May 19, 1936. J. A. JOHNSON 2,040,851

FEEDING MEANS FOR RECEPTACLE CLOSURE CAPS

Filed Aug. 31, 1934 2 Sheets-Sheet 1

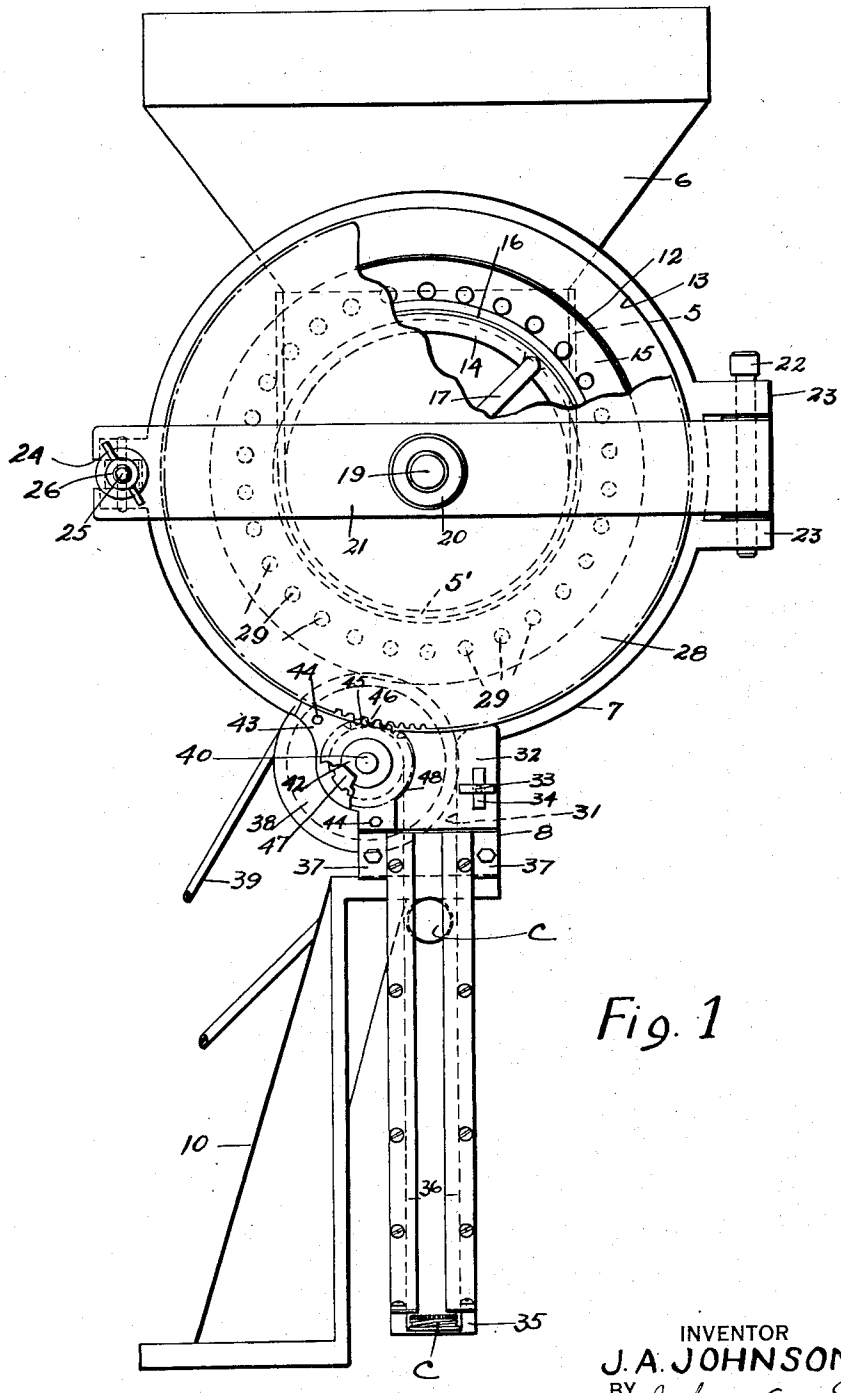



Fig. 1

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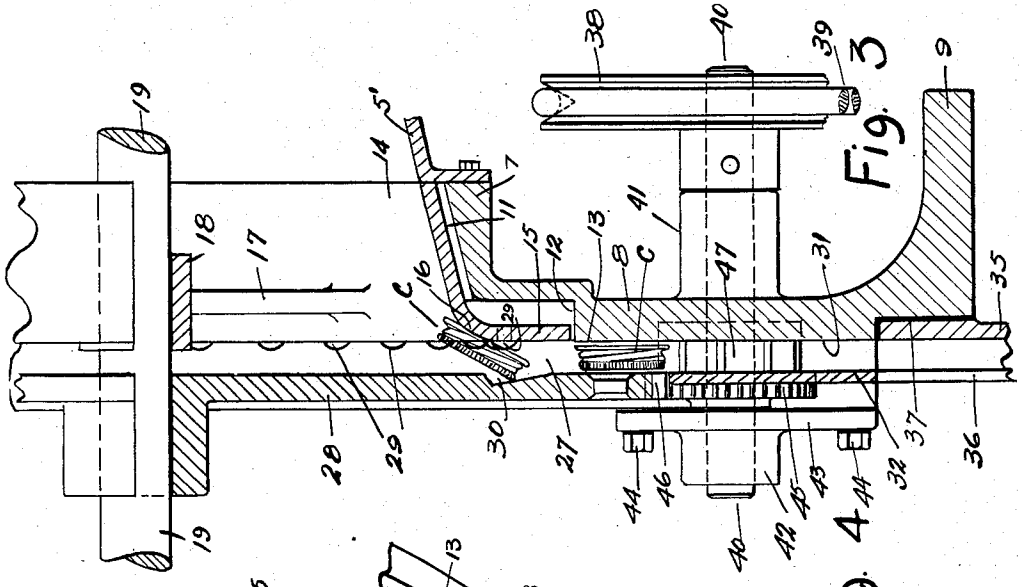


