United States Patent [19]

Rockola

[11] **3,771,691**

[45] **Nov. 13, 1973**

[54] **DEPLETED STAKE REPLACEMENT APPARATUS FOR CUP DISPENSER**

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[73] Assignee: **Rockola Manufacturing Corp.,** Chicago, Ill.

[22] Filed: **July 17, 1972**

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[52] **U.S. Cl.** **221/11,** 221/1

[51] **Int. Cl.** **G07f 11/60**

[58] **Field of Search** 221/11, 106, 108, 221/110, 111

[56] **References Cited**

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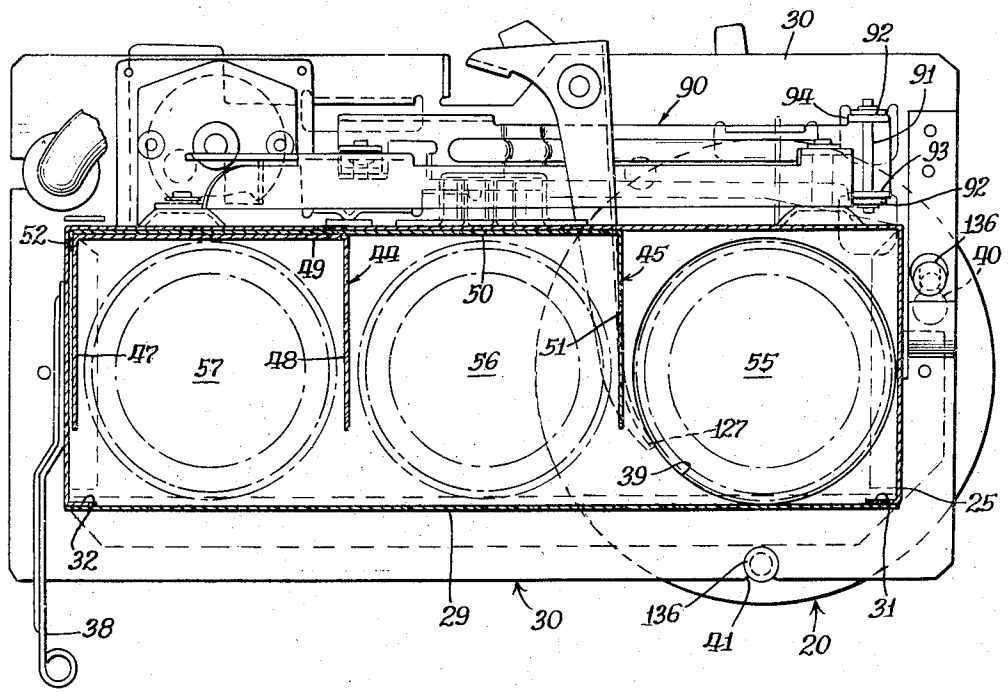
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Primary Examiner—Robert B. Reeves
Assistant Examiner—Thomas E. Kocovsky
Attorney—James A. Davis et al.

[57] **ABSTRACT**

A compact power-actuated assembly for storing paper cups in vertical columns and periodically shifting individual columns thereof laterally over a cup drop mechanism, including a linkage system for selectively actuating the latter to remove individual cups from an over-disposed column or stack; the shifting of the cup stacks being operatively responsive to the depletion of a supply of cups over the cup drop mechanism.

3 Claims, 8 Drawing Figures



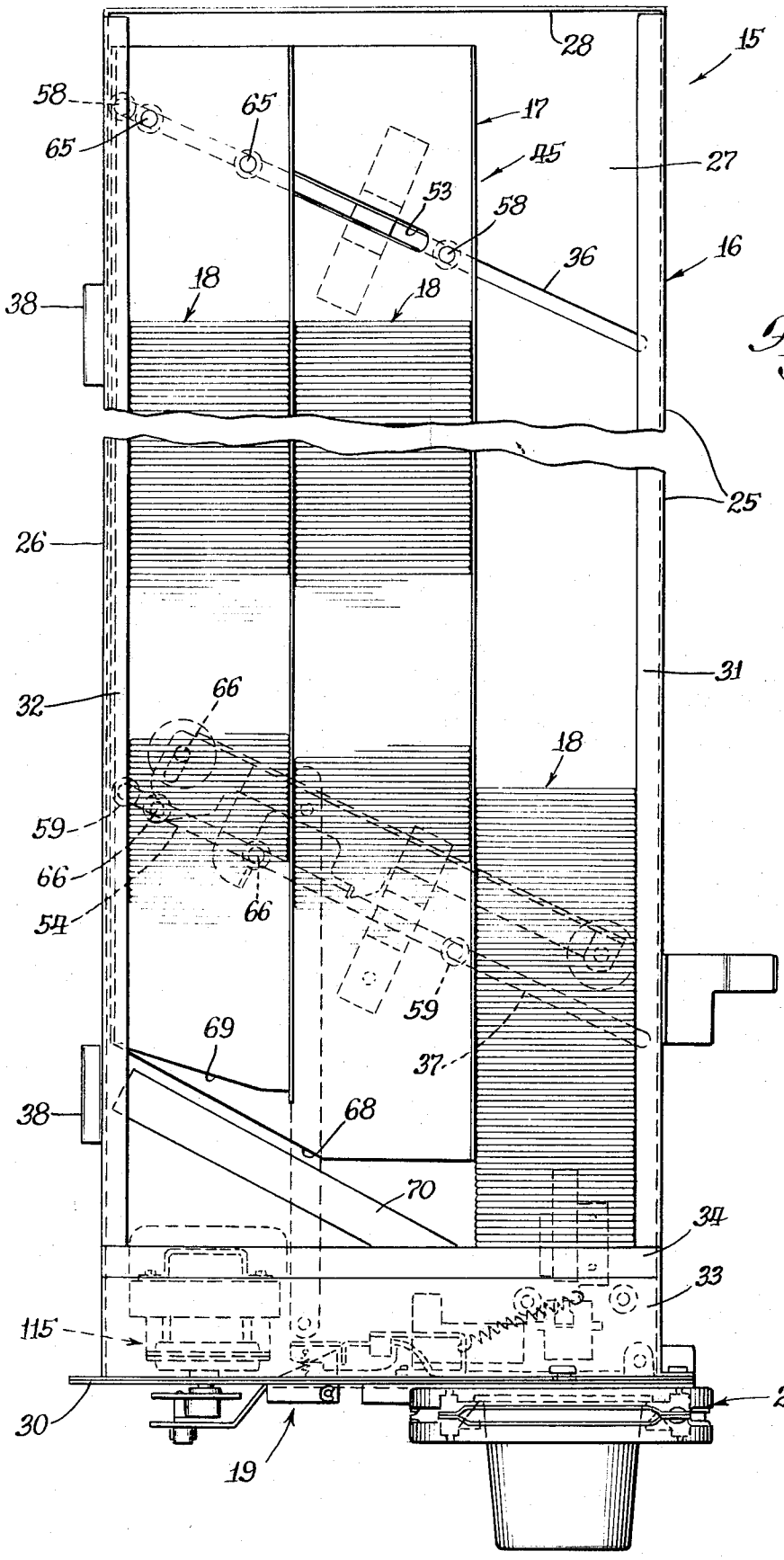

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Fig. 1.

