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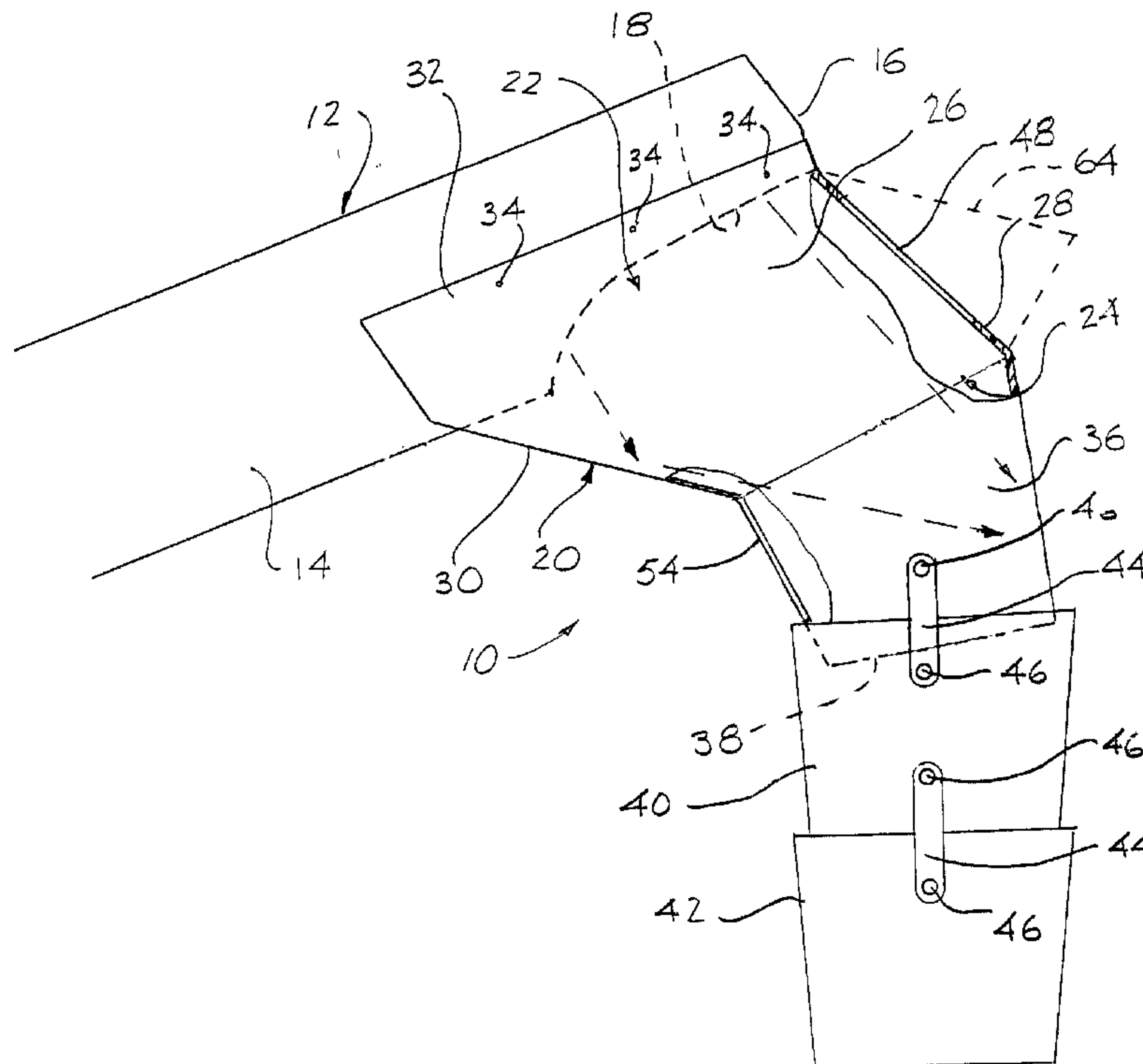
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(54) Titre : BUSE DE REGULATION DE DEBIT DE VIS A GRAIN AVEC FONCTION DE RELACHEMENT DE PRESSION

(54) Title: AUGER FLOW CONTROL SPOUT WITH PRESSURE RELIEF



(57) Abrégé/Abstract:

A spout is used for confining the grain flow from an auger. The auger may be a combine, grain cart unloading auger or a grain auger. The spout includes a chute that mounts on the auger tube. An unobstructed overflow opening in the chute allows grain or other matter to flow out of the spout if the outlet of the chute is plugged. This prevents filling and overloading of the auger and consequent auger damage.



