

April 21, 1936.

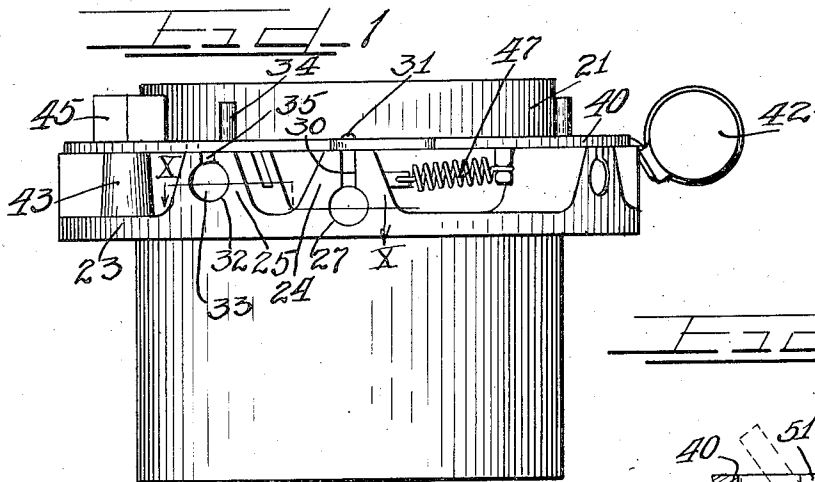
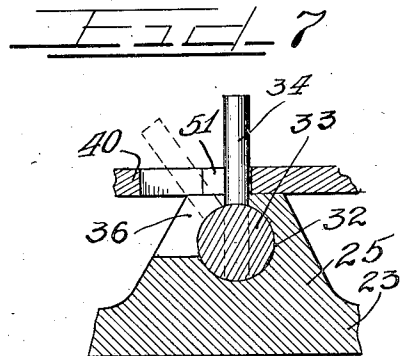
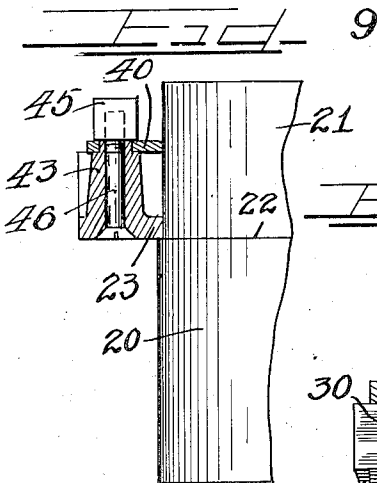
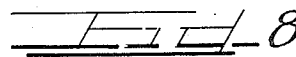
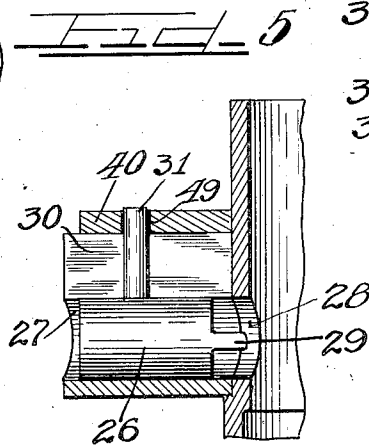
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2,037,752

