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DISPENSING MACHINE LOADING MECHANISM

Filed Dec. 6, 1950

2 Sheets-Sheet 1

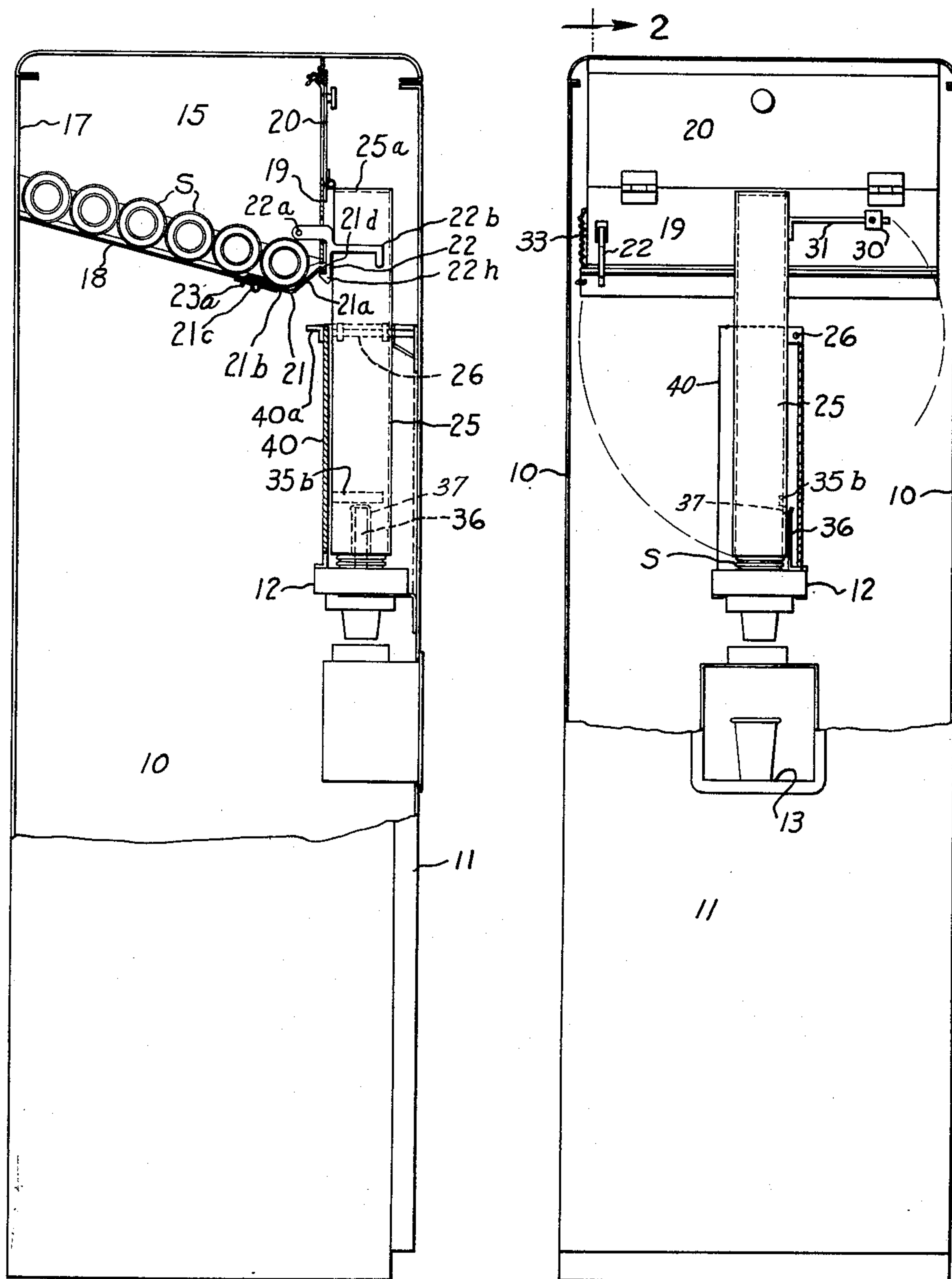


FIG. 2

FIG. 1

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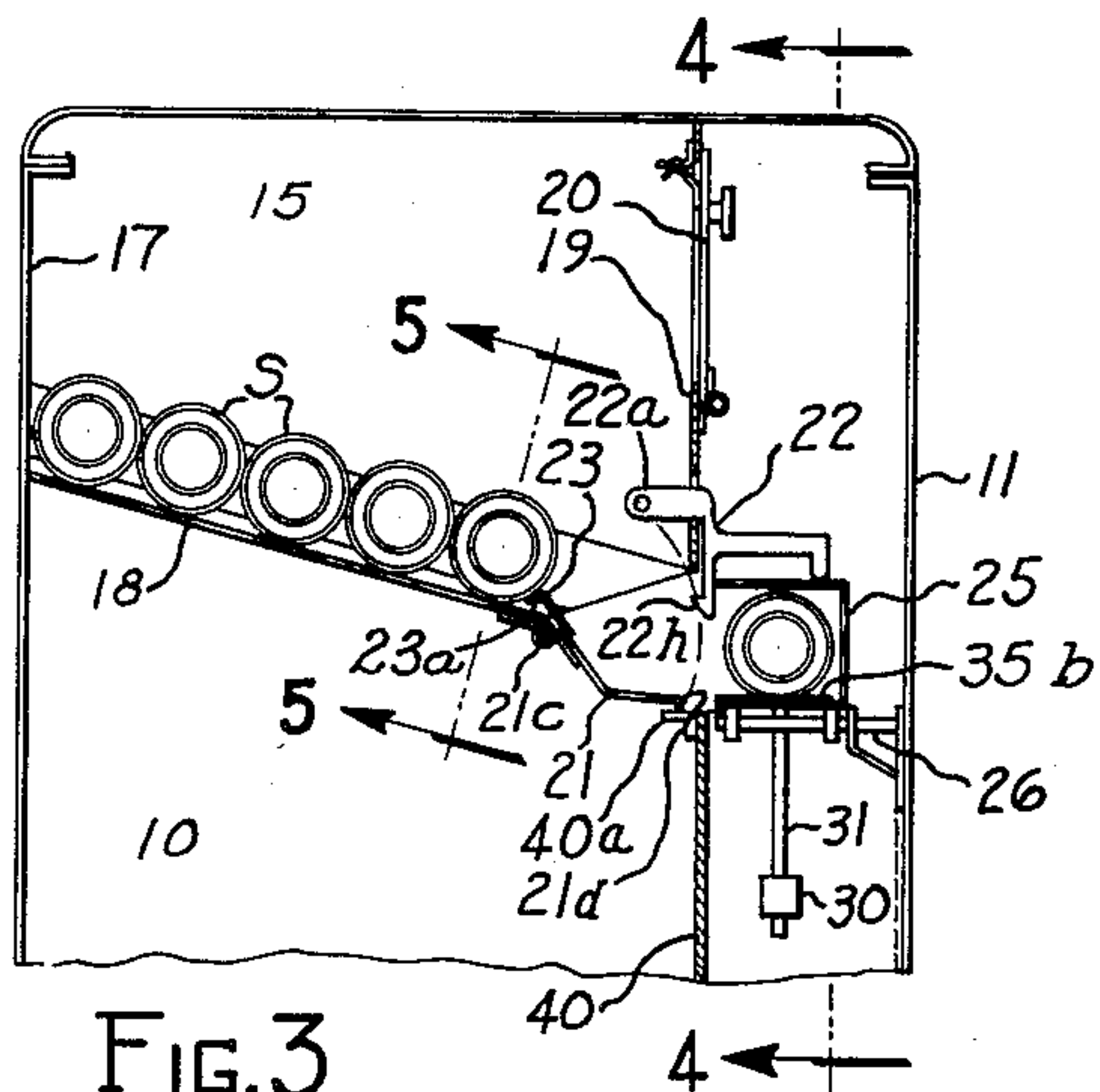


