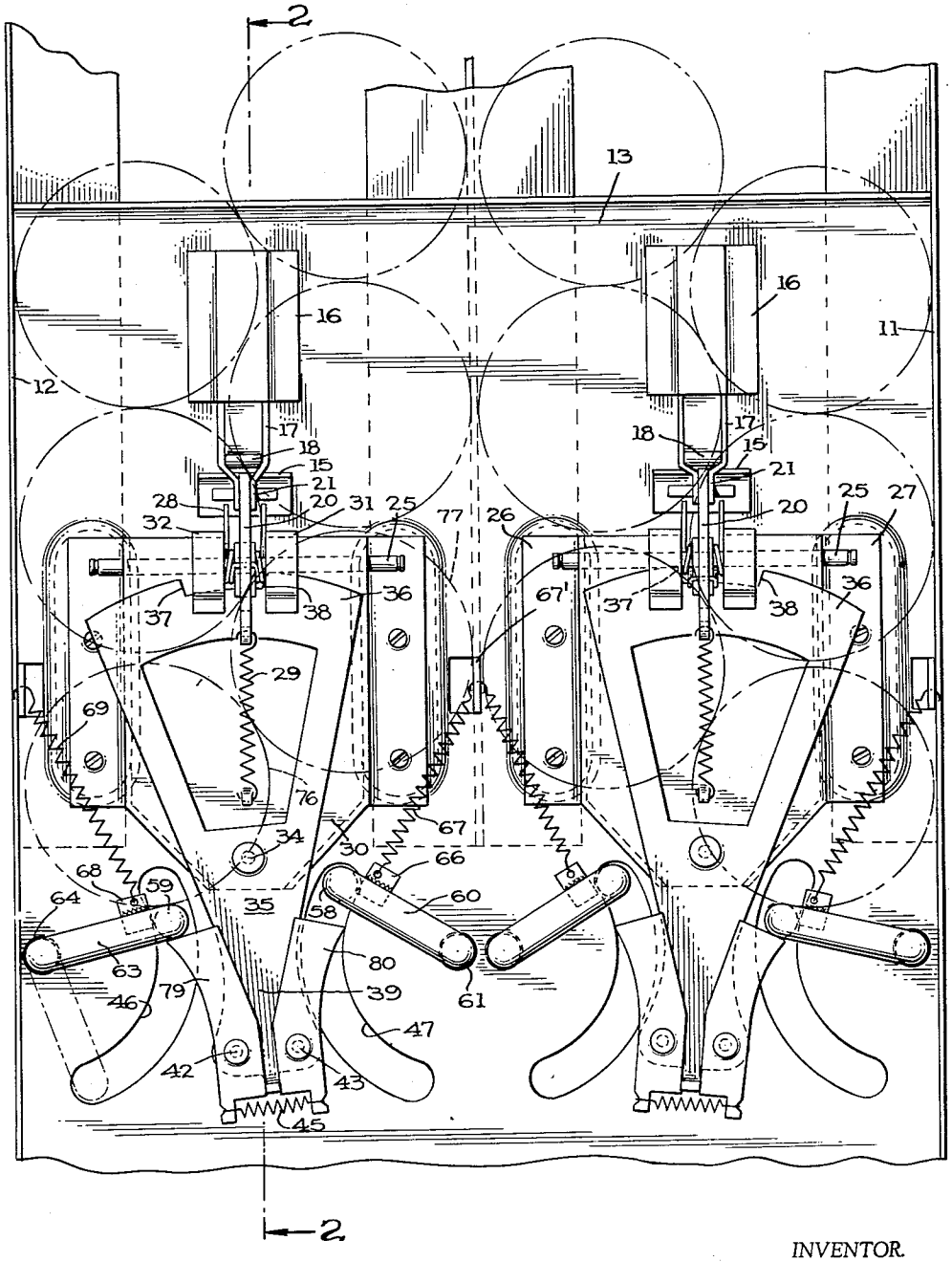
Oct. 6, 1964 H. R. PAYNE 3,151,772

DISPENSING MECHANISM FOR ARTICLES IN STAGGERED STACK

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FIG. 1.



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FIG. 2.

