Sept. 18, 1945. J. J. KITTESS 2,385,004.

CAPPING APPARATUS

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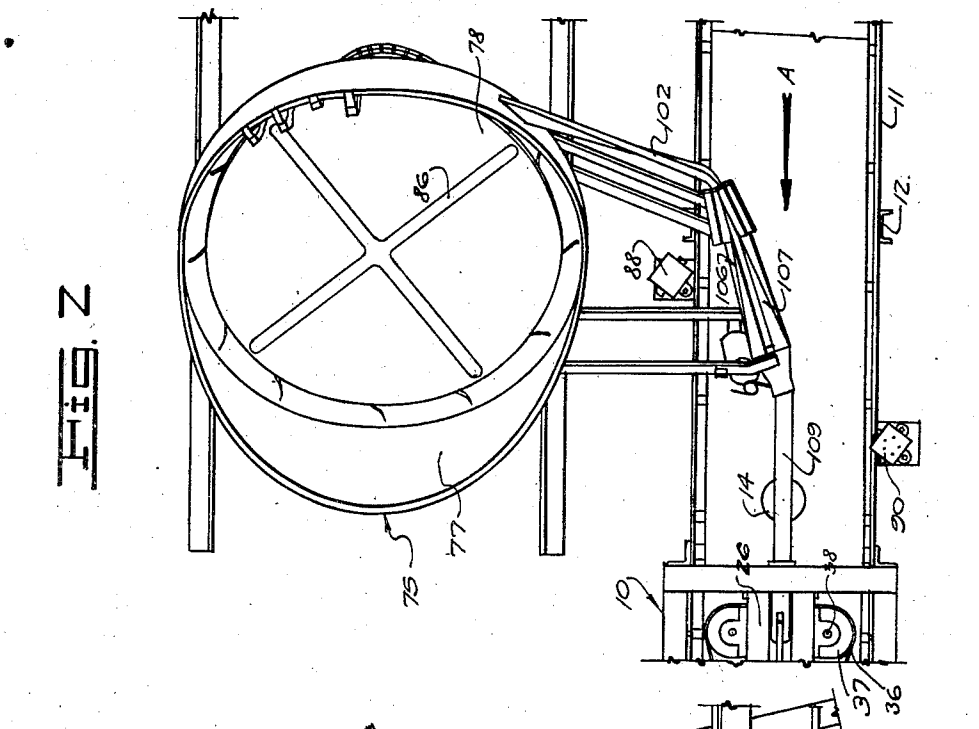