CUP DISPENSER

Filed Nov. 2, 1933

3 Sheets-Sheet 1



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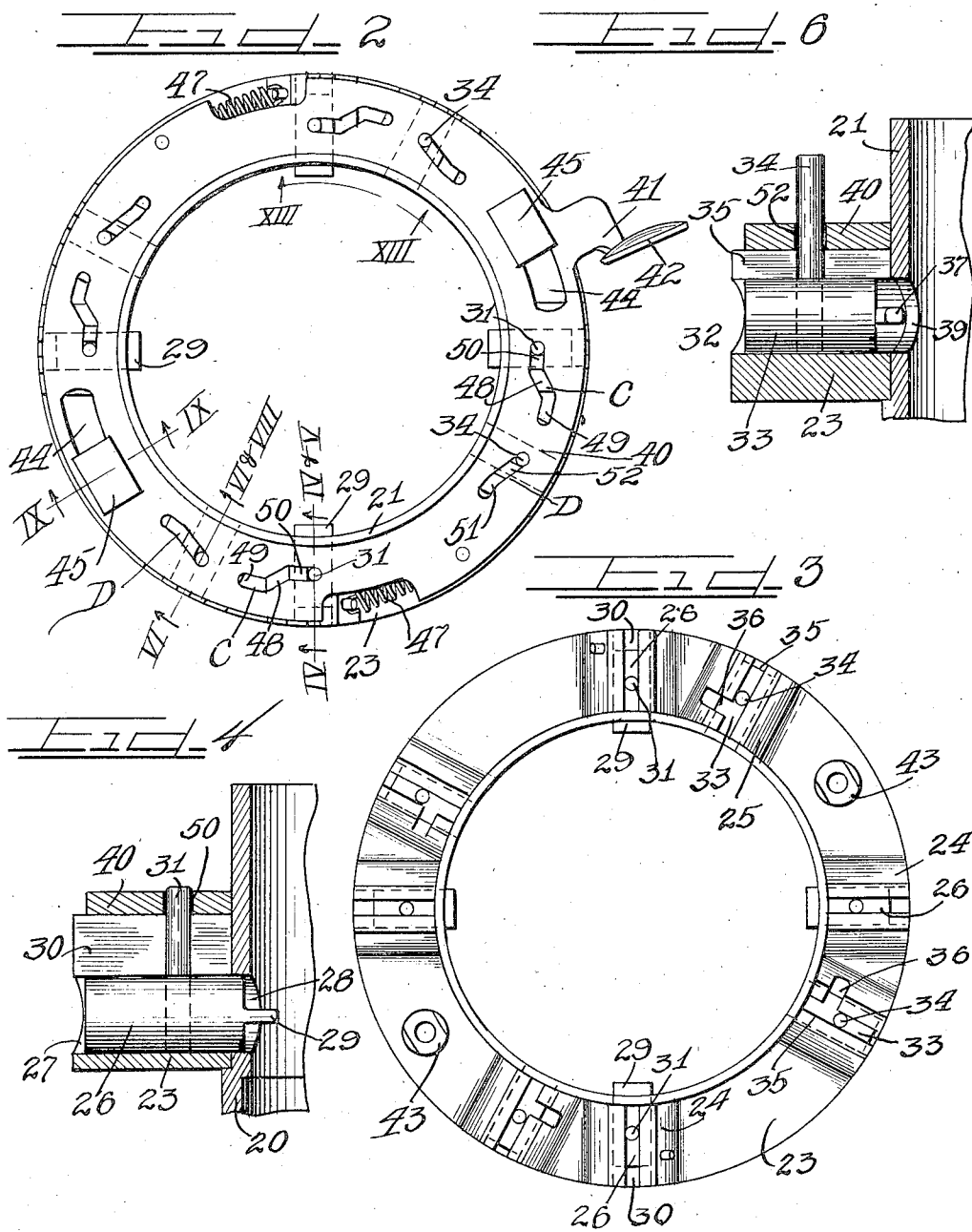
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CUP DISPENSER