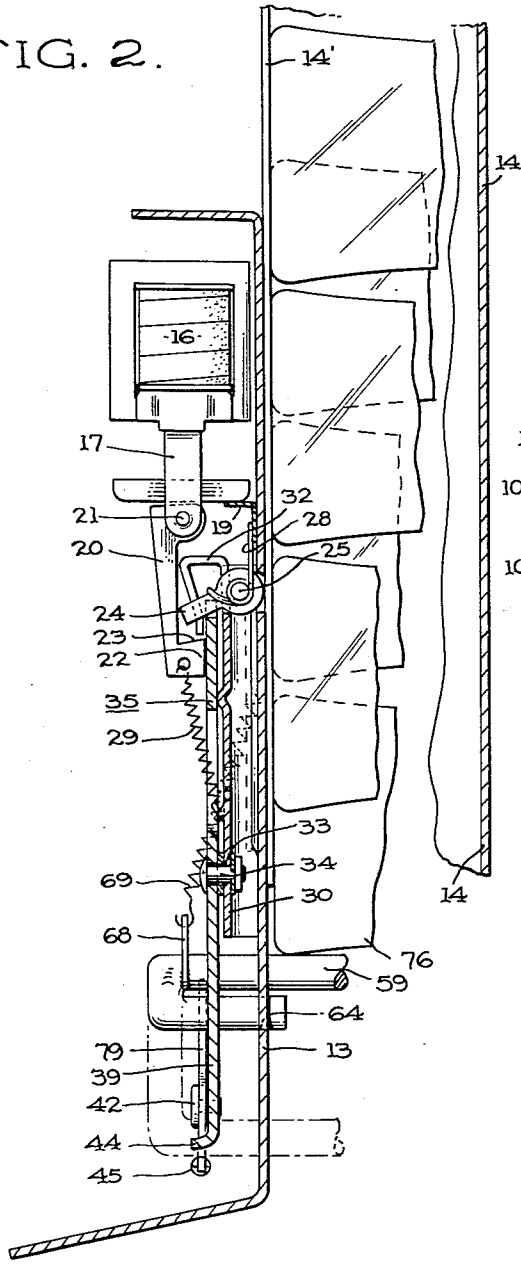
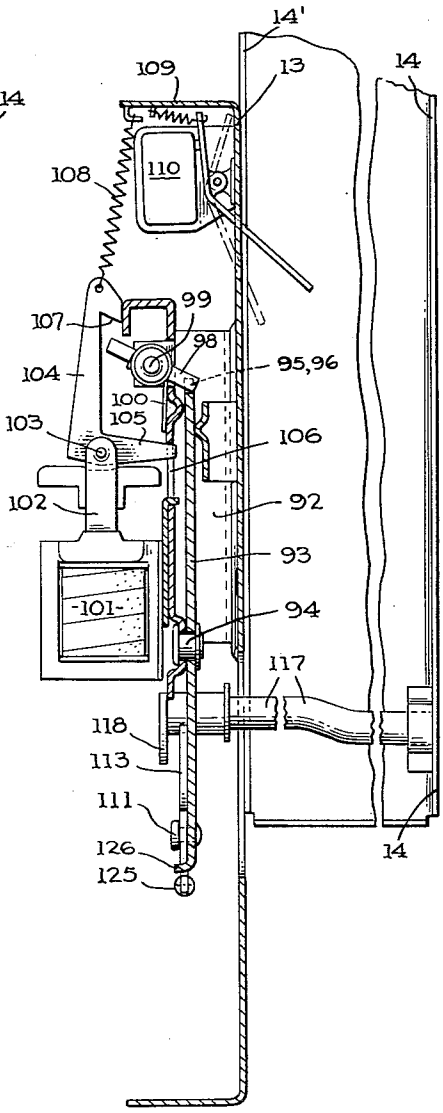


FIG. 4.