Fig. 2

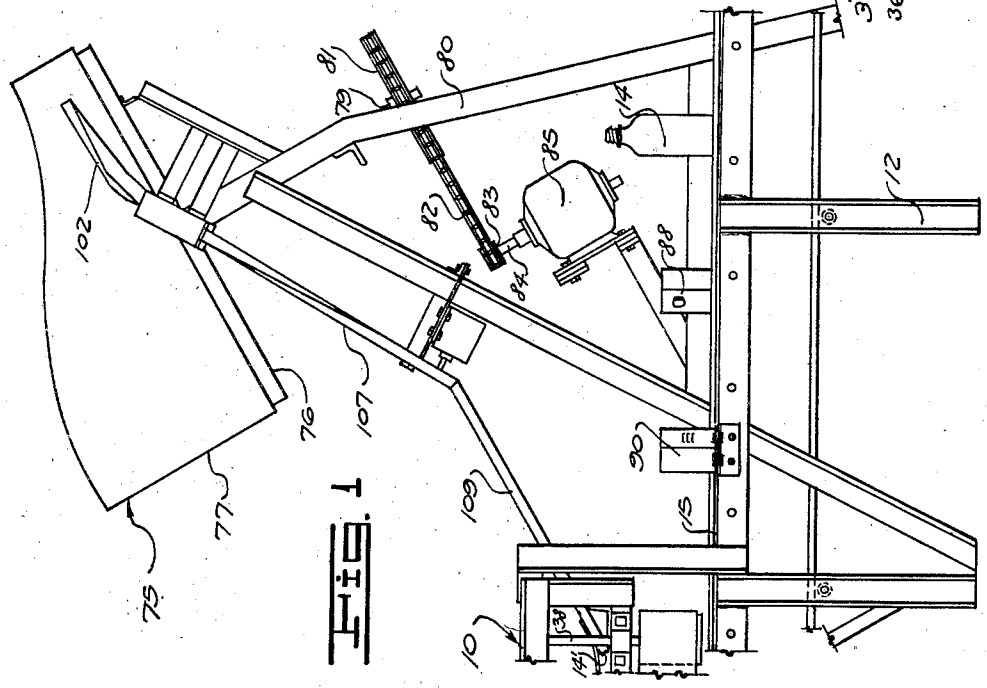


Fig. 1

INVENTOR.
J. J. KITTESS

BY

ATTORNEY

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Fig. 4

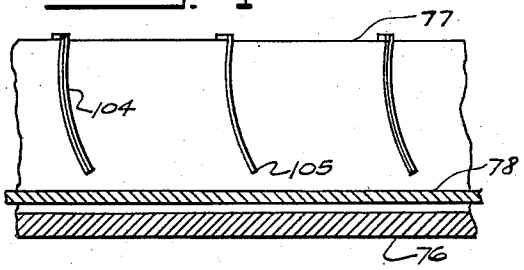


Fig. 3

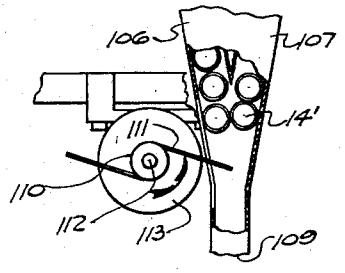


Fig. 10

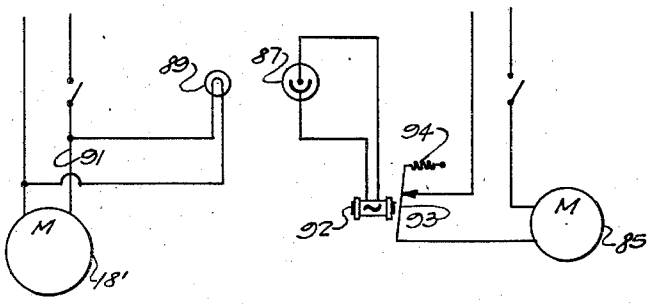
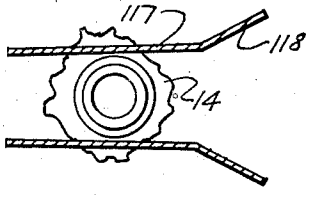