FIG. 3

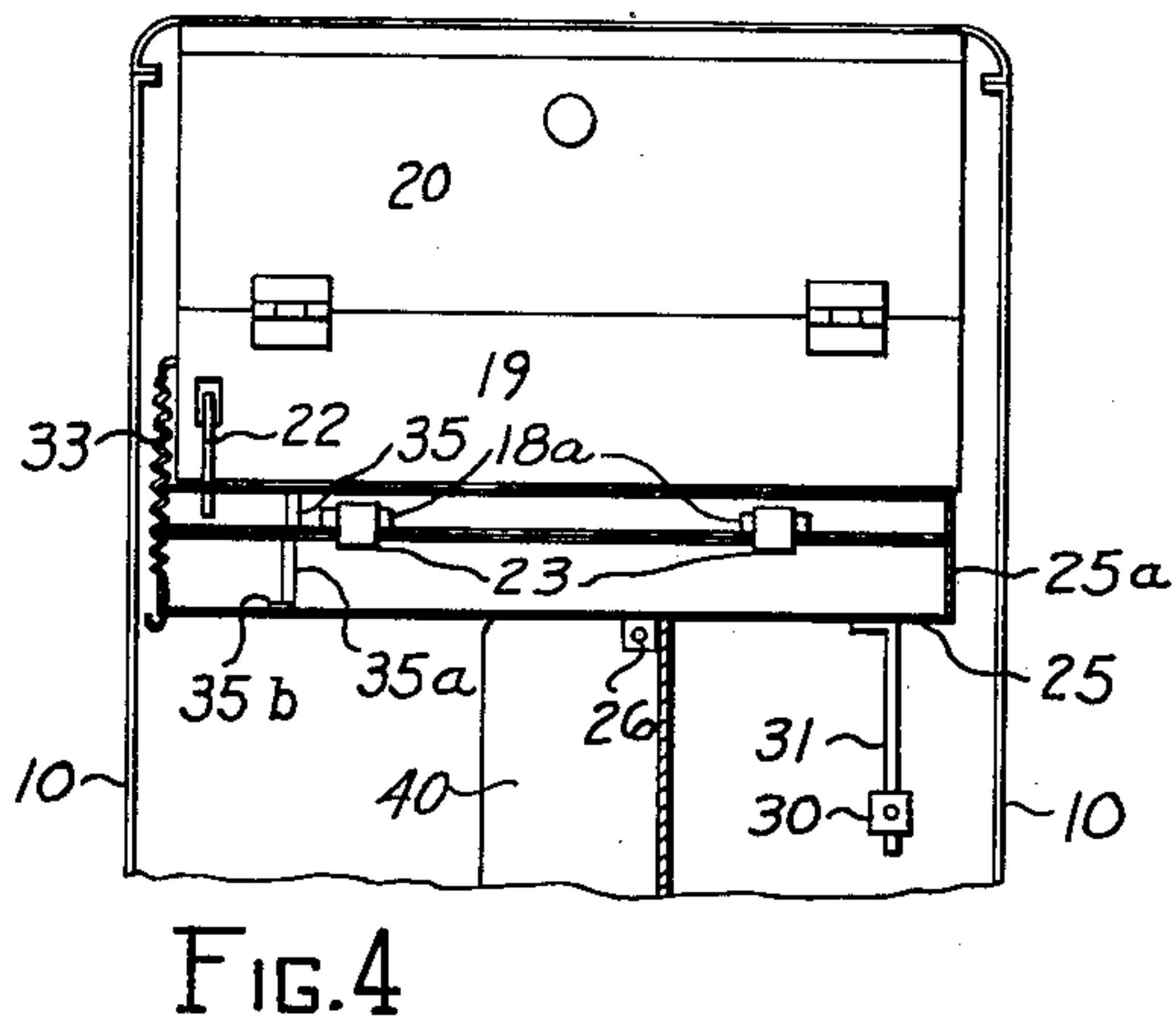


FIG. 4

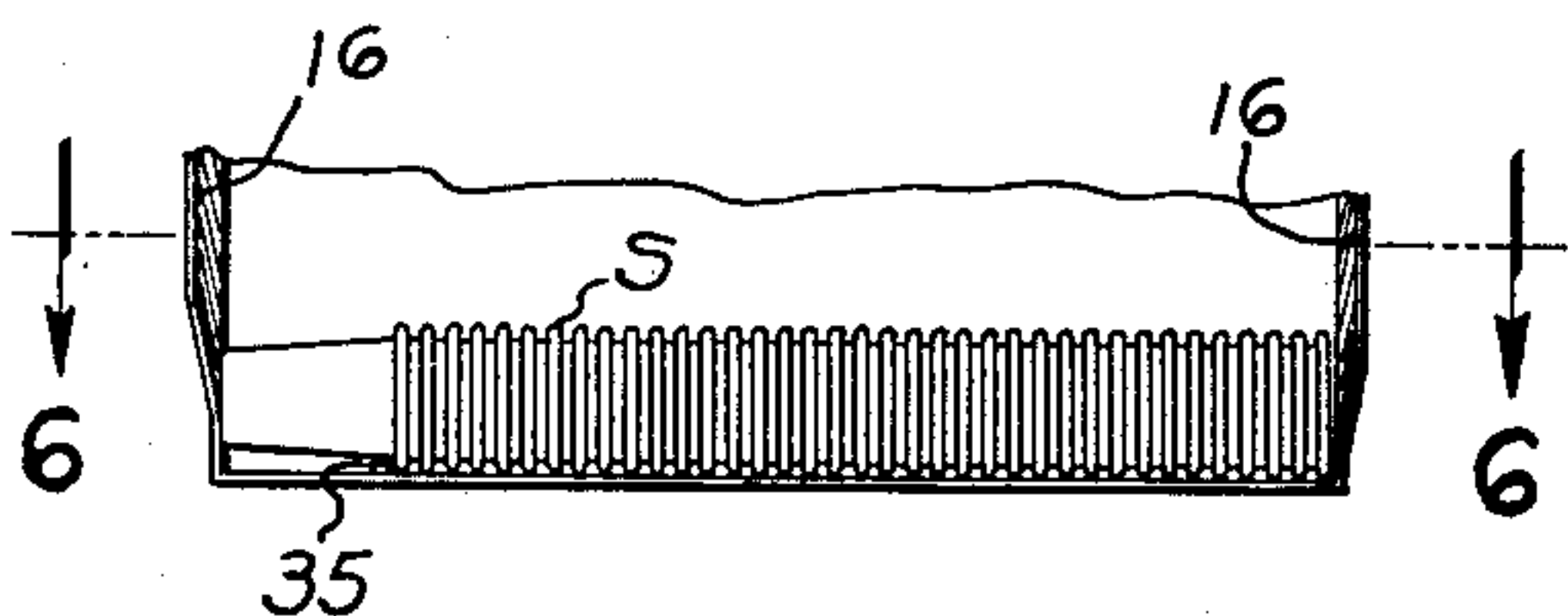


FIG. 5

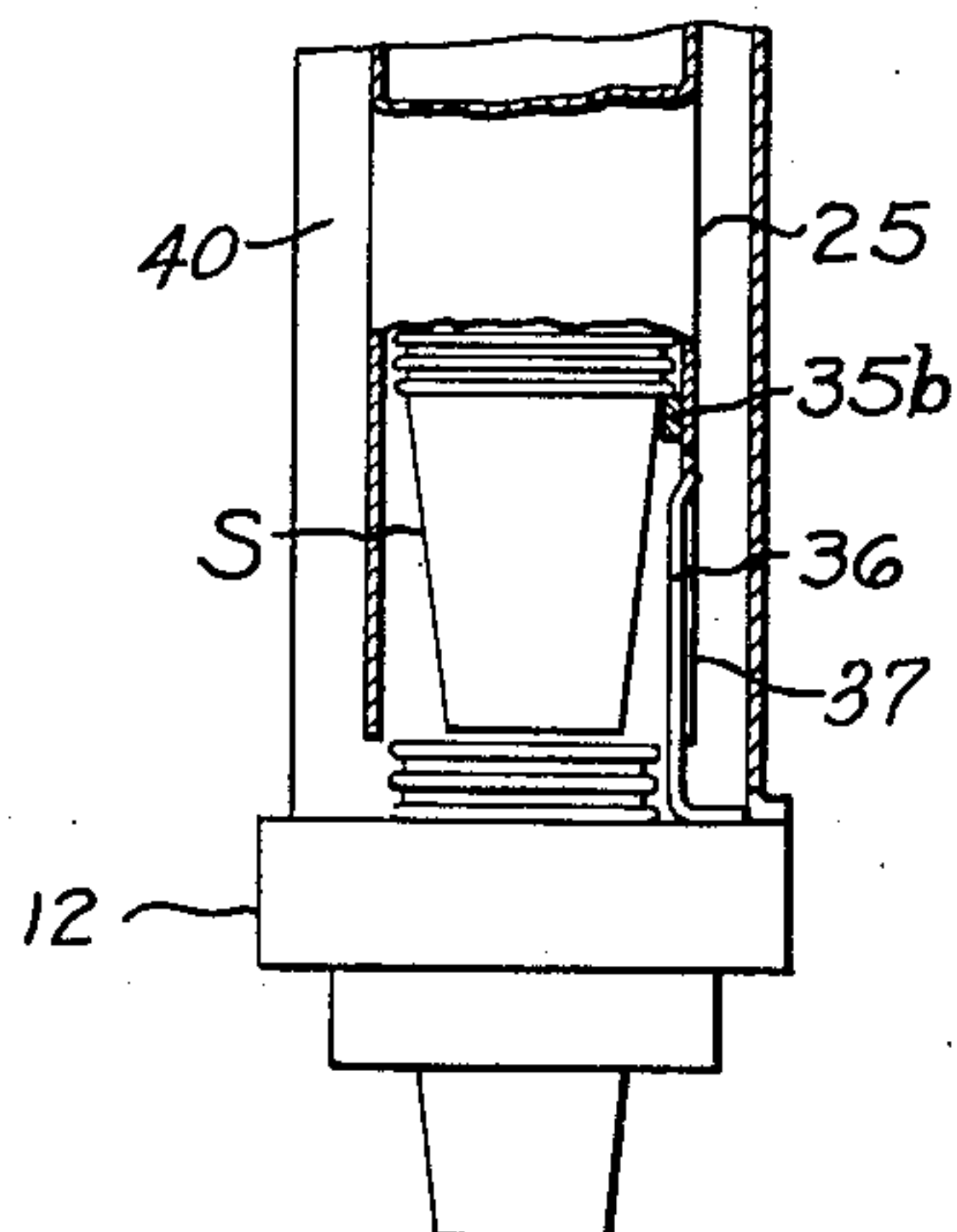


FIG. 7

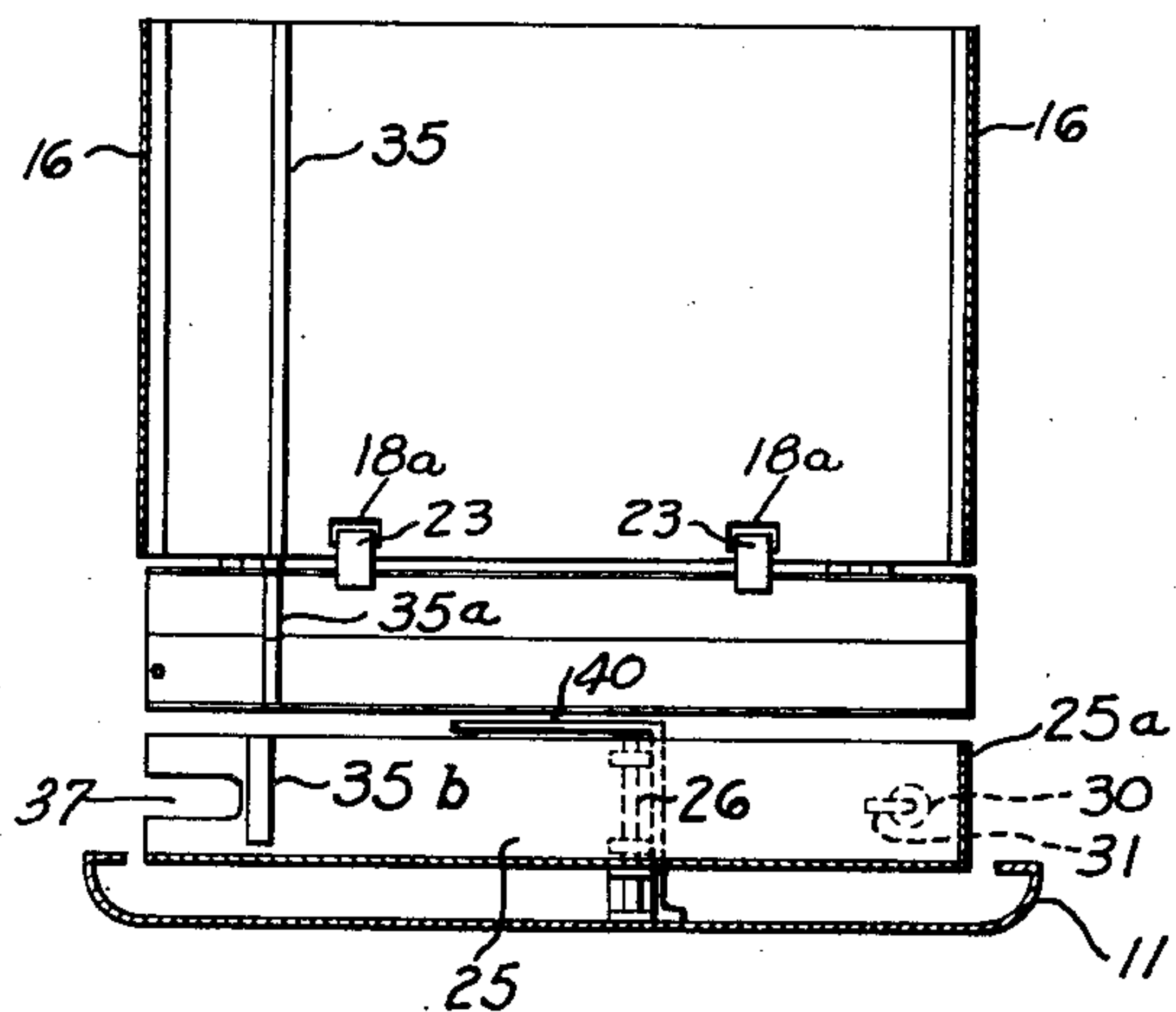


FIG. 6

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## UNITED STATES PATENT OFFICE

2,659,644

DISPENSING MACHINE LOADING  
MECHANISMEdward L. Hadden, Westfield, N. J., assignor to  
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12 Claims. (Cl. 312—44)

1

This invention relates to loading mechanisms of dispensing machines and is concerned more particularly with means operative automatically to transfer an object or a group of objects from storage to the point of use. By way of illustration, the invention will be explained in connection with a cup-drop mechanism of a vending machine, it being understood that other uses are contemplated. A main objective of the invention, as applied to a cup-drop mechanism of a dispenser, is automatically to maintain the cup-drop supplied with cups from an adjacent storage bank. A further objective of the invention is the construction of a cup-drop reloader operative automatically within the length of a roll of nested cups to replenish the cup-drop device with a new stack of cups when the stack previously supplied has been depleted to a predetermined minimum number. By way of further improvement the invention undertakes to effect a reloading operation without recourse to power operated devices other than forces of gravity. Still another objective of the invention is to render available a loading mechanism that is efficient in operation, devoid of complicated mechanisms, and one that may be readily and inexpensively constructed and housed in a minimum amount of space within the cabinet structure of a conventional dispensing machine.