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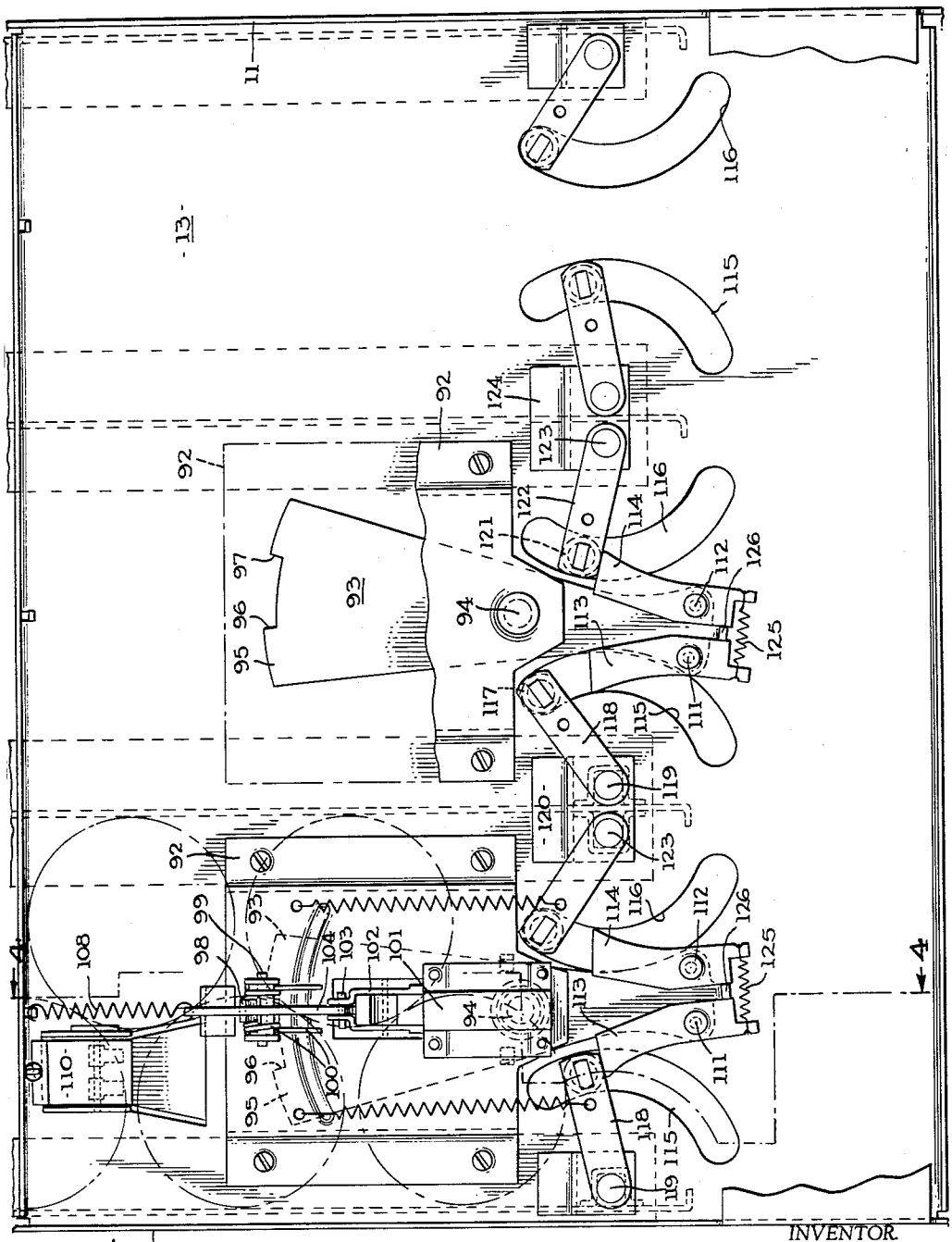


FIG. 3.

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DISPENSING MECHANISM FOR ARTICLES IN STAGGERED STACK

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Filed Nov. 21, 1962, Ser. No. 239,165
3 Claims. (Cl. 221—67)

This invention relates to a dispensing mechanism for dispensing a single article at a time from a plurality of articles arranged in a staggered stack.

Even more particularly this invention relates to a mechanism for dispensing a single article at a time from a staggered stack of articles in which the dispensing mechanism is actuated by the weight of the articles in the staggered stack of articles and release of the dispensing mechanism for dispensing a single article at a time from the staggered stack of articles is actuated by electrically energized means.

