June 12, 1951 S. D. POLSEN ET AL 2,556,740

CUP DISPENSER

Filed Dec. 27, 1945 3 Sheets-Sheet 1

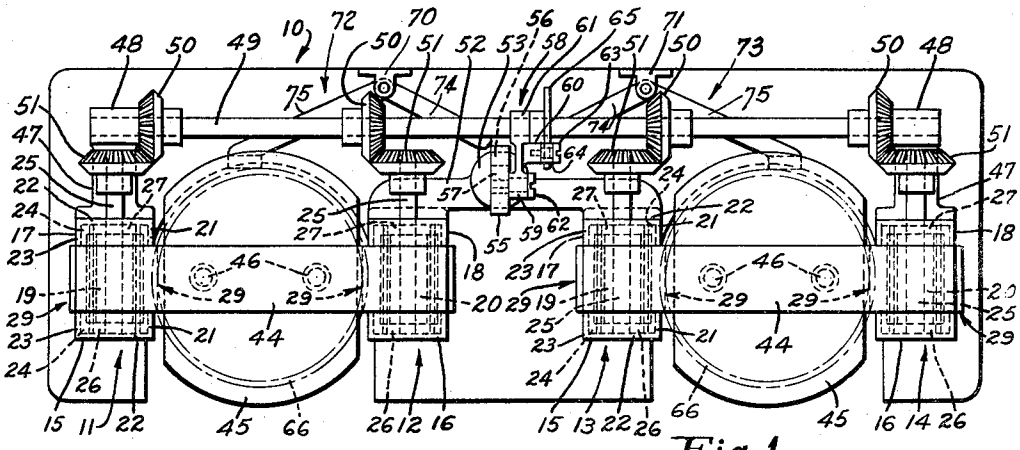


Fig. 1

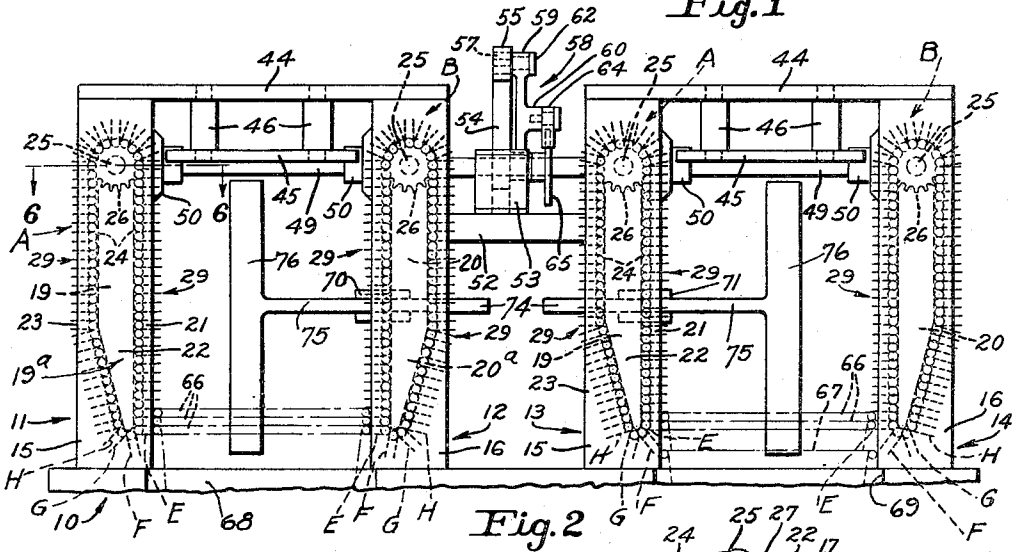


Fig. 2

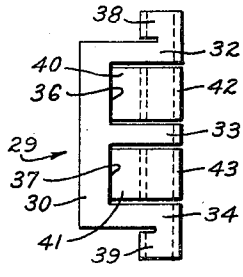


Fig. 3

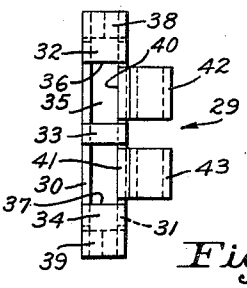


Fig. 4

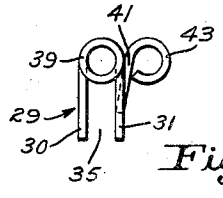


Fig. 5

