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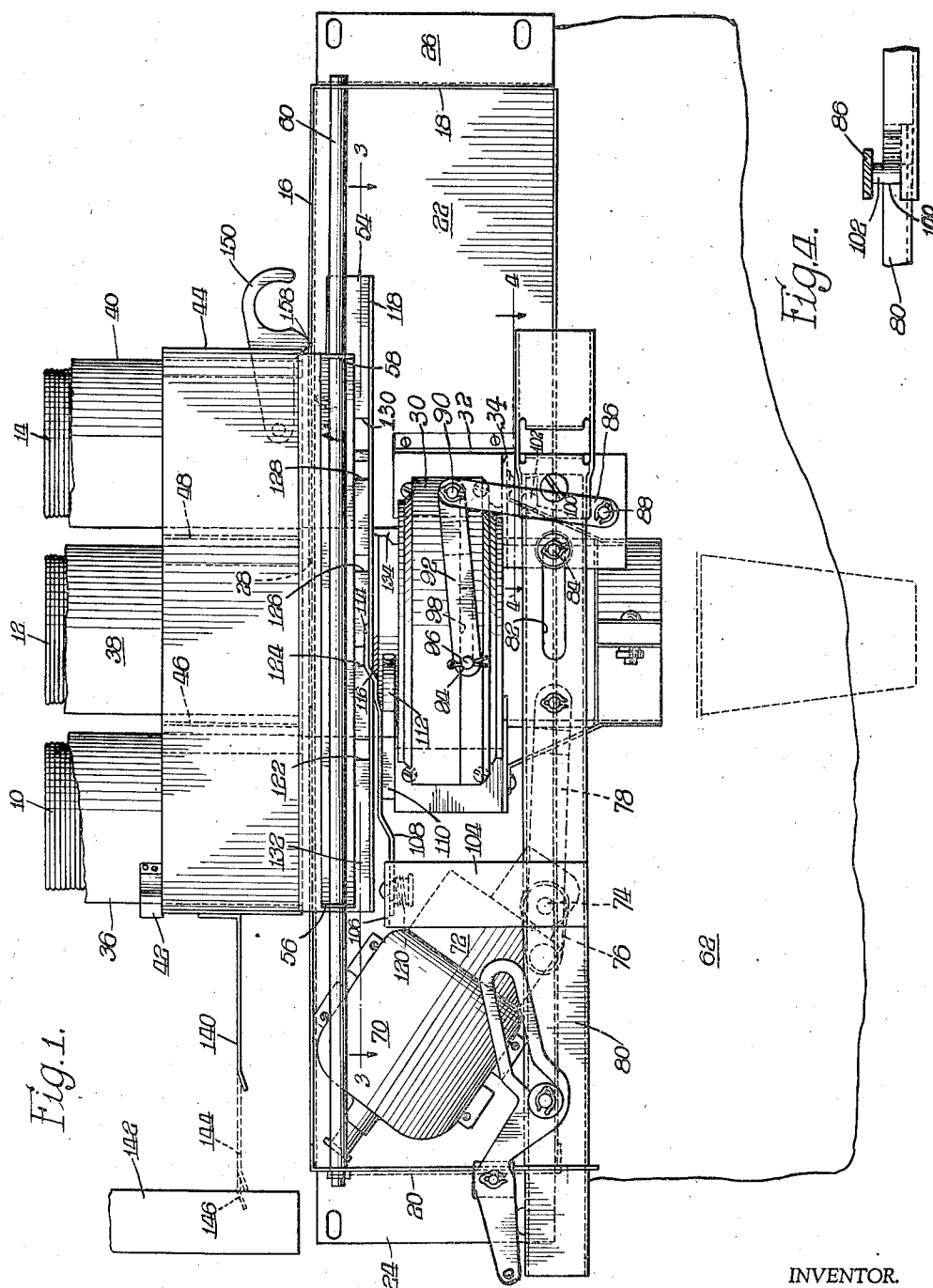
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MULTIPLE MAGAZINE LOADING MECHANISM FOR CUP DISPENSERS

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MULTIPLE MAGAZINE LOADING MECHANISM FOR CUP DISPENSERS

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This invention relates to a multiple magazine loading mechanism for a cup dispenser and is to be distinguished from an assembly of cup magazines each of which is equipped with its own cup dispenser.