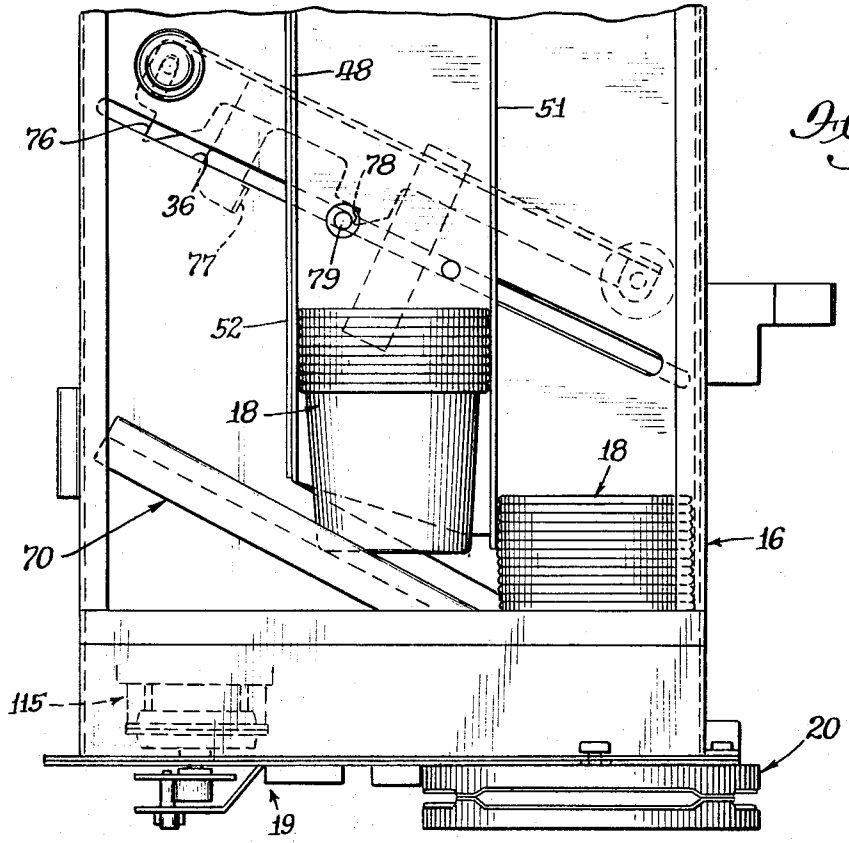

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Fig. 2.

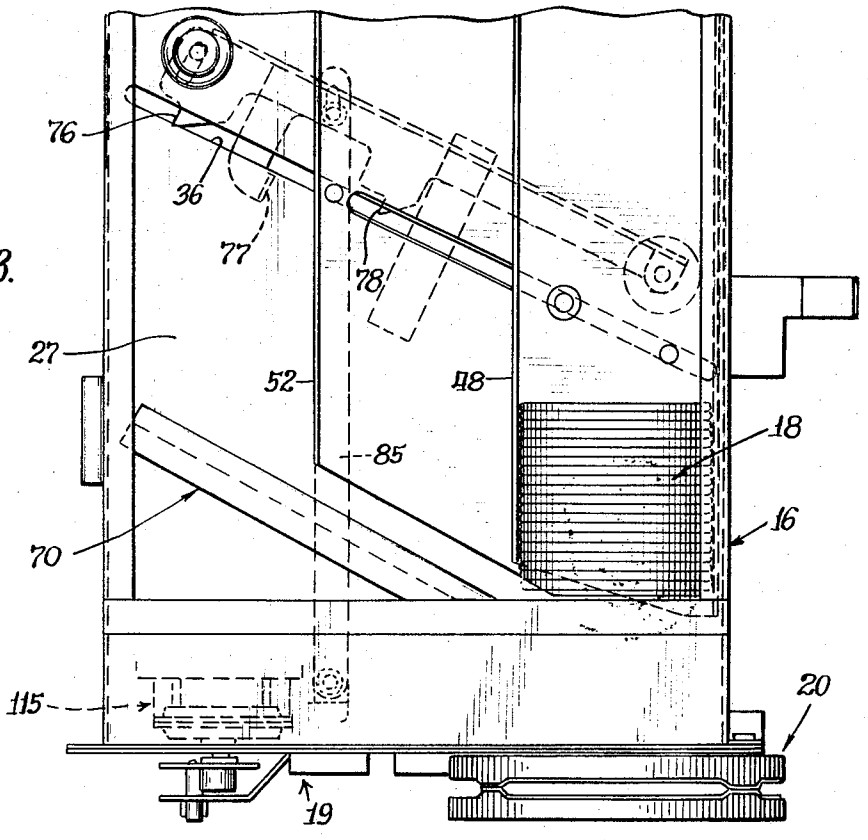

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Fig. 3.

