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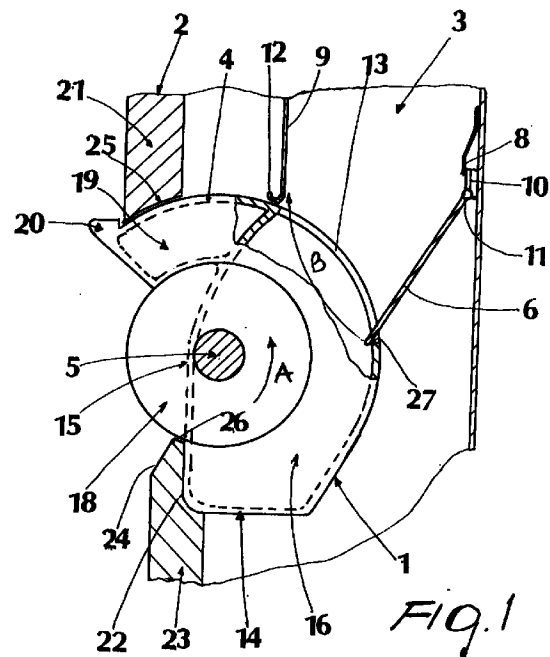
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(54) **Tipping tray assembly acting as a customer access vend door**

(57) A tipping delivery compartment assembly acting as an access vend door, particularly suitable for a vending machine, comprising a hollow body (4) which is arranged to oscillate about a horizontal axis of rotation between a loading position for loading therein at least one package of product and a tipping position for unloading the package of product; the hollow body (4) internally delimits a compartment or chamber (16) for receiving and collecting one or more packages of products, an access opening (13) at the top of the chamber (16), which in its loading position is arranged to act as an inlet passage for the or each package of product and in the tipping or unloading position allows access to the chamber (16) in order to remove the package or packages loaded therein, and a tab which is configured as a handle (20) for manual tipping of the hollow body (4) by an operator about the axis of rotation starting from the loading position.



Description

[0001] The present invention relates to a tipping tray assembly acting as a customer access vend door, particularly for use in vending machines which can be installed in places open to the public.

[0002] A conventional vending machine comprises a magazine for storing products to be sold, a dispensing device which can be controlled by a control unit, which can be usually enabled by means of a token or cash or an electronic key or the like, and a vend door for access to a delivery compartment from which a requested product can be retrieved. The whole unit is supported by a stout frame which is closed by metal sheets suitable for providing adequate resistance to any breaking attempts.

[0003] Automation and motorization of vend doors for access to the delivery compartment has the drawback that its control operating systems are liable to become jammed, and thus periodic and accurate maintenance of the vending machine is required.

[0004] Moreover the problem also consists of keeping the delivery compartment clean, i.e., free from any soiling or trash deposited by ill-intentioned people. Cleanliness and hygiene are in any case indispensable requirements to avoid irritating and discouraging customers from purchasing goods through a vending machine. To this end, it is important to provide a delivery compartment in a vending machine, which is clearly visible and has no dark or hardly accessible regions.

[0005] The main object of the present invention is to provide a tipping delivery compartment acting as a vend door which is of quite practical and efficient operation and ensures that its content is fully discharged each time, in order to prevent dispensed products from remaining uncollected or to avoid the delivery compartment being used as a place for collecting objects or trash deposited by the customer.

[0006] Another object of the present invention is to provide a delivery compartment, which can be easily accessible and washable or otherwise cleaned from outside.

[0007] Another object of the present invention is to provide a delivery compartment, which is theft-proof.

[0008] Another object of the present invention is to provide a tipping delivery compartment that can be used as an access vend door which allows easy and quick removal of dispensed products, besides being simple and thus of low cost to manufacture.

[0009] These and other objects which will become better apparent hereinafter are achieved by a tipping delivery assembly acting as an access vend door, particularly suitable for a vending machine, comprising a hollow body which is arranged to oscillate about a horizontal axis of rotation between a loading position for loading therein at least one package of product and a tipping position for unloading each package of product, an inner compartment or chamber delimited in said

body for receiving and collecting one or more packages of products, an access opening at the top of said chamber, which in said loading position is arranged to act as an inlet passage for each package of product whereas in said tipping or unloading position allows access to said compartment or chamber to remove each package loaded therein, and a tab which is shaped as a handle for manual tipping of said hollow body by an operator about said axis of rotation starting from said loading position.

[0010] Advantageously, said hollow body is asymmetrically distributed around said axis of rotation, so as to move automatically and quickly into its loading position starting from a tipping position upon being released by the operator.

[0011] Further aspects and advantages of the present invention will become better apparent from the following detailed description of some currently preferred embodiments thereof, given merely by way of non-limiting example with reference to the accompanying drawings, wherein:

Figure 1 is a side elevation view, with parts shown in cross-section along vertical planes, of a delivery compartment assembly in its loading position;

Figure 2 is a side elevation view, with parts shown in cross-section, of the delivery compartment in a position intermediate between loading and unloading positions;

Figure 3 is a side elevation view, with parts shown in cross-section, of the delivery compartment in its tipping or unloading position;

Figure 4 is a side elevation cross-section view on a reduced scale, taken along a vertical plane, of a different embodiment with the receiving chamber in the tipping position and with an inclined surface for sliding and outward fall of the package or packages contained therein;

Figures 5, 6 and 7 are views of another embodiment of a delivery compartment assembly, shown in its loading position, in an intermediate rotation position and in its unloading position, respectively; Figure 8 is a front view on a reduced scale of the delivery compartment assembly of Figures 5, 6 and 7;

Figures 9 to 12 are views of a delivery compartment according to another embodiment, in various sequential positions starting from its loading position to its unloading position;

Figure 13 is a front view of the delivery compartment assembly of Figures 9 to 12;

Figure 14 is a sectional view taken along the line XIV-XIV of Figure 13; and

Figures 15 to 18 are views of another embodiment, shown, respectively, in plan view, in a sectional view taken along the line XVI-XVI of Figure 15, in a side and bottom view.