In such prior cup-loading mechanisms of which I am aware, it has been customary to effect a cup-loading operation by power means, electrically or hydraulically operated, triggered by a low-level-feeler device associated with the cup-drop. In other types of cup replenishing devices, the cups are carried in stacks around the periphery of a drum or turret, the latter being successively indexed to bring a new stack in registry with the cup-drop when the preceeding stack has been used up. Mechanisms of this character require numerous elements which must be properly coordinated and related to function properly and in addition, are difficult to load and require more room than is conveniently to be had in the cabinet of a dispensing machine.

The present invention overcomes these and other disadvantages of prior loading devices and renders available a simple structure operating solely by gravity and which embodies but a single gate through which all of the stacks of cups eventually move, thus greatly increasing the capacity of the machine by utilizing for stack storage the space heretofore required for power devices, drums, etc. and in which the reserve supply may be increased still further merely by

2

enlarging the storage space without change or alteration to the gravity operated loading device of this invention.

In attaining the objectives of the invention it is proposed to arrange a cup-stack storage compartment on an inclined plane within the upper regions of a cabinet. Preferably the lower forward portion of the compartment is provided with a combination trap-door and escapement device so constructed and arranged that but one roll or stack of cups may roll out whenever the door is opened. Adjacent the trap-door a side-way disposed U-shaped transfer chute is arranged and constructed to swing periodically about a medial pivot to a generally horizontal position capable of receiving a stack of cups and thereafter, under the influence of gravity, to a vertical position whereat the confined stack of cups is caused to move along the chute into an aligned cup-drop mechanism positioned beneath. When the level of the stack in the cup-drop falls to point at which only a preselected number remain, the transfer chute is caused to swing to a horizontal position, again by gravity, unlatch the trap-door and receive another stack of cups.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawings.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, drawings depicting a preferred typical construction have been annexed as a part of this disclosure and, in such drawings, like characters of reference denote corresponding parts throughout all the views, of which—

Figure 1 is a front elevation of a typical vending machine with the upper portion of the door omitted to show the cup-reloading mechanism of this invention.

Fig. 2 is a side elevation of the machine of Fig. 1 with the upper portion of the side sheet metal structure omitted back to the plane 2—2 of Fig. 1.

Fig. 3 is similar to Fig. 2 except that the swing-chute is shown in the horizontal position where it has received a new cup stack and the cup gate is shown in the open position.

Fig. 4 is a sectional view taken on plane 4—4 of Fig. 3 looking through the front of the swing-chute.