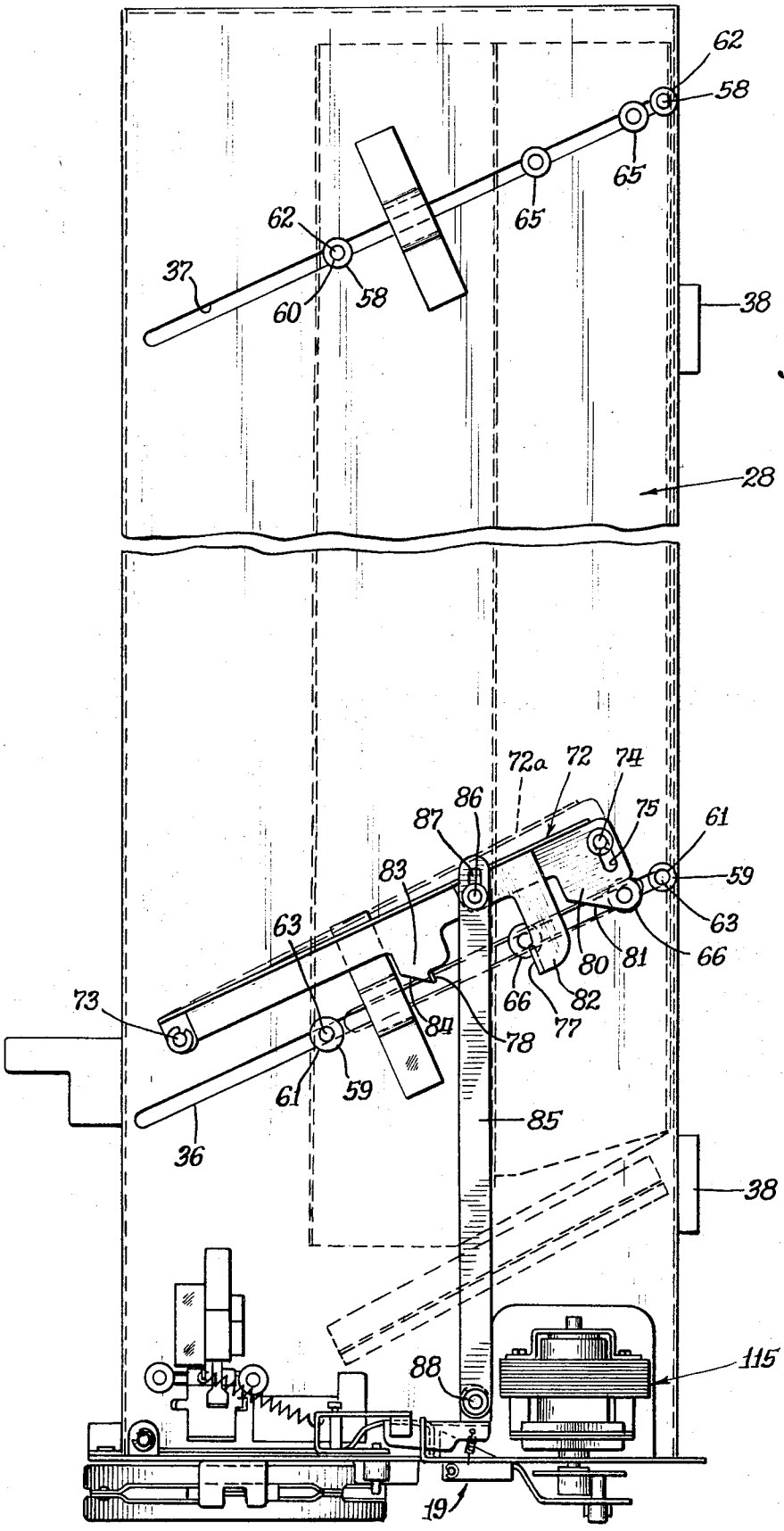

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Fig. 4.

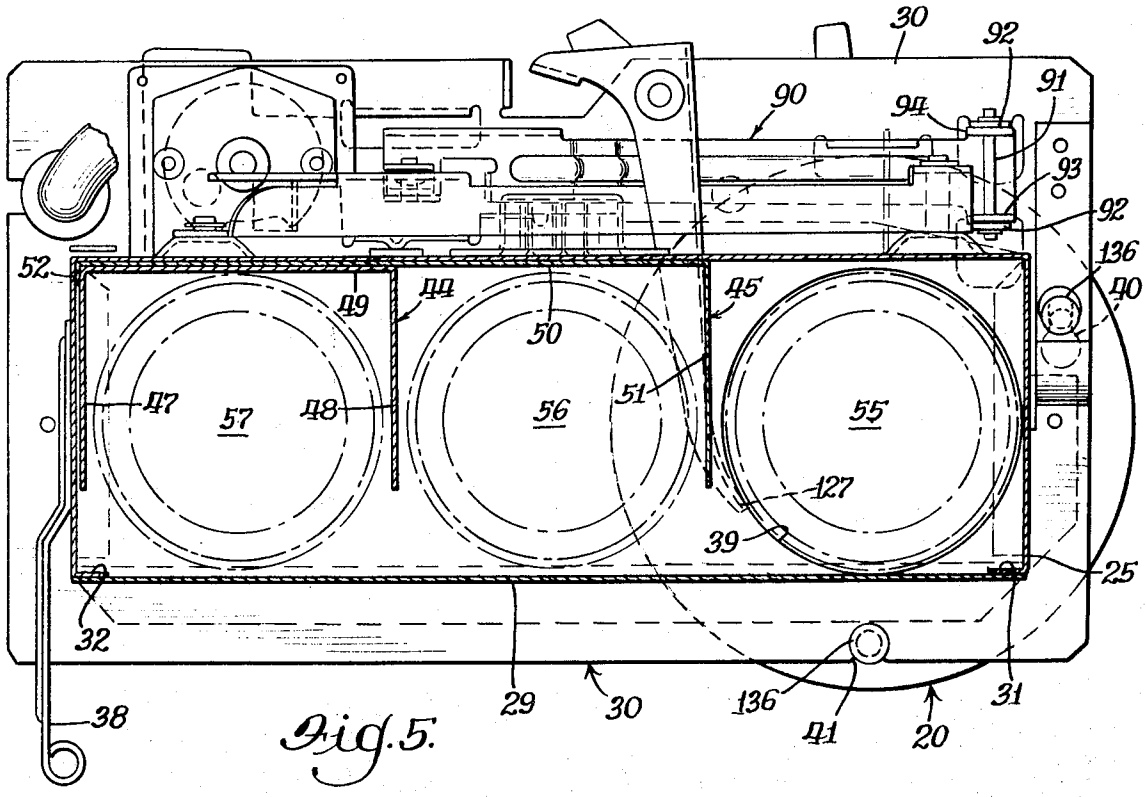

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Fig. 5.

Fig. 6.