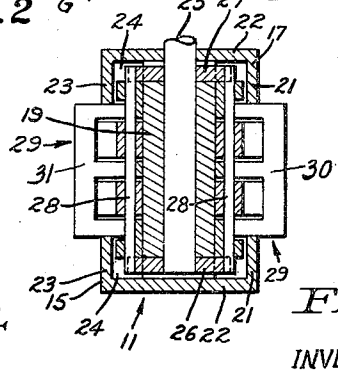


Fig. 6

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CUP DISPENSER

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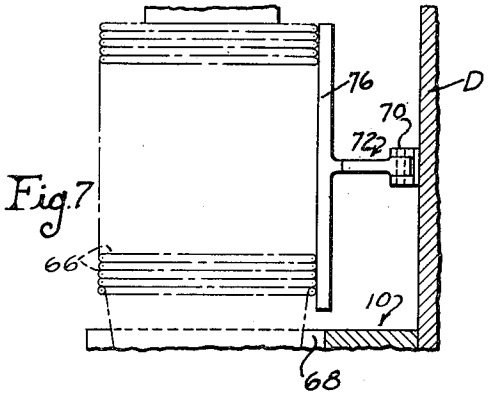


Fig. 7

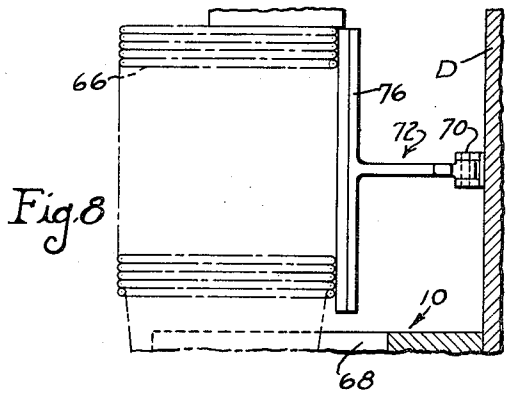


Fig. 8

Fig. 9

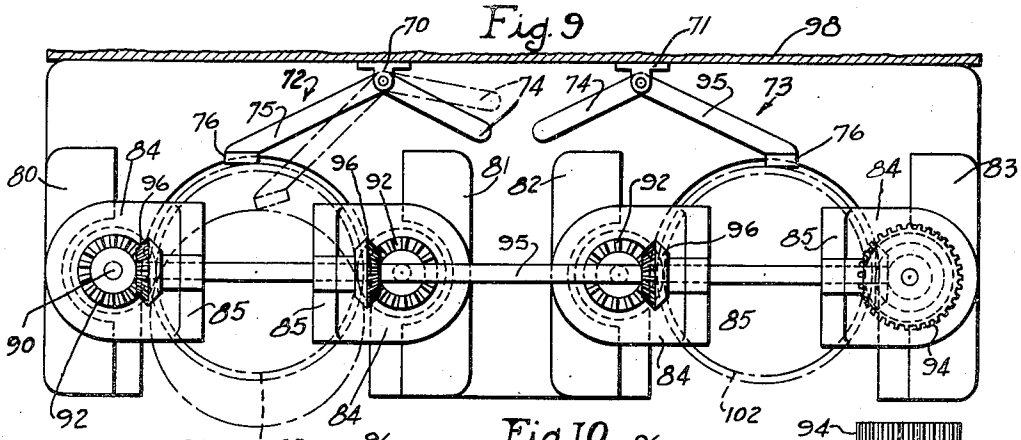
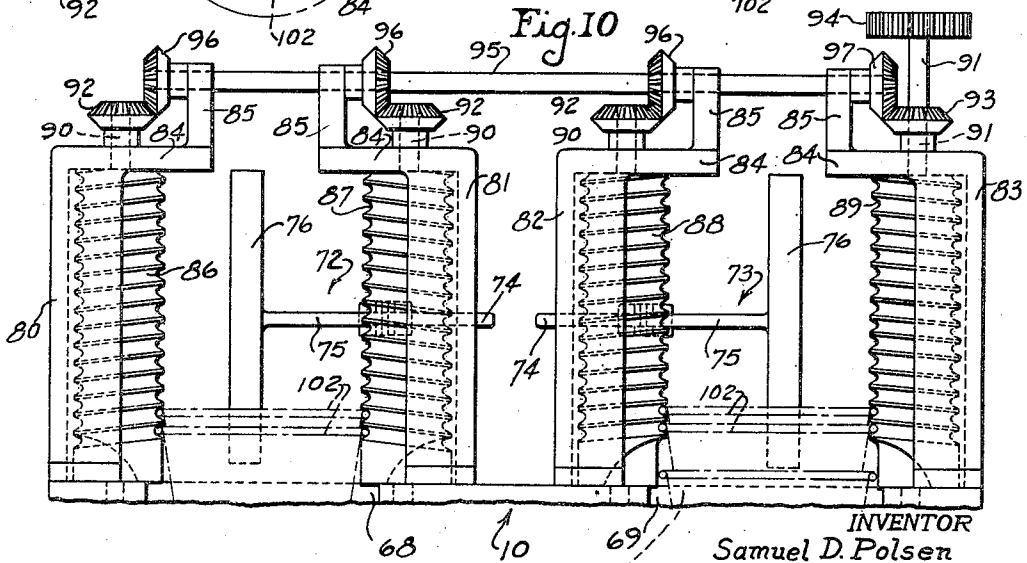