Fig. 3

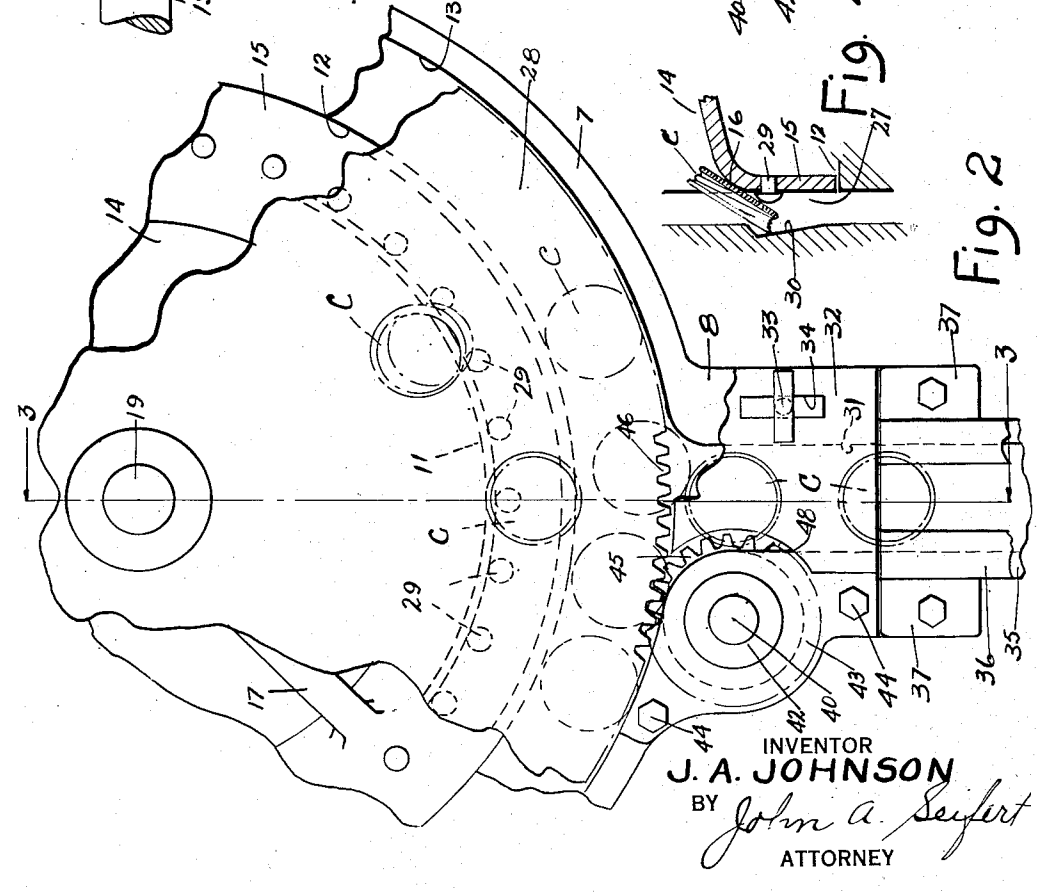


Fig. 2



Fig. 4

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# UNITED STATES PATENT OFFICE

2,040,851

## FEEDING MEANS FOR RECEPTACLE CLOSURE CAPS

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11 Claims. (Cl. 226—88.1)

This invention relates to apparatus for feeding receptacle closure caps in predetermined position to apparatus for assembling liners in the caps or to apparatus for applying the closure caps to receptacles, and particularly for feeding closure caps having the skirt screw threaded for interlocking engagement with corresponding screw threads about the mouth of the receptacle.

It is the principal object of the invention to provide feeding means that will select and permit delivery of only caps facing in a predetermined direction without the use of excessive and complicated arrangement of parts.

Other objects and advantages will hereinafter appear.

The invention embodies a hopper casing having a bottom declining to an open end thereof and a rotatable drum having an annular flange at the outer end arranged with a series of protuberances to engage and direct the caps leaving the drum at an angle inclining toward the side into engagement with an annular groove in a disk rotatably mounted in spaced relation to the flange of the drum, the groove and protuberances permitting passage of the caps between the drum flange and disk only when the caps engage the groove at a predetermined angle. The caps passing between the drum flange and disk enter a delivery chute under the influence of a revolving wheel and are delivered to the designated apparatus.

In the drawings accompanying and forming a part of this application, Figure 1 is a front elevational view of the apparatus with a portion of the disk broken away to show the arrangement of the protuberances on the drum flange.

Figure 2 is a fragmentary view, on an enlarged scale, showing a driving connection, and in dotted lines a cap passing a protuberance on the drum flange and the disk groove, and a cap being retained by a pair of protuberances.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 2 looking in the direction of the arrows and showing a cap in proper angular relation to the disk groove to pass between the disk and drum flange; and

Figure 4 is a fragmentary view in section of the disk groove and a protuberance on the drum flange showing a cap in improper angular relation with the disk groove.

In carrying out the invention illustrated in the drawings, there is provided a hopper comprising a casing 5 having an arcuate bottom inclining, as shown at 5' in Figures 1 and 3, and one end open with the upper portion of the casing being arranged with a funnel shaped member 6. The hopper is mounted in elevated relation to the apparatus to which the caps are to be fed by an annular or ring portion 7 of a bracket 8 arranged with a base portion 9 engaged and secured upon a pedestal or standard 10 adapted to be mounted on or relative to said apparatus, not shown, to which the caps are to be fed. The ring 7 is composed of a series of connected portions of progressively increased diameters, as indicated at 11, 12 and 13.