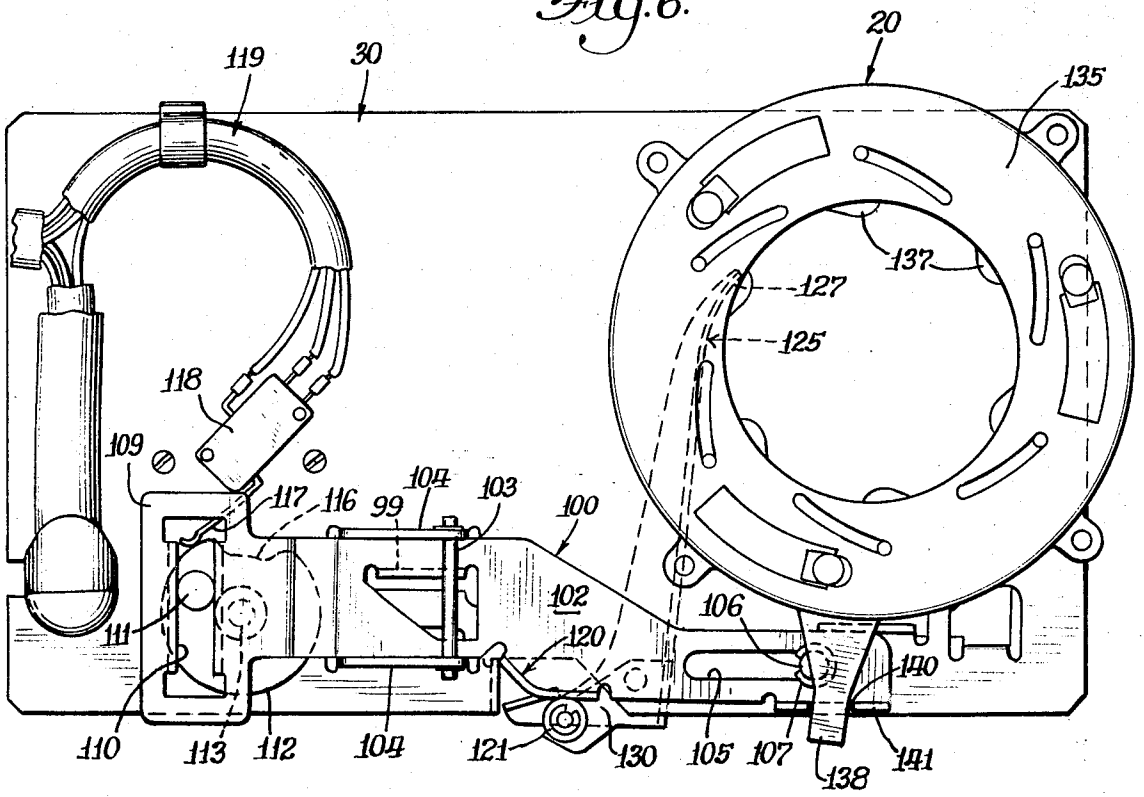
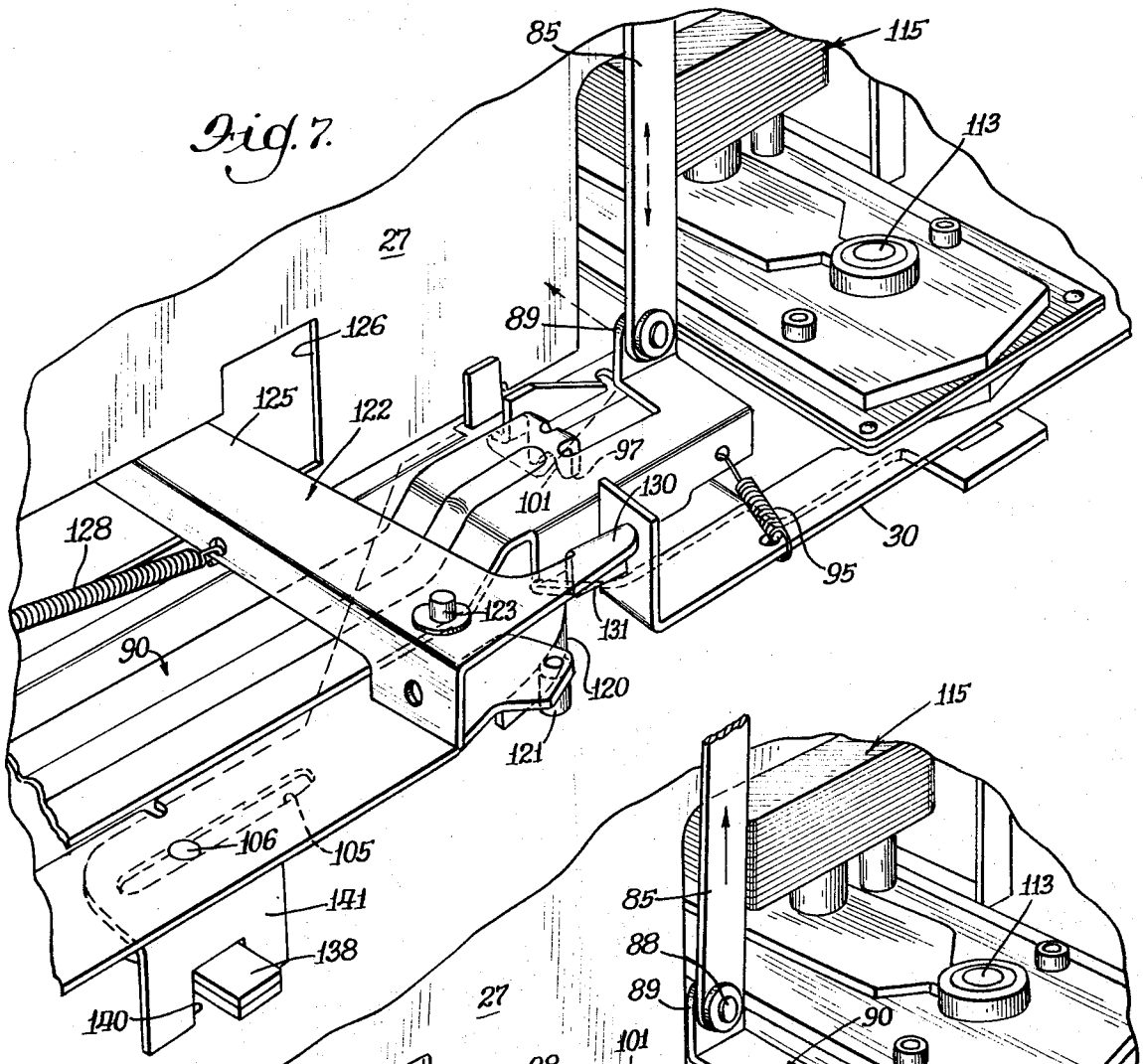

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Fig. 7.


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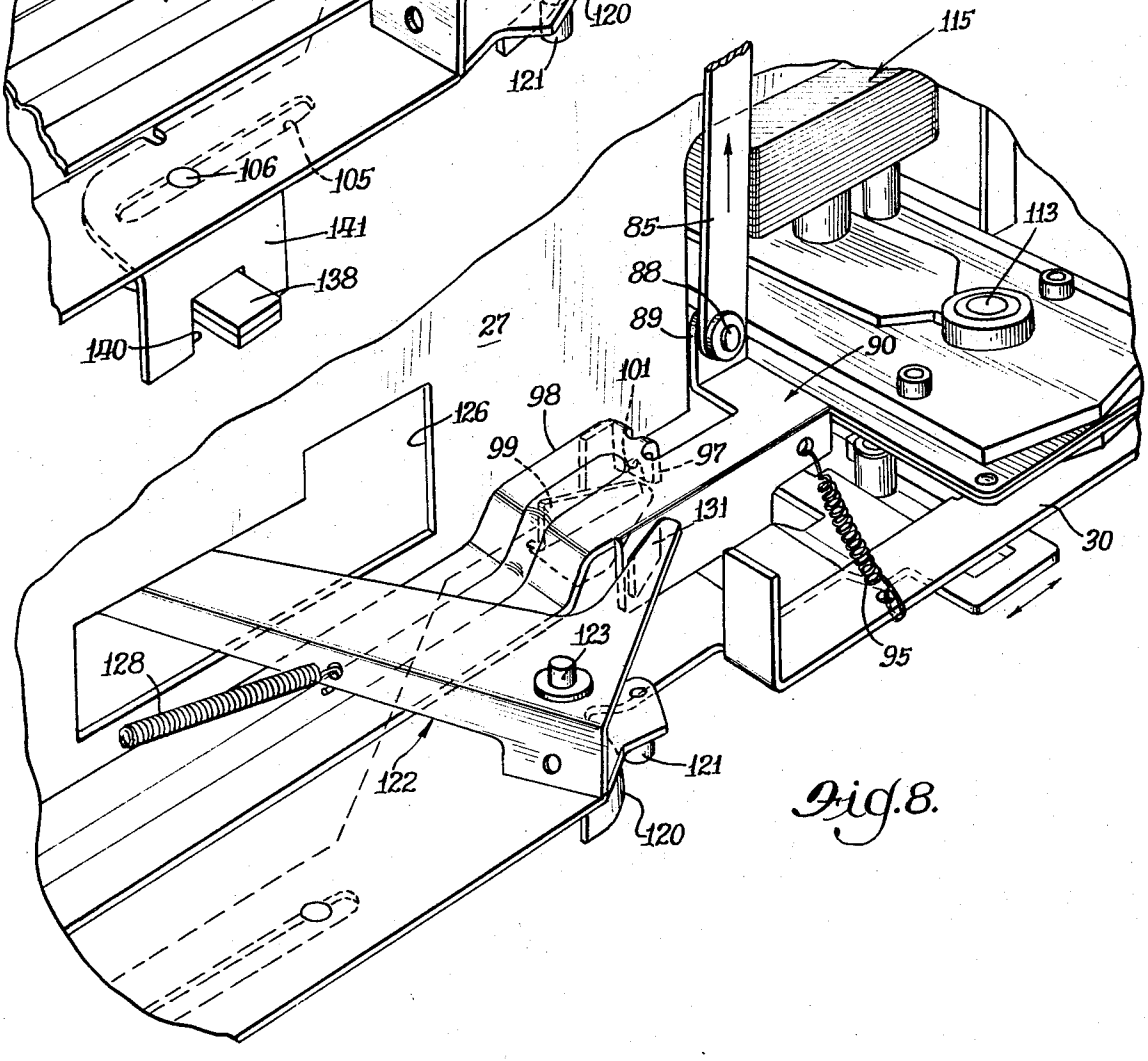

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Fig. 8.