[0012] In the accompanying drawings, identical or similar parts or components have been designated by the same reference numerals.

[0013] With reference first to Figures 1 to 3, the reference numeral 1 generally designates a delivery compartment assembly acting as a vend door for retrieving (packaged) items dispensed by a vending machine, which comprises a supporting frame 2 for a magazine (not shown) containing the items to be distributed and a dispensing device controlled by a token, a card or an electronic key, as in common practice in the art.

[0014] A gravity downhill path 3 extends from the magazine and terminates at its lower part at assembly 1, where it can be closed by a gate 6.

[0015] The gate 6 has an edge which is articulated to the internal wall of the path or duct 3. For example, a block 10 is welded or otherwise fixed to the inner wall 9 of the path 3 and has a hinge 11 which is rigidly coupled to the gate 6. The block 10 is preferably at least partly covered by a metal plate 8 to prevent falling items from being retained by the block.

[0016] The inner wall 9 of the path 3 opposite to the hinge 11 ends close to, but not in contact with, the outer wall of the delivery compartment 1 and its edge 12 is radiused and curved outwards with respect to the passage 3 for stiffening purposes.

[0017] The assembly 1 comprises a shell or hollow body 4 which is substantially shaped like a portion of a hollow cylinder and is mounted on the frame 2 so that it can rotate on two lateral pivots 5 which are axially aligned so that the hollow body 4 can oscillate about a horizontal axis of rotation between a loading position (Figure 1) and a tipping or unloading position (Figure 3).

[0018] More particularly, the hollow body 4 has a rear opening 13 at its cylindrical portion, while on the opposite side it has an end wall 14 and side walls 15 which might be slightly convex towards the outside, said end and side walls delimiting an internal compartment or chamber 16 for receiving or collecting (packaged) items to be dispensed.

[0019] If required, at least part of the walls 14 and 15 can be perforated or gridded for lightening purposes and to prevent liquids from being collected in the chamber 16.

[0020] As shown in Figures 1 to 3, the steps of loading, rotation and unloading of the drum 4 occur by means of a counterclockwise angular movement of said hollow body in the direction shown by arrow A. Lateral reinforcement disks 18 are provided between the shell 4 and the pivots 5.

[0021] A portion 19 of the hollow body 4 is designed to protrude from the frame 2 and has a rounded ridge which is externally shaped as a longitudinal lip 20, which can be accessed from the outside of the vending machine and is designed to act as a grip element for the user.

[0022] The configuration of the hollow body 4 is such that its center of gravity is offset with respect to its axis

of rotation, and thus, if released, it is automatically arranged as shown in Figure 1, i.e., in its loading position.

[0023] During a loading step (Figure 1), the lip 20 abuts against an upper wall 21 of the frame 2, while the lower portion of the hollow body 4 is arranged against a shoulder and is accommodated in a recess 22 formed in a lower portion 23 of the frame 2, whereas in its overturned or unloading position the end part of the portion 19 abuts against an external chamfer 24 close to the recess 22 in the wall 23.

[0024] The thickness of the wall 21 and 23 of the frame 2 facing the hollow body 4 has a respective rounded region 25 and 26 to ensure minimum clearance between frame 2 and hollow body 4 and thus to leave no free space for inserting breaking tools to have access to the vending machine.

[0025] During the loading step the gate 6 remains lowered and resting at its free end on the lower edge 27 of the rear opening 43. In this position, the gate 10 is inclined toward the opening 13 and acts as an inclined-plane chute to guide the descent of the product or products to be dispensed (Figure 1). During rotation of the hollow body 4, the gate 6 is moved by the edge 27 of the opening 13 and rotates in the direction of the arrow B (Figure 1) and before reaching its unloading position (Figure 2) it closes the lower end or mouth of the path 3 and keeps it closed until the hollow body 4 is rotated backward. This position of the gate 6 makes it possible to keep another product possibly selected by customer on standby position until the hollow body 4 is again rotated to its loading position.

[0026] The selected product or item descends by gravity along path 3, slides along gate 6 arranged at an angle and is directed to the receiving chamber 16 while passing through opening 13. At this point the customer grips the lip 20 and pushes it downward, thus turning the hollow body 4 in the direction of the arrow A, possibly overcoming the contrast of a counterweight (not shown in the drawings). At the same time, the gate 6 is moved to its horizontal position, thereby closing the lower end of the passage 3. Once the hollow body 4 is completely tipped forward toward the customer (unloading position), the customer can have easy access to the inside of the receiving chamber 16, which is clearly visible from the outside of the vending machine, in order to remove the selected product.

[0027] Figure 4 illustrates a different embodiment in which the wall 15 of the receiving chamber 16 is flat in order to ensure that in the fully tipped position the chamber 16 is completely and automatically emptied.

[0028] Figures 5 to 9 illustrate an embodiment in which the grip element of the hollow body 4 is constituted by a longitudinal groove 28, e.g. in the shape of a semicircle in cross-section and having a raised lip 29, which can be received during a loading step (Figure 5), in a respective seat 30 formed in the outer wall 31 of the frame 2. In this embodiment, instead of the moving gate

6 there is provided a fixed chute acting as an inclined plane 32 at the lower mouth of the passage 3.

