Jan. 12, 1965 W. R. HEISER 3,165,231

VENDING MACHINE

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FIG.1.

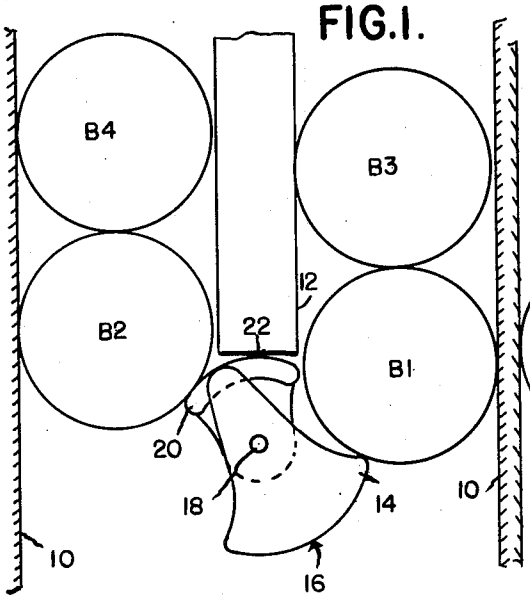


FIG.2.

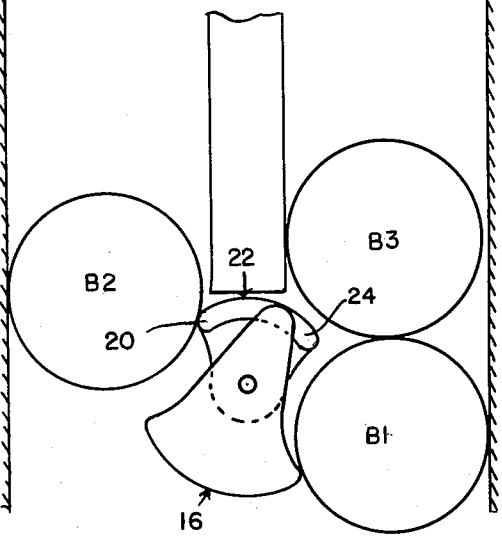
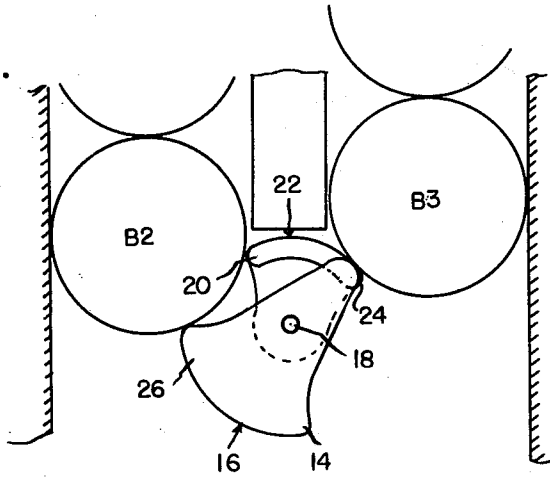


FIG.3.



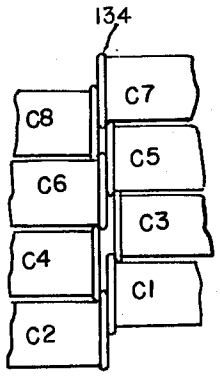
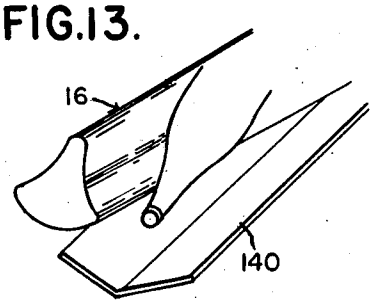


FIG.12.

FIG.13.



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FIG.4.