The background of this invention is found in the drink vending machine art where in the bulk vending machines it is customary to dispense a drink into a flat bottomed cup which has been positioned beneath a dispensing spout after discharge from a cup dispenser. The number of types of successful cup dispensers is small and because it is necessary to buy paper cups, it is customary for the vending machine manufacturers to purchase the cup dispensers from the cup company supplying the cups. These cup dispensers are commonly in the form of a ring with a plurality of cup supports positioned around the inside wall of the ring, which supports are capable, upon each actuation of an external control, of delivering one cup off the bottom of a stack of flat bottomed cups.

It will be understood additionally that flat bottomed cups have substantial rims and do not nest closely. Indeed, five or six cups to the inch is the rule so that a cup magazine two feet high will accommodate in the neighborhood of one hundred cups. Due to the fact that cup magazines must be located near the top of the vending machine so that cups may be dropped by gravity to a beverage dispensing position which is about waist high, it is desirable to limit the height of a cup magazine. Hence in a vending machine which is capable of dispensing 250 or 300 drinks at one servicing, there is commonly provided a plurality of stacks of cups and various structures for removing cups successively from these stacks.

Broadly, the object of this invention is to provide a new and improved means for loading a conventional cup dispenser with stacks of cups, each loading to occur at a time when there are perhaps a half dozen cups still remaining in the cup dispenser. An important feature contributing toward the attainment of this broad object is the positioning of a plurality of stacks of cups on a supporting surface such as a shelf and pushing the stacks of cups successively over an edge of the shelf into a cup dispenser. The principle of pushing a cup over the edge of a shelf or supporting surface into a loading position is not new, for in the early art it was not uncommon to provide a multiple cup magazine assembly with some sort of a dispensing device on the bottom of each magazine and to drop cups one at a time off the bottom of certain magazines and push them

along a shelf to a loading position. Such structures, however, do not meet applicant's problems because the pushing of a single cup along a shelf is quite different from pushing a stack of cups along a shelf. Applicant provides a plurality of open bottom cup magazines mounted on a pusher member which may be moved along the shelf toward an edge such as a hole in the shelf.

A second object of this invention is to provide a single source of power for operating the multiple magazine loader and the cup dispenser. It has been common practice heretofore, and this applies to circular multiple magazine loaders as well as to straight line multiple magazine loaders, to cause the cup dispenser, when it reaches a certain stage of cup exhaustion to drop a pawl or some equivalent device, which in turn causes a spring or other independent source of power to advance the next stack of cups into position in the cup dispenser. One of the features of this invention is to take off of the main source of power for operating a vending machine one arm for operating the cup dispenser and a second arm having a finger for testing the presence of cups immediately above the cup dispenser for moving the stacks of cups into filling position over the cup dispenser when the testing finger detects an absence of cups in the cup dispenser. By this arrangement, if the machine is in working condition, the cup dispenser and the multiple cup magazine loader are likewise. Moreover, by this arrangement the evils of swift movement caused by spring action may be avoided. Movements of the stacks of cups into loading position above the cup dispenser is slow and evenly paced.

Another object of this invention is to provide a new relationship between a testing finger and the element which it controls. Describing testing fingers generally, it will be understood that the function of the testing finger is to determine whether or not there are cups in the cup guideway above a cup dispenser, and if there are no cups, the testing finger must be capable of some movement which will cause an independent mechanism to advance a stack of cups into the cup dispenser. In order to make the test as to the presence of cups, the testing finger makes an inward movement through an opening in the cup guideway above the cup dispenser to a point where it will encounter cups if any are present. If it encounters cups, the testing finger can be advanced no further into the cup chamber, and when in this position the testing finger does not bring into operation any loading mechanism. On the other hand if there are no cups at the point

where the testing finger enters the cup space it continues its advance into the cup guideway a substantial distance, and in the course of this advance the finger drops a pawl against a notch in a rack or does some other purely mechanical action, which results in the positioning of a new stack of cups in the cup dispenser. It will be appreciated that it is necessary to draw the testing finger away from the stack of cups on each actuation of the cup dispenser, for when there are ample cups in the cup dispenser, if the testing finger were not withdrawn, its pressing against the rims of the cups at the moment when the cups drop the thickness of one rim might cause a jamming, and in the case where there are no cups above the cup dispenser, the testing finger has advanced so far into the cup guideway that when the new stack is dropped into position the stack would come to rest on the testing finger. In consequence, in order to effect these movements of a testing finger, rather complicated mechanism is necessary.