Fig. 10



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CUP DISPENSER

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Fig. 11

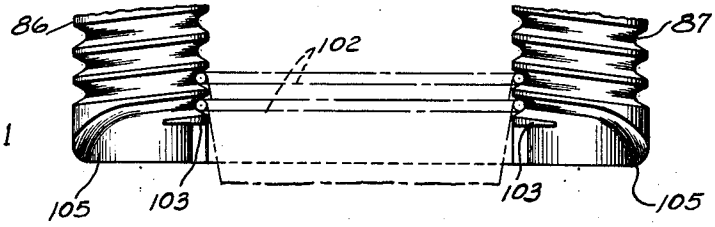


Fig. 12

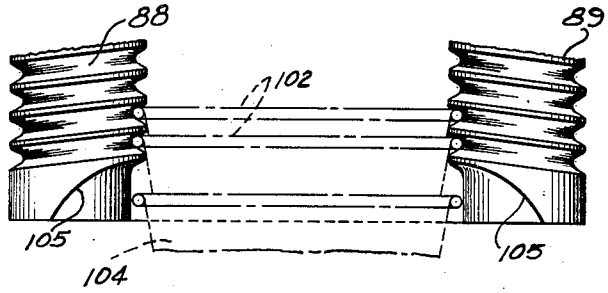
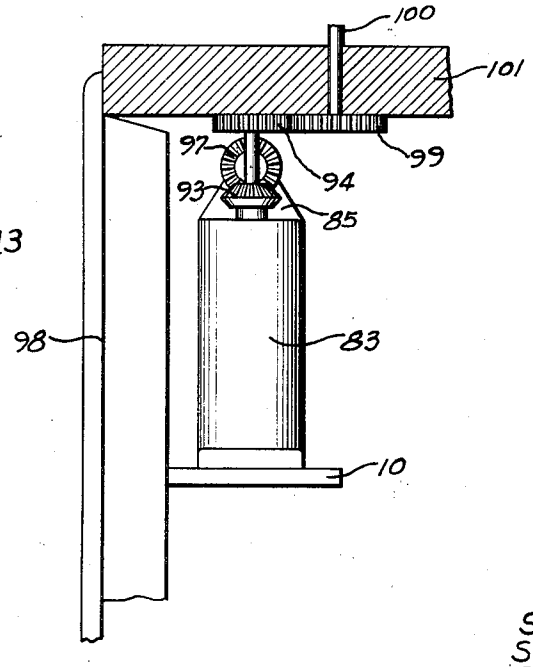


Fig. 13



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UNITED STATES PATENT OFFICE

2,556,740

CUP DISPENSER

Samuel D. Polsen and Sven Herbert Nelson, Bridgeport, Conn., assignors of one-fourth to Blanche H. Polsen, one-fourth to Mildred P. Nelson, one-fourth to said Sven Herbert Nelson, and one-fourth to Norman Hubbell Nelson, all of Bridgeport, Conn.

Application December 27, 1945, Serial No. 637,354

9 Claims. (Cl. 312—44)

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This invention relates to new and useful improvements in dispensing devices and has particular relation to a mechanism for feeding paper or other disposable cups or containers.

The objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein satisfactory embodiments of the invention are shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

Fig. 1 is a top plan view showing a cup feeding means made in accordance with the invention;

Fig. 2 is a front elevational view thereof;

Fig. 3 is a bottom plan view of one of the links employed;

Fig. 4 is a rear elevational view of the link;

Fig. 5 is an end view of the same;

Fig. 6 is a detail sectional view taken as along the line 6—6 of Fig. 2;

Fig. 7 is a detail view showing the manner of use of a part of the device of Figs. 1 and 2;

Fig. 8 is a view similar to Fig. 7 showing the actual use of such device;

Fig. 9 is a view somewhat similar to Fig. 1 showing a modification;

Fig. 10 is a front elevational view of the device of Fig. 9;

Fig. 11 is an enlarged elevational view illustrating the actual feeding of the cups by the means of Figs. 9 and 10, and showing the lowermost cup of a stack in position just prior to the dispensing thereof;

Fig. 12 is a view similar to Fig. 11 but showing the feed means advanced one step; and

Fig. 13 is an enlarged view showing the feed means of the invention as mounted on a refrigerator door.

The cup feeding means of the present invention while susceptible to a number of uses is particularly adapted for the use in a dispensing apparatus, such as that disclosed in our application Ser. No. 537,658 filed May 27, 1944, patented September 2, 1947, No. 2,426,707. Thus, the apparatus disclosed in this application may be substituted for the apparatus mounted on the refrigerator door in the above application.

Referring in detail to the drawings, and at first more particularly to Figs. 1 through 8, the cup feeding means of the invention there shown comprises a base 10 suitably mounted on the inner

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side of a refrigerator door, fragmentarily shown in Figs. 7 and 8, and there designated D. Supported on the base 10 are four vertical structures, generally designated 11, 12, 13 and 14, respectively. These structures are arranged in spaced relation and the pair of structures 11 and 12 comprise parts of a cup feeding means while the pair of structures 13 and 14 comprise parts of a second cup feeding mechanism.

The vertical structures 11, 12, 13 and 14 are similar and a description of one pair of such structures will apply to the other, and for this reason the same reference characters are used, with respect to the individual parts of the different vertical structures. Thus, vertical structure 11 comprises a front guide 15 and a rear guide 17 while vertical structure 12 comprises a front guide 16 and a rear guide 18. For the purpose of further description, it is here noted that vertical structure 13 is a duplicate of structure 11 and that vertical structure 14 is a duplicate of the structure 12.

The respective front and rear guides 15 and 17 are disposed against or separated by a spacing means or block 19, comprising an elongated relatively thick block having its sides parallel in its upper portion and tapering off as at 19a in its lower portion. A somewhat similar separating means at 20 is located between the front and rear guides 16 and 18 of vertical structure 12 and this means 20 has parallel sides in its upper edge portion and in its lower portion is inclined as at 20a. All of the various front and rear guides are of the same construction and each is generally U-shaped in transverse section and includes an intermediate or connecting wall 22 and side walls 21 and 23 at opposite edges of said wall 22.

In making up any one of the vertical structures, a pair of guides 15 and 17, or 16 and 18, are arranged with their open sides in opposing relation at opposite sides of the separating means or blocks 19 or 20, as the case may be. The guides extend laterally and have their flanges or wall portions 21 and 23 laterally of the separating means and thus, together with the separating means (see Fig. 6) define paths or grooves 24 extending down at one side of the separating means and between the edge portions of said separating means and the wall 21 and passing under the separating means and up the other side of the latter and the inner side of the wall 23.

Mounted in or on the upper portions of the separating means 19 and 20 are shafts 25, each of which at the respective outer and inner vertical edges of the upper portions of the separator

means mount sprockets 26 and 27. The purpose of these sprockets is to drive chain feeds for feeding the paper cups, as well be hereinafter more particularly set forth.

Thus, in the drawings, a chain A passes about the separating means 19 while a similar chain B passes about the separating means 20. Chains A and B comprise complemental parts of means to support a stack of cups by engagement with the lip portions of the individual cups. These chains are of similar construction and each is made up of a series of links 29. Each such link in edge elevation comprises a pair of finger or flange-like portions 30 and 31 (see particularly Fig. 5) extending in parallel relation and at their inner edges connected by a series of loop portions 32, 33 and 34 (Figs. 3 and 4).

