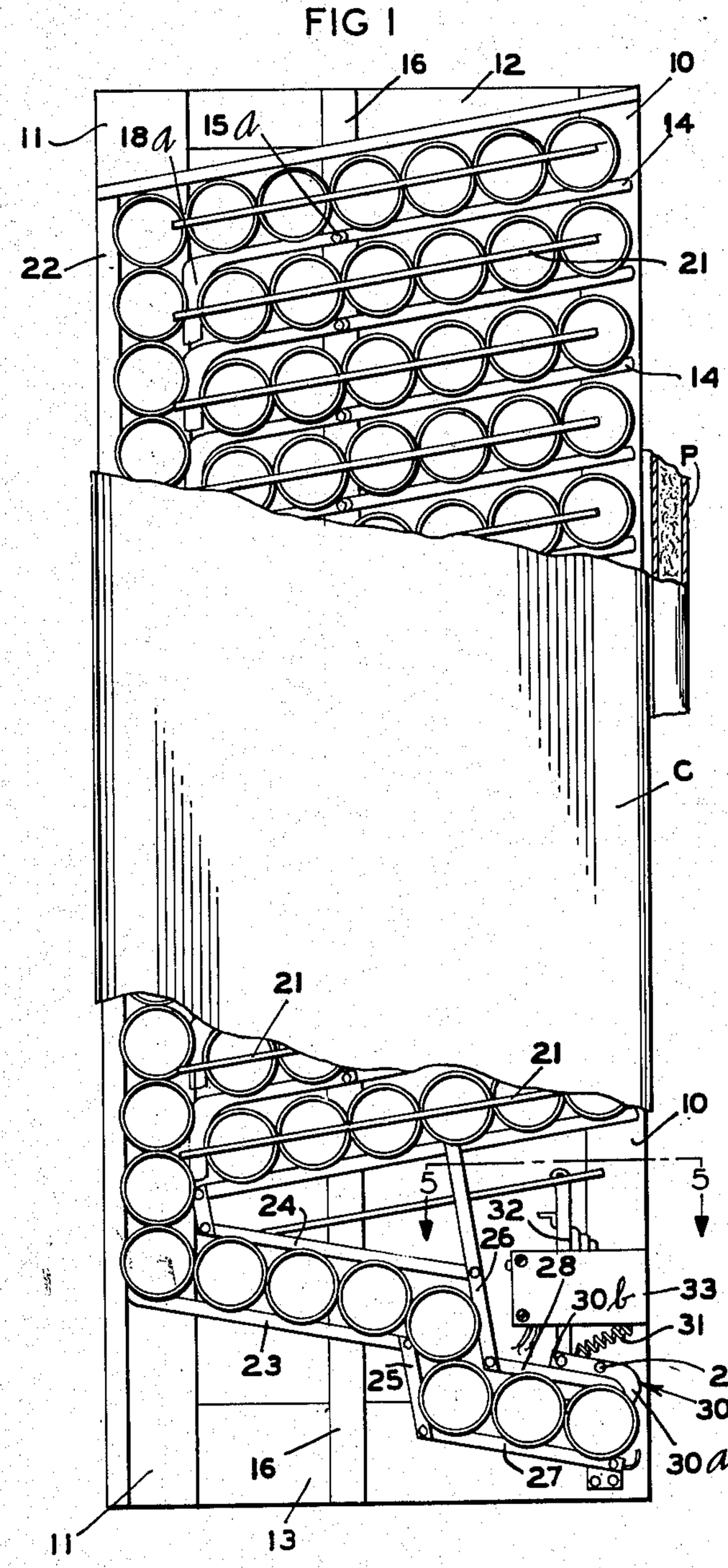
Feb. 17, 1953 F. A. OSSANNA, JR 2,628,875

VENDING OR DISPENSING MACHINE FOR CYLINDRICAL CONTAINERS

Filed Sept. 14, 1949 3 Sheets-Sheet 1

FIG 1



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Filed Sept. 14, 1949 3 Sheets-Sheet 2