DEPLETED STAKE REPLACEMENT APPARATUS FOR CUP DISPENSER

BACKGROUND OF THE INVENTION

This invention relates generally to automatic vending machines utilizing paper cups and is particularly directed to an improved combination of elements for storing, handling and dispensing paper cups.

The vending machine art has heretofore developed automatic cup dispensing means in which rotatably driven magazine means are conventionally employed to store a plurality of vertical stacks or columns of empty cups; the magazine being periodically indexed rotatably to successively position a stored stack of cups registeringly over a cup drop mechanism capable of stripping individual cups from the lower end of the stack for delivery to a drink vending stage. Typifying such developments of the prior art is the mechanism of U. S. Pat. No. 3,576,275, issued Apr. 27, 1971, while the features of a commonly used cup drop mechanism are disclosed in U. S. Pat. No. 3,071,292, issued Jan. 1, 1963.

While the aforementioned prior developments have been generally satisfactory for their intended purposes, the same are normally of a complex nature requiring relatively sophisticated and costly mechanisms for indexing the rotatable cup storage magazine and dispensing cups from a stack thereof. As a consequence, such prior known storing and dispensing devices are relatively expensive, requiring careful manufacturing techniques and due to the employment of a rotatable storage magazine, demand comparatively large and inefficient space requirements.

Thus the need has arisen for a relatively inexpensive, compact and yet dependable cup storage and dispensing apparatus capable of lending itself to areas of use where space requirements are at a premium, as for example in smaller compact drink vending machines.

The present invention is directed to the provision of simplified apparatus for storing a plurality of paper cups in vertical stacks arranged in side-by-side relation and for automatically delivering individual cups therefrom while providing for the automatic gravitational shifting of stored individual stacks thereof into dispensing position.

In brief, this invention contemplates a generally rectangular box-like cup storage magazine having laterally shiftable column separators or compartmentalizing means capable of being successively relocated within the storage magazine by the influence of gravity forces thereon; the same being brought into operational position in response to the periodic depletion of the cup supply over a conventional cup drop mechanism. A single electric motor is utilized to actuate the cup drop mechanism and to periodically initiate activation of the cup storage compartments into cooperating alignment with an underdisposed cup drop mechanism.

It is an important object of this invention to provide improved and simplified mechanisms for handling and dispensing cups in automatic vending machines.

Another important object of this invention is to provide simplified apparatus for storing a plurality of cups in vertical columns separated by laterally shiftable compartments capable of being gravitationally moved to a common cup dispensing position within a storage magazine.

A still further object of this invention is to provide improved cup storage and dispensing apparatus demonstrative of improved economies of manufacture, dependability of operation and compactness.

Having thus described the present invention, the above and further objects, features and advantages thereof will appear from the following detailed description of a preferred embodiment of its several features illustrated in the accompanying drawings, so as to enable those skilled in the art to comprehend and practice its teachings.

IN THE DRAWINGS

FIG. 1 is a foreshortened front elevational view of cup dispensing apparatus according to this invention;

FIG. 2 is a partial front elevational view thereof showing a first shifted position of the interior cup compartmentalizing means employed therewith;

FIG. 3 is another partial front elevational view of the apparatus illustrated in FIGS. 1 and 2 showing a second shifted position of the compartmentalizing means thereof;

FIG. 4 is the rear elevational view thereof;

FIG. 5 is a cross-sectional view taken substantially along vantage line 5-5 of FIG. 1, looking in the direction of the arrows thereon;

FIG. 6 is a bottom plan view thereof, illustrating features of the cup drop mechanism and means for driving the same;

FIG. 7 is a partial perspective view of the means employed for initiating gravitational shifting of the interior compartmentalizing means; and

FIG. 8 is another perspective view of the mechanism illustrated in FIG. 7, operationally conditioned to effect lateral shifting of the vertical stack of cups within the storage magazine.

Turning now to the general features of the present invention as disclosed in the embodiment thereof illustrated in the drawings, reference is initially made to FIG. 1 showing the normal operating condition for a three-stack or column dispensing apparatus according to this invention, which is indicated generally at 15. It will be recognized that apparatus 15 comprises magazine means 16 having interior compartmentalizing means 17 for dividing the interior of the magazine means into vertical compartments, each of which accommodates a vertical stack of cups 18 (labeled stack 1, 2 and 3 in FIG. 1). Motorized drive means 19 are housed beneath the lower end of the magazine means along with a conventional cup dispensing mechanism or "cup drop" 20. It will be understood by those familiar with the art that assembly 15 is typically adapted to be mounted within the hollow interior of a vending machine cabinet, usually behind a front door wall thereof, conventionally mounted on hinges for purposes of admitting repair or maintenance personnel to the interior of the cabinet. It also will be understood that the discharge of cups 18 from the cup drop mechanism 20 and means (not shown) for delivering the same to a vending stage accessible to the customer whereat liquid ingredients are introduced to the cup are according to known practice.

Turning now to the specific features of magazine means 16, reference is specifically made to FIGS. 1 through 5 of the drawings. As shown thereat, the magazine means comprises a generally rectangular parallelopiped housing structure defined by parallel spaced planar sidewalls 25 and 26, a generally planar rectangular back wall 27, an enclosing top wall 28, a removable

front cover wall 29 (see FIG. 5) and a generally rectangular bottom platform wall 30 covering over the lower end of the rectangular magazine housing and extending beyond the periphery thereof. (See FIGS. 1 and 5). Each of the sidewalls 25 and 26 is bordered along its forward margin by an inwardly turned lip portion 31 and 32, respectively, which cooperate with a partial front barrier wall 33 located adjacent platform 30 and formed with an offset flange portion 34 along its upper margin to interlock with the removable cover wall 29 and maintain the same in position over the open front side of the magazine housing.

The back wall 27 of the magazine housing is distinguished by a pair of parallel-spaced slotted openings 36 and 37 (see FIG. 4) inclined to the horizontal in the upright position for the magazine as illustrated, the purpose of which will appear presently. Hinge pintle brackets 38,38 are spot welded to the housing's lefthand sidewall 26, as viewed in FIG. 1, to provide convenient means for swing mounting the magazine within the interior of a vending machine cabinet (see FIG. 5).

It will be appreciated that the magazine means 16 is best formed as a fabricated sheet metal structure by bending the top and sidewalls thereof integrally from its planar back wall. Spot welding the several walls together is preferred to rigidly intertie the cabinet walls into an integral unit. From FIG. 5 in particular, it will be appreciated that the bottom platform wall 30 is distinguished by an enlarged opening 39 adjacent sidewall 25 of the magazine cabinet to accommodate the underdisposed cup drop mechanism 20 and to that end also is provided with several keyhole openings 40 and 41 for removably attaching the cup drop mechanism 20 to the underside of platform wall 30.

Within the hollow interior of the magazine cabinet are several compartmentalizing means 17 which will now be described with particular reference to FIGS. 1–5 of the drawings.

