Nov. 3, 1964 C. D. WILLIAMS ETAL 3,155,274

CONTAINER DISPENSING MACHINE

Filed Jan. 17, 1963 5 Sheets-Sheet 1

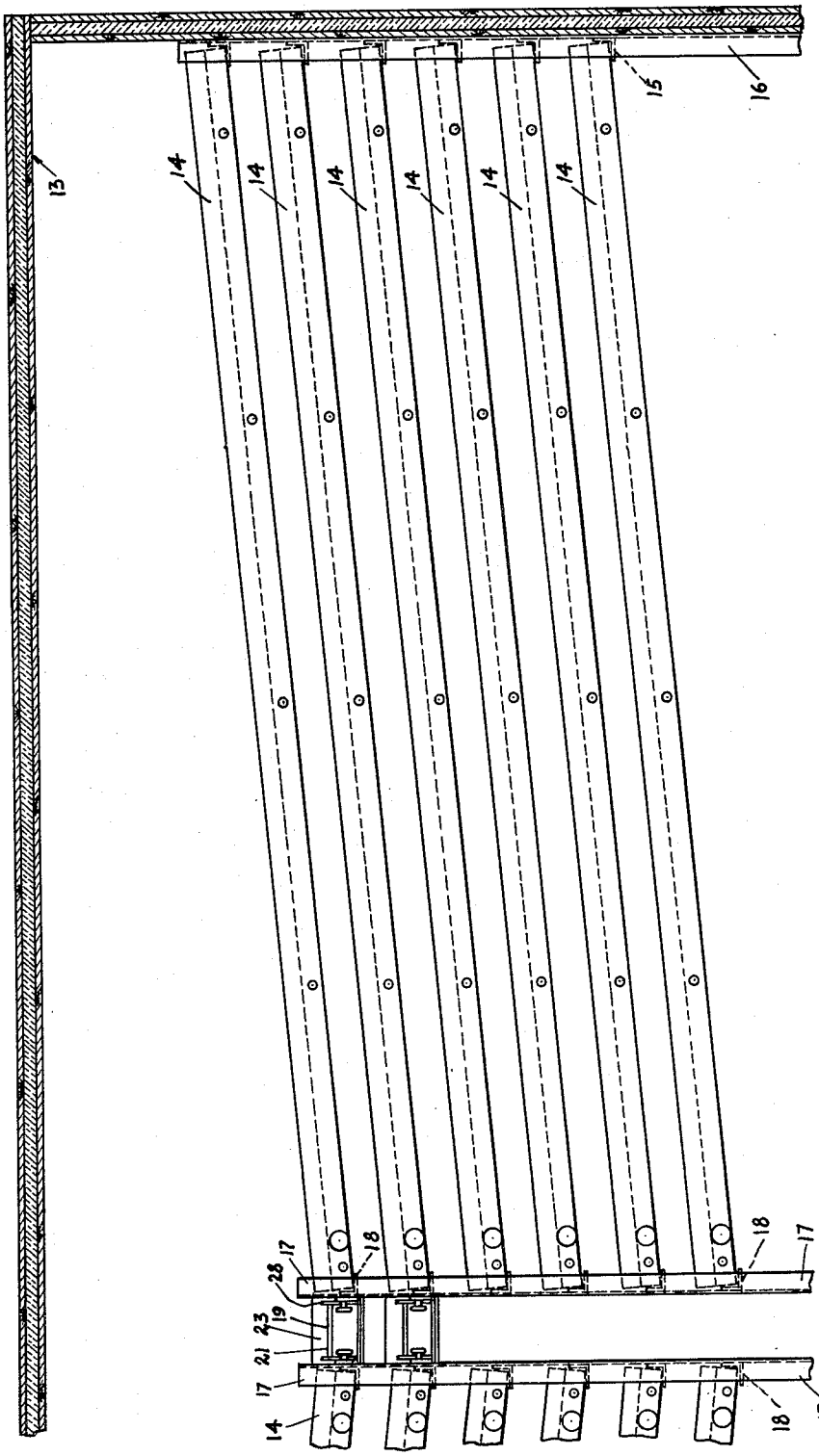

Fig. 1.

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CONTAINER DISPENSING MACHINE