[0029] According to the embodiment shown in Figures 9 to 14, the hollow body 4 has a raised portion 33 which is adjacent to the opening 13 and is arranged to abut against a shoulder 35 which is formed in the internal wall 34 of the frame 2 (Figure 12). The sequence of Figures 9 to 12 illustrates the steps of rotation of the hollow body 4 from the loading position (Figure 9) to the unloading position (Figure 12). It will be noted that in this embodiment the gate 6 is L-shaped, so as to rest on the opening 13 and be moved by the edge of the raised portion 33. As shown in Figure 14, the product receiving chamber 16 has a relatively larger capacity.

[0030] Figures 15 to 18 illustrate another embodiment, in which the receiving chamber 16 has a wall 15 with a broad concave portion 36.

[0031] The movement of the hollow body 4 preferably is caused manually by the customer. However, the hollow body 4 can be provided with resilient return means or be operatively connected to a source of motion.

[0032] The disclosures in Italian Patent Application No. VR98A000027 from which this application claims priority are incorporated herein by reference.

[0033] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A tipping delivery compartment assembly acting as an access vend door, particularly suitable for a vending machine, characterized in that it comprises a hollow body (4) which is arranged to oscillate about a horizontal axis of rotation between a loading position for loading therein at least one package of product and a tipping position for unloading each package of product, an inner compartment or chamber (16) delimited in said hollow body (4) for receiving and collecting one or more packages of product, and an access opening (13) at the top of said chamber (16), which in said loading position is arranged to act as an inlet passage for each package of product, whereas in said tipping or unloading position allows access to said chamber (16) to remove each package loaded therein.
2. An assembly according to claim 1, characterized in that the center of gravity of said hollow body (4) is offset with respect to said axis of rotation, so that upon being released said hollow body (4) is automatically arranged in its loading position.
3. An assembly according to claim 1 or 2, characterized in that said receiving chamber (16) has a flat internal surface (15) which in its unloading position becomes a bottom surface which is inclined toward the front of said vending machine.
4. An assembly according to any claim 1 to 3, characterized in that at least part of the surface delimiting said receiving chamber (16) is perforated or grilled.
5. An assembly according to any preceding claim, characterized in that said hollow body (4) has grip means (20) for manual tipping thereof by an operator.
6. An assembly according to claim 5, characterized in that said grip means comprises a longitudinal ridge arranged to abut, in use, against the frame component (21,23) of said vending machine both in the loading position and in the unloading position.
7. An assembly according to claim 5 or 6, characterized in that said grip means (20) comprises a longitudinal groove (28) provided with a lip (29).
8. An assembly according to any preceding claim, characterized in that said hollow body (4) has a partly cylindrical configuration at said access opening (13).
9. An assembly according to any preceding claim, characterized in that said hollow body (4) is operatively connected to return means from its unloading to its loading position.
10. An assembly according to claim 9, characterized in that said return means comprises at least one resilient return element.
11. An assembly according to claim 9, characterized in that said return means comprises a source of motion.
12. An assembly according to any preceding claim, characterized in that it comprises a controlling and guiding gate (6) arranged to discharge product packages through said opening (13) when said hollow body (4) is in its loading position.
13. An assembly according to claim 12, characterized in that said gate (6) is movably mounted between an opened and closed position.