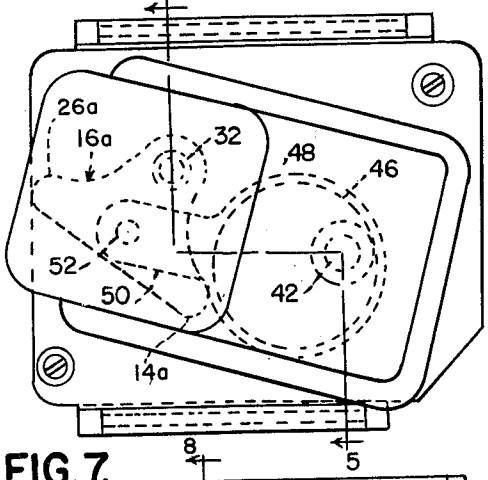


FIG.6.

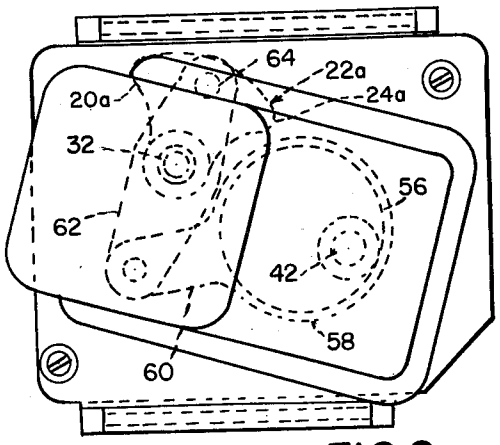


FIG.7.

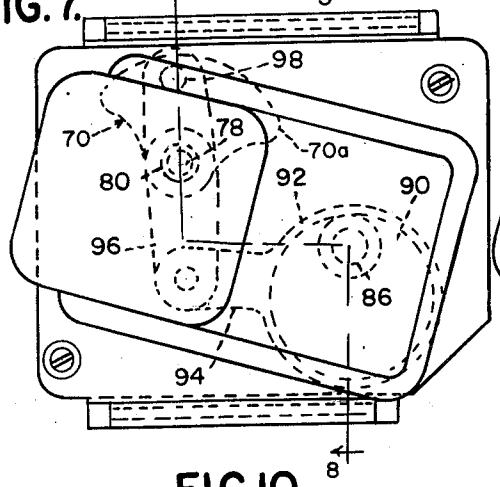


FIG.9.

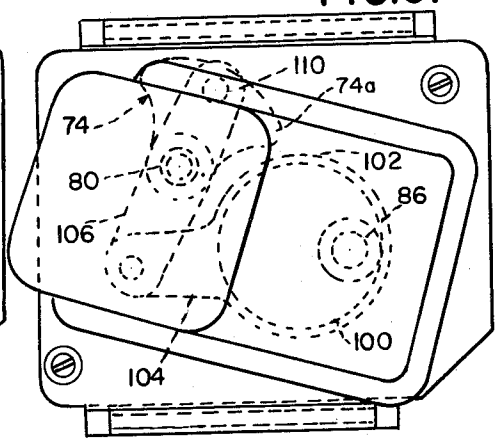
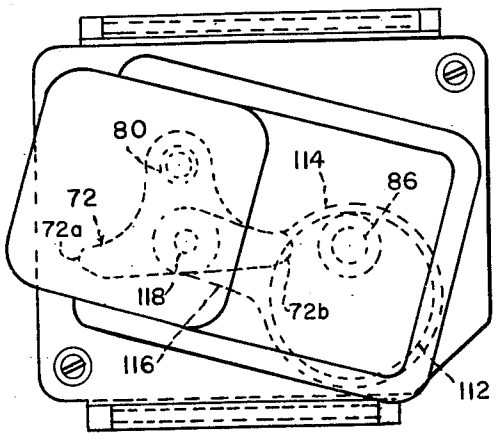


FIG.10.



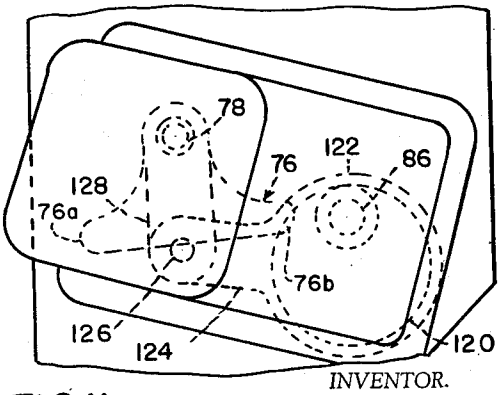


FIG.11.