ABSTRACT OF THE INVENTION

A spout is used for confining the grain flow from an auger. The auger may be a combine, grain cart unloading auger or a grain auger. The spout includes a chute that mounts on the auger tube. An unobstructed overflow opening in the chute allows grain or other matter to flow out of the spout if the outlet of the chute is plugged. This prevents filling and overloading of the auger and consequent auger damage.

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 the 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 flow from the auger discharge, and condenses the flow in a direction with an outward component. This produces a concentrated flow without backing up the flow from the auger. In most cases, frusto-conical extensions are mounted on the chute as described in the application referenced above.

If, through inadvertence of an operator or any other cause, 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 the auger. This will overload the auger and cause damage to the auger and its drive.

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

5 SUMMARY

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

a chute having:

- 10 a receiving opening;
- an outlet opening; and
- a convergent peripheral wall extending from the inlet opening towards the outlet opening;
- a discharge collar depending at an obtuse angle from the
- 15 peripheral wall around the outlet opening;
- an unobstructed overflow opening in the peripheral wall; and
- a chute mount for mounting the chute on the auger tube with the receiving opening confronting the auger tube.

If the level of the material being conveyed rises to an undesirable level
20 inside the chute for any reason, the excess will flow out of the overflow, preventing filling of the auger.

The overflow is preferably positioned in an outwardly sloping outer side of the peripheral wall to place the overflow out of the normal flow path of the material being conveyed, so that material is not lost through the overflow.

25 The discharge collar is preferably substantially frusto-conical. In use, the inner side of the chute intercepts the flow out of the auger discharge and directs it

outwardly where it impinges upon and swirls about the inside of the collar to discharge downwardly from the spout.

An inner overflow opening may be provided in the inner side of the discharge collar. This provides additional overflow capacity and also an early visual
5 warning to an operator of an overflow condition. This early warning can be augmented by placing a sensor in the inner overflow, for example a microswitch actuator at the bottom edge, to detect the onset of an overflow over the bottom edge. The outward slope of the peripheral wall directs the flow away from the inner overflow to prevent the loss of material through that opening.

10 Where the ingress of material into the chute through the outer overflow opening or high wind conditions are a concern, a shield may extend across the opening. This may be spaced sufficiently from the peripheral wall of the chute that there is no undue restriction of flow. Alternatively, the shield may be sufficiently light weight and freely movable that free flow is not impeded.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

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

Figure 1 is a side elevation, partially broken away, of a spout according to the present invention mounted on the end of an auger;

20 Figure 2 is an outer end view of the spout; and

Figure 3 is an inner end view of the spout.

DETAILED DESCRIPTION

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

The spout 10 includes a chute 20 with a receiving opening 22 at the top and an outlet opening 24 at the bottom. A peripheral wall 26 of the chute extends downwardly from the receiving opening. It includes an outer side 28 that slopes outwardly from the outer end of the auger. An inner side 30 of the peripheral wall slopes outwardly under the discharge opening of the auger. A chute mount 32 at the upper end of the chute includes two flanges extending along opposite sides of the auger tube and fixed to it by bolts 34. The chute thus depends from the auger with the receiving opening confronting the discharge opening 18 of the auger tube.

At the bottom end of the peripheral wall is a frusto-conical discharge collar 36 leading to a spout discharge 38 that is off-set outwardly with respect to the receiving opening. Both the inner side 30 and outer side 28 of the peripheral wall slope outwardly with respect to the auger tube, with the inner side 30 converging towards the side 28 so that the chute tapers from the receiving opening 22 to the discharge collar 36. 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 40 and 42. The wide upper end of the upper extension tube 40 is positioned over the frusto-conical discharge collar 36 of the peripheral wall 26 while the lower end extension tube 42 similarly fits over the lower end of the upper extension 40. The extensions are connected to one another and to the chute 20 by straps 44 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 46. 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.

An unobstructed overflow opening 48 is provided in the outer side 28 of the chute peripheral wall. This opening has a rounded upper edge 49 and straight side and bottom edges 50 and 52 respectively. When a body of grain or seed builds up in the chute for any reason, the excess material will flow out through the overflow opening 48 without damaging the spout, the auger or the auger drive.

A second, inner overflow opening 54 is formed in the inner side of the discharge collar 36. This has an inverted generally trapezoidal shape. This inner opening, being lower and on the inner side will begin to discharge grain earlier than the outer opening at a position that is more visible to the operator than the outer opening.