One of the objects of this invention is to eliminate the necessity for complicated mechanisms for performing this function and one of the features of the invention is the combining of the testing finger and the means for advancing the multiple cup magazines successively over the cup dispenser into a single element and causing that element so to reciprocate with respect to an opening in the cup guideway immediately above the cup dispenser elements that a single reciprocating motion will serve to test the presence of cups and in the absence of cups to permit the driving element to function. This will be fully understood in reading the disclosure that follows.

A fourth object of this invention is to combine this multiple magazine loading mechanism for a cup dispenser with a coin mechanism in such a fashion that the loader will cause the coin mechanism to return coins to a customer when all of the magazines are empty.

These and such other objects as may hereinafter appear are attained in one embodiment of the invention hereinafter disclosed, wherein:

Figure 1 is a side elevation of the device with parts broken away and showing the position of the cup stacks;

Figure 2 is a plan view with the cup stacks, magazines and brackets to hold them in place removed;

Figure 3 is a view taken on the line 3—3 of Figure 1; and

Figure 4 is a view taken on the line 4—4 of Figure 1.

Continuing to refer to the drawings, and particularly to Figures 1 and 2, a supporting surface for a plurality of stacks of cups 10, 12 and 14 is provided by a shelf 16 which forms part of a framework having end walls 18 and 20, back wall 22 and flanges 24 and 26. This framework in my structure is disposed on the inside of a vending machine door as may be seen in the application of Ernest H. Thompson and Leo W. Doggett, Serial No. 319,224, filed February 16, 1940. In the shelf 16 is cut a hole 28 of sufficient size to pass a stack of cups such as 12. A cup dispenser of one of the types commonly offered by paper cup manufacturers is indicated by the numeral 30 and is supported on vertical bracket 32 and horizontal bracket 34 which in turn are attached to the back wall 22 of the frame. The stacks of cups 10, 12 and 14 are positioned inside of open bottom cup magazines 36, 38 and 40 which are supported by brackets such as 42 in a pusher unit 44.

This pusher unit 44 comprises a rectangular member having partitioning walls 46 and 48. The pusher unit 44 may be moved to the right or the left along the shelf 16 by means hereinafter described and this relationship between the pusher member 44 and the shelf 16 is maintained by means of a bracket 50, see Figure 2, on the lower rear portion of the pusher member 44 sliding beneath a holding member 52 which is fastened to the back wall 22 of the frame by any suitable means. Again referring to Figure 1, along the front lower edge of the pusher member 44, there is provided a depending member 54 having forwardly extending brackets 56 and 58 with holes therein for guidably holding the pusher member 44 along the guiding means or rod 60.

It will thus be seen that my invention broadly comprises a shelf for supporting a plurality of cup stacks and for advancing said cup stacks into loading position with respect to a cup dispenser by pushing the cup stacks along the shelf. A feature rendering possible the positioning of the stacks of cups along the shelf without tipping them over or causing them to conflict with one another is the provision of separate magazines 36, 38 and 40 carried by the pusher member. It will be noted that the cup magazines lie in alignment, an arrangement which requires little depth with the result that when this assembly is mounted on the back of a vending machine door, it assists in making it possible to mount a coupling between a driving element on the door of the vending machine and a driven element within the machine approximately in the plane of the door opening whereby the two elements of the coupling will easily register with each other upon the closing of the door. This feature will be appreciated by referring to my co-pending application, Serial No. 301,528, filed October 27, 1939, which matured into U. S. Patent No. 2,261,338 for a Mechanical selective drink vending machine where it is seen that the employment of a rotatable multiple cup magazine loading device causes the couplings between the mechanism on the door and the mechanism in the cabinet to be positioned well within the cabinet with the result that it is comparatively difficult to effect accurate registry. This arrangement should be compared with that shown in the Thompson and Doggett application, heretofore mentioned, which employs the presently described multiple cup magazine loading device where it is seen that the coupling between the mechanism on the door and the equipment within the cabinet is very nearly within the plane of the door opening.