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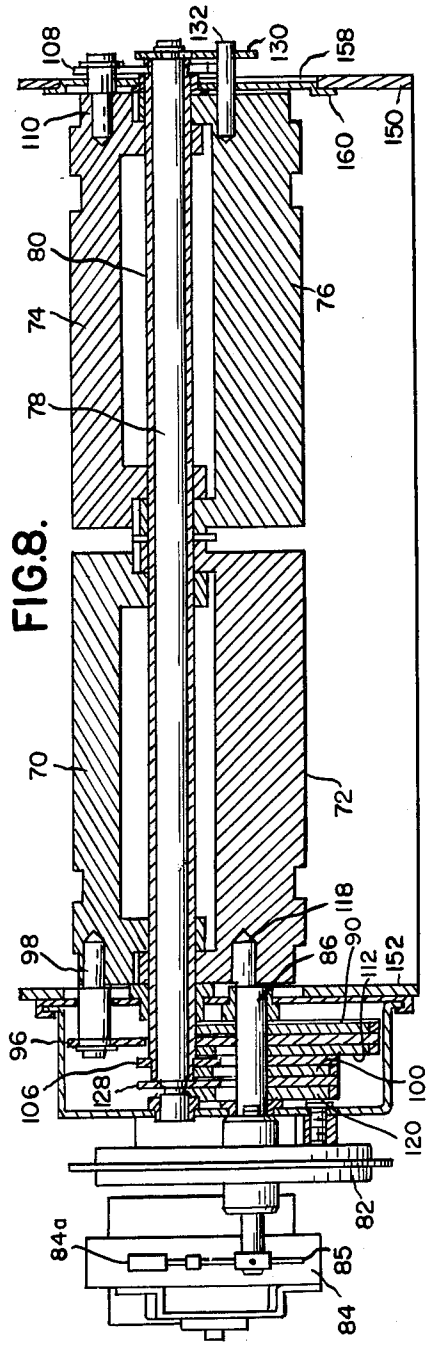


FIG.8.

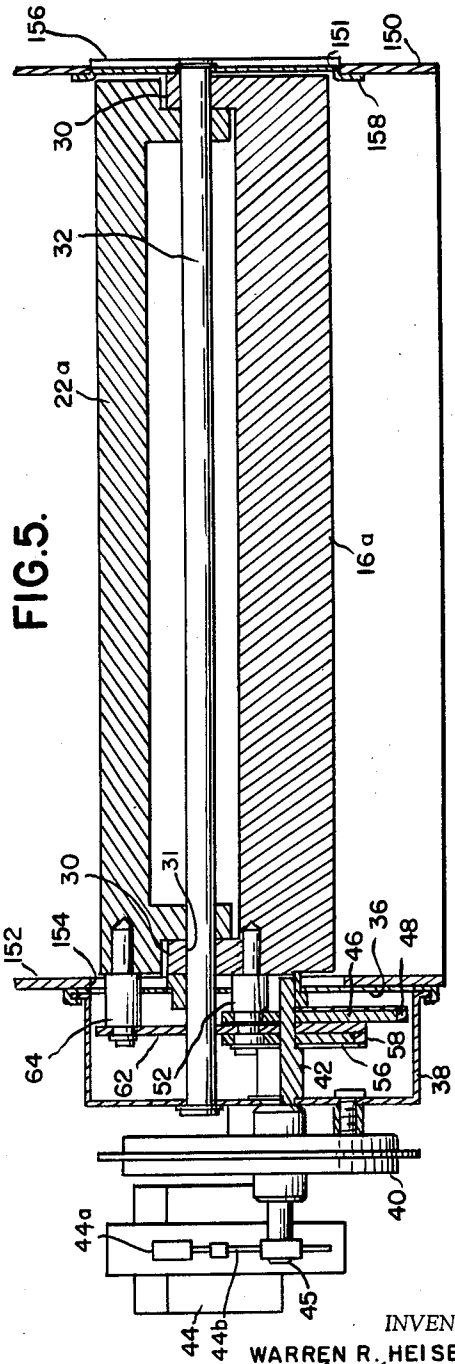


FIG.5.