Fingers 30 and 31 are spaced as shown at 35 and this space is for the reception of the bead portion of a paper cup, as will appear. Between the loop 32 and the loop 33 there is a space 36 and between the loop 33 and loop 34 there is a space 37 resulting from the cutting away of material. Opposite such cutaway portions are extensions 40 and 41, the end portions of which are formed or rolled into loops or eyes 42 and 43 respectively, and which loops or eyes function as bearings in the assembled chain.

At the ends of folded portions of the various links, eyes or cylindrical bearing portions 38 and 39 are formed and by a comparison of Figs. 3–5, it will be noted that such bearing portions are radially offset with relation to the bearing portions 42 and 43. In assembling the links into a chain, the links are disposed with the finger portion 30 of one link against the finger portion 31 of the next adjacent link and this disposes the loops 42 and 43 of one link in the openings 36 and 37 of the other link and in alignment with the bearings or eyes 38 and 39 of such other link. Then a combined connecting and bearing pin 28 is passed through these aligned portions and pivotally secures the pair of adjacent links together. The operation is repeated until a chain of the desired length is provided.

The pins 28 extend beyond the lateral edges of the links and when the assembled chain is in use the end portions of these pins act as guide and feeding means and operate in the channels or paths 24 and also are received between the teeth of the sprockets 26 and 27 so that as said sprockets are turned the chain will be fed about the separating means 19 or the separating means 20, as the case may be.

When the chains are in place it is noted particularly by reference to Fig. 2 that the inner or opposing portions of chains A and B extend substantially vertically and that the fingers 30 and 31 of the individual links of said chains are disposed substantially horizontally. Where the links pass about the lower ends of the portions 19 and 20, respectively, the links pivot sharply relative to one another, and then as they start up the outer sides of said separating members, the links move back more into parallel relation.

This is best illustrated by reference to links E, F, G and H in Fig. 2. There it will be noted that the lower pair of horizontal links E of the chains A and B are supporting the lowermost of the cups 66 by receiving the bead of said cups between their fingers 30 and 31. However, the next movement of the chains will result in the links E assuming the position of links F and from such positions, it will be clear that the links F have discharged a cup. As the chains move progressively the next position of the links is as of G, then at H, and at H it will be noted that the links in the vertical row or as they move up the outer inclined surface of the separating members 19 and 20, respectively, come into parallel relation again. This subject will later be explained more in detail as the operation of the complete machine is considered.

The upper ends of the vertical constructions 11 and 12 and the vertical constructions 13 and 14 are tied together by cross plates or brackets 44 which, through depending posts or studs 45, support locating plates 45 in positions between the upper portions of the respective pairs of chains. The purpose of the plates 45 is to facilitate loading of the cup dispensers. For such purpose, a stack of cups is moved horizontally through the open front side of the device into the space between the pair of vertical constructions 11 and 12 or the pair of vertical constructions 13 and 14. The upper edge of the uppermost cup is against the under face of a locating plate 45 and then the stack of cups is simply pushed laterally into place. As this happens, the beads of the cups are received between the finger portions 30 and 31 of the respective links 29.

The chains may be operated in any desired manner but here the operation is shown as controlled by solenoid 53. To the desired end, brackets 47 are mounted on the rear guides 17 and 18 and such brackets include or support bearings 48 mounting a main shaft 49 extending along the rear of the vertical structures 11 through 14. On the shaft 49 are a series of bevelled gears 50 meshing with bevelled gears 51 on the shafts 25.

A bracket 52 mounts the solenoid 53, the armature 54 of which extends vertically. 55 is a T-shaped portion on the armature 54 and the same is provided with a rectangular slot 56 receiving and guiding a slide 57 to which is attached one end of a lever, generally designated 58. This lever includes a hub portion 59, a hub portion 60 and a third hub portion 61, the latter being turnable on the shaft 49. 62 is a stud or screw securing the hub portion 59 of lever 58 to the slide 57, while 63 is a similar stud or screw securing a ratchet pawl 64 to the hub 60 of the lever. 65 is a ratchet wheel mounted on the shaft 49.