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3 Sheets-Sheet 2



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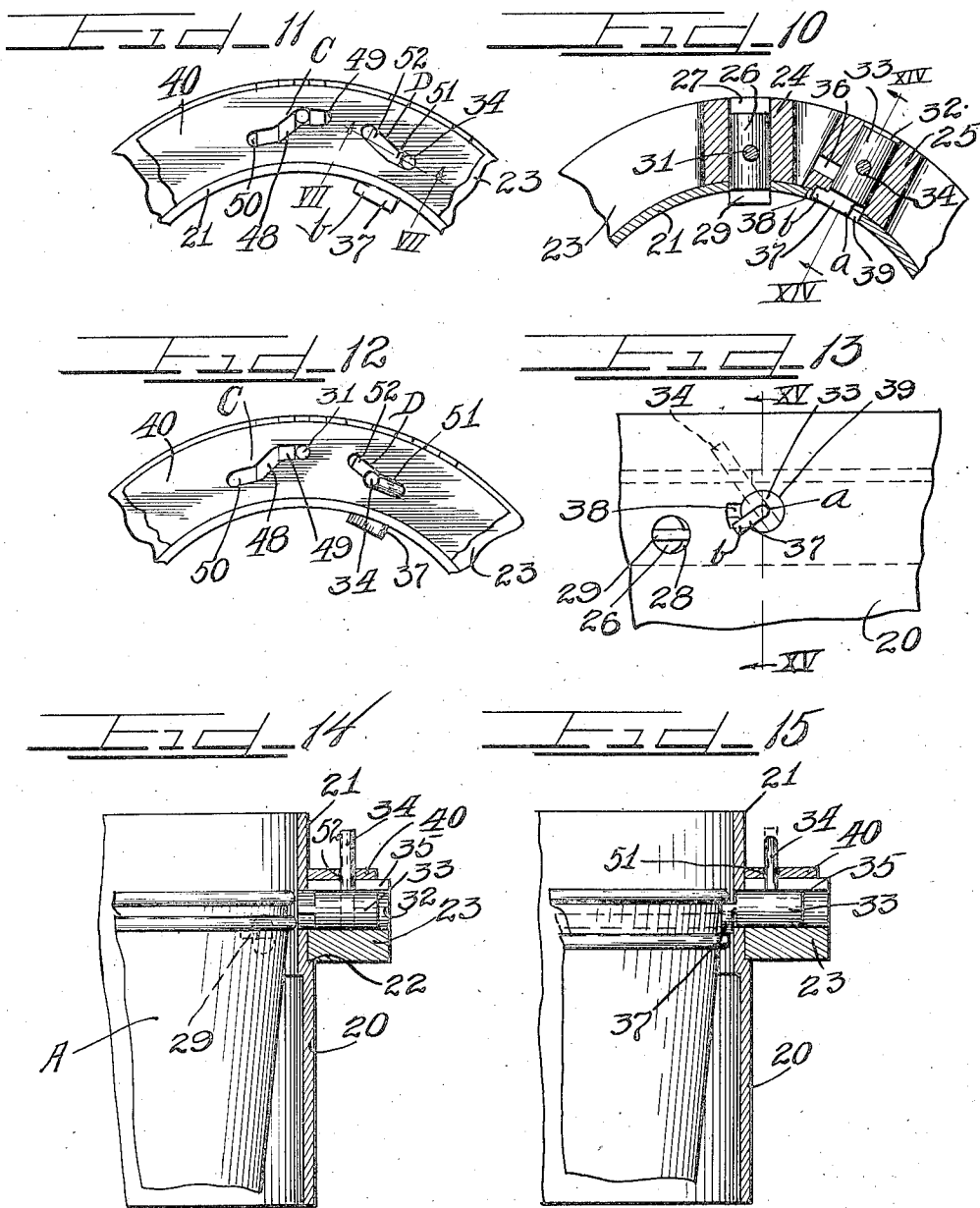
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CUP DISPENSER

Filed Nov. 2, 1933

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,037,752

CUP DISPENSER

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Application November 2, 1933, Serial No. 696,314

12 Claims. (Cl. 312—44)

This invention relates to dispensing devices adapted particularly for dispensing conical or frusto-conical flanged drinking cups one by one from a stack of inter-nested cups.