FIG 7

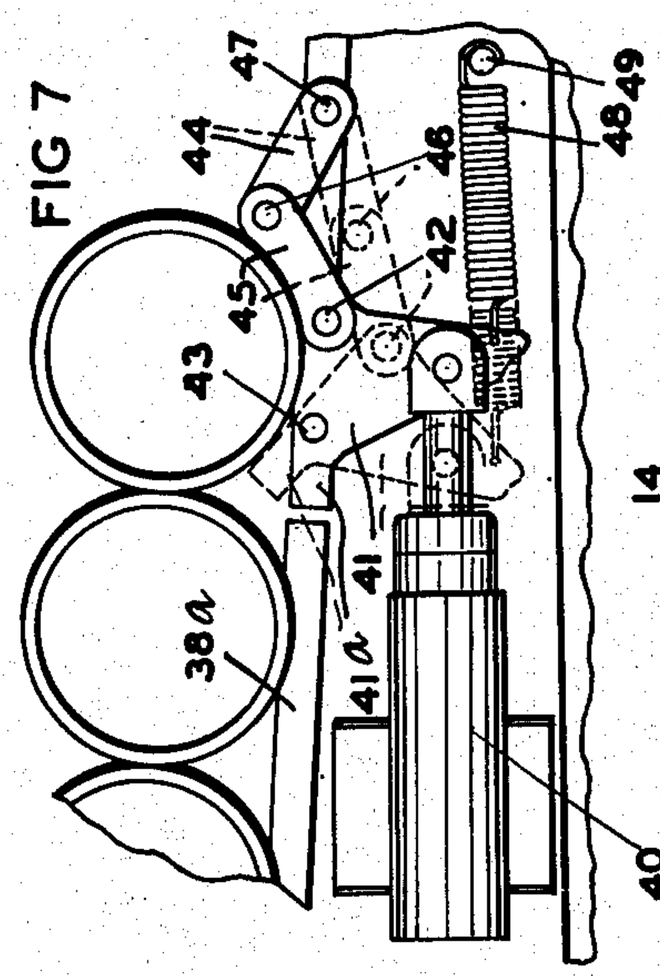


FIG 2

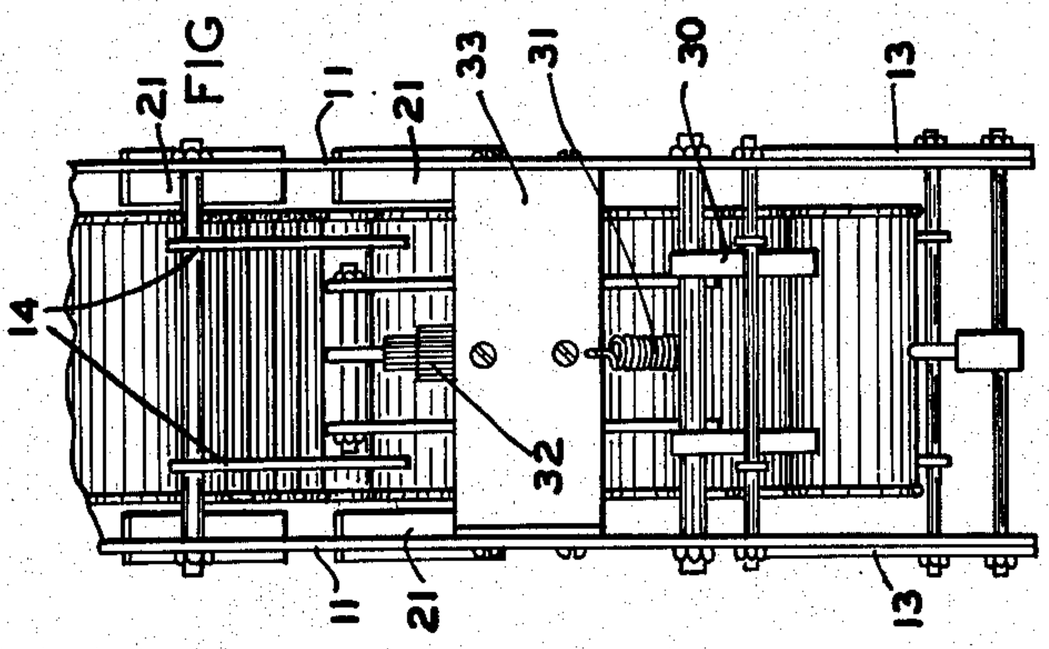


FIG 6

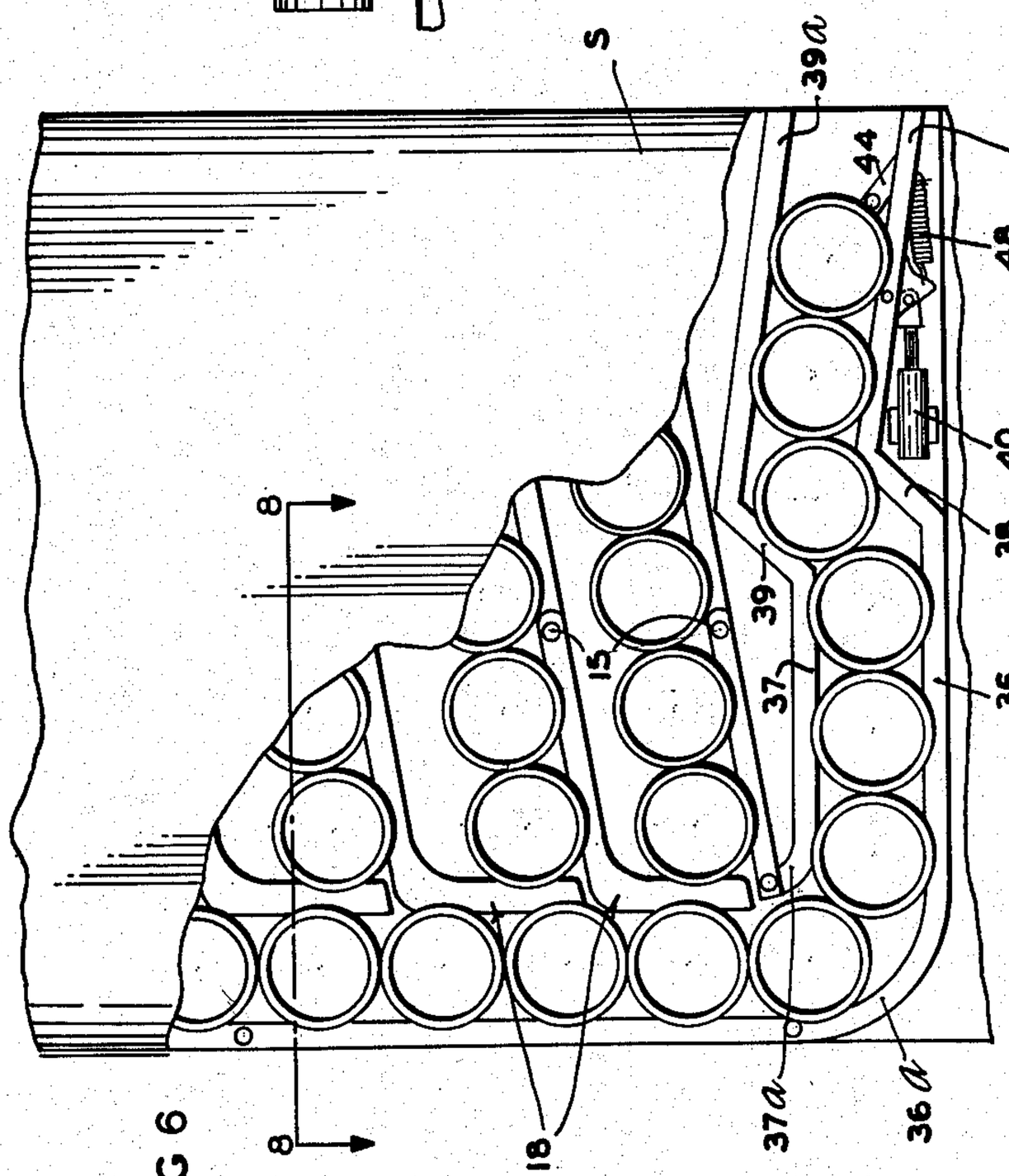
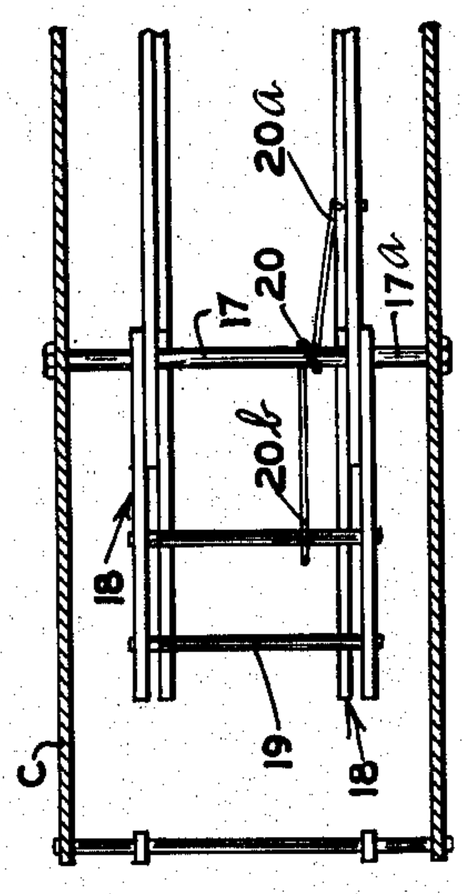