With the described construction, the cups 66 in stacks are mounted by and located between the pair of chains A and B of the uprights 11 and 12, and between the chains A and B of the uprights 13 and 14. The parts are so set that the feed of one of the pairs of chains is one-half a step ahead of the feed of the other pair of chains. Therefore, when the solenoid 53 is operated and shaft 49 is given a predetermined movement, the chains of the uprights 13 and 14 will be fed to dispense a cup, as the cup 67 in Fig. 2, while the chains of uprights 11 and 12 will be advanced to position a cup ready for dispensing, as for example, the lowermost cup of the stack 66 in the left hand portion of Fig. 2.

When the solenoid is next operated the lowermost cup will be fed from the stack in the left in Fig. 2 while the stack to the right in said figure will be advanced but will not feed a cup, although the lowermost cup of such stack will be dispensed in the next succeeding operation of the solenoid. The base 10 is provided with cutouts 68 and 69 whereby the dispensed cup may fall through the base for reception in any suitable manner, as for example, as disclosed in our patent application above mentioned.

It is the present plan that when an attendant renews the supply of material to be dispensed in a dispensing machine with which the present cup feeding means will be used, he will see that the cup feeding mechanism has a full supply of cups. In other words, he will not leave a small supply of cups in each side of the present feed devices. To facilitate the removal of a broken lot of cups in order that he may replace them with a full stack, means are provided for pushing a portion of a stack of cups forwardly with respect to the different pairs of chains.

To this end brackets 70 and 71 are mounted on the door D and pivoted on the respective brackets are levers 72 and 73, each including a handle portion 74 and an arm 75 equipped with a vertically disposed blade 76. The handles 74 extend into the intermediate space between the vertical structures 12 and 13 while the blades 76 are disposed in the rear of the respective stacks of cups.

Clearly, by reference to Figs. 7 and 8, it will be seen that when the operator reaches in and pushes backwardly on either handle 74 the lever 72 or 73 will be rocked as from the position of Fig. 7 to the position of Fig. 8 and the blade 76 will push the entire stack of cups, or any part of a stack of cups, forwardly between the vertical structures 11 and 12, or 13 and 14, as the case may be, so that such stack of cups is easily removed from the machine. This obviates the necessity for the operator to reach into a cup or to come in contact with any part other than the exterior of a cup, which may later be used.

Referring now to Figs. 9 through 13, there is disclosed a modified means for feeding the cups. However, in this modification some of the parts previously illustrated are used and where such is the case, said parts are referred to by the previously used reference characters.

Referring in detail to the modified structure, mounted on the base 10 are four upright structures comprising two pairs of which the uprights 80 and 81 comprise one pair and 82 and 83 the second pair. Each upright at its upper end has an inwardly disposed portion 84 and then an upwardly directed portion 85. Mounted by the upright 80 and located between the base 10 and the portion 84 of such upright is a feed screw or worm 86. A companion to such screw is designated 87 and associated with the upright 81 and is located between the part 84 of the latter and the base 10.

Similarly feed screws 88 and 89 are associated with the uprights 82 and 83. It is to be understood that the feed screws 86 through 88 each include an extension or shaft portion 90, while the feed screw 89 includes a similar but longer portion or shaft 91. Mounted on the upper ends of the shaft 90 are bevelled gears 92 and a bevelled gear 93 corresponding with the bevelled gears 92, and in the same vertical relation to the base 10, is mounted on the intermediate portion of the shaft 90.

On the upper portion of said shaft 90 is a fairly large diameter spur gear 94. A shaft 95 is mounted for turning movement in the vertical portions 85 and has attached to it a series of bevelled gears 96 meshing with the bevelled gears 92 and a similar bevelled gear 97 meshing with the bevelled gear 93. The entire described mechanism as well as the pair of levers 75 are all mounted on a door 98 of a refrigerator cabinet, such as the door in our application above identified.

When this door is closed the spur gear 94 is meshing with a similar gear 99 secured to the inner end of a shaft 100, which shaft passes through the top or upper wall 101 of a refrigerator cabinet. The relationship of the parts is such that when the door 98 is closed the spur gear 94 is meshing with the spur gear 99 and may be rotated from the latter, the latter being driven by mechanism located on the upper side of the wall 101. Such mechanism may be the same or similar to that disclosed in our above mentioned application, although the particular mechanism used is not controlling and is not here illustrated.