In use, grain or other material being discharged from the auger discharge 18 will fall onto the sloping inner side of the chute 20. It is then redirected towards the outer side of the collar 36. The collar then redirects the flow once more to provide a condensed flow down out of the collar. The flow in the spout passes under the overflow opening 48 and over the overflow opening 54.

An optional sensor 56 may be mounted on the spout to detect the onset of an overflow. The illustrated sensor is a small paddle 58 extending into the bottom side of the overflow 54 and a microswitch 60 operated by outward deflection of the paddle. The sensor is connected to a circuit 62 to generate an alarm condition, operating an audible or visual alarm or to shut down the auger.

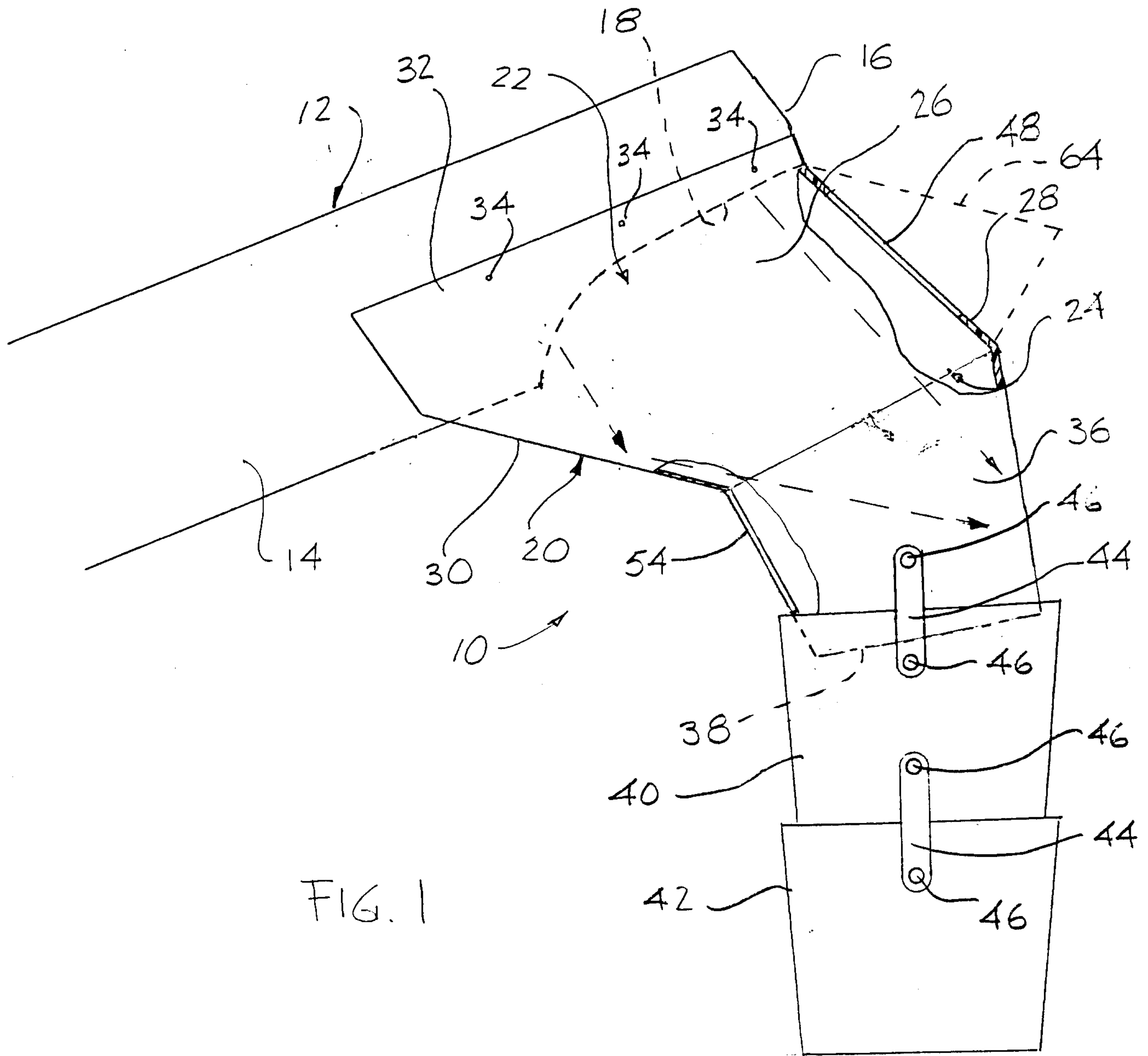
Another optional element is the wind shield 64 that is spaced from and extends across the outer over flow opening 48. Without restricting the overflow from the opening, this inhibits the ingress of foreign matter and wind into the spout.