5 The important object of the invention is to provide structure and arrangement in which supports for the bottom cup of a stack and supports for the next cup are alternately moved toward and away from the axis of the cup for release of
10 cups one by one from the stack and with the supports for the second cup rotatable to apply downward pressure against the bottom cup to force it away from the second cup and eject it from the stack.

15 A further object is to provide supports in the form of cylindrical members movable in cylindrical passageways and provided at their inner ends with suitable supporting ledges, and with the cylinder members which support the second cup
20 rotatable for application of their supporting ledges to the bottom cup to cause positive downward movement thereof to assure complete release thereof from the stack.

A further object is to provide a single cam
25 structure operable by the person desiring a cup to cause the proper consecutive and cooperating movements of the various supporting and ejecting members.

30 The invention also involves other features of construction, arrangement and operation and all of the various features of the invention are incorporated in the structure disclosed on the accompanying drawings, in which drawings—

35 Figure 1 is a front elevation of a stack supporting frame with the dispensing controlling structure mounted thereon;

Figure 2 is a plan view of the structure shown in Figure 1;

40 Figure 3 is a plan view of the structure with the rotary cam plate removed;

Figure 4 is an enlarged section on plane IV—IV Figure 2 showing one of the bottom cup supporting members in supporting position;

45 Figure 5 is a section similar to Figure 4 showing a bottom cup supporting member in withdrawn or cup release position;

Figure 6 is an enlarged section on plane VI—VI Figure 2 showing one of the second cup supporting members in normal or cup releasing position;

50 Figure 7 is an enlarged section on plane VII—VII Figure 11 showing a second cup supporting member in cup supporting position;

55 Figure 8 is a view similar to Figure 6 showing the second cup supporting member rotated for ejection of the bottom cup;

Figure 9 is a front elevation of the dispensing structure showing the supporting frame for the cup supporting members and the rotary cam member in transverse section on plane IX—IX Figure 2;

5 Figure 10 is a section on plane X—X Figure 1 showing the cup supporting members in normal position;

Figure 11 is a fragmentary plan view showing the intermediate position in which the bottom
10 cup supporting members are withdrawn and the second cup supporting members projected;

Figure 12 is a view similar to Figure 11 showing the final movement during which the second cup supporting members are rotated for ejection
15 of the bottom cup;

Figure 13 is a view on plane XIII—XIII Figure 2 showing the final movement of the supporting members;

Figure 14 is a section on plane XIV—XIV Figure 10; showing the normal position of the supporting elements relative to cups within the dispensing tube; and

Figure 15 is a section on plane XV—XV Figure 13 showing the manner of ejection of the bottom
25 cup by the ejector means.

The dispensing structure shown comprises a tubular supporting frame or base 20 whose upper end 21 is of reduced diameter to provide an external shoulder 22 on which is mounted the annular supporting frame 23, this frame intimately receiving the end 21 and being rigidly secured relative thereto. The frame 23 is in the form of an annular plate with transverse lugs thereon forming guideways for the various cup supporting and dispensing controlling members.

As shown, a set of four lugs 24 is illustrated with the lugs spaced 90° apart, and another set of four lugs 25 is shown, the lugs 24 supporting and guiding the supporting means for the bottom cup and the lugs 25 providing support and guide means for supporting the second cup and for ejecting the bottom cup. The bottom cup supporting members are in the form of cylindrical blocks or plungers 26 slidable in cylindrical
45 passageways 27 in the lugs 24 and extending radially relative to the axis of the dispensing frame 20. At their inner ends, the cylindrical passageways register with openings 28 in the wall 21 of the dispenser frame and each plunger 26 has at its inner end a horizontal diametrically extending flange or supporting ledge 29 thereon. When the plungers are shifted inwardly in their normal position, these ledges engage below the flange of the bottom cup of a stack of cups A in the dis-
55

penser frame passage, and when the plungers are withdrawn, the bottom cup is released. Each lug 24 has a longitudinal extending slot 30 in its upper side communicating with the cylindrical passage 27 and through this slot extend a pin 31 secured to the plunger in the passageway, such pin holding the plunger against rotary movement to maintain its supporting ledge 29 in horizontal position at all times.