FIG 8



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Filed Sept. 14, 1949 3 Sheets-Sheet 3

FIG 3

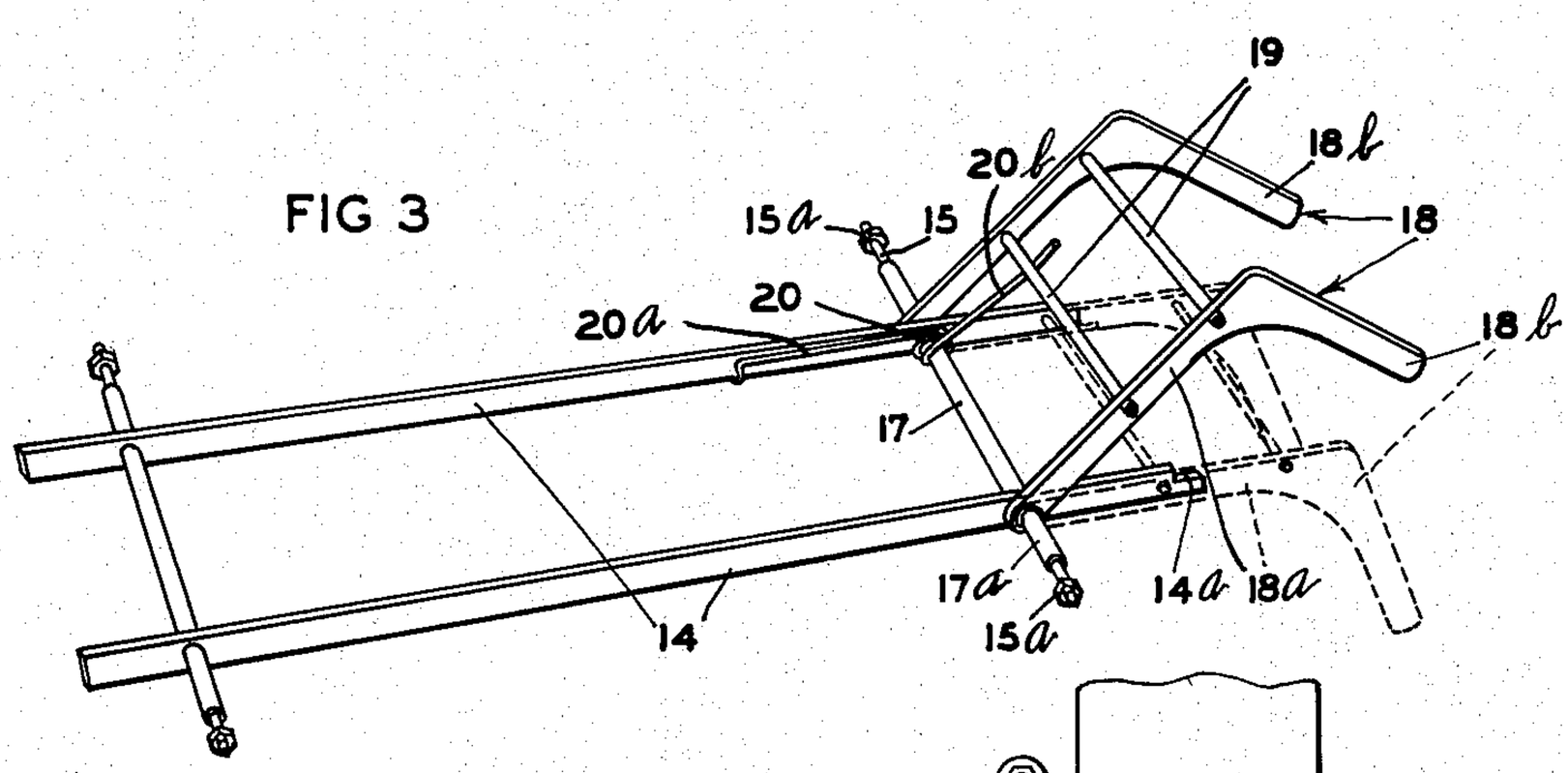
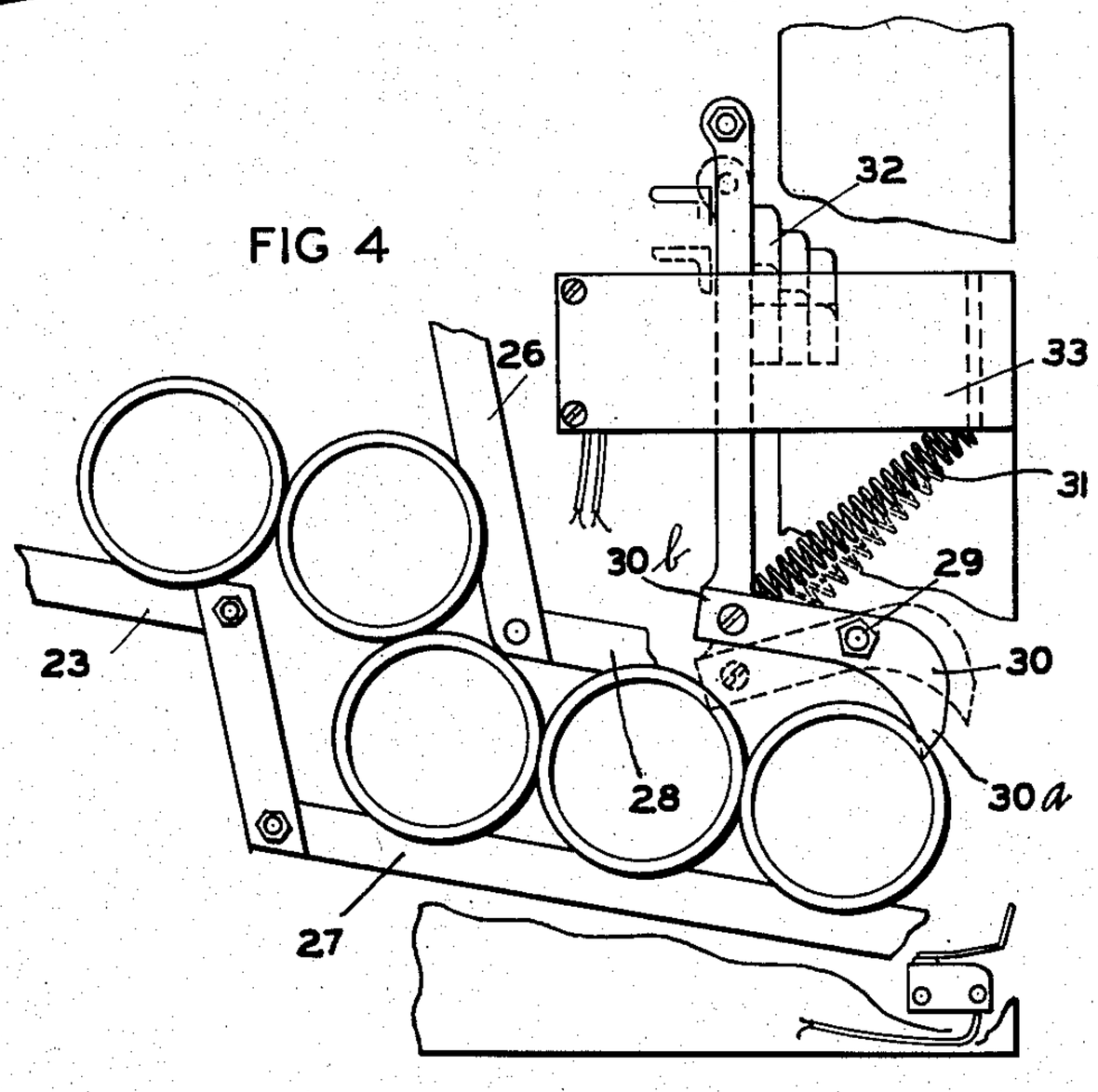