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3,165,231

VENDING MACHINE

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Filed Mar. 10, 1958, Ser. No. 720,443
3 Claims. (Cl. 221—115)

The present invention relates to a vending machine, and more particularly, to a machine designed to vend bottles or cans of beverages.

It is an object of the present invention to provide vending apparatus characterized by the fact that the containers are vended smoothly without permitting the containers to drop at any time during the vending cycle.

It is a further object of the present invention to provide container vending apparatus for vending containers alternately from the bottom of two adjacent single columns of artciles. It is noted at this time that above the vending mechanism the two single columns of articles may merge into a double staggered column if desired.

It is a further object of the present invention to provide vending apparatus for vending cans in which the cans are arranged in two double columns each double column of cans comprising a front and rear column portion, the cans in the two column portions being disposed in substantially end to end relationship.

It is a further object of the present invention to provide apparatus for vending cans from two double columns as described in the preceding paragraph in which the cans are vended sequentially from the sub-columns.

It is a further object of the present invention to provide can vending apparatus in which the cans are so positioned and advanced in adjacent columns as to avoid movement of a lower corner of one can over the upper corner of a can in the next adjacent sub-column.

It is a feature of the present invention to provide container dispensing apparatus disposed between two vertical columns comprising a pair of two relatively movable container control members and means operating the members in timed relation to release a container from an upper one of said members to the lower one and to release a can from the lower one of said members.

It is a further object of the present invention to provide upper and lower relatively movable members adapted to dispense containers alternately from two adjacent columns, a motor for actuating said members, means connecting said motor to both of said members to actuate said members to vend a container by the lower of said members from one of said columns and to move said lower member in position to engage the lowermost container in the other column of containers, and to move said upper member to engage below and support the container above the container above the container last vended and to release the lowermost container in said other column for engagement by said lower member.

It is a further object of the present invention to provide apparatus as described in the preceding paragraph in which said upper and lower members are designed to provide controlled movement of said containers into engagement with said support members.

It is a further object of the present invention to provide container support and vending members shaped to release the forward end of each container in advance of the rear end thereof so as to guide said containers for movement into a downwardly inclined dispensing chute.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings,

illustrating preferred embodiments of the invention, wherein:

FIGURE 1 is a schematic elevational view of the dispensing apparatus.

FIGURES 2 and 3 are fragmentary elevational views similar to FIGURE 1 showing the positions of the container support members at different phases of the operation.

FIGURE 4 is an end elevational view of the supporting and dispensing members and the actuating means for the lower one of said members.

FIGURE 5 is a sectional view substantially on the line 5—5, FIGURE 4, with the parts in somewhat different position.

FIGURE 6 is a view similar to FIGURE 4 except that it shows the actuating means for the upper one of said supporting and dispensing members.

FIGURE 7 is an end elevational view of a modified construction designed to dispense beverage cans from four juxtapositioned stacks showing the connections to the upper forward supporting member.

FIGURE 8 is a fragmentary sectional view substantially on the line 8—8, FIGURE 7.

FIGURE 9 is a view similar to FIGURE 7 showing the connections to the upper rear supporting member.

FIGURE 10 is a view similar to FIGURE 7 showing the connections to the lower front supporting member.

FIGURE 11 is a view similar to FIGURE 7 showing the connections to the lower rear supporting member.

FIGURE 12 is a fragmentary end elevation showing the relationship of two adjacent stacks of cans in which the cans are disposed in substantially end to end relationship.

FIGURE 13 is a diagrammatic view illustrating the modified shape of the lower support members controlling the position of the articles as they are released.

Referring first to FIGURES 1–6 there is illustrated a vending apparatus which may be provided in a refrigerator cabinet if desired and which may conveniently be associated with conventional coin controlled mechanism to effect release of containers such for example as bottles.