The lugs 25 are adjacent to the lugs 24 and each lug 25 has a cylindrical passageway 32 there-through extending radially relative to the axis of the dispenser frame 20. The members for supporting the second cup of a stack and for ejecting the bottom cup are in the form of cylindrical blocks or plungers 33, each plunger having a pin 34 extending upwardly radially therefrom. Each lug 25 has the vertical longitudinal slot 35 for receiving the pin 34 for guiding the axial movement of the plunger 33, and a lateral slot 36 extends from the longitudinal slot 35 for receiving the pin 34 when the plunger is in its inner position and for then permitting and guiding rotational movement of the plunger.

As best shown in Figures 6, 8, 10, 13 and 15, each plunger 33 has at its inner end a flat radially extending supporting ledge or flange 37. The inner or heel end of the flange or tongue 37 is substantially concentric with the axis of the plunger and the outer end of the tongue extends a distance radially beyond the periphery of the plunger, the heel and outer ends being designated, respectively, as *a* and *b* in Figure 13. When the pins 34 on the plungers 33 are in the longitudinal guide slots 35 the tongues 37 will be horizontal, and the wall 21 of the dispenser frame has slots 38 extending laterally from the openings 39 in the wall 21 which register with the guide passageways 32 for the plungers in the lugs 25. Through these lateral slots 38 the tongues 37 are projected when the pins 34 come into registration with the guide slots 36 in the lugs so that, when the plungers are then rotated, the supporting tongues 37 will be deflected downwardly.

The axes of the plungers 33 are in a horizontal plane which is above the horizontal plane of the axes of the plungers 26 by a distance equal substantially to the distance between the flanges on the cups in a stack. When the plungers 26 are in their normal position with their tongues or flanges 29 projected into the bore of the dispenser frame 20, they are engaged by the flange on the bottom cup of the stack so that the stack is supported. The flanges or tongues 37 on the plungers 33 will, upon axial shift of the plungers, project into position below the flange of the second cup, or cup above the bottom cup, such engagement of the second cup, as will presently be described, being accompanied by withdrawal of the plungers 26 for release of the bottom cup and support of the stack thereafter by the plungers 33. After the plungers 33 have assumed support of the stack after release of the bottom cup from the plungers 26, the plungers 33 are rotated, their tongues 37 which were projected through the slots 38 being then swung downwardly to forcibly dislodge the bottom cup from the stack if it did not of itself drop when released, the heels of the tongues 37 remaining in contact with the flange of the second cup to maintain support of the stack during ejection of the bottom cup.

Describing now the means for controlling the proper sequential operation of the cup dispens-

ing controlling members, a flat annular cam ring 40 surrounds the wall 21 of the dispenser frame and rests on the top of the lugs 24 and 25, and has a bracket 41 extending therefrom provided at its end with a finger plate 42 by means of which the plate may be readily rotatably shifted. The extent of rotational movement of the cam plate is limited by stop lugs 43 on the frame 23 which lugs extend upwardly through slots 44 in the cam plate so that the engagement of the ends of the slots with the stop lugs will determine the extent of rotation of the plate. The plate may be held in position on the lugs 24 and 25 as by means of blocks or nuts 45 receiving the threaded ends of screws 46 extending through the stop lugs. Springs 47 anchored to the frame 23 and to the cam plate tend to hold the plate normally in position at the end of its clockwise rotational movement (Figure 2).

The cam plate 40 has cam slots C for receiving the pins 31 on the plungers 26, and has also cam slots D for the pins 34 on the plungers 33. Each of the slots C has a diagonal section 48 and circumferentially extending end sections 49 and 50 which extend in arcuate direction concentric with the axis of the dispenser frame 20, the ends 50 normally receiving the pins 31.