Even more particularly still this invention relates to a dispensing mechanism for dispensing one at a time an article such as a single can or bottle from a staggered stack of articles, cans or bottles, hereinafter referred to for convenience as bottles, in which the weight of the bottles in the stack actuates the dispensing mechanism and the mechanism is released for the dispensing of a bottle by electrically energized means which may be energized from any suitable source and controlled by any suitable switch mechanism which switch mechanism may preferably be actuated by the deposit of a coin.

At the present time articles such as bottles of popular beverages are usually stored for selective sale in refrigerated cabinets with coin release mechanisms for dispensing one bottle at a time. In these cabinets the bottles may be disposed on sloping shelves arranged one shelf above the other or the bottles may be arranged in vertical staggered stacks in side by side bins. In the first type of dispenser in which the bottles are arranged on sloping shelves the lowermost bottle on each shelf may move by gravity to a position where it can be withdrawn manually by the purchaser after a coin has been deposited to release a locking mechanism allowing withdrawal of one bottle at a time.

In the second type of apparatus in which the bottles are arranged vertically in columns in staggered stacks in side by side bins various devices have been used for releasing one bottle at a time on the deposit of a suitable coin. Usually this release mechanism is driven by an electric motor and moves from beneath one bottle in the selected column in the selected staggered stack to a position beneath the next bottle to prevent more than one bottle from being dispensed at a time.

The first type of dispenser has advantages of relatively simple construction and the merchandise is visible for selection by the purchaser. A variety of types of beverage can be sold in this machine depending only on the number of sloping shelves provided. This multiplicity of variety is disadvantageous to the bottler who may place the machine on location since the machine can then be used for vending products other than those of the bottler.

In the second type of dispenser in which the bottles are arranged in staggered stacks it has been found that the practical size of the cooler, doors and the like of the apparatus limits the number of double column staggered stacks side by side in the cabinet. The number of selections are therefore limited in a machine of maximum size. This is advantageous to the bottler since it limits the number of beverages that can be sold other than those of the bottler. A further advantage is that more bottles

can be stored in the staggered stack type dispenser than in the shelf type machine which is advantageous. However, in the staggered stack machine, the delivery mechanism is usually motor-driven; it is expensive; and there is always the possibility of a mechanical jam of the mechanism in the automatic, positive drive of the dispensing mechanism for the bottles.

Heretofore it has been proposed to dispense from stacks of articles or bottles less than two diameters of the articles or bottles in width with mechanism for holding the lowermost bottle in the stack first on one side of the stack and then on the other side of the stack. One such proposal is found in the copending application of Harry R. Payne and Jack M. Womack, Serial No. 98,062, filed March 24, 1961, now Patent No. 3,107,812, October 22, 1963, for Dispensing Mechanism for Articles in Staggered Stack and owned by the assignee hereof. In the present invention the article or bottle being dispensed moves the holding mechanism and particularly the latching portion thereof to the opposite position to support the next bottle on the opposite side of the stack in a one-latched-position or single step lowering of the bottle to be dispensed.

In the dispensing mechanism proposed in the present application the latch is actuated by the weight of the bottle to release the bottle to be dispensed and is moved by the weight of the bottles to position to latch the support for the opposite and next bottle in the stack.

The dispensing mechanism of the present concept is relatively inexpensive to make, use and service, and permits dispensing at a fast rate without damage to the mechanism. The speed of actuation is advantageous in rush hours, permitting maximum sales. The mechanism of the present concept is simple to service; it eliminates vending errors; and is fool-proof in operation.

In the present dispenser, when a coin is deposited or the switch in the electric circuit momentarily closed, a short pulse of electric current passes to the electrically energized means which suffices to actuate this means. This means then lifts a latch which in turn releases a rock plate releasing a support beneath the lowermost bottle. The support then moves the rock plate out of its path and into position to latch an opposite bottle support. The descending stack of bottles rotates the opposite bottle support arm into engagement with the rock plate and continues until the rock plate is rotated to its locked position, preventing further downward movement of the stack of bottles. The arm continues to rotate in a downward direction under the weight of one bottle. This bottle only is then dispensed. The lowermost bottle thus moves to dispensing position and the stack of bottles moves downwardly until the next bottle in the stack of bottles engages the opposite bottle support. Thereafter, the first support returns to its upper and bottle supporting position with the rock plate latching the opposite bottle support against movement.