Filed Jan. 17, 1963 5 Sheets-Sheet 2

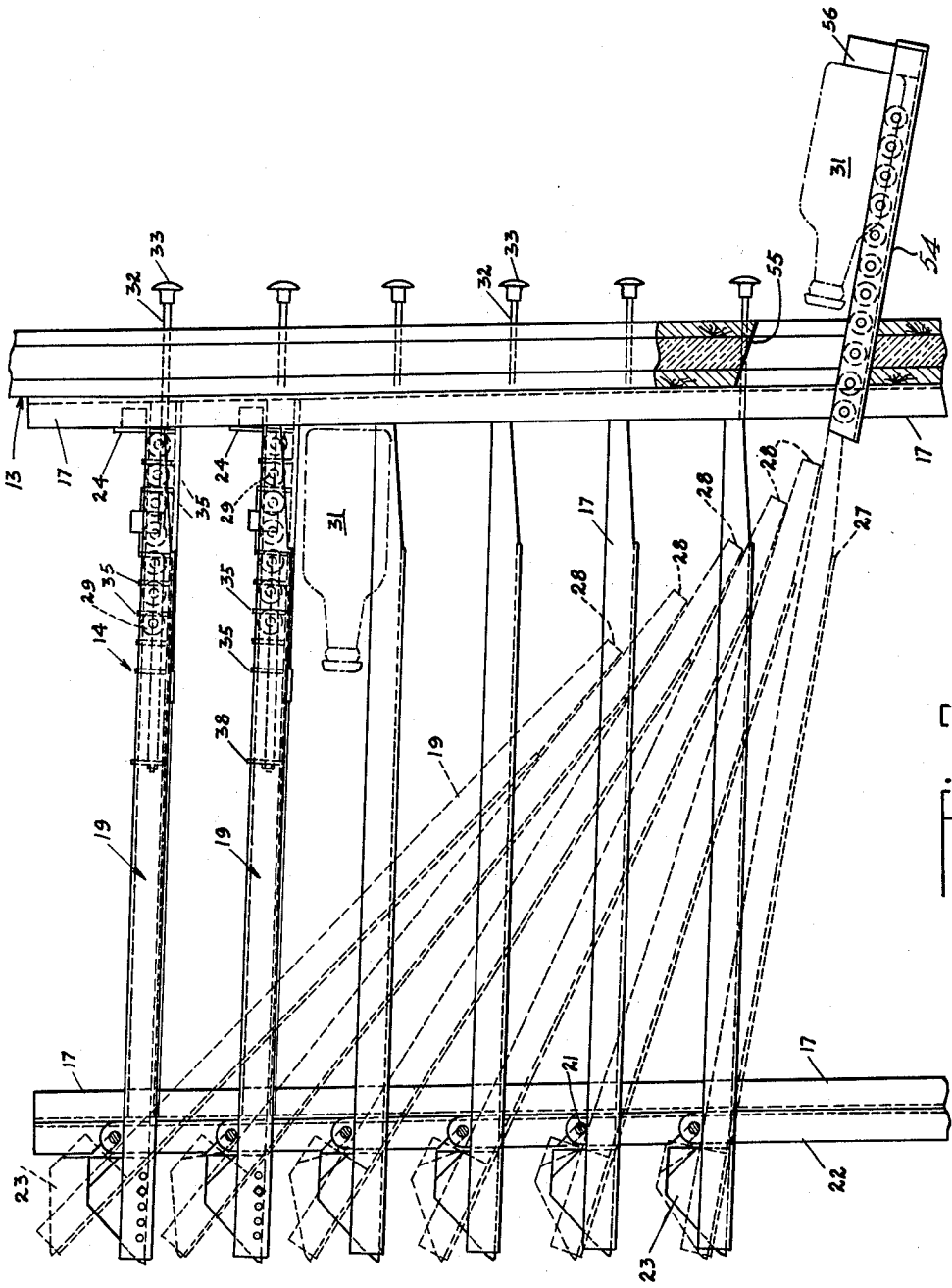

Fig. 2.

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Nov. 3, 1964 C. D. WILLIAMS ETAL 3,155,274