Fig. 5 is a sectional view taken on line 5—5 of Fig. 3.



3

Fig. 6 is a plan view substantially normal to the cup ramp taken on the plane 6—6 of Fig. 5.

Fig. 7 is a fragmentary view, on an enlarged scale, of one form of a cup-stack release means.

Referring more particularly to Figs. 1 and 2 the invention is shown embodied in a representative vending machine having a cabinet portion 10 and a door portion 11. Vending machine mechanisms (not illustrated) may be housed within the cabinet or in a separate cabinet, as will be understood. A conventional cup-drop device is represented at 12, and comprises a ring-like member having a central aperture adapted to contain a stack of cups and to release them one-by-one as the device is actuated. The mechanism of a cup-drop device per se is well known and as it forms on part of the instant invention further detailed description is deemed unnecessary. Suffice it to say that when the cup-drop is operated, either manually or by coin-controlled means, a single cup is released and allowed to drop upon a recessed shelf 13 provided.

In accordance with the invention the cup-drop mechanism, recessed shelf, and portions of the cup loading mechanisms are mounted upon the door 11 whereby when the latter is moved to an open position, access to the mechanisms within the cabinet for the purpose of replenishing stock, making of adjustments, etc. may be readily had.

In the upper portions of the cabinet a cup storage compartment 15 is provided, which compartment is defined in the instant embodiment by side walls 16, rear cabinet wall 17, a lower wall 18, forwardly and downwardly inclined, and a front wall 19. Preferably the front wall 19 is fashioned with a loading door 20 through which stacks of cups may be inserted into the storage compartment.

As illustrated more particularly in Figs. 2 and 3, the leading portion of the inclined shelf 18 is provided with a hinged trap-door 21, whose length is at least equal to the length of a stack of cups, indicated as S, and a width substantially equalling the cup diameter. The trap-door is also fashioned with a portion 21a that is bent upwardly along a medial line from the general plane of the portion 21b. The latter portion 21b normally lies in a plane substantially coincident with the plane of the inclined shelf 18 to which it is hinged as at 21c. In the position of the parts illustrated in Fig. 1, the trap-door 21 is shown closed and it is normally retained in that position by means of a latching hook 22. The hook 22 is formed somewhat T-shaped, one leg 22h forming a hook, another leg 22a forming a pivot point, and another lateral leg 22b forming a hook release arm. Preferably the pivot point 22a is connected above the door at a point such that the hook end 22b may move substantially perpendicularly to the line of movement partaken by the outer lip 21d of the trap-door in moving from closed to open position. When closed and latched, the trap-door 21 cradles a roll of cups as shown in Fig. 2, but when opened (Fig. 3) the cradled roll of cups is caused to roll downwardly and forwardly off the trap-door. Succeeding rolls are prevented from immediately following by reason of the provision of interference abutments 23 carried by the trap-door at the opposite side of the pivotal axis 21c. The abutments 23, which preferably are a succession of short tabs but which may be a continuous strip, lie normally in the plane of the portion 21b of the trap-door, and when the latter is swung downwardly, to the position shown in Fig. 3, the

4

abutments 23 are elevated and lie athwart the course of the next following stack of cups and prevent forward movement thereof. When the trap-door is in the closed position, the abutments 23 recede allowing the next succeeding roll of cups to roll forward to be cradled in the trap-door. Preferably the free ends of the abutments 23 are formed with downwardly bent portions 23a which, when the trap-door is in closed position (Fig. 2) recede into correspondingly related openings 18a provided in the shelf 18. The door is prevented from swinging too far when opened by means of an extension 40a that underlies the door 21 and abuts the door when the door is fully open.

In normal use of the cup-drop 12, a stack of cups stands vertically therein so that they feed by gravity through the cup release and on to the shelf 13. The instant invention proposes an arrangement for storing the cup-stacks horizontally, to conserve space and to utilize otherwise wasted cabinet space, and to effect the transfer of the stacks singly and successively to the cup-drop as they are needed. To effect the transfer and proper orientation of successive cup-stacks, it is proposed to provide a delicately balanced, centrally pivoted cup chute disposed so that, in one position, it is horizontally aligned with the exit gate formed by the trap-door 22 and in position to receive a roll of cups, and in another position it is aligned with the cup-drop 12 so that the stack of cups received and embraced by the chute may drop thereinto. A preferred form of transfer chute is illustrated more clearly in Figs. 1, 2, and 3 and comprises an elongated open-sided member 25 mounted to swing about a shaft 26 carried by the door 11. Preferably, one end of the chute is closed by an end wall portion 25a which acts as a dust excluder when the chute is in a vertical position.

The pivotal axis 26 of the chute is positioned intermediate the ends of the chute, as illustrated in Fig. 2, and to one side of the longitudinal axis thereof, as illustrated in Fig. 1, so that the chute may revolve in a circle whose radius is approximately one-half of the chute length. The open side of the chute is arranged to face the cup storage compartment 15, and when in its horizontal position is substantially aligned with the exit gate of the compartment when the trap-door 21 is opened, as illustrated in Fig. 3. When the chute is in the said horizontal position and the trap-door is opened, the stack of cups is caused to roll by gravity down the incline of the opened trap-door and into the interior of the transfer chute where it becomes confined by the front, bottom, and top walls thereof.