This cycle can be repeated as many times as there are bottles in the staggered stack of bottles so long as each cycle is started by the deposit of a coin or by the momentary closing of a switch in the electric circuit for the electrically energized means.

The electrically energized or actuated means may be a solenoid, an electric motor or other suitable electrically actuated device for lifting the latch.

It is therefore an object of the present invention to provide a novel dispensing mechanism for dispensing one at a time a single article such as a bottle from a staggered stack of articles or bottles which mechanism is actuated by the weight of the bottles or articles in the staggered stack and is released for dispensing a single article or bottle at a time by electrically energized means actuating a latch.

Another object of the present invention is to provide such a dispensing mechanism in which the electrically energized means is a solenoid which is momentarily actuated, on the deposit of a coin or by the momentary closing of a switch in its circuit, to raise a latch. This permits a support beneath the lowermost bottle in the stack to swing downwardly under the weight of the bottles to dispense the lowermost bottle in the stack. The next bottle in the stack genegaes an oppositely disposed support which prevents that bottle from being dispensed and supports all of the remaining bottles in the stack. The mechanism is so arranged that the first support, after permitting a bottle to be dispensed, returns to its upper position.

Another object of the present invention is to provide a dispensing mechanism having spaced opposed pivoted supports for alternately supporting the bottles in the stack. The weight of the lowermost bottle and of the bottles thereabove in the stacks used to move the support adjacent the lowermost bottle downwardly into engagement with a stop mechanism which is latched in position by a solenoid actuated latch. This latch is released when the solenoid is momentarily energized, as by the deposit of a coin or by the momentary closing of a switch in the solenoid circuit, to permit the weight of the bottles in the stack to move the adjacent support downwardly. The stop is moved from beneath the support so that the support may swing to position to dispense the lowermost bottle with the remainder of the bottles then being supported by the new lowermost bottle which engages the opposite support. This opposite support is prevented from dispensing movement by the stop. After dispensing the first bottle, the first support returns to its support position by the action of a spring.

Other and further objects of the present invention will appear from the following description of illustrative embodiments thereof.

The illustrative embodiments of the present invention described hereinafter should in no way be construed as defining or limiting the invention and reference should be had to the appended claims to determine the scope of the present inventive concept.

In the accompanying drawings, in which like reference characters indicate like parts,

FIG. 1 is a front view of an embodiment of the present invention showing the relative position of the parts thereof;

FIG. 2 is a view partly in section of the embodiment of FIG. 1 on the line 2—2 thereof;

FIG. 3 is a view of another embodiment of the present invention; and

FIG. 4 is a view of the embodiment of FIG. 3 on the line 4—4 thereof.

Referring now to FIGS. 1 and 2, bins for the staggered stacks of bottles are provided having side walls **11** and **12** and a common center wall which are spaced and supported by end walls **14** and **14'** (FIG. 4). The side wall and center wall of the bins are spaced apart less than twice the diameter of the bottles to be dispensed so that the bottles will lie between the walls in staggered stack in known manner. The end walls **14** and **14'** are spaced to accommodate the length of the bottles to be dispensed. Brackets **15** are formed on the central portion of face plate **13**. Solenoids **16** which are provided with plungers **17** are mounted on plate **13**. Each plunger **17** has a rigid head **18** which in lowermost position engages outturned portion **19** of bracket **15**. Arm **20** is pivotally mounted on plunger **17** at **21** and has shoulder **22**. Arm **20** is provided with a latch engaging surface **23** which in its lowermost position lies beneath latch **24**. Spring **29** pulls arm **20** toward its lower position as seen in FIG. 2.

Latch **24** is carried by spindle **25** which is mounted for rotation in flanges **26** and **27** which are mounted, respectively, on face plate **13**. Each latch **24** is spring

biased by spring **28** to lowered position shown in the figures.

