April 8, 1941. J. W. CARLSON 2,237,411

CUP DISPENSER

Filed June 18, 1938 2 Sheets-Sheet 1

Fig. 1

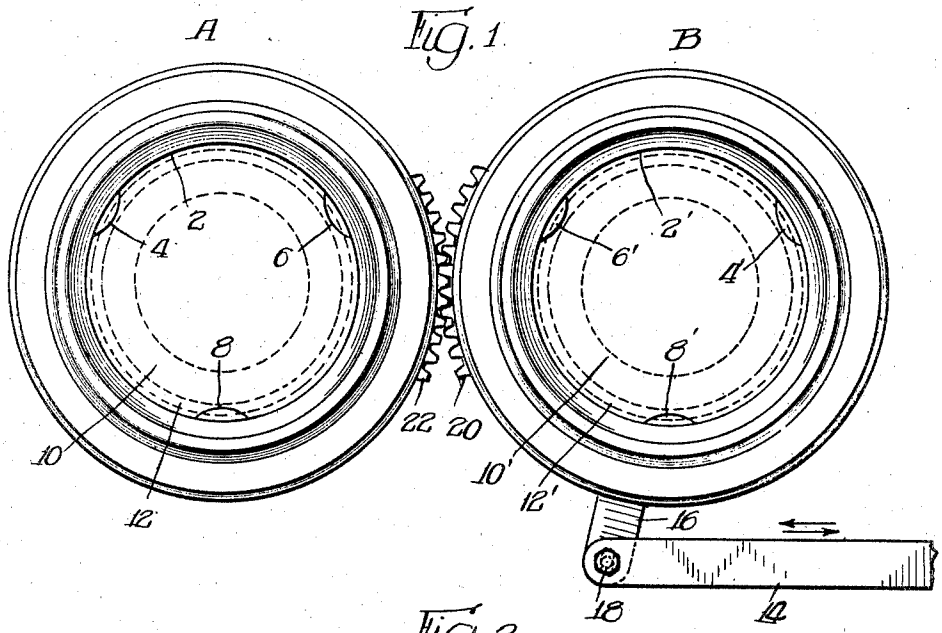


Fig. 2

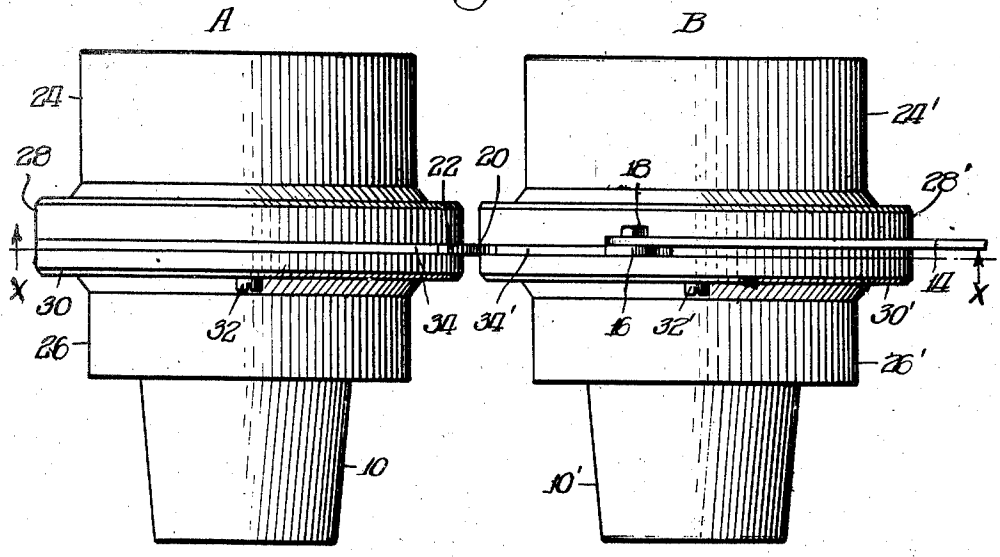
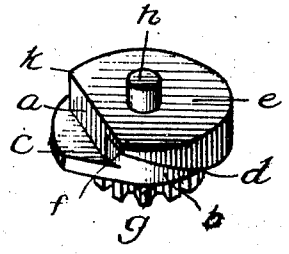


Fig. 3.



