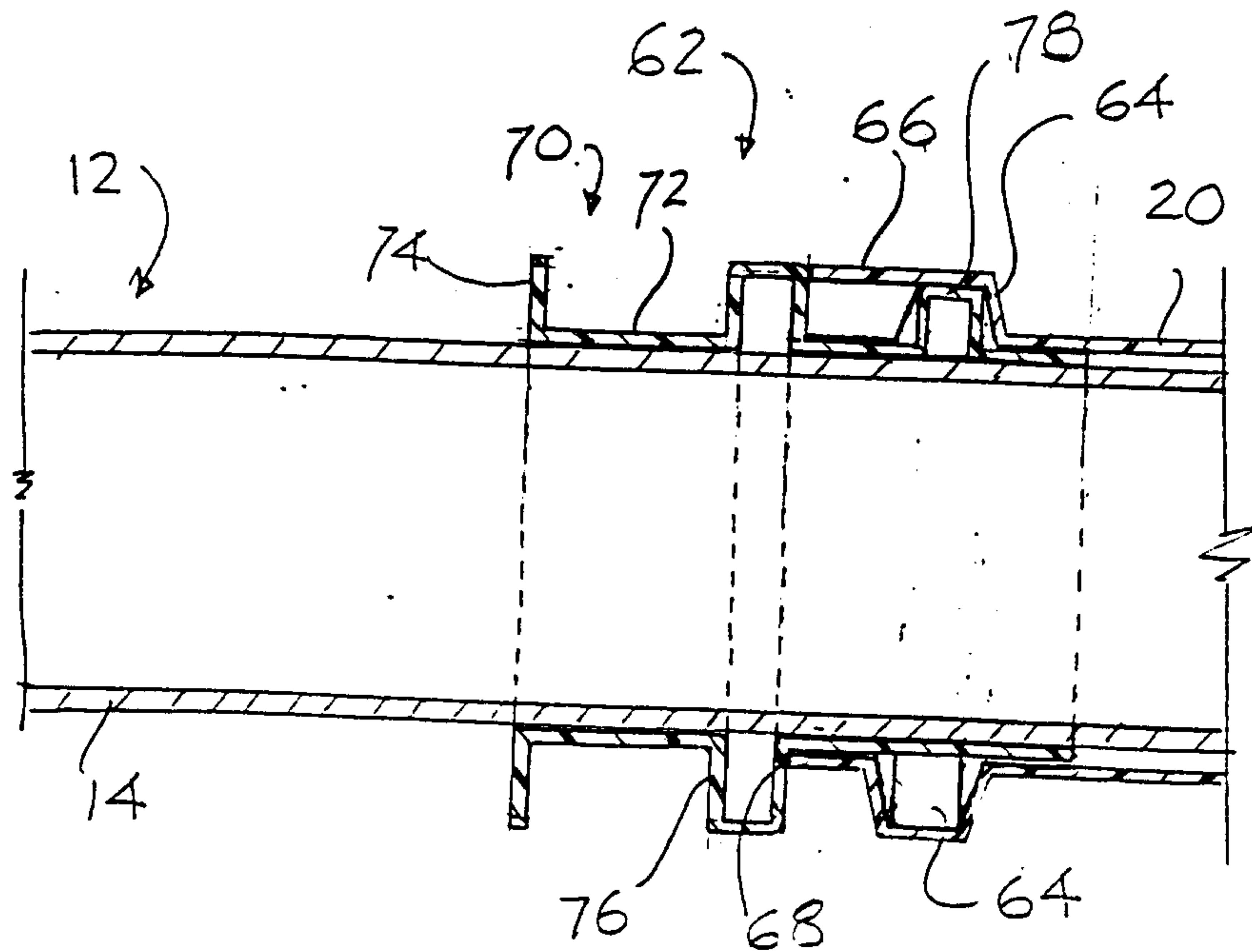


FIG. 8

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