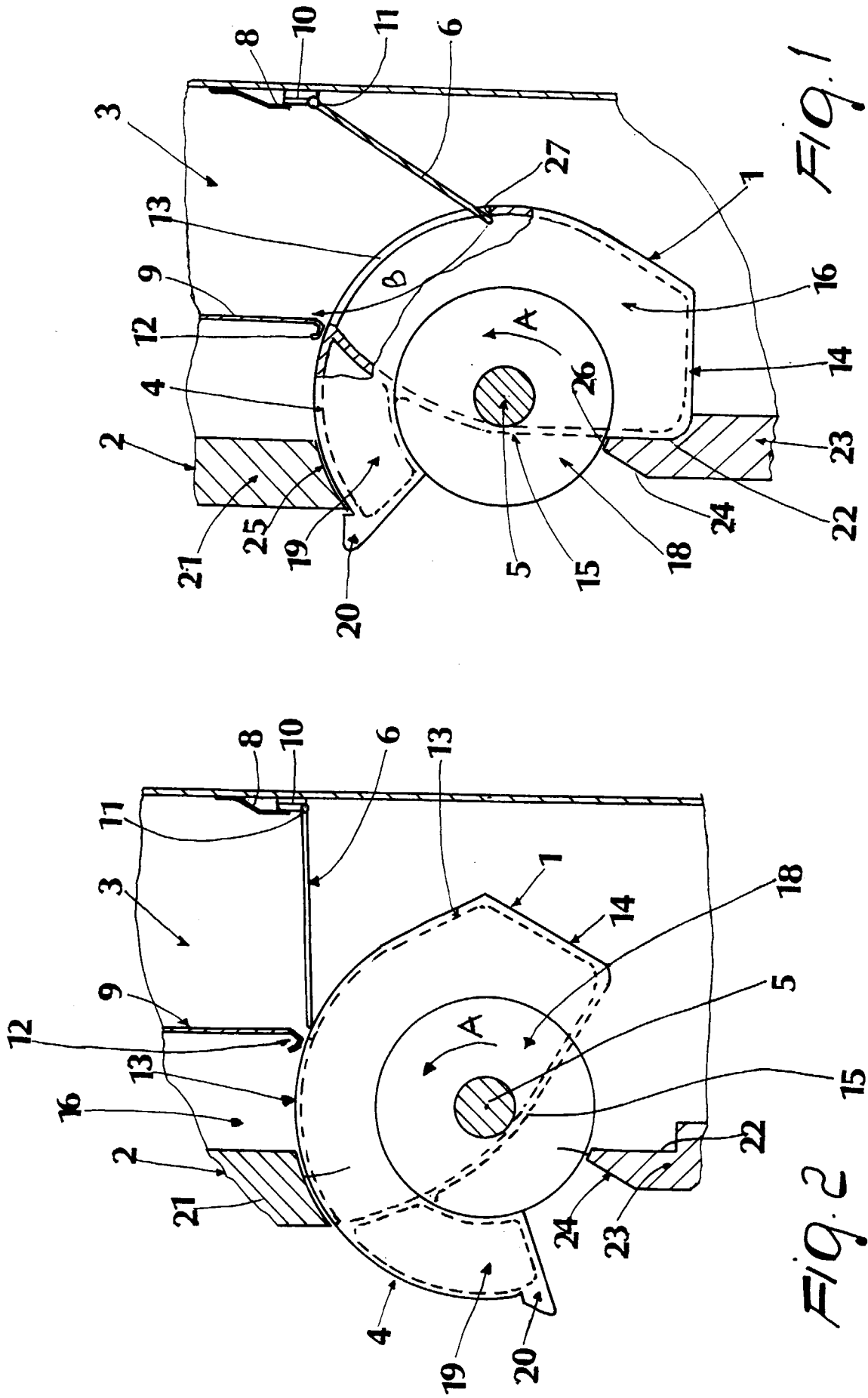


FIG. 1

FIG. 2

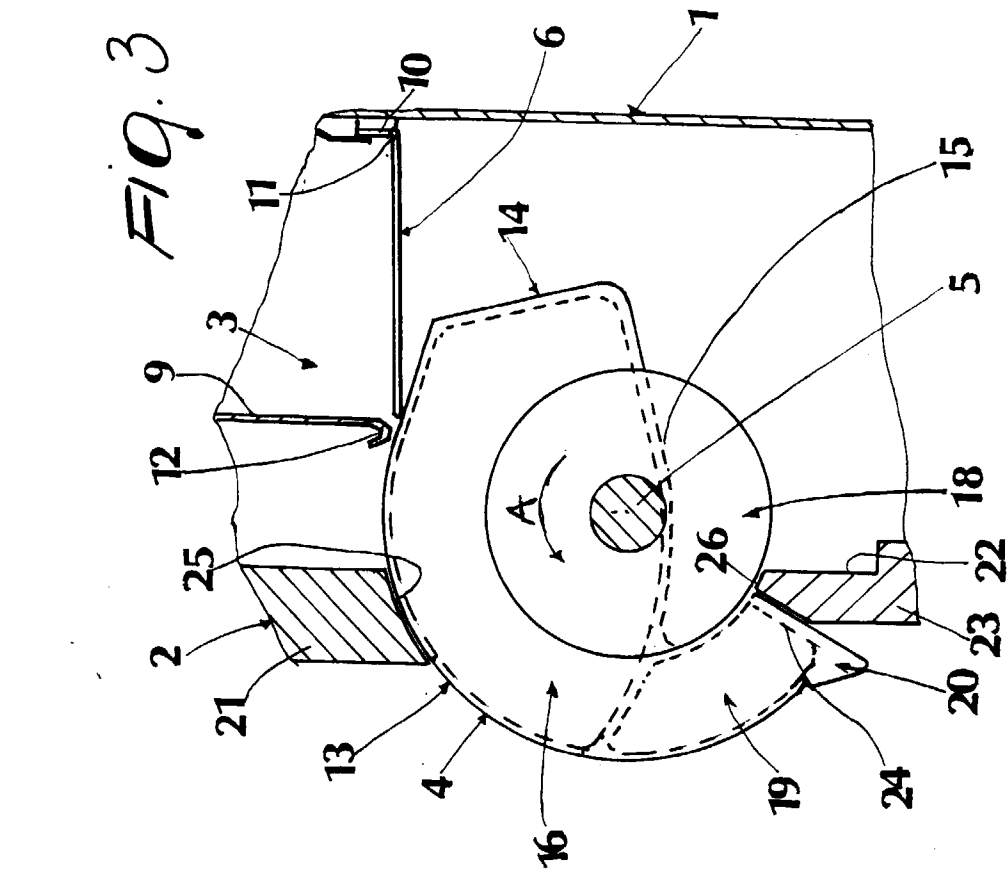


FIG. 3