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CUP DISPENSER

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Fig. 4

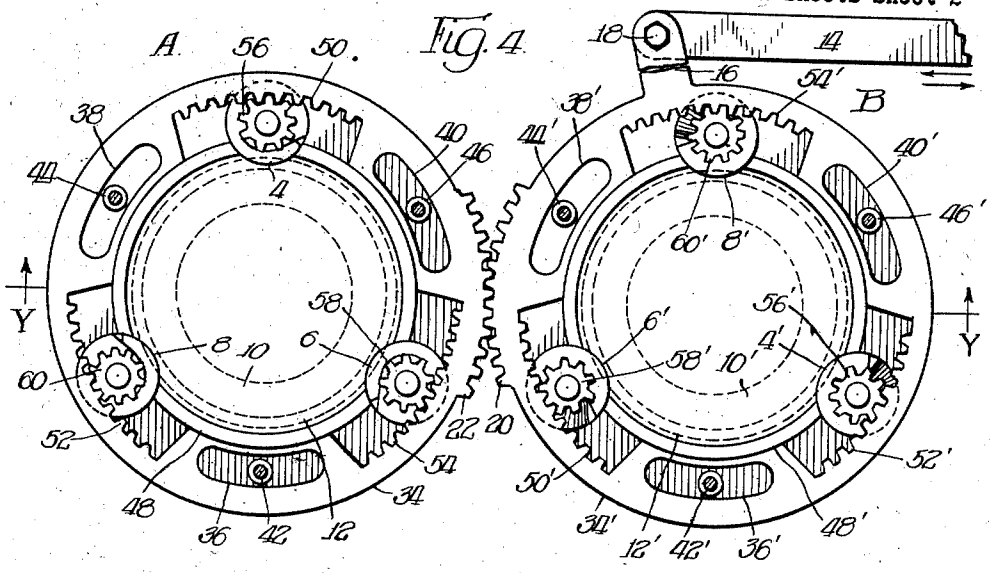


Fig. 5

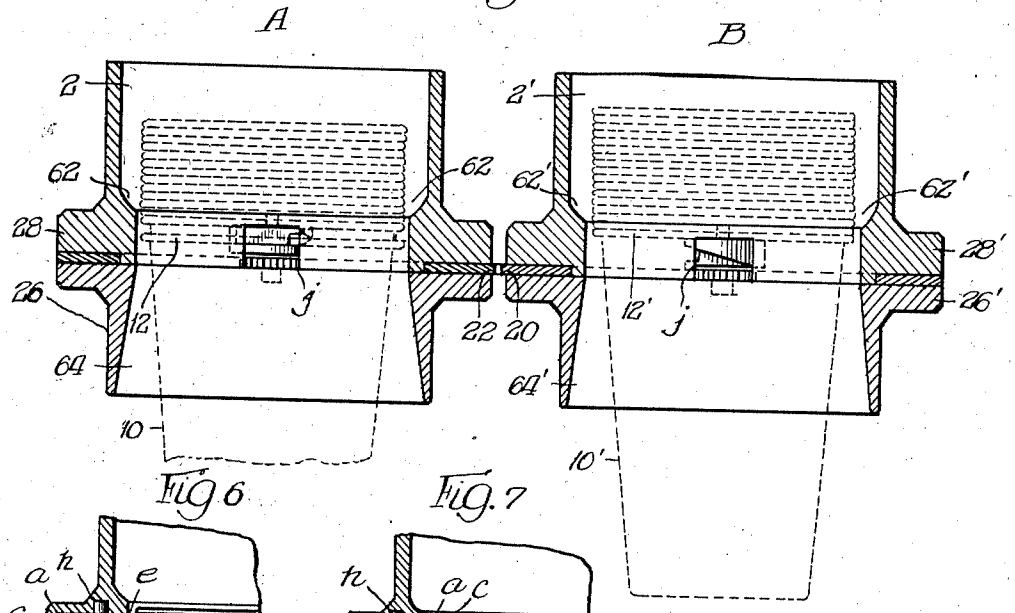


Fig. 6

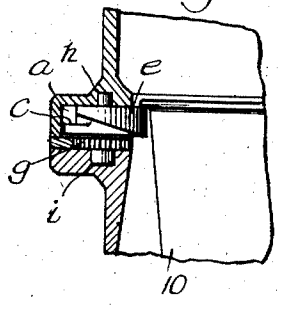
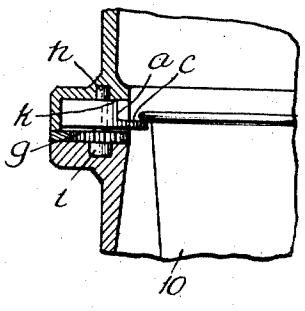


Fig. 7



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Patented Apr. 8, 1941

2,237,411

UNITED STATES PATENT OFFICE

2,237,411

CUP DISPENSER

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Application June 18, 1938, Serial No. 214,432

12 Claims. (Cl. 312—44)

This invention relates to dispensers for paper cups and the like and more particularly to a new and improved type of multiple cup dispenser adapted to successively dispense paper cups from two or more columns or stacks containing said cups in nested relationship. The invention especially relates to a new and improved type of multiple dispenser which is especially adapted for use with coin controlled drink vending machines.

In order to operate a drink dispensing machine satisfactorily, provision must be made for a relatively large supply of paper drinking cups. A stack of nested drinking cups adequate to supply the needs of a given machine could be provided by using a single dispenser, but the height of the stack would necessarily be such as to unduly increase the height of the machine and cause difficulty in replenishing the supply of cups. For this reason it is more desirable to provide a plurality of columns of stacks of nested cups, but in doing so the problem of dispensing such cups with a coin controlled mechanism is made more difficult.

One of the objects of the present invention is to provide a new and improved type of mechanism for dispensing cups or other similar flanged articles from a plurality of columns or stacks.

Another object of this invention is to provide a mechanism of the type described in which cups can be dispensed from two or more columns by an operating mechanism associated directly with only one of said columns.

Still a further object of the invention is the provision of a new and improved means for dispensing flanged articles such as cups from two columns thereof alternately by a mechanism associated directly with one of said columns and so arranged that movement of said mechanism discharges a cup from said column and simultaneously brings a cup into position ready for discharge in the adjacent column.