The closure caps C illustrated in the present instance as having the skirt portion screw threaded are supplied to the hopper from the member 6 and by the formation of the bottom of the casing 5 they move by gravity toward the open casing end and ring 7 where they are tumbled about to place them in sidewise position by a drum 14 of conical form and of a diameter slightly less than the ring portion 11 which has a wall thereof extending parallelly to the wall of the drum. The end of larger diameter of the drum is flanged outwardly to an extent to be fully engaged in the ring portion 12 with the outer surface thereof flush with the surface of the bottom wall of the ring portion 13, as at 15 in Figure 3. In forming the flange 15 there is arranged an arcuate surface at the outer edge of the drum, as at 16, which will cause the caps extending parallelly of the wall of the drum to leave the drum at an angle inclining toward the side, as clearly shown in Figure 3. The drum 14 is rotatably mounted in the ring 7 with the wall thereof extending flush with and as a continuation of the bottom wall of the casing 5 by a series of spokes 17 diverging inwardly from and intermediate the ends of the drum and terminating in a hub 18 engaged on and fixed to a shaft 19.

The drum 14 is adjustable away from and into the ring 7 to facilitate inspection and replacement of parts by rotatably mounting the shaft 19 in a bearing 20 centrally of an arm 21 pivotally mounted at one end by a headed pintle 22 between a pair of spaced ears 23 projecting laterally from the ring 7. The drum is retained in position in the ring by a bifurcation 24 in the end of the arm opposite the pivoted end to be releasably engaged by a hasp 25 pivotally mounted on the ring 7 diametrically opposite the ears 23, the hasp being in the form of a bolt having screw threaded thereon a wing nut adapted to be adjusted to abut the arm bifurcation 24 with an interposed washer, as at 26 in Figure 1.

The flange end 15 of the drum is closed and arranged with an annular passage 27 of a width slightly greater than the height or depth of the

caps to permit the caps to pass through said passage from the drum only in sidewise vertical position. The passage 27 is formed by a plate or disk 28 of a diameter slightly less than the diameter of the ring portion 13 to permit free rotation of the disk within said portion and said disk is rotated simultaneously with the drum by fixedly mounting the disk on the shaft 19. The peripheral portion of the disk 28 forms an annular recess of rectangular shape in cross section with a corner section of the ring portion 13, as shown in Figure 3, in which the caps are engaged by the rotation of the drum and disk to position the caps sidewise for ready discharge of the same from the hopper, as hereinafter set forth in detail.

To deliver the caps in a predetermined position, in the present instance with the open end or face of the caps lowermost to be fed to apparatus for applying the caps to receptacles, the caps leaving the drum with their open end facing the arcuate edge 16 of the drum will be permitted to enter the passage 27 and the rectangular recess formed by the peripheral portion of the disk 28 and the corner section of the ring portion 13, and the caps having their closed end engaging the arcuate edge 16 will be detained in the drum and dislodged from such position by the continuous rotation of the drum and disk. This selective delivery of the caps is accomplished by providing the drum flange 15 with a circular series of equidistantly spaced protuberances in the form of pins 29 fixed in the flange and having rounded heads exposed on the outer face of the flange with the distances between the heads less than the diameter of the caps to be fed by the hopper, as clearly shown in Figure 2. The heads of the pins co-operate with the arcuate edge 16 of the drum to position the caps having their closed end lowermost to extend toward the side at a predetermined angle, as shown in Figure 4. The face of the disk 28 opposite the drum flange 15 is arranged with an annular groove 30 of V-shape in cross section with the inner side thereof extending at an acute angle to the horizontal and the outer side of approximately four times the length of the inner side extending at an obtuse angle from said inner side, as clearly shown in Figures 3 and 4. An edge of the open end of the caps having their closed end or bottom engaged by the arcuate drum edge 16 and protuberances 29 will engage a point on the outer longer side of the groove 30 opposite the point of contact between the cap bottom and the protuberance 29, preventing further outward movement of said caps between the drum flange and disk, as shown in Figure 4. The caps with their open end facing the arcuate drum edge 16 will be placed by the rotation of the drum and disk to engage over a protuberance 29, as shown in dotted lines in Figure 2, whereby the cap will be inclined toward the side to engage the outer side of the groove 30 far out of line with the point of contact between the cap and arcuate drum edge 16, permitting the cap to readily pass over the protuberance into the passage 27, as shown in Figure 3.