A face plate **30** has flanges **26** and **27** and is spaced from face plate **13**. Face plate **30** is provided with horizontally and downwardly turned upper extensions **31** and **32** to guide arm **20** and rock plate **35**. Face plate **30** is bored adjacent its central lower portion at **33** to receive pivot **34** of rock plate **35**. Rock plate **35** has an arcuate upper edge **36** which is provided with a notch forming spaced stops **37** and **38**. In standby position latch **24** lies between stops **37** and **38**. Rock plate **35** is reduced in width below pivot **34** to shank **39**. Beneath shank **39** rock plate **35** is widened to support tumbler plates **79** and **80**. Tumbler plates **79** and **80** are pivoted at **42** and **43**, respectively, on shank **39**. Shank **39** has outturned portion **44** separating the tumbler plates. A spring **45** urges the tumbler plates into engagement with portion **44**.

In the position shown in FIG. 1 tumbler plates **79** and **80** overlie arcute slots **46** and **47**, respectively, which slots are let into front plate **13**.

A bottle support rod **58** extends the full length of the device being journaled in back **14** and extending through arcuate slot **47**. Rod **58** is provided with U-turned end portion **60** which is journaled in face plate **13** at **61**.

An opposed bottle support rod **59** extends through arcuate slot **46** and is provided with a U-turned outer end **63** which is journaled at **64** in face plate **13**. Rod **58** is provided with a collar **66** and spring **67** extends between collar **66** and bracket **67'** to resiliently hold rod **58** in its upper position. Rod **59** is provided with collar **68** and spring **69** extends between the **68** and side **12** to resiliently hold rod **59** in its upper position.

When a coin is placed in the mechanism in known manner, an electric circuit is completed to either solenoid **16** as selected. Energizing solenoid **16** draws armature **17** upward and with it arm **20**. Shoulder **23** of arm **20** is engaged beneath latch **24** and raises latch **24**. Assuming that in the staggered stack of bottles in the mechanism the lowermost bottle is on the left side in ther left stack, as seen in FIG. 1, and is there indicated as **76**, the weight of the bottles in the staggered stack will bear upon bottle **76** and upon support **59** moving support **59** downward in slot **46** into engagement with tumbler plate **79** rotating rock plate **35** counterclockwise until stop **38** is against latch **24**. When latch **24** is raised by solenoid **16**, as just described, stop **38** moves beneath latch **24** with counterclockwise rotation of rock plate **35** about pivot **34** under the influence of the downward movement of the rod **59** in contact with the tumbler plate **79**, the rock plate **35** having been released by removal of the latch **24** from engagement with the stop **38**.

Energization of solenoid **16** moves armature **17** upward and this movement continues until shoulder **23** of arm **20** disengages from latch **24**. Spring **28** then snaps latch **24** downward onto arcuate surface **36** on the right side of stop **38**. When solenoid **16** is deenergized spring **29** pulls arm **20** down to its initial position.

As the rod **59** rotates downward, it moves the tumbler plate **79** out of its path through counterclockwise rotation imparted to the rock plate **35**. As the stack of bottles supported by the rod **59** descends, the next above bottle **77** contacts the rod **58** and moves rod **58** downward from its uppermost position into engagement with tumbler plate **80**. The downward movement of rod **58** in contact with tumbler plate **80** imparts a clockwise rotation of rock plate **35**, such rotation continuing under the influence of the downward movement of rod **58** until the rock plate **35** rotates clockwise to the point that latch **24** drops between stops **37** and **38**, and the latch **24** finally engages stop **37**. The rock plate **35** is now latched against further rotation and the arm **58** and the bottle **77** and those bottles above it are prevented from further downward movement by the latched rock plate **35**.

Bottle 77 and those bottles above it are now supported on rod 58.

The bottle 76 on arm 59 now separates from bottle 77 and those bottles above bottle 77 and continues its downward movement. By the time the rod 59 reaches its lowermost position, shown in dotted lines in FIG. 1, the bottle 76 has rolled off the rod 59 and is thus dispensed. The unloaded arm 59 is now free to return under the influence of spring 79 to its uppermost position rocking the tumbler plate 79 on the pivot 42 out of the path of rod 59. The spring 45 returns the tumbler plate 79 to its upright position against outturned portion 44 of rock plate 35.