An additional object of the present invention is to provide new and useful improvements in cup dispensers having a plurality of rotatable dispensing elements.

In accordance with this invention, a multiple dispenser is provided adapted to receive two or more columns of nested articles or cups and so arranged that an operating mechanism associated with one column dispenses a cup from said column while it is simultaneously loading a cup into dispensing position in another of said columns. This arrangement makes it possible to alternately and successively dispense cups from two columns of nested cups and reduce to a minimum the number of moving parts. Such an arrangement is particularly advantageous in coin controlled drink vending machines because it simplifies the construction of such machines.

Cup dispensers constructed in accordance with the present invention have certain other new and useful features which represent improvements over existing cup dispensers. The type of dispenser herein provided has a guideway for a stack of nested articles, a plurality of dispensing devices disposed around said guideway, a ring member for operating said dispensing devices and means interiorly disposed within said ring member and associated therewith in a manner adapted to guide said ring member and to limit the movement thereof to a predetermined amount.

Among further features of this invention are the provision of a guideway made up of upper and lower flanged elements, a ring member for operating the dispensing device disposed between said flanged elements and means for holding said flanged elements together which likewise assists in guiding said ring member and holding it in place. All working parts are readily accessible but at the same time are contained within a substantially closed chamber and are not likely to become clogged or dirty. This is particularly important in vending articles such as paper cups which must be dispensed under sanitary conditions.

Of outstanding importance is the provision of gear segments on the exterior of the ring members adapted to mesh with similar gear segments in adjacently disposed cup dispensers whereby the actuation of one dispenser automatically actuates an adjacent dispenser. Thus, a cup in one dispenser is brought into discharge position while a cup in an adjacent dispenser is being discharged.