FIG 4



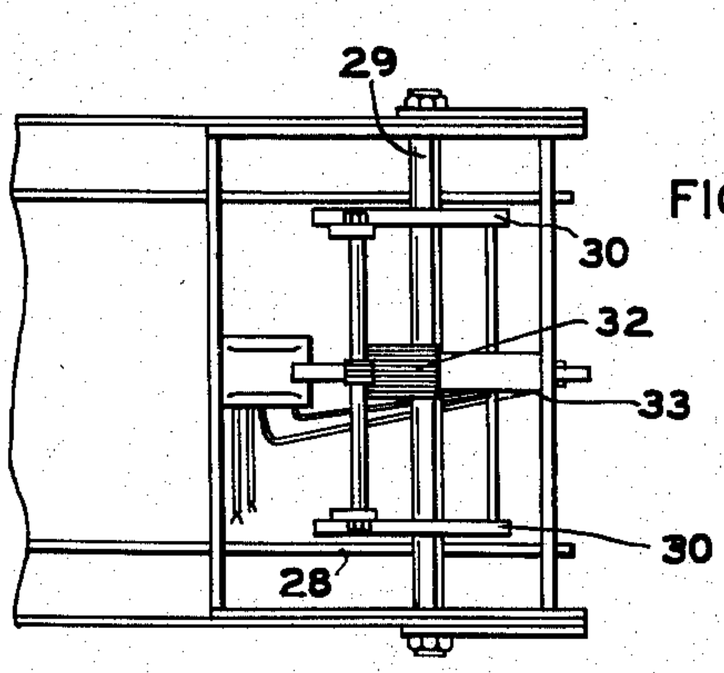


FIG 5

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UNITED STATES PATENT OFFICE

2,628,875

VENDING OR DISPENSING MACHINE FOR CYLINDRICAL CONTAINERS

Fred A. Ossanna, Jr., Austin, Tex.

Application September 14, 1949, Serial No. 115,756

4 Claims. (Cl. 312—48)

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This invention relates to automatic vending machines and particularly to a machine for storing a large number of cylindrical product-containers such as cans and for dispensing such containers, one at a time, through the control of an instantaneous release mechanism.

My invention has for its general object, the provision of a simple and efficient vending machine for cans and other cylindrical product-containers which will store and provide facilities for intermittent flow of a large number of filled containers in a minimum amount of space and will, subject to finger control preferably in connection with a coin control mechanism, discharge said containers one at a time through the medium of an instantaneously actuated release mechanism incorporated into the structure and closely cooperating with the control and flow of containers through the machine.

It is a further object to provide in a can vending machine, a multiple ramp and delivery chute structure wherein filled cylindrical containers varying materially in size, may be stored and dispensed one at a time, with provision for supporting and guiding the progressive travel of the containers for rolling, dropping and subsequent rolling action through a gravity principle alone and wherein throughout the entire system, the retarding effects of friction have been minimized by my novel and efficient construction.

Another object is the provision in a vending or dispensing machine for cylindrical containers, of a multiplicity of container storage ramps inclined slightly from the horizontal and delivering to a downwardly extending delivery chute very compactly related therewith, all in combination with combined gate and ramp extension mechanism which is related to the storage rack, discharge chute and release mechanism to prevent mutual interference between the inclined rows of stored containers and those in the delivery chute and which operates independently for each ramp and is dependent for opening operation upon relief of the weight of all containers in the above ramp and which further, has the combined functions of retaining containers in one ramp and normally acting as a portion of the guides for the delivery chute and also acting as an extension for the rails of the container ramp above.

A still further object is the provision of simple, compact and efficient, instantaneously operated, release mechanism cooperatively associated with the storage and flow system of my machine to discharge and dispense one container at a time and to control the intermittent progressive flow

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of containers in the machine as well as to check and lock flow during the vending or discharge operation of all containers with the exception of the forwardmost container being discharged.