As best seen in FIGURE 1 the cabinet may be provided with a plurality of vertical separator bars **10**. Conveniently, the separator bars **10** may be arranged in pairs adjacent the center and rear end portions of the bottles where the bottles are of uniform cylindrical shape. Adjacent the lower portion of the space between a pair of adjacent vertical bars **10** there is provided a separator **12**. The separator **12** may if desired extend the full height of the storage portion of the cabinet. In either case, as the bottles approach the bottom of the space between the bars **10** they move into separated columns at opposite sides of the separator **12** as clearly illustrated in FIGURE 1.

With the parts in the position indicated in FIGURE 1 it will be observed that the bottle B1 engages a lobe **14** of the lower support member **16** which is pivoted for angular movement about the axis of pivot pin **18**. The bottle B2 engages the lobe **20** of the upper support member **22**. Means are provided for effecting independent but timed angular movement of the supporting members **16** and **22**. With the parts in the position illustrated in FIGURE 1 the lower supporting member **16** moves clockwise to the position illustrated in FIGURE 2 which permits downward movement of the bottles B1 and B3 to the position shown. At the same time, the upper supporting member **22** initially remains substantially stationary and its lobe **20** supports the bottle B2 and the bottles thereabove including the bottle B4. Upper mem-

ber 22 moves independently to the intermediate position of FIGURE 2, release of bottle B2 being timed so that upon release it is in supported relation to lower member 16. Further movement of the supporting members 16 and 22 takes place to the position illustrated in FIGURE 3. In this position it will be observed that the lobe 14 of the lower supporting member has moved into a clearance position, vending or dispensing the bottle B1. During this movement the lobe 24 of the upper supporting member 22 has moved into position below the bottle B3. The upper and lower supporting members are so dimensioned that the lobe 24 of the upper supporting member moves smoothly into engagement with the bottle B3 prior to release of the bottle B1. It will further be observed that the upper surface of the supporting member 22 is arcuate in cross-section so that its angular movement about the pivot axis 18 takes place without causing or permitting vertical movement of the bottle B3.

In FIGURE 3 it will be observed that the lower support member 16 has dispensed the bottle B1 but is still moving and its movement will continue until its lobe 26 is substantially adjacent the lower surface of the bottle B2. Thus, the bottle B2 moves smoothly into a position in which it is supported by the lobe 26 of the lower support member 16 before it is released by the lobe 20 of the upper support member 22.

It will be appreciated that the next actuation of the dispenser releases the bottle B2 and moves the bottle B3 into supported position by the lobe 14 for subsequent vending.

The description of FIGURES 1–3 is in general terms and the actual mechanism for effecting the controlled sequential movement of the upper and lower support members 16 and 22 is best understood from FIGURES 4–6.

Referring first to FIGURES 4 and 5 it will be observed that the lower support member 16*a* is elongated and includes flange portions 30 at opposite ends having openings 31 which receive a mounting rod 32 the ends of which are supported in a fixed rear mounting plate 156 and a fixed front mounting plate 36. The plate 36 has connected thereto a housing member 38 in which are provided suitable actuating mechanism. Mounted on the housing member 38 is a speed reducer 40 including a drive shaft 42. A motor 44 is connected to the speed reducer and is adapted to be de-energized by switch 44*a* controlled by cam means 44*b* carried by shaft 45 which is rotatable with the shaft 42 so that the motor may drive the shaft 42 through a predetermined angular movement and then stop. In this embodiment of the invention the motor will be operated to rotate the shaft 42 in 180-degrees' increments and accordingly two switch operating cams are carried by shaft 45. Since the shaft 45 rotates in synchronism with the shaft 42 it will be understood that one of the cam arms 44*b* engages the actuator of the switch 44*a* after each 180 degrees' rotation of the shaft 42. The switch 44*a* is connected to the motor so that when actuated by a cam arm it stops the motor. The motor is started by suitable coin controlled means as is well understood in the art.

Rigidly connected to the shaft 42 is an eccentric 46 which drives a crank member 48 having an arm 50 connected as by a pin 52 to the lower support member 16*a* in a position spaced from the axis of the pivot support rod 32. It will be apparent that 180-degrees' rotation of the shaft 42 will swing the lower support member 16*a* from the illustrated position to the position in which it is inclined in the opposite direction.