Other features and advantages of the invention will be apparent by reference to the following description in conjunction with the accompanying drawings, in which:

Figure 1 illustrates a top plan view of a multiple dispenser adapted to alternately dispense cups or similar articles from two columns;

Figure 2 represents a side elevational view of the dispenser shown in Figure 1;

Figure 3 represents a perspective view of one of the dispensing elements;

Figure 4 represents a bottom plan view along the line X—X in Figure 2 with the lower part of the dispenser removed;

Figure 5 represents a side sectional view of the

dual multiple dispenser taken through Y—Y of Figure 4 with the lower parts in place;

Figure 6 is a sectional view with parts broken away showing one of the dispensers with the lowermost cup of a stack of cups supported on one of the dispensing elements before the cup is brought into a position ready for discharge;

Figure 7 shows a section of the dispenser with parts broken away and with the lowermost cup of a stack in what may be termed the discharging position or the position in which the cup is ready for discharge.

As shown in Figure 1, a preferred embodiment of this invention consists of a dual dispenser capable of dispensing cups alternately from two stacks or columns thereof. As shown, two dispensers A and B are arranged side by side. These dispensers are provided with guideways 2, 2' for the two columns of nested cups. Disposed within said guideways are rotatable dispensing devices or dispensing elements 4, 6 and 8 and 4', 6' and 8', respectively. The cup or cups to be dispensed, 10 and 10' are provided with flanged or beaded rims 12 and 12', respectively. Dispenser B is operated by an actuating lever 14 which is connected to arm 16 of dispenser B by a bolt, rivet or other suitable means 18. Any movement of arm 16 of dispenser B is automatically imparted to dispenser A by means of gear segments 20 which mesh with gear segments 22 of dispenser A.

Referring to Figure 2, it will be seen that guideways 2 and 2' of dispensers A and B, respectively, each comprise two parts, an upper part and a lower part. In dispenser A, upper part 24 is connected with lower part 26 through flanged members 28 and 30, member 28 being integral with upper part 24 and member 30 being integral with lower part 26. Upper part 24 and lower part 26 are preferably held together by means of bolts or screws 32. Dispenser B similarly has an upper part 24' connected to a lower part 26', the upper part being provided with flange 28' and the lower part with a flange 30', and the connection being made by means of bolts or screws 32'. The operating member for each dispenser, that is, the member which operates dispensing elements 4, 6 and 8 and 4', 6' and 8', is a ring member 34 in dispenser A and ring member 34' in dispenser B. In dispenser A, ring member 34 is disposed between flanged elements 28 and 30. In dispenser B, ring member 34' is disposed between flanged elements 28' and 30'.

In Figure 3, it will be observed that each of the dispensing elements 4, 6 and 8 and 4', 6' and 8' has a segmental portion *a* removed from the top thereof and another segmental portion *b* removed from the bottom or lower part thereof and intersecting with segmental portion *a*. The removal of segmental portion *a* provides a flat cup supporting surface *c*. This surface *c* is flat in order not to disturb the vertical alignment of the cups in the stack. Just before the lowermost cup of the stack is discharged it rests upon flat segmental surface *c*. As each dispensing element is moved clockwise, supporting surface *c* is removed from beneath the cup and the position of the dispensing element changes until the cup is entirely within the area formed by cut out portion *b*, at which point it no longer has any supporting surface and will drop from the dispenser. It will be understood, of course, that dispensing elements 4, 6 and 8 are so arranged as to be in the same position with respect to each other at all times. Likewise dispensing elements 4', 6' and 8' are in the same position with respect to each other at all times. As a cup is discharged the curved or worm-like surface *d* serves to push it downward in case it does not drop freely of its own accord. At the same time, top surface *e* engages the cup next to the lowermost cup at point *f*. This is made possible by the fact that the distance between surface *e* and surface *c* is such that surface *e* lies intermediately between the flanges of the cups. Counterclockwise motion of the dispensing element then causes a cup to drop from surface *e* to surface *c*. Each dispensing element is provided with a pinion gear *g*, an upper pivot *h* and a lower pivot *i*, the latter being shown in Figures 6 and 7. Point *k* is preferably even with the wall of the guideway when maximum counterclockwise rotation has been reached.