It will be noted that should the caps be positioned between and engaged by two adjoining protuberances, as shown in dotted lines in Figure 2, either with the open end facing toward or away from the disk 28, said caps will not enter passage 27 as they will be engaged between opposite points on the outer side of the groove 30 and the pair of protuberances.

The caps entering the passage 27 pass into a passage formed by a channel 31 in the front face of the bracket 8 covered by a plate 32 releasably retained on the bracket by a pin 33 rotatably mounted in the bracket to engage an elongated opening 34 in and adjacent a side edge of the plate and said pin having a head corresponding to the shape of the opening but of smaller dimensions whereby the plate may be readily engaged or removed from the retaining pin when the head is in register with the opening, the adjusting of the pin with the head extending transversely of the opening will retain the plate on the pin. The removable mounting of the cover plate 32 will facilitate the inspection and removal of caps in the passage 31.

The passage 31 communicates with a chute 35 of the usual channel shape in cross section with guide and retaining rails 36 fixed to the side walls of the channel, as shown in Figure 1, the upper end of the chute having opposite lateral extensions 37 secured in a recessed portion in the front face of the bracket 8, as shown in Figure 3. The lower end of the chute is curved to extend in a horizontal plane and in the present instance position the caps with the open end lowermost in position to be fed to apparatus for applying caps to receptacles. If it is desired to feed the caps to apparatus for assembling lining pads in the closure caps the lower end of the chute is curved to extend in the opposite direction from that shown in the drawings of the present application to position the caps with the bottom or closed end lowermost.

To tumble and agitate the caps in the drum 14 to position the caps to enter the passage 27, the drum and disk 28 are simultaneously and continuously rotated from a suitable source of power, such as an electric motor (not shown) by a peripherally grooved pulley 38 connected to and driven from the electric motor by a belt 39 engaged around said pulley and a pulley on the shaft of the motor. The pulley 38 is fixed on an end of a shaft 40 rotatably mounted in a boss 41 projecting from the rear face of the bracket 8 and a boss 42 of a plate 43 fixed to the ring member 7 and a raised portion of the front face of bracket 8, as by bolts 44, as clearly shown in Figure 3. Between the plate 43 and the bracket 8 there is provided a space to permit the mounting of a pinion 45 on the shaft 40 to mesh with gear teeth 46 arranged about the periphery of the disk 28 to positively actuate the drum and disk.

In the continuous operation of the feeding apparatus there will be an accumulation of caps in the passage 27 that have passed the protuberances 29 and the annular groove 30. To urge said accumulated caps into the passage 31 said caps are agitated through the revolving of a wheel 47 fixedly mounted on the shaft 40 within a recess in the bracket 8 adjacent the pinion 45 as shown in Figure 3. The periphery of the wheel 47 may be serrated as indicated in Figures 1 and 3 to provide a gripping surface.

A portion of the plate 32 is cut away adjacent the pinion 45 and agitating wheel 47, as at 48, so it will not interfere with the rotation of said pinion and wheel.

While I have illustrated one embodiment of my invention, it will be obvious that various modifications may be made in the construction and arrangement of parts, and that portions of the invention may be used without others and come within the scope of the invention.

Having thus described my invention, I claim:

1. In closure cap feeding means, a casing having an open end, a tapering drum rotatably

mounted in the open end of the casing and having a curved edge at the larger end to direct the caps from the drum in sidewise inclined position, a disk rotatable in spaced relation to the drum to engage the caps leaving the drum and permit passage of said caps sidewise to the space between the drum and disk, and means arranged on the outer side of the curved edge of the drum to engage and direct the caps with the closed end lowermost to abut the disk at an angle preventing said caps from passing between the drum and disk.