Another object is the provision of a gravity actuated vending machine and system of the class described, capable of high capacity for storage, but so constructed that the weight pressure in the rack is relieved during all conditions to a point negligible in its effect upon the flow and vend of the containers.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a side elevation of an embodiment of my vending machine with top and bottom portions of the casing broken away to show the rack construction, the bottom ramp and the electromagnetically operated can-release mechanism;

Fig. 2 is a front elevation of the lower portion of my vending machine with the casing removed;

Fig. 3 is a detail perspective view showing one section of the ramp rails removed, having my efficient gate mechanism applied thereto, the dotted lines indicating the container-retaining position of the gate mechanism;

Fig. 4 is a fragmentary side elevation on a somewhat larger scale showing the forward portion of the vend area of the storage rack with pressure-relieving jog therein and illustrating the structure of my release mechanism;

Fig. 5 is a fragmentary, horizontal cross section taken on the line 5—5 of Fig. 1;

Fig. 6 is a fragmentary side elevation showing a somewhat different embodiment of my invention with the casing removed;

Fig. 7 is a fragmentary side elevation on a somewhat larger scale, showing the solenoid-operated release mechanism of said second embodiment; and

Fig. 8 is a fragmentary, horizontal cross section taken on the line 8—8 of Fig. 6 and showing the vertically offset relation of the gate arms of successive ramps which permit of independent, non-interfering operation of the gate construction.

Referring now to the embodiment of my invention shown in Figs. 1 to 5 inclusive, an upstanding, relatively tall, box-like frame is provided comprising as shown, elongated, rear and forward rigid metal corner posts 10 and 11 respectively, interconnected and reinforced at top

and bottom by relatively short transverse beams 12 and 13 respectively. The frame is further reinforced, as will hereafter appear, by transverse interconnection of rail-supported rods and release mechanism-supporting plate.

Within said unitary frame is mounted my storage rack structure, delivery chute, bottom delivery ramp and electro-magnetically operated release mechanism.

It will be understood that while I have illustrated one unit capable of handling filled cylinder containers varying somewhat in length and diameter, in commercial machines ordinarily a plurality of said units will be utilized in compact, side by side relation, each employing all the mechanism illustrated here and housed within a unit, causing and preferably being adapted to store and vend in each unit, a different product.

A multiplicity of container-storing ramps are supported in my frame inclined slightly from the horizontal from the rear of the machine to the front at preferably an angle approximating eight degrees from the horizontal. These ramps are formed and defined by a multiplicity of pairs of spaced, parallel, narrow rail bars 14 disposed edgewise and spaced apart a distance considerably less than the length of the can or cylindrical container to be supported thereon. The rails 14 extend from the front and loading side of the machine to points several inches short of the rear of the machine and short of the rear longitudinal edges of the elongated corner bar posts 11. They are supported as shown, in pairs by horizontal rail-supporting rods 15 which are bolted at their ends to the forward corner posts 10 and to elongated vertical frame bars 16 disposed at the respective sides of the frame and secured thereto intermediately of the corner bar posts. The extremities of rail support rods 15 are threaded to receive nuts 15*a* and spacer sleeves are utilized upon the rods to space the rails 14 the requisite distance apart and to further space the rails in proper relation with the sides of the frame. To this end, longer intermediate spacer sleeves 17 are telescoped over the rods 15 and interposed between the two rails of a pair, while shorter spacer sleeves 17*a* are interposed between the sides of the frame and the longer rail extension arms 18*a* of a novel gate mechanism which comprises an important part of my invention.

Gate mechanism comprising a pair of rigidly interconnected L-shaped gate arms 18 is provided for each of the ramps with the exception of the top ramp and the bottom delivery ramp of my structure. The gate arms 18 spaced apart and rigidly interconnected by a pair of transverse rigid rods 19 interconnecting the longer and upper sections thereof are fulcrumed adjacent their inner extremities upon the rearwardly disposed rod 15 and said rod as clearly shown in Figs. 1 and 3, is disposed inwardly a few inches from the rear extremities of the rails 14. The length of the sections 18*a* of the gate arms is such that said arms in normal downward position, are disposed in continuation and flush against the rails 14 for a distance of several inches, support for said arms being made by the inner, transverse, interconnecting rod 19 abutting and being received in a recess or shoulders 14*a* formed in the rear ends and upper edge of the rails 14. The L-shaped gate arms have

integrally formed therewith, the normally depending can-retaining legs or sections 18*b* which are angled approximately at 100 degrees relative to sections 18*a* to complement the angulation of rails 14 and to dispose sections 18*b* in substantially vertical position cumulatively for the several ramps constituting a substantially vertical guide at one side of the channel or delivery chute.

Gate members 18 and the entire gate structure is urged upwardly into open and non-obstructing position by torsion springs 20 having one or more convolutions encircling an intermediate spacer sleeve 17 and each having an arm 20*a* affixed and abutting the appropriate rail 14 and a second radial arm 20*b* underlying one of the tie rods 19 of the associated gate mechanism. The torsional springs 20 are tensioned and of sufficient power to instantly raise the gate mechanism to the full line position shown in Fig. 3 when the weight of all filled cans or containers formerly resting thereon has been removed. The weight of a single container resting upon the longer arms or sections 18*a* of the gate mechanism, which arms constitute rail extensions, is adequate to retain the gate mechanism in the closed position indicated by dotted lines in Fig. 3 with the depending sections 18*b* obstruct-flow of containers rearwardly in the ramp below.

It is important to note (see Fig. 8) that the L-shaped arms 18 of the alternate gate mechanisms from top to bottom, are disposed in vertically offset, non-interfering relation with the vertical planes of the adjacent gate mechanism arms. This of course, can be easily accomplished by alternately varying the spaced relation of the arms 18 of the successive pairs, from top to bottom.

For each ramp formed by a pair of the rails 14 and the associated rail extension and gate mechanism comprising arms 18, rigid end guide strips 21 are provided secured to the front and rear corner bar posts 10 and 11 and extending in parallel relation with the inclined rails 14 and disposed in end positions substantially diametrically of the cans or other filled containers stored in the racks.