Referring now to FIGURES 5 and 6, the mechanism for effecting the required movement of the upper support member 22*a* is best seen.

In FIGURE 6 there is illustrated a second eccentric drive disc 56 keyed or otherwise connected to the shaft 42 and which is connected by a crank 58 having an arm 60 to a lever 62 mounted on the support rod 32. The upper end of the lever 62 is connected by a pin 64 to the upper support member 22*a*.

A comparison of FIGURES 4 and 6 shows that the eccentric discs 46 and 56 are angularly displaced relative to the drive shaft 42 and hence, they do not operate in synchronism. As previously described in connection with FIGURES 1–3, the upper and lower support members are operated in the required sequence to effect a smooth lowering of the bottles into engagement alternately with the upper and lower support members without permitting them to drop during the vending operation.

In the mechanism just described, the containers are referred to as bottles and are disposed generally in two adjacent stacks.

It will of course be apparent that the support member 16*a* is generally similar in shape to the support member 16 and is provided with similar lobes 14*a* and 26*a*. Similarly, it will be observed that the support member 22*a* of FIGURE 6 is generally similar in shape to the support member illustrated diagrammatically in FIGURES 1–3, and is provided with support lobes 20*a* and 24*a* corresponding to the lobes 20 and 24 seen in FIGURES 1–3.

Referring now to FIGURES 7–11 there is illustrated an arrangement by means of which a relatively large number of beverage cans may be dispensed from the same cabinet. In this case, since the cans are or may be about only one-half as long as the bottles, the space occupied by each stack of bottles may receive two stacks of cans in which the cans in the two stacks are disposed in generally end to end relation.

This arrangement, described in general terms, comprises means for releasing four cans from the bottom of the two main stacks each of which is composed of two sub-stacks, before a second can is released from any of the stacks.

The mechanism for smoothly lowering the four subcolumns of cans in supported relation into dispensing position and then dispensing them in sequence is illustrated in FIGURES 7–11, of which FIGURE 8 is a sectional view through the apparatus, and FIGURES 7, 9, 10 and 11 are end views showing actuating mechanism extending to different support members. In these figures the support members are four in number; namely, an upper front support member 70, a lower front support member 72, an upper rear support member 74, and a lower rear support member 76. In this case the support members are mounted for independent angular movement on pivot support structure which includes a rod 78 extending through a tube or sleeve 80. In this case a speed reducer 82 has a motor 84 provided with switch 84*a* associated with control means to arrest the motor after 90 degrees of rotation of its shaft 86. Accordingly, four actuations of the motor are required to effect a complete rotation of the shaft 86 and hence the mechanism is adapted to properly time four cams 85 to control the dispensing of the cans in the proper sequence from four related juxtaposed columns. The operation of this mechanism is similar to that previously described in connection with FIGURE 5. The cams 85 rotate in synchronism with the shaft 86. Since four cams 85 are provided one of the cams will engage the actuator of switch 84*a* after each 90 degrees' rotation of the shaft 86 and this will stop the motor. The motor will be restarted, as is conventional in the art, by suitable coin controlled mechanism.

Referring first to FIGURES 7 and 8 there is shown an eccentric 90 keyed or otherwise secured to the shaft 86 and connected by a crank 92 having an arm 94 to a lever 96 which is mounted for rocking movement on the sleeve 80. The upper end of the lever 96 is connected by the pin 98 to the forward upper support member 70.

As best seen in FIGURE 9, the upper rear support member 74 is actuated by mechanism which includes an eccentric 100 keyed or otherwise secured to the drive shaft 86 and connected by a crank 102 having an arm 104 to a lever 106 which is keyed or otherwise secured to the

sleeve 80. Lever 106 constitutes drive means for sleeve 80. At the rear of the assembly the sleeve 80 has rigidly connected thereto an operating arm or drive means 108 which is connected by a pin 110 to the upper rear support 74.

A comparison of FIGURES 7 and 9 shows that the eccentrics 90 and 100 are out of time with respect to each other and will accordingly cause rocking movement of the upper support members 70 and 74 in differently timed relationship.