Fig. 11



INVENTOR.
J. J. KITTESS

BY

ATTORNEY

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Fig. 5

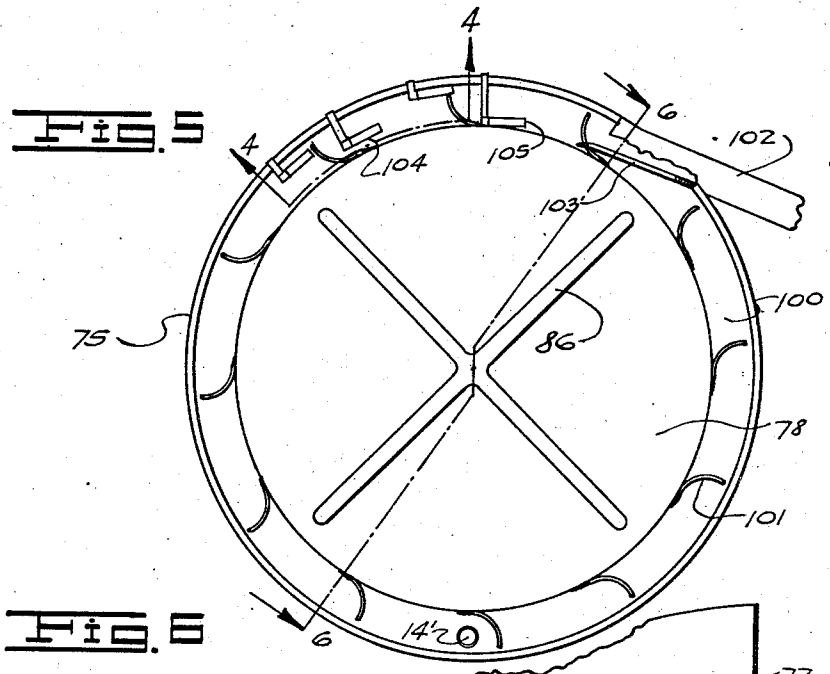


Fig. 6

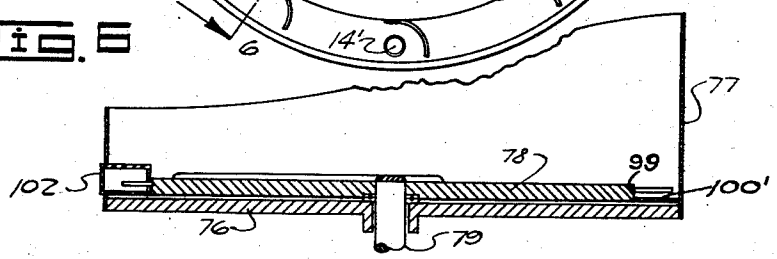


Fig. 7

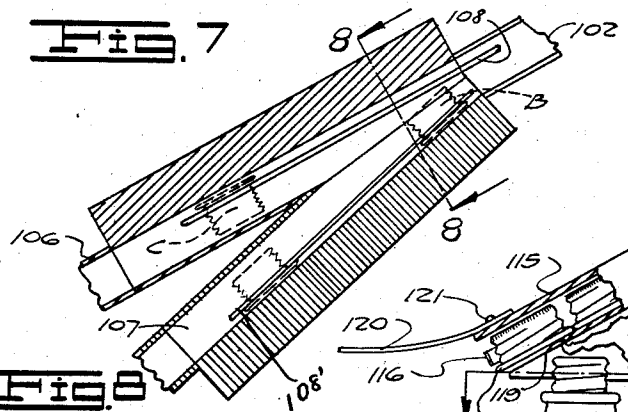


Fig. 8

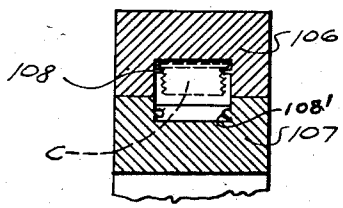
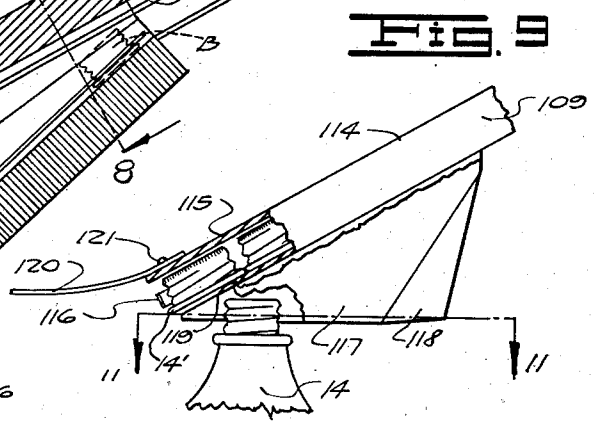


Fig. 9



INVENTOR.
J. J. KITTESS
BY
ATTORNEY

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UNITED STATES PATENT OFFICE

2,385,004

CAPPING APPARATUS

Jason J. Kittess, Los Angeles, Calif.

Application April 25, 1944, Serial No. 532,655

2 Claims. (Cl. 226—88.1)

This invention relates to a capping apparatus.

The general object of the invention is to provide an improved apparatus for feeding closure members.

A more specific object of the invention is to provide an improved bottle cap feeding device.