A downwardly extending, preferably vertical delivery chute common to all of the ramps defined by the several sets of rails 14 and gate mechanisms 18, is formed at the rear of the machine as shown, defined at its rear side by a pair of spaced, vertical rails 22 appropriately secured at their ends and intermediate portions to suitable members of the rigid frame and spaced rearwardly of the rearward edges of sections 18*b* of the gate mechanism for accommodation and adequate clearance of a vertical row of cans delivered from the ramps. As previously stated, the rear edges of sections 18*b*, when the gate mechanisms are disposed in closed positions cumulatively form guides at the forward side of the delivery chute.

At the lower end of the delivery chute and adjacent the bottom of the frame, a lower, forwardly delivering ramp is formed in communication with the bottom of the chute, comprising as shown, a pair of forwardly declined spaced, parallel rails 23 secured at their rear ends to the vertical rails 22 of the delivery chute and extending to an intermediate position in the width of the frame. The ramp further includes a pair of parallel, forwardly declined retaining rails 24 po-

sitioned parallel and above the rails 23 for preventing upward displacement of the cylindrical containers in the intermittent flow and delivery thereof.

Said lowermost or vending area ramp includes a downwardly, jogged portion comprising short rails 24 inclined with respect to the vertical and parallel spaced rails 26 lie in substantial alignment with the rails 23 and 24 and forming a jog passage communicating at its forward end with a forwardly declined passage defined by two sets of rails 27 and 28 respectively, which extend to the forward side of the machine for delivery of cylindrical, filled containers, one at a time, subject to control of my solenoid-operated release mechanism.

In commercial use of my invention, a plurality of such units disposed in compact, side by side relation, are usually housed in an ornamental casing C enclosing the entire structure at sides, top, rear and front. The front of the machine is provided with a removable closure panel P having conventional type of interfitting and locking mechanism for securing the same to the frame. This panel must be removed for loading of the various ramps of the rack and if made in a continuous sheet, has a suitable aperture or recess with can-receiving means for facilitating the discharge of one cylindrical container at a time from the front of my machine.

The bottom ramp having the downwardly jogged, vending area delivers the containers progressively from the vertical delivery chute and because of the jog and abutment relation of one or more containers with the nearly vertical edges of tracks 26, relieves the entire system when fully or partially loaded of the greater portion of the weight pressure, thereby preventing interference or bunching up of containers in the intermittent flow. Relief of this pressure is necessary for efficient and orderly operation of my machine and for cooperative control of the discharge through a relatively small and compact release mechanism.

My release mechanism, as illustrated in Figs. 1 to 5, comprises a dual function dog disposed intermediately between the vend area upper guard rails 28 and fulcrumed on a horizontal pivot shaft which may be suitably supported from the lower portions of the forward bar post 10 of the frame. The dog mechanism as shown, comprises a pair of rigidly interconnected spaced arms 30 fulcrumed on the shaft 29 and having forwardly and downwardly curved and somewhat hook shaped container-retaining portions 30*a* for engagement as shown in Figs. 1 and 4 with the forward portion of the endmost container and having also rear abutment extremities 30*b* for engagement with the next to the forwardmost container during swinging of the dog structure for release of the forwardmost container. The dotted lines in Fig. 4 show the moved position of the dog mechanism 30 wherein the end container is released for discharge and the next successive one is engaged and locked by the abutment end 30*b* to retain all containers in the lowermost ramp, delivery chute and racks, in stationary position, until the dog mechanism is returned to normal retaining position, as shown in full lines in Fig. 4.

It is desirable that the dog mechanism 30 be instantaneously controlled to properly lock and retain all containers with the exception of the forwardmost in stationary relation. To this end, I have provided an electro-magnetic mechanism controllable by a button or finger pressure for

suddenly swinging dog mechanism 30 from container-retaining position to releasing position. A coil spring 31 connects the rear portion of the dog mechanism 30 through a strut comprising a cross shaft at the rear of the two arms 30 with an attachment element disposed forwardly and above the fulcrum of the dog. This spring is tensioned to normally swing the hooked retaining end 30*a* of the dog mechanism downwardly to engage the forward portion of the forwardmost container. At the rear end of the dog mechanism 30, is pivotally mounted an upwardly extending armature bar or core 32 of a solenoid mechanism, the electro-magnetic coil or windings of which is mounted in a solenoid frame 33. An electrical circuit is provided for the electromagnetic coil which usually includes a coin control master switch for interconnecting wires of the circuit and which become effective to close the circuit after depositing a coin and after a button or other switch element is press controlled by the purchaser. The action of the solenoid is of course instantaneous when finger pressure is applied to the button or switch and causes the rear end or strut of the dog mechanism to be elevated and the front end depressed, raising the retaining hooks 30*a* and simultaneously lowering the abutment ends 30*b* of the dogs 30 to engage against the forward portions of the second container in series from the delivery front of the machine.

The particular means and method of supporting cylindrical containers for rolling action throughout the various ramps, is an important feature of my invention. Friction throughout my machine has been minimized by the positioning of the support rails of the declined storage ramps in such a way that containers are supported at two points located as near as and on each side of the center of gravity of the containers as possible, without producing undue, lateral instability. It is understood of course, that the containers are placed in the rack on their sides and rolled down the support rails and fall progressively down the substantially vertical delivery channel, guided by rails on either side and walls at either end. The effect of the above mentioned placement of my support rails in the declined ramps, is to permit the containers to be guided along a straight path by the sides of the frame of the rack or casing with very little frictional force. It amounts to the difference in force required to guide and roll a keg having convex sides as contrasted with a truly cylindrical drum; the difference in force required to control a rolling beer keg and a rolling oil drum. I have found that most effective relation of the spacing of the narrow rails to the length of the container is within a range of from 40% to 75%, optimum spacing of the rails being substantially 50% and the widest effective spacing being illustrated in the drawings.

In order to prevent mutual interference by the declined storage rows of containers and the vertical delivery channel receiving therefrom, it is necessary to isolate by means of gates, each of the declined rows which feed into the vertical delivery channel. This is accomplished by means of the gate structures which are supported in each case, by a hinge pin extending through the inner ends of the arms 18*a* and which extend also through the inclined support rails. In the down or closed positions, the gates

are supported by shouldered extensions of the support rails 14 disposed outwardly or beyond the hinge pin. In the closed position, each gate permits the containers rolling upon the declined rails to which it is attached, to flow over the top side of the gate (arms 18*a*) and into the vertical delivery channel. That is to say, the gate in a down position, acts as an extension of the declined support rail as well as a short vertical rail structure for the front side of the vertical delivery channel of the ramp below. The sides 18 of the gate structure, have the general shape of an L with preferably an inner angle approximating 98 degrees. The diagonal support rails are set at approximately an 8 degree decline toward the vertical delivery channel. As previously stated, the closed gate structure in each instance, acts as a closure and release means for the declined row of containers located in the ramp directly below the rails 14 to which the gate structure is pivoted.