CONTAINER DISPENSING MACHINE

Filed Jan. 17, 1963 5 Sheets-Sheet 3

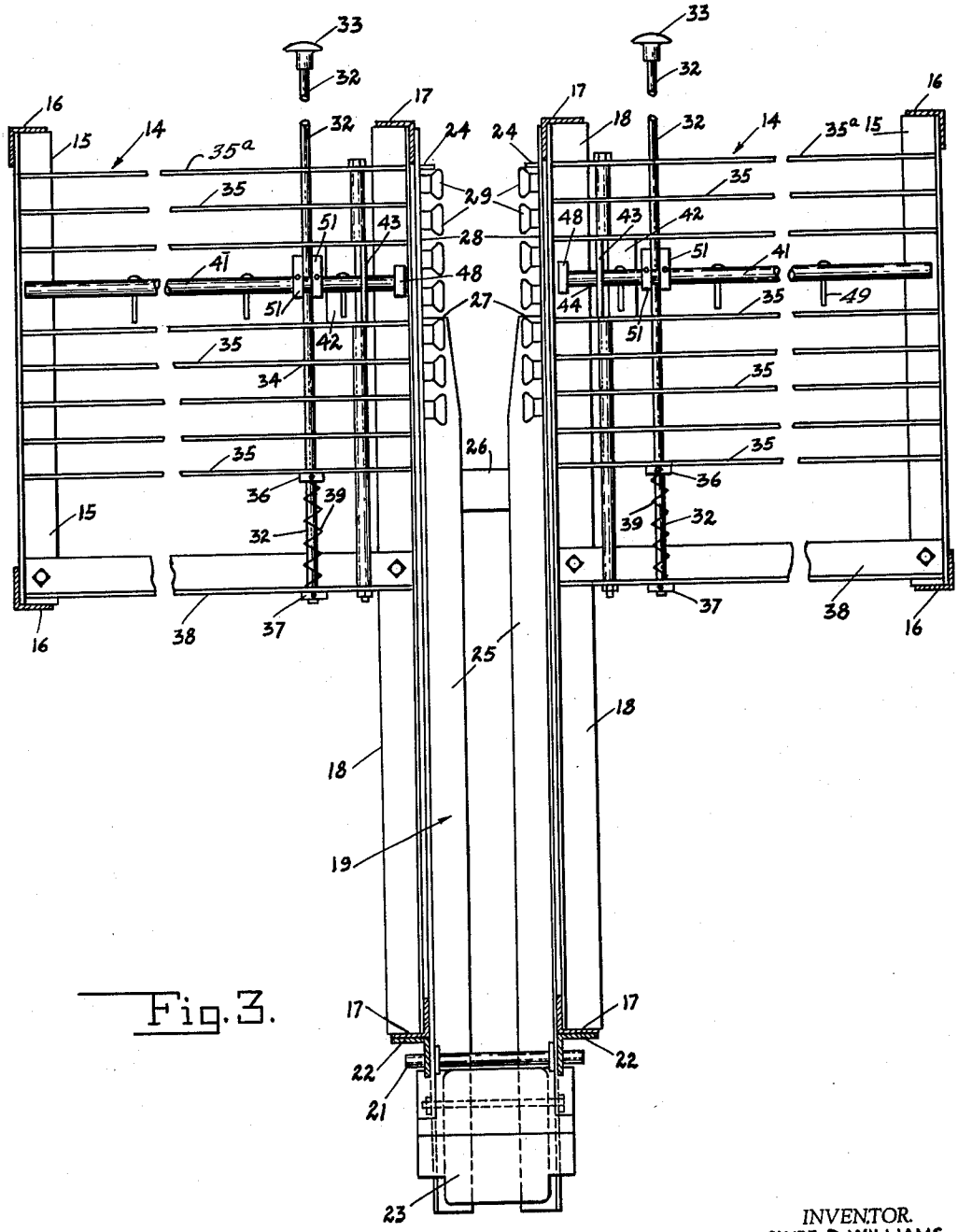

Fig. 3.

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CONTAINER DISPENSING MACHINE

Filed Jan. 17, 1963 5 Sheets-Sheet 4

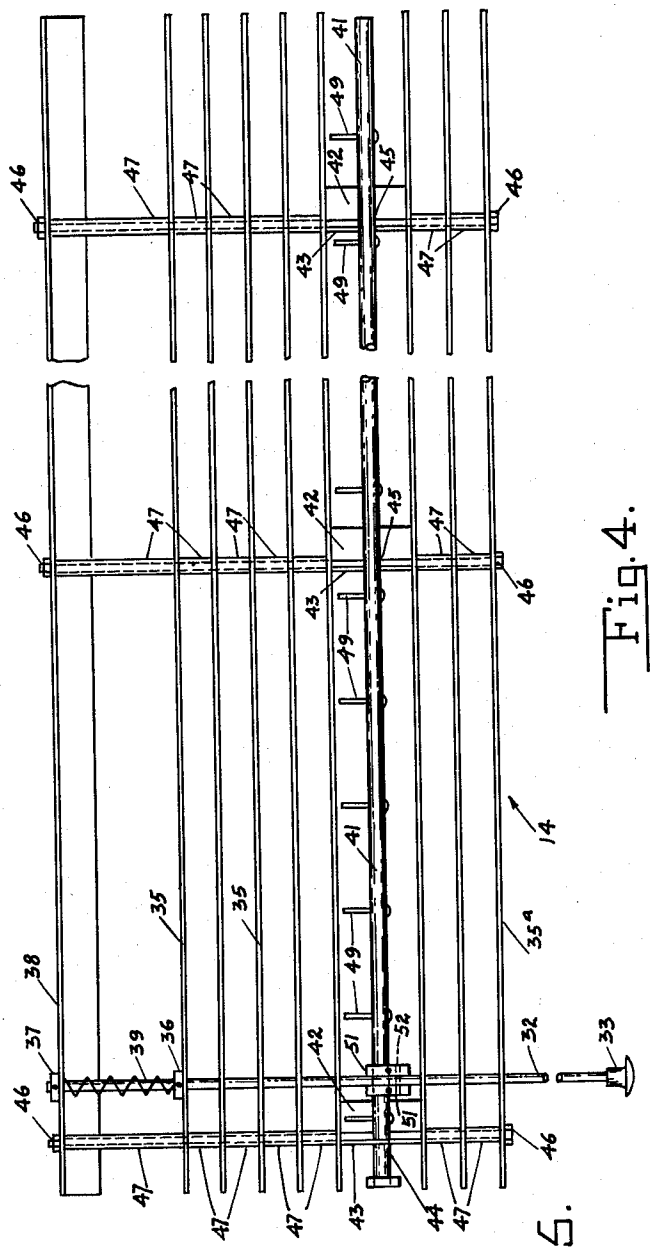

Fig. 4.

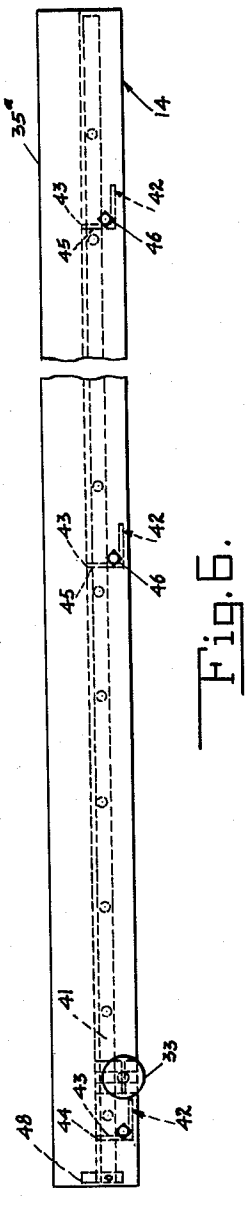

Fig. 6.