As stated heretofore, an object of this invention is to utilize a single source of power for operating the cup dispenser 30 and moving the pusher unit 44. Examining the structure which provides this feature, referring to Figure 1, a source of power 70 such as a motor, through a speed reduction gear box 72, rotates a shaft 74 carrying an arm 76. Pivoted on the end of the arm 76 is a link 78 which in turn is pivoted to a driving bar 80. This driving bar 80 reciprocates in a slot on the side wall member 20 and a slot 82 in the reciprocating bar 80 receives a stud 84 mounted on the bracket 34. The driving bar 80 and the source of power together with its mounting forms no part of this invention. It is simply the single source of power utilized to operate both the cup dispenser 30 and the pusher unit 44. The power transmitting means between the driving bar 80 and the cup dispenser 30 is shown in Figures 1 and 3, and referring to Figure 1, com-

prises an arm 86 pivoted at 88 to the bracket 34. The other end of the arm 86 is coupled at 90 to a link 92, having a hole 94 in its free end which receives the end of a stud 96 which is the actuating element for the cup dispenser 30 and reciprocates in the slot 98. A slot 100 formed in a rearwardly extending flange of the bar 80 receives a stud 102 (Fig. 4) secured to the arm 86. It will be clear, then, that reciprocation of the stud 96 in the slot 98 to dispense a cup will be caused by reciprocation of the bar 80 carrying with it the stud 102 which, being secured to the arm 86, will move this arm about its pivotal point 88 thus reciprocating the link 92 and the stud 102.

Continuing to refer to Figure 1, the means for driving the pusher unit 44 comprises an arm 104 welded to the driving bar 80 and having a bracket 106. From this bracket 106 is pivotally suspended a combination driving element and testing finger 108. This combination driving element and testing finger 108 is shaped from a single piece of metal, as may best be seen in Figure 3, and has downwardly turned flange 110, an extension of which projects forwardly to form the finger 112. The driving element itself consists of a hook member 114 which is held above the plane of the main portion of the combination driving element and testing finger 108 by means of the sloping wall portion 116. This may best be seen in Figure 1. By means of this sloping wall portion 116 it will be observed that the hook 114 may be passed above a flange 118 on the depending member 54 and by means of the spring 120 the hook 114 is urged against the wall of the depending member 54. A series of apertures 122, 124, 126, 128 and 130, see Figures 1 and 3, are cut into the depending member 54 in horizontal alignment with the hook 114 of the combination driving element and testing finger 108.

As shown in Figure 1, the pusher unit is in its second position. Its first position is to the right with the magazine 10 directly above the cup dispenser 30, that is, in the position occupied in Figure 1 by the magazine 12. Under such circumstances the hook member 114 engages the flange 54 at the point 132. The wall of the cup guideway above the cup dispenser has been cut away at points 134, see Figure 3, so as to permit the testing finger 112 to penetrate the guideway. If no cups are present, the hook member 114 will catch the first of the apertures which may be more broadly described as stops such as 122, 124, etc. to the right and draw the pusher unit to the left. These apertures are spaced apart such a distance and the stroke of the driving member is such that each time the hook member enters an aperture the pusher unit will be moved only half the width of a magazine. Thus, it is evident that it requires two strokes of the combination driving element and testing finger 108 to advance a loaded magazine into cup dispenser filling position.

The advantage of using a common source of power such as the driving bar 80 for actuating the cup dispenser 30 and moving the pusher unit 44, as contrasted with using independent sources of power for these two elements, lies in the fact that each time the cup dispenser is actuated the testing finger and hook member are also actuated, so that the hook member is always in readiness to advance the pusher unit when the testing finger indicates the absence of cups. If for any reason the vending machine is not operating, a service man will always discover this and upon placing the vending machine back in operation

he is certain that the pusher unit 44 is also established in operation.

The action of the testing finger, which is believed to be entirely new, is best seen in Figure 3 where the testing finger 112 and hook member 114 are shown in three positions. Position A occurs when the vending machine is not in operation, at which time the testing finger 112 is so far withdrawn from the cup guideway as not to engage the cups one of which is shown in the cup dispenser and bears number 136. Position B shows the combination driving element and testing finger 108 with the hook member 114 cammed out of engagement with the apertures 122, 124, etc., because the testing finger 112 is riding along the rim of the cups such as 136. In this connection, attention is directed toward a positioning member 127 in the cup guideway immediately above the cup dispenser opposite to the testing finger 112. This positioning member 127 keeps the testing finger 112 from disaligning the stack of cups. Position C shows the combination driving element and testing finger 108 in fully actuated position with the hook member 114 in the aperture 126 because the testing finger 112, which is in fixed relationship to the hook 114, has not been cammed outwardly by the cups 136. It is, therefore, perceived that by making the testing finger 112 and the driving hook member 114 parts of the element 108, or more broadly, by giving them a fixed relationship to each other, and then by providing a reciprocating stroke of member 108 so directed toward the stack of cups that testing finger 112 will engage the cups, the direction of the reciprocating stroke will be altered if the element 112 engages cups and the hook member 114 will be held out of operable engagement with the apertures 122, 124, etc.