In Figure 4, the construction and arrangement of the two dispensers is shown with lower members 26 and 26' removed. In other words, Figure 4 illustrates the appearance of the operating mechanism looking from the bottom thereof. As illustrated, each of the operating members 34 and 34' is provided with three channels 36, 38 and 40 and 36', 38' and 40', respectively. In alignment with channels 36, 38 and 40 are threaded recesses 42, 44 and 46 in flange 28 of upper guideway member 24. These recesses are adapted to receive screws 32 (Figure 2) which not only serve to hold together members 24 and 26 of dispenser A but also serve to guide ring member 34 and limit the motion thereof. In dispenser A a ridge or collar 48 is provided which may also serve to guide ring member 34 and which additionally tends to keep dirt out of the operating mechanism. Similarly, in dispenser B, channel portions 36', 38' and 40' are in alignment with threaded recesses 42', 44' and 46', respectively. These recesses are adapted to receive screws 32' (Figure 2) which serve to hold together upper and lower parts 24' and 26', respectively, of dispenser B and likewise limit the motion and act as guiding elements for operating member 34'. Dispenser B is provided with a ridge or collar 48' which depends from upper member 24' and serves to keep dirt out of the operating mechanism and also acts as an additional guide for ring member 34'.

In dispenser A, ring member 34 is provided with gear segments 50, 52 and 54. Similarly, in dispenser B, ring member 34' is provided with gear segments 50', 52' and 54'. Gear segments 50, 54 and 52 are adapted to mesh with pinion gears 56, 58 and 60 of dispensing elements 4, 6 and 8, respectively. Similarly, in dispenser B, gear segments 52', 50' and 54' are adapted to mesh with pinion gears 56', 58' and 60' of dispensing elements 4', 6' and 8', respectively. In Figure 5, the multiple dispenser is illustrated in cross-sectional view taken along line Y—Y of Figure 4. As shown in Figure 5, the guideways 2 and 2' of dispensers A and B, respectively, preferably converge at points 62 and 62', approximately at flanged portions 28 and 28', that is, just before the cups are to be dispensed. This permits a substantial space around the upper portion of the stack of cups thereby facilitating refilling of the dispensers but restricts the lateral motion of the cups when they are about to be dispensed. Just after the cups are dispensed, a diverging portion or area 64 and 64' is provided in dispensers A and B, respectively, thus permitting cups which have been discharged or dis-

pensed from the bottom of the stack to fall freely onto a platform or into a holder.

The means for holding the dispensers A and B in the relationship shown in Figures 1, 2, 4 and 5 is conventional. Quite commonly these dispensers are mounted on some portion of a coin operated liquid vending machine, and each is fastened in proper relationship to the other upon some frame member of the vending machine. Under some circumstances, the dispenser A may be fastened to dispenser B by a frame member and then either A or B will be fastened to the dispensing mechanism. A wide variety of conventional means are available for maintaining the two dispensers in the relationship shown in the drawings.

As illustrated in Figure 5, the dispensing elements in dispensers A and B are so arranged as to permit loading or bringing cups into discharge position in dispenser B while cups are being discharged from dispenser A. Thus, in the position of the dispensing elements in Figure 5, the lowermost cup of the stack is just being discharged in dispenser A while in dispenser B a cup has just been discharged, and the lowermost cup of the stack is resting upon the top surface of the dispensing elements. This is more clearly shown in Figures 6 and 7.

In considering Figures 6 and 7 in conjunction with Figure 3, it will be seen that in Figure 6 the lowermost cup of the stack is resting upon the top surface *e* of the dispensing elements. Hence, it will require a counterclockwise motion of the dispensing element to bring said cup into discharge position on lower surface *c*. In Figure 7 the dispensing element has been rotated approximately 180° with the result that the lowermost cup of the stack has dropped from the top supporting surface *e* into segmental cut out portion *a* and is now resting upon lower surface *c*. Each dispensing element rotates freely on pivots *h* and *i*, the former being seated in the upper flanged portion of the dispensers and the latter in the lower flanged portion. As illustrated in Figures 5, 6 and 7, only a small portion of each dispensing element projects into guideways 2 and 2' through rectangular openings *j* in said guideways. Hence, there is very little chance for dirt to clog the dispensing mechanism or render it unsanitary.