The cam slots D have each a part 51 extending in arcuate direction around the axis of the dispenser frame 20 and a diagonally extending section 52 extending outwardly, the pins 34 on the plungers 33 extending normally through the slot sections 52 at the outer ends thereof. The plungers 26 are normally held in their inner positions with their supporting tongues or ledges 29 projected into the dispenser passageway through the dispenser frame 20 while the plungers 33 are held in their outer position with their supporting and ejector ledges 37 withdrawn from the dispenser passageway.

Describing now the operation, the first or normal position of the dispensing elements is shown in Figures 1, 2, 3, 4, 5, 6, 10 and 14, the stack, shown in Figure 14, being supported by the bottom cup which rests with its flange on the projected ledges 29 of the plungers 26. During a partial, substantially half-way rotational movement of the cam plate, the dispensing controlling elements assume an intermediate position shown in Figures 5, 7, and 11. During this movement of the cam plate, the pins 34 on the plungers 33 are engaged by the diagonally extending cam slot portions 52 and the plungers 33 are shifted inwardly to project their supporting ledges 37 into the dispensing passageway and into position below the flange of the second cup. During this positioning of the plungers 33, the plungers 26 remain in their normal position as their pins 31 are engaged by the inner circumferentially extending ends 50 of the slots C. But when the circumferentially extending ends 51 of the slots D engage with the pins 34, then the diagonal portions 48 of the slots C engage with the pins 31 and the ledges 29 of the plunger 26 are withdrawn from below the flange of the lower cup, but such withdrawal is after the flange of the second cup has been received on the ledges 37 of the plungers 33, the bottom cup being now free to drop.

As the cam plate is now moved to the end of its stroke, the pins 31 on the plungers 26 will be engaged by the circumferentially extending outer portions 49 of the cam slots C and these plungers will be locked in their withdrawn position. The ends of the pins 34 are, however,

engaged by the outer ends of the cam slot sections 51 and, as the pins are at this time opposite the lateral notches 36 in the lugs 25, the plungers 33 are free to be rotated, and such rotational movement will swing down the supporting ledges or tongues 37 for engagement of their ends b with the top of the flange of the bottom cup, should such cup have failed to drop after release therefrom from the stack upon withdrawal of the plungers 26. The dispensing parts are now in their third position as shown in Figures 8, 12, 13 and 15. During downward swing of the abutment tongues 37 to carry their points against the flange of the bottom cup, the heels a remain in contact with the flange of the second cup so as to maintain support of the stack. Upon release of the cam plate, the springs 47 will rotate it back to normal position and the dispensing controlling elements will be moved back to their normal position ready for the dispensing of another cup from the dispenser. During the return movement of the parts, the plungers 26 will be moved inwardly to project their ledges 29 into the dispensing passageway to receive the flange of the bottom cup before the plungers 33 are retracted or moved to retract their supporting ledges 37 from below the cup flange, the stack dropping down for support on the ledges 29 of the plungers 26 as soon as the plungers 33 have been withdrawn.

The dispensing apparatus is of simple design and the operating parts are durable and can be economically manufactured and the operation is certain and efficient.

I have shown a practical embodiment of the various features of the invention, but I do not desire to be limited to the exact construction, arrangement and operation shown and described as changes and modifications may be made without departing from the scope of the invention as outlined in the accompanying claims.

I claim as follows:

1. In a dispenser for dispensing flanged cups from a stack of inter-nested cups, a base having an opening for the passage of cups, a series of lower supporting members movable toward and away from said opening and having supporting ledges for engaging below the flange of the bottom cup of a stack, a series of upper supporting members movable toward and away from said opening and having supporting ledges for receiving the flanges of the second cup of a stack, cam means for controlling the alternate reciprocation of said upper and lower supporting members, and means on said supporting members controlled by the movement of said cam means for reciprocating said supports and causing rotary movement of said upper supporting members about their axes of reciprocation after inward movement thereof to cause engagement of their supporting ledges against the top of the bottom cup for forcing said cup from the stack after release thereof from the lower supporting member ledges while said upper supporting members simultaneously support the remainder of the stack of cups.