Fig. 5.

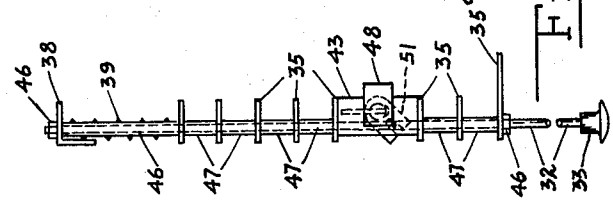

Fig. 7.

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CONTAINER DISPENSING MACHINE

Filed Jan. 17, 1963 5 Sheets-Sheet 5

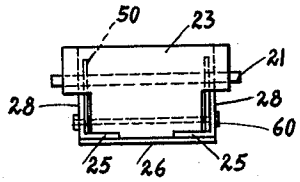

Fig. 9.

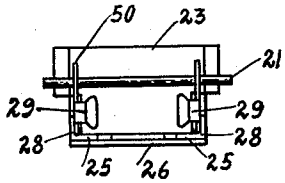

Fig. 10.

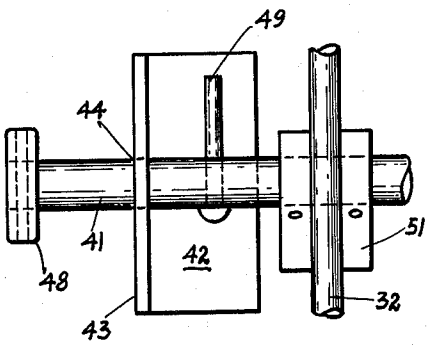

Fig. 11.

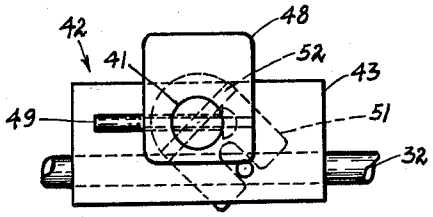

Fig. 12.

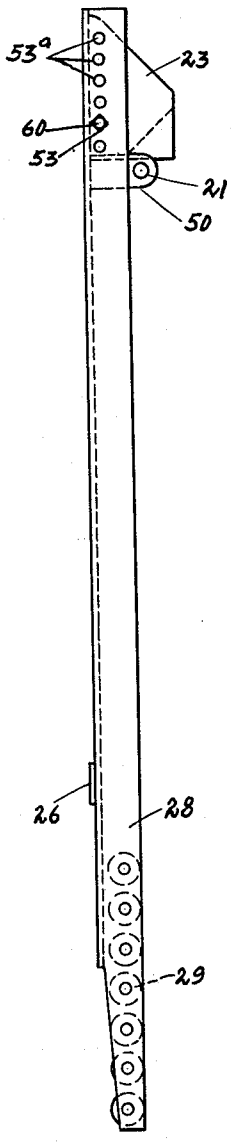

Fig. 8.

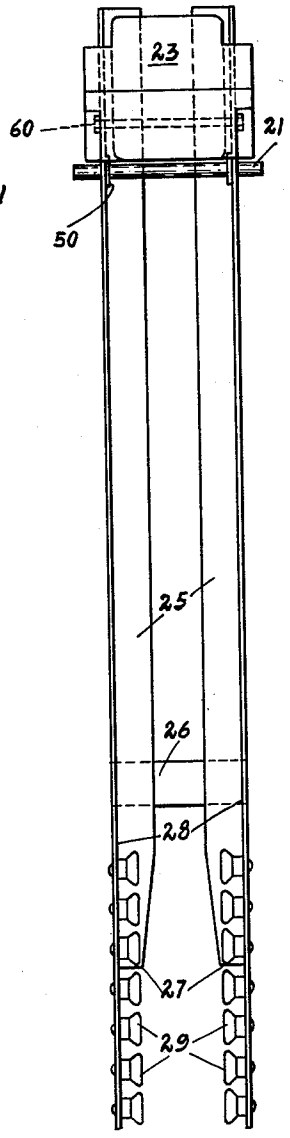

Fig. 7.

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United States Patent Office 3,155,274 Patented Nov. 3, 1964

3,155,274

CONTAINER DISPENSING MACHINE

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Filed Jan. 17, 1963, Ser. No. 252,108
8 Claims. (Cl. 221—130)

This invention is for a dispensing machine for beverage containers wherein the containers are gently moved successively from a storage area through a feed path to a pick-up station with a minimum of agitation of the contents of the containers.