As best shown in these figures, means 17 provides for storage of cups in vertical stacks or columns separated by shiftable compartments for eventual disposition over the cup drop mechanism 20. To this end (see FIG. 5) two internested compartment separators 44 and 45 are provided, each having a generally U-shaped cross-sectional configuration with separator 44 being housed within separator 45. More specifically, it will be noted from FIGS. 1 and 5 that the compartmentalizing separator 44 is formed with two parallel-spaced sidewalls 47,48 interconnected by a planar back wall 49, the length of such walls being in accordance with the desired height of the magazine means 16 and the stacks of cups to be housed therein.

Separator 45 is of similar shape and cross section having a planar back wall 50 and parallel-spaced sidewalls 51 and 52 projecting at right angles outwardly from its lateral margins. It will be noted that while wall 51 is of substantially identical shape and size with wall 48 of the separator 44, the second wall 52 thereof is considerably foreshortened and may be characterized more as a lip wall. The back wall 50 of separator 45 is further distinguished by a pair of elongated slotted openings 53 and 54 located to align registeringly with the underlying slotted openings 36,37 in back wall 27 of the magazine housing. It should be noted that the separator 45 like separator 44 is open at both its upper and lower ends as well as along its front side and that the lateral dimension of its back wall 50 is substantially twice the corresponding dimension for wall 49 of separator 44. Of additional geometric consequence is the fact that the lateral dimension of wall 50 is substantially two-thirds that of the rear wall 27 of the magazine. As a result of these dimensional relationships, separator 44 occupies substantially one-third of the lateral dimension of the magazine with the space between wall 48 thereof and wall 51 of the separator 45 defining substantially another one-third of the magazine's interior. Similarly the spacing between wall 51 of separator 45 and wall 25 of the magazine define substantially another one-third interior spacing when such elements are organized as illustrated in FIGS. 1 and 5 of the drawings. These internal spacings provide three columns for cup stacks 1, 2 and 3 as labeled in FIG. 1, defining thereby compartments 55, 56 and 57 (see FIG. 5).

Turning now to the interfitted relationship between the separators 44 and 45, it will be seen from FIG. 1 that separator 45 is slidingly mounted against the interior face of the magazine back wall 27 by pairs of roller guides 58,58 and 59,59, respectively engaged with the slotted openings 36 and 37 of the magazine back wall. In this regard the members 58 and 59 are projected from the back wall 50 of the separator member 45 to extend through the openings 36 and 37, respectively, whereat enlarged washers 60 and 61 are locked on cylindrical stub shafts 62 and 63 thereof respectively; being held thereto as by C-shaped locking rings or the like. Thus the separator member 45 is slidingly mounted on the back wall 27 of the magazine.

In a similar fashion pairs of roller supports 65,65 and 66,66 extend through the slotted openings 53 and 54 of separator member 45 as well as through the slotted openings 36 and 37 of the magazine back wall, to slidingly mount separator 44 inside of separator 45. As a result of this construction, separator 44 is movable relative to separator 45 and both thereof are movable relative to the magazine housing along the path defined by the sloping slotted openings 36 and 37 therein. It will be noted from FIG. 1 that the lower edge of back wall 50 for the separator 45 is cut at a bias from substantially its midpoint to the lefthand margin thereof as indicated at 68. Similarly the lower marginal edge 69 of the back wall for separator 44 is cut at a bias, with the angle of such cut margins substantially paralleling the slope of the slotted openings 36 and 37.

Located immediately beneath the two separator means 44 and 45 is an inclined chute or guideway 70 of substantially V-shaped cross section; the lower ends of the cup stacks (see FIG. 1) resting thereon for sliding guidance as the separator devices 44 and 45 are translated periodically toward the righthand sidewall 25 of the magazine (see FIG. 2).

From examination of FIGS. 1 through 3, it will be understood that in operation stack No. 3 as viewed in FIG. 1 is sequentially translated from its position adjacent the lefthand sidewall 26 of the magazine to a position of registry over the cup drop means 20 adjacent the righthand sidewall 25 of the magazine. This sequence of operations is shown progressively in FIGS. 1, 2 and 3. In order to accomplish this function, drive means 19 are employed as will now be described.

With special reference to FIG. 4 of the drawings, it will be seen that a latch bar 72 is pivotally supported at one end on pivot means 73 over the rearward face of back wall 27 for the magazine. It will be noted that

the latch bar 72 is located substantially parallel to the lowermost disposed slotted opening 36 and slightly thereabove. The opposite or unpivoted end of bar 72 is guided on pin means 74 projecting outwardly of back wall 27 through a slotted opening 75 formed in the latch bar. Thus pivoting movement of bar 72 is limited by the extent of slotted opening 75.

Latch bar 72 is distinguished by three latch fingers 76, 77 and 78 disposed interferingly with the path of movement of an extended latch pin 79 associated with and comprising one of the sliding support members 66 for the separator means 44; there being only one such extended latch pin member 79 (see FIG. 4). It further will be noted that the latch finger 76, for example, projects inwardly from a downwardly depending arm portion 80 formed at the outer end of the latch bar 72 and is distinguished by a sloping cam edge 81. Latch finger 77 on the other hand is located below the slotted opening 36 in the normal disposition for the latch bar 72; the same extending inwardly at right angles from a depending arm portion 82 formed on the latch bar 72 in spaced relation to portion 80 thereof. Latch finger 78 is formed at the lower end of a third depending arm portion 83 located substantially midway of the length of latch bar 72; with latch finger 78 like 76 extending downwardly beyond the upper margin of slot 36 in the normal FIG. 4 positioning of the latch bar 72 so as to interferingly engage latch pin 79 as the latter moves along slot 36. Depending arm 83, like arm 80 also is provided with a sloping cam surface 84 on the side thereof adjacent or closest to the pivot pin 73. These two cam surfaces 84 and 81 cooperate with pin 79 to automatically lift the latch bar 72 upwardly about its pivot center 73 in response to movement of the pin 79 upwardly along the slope of slot 36 when returning the compartmentalizing separators 44 and 45 to their FIG. 1 positions.

As shown best in FIG. 4, latch pin 79 is normally latched against finger 76 when the separator means 44 and 45 are in their FIG. 1 positions. When the cups in stack No. 1, as illustrated in FIG. 1, are depleted, lifting the latch bar 72 permits the latch pin 79 to escape the latch finger 76 allowing separators 44 and 45 to slide down sloping slots 36 and 37 toward wall 25 of the magazine. This movement is effected by gravity until pin 79 abuts against secondary latch finger 78, which is positively insured by clockwise pivoting actuation of the latch bar 72. In order to provide positive movement of bar 72 in a clockwise direction after upward pivotal movement thereof to its dotted line position 72*a* in FIG. 4, the finger member 77 is provided adjacent the lower side of slot 36 as previously explained. Thus upon release from finger 76 by upward movement of the latch arm 72, movement of the latch pin 79 along the sloping opening 36 produces interfering engagement between pin 79 and finger 77 striking the latter and kicking the latch bar 72 downwardly to reverse its pivotal motion. In so doing, the secondary latch finger 78 is brought into interfering alignment with the slotted opening 36 and pin 79, to engage the latter and arrest the separators until latch bar 72 is again raised to its dotted line position 72*a*.