Referring now to FIGURES 8 and 10 there is shown a third eccentric 112 keyed or otherwise secured to the drive shaft 86 and connected by a crank 114 having an arm 116 and a pivot pin 118 to the lower front support member 72.

Referring now to FIGURES 8 and 11 there is illustrated a fourth eccentric 120 keyed or otherwise secured to the shaft 86 and connected by a crank 122 having an arm 124 and a pivot pin 126 to an actuating arm 128 keyed or otherwise rigidly secured to the rod 78. Arm 128 constitutes drive means for rod 78. At its rear end the rod 78 extends beyond the end of the tube 80 and has rigidly secured to the extending portion thereof an actuating arm 130 or drive means which is connected by a pin 132 to the lower rear support member 76.

A comparison of FIGURES 7 and 10, as well as a comparison of FIGURES 9 and 11, shows that the eccentrics which drive the four support members 70, 72, 74 and 76 are arranged so that the movements of the upper and lower support members of each pair are out of time. In other words, operation of the machine by energizing the motor results in relative rocking movement between the upper and lower support members of each pair. Again, the timing of the movement is such that in each of the four stacks of cans, the entire stack of cans is moved downwardly with the lower can in engagement with a lobe of a lower support member until it reaches a position in which the can above the lowest can in the stack is engaged by a lobe of the upper support member which thereupon takes over support of the engaged can and the cans in the stack thereabove. Additional movement of the lower support member thereafter releases the lower can which at that time is free from engagement with the cans thereabove. Secondly, the lowermost can in each stack is supported by a lobe of the upper member until a lobe of the lower member moves into position to engage the can just as it is released by the lobe of the upper member. With this arrangement the cans are handled smoothly and the entire stack of cans is lowered in supported condition without ever being dropped from one supported position to another.

It will be appreciated that with the arrangement illustrated in FIGURES 7–11, a complete cycle involves a 360-degrees rotation of the drive shaft 86 and that during this rotation of the shaft 86, a can will be released from each of the four stacks. If the eccentrics are properly timed, these cans may be released at positions corresponding to approximately 90 degrees' rotation of the shaft 86. Accordingly, by providing a rotary switch controller associated with the member 85, the motor may be de-energized after it has driven the shaft 86 through approximately 90 degrees of rotation. Initiation of operation of the motor in either case may be by suitable coin controlled mechanism.

It will be observed that the support members 70 and 74 seen in FIGURES 7 and 9, are generally similar in shape to the support members 22 of FIGURES 1–3, and these are provided with support lobes 70*a* and 74*a* corresponding to the lobes 20 and 24 of the support element 22. Similarly, referring to FIGURES 10 and 11, it will be observed that the support members 72 and 76 correspond generally in shape to the support member illustrated diagrammatically at 16 in FIGURES 1–3, and these support members include support lobes 72*a*, 72*b*, 76*a*, and 76*b* which correspond respectively to the lobes 26 and 14 of the support element 16.

An important feature of the present invention is the control of the two stacks of cans which are in substantially end to end relationship as illustrated in FIGURE 12. Cans are provided with radially extending ribs, ferrules, or flanges 134 and these prevent stacking of cans in a stack in which the ends are in perfect alignment. Instead, the condition illustrated in FIGURE 12 prevails in which it will be observed that the flanges 134 cause the cans to assume a somewhat staggered relationship. This arrangement would cause the cans to interfere with each other during vending unless handled in a particular way, as suggested herein. It will be observed that the stack of cans to the left, in which the lowermost cans are designated C2, C4, C6, and C8, is at a somewhat lower level than the stack of cans to the right, the lowermost cans of which are designated C1, C3, C5, and C7. With this arrangement the can C2 is lower than the can C1 and the next can to be dispensed. Similarly, since the cans are all of the same diameter, the can C4 is lower than the can C3, the can C6 is lower than the can C5, and the can C8 is lower than the can C7. When the can C2 is dispensed, the can C1 becomes the lowermost of the cans and is the next can to be dispensed. However, at this time the can C4 becomes the lowermost can in the stack to the left of the figure and may be moved downwardly into substantial registration with the can C1 but nevertheless slightly thereabove. When the can C1 is dispensed the can C4 becomes the lowermost of all of the cans illustrated and the can C3 of course becomes the lowermost can in the right hand stack. With this arrangement it will be observed that both stacks of cans can be vended or dispensed without ever causing the lowermost corner of a can in either stack to traverse or pass across the uppermost corner of a can in the opposite stack. This positively prevents interference between the cans of the type which might occur if for example the can C7 were required to move downwardly so that its lower corner might engage the upper adjacent corner of the can C6.