Machines for vending cans or bottles containing carbonated liquids normally are provided with a storage area and a feeding mechanism by which cans or bottles roll or are dropped via a runway from storage to a terminal or discharge station of the machine. Attempts have been made to move such beverage containers with the least amount of agitation so as not to disturb the carbonated contents thereof, for example, which, when shaken, release gas to the detriment of the beverage flavor and consistency. Ofttimes even rupture of the containers will occur through the build up of the pressure of the released gases. In many instances, bottled or canned beverages are intended to be stored in a machine and delivered such that undesired solid material suspended in the liquid when bottled precipitates or settles to the bottom of the container to remain undisturbed when the beverage is poured from the container. It is most important that containers of such beverages be fed by mechanism of the machine a minimum of agitation in order to achieve the desired results. However, the customary beverage dispenser is designed with a feed path connecting the container storage area with the terminal or pick-up station such that the cans or bottles roll on their sides throughout the length of the feed path, with disadvantageous agitation of the liquid contents of the containers occurring.

It is the concept of the instant invention to provide a machine for dispensing containers from a storage area to a pick-up station through a feed path whereby the containers are received from the storage area and gently lowered and discharged to the terminal station with a minimum of agitation of the contents thereof.

It is an object of the present invention to provide a new and improved container dispensing machine.

Another object is the provision of a dispensing machine having a large storage capacity for containers, and a gating mechanism for feeding the containers successively and selectively from various locations of the storage area.

Still another object is the provision of a feeding mechanism for carrying containers from a storage area to a terminal station by gently lowering the containers and sliding them lengthwise to the terminal station.

A further object of this invention is the provision of a container dispensing machine having a gating mechanism for both advancing and transferring the containers onto a carrier within a feed path for delivery of the containers successively to a terminal station with minimum agitation of the contents of the containers.

A complete understanding of the invention may be had from the following detailed description of a specific embodiment thereof when read in conjunction with the appended drawings, wherein:

FIG. 1 is a front elevation of the machine with portions removed for clarity;

FIG. 2 is a side elevational view partially broken away;

FIG. 3 is a plan view of storage racks positioned on opposite sides of a lever arm;

FIG. 4 is a plan view of a storage rack with container releasing mechanism associated therewith;

FIG. 5 is an end view of the mechanism disclosed in FIG. 4;

FIG. 6 is a front elevational view of the shelf shown in FIG. 4;

FIG. 7 depicts in plan view a feed mechanism lever arm in detail;

FIG. 8 is a side elevational view of the lever arm;

FIG. 9 is an end elevational view of the lever arm;

FIG. 10 is a front elevational view of the lever arm;

FIG. 11 is an enlarged detail view of the gating mechanism shown assembled in FIG. 4; and

FIG. 12 is an enlarged elevational view of the end of the gating mechanism.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIGS. 1, 2 and 3, which illustrate a preferred embodiment, a cabinet structure **13** broken away to illustrate that the storage and feeding mechanism of the machine is housed within a walled cabinet which is insulated and which may be the so-called walk-in cooler or refrigerator. The storage mechanism includes a plurality of vertically spaced storage racks **14** extending inwardly from opposite sidewalls of cabinet **13**. Vertically disposed laterally spaced members **16** attached to said sidewalls are connected by suitable members such as angles **15** to provide support and means for attachment of one end of such racks **14**. Intermediate said sidewalls are a plurality of uprights **17** disposed in longitudinally spaced relation relative to said sidewalls. Vertically spaced cross members **18** connect adjacent uprights **17** and provide support for the adjacent ends of racks **14**. As best shown in FIG. 1, the racks **14** extending from each cabinet side wall terminate in spaced relation and the members **18** support the ends of the racks at a level below that of the ends of the racks supported upon the member **15**. Additionally, the uprights **17**, to which the members **18** supporting the adjacent ends of the racks are attached, are in spaced relation and with said space are disposed the feeding mechanism arms **19** to be hereinafter discussed.

As best shown in FIGS. 1, 2 and 3, containers **31** are selectively received from storage racks **14** onto pivotally mounted counter-balanced arms **19** which successively lower the container **31** from its respective storage rack onto the delivery rack **54** extending exteriorly of the cabinet **13**. As best shown in plan view at FIG. 3, opposing ends of adjacent storage racks are serviced by a counter-balanced lever arm **19** which selectively receives a container from either storage rack and pivots downwardly to discharge the container to the next lower arm **19** by an end-wise sliding movement upon rollers **29** provided for the purpose.

A plurality of vertical spaced lever arms **19** are connected to the posts **17** with their longitudinal axes perpendicular to the longitudinal axes of the racks **14**. As best shown in FIG. 2, the arms **19** are retained in substantial alignment with the top surface of the shelves or racks **14**; thus, both the arms **19** and the racks **14** support each container with one end thereof lower than the other. The arms **19** are pivoted on a fulcrum or bearing **21** fixed between opposed angle members **22** which are in back-to-back relation to one pair of angles **17**. A counter-weight **23** is positioned adjustably to one side of each bearing **21** on the arms **19** as shown best in FIG. 2. On the opposite side of the pivot bearing **21** from the weight **23** stop members **24** are provided on the uprights **16** to arrest the upward movement of the end of each arm **19** when the opposite end of the arm moves downwardly to a horizontal plane from a non-horizontal plane as depicted in phantom outline in FIG. 2.