Other objects and advantages of this invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a side elevation showing an apparatus embodying the features of my invention;

Fig. 2 is a top plan view of the apparatus;

Fig. 3 is a plan view with parts in section showing the bottle cap chute and cap impeller;

Fig. 4 is a sectional view taken on line 4—4, Fig. 5;

Fig. 5 is a top plan view showing the hopper;

Fig. 6 is a section taken on line 6—6, Fig. 5;

Fig. 7 is a sectional detail showing the hopper chute;

Fig. 8 is a section taken on line 8—8, Fig. 7;

Fig. 9 is a fragmentary elevation partly in section showing the lower end of the discharge chute;

Fig. 10 is a wiring diagram, and

Fig. 11 is a section taken on line 11—11, Fig. 9.

This application is a division of application Serial No. 439,374, filed April 12, 1943.

Referring to the drawings by reference characters, I have shown my invention as embodied in a bottle cap feeding apparatus which is indicated generally at 10. The apparatus shown and described is arranged to feed screw caps to bottle capping apparatus, but it will be understood that this reference to screw caps and bottles is for the purpose of illustration only and that the apparatus is adapted to feed various types of closures.

As shown, the apparatus includes a base 11 mounted on suitable legs 12. The apparatus is adapted to feed bottle caps 14' onto bottles 14 which may be transported on a conveyor 15.

The apparatus includes a bottle cap hopper which is indicated at 75. The hopper is supported with its axis inclined as shown in Fig. 1, and the hopper includes a base 76 (Fig. 1) which is shown as round and is surrounded by a side wall 77. The side wall 77 is of greater length on the lower side of the hopper so that the caps will not fall out.

Within the hopper 75 I arrange a disc 78 which is mounted on the shaft 79. The shaft 79 extends downwardly as shown in Fig. 1 and the shaft and hopper are supported on a frame portion 80 which extends upwardly from the base 11 previously mentioned.

The shaft 79 has a sprocket 81 thereon which is engaged by a chain 82. The chain 82 passes over a sprocket 83 mounted on the armature shaft 84 of a motor 85. The construction is such that when the motor 85 is operating the disc 78 will be rotated. The disc 78 on the upper surface thereof is provided with agitating members 86 which are shown as arranged in cruciform shape and which stir the bottle caps which rest upon the disc 78 so that the caps gradually move downwardly in the hopper 75.

In order to control operation of the motor 85 I provide photo electric means including a light sensitive photo electric cell 87 mounted in the housing 88 and a source of light 89 mounted in a housing 90. As shown in Fig. 10 the light source 89 is in the circuit 91 to the motor 18' which drives the conveyor 15 by means not shown so that when the motor 18' operates the light 89 will be illuminated. The light from source 89 passes across the conveyor belt and when uninterrupted energizes the cell 87 which through a magnet 92 opens a switch 93 to the motor 85. When light from the source 89 is interrupted by the presence of a bottle on the conveyor the electro-magnet 92 releases the switch 93 and a spring 94 pulls the switch to on position so that the motor 85 will operate.

The disc 78 is provided with a peripheral cut away or rabbet portion 99. The rabbet 99 together with the adjacent wall of the hopper 75 forms a circumferential groove 100 the bottom of which is the lower wall 100' of the rabbet. In the groove thus provided I mount a series of leaf springs 101 which are attached to the inner surface of the groove and project outwardly as shown in Fig. 5. The leaf springs 101 are arcuate and are adapted to correctly position bottle caps which fall into the groove 100. Most of the bottle caps become positioned so that either their tops or the skirts contact the bottom of the groove and thus they advance to a discharge chute 102 which has an entrance portion 103 substantially tangent to the groove 100.

In order to remove caps which are not resting flatly in the groove 100 I provide a series of springs 104 which are mounted on the wall 77 of the hopper 75 and which project inwardly and downwardly. The springs 104 have an edge 105 which is of such a height that a cap setting flat in the groove 100 will pass under and will be forced down by the springs. A cap which is tilted relative to the bottom of the groove will

either be forced downwardly into the groove or will be discharged from the groove.