2. In closure cap feeding means, a casing having an outlet opening, a tapered drum rotatably mounted at the outlet opening having a flange extending laterally from the larger end, a series of protuberances arranged on the outer face of the flange and equidistantly spaced apart distances less than the diameter of the caps to direct the caps leaving the drum to incline sidewardly, and a disk rotatable in spaced relation to the flange at a distance slightly greater than the height of the caps and adapted to co-operate with the protuberances to permit passage of the caps with the open end facing the drum flange between said flange and disk and prevent the passage of caps with the open end facing the disk.

3. In closure cap feeding means, a hopper casing having an outlet opening at one end, a drum of conical form having a flange extending laterally from the larger end thereof and rotatably mounted with the opposite end at the outlet opening of the casing, a series of protuberances equidistantly spaced on the outer face of the flange, and a disk rotatable in spaced relation to the flange of the drum and having an annular groove in a face thereof in opposed relation to the protuberances to engage the caps leaving the drum and permit passage of caps extending at a predetermined angle to the groove and engaged over a drum protuberance between the drum flange and disk.

4. Closure cap feeding means as claimed in claim 3, wherein the wall of the groove in the disk engaged by the caps extends at an acute angle toward the drum flange.

5. In closure cap feeding means, a hopper casing having an outlet opening at one end, a chute extending from the outlet opening, a drum having an annular flange extending laterally from one end thereof and rotatably mounted in the outlet opening with the flange flush with a wall of the chute, a series of protuberances equidistantly spaced about the drum flange, and a disk rotatable in spaced relation to the flange and flush with a wall of the chute opposite to the wall flush with the drum flange and having an annular groove in a face thereof in opposed relation to the protuberances to engage the caps leaving the drum and cooperate with the protuberances to permit predeterminedly positioned caps to pass between the disk and drum flange and enter the chute.

6. Closure cap feeding means as claimed in claim 5, wherein the axes of rotation of the drum and disk are in vertical alinement with the chute to assure the ready discharge of the caps from the hopper.

7. In closure cap feeding means, a hopper casing having an outlet opening at one end, a shaft rotatably mounted centrally of the outlet opening, a drum fixed on the shaft to rotate in the outlet opening and having a series of protuberances equidistantly spaced about the outer end thereof, a disk fixed on the shaft in spaced relation to the drum and having an annular groove in a face thereof in opposed relation to the protuberances arranged to engage caps leaving the drum and permit passage of caps engaging the groove at a predetermined angle between the drum flange and disk, and driving means connected to the disk to rotate simultaneously the drum and disk.

8. Closure cap feeding means as claimed in claim 3, wherein the groove in the disk is of V-shape in cross section.

9. In closure cap feeding means, a casing having an opening in one end, a bracket having an annular portion upon which the casing is mounted at the open end, a chute in the bracket, a drum rotatable in the annular portion of said bracket with one end juxtaposed to the casing opening adapted to receive caps from the casing and having protuberances equidistantly spaced about the outer end opposite the end juxtaposed to the casing opening, and a disk spaced a predetermined distance from the outer end of and rotatable with the drum and in conjunction with a portion of the bracket form an annular channel adapted to receive caps in sidewise position and communicating with the chute in the bracket, said disk having a groove in the face thereof opposed to and co-operating with the protuberances to permit of a cap engaging over a protuberance to enter between the drum and disk and delivery thereof to the chute.

10. In closure cap feeding means, a casing having an opening in one end, a rotatable drum having one end juxtaposed to the casing opening and adapted to receive caps therefrom and having protuberances equidistantly spaced about the opposite end, and a disk spaced a predetermined distance from the opposite end of the drum having a groove in the face opposed to the protuberances to be engaged by a side of the caps and direct caps engaged over protuberances sidewise to the space between the disk and drum.

11. In closure cap feeding means, a casing having an opening in one end with a circular row of protuberances about the open end of the casing spaced apart equal distances less than the diameter of the caps, and a disk spaced from the open end of the casing a distance slightly greater than the height of the caps and having a groove in the face opposed to the protuberances adapted for the engagement of a side portion of the caps and arranged to direct the caps engaging over protuberances to the space between the disk and open end of the casing.

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