It thus will be understood that upon initial escapement of latch finger 76 and latch pin 79, the compartmentalizing separators 44 and 45 slide downwardly from their FIG. 1 positions to their FIG. 2 positions at which point the pin 79 is abuttingly engaged by the secondary latch finger 78. As the cups in stack 2 are depleted and finally exhausted, latch bar 72 is again raised permitting escape of pin 79 from finger 78. Inasmuch as the righthand wall 51 of the separator 45 at this stage of events is abutted against the inside face of wall 25 for the magazine, there is no further movement of the separator 45 toward that wall. However, the secondary release of the pin 79 from finger 78 permits separator 44 to move inside separator 45 translating the same from its FIG. 2 to its FIG. 3 position, thereby relocating stack No. 3 over the cup drop 20.

In order to effectuate the desired periodic lifting of the latch bar 72 to produce sequential escapement of pin 79 from the latch fingers 76 and 78 as above described, the drive means 19 employs a push rod 85 (see FIG. 4) which is pivotally joined to the arm 82 of the latch bar 72 by pivot connector 86 projecting outwardly from the latch bar 72 through an elongated slotted opening 87 adjacent the upper end of rod 85. The lower end of the push rod is joined by pivot means 88 to an upstanding ear portion 89 near the outer end of an actuator arm 90 (see FIGS. 4, 7 and 8).

Arm 90 is pivotally supported at one end on a pivot shaft means 91 carried between spaced mounting ears 92,92 projecting upwardly from platform wall 30 rearwardly of the back wall of the magazine (see FIG. 5). The pivotal mounting of arm 90 is such as to permit the same to move toward and away from the rear wall of the magazine, or that is laterally on shaft 91 as well as up and down relative to the platform wall 30. This is accomplished simply by providing a pair of spaced mounting ears 93 and 94 at the base or pivotally connected end of the arm 90, to fit between the mounting ears 92,92 and through which the pivot shaft 91 extends. The opening in ear 94 is elongated along an axis paralleling the plane of wall 30 whereby actuator 90 is permitted to pivot, within limits, about its ear 93 on rod 91; such limit being determined by the extent of the slotted opening in ear 94. Lateral movement of arm 90 is opposed in one direction by spring means 95 joined between the outer end thereof and platform wall 30 as illustrated in FIGS. 7 and 8. Thus movement of the actuator toward the rear wall of the magazine serves to tension spring 95 and the latter then operates to retract the arm to its normal operating position, as viewed in FIG. 7.

Regarding the movements of the arm 90, it will be understood that upward movement of the outer end thereof effects upward movement of the push rod 85, lifting the latch bar 72 and releasing latch pin 79 from latching fingers 76 and 78, as the case may be. In order to effect the needed periodic vertical pivotal movement of the arm 90 about its pivot connector 91, arm 90 is provided with a cam following finger portion 97 depending downwardly from its main portion 98 between the outer ear portion 89 thereon and its pivotal connection with pin 91. When the arm 90 is in its innermost position, or that is, closest to wall 27 of the magazine (effected by means to be described presently) the follower finger portion 97 is adapted to engage an upwardly projecting cam portion 99 associated with a reciprocating actuator 100, mounted beneath the platform wall 30 (see FIG. 6). It will be noted that the cam portion 99 is substantially triangular-shaped and extends above the plane of platform wall 30 while the cam follower portion 97 is bifurcated to provide a groove 101 capable of straddling the wedge-shaped

cam portion 99 as the latter reciprocates therebeneath in response to reciprocating activity of the actuator 100, as will be described presently. Of course, as the wedge-shaped cam portion 99 advances toward follower 97, it raises the push rod 85 and actuator arm 90 until it travels past the follower, whereupon arm 90 drops vertically to effect reciprocating up-and-down activity of the push rod 85 as indicated by the directional arrows in FIG. 7.

With particular reference now to FIG. 6 of the drawings, the features of the actuator means 100 will be described. As there shown, actuator 100 is formed as a stamped metal member of generally elongated configuration which is mounted for linear reciprocating movement beneath platform wall 30 of the magazine. Thus the main body 102 of the actuator 100 is disposed between a guide pin 103 extending transversely thereof between parallel-spaced mounting ears 104,104 struck outwardly of the magazine bottom wall 30, to straddle opposite lateral margins of the body portion 102. Additional guide means for the actuator are provided by an elongated slotted opening 105 formed through the body portion 102 thereof adjacent its righthand end as viewed in FIG. 6. A guide pin 106 projects outwardly of the bottom wall 30 through the slotted opening 105 and a C-shaped locking ring 107 prevents disassociation of the body portion 102 from the pin 106. The actuator cam portion 99 is struck outwardly of the body portion 102 to extend upwardly through an opening formed for that purpose in the magazine's bottom wall 30, which opening is generally formed in striking of the ears 104,104 from bottom wall 30. Thus it will be recognized that the body portion 102 of the actuator 100 is mounted for rectilinear reciprocating motion between the pin 103 and the bottom face of the magazine platform 30 and is guided in its linear movement by pin means 106 and the slotted opening 105.

At the opposite end of body portion 102 from that provided with the slotted guide opening 105, is an enlarged portion 109 of generally rectangular configuration formed with its longitudinal axis generally transverse to the lengthwise axis of actuator 100. An elongated slotted opening 110 is provided generally centrally of such portion 109 to receive a drive roller means 111 projecting outwardly of an underlying, rotatably driven, disc cam 112 affixed to the shaft 113 of a drive motor and reduction gear unit 115, as best shown in FIGS. 1, 4, 7 and 8. The drive roller 111 is disposed off-center or eccentrically of the rotational axis for the disc cam 112 to impart cranking action to the actuator 100. The periphery of cam 112 further constitutes a continuous cam surface having a depression or node area 116 which cooperates with a follower arm 117 of a microswitch 118. Switch 118 serves to deenergize the motor means 115. With this arrangement motor means 115 is automatically deenergized each time the follower means 117 enters the node 116 thereby to effect a single rotation per operating cycle for the disc cam 112. Attached to switch 118 and motor means 115 are suitable electrical connection means 120 to electrically associate the same with a conventional electrical power source and attendant coin acceptor and accummulator circuitry of the vending machine which operate to periodically energize motor means 115 upon deposit of a predetermined coin value by the customer, in a known manner in this art.

From the description of the actuator 100 thus far set forth, it will be appreciated that rotational activity of the cam means 112 effects rectilinear reciprocating movement of the actuator 100 in response to movement of the eccentrically disposed roller means 111 along slotted opening 110 therein.

It will be recalled that in order to align the cam follower means 97 with the projecting cam portion 99 of the actuator 100, it is necessary to shift arm member 90 laterally toward the rear wall 27 of the magazine. The means for effecting such operation will now be described.