When a stack of cups occupies the position with the chute 25, as shown in Fig. 3, the weight of the cups overbalances the chute at one side of the pivot 26, and the chute automatically revolves about the pivot 26 and assumes a vertical position medially of the width of the storage compartment wherein the stack becomes aligned with the cup-drop and in position to feed downwardly.

Normally the transfer chute is caused to move in a clockwise direction (Fig. 1) by the provision of a weight 30, radially adjustable on a support 31 carried by the chute at one side of the medial pivot point 26. When the chute is empty, the weight 30 causes the chute to revolve to a horizontal position, preferable with a limited overtravel, and as it approaches the latch 22, lifts it momentarily, and unlatches the trap-



5

door. The trap-door thereupon swings downwardly, under the weight of the stack of cups, the chute returns to a horizontal position, and the cups roll out into the chute. Immediately thereafter, the chute revolves counterclockwise, due to the unbalancing weight of the cups therein. Coincidentally, the trap-door when relieved of the weight of the stack of cups, moves to its closed position, this closing movement being accomplished preferably by a spring 33 connected between the free end of the trap-door and a relatively stationary part of the cabinet.

Experience has shown that as a cup-stack S rolls along the cup rims, it tends to grow longitudinally. To prevent undue elongation, guide rails or tracks 35, 35a, 35b, are provided upon the compartment floor 18, trap-door 21, and at least in one side wall of the chute 25 respectively. These tracks are positioned to engage and guide the lip of the leading cup as shown in Fig. 5, and prevent elongation and consequent binding as the rolls move into operating position.

The track 35b on the inner surface of the transfer chute further functions as an abutment to prevent sliding of the entire stack out the end of the chute as the chute revolves about the pivot 26 in moving from a horizontal receiving position to a vertical delivery position. At the end of the revolving movement the cup-stack is dislodged from the ledge 35b, which is wider than the space between the rims of two nested cups, through the agency of inertia, by the provision of a stationary cup-engaging arm 36 (Fig. 7) positioned to engage and stop cup-stack movement when they arrive in a vertical position. The arm 36 may conveniently form part of the cup-drop mechanism 12 and is arranged to operate through a slot 37 provided in the wall of the chute 25. The shield 40 is a stationary plate suitably attached to the door and is of such size and shape as to form a closure for the side of the transfer chute when the latter is in vertical position. As the cup-stack arrives in a vertical position, the counterclockwise movement of the cup-stack is stopped by the arm 36, whereas the transfer chute 25 may move, under its momentum, a slight distance further, thus moving the ledge 35b from under the cup lip, and the cup-stack falls into the cup-drop. To provide for such releasing action, the width of the cup chute is slightly wider than the diameter of the cup-stack so that a limited overtravel becomes possible.

As the supply in the cup-drop falls to a point whereat the lower end of the weighted transfer chute 25 may move clockwise past the top cup of those remaining in the cup-drop, clockwise movement of the chute again takes place and a new supply of cups is automatically transferred from storage to the cup-drop. For this reason the chute should be delicately balanced in order that the biasing effect of the weight 30 does not exert sufficient lateral pressure on the rims of the last one or two cups to cause it or them to stick and fail to fall into the cup-drop 12 thereby starving the cup-drop and jamming the chute.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various utilizations by retaining one or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention, and therefore, such adaptations should be, and are intended to be,

6

comprehended within the meaning and range of equivalency of the following claims.

Having thus revealed this invention, I claim as new and desire to secure the following combinations and elements, or equivalents thereof, by Letters Patent of the United States:

1. A cup loader for a cup drop mechanism of a dispensing machine comprising, a storage compartment adapted to contain stacks of nested cups, said compartment being defined by a downwardly inclined floor portion, side wall portions, and a front wall portion extending transversely the direction of incline of said floor portion, a stack delivery passageway at the intersection of the planes of said floor and front wall portions, a door element hinged to one of said portions operative normally to maintain the said passageway closed, a movable cup-stack receiving chute operative when in one position substantially to align with said passageway and when in another position to align with the cup-drop mechanism of the dispensing machine, said receiving chute being pivotally supported intermediate its ends, means tending normally to bias the said trough to a position aligned with said storage compartment passageway, said means being overcome on the receiving into the chute of a stack of cups whereby the chute is caused to swing by gravity about its pivot into alignment with the cup-drop mechanism, and chute actuated means operative to open said door when the chute is aligned with the passageway.

2. Loading means for a cup-drop mechanism of a dispensing machine comprising, a compartment for storing stacks of nested cups, said compartment being defined by a downwardly inclined floor portion, upwardly diverging side wall portions, and a front wall portion extending across the lower end of the said inclined floor portion, a cup-stack delivery passageway formed at the intersection of the planes of said floor and front wall portions, a movable cup-stack receiving chute arranged to swing in a substantially vertical plane and operative when in a horizontal position substantially to align with said passageway whereby to receive a stack of cups from said storage compartment and when in a vertical position substantially to align with the cup-drop mechanism of the dispensing machine, said receiving chute being pivotally supported to swing on a horizontal pivotal axis located between its ends so that the chute may revolve, means tending normally to bias the said chute to a position aligned with said storage compartment passageway, said means being overcome by the weight of a stack of cups entering the chute whereby the chute is caused to revolve by gravity about its pivot and into alignment with the cup-drop mechanism.