Referring now to FIGURE 13 there is illustrated an arrangement in which the lobe of the lower support members 16 or 72, 76 are tapered so that as a cylindrical article, either a can or a bottle having a cylindrical portion, is dispensed, it is released in a controlled manner so that its end adjacent the front of the dispensing apparatus moves downwardly before the opposite end with the result that the article is properly released into an inclined chute indicated generally at 140.

An important advantage of the construction best illustrated in FIGURES 5 and 8 is that the container supporting and vending mechanism including the supporting rotors engaged by the bottles or cans, the actuating cams or cranks, the speed reducer, the electric motor, and control means therefor are all formed as a sub-assembly which can be inserted or removed from the cabinet in a very simple manner. Specifically, within the cabinet there is provided a rear supporting plate or wall 150 having an opening therein indicated at 151. The front supporting plate or wall, located within the cabinet is indicated at 152 and is provided with an enlarged opening 154.

The assembly comprising the support members 16 and 22 or the support members 70, 72, 74 and 76 include at the inner end thereof support plates 156 or 158 having a central offset portion dimensioned to fit within the opening 151 and locating flanges 158 or 160. The housing 38 as seen in FIGURE 5 includes the mounting plate 36 which is adapted to be attached to the plate 152 by mounting screws (not shown). Obviously, the removal of the mounting screws which secure the housing 38 to the front support plate 152 permits removal of the entire assembly.

It is further observed that the openings in the plates 150 and 152 are made of the same size so that the apparatus may be converted from a bottle dispenser to a

can dispenser simply by substituting the appropriate dispensing mechanism. Obviously of course, it is also possible to provide a cabinet having a desired number of bottle dispensers and at the same time a desired number of can dispensers.

The drawings and the foregoing specification constitute a description of the improved vending machine in such full, clear, concise and exact terms as to enable any person skilled in the art to practice the invention, the scope of which is indicated by the appended claims.

What I claim as my invention is:

1. A can vender comprising guide and support structure for four adjacent vertical stacks of cans all of which are disposed with their axes horizontal and parallel, the cans in each column being disposed in end-to-end relationship with one adjacent column and in generally side-by-side relationship with the other adjacent column, said guide and support structure comprising vertical support surfaces engaging the outer sides of the cans and a vertical separator intermediate the stacks of cans in side-by-side relationship and comprising in addition two pairs of upper and lower support and release members, all of said members being pivoted for independent movement about a horizontal axis located in the vertical plane of said separator, each member having portions movable alternately into and out of can supporting position at opposite sides of said separator, elongated actuator means extending from front to rear of said vender, drive mechanism at one end of said vender coupled to the upper and lower support and release members at such end for effecting independent rocking movement thereof and coupled also to the adjacent end of said elongated actuator means, and means at the opposite end of said elongated actuator means coupling it to the upper and lower support and release members at the opposite ends of said vender, and means for controlling said drive mechanism to move said two pairs of upper and lower supports and release members simultaneously in substantially equal increments of a sequenced movement at each operation to release a single can at each operation and in a predetermined regular sequence.

2. A vender as defined in claim 1 in which said elongated actuator means constitutes the pivot support for all of said members.

3. A vender as defined in claim 1, said members being constructed and arranged so that movement of each of said members away from can supporting position is accompanied by downward movement of the can directly engaged thereby, said support and release members being timed together so that each can in the two adjacent stacks in which the cans are in end-to-end relationship is at all times during its passage through the vender higher than one and lower than the other of the two most closely adjacent endwise associated cans in the adjacent stack, and both stacks are lowered simultaneously, and only the lowermost can of both stacks is released.

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