When the shaft 95 is turned it will be clear that the pair of feed screws 86 and 87 and the pair of feed screws 88 and 89 will be turned about their respective longitudinal axes. Feed screws 86 and 87 comprise a complemental part of means to support a stack of cups by engagement with the lip portions of the individual cups. The same is true of screws 88 and 89. A stack of cups is mounted by each pair of feed screws, the beads 102 of such cups being received in the threads of the feed screws.

Preferably the lead of the feed screws or the center distances of the threads thereof are such that the cups are loosened from their usual or resting positions and so are freed somewhat of one another. Now, with respect to Figs. 10, 11 and 12, it will be noted that the cups held by the screws 86 and 87 may not move downwardly since the lead or lower thread portion 103 of each such screw is under the bead of the cup.

However, another one-half turn of each of said screws 86 and 87 will result in the dispensing of the lowermost cup held by them. In actual practice, one of the pairs of feed screws is set one-half step ahead of the other and thus by reference to the right hand portion of Fig. 10 and Figs. 11 and 12, it will be noted that while the screws 86 and 87 are yet supporting all cups, the screws 88 and 89 have advanced so that their lead or end portion has passed from under the lowermost cup 104 and the same is dropping away from the stack. Each feed screw includes a sharply downwardly cammed portion 105 and the purpose of this arrangement is to forcefully push downwardly on the lowermost cup 104 as the feed screws complete their partial movement, provided said lowermost cup has not freely fallen away from the stack.

By reference to Fig. 12, it will be obvious that when the screws 88 and 89 have completed their one-half turn, their portions 105 will have advanced so that they will very definitely have cammed downwardly any cup not falling freely from the bottom of the stack. From the above it is to be understood that on the first operation a cup will be fed downwardly from between one pair of feed screws, as the pair 86 and 89, and that on the next operation a cup will be fed downwardly from between the other pair of feed screws, as the pair 86 and 87. The drive for said screws is very simple and while such drive is disconnected when the door 98 is open, this is not objectionable since at such time the machine is not being used. Further, as the door is closed, the gear 94 is automatically brought into mesh with the gear 99 and the device is ready for use.

Having thus set forth the nature of our invention, what we claim is:

1. In a cup feeding device, a base, a pair of upright structures, a pair of chains one on each of said upright structures, said pair of chains

adapted to support cups between them, said chains spaced apart and including means to support independent of one another the cups of a stack of nesting cups between them by engagement with the beads of the individual cups of the stack, means to move said chains to advance the stack of cups and feed a cup from the stack, and a long blade movable into the space between said chains to eject laterally cups supported by the chains.

2. In a device for feeding cups, a horizontal base having a cutout opening downwardly therethrough and through its forward edge, a pair of uprights on said base and located at the respective opposite sides of said cutout, a cup supporting and feeding means comprising a pair of complemental parts of which one is at the inner side of and associated with each of said uprights and is thus located at a side of said cutout, said parts between them adapted to support a nested stack of cups of which the lowermost cups of the stack extend at least partially downwardly through said cutout by engagement with lip portions of the cups at opposite sides of the latter, means to advance said feeding and supporting means to feed cups one at a time from the bottom of said stack downwardly through said cutout, a bracket rearwardly of said feeding and supporting means, an arm pivoted intermediate its ends to said bracket and having one end portion forming a handle extending to the outerside of one of said brackets, a vertically disposed blade on the other end portion of said arm and of substantially the height of said feeding and supporting means above the base, and said blade adapted on rocking of said arm on its pivot by manipulation of said handle to move forwardly and engage any cups between said feeding and supporting means, including lowermost cups partially passing through said cutout, and move such cups in stacked relation, including such lowermost cups forwardly from between said feeding and supporting means and through the open forward edge of the base for removal from the device.

3. In a device for feeding cups, a horizontal base having a cutout opening downwardly therethrough and through its forward edge, a pair of uprights each rigid at its lower end with said base and at its upper end laterally extending, said uprights located at the opposite sides of said cutout, a feed screw at the inner side of each of said uprights and at their lower ends having bearing in said base and at their upper ends in the respective lateral extensions, said feed screws at opposite sides of said cutout and spaced apart to receive a vertically disposed stack of nested cups and to support said cups by reception of portions of the beads of the individual cups between threads of the screws with portions of the lowermost cups extending downwardly through said cutout, means for rotating said screws in unison to feed said cups downwardly through said cutout, a bracket rearwardly of said screws, an arm pivoted intermediate its ends to said bracket and having one end portion extending to the outer side of one of said uprights forming a handle, a vertically disposed blade on the other end portion of said arm and of substantially the height of said feed screws and disposed to move forwardly and engage any cups between said screws, including lowermost cups partially passing through said cutout, and move said cups in stacked relation, including such lowermost cups forwardly from between said screws and through the open forward edge of the base for removal from the feeding device.