All of the requirements of successful testing of the presence of cups are met in my structure. Firstly, in normal or idle position, that is position A, the testing finger is not inside the cup guideway so that it cannot interfere with the cups. Secondly, as the driving bar 80 moves to the right, if there are cups in the stack, the testing finger 112 is cammed outwardly by the cups and in turn moves the hook member 114 into non-engageable relationship with the apertures, such as 122. When the element 108 is in position B, the cup dispenser drops a cup but continues to hold the stack thereabove in fixed vertical position. As the driving bar 80 and the element 108 return to normal position or position A, the testing finger withdraws from the cup guideway above the cup dispenser and at the end of the stroke, the cup dispenser drops the cup stack above it by one cup.

Where the cup guideway is empty, the dispensing finger permits the hook member 114 to engage the next aperture to the right, see Figure 3, and draw the pusher unit to the left. Two cycles of the machine are required to advance the pusher unit 44 by one magazine to the left. On the second of such movements, the cups which are sliding along the shelf 16 of, for example, magazine 12, are being slipped over the hole 28 so as to drop into the cup dispenser. The actual dropping of the cups does not occur until just before the end of the stroke because the cups are a stack and comprise a fairly rigid unit so that before the drop occurs, the whole of the lower rim of the lowermost flat bottomed cup must have cleared the edge of the shelf opening. When this occurs the testing finger is again outside of the cup

guideway and does not interfere with the descent of the cups into the cup dispenser.

A further feature of this invention is the provision of a finger 140, see Figures 1 and 2, having a tip of a size adapted to penetrate the coin track of a coin mechanism 142 and cause any acceptable coins to be returned to the customer of the vending machine. It will be appreciated that after the third magazine 14 has been emptied and the combination driving element and testing finger 108 is again permitted to engage the wall of the main flange 54, if there was no other aperture to the right of the aperture 128, see Figures 1 and 3, the hook would slide idly along the surface of the depending member 54. On the other hand, the provision of the aperture 130 which is very close to the aperture 128 permits the hook member 114 to draw the pusher unit further to the left by a short distance. At the time when the pusher unit 44 occupies a position with the magazine 14 above the cup dispenser the finger 140 is in the dotted position 144 with its tip immediately adjacent to the coin track 142 of a suitable coin mechanism, not shown. When the cup guideway above the cup dispenser 30 becomes empty, the hook member 114, see Figure 3, engages the aperture 130 during the latter part of its stroke only and draws the pusher unit 44 to the left, causing the finger 140, see Figure 1, to penetrate the coin track or chute 142 of the coin mechanism 142 and to occupy position 146. In this position, all acceptable coins will be returned to the customers and inasmuch as these vending machines are operable only by virtue of the acceptance of a coin by the coin mechanism, the absence of cups in the cup magazines will prevent further operation of the machine.

As for servicing this type of cup dispenser, a service man raises the pawl 150, see Figure 1, and draws the pusher unit 44 to the right. The pawl 150 engages a series of holes 152, 154, etc., see Figure 2, fairly firmly under the impulse of a spring 156 in order to prevent lateral displacement of the pusher unit 44 by rocking or other movements of the vending machine cabinet. The tip 158 of the pawl 150 is so shaped that it is impossible to advance the pusher unit 44 to the right without raising the pawl whereas the tip 158 permits the pusher unit to be drawn to the left by the combination driving element and testing finger 108. The service man fills all three magazines, magazine 10 being above the cup dispenser 30. Thereafter the loading mechanism operates as described.

The foregoing describes one embodiment of my invention. It will be appreciated that certain equivalent structures may be devised and it is not intended that the scope of my invention be limited by the particular embodiment shown.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A cup dispenser loading mechanism comprising an elongated shelf for supporting a plurality of cup stacks disposed in substantial alignment, said shelf having a centrally disposed opening therein, a cup dispenser beneath said opening disposed to receive stacks of cups from said shelf, a pusher member adapted to push said stacks of cups along the shelf successively into said opening, motor actuated means drivingly connected to a substantially lineally reciprocating actuating element, means connected to said actuating element for operating said cup dispenser to dispense a cup upon each complete reciprocation

of said element and means responsive to the absence of cups at a predetermined level in the stack above said opening and connecting said reciprocating element to said pusher member thereby to cause said pusher member to push another stack of cups into said opening.