When the containers are entirely evacuated from a given declined storage row or ramp and the very last container of that row has passed below the lowest end or toe (bottom end of the short side of the L of its gate, that gate then automatically rises, releasing the declined row of containers which it had been holding back and holding out of the vertical delivery channel, while in closed position. Two forces activate the gate elements: First, a torsion spring or other yieldable means wound about or otherwise operatively connected with the axle or gate structure and secondly, the weight of the row of containers retained behind the gate arms 18*b* in the closed position of the gate structure.

My gate structure is so designed that the weight of only one container above it will hold it in a closed position against the combined force of the spring and the row of containers immediately below in the declined storage ramp. It is obvious also that when the last container is in the vertical delivery channel and opposite the short side of the L of the gate structure in its closed position, the gate cannot open against it. The angle of declination of the storage rails is such that the weight of the containers in a given diagonal row is not adequate to jam a container positioned in the vertical delivery channel opposite the toe of the gate.

A very important aspect of the automatic operation of my gate mechanism is as follows:

Whereas the declined support rails are spaced identically in width throughout the rack, the gate structures located at the lower or delivery ends of each set of declined rails, are of alternating widths, so that independent action is possible for each gate and so that no gate can interfere with adjacent gates in its operation or in the operation of said adjacent gates, regardless of what position any of the gates may be in. This unique feature which I choose to call "scissor action of the gate elements" positively eliminates the possibility of jamming the vertical delivery channel by out-of-sequence delivery action of the various declined ramps or storage rows. Fig. 8 of the drawings which illustrates a slightly modified form of the invention later to be described, shows to best advantage, the vertically offset, alternate width relation of the gates which is easily obtained by making alternate gate structures of greater width and then alternately pivoting the arms of the gate structures to the inner sides of the interconnected rails and then to the outer sides of the interconnected rails.

Ordinarily, the rack should be loaded from top to bottom. This will insure emptying the same in sequence from top ramp downwardly. However, in the event that the loader should fill the rack indiscriminately, the only result will be that he will be unable to insert the full complement of containers into the rack. The rack will empty automatically just as well after such loading, however, because of the vertically offset gate side relations or as I call it, the "scissor action" of the adjacent gate element. This is so because with independent action for each gate, the instant any out-of-position container in the vertical delivery channel moves down (as a container is released from the rack), any gate which might not be fully up or fully down (the two normal positions of rest for the gate elements) will either rise or lower in the delivery channel, depending upon whether the container holding it in its usual position is the last container in the vertical row. If it happens to be the last container the gate formerly fouled by it, will rise to its fully open position, thus releasing its containers into the vertical delivery channel. If there are several containers above the one causing the fouling, then the gate will close when that container is out of the gate's orbit. This follows because the weight of one or more containers directly down in the vertical delivery channel is more than the combined weight of the spring-raising effect and the containers held back by the toe of the fouled gate.

It is critically necessary to have in my system, which stores and provides one-at-a-time delivery to a very large number of filled containers, a means for very materially relieving the weight pressure upon the row of cans in the vertical delivery channel and upon the containers in the lower delivery ramp in the vend area. This I very effectively accomplish through the jogged structure of the lowermost delivery ramp which declines forwardly from its rear communication with the vertical delivery channel to the forward side of the machine. With my structure the weight pressure is substantially constant in full storage or partially filled conditions of the rack and at a minimum in all conditions. Consequently, a very simple and compact solenoid release mechanism may be utilized to instantaneously release the foremost container in the delivery ramp upon finger pressure of a button or lever and to simultaneously lock and prevent movement of the other containers in the system, until the vend is completed.

For example, as shown, the vertical delivery channel will hold approximately eighteen containers. Any declined storage ramp as shown, will hold six cans. The bottom forwardly declined delivery ramp receiving from the vertical delivery channel holds seven containers and this ramp has incorporated into it, the jog effected by the sets of short and sharply inclined rails 25 and 26 and their relation with the rear rails 23 and 24 and the forward vend rails 27 and 28. The total weight which would be exerted on the release mechanism by a full rack (vertical delivery channel and top and bottom declined ramps) would be approximately eighteen pounds when six ounce filled containers are used and if no pressure relief system were incorporated in the rack. With my jog construction, maximum pressure of three and one half pounds or less, is

present when the vertical channel and all ramps are filled to capacity.

In the same example, the release mechanism is preferably held in a normal or closed-in-front position by a spring having a pull approximating ten pounds. Without efficient means built into my structure for diverting and reducing pressure of the containers upon the release element, a partially open or jamming position would result because as the release element or structure rises in front to emit a container or make a vend, it lowers at its rear end to stop the succeeding container in the rack during the dispensing or vending action. If the release element were forced partially open by weight of container, it follows that the second container behind the container being dispensed, would be too far forward to permit the butt of the release element to fully lower. If it could not fully lower in the rear, the release element could not fully rise to dispense and the whole rack would be jammed until cleared manually. In the same example referred to, a solenoid, capable of overcoming a spring pressure greater than the ten pounds specified (preferably approximating twelve pounds) may be utilized. A larger solenoid capable of overcoming a spring pressure of from eighteen to twenty five pounds would be inefficient and wasteful of space.

It is critically necessary to have both upper and lower rails in the bottom declined ramp and more particularly, at the turn junctions so that the line of containers is kept accurate and bunching up prevented. Thus, we see that there are three points where force or pressure is taken by the rack rails and removed therefore from the release elements: (1) At the sharp curve at bottom of vertical delivery channel. (2) At the strut formed by the front rails **26** of the jog occuring approximately at the middle of the bottom delivery ramp. (3) At the bottom rail directly under the jog or drop (rails **27**).

In Figs. 6 to 8 inclusive, I illustrate another embodiment of my invention identical in most respects with the form first described and consequently similarly numbered throughout the parts which are utilized in common. In this second embodiment of the invention, I may dispense with a separate frame for the rack including the corner, vertical plates or posts **10** and **11** and provide templates or casing sides S made the full width and height of the machine and acting as the guides for the ends of the containers in the ramps and downwardly extending delivery chute. The shafts or rods **15** for supporting the rails and pivoting the gate structures, may be affixed in suitable sockets drilled or tapped in the opposing inner sides of the templates S.