4. In a cup feeding device, a base, a pair of upright structures, a pair of chains one on each of said upright structures, said pairs of chains adapted to support cups between them, said chains spaced apart and including means to support independent of one another the cups of a stack of nesting cups between them by engagement with the beads of the individual cups of the stack, means to move said chains to advance the stack of cups and feed a cup from the stack, means movable into the space between said chains to eject laterally cups supported by the chains, and said last means comprising a manually operable pivoted lever having a long blade movable into the space between said chains and of a length substantially equal to the height of a stack of cups when supported by said chains.

5. In a device for feeding cups, a horizontal base having a cutout opening downwardly therethrough, feed screws, said feed screws mounted at opposite sides of said cutout and extending vertically and spaced apart to receive a vertically disposed stack of nested cups to support said cups by reception of portions of the beads of the individual cups between threads of the screws with portions of the lowermost cups extending downwardly through said cutout, means for turning said screws in unison to feed said cups downwardly through said cutout, and said cutout opening through the lateral edge of said horizontal base whereby a nested stack of cups of the height of said feeding screws may be moved into the latter by a lateral movement of such stack as the lower portions of the lowermost cups of the stack move into said cutout through its open lateral edge.

6. In a cup feeding device, a base, a pair of upright structures on said base in spaced relation, each of said structures including an elongated vertically disposed means, said means of one structure arranged with its front face in opposed parallel relation to the means of the other structures, endless chains over each of said structures, each of said chains comprising links each having stiff parallel finger portions adapted to receive portions of a bead of a cup whereby the two chains are adapted to support independent of one another the cups of the stack between them with the opposite portions of a bead of a cup between the finger portions of oppositely located links of the respective chains, means to advance said chains in unison, and said parallel finger portions of each link movable in unison whereby as the lowermost finger portions of a pair of opposite links support a cup the uppermost fingers of said links serve to force said cup to move along with the chains.

7. In a cup feeding device, a base, a pair of upright structures on said base in spaced relation, each of said structures including an elongated vertically disposed means, said means of one structure arranged with its front face in opposed parallel relation to the means of the other structure, each of said means tapered on its rear side toward its lower end whereby such end is relatively narrow, endless chains over each of said structures and maintained in parallel relation by engagement with the front faces of the respective structures, each of said chains comprising links each having a pair of parallel fingers adapted to receive portions of a bead of a cup whereby the two chains are adapted to support independent of one another the cups of a stack of cups be-

tween them with the opposite portions of a bead of a cup between the finger portions of a pair of oppositely located links of the respective chains, said links located closely adjacent in the chains and pivoted one on the other whereby as the links pass along the front face of said means the finger portions of the links are substantially normal to such face and as the links pass about the reduced lower end portions of the means the links pivot sharply on and relatively to one another, means to advance such chains in unison to feed such cups one at a time from the stack, and said fingers relatively stiff and each pair movable with its link whereby the lowermost fingers of the pairs support the cups and the uppermost fingers of the pairs bearing on the upper edges of the beads of the cups force the latter to move with the chains and force the lowermost cup of a stack from the next lowermost cup thereof to dispense said lowermost cup as the links pass about the reduced lower end portions of said means.

8. The device as in claim 7 including pins pivotally connecting the adjacent links and extending beyond the longitudinal edges of the chains, sprocket wheels supported by and positioned at the sides of said means and receiving the end portions of said pins, and said means to advance said chains in unison comprising means whereby said sprocket wheels are intermittently turned.

9. A chain for the purpose specified comprising a plurality of links each formed of metal and comprising a pair of parallel fingers, a pair of spaced bearings at the rear of said fingers and substantially in alignment therewith and comprising connecting means connecting said fingers into a unit, and a second pair of bearings laterally offset with respect to said fingers and in a plane with the first bearings which plane is normal to the planes of the fingers and adapted in the assembled chain to register with the first mentioned bearings of a next adjacent link and to be pivotally connected therewith by a pin passing therethrough and through such bearings of said next link.

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