The operation of the above described multiple dispenser unit is as follows. Columns or stacks of nested cups are inserted in the guideways 2 and 2' of dispensers A and B, as illustrated, for example, in Figure 5. The bottoms of the lowermost cups are ordinarily projected out of the dispensers, as illustrated in Figures 2 and 5. The cups are then ready to be dispensed. The dispensing operation is carried out by moving actuating arm 14 in the direction of the arrows, as illustrated in Figures 1 and 4. Ordinarily to dispense a cup from the bottom of the stock in either dispenser A alone or dispenser B alone, a forward and a reverse movement of actuating arm 14 would be required. Dispenser elements 4, 6 and 8 and 4', 6' and 8' in dispensers A and B, respectively, are so arranged, however, that cups are alternately and successively dispensed, one cup being dispensed from one dispenser on the forward movement of actuating arm 14 and another being dispensed from the other dispenser on the reverse movement of said actuating arm.

As will be seen by reference to Figure 4, any movement of actuating means 14 is imparted to operating ring member 34' through an arm 16 which is connected to actuating member 14 by means of a bolt and nut or other suitable means 18. Actuation of arm 14 is preferably effected by means of a coin controlled mechanism operating in conjunction with a motor or other suitable operating means, not shown.

When ring member 34' is moved dispensing elements 4', 6' and 8' are rotated by engagement of gear segments 50', 52' and 54' with pinion gears 56', 58' and 60'. As ring member 34' is rotated it is guided by screws 32' (Figure 2) which are seated in recesses 42', 44' and 46' (Figure 4). The guiding of ring member 34' is effected by means of grooves or channels 36', 38' and 40'. Additionally, a depending flange or ridge 48' integrally associated with upper member 24' of dispenser B serves to hold ring member 34' in place. Because of said flange 48', ring member 34' is not visible from the interior of the dispenser, although in the construction shown it can readily be seen from the exterior thereof. Screws 32', in conjunction with grooves or slots, 36', 38' and 40', also serve to limit the motion of ring member 34'.

In addition to rotating dispensing elements 4', 6' and 8', ring member 34' is also connected to and imparts movement to ring member 34 of dispenser A, said connection being effected by means of gear teeth 20 integrally associated with the exterior of member 34' and gear teeth 22 integrally associated with the exterior of ring member 34. The movement imparted to member 34 through gear segments 20 and 22 causes a rotation of dispensing elements 4, 6 and 8 in dispenser A in a manner similar to that of dispenser B. Thus, ring member 34 is provided with grooves or slots 36, 38 and 40 which, in conjunction with screws 32 (Figure 2), seated in threaded holes 42, 44 and 46 (Figure 4), serve to guide and limit the motion of member 34. Dispensing elements 4, 6 and 8 are rotated by coaction between gear segments 50, 52 and 54 and pinions 56, 58 and 60.

As previously indicated, the arrangement of the dispensing devices in dispensers A and B is such that a cup is discharged from one dispenser or the other every time actuating means 14 is moved in a forward or reverse direction. It will readily be seen that when ring member 34' of dispenser B is moving counterclockwise, ring member 34 of dispenser A is moving clockwise so that the operation of the two dispensers is reversed with respect to each other. Since each dispenser has what may be called a loading and a discharging movement, it will be readily apparent that one dispenser is being loaded while the other is being discharged. This loading and discharging movement can best be understood by reference to Figures 3, 6 and 7.

In Figure 7 the lowermost cup of a stack is shown in loaded position, that is, in the position in which it is ready to be discharged. When a cup is in this position the point *k* of each dispensing element is approximately in the same plane with the wall of the cup guideway. The same is true with respect to the point *f* of each dispensing element (Figure 3) although this point may be slightly within the walls of the guideway. In loaded position each dispensing element, according to the construction herein described, has reached its maximum counterclockwise movement, or in other words, cannot be moved any further in a counterclockwise direction. The same is true with respect to ring operating member 34' in dispenser B or ring

operating member 34 in dispenser A. When in loaded position the lowermost cup of the stack is resting upon surface c (Figure 3).