3. The combination of claim 2 including gate means extending across said passageway operative normally to close the passageway, and means operated by said chute as the latter moves into horizontal position to effect opening of the gate means whereby to permit the passage of a stack of cups therethrough.

4. The combination of claim 3 including escapement means operatively associated with said gate means to release but one stack of cups on each operative cycle of the cup-stack receiving chute.

5. Cup-drop leading means comprising a storage compartment adapted to contain one or more stacks of nested cups, said compartment being defined by a downwardly inclined floor portion,



side wall portions, and a front wall portion extending across the lower end of the inclined floor portion, said front wall portion and said bottom wall portion having a cup stack delivery passageway therein at the intersection of their planes, an escapement means in the passageway operative to pass a single stack of cups on each operating cycle, a movable cup-stack receiving chute operative when in one position substantially to align with said passageway whereby to receive a stack of cups from said storage compartment and when in another position to align with the cup-drop, said receiving chute being pivotally supported between its ends so as to revolve, means tending normally to actuate the chute to a position aligned with said passageway, said last named means being overcome by the weight of a stack of cups whereupon the chute is caused to revolve to a position aligned with the cup-drop mechanism, and means including said chute for actuating said escapement device cyclically whereby said chute receives a stack of cups from storage and thereafter transports the stack to the cup-drop.

6. The combination of claim 5 including means in addition to the side walls of the storage compartment to guide the cup-stacks along the inclined floor portion.

7. The combination of claim 5 including abutment means positioned within the chute operative to engage with and constrain the cup-stack against movement in a longitudinal direction therein, and means operative as the chute arrives in a vertical position to dislodge the stack of cups from said chute contained abutment.

8. Loading means for a cup-drop mechanism of a dispensing machine having a cabinet portion and a door portion comprising, a compartment in the cabinet portion for storing stacks of nested cups, said compartment being defined by an inclined floor portion, side wall portions, and a front wall portion and said compartment having a cup-stack delivery passageway formed therein, a movable cup-stack receiving chute arranged to swing in a vertical plane and operative when in a horizontal position substantially to align with said passageway whereby to receive a stack of cups from said compartment and when in a vertical position to align with the cup-drop mechanism of the dispensing machine, said receiving chute being pivotally supported to the door portion of the dispenser so as to swing on a horizontal pivotal axis, means tending normally to bias the said chute to a position aligned with said storage compartment passageway, said means being overcome by the weight of a stack of cups being placed in the chute whereby the chute is caused to swing by gravity about its pivot and into alignment with the cup-drop mechanism, gate means extending across said passageway operative normally to close the passageway, and means operated by said chute as the latter moves into horizontal position to actuate said gate means whereby to release a stack of cups to the chute.

9. A device for transferring a stack of cups from storage to a point of use and for orienting the stack from horizontal position in storage to a vertical position in use which comprises a movable chute member, said chute being closed on three sides and disposed with its open side facing the cup-stack held in storage, means for moving the chute to a generally horizontal position adapted to receive a stack of cups said last named means being overcome by the weight of a stack

of cups received in the chute whereupon the chute is caused to move to a vertical position wherein the stack of cups may fall by gravity through the chute, closure means for the open side of the chute operative when the chute is vertically disposed, abutment means positioned within the chute operative to engage with and normally constrain the cup-stack against movement in a longitudinal direction therein, and means operative as the chute arrives in a vertical position to dislodge the stack of cups from said chute contained abutment.

10. A device for transferring an object from storage to a point of use and orientating the object from horizontal position in storage to a vertical position in use which comprises a movable chute member, said chute being closed on three sides and disposed with its open side laterally directed and facing the objects held in storage, means pivotally supporting the chute to swing about a horizontal axis, said pivotal supporting means being positioned between the ends of the chute so that the chute may revolve, means operative normally to bias an empty chute in one direction about said pivotal axis, said last named means being overcome and said chute being caused to move in the opposite direction upon receiving an object therein and stationary means positioned adjacent the said lateral open side of the chute effective as a closure therefore during the revolving of the chute and whereby the object to be orientated is contained within the chute during the orientation.

11. Loading means for a dispensing mechanism of a dispensing machine having a compartment for storing items to be dispensed, said compartment being defined by a floor portion, side wall portions, and a front wall portion extending across the end of the said floor portion, and a delivery passageway formed at the intersection of the planes of said floor portion and the front wall portion, comprising a movable open-sided receiving chute arranged to swing in a substantially vertical plane and operative when in a horizontal position substantially to align with said passageway whereby to receive through its open side an item to be dispensed from said storage compartment and when in a vertical position substantially to align with the dispensing mechanism of the dispensing machine, said receiving chute being pivotally supported to revolve on a horizontal pivotal axis located between its ends, means tending normally to bias the said chute to a position whereat its open side is aligned with said storage compartment passageway, said means being overcome by the weight of an item received in the chute whereby the chute is caused to swing by gravity about its pivot and deliver the item to the dispensing mechanism.

12. The combination of claim 5 in which cups within the chute and extending above the lowermost edge of the chute when the latter occupies a position aligned with the cup-drop mechanism arrests operation of the means tending normally to revolve the chute to a position aligned with the said passageway until the cups have been discharged below the lowermost edge of the chute.

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