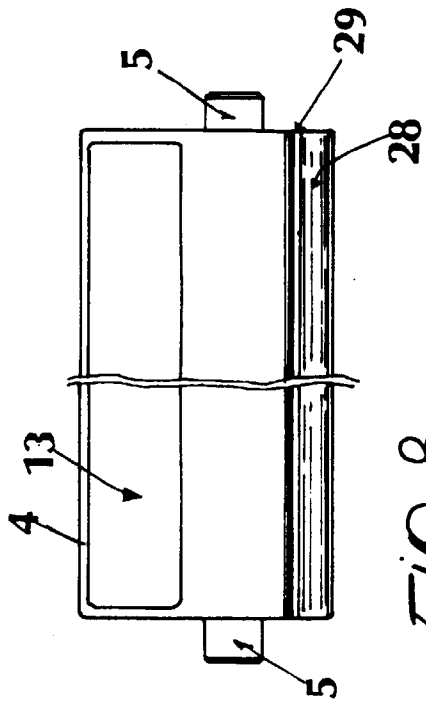


FIG. 8

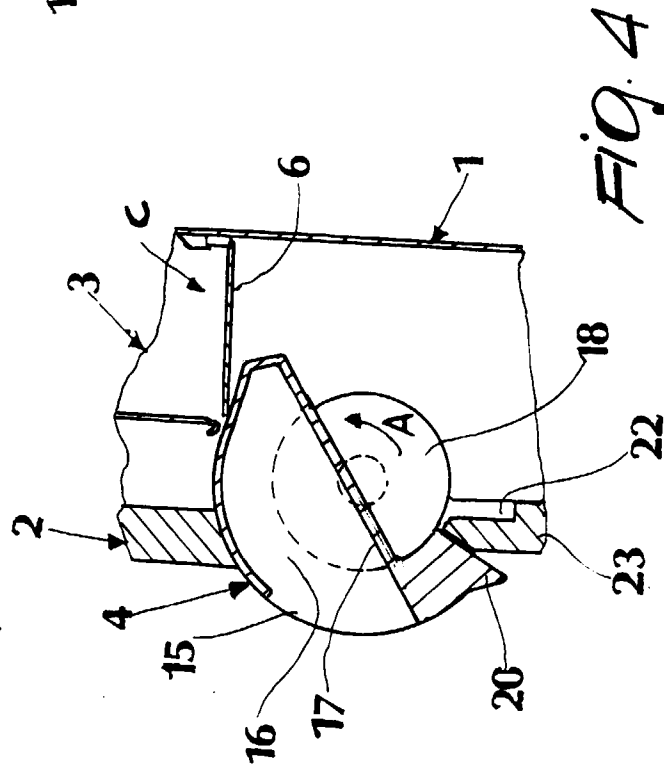


FIG. 4