As counterclockwise movement of the dispensing element is started said cup tends to slide off of surface c into recess b where it is freely suspended and unless held by friction to the cup above it will drop freely. But in the event that it does not drop freely, it is gradually pushed off into space by inclined surface d and finally is positively discharged. In the meantime, during clockwise rotation of each dispensing element (Figure 3) the point f of upper surface e becomes engaged beneath the beaded rim of the cup which is directly above the cup being discharged, and as rotation in a clockwise direction is continued, the bead of said cup which is now the lowermost cup of the stack becomes fully supported by surface e of each dispensing element, as shown in Figure 6. At this point clockwise motion of each dispensing element is stopped, this being effected by screws 32 and 32' in dispensers A and B, respectively, striking the ends of slots 36, 38 and 40 in dispenser A and 36', 38' and 40' in dispenser B (Figure 4). It will be apparent that the desired amount of rotation for each dispensing element may be readily regulated by the size of said slots.

When the limit of clockwise rotation for each dispensing element has been reached, as previously described, and as shown in Figure 6, each element is then moved counterclockwise and as such counterclockwise movement takes place, the lowermost cup drops from surface e (Figure 3) into segmental recess a and then rests on surface c in loaded position ready for discharge. Since ring members 34 and 34' rotate in opposite directions, it will readily be seen that this new and improved type of dispenser affords an excellent and satisfactory means for alternately and successively dispensing cups from two stacks thereof. Furthermore, the actuating arm 14 is connected only to one of the dispensers, thus simplifying the construction and reducing the number of moving parts. No attempt has been made to describe in detail various types of motors and coin controlled mechanisms which could be used to operate actuating arm 14, but it will be apparent that the fewer levers required to actuate the cup dispensing mechanisms, the simpler will be the coin controlled mechanism or other mechanism required.

It will be understood that variations may be made in the dispensers described without departing from the invention. For instance, ridges or flanges 48 and 48' may be omitted. Other modifications may be made which will be apparent to those skilled in the art.

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

1. A multiple dispenser for stacks of articles comprising, in combination, a plurality of guideways for said articles, dispensing devices supported by each of said guideways, operating means for said dispensing devices supported by each of said guideways, and means comprising gear teeth connecting said operating means and adapted to impart any movement of one of said operating means to a connected operating means.

2. A multiple dispenser for stacks of articles comprising, in combination, a plurality of guideways for the articles, dispensing devices disposed around each of said guideways, operating means for said devices disposed around each of said guideways, and means connecting the operating means of one set of dispensing devices with the operating means of another whereby movement of one of said operating means is imparted to another but in an opposite direction.

3. A multiple dispenser for stacks of articles comprising, in combination, a plurality of guideways for the articles, dispensing devices supported by said guideways, operating means for said dispensing devices supported by each of said guideways, connecting means between said operating means whereby movement of one operating means is imparted to the other, said connecting means comprising exterior gear teeth on said operating means, and independent actuating means connected with only one of said operating means.

4. A multiple dispenser for stacks of articles comprising, in combination, a plurality of guideways for the articles, a plurality of rotatable dispensing devices disposed circumferentially around each of said guideways, operating means for said dispensing devices comprising a ring member around each of said guideways and means connecting a ring member of one guideway with the ring member of another guideway whereby movement of one ring member is imparted to another ring member.

5. A multiple dispenser for stacks of articles comprising, in combination, a plurality of guideways for the articles, rotatable dispensing devices disposed around each of said guideways, an operating ring member for said dispensing devices disposed around each of said guideways, said dispensing devices including means adapted to bring the lowermost member of the stacks of articles in said guideways into discharge position when the operating ring member associated with said guideway is moved in one direction and to discharge said article when said ring member is moved in an opposite direction, connecting means between said ring operating members, and actuating means connected with one of said operating members, said dispensing devices in each guideway being disposed in such relationship that articles are dispensed alternately and successively from said guideways upon each movement of the actuating member.

6. In a dispenser for a stack of nested articles, the combination of, a guideway for the articles, dispensing devices disposed around said guideway, a ring member around said guideway for operating said dispensing devices, gear teeth exteriorly disposed on said ring member, and means connected with the gear teeth for operating the ring member.