In this second embodiment, a different construction of jog is utilized in the lowermost delivery ramps, which receives from the vertical delivery channel and a smaller, more compact and different form of release mechanism is also employed.

Referring now to Figs. 6 and 7, the lowermost ramp for delivery and including the vend area of containers is declined from the rear of the machine forwardly at very slight angulation from the horizontal throughout approximately half of the breadth comprising lower rails **36** and necessarily upper rails **37** disposed in pairs the same distance apart as the main storage rails. Rails **36** and **37** communicate with the rear guide rails and forward guides of the vertical delivery chute by means of substantially arcuately curved portions **36***a* and **37***a* respectively. The forwardly declined delivery ramp is then jogged upwardly at a sharp incline by lower and upper cooperating rails **38** and **39** which as shown, are of a length slightly less than the diameter of one container. Thereafter, the vend area rails **38***a* and **39***a* are declined forwardly to the extreme front of the machine, as clearly shown in Fig. 8.

The upward jog in the bottom delivery ramp, as described, offers a space below the forward portion of the ramp, for nicely accommodating the solenoid **40** and other parts of my electromagnetically operated release mechanism. The release mechanism, as best shown in Fig. 7, comprises for each side adjacent the forward ends of the rails **39**, a triangularly shaped dog **41**, the two dogs of the mechanism being transversely aligned at the machine and rigidly interconnected by cross rod **42** and by the fulcrum rod **43**. The rod **42** further serves to pivotally connect a short link structure **44** with the inwardly extending ends of release arms **45**. Two of said arms are provided rigidly interconnected by the pivot rod **46** and said links are fulcrumed at their outer ends upon a cross shaft **47**. The inner extremities of the release links **45** are shaped to engage the lower and forward portions of the periphery of the forwardmost container in the vend area. Normal container-retaining position is illustrated in full lines in Fig. 7 while the release or vending position of said mechanism is illustrated in the dotted lines. In release, it will be noted that the triangular dogs **41** are provided with short, rearwardly extending abutment arms **41***a*, which are adapted in the vending action to be engaged by the next successive containers inwardly of the container being discharged. The dogs **41** and the articulated linkage connected with the forward portions thereof, are urged to retaining position by one or more coiled springs **48** interposed between the depending apex of the dog element **41** and retaining element **49** affixed to the forward and lower portion of the frame.

The machine described, as shown in Figs. 6 to 8 inclusive in a single or multiple units, is of course, adapted and ordinarily enclosed within an insulated or refrigeration housing (not shown) and having a door or doors at the front thereof which may be locked if the machine is used for coin control vending.

It will of course be understood that my machine and invention is not only adapted for coin control vending of filled cylindrical containers, but is equally adapted as a one-at-a-time dispensing machine for frozen foods and other articles, packaged in cylinder containers.

It will of course be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of my invention.

What I claim is:

1. In a vending or dispensing machine for cylindrical containers, a storage rack having a plurality of declined ramps adapted to deliver to a common delivery channel, each of said ramps being defined by a supporting bottom structure upon which cylindrical containers may freely roll and a bottom structure extension swingably secured to said bottom structure and normally extending to said delivery channel, abutment means for retaining said extension in container-supporting position when the weight of containers is imposed thereon, yieldable mechanism for swinging said extension upwardly when the weight of no containers is imposed thereon and a gate for closing off discharge of containers on the ramp

below, said gate comprising a depending structure secured to the outer end of said bottom extension and normally positioned at one edge of said delivery channel, the gates of alternate ramps being staggered in vertical relation to permit free and independent swinging of the gate and bottom structure extensions throughout the rack.

2. In a vending or dispensing machine for cylindrical containers, a storage rack having a plurality of declined ramps adapted to deliver to a common delivery channel, each of said ramps being defined by a pair of parallel rails declined somewhat from the horizontal, a combined rail-extension and gate mechanism hinged to said rails adjacent the lower ends thereof and comprising a pair of straight rail extension members adapted for positioning in side by side relation with said rails and extending on the tops thereof in a common plane with said rails when the weight of containers is imposed upon said mechanism, abutment means for retaining said mechanism in container-supporting position, resilient mechanism for swinging said first mentioned mechanism upwardly when the weight of all containers is removed therefrom, said rail extension members having parallel gate arms angled downwardly therefrom and of a height to extend to points adjacent the rails of the ramp below to control delivery of containers from said lower ramp, said gate arms when in normal position on a plurality of said ramps cooperating with means spaced therefrom to define at least a portion of a downwardly extending delivery channel, said parallel gate arms of alternate ramps being staggered in vertical relation to permit free and independent swinging of the gate arms and rail extension members throughout the racks.

3. In a vending or dispensing machine for cylindrical containers, a storage rack having a plurality of declined ramps adapted to deliver to a common delivery channel, said ramps being defined by a supporting bottom structure declined towards the delivery ends thereof and upon which cylindrical containers may freely roll and at least a multiplicity of said ramps having a combined bottom extension and gate structure swingably connected with the lower portions thereof, said structure comprising a ramp bottom extension adapted for positioning substantially flush with said bottom when the weight of any containers is supported above, thereon and comprising a depending, angled pair of spaced gate arms secured to the outer portion of said bottom extension and including also yieldable means for swinging said bottom extension and gate structure upwardly when the weight of all containers is removed therefrom, the spaced relation of said depending gate arms of alternating ramps being staggered in vertical relation to permit free and independent swinging of said gate and ramp extensions throughout the rack.

4. In a vending or dispensing machine for containers, a storage rack including a plurality of sets of parallel rails for supporting and causing rolling of cylindrical containers and a combined rail-extension and gate mechanism hinged to certain adjoining sets of rails adjacent the lower ends thereof and comprising rail extension structure adapted for positioning substantially flush with the top of said rails when the weight of one or more containers is imposed thereon, and a pair of spaced depending gate arms secured to said extension structure and angled relative thereto to form a blockade for containers in the ramp below when one or more containers are supported by said extension structure in the upper ramp, and resilient mechanism for swinging said extension means with the said gate upwardly when the weight of all containers is removed from said extension, said spaced gate arms of alternate ramps being staggered in vertical relation to permit free and independent swinging of the gate and ramp extensions throughout the rack.

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