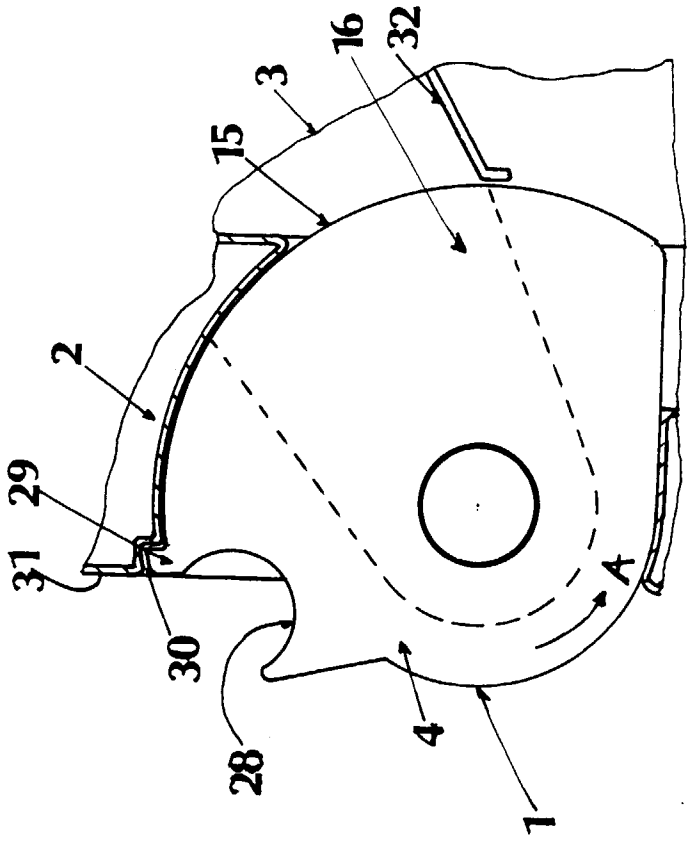


FIG. 5

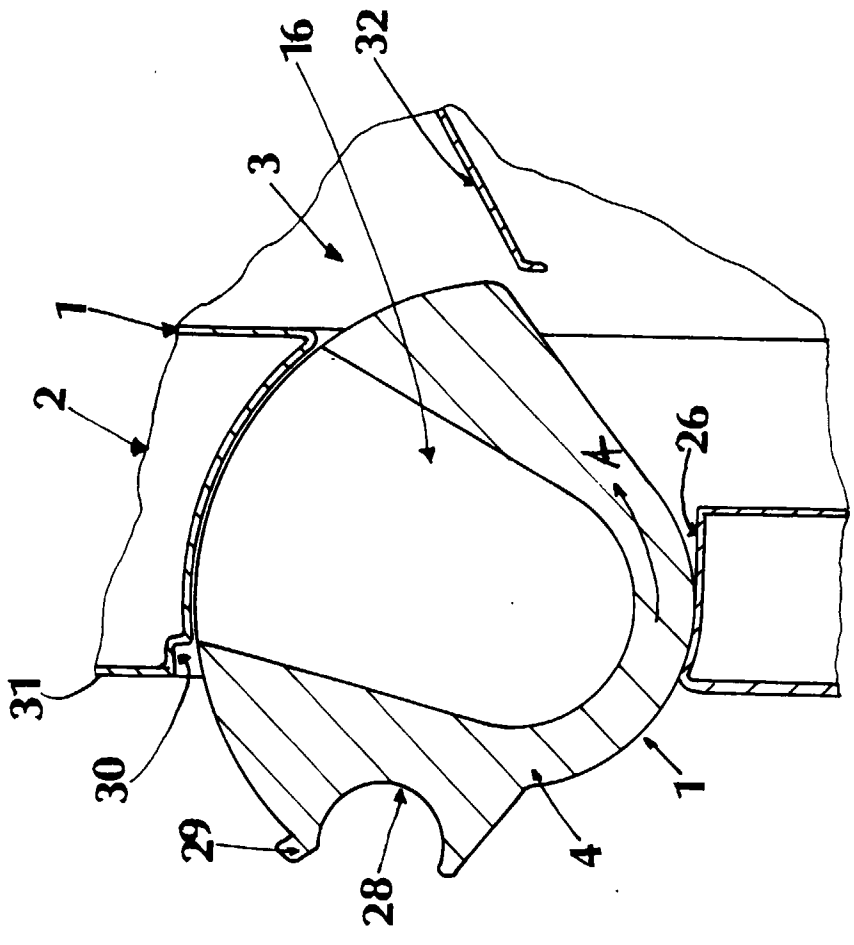


FIG. 6

FIG. 7