2. A cup dispenser loading mechanism comprising an elongated shelf for supporting a plurality of cup stacks disposed in substantial alignment, said shelf having a substantially centrally disposed opening therein, a cup dispenser disposed beneath said opening to receive stacks of cups from said shelf, a frame movable lengthwise of the shelf and supporting a plurality of open bottom cup magazines, said frame being movable from an initial position in which one of said magazines at one end of the frame is over said opening to a position in which a magazine at the opposite end of said frame is over said opening, means for advancing said frame over said opening, said advancing means being normally inoperative to advance said frame when cups are present in a magazine of said frame above said cup dispenser, and means responsive to the absence of cups in the magazine above said cup dispenser for connecting said frame advancing means to said frame to cause the advancement of the next magazine.

3. A cup dispenser loading mechanism comprising an elongated shelf for supporting a plurality of cup stacks disposed in substantial alignment, said shelf having an opening therein, a cup dispenser disposed to receive stacks of cups through said opening, a pusher member comprising a frame movable lengthwise of the shelf and supporting a plurality of open bottom cup magazines, said frame being movable from an initial position in which a magazine at one end thereof is over said opening to a position in which the magazine at the opposite end thereof is over said opening, means for lineally advancing said pusher member toward said opening, means responsive to the absence of cups in the magazine above said cup dispenser for connecting said pusher member advancing means to said pusher member, means associated with said frame normally to hold said frame stationary and to prevent backward movement thereof but ineffective to prevent movement of said frame when said pusher member is positively moved by said advancing means, and manual means for releasing said holding means and returning said frame to a predetermined position.

4. A cup dispenser loading mechanism comprising a cup dispenser, means for successively loading said cup dispenser with stacks of cups, motor actuated means drivingly connected to a lineally reciprocable actuating element, means connected to said actuating element for actuating said cup dispenser to dispense a cup upon each complete reciprocation thereof, and means responsive to the absence of cups at a predetermined level in the stack above said cup dispenser for connecting said lineally reciprocating actuating element to said cup stack loading means.

5. A cup dispenser loading mechanism comprising a cup dispenser, a pusher unit capable of advancing stacks of cups in a substantially straight line successively into said cup dispenser and moving from a predetermined initial position on one side of said cup dispenser to a predetermined final position, said final position being beyond the position in which the last cup stack is aligned with said cup dispenser, and

means associated with said pusher unit adapted to enter a coin track to cause a coin to be returned when said pusher unit is in said final position.

6. A cup dispenser loading mechanism of the character described comprising an elongated shelf for supporting stacks of cups, a hole in said shelf positioned substantially midway between the ends thereof, a cup dispenser positioned beneath said hole, a guide rod parallel to the length of the shelf, a pusher member having means cooperatively engaging said guide rod and resting upon said shelf, a plurality of aligned open bottomed cup magazines so supported by said pusher member as to come into registry successively with the hole in said shelf as the pusher member is advanced longitudinally on the shelf, a depending flange on said pusher member having a series of holes therein, and means responsive to the absence of cups in the magazine above said cup dispenser for engaging said holes and advancing the pusher member longitudinally of the shelf.

7. A cup dispenser loading mechanism of the

character described comprising an elongated shelf having an aperture therein, a cup dispenser disposed beneath said aperture, a pusher unit for advancing a plurality of stacks of cups along the shelf so as to drop successively into the cup dispenser, a plurality of spaced aligned apertures disposed along one side of the pusher element parallel to its line of movement, a single actuating means for actuating both the cup dispenser and the pusher unit reciprocatably along a line substantially parallel to the movement of the pusher unit, a driving element pivoted on the single actuating means and having a hook member yieldably pressed against said apertured side, a finger on said driving element adjacent said hook member, movable therewith and so positioned as to engage cups at a predetermined point above the cup dispenser on each cycle of the single actuating means, engagement of said finger with said cups adapted to move said finger and to cam the hook element out of engagement with the spaced aligned apertures on the pusher unit.

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