The arms **19**, FIG. 3 are comprised of a pair of spaced

angle members 25 which are spaced apart by a cross-piece 26. The angle member 25 at the unweighted end of each arm 19 has its horizontal legs tapered outwardly from the center of the arm and terminated as at 27 whereas the companion vertical leg 28 of each member 25 extends longitudinally past the terminal 27 of each horizontal leg. A plurality of rollers 29 with their axes parallel with the longitudinal axis of the shelves or racks 14 are mounted for free rotation on opposed vertical leg members 28. The spaced rollers 29 are positioned on each side of the arm 19 longitudinally for a distance greater than one-half the width of a rack 14, for example, as shown in FIGS. 2 and 3, to receive a container gravity fed thereon sidewise from a rack as shown by the attitude of a bottle 31 in FIG. 2. The container is supported lengthwise by the rollers 29 on each side of the arm 19 and it bridges the gap between confronting rollers. The racks 14 are inclined so as to converge toward the arms 19, and both the arms and the racks are inclined towards the front face of the cabinet 13, FIG. 2, to maintain the bottoms of the containers lower than the tops thereof.

The gating mechanism for serially moving containers such as bottles or cans from the racks 14 is shown in detail in FIGS. 3, 4, 5, 6, 11 and 12 wherein an operating plunger 32 with a knob 33 on the outer end thereof extends inwardly through the front face of cabinet 13 and is slideably engaged to the racks through apertures 34 provided in alignment across bearing bars 35 which make up the individual racks 14. A pair of collars 36, 37 are fixedly connected to the plunger 32 with the collar 36 disposed behind an angle 38 at the rear of the shelf 14, and the collar 37 normally urging against one of the bearer bars 35. The collars 36, 37 are connected by suitable means such as set screws to the plunger 32. Concentrically arranged over the end of the plunger 32 opposite the knob 33 there is positioned a coil spring 39 having one end urging against the collar 36 and the other end against the angle 38 of the shelf 14. Pressure exerted inwardly against the knob 33 compresses the spring 39 as the collar 36 is moved toward the fixed angle 38 of the shelf or rack 14. Subsequent release of the plunger knob 33 enables the spring 39 to return the plunger 32 to its fully extended position with the collars 36 and 37 serving as stops when in contact with the adjacent bearer bar 35 and the vertical leg of the angle 38, respectively.

An elongated rod 41 is supported longitudinally between a pair of adjacent bearer bars 35 of each rack 14 by spacers 42 having vertically extending portions 43 which are secured transversely to bars 35 at longitudinally spaced locations. The vertical portions 43 are suitably apertured as at 44, or notched as at 45, to slideably support a rod 41 in location on each rack 14. The members 42 are secured between confronting faces of adjacent bearer bars 35 by bolts 46 having their shanks passed through sleeves 47 which function as transverse spacers for rigidly securing the bearer bars 35 together. The members 42 space the bars 35 adjacent the rod 41 in position such that the rod 41 is aligned substantially perpendicular to the plunger 32. Each rod 41 is arranged to lie in a plane beneath the upper surfaces of the bearer bars 35 in order that a bottle or can may roll on its side from one end of the rack 14 to the other, and with the container bottom in frictional contact with the front bar 35*a* which is of a height to extend above a plane including the upper surfaces of the bearer bars 35. At the inner terminal end of each rod 41 adjacent an arm 19 there is attached a stop 48 which extends upwardly into the path of travel of a container from a rack onto an arm. The stop 48 is swung through an arc when the rod 41 is rotated in a manner to be explained hereinafter whereupon the path is cleared for the depositing by gravity feed of a container from a rack onto the arm.

Referring particularly to FIG. 4, pins 49 are depicted connected to the rod 41 at spaced intervals only slightly greater than the outside diameter of containers to be delivered. The pins 49 lie in a common plane which is at a right angle with respect to the upright stop 48 in normal condition such that when the stop is moved from a vertical to a horizontal direction by a quarter rotation of the rod 41, the pins 49 extend vertically. When in such vertical position, the pins 49 hold the containers in position on the rack 14 except that the last container on the rack rolls or slides by gravity onto an arm 19 because the stop member 48 no longer obstructs its passage. When the pins are returned to their normal position out of the path of the containers on a rack, the containers advance toward and are stopped by the member 48 which then projects into the path of the containers. The gating action is accomplished through rocking of a pair of dogs 51 which are connected to the operating plunger 32 by a clevis and pin connection as best shown in FIGS. 11 and 12. The dogs 51 are engaged fixedly by means such as set screws to the rod 41, and the rod extends through apertures provided in the dogs. The dogs are bifurcated, and a pin 52 is attached to the rod and is received within the forks of the dogs. Accordingly, when the plunger 32 is pressed inwardly, the rod 41 is rotated a quarter turn to both remove the stop 48 from its normal attitude, and to move the pins 49 vertically between the containers disposed on the rack 14. When the spring 39 returns the plunger 32 to the normal condition, the pins 49 are lowered by the quarter rotation of the rod 41 out of the feed path of containers on the rack 14 for advancing the containers successively against the stop member 48.