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. Various

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 of the appended claims.

Embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A spout for an auger having an auger tube with an outer end and an auger tube discharge opening adjacent the outer end, the spout comprising:
 - a chute having:
 - a receiving opening;
 - an outlet opening; and
 - a convergent peripheral wall extending from the inlet opening towards the outlet opening;
 - a discharge collar depending at an obtuse angle from the peripheral wall around the outlet opening;
 - an unobstructed overflow opening in the peripheral wall; and
 - a chute mount for mounting the chute on the auger tube with the receiving opening confronting the auger tube.
2. A spout according to Claim 1 wherein the outlet opening is offset outwardly with respect to the receiving opening such that an outer side of the peripheral wall slopes outwardly, and the overflow opening is an outer overflow opening in the outer side of the peripheral wall.
3. A spout according to Claim 1 or 2 wherein the discharge collar is substantially frusto-conical.
4. A spout according to Claim 2 or 3 including an inner overflow opening in the discharge collar at an inner side thereof.
5. A spout according to any one of Claims 2 to 4 including a shield extending across the outer overflow opening to prevent the ingress of material into the chute.



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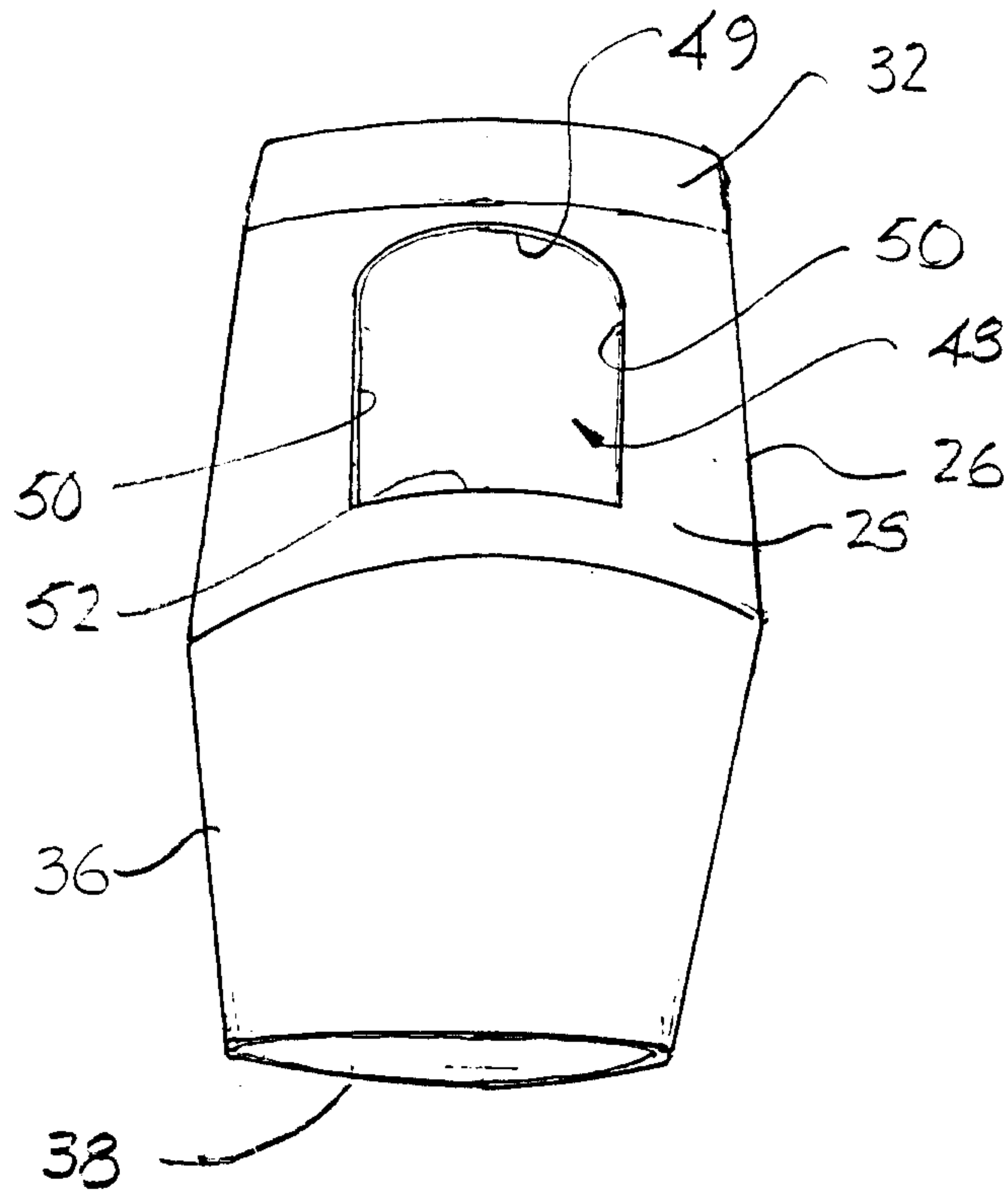