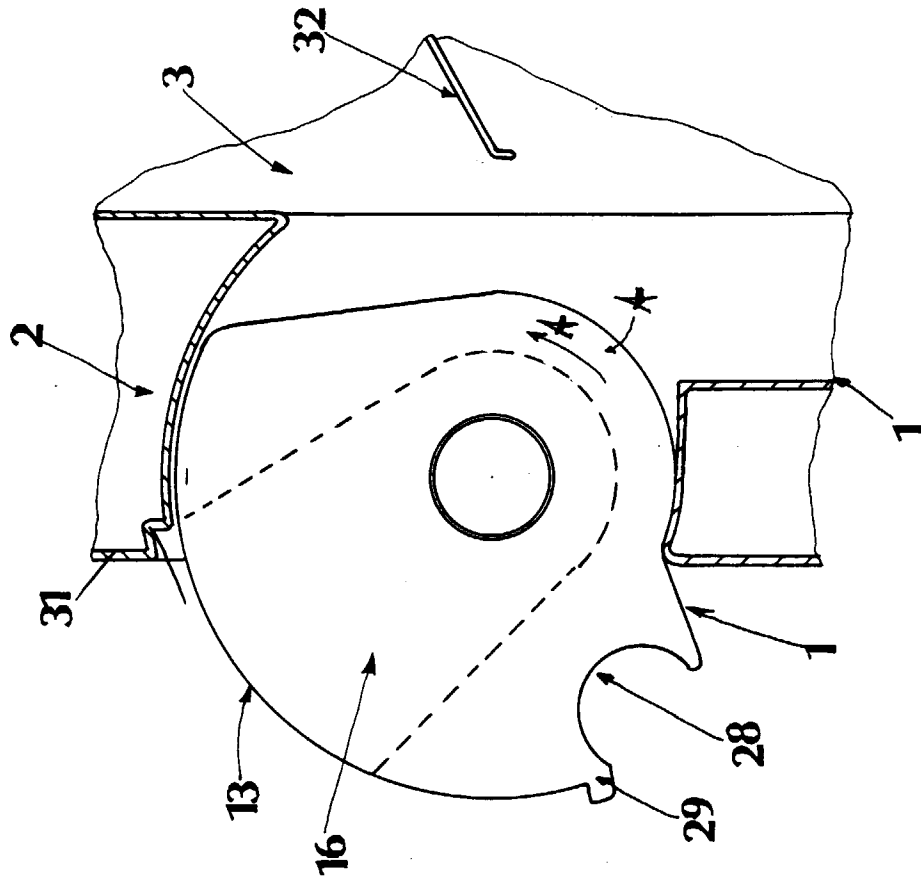
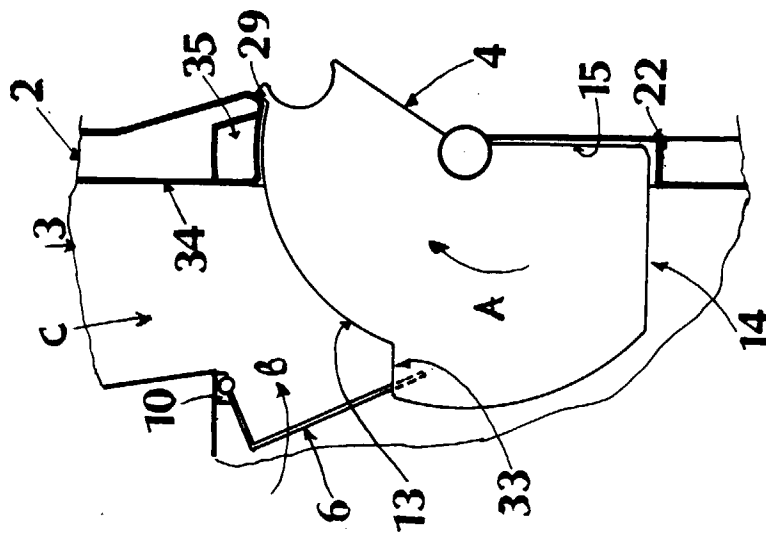
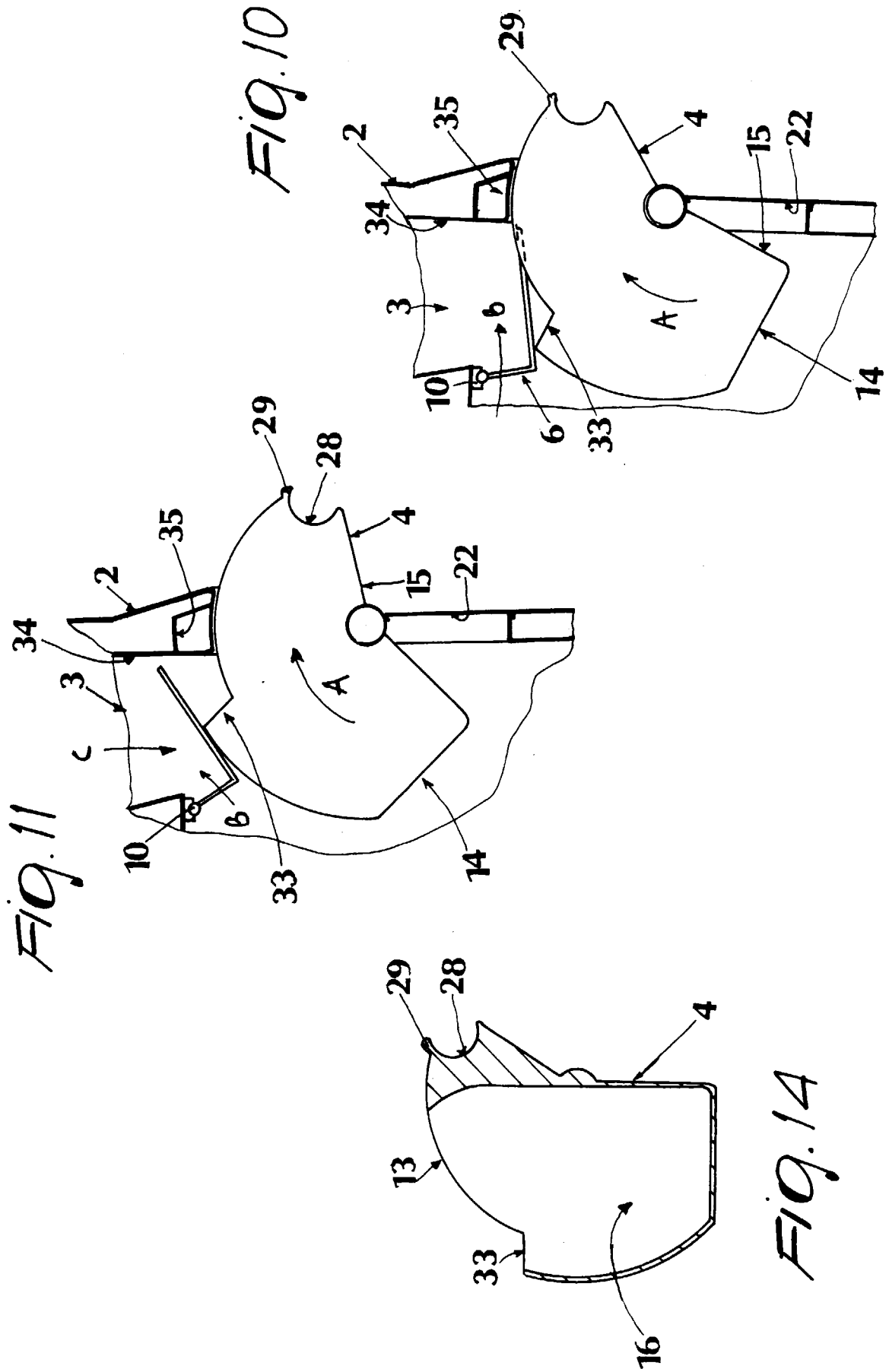