With special reference to FIGS. 6, 7 and 8 of the drawings, it will be seen that substantially midway along the length of the actuator's body portion 102 and along the lower margin thereof (as shown in FIG. 6) is an extending skirt portion 120 having a generally curvilinear bottom plan profile. Such skirt portion in fact constitutes a cam surface which, as shown best in FIGS. 7 and 8, is adapted to be engaged by a roller means 121 associated with a bell crank sensing finger 122 pivotally mounted on a stub shaft 123 projecting upwardly from the bottom wall 30 of the magazine. Pivotal actuation of finger 122 on shaft 123 is effected in response to the following activity of the roller means 121 along a curvilinear cam surface 120. The sensing finger member 122, as noted, is formed as a bell crank having one longer arm portion 125 extending through an opening 126, formed in the rear wall 27 of the magazine, a distance sufficient to permit the outer end 127 thereof (see FIG. 5) to move interferingly beneath the opening 39 and over the cup drop means 20 in the absence of a stack of cups in the latter. A return spring 128 is fastened between arm 125 and the rear wall 27 of the magazine to normally bias the arm portion 125 across the opening 39. Positive actuation of arm 125 away from opening 39 is effected by the activity of the follower means 121 along cam surface 120 in response to returning movement of the actuator 100 (to the right as seen in FIGS. 7 and 8).

From FIG. 8 in particular it will be noted that in the absence of a cup between opening 39 and the cup drop 20, the sensing finger 122 is biased by spring 128 in a counterclockwise sense to cause the sensing arm portion 125 thereof to move across the space above the cup drop, as previously described. When this occurs, the shorter secondary arm portion 130 thereof, provided with depending flange 131 adjacent its outer end, moves inwardly toward arm 90, engaging the latter and moving it toward the rear wall 27 of the magazine. Upon this happenstance arm 90 pivots laterally about its pivot pin 91 (see FIG. 5), as previously explained, and thereby positions the grooved cam follower portion 97 thereon in alignment with the cam portion 99 of the actuator 100 (see FIG. 8). It will be understood that actuator 100 meanwhile has advanced away from the motor means 115 in response to rotational operation of the eccentric carrying cam plate 112 during the latter's first one-half rotational cycle. Continued rotation of the cam plate 112 causes actuator 100 to return to its initial position thereby moving the cam means 99 beneath the follower portion 97, lifting arm 90 and push rod 85. This serves to release the latch pin 79 from latch finger 76 or 78 as the case may be, for gravitational release of the compartmentalizing means within the magazine so as to reposition the cup stacks therewithin. On completion of the movement of cam means

99 beneath the follower 97, spring means 95 returns the actuator arm 90 laterally to its normal non-interfering position with respect to the cam means 99. Simultaneously with the lateral movement of the actuator arm 90 away from the wall 27 of the magazine, the return movement of actuator 100 (to the right as viewed in FIG. 8) causes the cam portion 120 thereof to engage roller means 121 on the sensing finger, pivoting the latter clockwise to its FIG. 7 position. So long as cups are present over the cup drop, the normal operating cycle of the actuator 100 successfully bypasses the cam follower 97 on the actuator arm, thus maintaining the cup compartmentalizing means in their latched positions until a resupply of cups over the cup drop 20 is called for.

It will be appreciated that upon the depletion of cup stack 1, for example, the sensing finger 122 moves across the opening 39 above the cup drop, initiating the first release of the latch pin 79 from the latch finger 76. This permits stack 2 to move or advance over the cup drop oepning as specifically illustrated in FIG. 2 of the drawings. Simultaneously, stack 3 moves with stack 2 to its FIG. 2 position. Upon the depletion of the cups from stack 2 the release of the latch pin 79 from the latch finger 78 occurs, releasing the compartmentalizing separator 44, and permitting the latter to slide relative to the separator 45 to relocate stack No. 3 over the cup drop, as illustrated in FIG. 3 of the drawings. Thus the three stacks of cups within the magazine are successively disposed over the cup drop for dispensing by the latter. Resetting of the magazine to its initial FIG. 1 position and more specifically so relocating the compartmentalizing means therein, is done manually by shifting the separator means 44 and 45 up the slope of slots 36 and 37 and latching pin 79 with finger 76, whereat the columns may be reloaded with cups in readiness for recycling the above described operation.

Turning now to the features of the cup drop mechanism 20, it will be understood by those familiar with the art that the same comprises a conventional ring-type cup drop apparatus of the order disclosed in U. S. Pat. 3,071,292, issued Jan. 1, 1963. As such, the same includes a ring housing 135 (see FIG. 6) which is adapted to be located beneath the platform wall 30 and held to the latter by means of connector studs 136,136 having enlarged head ends insertable in the keyhole openings provided therefor in the platform wall, such as opening 40 and 41. This removably suspends the cup drop means 20 in operating position beneath opening 39. A plurality of dispensing fingers 137 are included in the mechanism 20 for engaging the lip or rim of conventional paper cups and separating the lowermost one thereof from the overdisposed stack to gravitationally release the same in response to cyclic operation of an operating mechanism for the several dispensing fingers 137. Specifically, fingers 137 are actuated in response to limited arcuate actuation of an associated linkage system housed within ring 135 and formed with tail member 138 projecting outwardly from ring 135. The tail member 138 extends through a slotted opening 140 provided in a downwardly extending lip wall 141 associated with the actuator member 100. Thus as the actuator 100 is linearly reciprocated in response to actuation of its eccentric connection with the cam plate 112, the tail 138 is cyclicly reciprocated to actuate the dispensing fingers 137 in a known manner. As a consequence, for each rotational cycle of the cam member 112, one cup is separated from the lower end of a stack of cups and gravitationally dropped through the open center of the cup drop mechanism 20 according to conventional practice. As noted previously when the supply of cups over the cup drop has been depleted sufficiently to permit the sensing finger member 122 to move across the opening immediately above the cup drop housing 135 the compartmentalizing means within the magazine are shifted laterally under the influence of gravity as hereinabove described. This places a fresh supply of cups over the cup drop. In this particular embodiment there are three such stacks of cups although it will be readily appreciated that the principles and teachings hereinabove disclosed are readily adaptable to any convenient number of cup stacks.

While the foregoing description sets forth the features and workings of a preferred embodiment of the concepts and teachings pertinent to this invention, it is to be understood that the same is not limited thereto except as may appear in the following appended claims.

I claim:

1. Apparatus for storing and dispensing paper cups comprising: a generally rectangular parallelopiped-shaped storage magazine having a planar back wall and parallel side walls extending at right angles from the lateral margins of said back wall, said back wall having a pair of parallel spaced slotted openings extending diagonally between said side walls; at least two compartmentalizing means supported within said magazine for gravitational sliding movement along said openings, toward one of said side walls; one of said compartmentalizing means being nested within the other for movement relative thereto and with the latter relative to said magazine; multiple latch means for holding each of said compartmentalizing means in predetermined positions spaced laterally of said one side wall whereat the same divide the interior of said magazine into at least three vertical compartments, each receptive of a stack of paper cups; cup drop means communicating with an opening in the bottom wall of said magazine adjacent said one side wall, means for cyclicly operating said cup drop means to dispense individual cups from the lower end of a stack of cups positioned thereover, and linkage means periodically actuated by said cup drop means for operating said latch means to initially release both said compartmentalizing means for movement relative to the magazine and thereafter said one compartmentalizing means for independent movement relative to said other thereof whereby the stacks of paper cups therein are successively positioned over said cup drop means.

2. The invention of claim 1 and sensing means actuated by said means for operating said cup drop means to determine the presence and absence of cups over said cup drop means, the same being operable to initiate actuation of said linkage means in the absence of cups thereover.

3. The invention of claim 2, and inclined guideway means supporting the lower ends of the stacks of paper cups in said compartmentalizing means and operable to guide the same into said cup drop means.

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