7. In a dispenser for a stack of nested articles, the combination of, a guideway for the articles, said guideway consisting of an upper part and a lower part, dispensing devices disposed around said guideway, a ring member around said guideway for operating said dispensing devices. and means interiorly disposed within said ring member adapted to limit the movement thereof, said means also serving as means for connecting the upper and lower parts of said guideway.

8. A multiple dispenser for a plurality of stacks of nested articles comprising, in combination, a plurality of guideways for the articles, said guideways each consisting of an upper and a lower part, a plurality of rotatable dispensing devices disposed around each of said guideways approximately at the junctures of the upper and lower parts thereof, a converging area immediately above said dispensing devices in the upper part

of each of said guideways, a diverging area immediately below said dispensing devices in the lower parts of said guideways, a ring operating member for said dispensing devices disposed around each of said guideways between the upper and lower parts thereof, and connecting means between said operating members whereby any movement of one of said operating members is imparted to another operating member but in a reverse direction.

9. A multiple dispenser for a stack of nested articles comprising two dispensers, each having a guideway adapted to hold a stack of nested articles, said guideway being made up of two separable flanged parts comprising an upper part and lower part, three rotatable substantially circular dispensing elements symmetrically disposed around each guideway approximately at the juncture of the upper part and the lower part between the flanges thereof, each of said dispensing elements partially projecting into the guideway, each of said elements having a minor segment removed from a top portion thereof to form a flat cup supporting portion about halfway through the element and having an intersecting minor segment removed from a bottom portion to form a non-supporting portion, and each having a pivot projecting from each side thereof with one end seated in the upper guideway part and the other end seated in the lower guideway part, a pinion gear associated with the lower end of each of said dispensing elements, a ring member around each guideway for operating said dispensing elements, said ring member having three separate equally spaced inwardly disposed sets of gear teeth adapted to mesh with the pinion gears of the dispensing element, and said ring member being disposed between the upper and lower parts of the guideway and adapted to move freely around the guideway to rotate said dispensing elements a predetermined amount, three guide slots interiorly disposed in each of said ring members in spaces between the gear segments, guide members in said slots comprising screws adapted to hold together the upper and lower parts of each guideway, said guide members being also adapted to limit the movement of each of said ring members, and gear teeth outwardly disposed on each of said ring members and adapted to mesh with each other whereby movement of one of said ring members is imparted directly but in a reverse direction to the other of said ring members.

10. A cup dispenser of the character described, comprising, in combination, a dispensing piece composed of an upper member and a lower member, said upper member having a cylindrical portion and a solid, enlarged flange portion formed integrally with the cylindrical portion, said flange portion being provided with cylindrically shaped recesses receiving cup dispensing elements, a plurality of cup dispensing elements engaging within said recesses and being provided with shafts seating within apertures formed in the bottom of said recesses, said lower member cooperating with the flange portion of the upper member and having cooperating apertures receiving the opposite extremities of the cup dispensing unit shafts, one of said upper and lower members being recessed to receive an annular ring provided with teeth to actuate the cup dispensing units.

11. In a dispenser for a stack of nested articles, in combination, a guideway for holding and dispensing the stack of nested articles, a plurality of cylindrically shaped recesses opening into the guideway, an annular track in the guideway adjacent to the cylindrically shaped recesses, a ring gear in the annular track, rotatable dispensing means disposed in each cylindrically shaped recess and actuating means connected to each rotatable dispensing means and projecting into the annular track, said actuating means comprising gear teeth for engaging the teeth of the ring gear.

12. In a dispenser for a stack of nested articles, in combination, a guideway for holding and dispensing the stack of nested articles, a plurality of cylindrically shaped recesses opening into the guideway, an annular track intercepting the cylindrically shaped recesses, a ring having toothed segments movable in the annular track, and a rotatable dispensing member in each cylindrically shaped recess and having means for engaging the toothed segments of the ring, said rotatable dispensing members each having an exterior diameter approaching the diameter of the cylindrically shaped recess to provide the bearing surface for rotatable movement.

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