The discharge chute 102 twists through 90° and caps passing into this chute move downwardly in the chute to a portion of the chute shown in Fig. 7 wherein the chute is provided with a main portion 106 and a by-pass portion 107. At the junction of the portions 106 and 107 I provide an upper pair of deflecting rails 108 and a lower pair of deflecting rails 108'. These rails are spaced apart a distance slightly greater than the diameter of the cap so that a cap with a skirt directed downwardly for instance—a cap indicated at B in Fig. 7—will engage the rails 108' and will move by gravity down the chute portion 107. Caps with the skirt directed upwardly, as for instance caps C in Fig. 7, will have their flanges engaged by the rails 108 so that they will be directed into the chute 106 in which they will move downwardly.

The chute portions 106 and 107 turn through 90° in opposite directions as they pass to a delivery chute 109. The caps in the chutes 106 and 107 therefore are turned through 90° in opposite directions so that as a result all of the caps pass into the delivery chute 109 in proper position with their tops directed upwardly.

In order to prevent caps from jamming as they enter the main chute 109 I provide a rotary member 110 which includes fingers 111, movable in the direction of the arrow in Fig. 3 to periodically force backwardly bottle caps in the chute portions. To rotate the member 110 it is driven by the armature shaft 112 of a motor 113 which is suitably controlled.

The delivery chute 109 is continued as at 114 and is provided with an exit portion 115. On each side of the exit portion a leaf spring 116 is mounted. These springs 116 are normally spaced apart a distance less than the diameter of the body of the cap so that the springs retain the cap in the position shown in Fig. 9.

Below the chute 114 I provide a guide member which includes depending walls 117. The walls 117 are flared outwardly as at 118 so that bottles advancing on the conveyor 15 if they are at one side or the other of their correct position will be moved by the flaring portion 118 to correct position so that they will pass between the sides 117.

The bottom of the chute portion 114 is cut away at 119 so that a bottle advancing will be in a position to engage the lowermost cap in the chute 114 as shown in Fig. 9.

In the operation of my invention a supply of bottle caps is placed in the hopper 75 and bottles are suitably placed on the conveyor 15. The motors 18', 85 and 113 are placed in operation. The bottles passing across the path of light from the exciter 89 to the photoelectric cell 87 causes the motor 85 to operate so that the hopper is rotated.

The bottle caps are discharged into the chute 102 whence they pass to the chutes 106 and 107 and are delivered to the delivery chute 109. The threaded necks of the bottles, as shown in Fig. 9, engage the inclined caps and pull the caps away from the springs 116. The bottles are guided into the proper position for engaging the caps by the flaring portions 118 of the guide member walls 117.

The bottle caps are applied by belts 36 driven by pulleys 37 on shafts 38 on frames 26.

Having thus described my invention, I claim:

1. A bottle cap feeding apparatus including a support, a hopper on said support, said hopper including a bottom and a cylindrical side wall, said bottom being inclined from the horizontal, a disc disposed above the bottom of said hopper, means to rotatably support the disc, means to rotate the disc, said disc having a peripheral rabbet therein, cap engaging members in said rabbet, resilient means to urge caps into said rabbet, and a discharge chute extending from said hopper, said chute having an entrance portion arranged to receive bottle caps in said rabbet.

2. A bottle cap feeding apparatus including a support, a hopper on said support, said hopper including a bottom and a cylindrical side wall, said bottom being inclined from the horizontal, a disc disposed above the bottom of said hopper, means to rotatably support the disc, means to rotate the disc, said disc having agitating means thereon, said disc having a peripheral rabbet therein, leaf springs attached to the inner surface of said rabbet and projecting outwardly therefrom, said springs being disposed below the plane of the top of said disc, other leaf springs on the wall of said hopper, said other leaf springs having downwardly directed free ends disposed to engage caps in said rabbet, and a discharge chute extending from said hopper, said chute having an entrance portion arranged to receive bottle caps in said rabbet.

JASON J. KITTESS.