FIG. 2

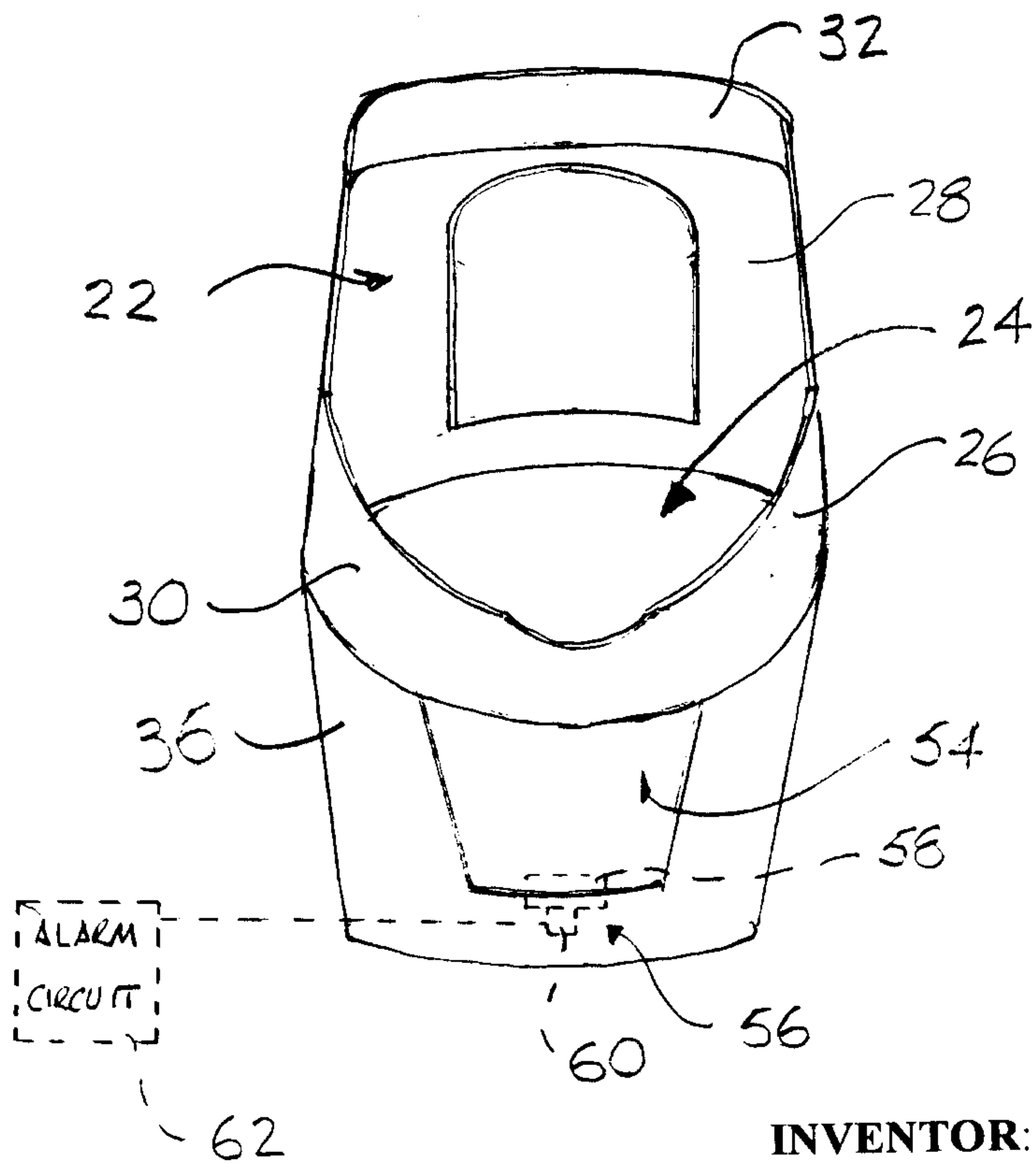


FIG. 3

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