Referring to FIGS. 7, 8, 9 and 10, the lever arm 19 is shown in detail with the rollers 29 forming a wheeled track at the free end of the arm. The angles 25 forming the arm has its horizontal leg tapered outwardly in order that the spacing between the corresponding horizontal legs is increased toward the end of the arm for the support of a bottle or container on the rollers with the side of the bottle bridging the distance between the rollers. In FIG. 8 the vertical leg 28 is shown tapered upwardly from the terminal 27 of the horizontal leg of the angles 25, whereupon the outer rims of the rollers adjacent the end of the arm extend below the tapered portion of the end of the arm. The outer rollers on the arm 19 abut the next lower arm 19 when a bottle is lowered thereon as depicted in FIG. 2. This action is made possible by the cantilevering of a bottle which is received on the rollers 29 from a rack 14 when it is gated therefrom by the mans described hereinbefore.

The counter-weight 23 is adjustable on the arm 19 on the side opposite the bearing 21 from the rollers 29 to enable a change of effect of the weight by its position selected on the arm 19. The weight is provided with an aperture 53 passed therethrough which is selectively aligned with a plurality of apertures 53*a* longitudinally spaced and extending through the vertical legs 28 of the arm 19. A bolt 60 passed through the aligned apertures 53 and 53*a* retains the weight in its selected position. The bearing 21 is in an elevated position with respect to the upper surfaces of the legs 28 and is retained in such position by a pair of brackets 50 such that the center of gravity of the weight is at a point above the pivot bearing 21 when the weight is moved toward the bearing. By the placing of the weight in this manner, the force of the counter-weight is adjustable to counter-act the weight of a bottle on the opposite end of the arm 19 whereupon the bottle is gently lowered on the arm for delivery upon the next lower arm and its rollers, and so on to the stationary track 54 through the front of the machine. The bearing 21 is connected at each end to the vertical angles 22 as best shown in FIG. 3, so that when the weight of the bottle is removed from the end of the arm 19 it will return to a loading position through action of the counter-weight 23.

Operation

For the purposes of explanation, assume that bottles are loaded onto the racks **14** and oriented thereon as suggested by the showing of the bottle **31** in phantom outline in FIG. 2 with the bottom of the bottle in contact with the front bar **35***a* of the rack. An operator presses the knob **33**, thus moving the plunger **32** toward the rear of the machine against the biasing action of the spring **39**. The clevis connection of dogs **51** with the rod **41** transmits the linear motion of the plunger travel to arcuate motion of the rod **41** whereupon the gate or stop **48** is swung out of the path of the bottle, which in addition to the force of gravity, is pushed by the pin **49** adjacent the stop **48** to roll the bottle from the end of the rack **14** onto the arm **19**. Only one bottle is discharged with each push of a plunger **32** because the pins **49** are rotated vertically between adjacent bottles, and thus function as stop members as the last bottle adjacent the stop **48** rolls onto the arm **19**. Release of pressure against the plunger **32** causes the return of pins **49** by action of the spring **39** to a horizontal plane out of the path of movement of bottles toward the stop **48** against which the entire row of bottles comes to rest for a subsequent gating operation. When a bottle **31** rolls from the rack **14** onto an arm **19**, it straddles the angles **25** of the arm and moves lengthwise on the rollers **29** toward the end of the arm. As the bottle approaches the end of the arm, the force of the weight of the filled bottle and its increase in distance from the fulcrum or bearing **21** overcomes the force of the counterweight times its distance from the bearing **21** whereupon the bottle is gently lowered to a next lower arm. The lowering of each successively lower arm into abutment with its subjacent arm defines a path of travel for the bottle toward the track **54** with the rollers **29** supporting the bottle throughout the entire path.

Stated otherwise, the counter-weight **23** is so selected that as the bottle **31** reaches the free end of the arm **19**, the weight of the bottle on the lever arm gradually exceeds the force of the weight **23**, and the arm gently lowers to bump onto the end of the next lower arm. Thus, the tapered end of the arm **19** abuts the next lower arm **19**, and the bottle is transported by the rollers from one arm to the next and so forth to a stationary terminal rail **54** which is of a length to extend beyond the front of the machine cabinet **13** with a delivery opening **55** through the wall of the cabinet whereby the bottle is delivered against a bumper **56** for pick-up. Although the embodiment is shown and described with reference only to a single rack **14** arranged on opposite sides of each arm **19**, a pair of racks may be disposed on opposite sides of each arm for doubling the capacity of containers which may be handled by the machine.

It is manifest that the above-described embodiment of the invention is merely illustrative and that numerous modifications may be made within the spirit and scope of the appended claims.

What is claimed is:

1. A container dispensing machine comprising stacked racks for holding containers in side-by-side relation on each rack with the bottom of a container lower than its top, pivotal arms horizontally disposed and vertically arranged with one arm adjacent each rack for receiving a container thereon from a rack, means for releasing one container at a time from each rack onto an arm, the arms being pivotal about a fulcrum intermediate its ends such that the weight of a container disposed on the arms tilts the arm to lower the container, each arm having a plurality of spaced rollers for gravity discharge of a container from its one end onto a next lower arm when tilted into abutment therewith, a stationary track for receiving a container from the lowest arm of the vertically spaced arms, the container being fed in a path defined by the lowering of one arm into abutting relation with the next lower arm and the transfer of the container from one arm to the next lower arm and finally to the stationary track whereby the contents of the bottle are undisturbed by the gentle lowering action effected.