The embodiment of FIGS. 3 and 4 operates in the same general manner as that of FIGS. 1 and 2 but has certain of the elements rearranged. In FIGS. 3 and 4 the bin for the bottles in staggered stacks are between side walls 11 and 12, back wall 14 and face plate 13. A bracket 92 for each stack of bottles is mounted on face plate 13 and rock plate 93 is mounted in bracket 92 on pivot 94. Rock plate 93 has an arcuate upper edge 95 provided with a notch forming stop 96 and 97. Latch 98 is pivoted at 99 in bracket 92 and is spring loaded by spring 100 to position shown in FIG. 4.

Solenoid coil 101 is mounted on bracket 92 and has armature 102 with arm 104 pivoted at 103. Arm 104 has extension 105 riding in a slot 106 of bracket 92 and terminates in shoulder 107 which engages latch 98. Spring 108 extends from arm 104 to extension 109 of face plate 13 to urge arm 104 to raised position as seen in FIG. 4.

Sold-out switch 110 is mounted adjacent extension 109 to actuate suitable indicia in the electrical circuit, in known manner, when the stack is empty.

At the lower end of rock plate 93 tumbler plates 113 and 114 are pivotally mounted at 111 and 112, respectively. Tumbler plates 113 and 114 project over arcuate slots 115 and 116, respectively, let into face plate 13. Support rod 117 extends through slot 115 and is mounted for rotation in rear wall 14. Arm 118 extends from the end of rod 117 to pivot 119 carried by bracket 120 mounted on front wall 13. Support rod 121 extends through slot 116 and is mounted for rotation in rear wall 14. Arm 122 extends from the end of rod 121 and is pivotally mounted at 123 on bracket 124 which is secured to front wall 13. Spring 125 urges tumblers 113 and 114 into engagement with stop 126 carried by rock plate 93.

The dispensing action of coil 101, latch 98, rock plate 93, tumblers 113 and 114, and support rods 117 and 121 is generally the same as that described for the embodiments of FIGS. 1 and 2 and need not be repeated. It should be noted that in the embodiment of FIGS. 3 and 4, shoulder 107 is disengaged from latch 98 on its downward stroke by extension 105 of arm 104 engaging the bottom of slot 106 to rotate arm 104 counterclockwise as seen in FIG. 4. When coil 101 is deenergized spring

108 returns arm 104 to its upper position for another dispensing cycle.

While FIG. 1 shows two stacks of bottles and associated dispensing mechanism, it is apparent that as many stacks of bottles can be arranged in side by side relationship as may be desired in the dispensing device.

It should now be apparent that the present invention in every way satisfies the several objectives discussed above.

Changes in or modifications to the illustrative embodiments described above may now be suggested to those skilled in the art without departing from the present inventive concept. Reference should therefore be had to the appended claims to determine the scope of this invention.

What is claimed is:

1. In a mechanism for dispensing a single bottle at a time from at least one staggered stack of bottles in a bin, two opposed bottle supports adjacent the lower end of the bin for each stack mounted for downward rotary movement from an upper normal bottle supporting position to a lower bottle dispensing position and supporting in turn the lowermost bottle of the stack of bottles in the bin, latch means mounted for oscillatory movement independently of the supports engaging and holding the support engaged by the lowermost bottle against downward rotation when the mechanism is in standby condition, a notch in said latch means, a latch normally engaged in said notch latching the latch means against movement and solenoid means for releasing the latch from said notch and for releasing the latch means whereby the weight of the bottles rotates the bottle support beneath the lowermost bottle in the stack downward toward bottle dispensing position and moves the latch means beneath the other bottle support preventing downward rotation thereof, said latch means then reentering said notch.

2. Mechanism as described in claim 1 including a face plate for the bin, a pivot for said latch means carried by said face plate, said notch being disposed above said pivot, means for rotatably mounting said latch on said face plate above said notch and an arm for said solenoid means engaging said latch and moved away from said pivot for releasing said latch from said notch.

3. Mechanism as described in claim 1 including a face plate for the bin, a pivot for said latch means carried by said face plate, said notch being disposed above said pivot, means for rotatably mounting said latch on said face plate above said notch and an arm for said solenoid means engaging said latch and moved toward said pivot for releasing said latch from said notch.

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