FIG. 9





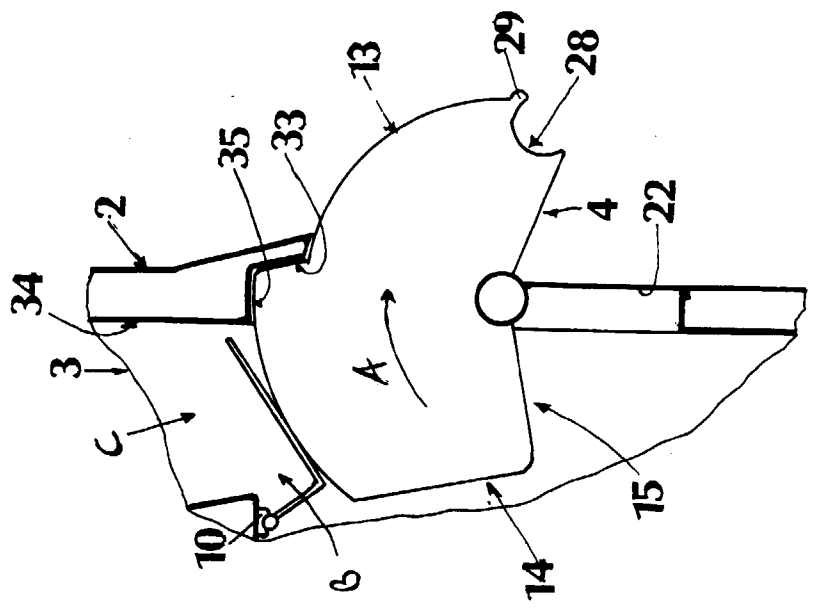


FIG. 12

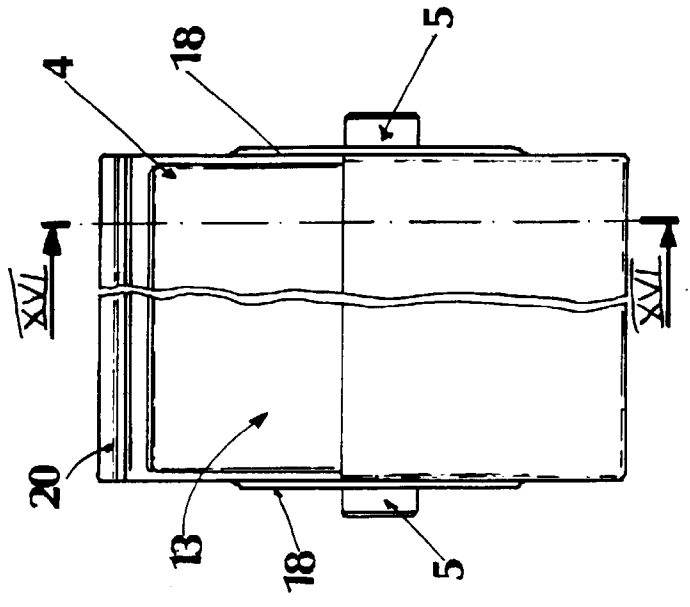


FIG. 13

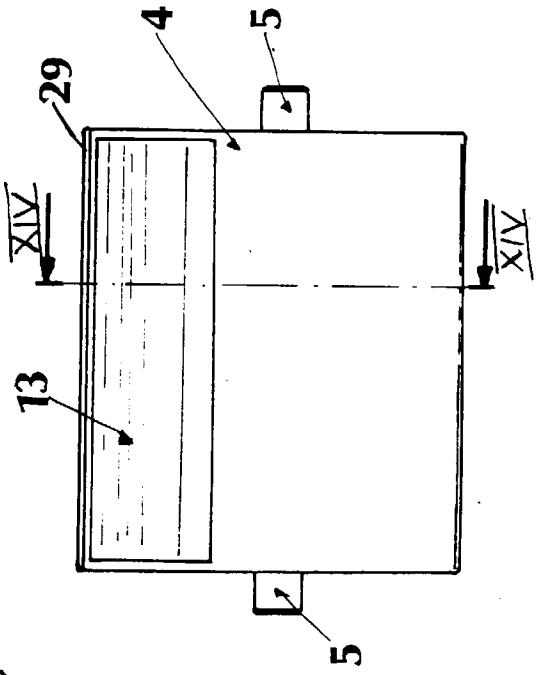


FIG. 15

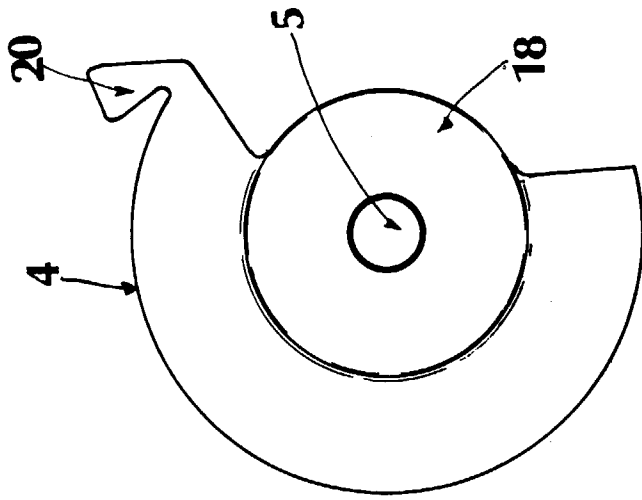
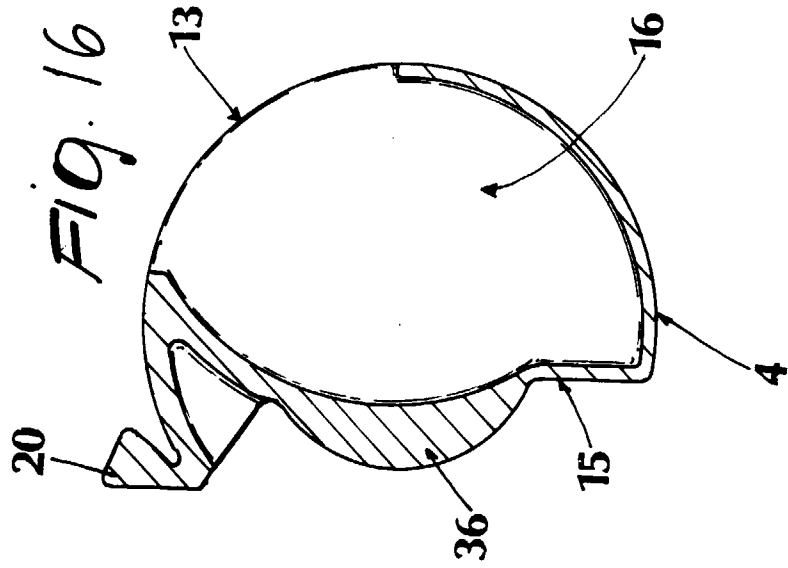


FIG. 17

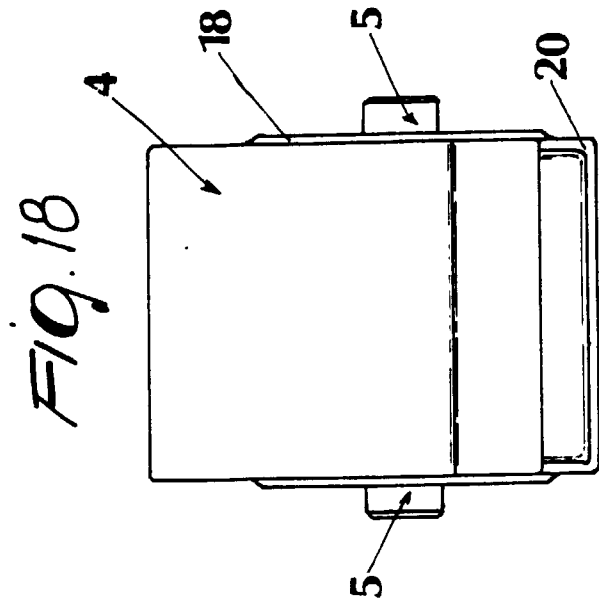


FIG. 18