2. A container dispensing machine comprising a plurality of racks oriented for holding containers in side-by-side relation and for discharge by gravity from corresponding inner ends of the racks, a plurality of horizontally disposed vertically spaced arms pivotal about a fulcrum intermediate the ends of the arm, the racks being convergent toward an arm for gravity feeding of a container onto the arm from either side thereof, a weight adjustably attached to one end of the arm, the other end of the arm having a plurality of spaced rollers upon which a container is received from a rack with the container weight being sufficient to tilt the arm gently about the pivot to lower the container to a next lower arm and for transfer of the container from the rollers of one arm to the rollers of the next lower arm, a stationary track for receiving the container from the lowermost arm and for transfer of the container to a pick-up station outside the machine, gating means connected to each rack for releasing one container at a time from the end of the rack by gravity onto an adjacent arm, and means extending outside the machine operatively connected to the gating means for actuating the gate of each rack selectively whereby a container from any one of the racks may be fed onto an adjacent arm of the selected rack and for feeding to the pick-up station.

3. A container dispensing machine comprising a housing, a plurality of divergent confronting racks within the housing, a plurality of arms pivotal about a fulcrum intermediate the ends of each arm and having an adjustable counter-weight on one end of each arm, the other end of each arm being adjacent the end of a rack for receiving a container gravity fed from the rack onto the arm, a container gating mechanism attached to each arm including an operating rod having a plurality of pins extending laterally therefrom and a stop member fixed to the end of the rod positioned at the end of the rack adjacent the arm and extending in a direction normal to the pins, a push rod linked to each operating rod accessible from outside the machine whereby force directed inwardly on the end of each push rod rotates the operating rod to move the stop member from the path of travel of a container on the rack and to move the plurality of pins to locations between adjacent containers positioned on the rack, biasing means connected to each push rod for returning the push rod to a normal position and the operating rod to a position with the stop member in the path of travel of containers on the rack and the pins are removed from between the containers on the rack, and each arm being tilted by the weight of a container gated from a rack, the arms lowering into contact with a next lower arm by the container weight to define a feed path from a rack to a lower position, and a container terminal station with a stationary track for receiving a container from a superjacent arm at the lower position and for transfer of the container to a location outside the housing.

4. In a container dispensing machine having a plurality of racks for the gravity feed of containers from ends thereof and gating means for discharging the containers from the rack ends, a container transferring means positioned to receive containers discharged from the rack ends including arms in spaced vertical alignment, each arm being tiltable about an axis for lowering an upper arm in contact with a next lower arm whereby a container discharged onto the upper arm is lowered by such arm to the next lower arm and so on from the upper arm to the lowest arm, and stop means located along the extended axis of the lowest arm for stopping the movement of the container, the stop means being located in an area accessible to an operator of the machine such that the container delivered to the stop means may be removed by the operator from the machine.

5. In a dispensing machine as in claim 4 wherein each

arm is provided with spaced rollers on which a container is conveyed axially along the arm for discharge of the container onto a subjacent arm and onto the stop means from the lowest arm, the rollers being located on the terminal portion of each arm opposite the end of the arm where the arm pivotal axis is located such that a container received on the arm is gravity fed by movement on the arm rollers in a direction away from the pivotal axis of the arm whereby the arm and container thereon is lowered by the weight of the container when the latter moves axially on the arm rollers, the container being discharged on the rollers of the next lower arm when the upper arm and the next lower arm form a continuous path of travel for the container.

6. In a container storage and dispensing mechanism, in combination,

(1) a plurality of vertically aligned and horizontally inclined means for storage and selective discharge therefrom of said containers,

(2) means disposed transversely of each said storage means in substantial alignment with one end thereof for reception of a container therefrom and for feeding the container to a dispensing opening in said mechanism,

(3) each said container feeding means having one end thereof remote from said storage means pivotally supported for movement between its respective storage means and the next lower feeding means for transferring thereto a container received for a storage means disposed in vertical spaced relation to said next lower feeding means.

(4) the pivotal support for each said container feeding means including a counter-weight returning the feeding means to its normal position transversely of its associated storage means after the container is transferred therefrom, and

(5) a stationary terminal rail disposed below the lowermost storage means and communicating with the exterior of the mechanism for receiving a container from the lowermost feeding means and discharging it from the mechanism.

7. The container storage and dispensing mechanism as defined in claim 6 wherein, said vertically aligned storage means are arranged at opposite sides of each said feeding means, whereby a container may be selectively discharged onto said feeding means from a storage means at either side of the associated feeding means.

8. The container storage and dispensing mechanism as defined in claim 6, wherein each said container storage means is comprised of at least two spaced container supporting members disposed substantially normal to the associated feeding means, a container abutment member disposed in spaced relation to and extending above the plane of said supporting members and against which one end of the containers are aligned in substantially parallel relation to said associated container feeding means, a member is rotatably disposed between said container supporting members in substantial alignment therewith below the container supporting surfaces thereof, means mounted on said rotatable member and extending laterally therefrom for selectively restraining movement of a container off the ends of the said supporting members onto said feed means and releasing the end container for movement onto the feeding means while restraining other containers from movement longitudinally of the supporting members, and means associated with said rotatable member for movement thereof to selectively position said laterally extending members for their intended purpose.

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