2. In a dispensing mechanism for dispensing flanged cups one at a time from a nested stack, a base having a delivery passageway for the cups, a series of lower supporting members movable toward and from said passageway and having supporting ledges for receiving the flange of the bottom cup of a stack, a series of upper supporting members adapted for movement toward and away from said passageway and having support-

ing ledges for receiving the flange of the second cup of a stack, said upper members being rotatable, an actuating member, and cam means controlled by movement of said actuating member to effect alternate reciprocation of said supporting members and rotary movement of said upper supporting members about their axes of reciprocation when in their inner position, the supporting ledges on said upper members being adapted, upon such rotary movement of said members, to engage the flange of the bottom cup to cause positive separation thereof from the second cup while said upper members simultaneously support the remainder of the stack of cups.

3. In a dispensing machine for dispensing flanged cups from a stack of nested cups, a supporting frame having a passageway therethrough for the cups, a series of lower supports reciprocable radially relative to said passageway and having supporting abutments at their inner ends for engaging below the flange of the bottom cup of a stack, a series of upper supporting members reciprocable radially relative to said passageway and having abutments at their inner ends for engagement below the flange of the second cup of a stack, actuating means, means controlled by said actuating means for effecting alternate reciprocation of said lower and upper supporting members for the release of cups one by one from the bottom of the stack, and means adapting said upper supporting members for rotary movement about their axes of reciprocation when they are in cup-engaging position, the supporting ledges on said upper supporting members being adapted during rotary movement of said members to exert downward pressure on the bottom cup of a stack to positively force the cup from the stack after release thereof from the lower supporting members while said upper members simultaneously support the remainder of the stack of cups.

4. In a dispensing device for dispensing flanged cups one at a time from a stack of cups, a supporting frame having a passageway therethrough for the cups, a set of lower plungers shiftable axially toward and away from the axis of said passageway and having horizontally extending ledges at their inner ends for engagement below the flange of the bottom cup of a stack, a series of upper plungers shiftable axially toward and from the axis of said passageway and having supporting ledges at their inner ends for engagement below the flange of the second cup of a stack, actuating means, means controlled by said actuating means for effecting alternate reciprocation of said plungers for release of the cups one by one from the bottom of the stack, the supporting ledges on said upper plungers remaining horizontal during such alternate reciprocation of the plungers, and means adapting said upper plungers for rotary movement about their axes of reciprocation when their ledges are in cup supporting position, said ledges when rotated with said upper plungers being adapted to exert pressure against the bottom cup to positively force the cup downwardly after release thereof from the lower plungers while said upper members simultaneously support the remainder of the stack of cups.

5. In a dispensing machine for dispensing flanged cups one at a time from the bottom of a stack of nested cups, a supporting frame having a cylindrical passageway therethrough for the cups, a series of lower plungers shiftable

longitudinally inwardly and outwardly relative to the axis of said passageway and having supporting ledges at their inner ends adapted, when said plungers are shifted inwardly, to engage
 5 below the flange of the bottom cup of a stack, a series of upper plungers shiftable axially inwardly and outwardly relative to the axis of said passageway and having supporting ledges at their inner ends adapted, when said plungers are
 10 shifted inwardly, to engage below the flange of the second cup of a stack, cam pins extending from said plungers, a cam plate rotatable on said frame, cam surfaces on said cam plate adapted upon rotary movement of said plate to alternately reciprocate said plungers for release
 15 of cups one by one from the bottom of the stack, means adapting said upper plungers for rotary movement while in their inner cup supporting position, the ledges on said upper plungers being adapted during said rotary movement to apply
 20 pressure against the top of the bottom cup for positive separation of said cup from the stack after release thereof by the lower plungers, and cam surfaces on said cam plate for cooperating
 25 with the pins of the upper plungers to effect such rotary movement thereof.

6. In a dispensing device for dispensing flanged cups one at a time from the bottom of a stack of nested cups, a supporting frame having a
 30 passageway for the cups, a series of lower plungers shiftable axially inwardly and outwardly relative to the passageway axis and having supporting ledges at their inner ends for engagement with the flange of the bottom cup of a
 35 stack, a series of upper plungers shiftable axially inwardly and outwardly relative to the passageway axis and having supporting ledges at their inner ends for engaging the flange of the second cup, said upper plungers being rotatable, cam
 40 pins extending from said plungers, a cam plate rotatable on said frame, and cam surfaces on said cam plate engaging said pins, said cam surfaces being adapted upon partial rotary movement of said cam plate to cooperate with
 45 said pins to cause first inward movement of said upper plungers to project their supporting ledges below the flange of the second cup, then outward movement of said lower plungers for withdrawal of their ledges from below the flange
 50 of the bottom cup, and then rotary movement of said upper plungers, the ledges on said upper plungers being adapted during such rotary movement to exert downward pressure against the top of the bottom cup to positively separate said
 55 cup from the stack after release thereof from the lower plunger ledges.

7. In a cup dispenser, a frame forming a passageway for delivery of cups from a stack of cups, a supporting plunger axially reciprocable in said frame into and out of engagement with the lowermost cup of the stack, another plunger carrying a cup engaging ledge and reciprocable into and out of engagement with the next lowermost cup of the stack, the last said plunger being

rotatable on its longitudinal axis to cause said ledge to pry off the lowermost cup of the stack while supporting the stack by its engagement with the next lowermost cup, and means for sequentially actuating said plungers.

8. In a cup dispenser, means forming a passageway for delivery of cups from a stack of cups, a plunger movable radially relative to said passageway into and out of engagement between the two lowermost cups of the stack, said
 10 plunger being rotatable upon its longitudinal axis to pry off the lowermost cup of the stack while supporting the next lowermost cup, and means for operating said plunger.

9. In a cup dispenser, means forming a passageway for the delivery of cups from a stack of cups, a plunger movable axially inwardly and outwardly relative to said passageway, an offset ledge on said plunger engageable between the two lowermost cups of the stack, said plunger
 20 being rotatable about its longitudinal axis to cause said ledge to pry off the lowermost cup while supporting the next lowermost cup, and means to operate said plunger.

10. In a cup dispenser, means forming a passageway for delivery of cups from a stack of cups, dispensing means including a plunger bodily movable substantially normally relative to said passageway into position between the two lowermost cups of the stack and bodily rotatable
 30 about its axis of movement to pry the lowermost cup from the stack while supporting the stack by engagement with the next lowermost cup, and supporting means movable into and out of engagement with the stack contemporaneously
 35 with the movement of said plunger out of and into operative position, respectively.

11. In a cup dispenser, means forming a passageway for delivery of cups from a stack of cups, a series of members movable into and out of supporting engagement with the lowermost cup of the stack, another series of members movable into and out of supporting engagement with the next lowermost cup of the stack, each of the last said series of members being bodily rotatable
 45 in its entirety to force off the lowermost cup of the stack while supporting the next lowermost cup, and a single cam member having cam surfaces for sequentially actuating both said series of members, the cam surfaces actuating the last
 50 said series of members inwardly and outwardly, also causing rotation of these members.

12. In a cup dispenser, means forming a passageway for delivery of cups from a stack of cups, movable means normally supporting the
 55 stack of cups, and a dispensing element movable into engagement between the two lowermost cups of the stack contemporaneously with the movement of said movable means out of supporting position and also bodily rotatable about its axis
 60 of movement to pry off the lowermost cup while supporting the stack due to its engagement with the next lowermost cup.

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