July 27, 1943. L. F. BOSCHEN 2,325,102

CLUTCH CONTROL MECHANISM

Filed Feb. 25, 1942

Fig. 1.

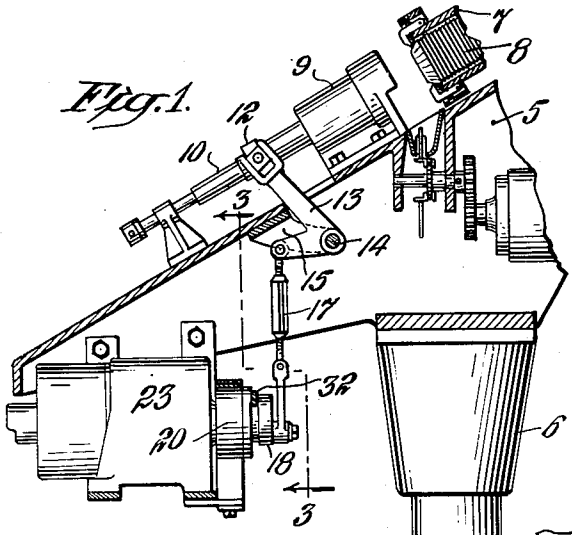


Fig. 2.

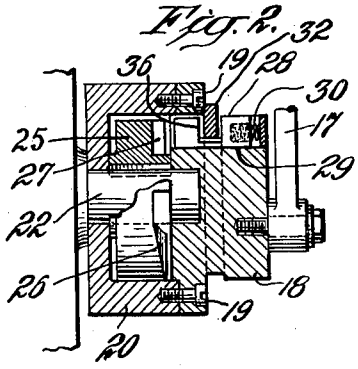


Fig. 3.

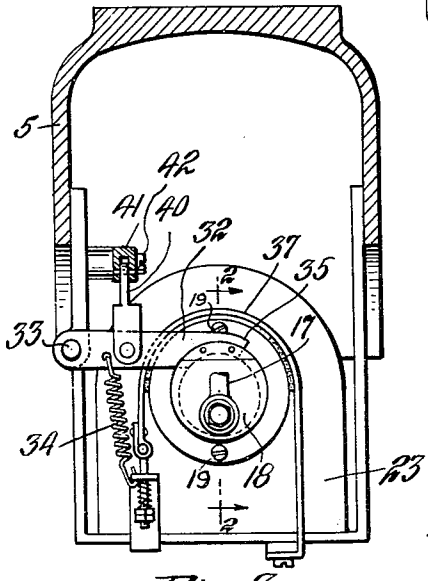


Fig. 4.

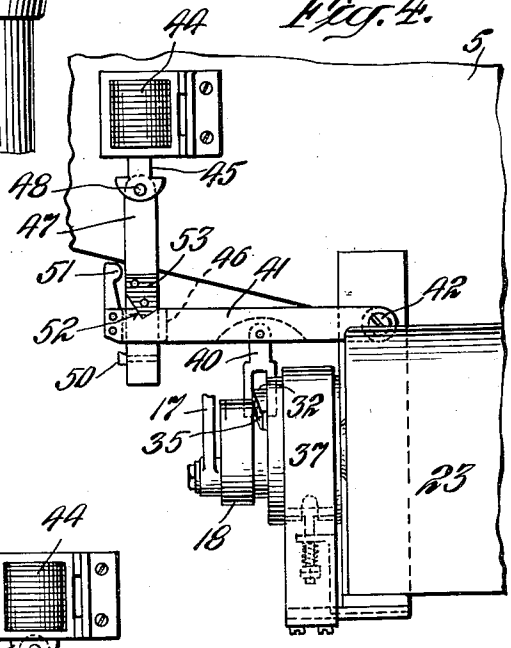
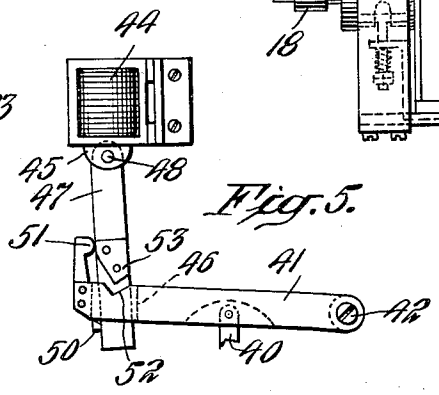


Fig. 5.



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Patented July 27, 1943 2,325,102

UNITED STATES PATENT OFFICE

2,325,102

CLUTCH CONTROL MECHANISM

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Application February 25, 1942, Serial No. 432,186

2 Claims. (Cl. 192—40)

This invention relates to releasing mechanisms for capping machines and the like and has for its object to provide a new and improved mechanical release for an electromagnet-actuated machine element which will prevent false operation of said element under all conditions of use.

Another object of the invention is to provide an electromagnet-actuated element of the above type which is automatically released after each energization of the electromagnet and thereby limits the operation of the machine parts controlled by said element regardless of the length of time the electromagnet remains energized.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

For purposes of illustration the invention will be described in its application to a machine for applying flexible skirted hood caps to milk bottles or the like, such as is disclosed in a copending application of C. W. Goodwin and H. W. Martin, Serial No. 399,280, filed June 23, 1941, for "Capping machine."

A machine of the above type includes a magazine containing stacks of nested preformed caps which are fed into a supply chamber from which they are successively picked by a special picker mechanism and are then advanced along a feed chute until they reach a cap applying station. At the last-mentioned station the caps are successively picked off by the necks of horizontally advancing milk bottles which carry them to a sealing station, where the skirts of the caps are folded around the necks of the respective milk bottles and sealed in place, all of which operations are fully described in the above-mentioned Goodwin and Martin application and form no part of the present invention.

The feed of caps in a machine of the above type is so synchronized with respect to the feed of the milk bottles that the caps are successively fed to the capping station to meet the advancing milk bottles as they pass such station. The picker mechanism, by which the caps are picked, one-by-one from the supply chamber and deposited in the feed chute, includes a bottle-actuated switch actuating a picker solenoid. Each time the solenoid is energized the picker mechanism should operate once, to pick a single cap from the supply chamber and deposit it in the feed chute. However, if the bottle-actuated switch should be held closed too long by a bottle, for example, due to stoppage of the bottle feed or due to the feed operating slowly, the picker mechanism may continue to operate to pick more than one cap from the supply chamber.

The present invention eliminates the foregoing difficulty and prevents more than one actuation of the picker mechanism for each energization of the picker solenoid regardless of the length of time the solenoid remains energized. This is accomplished by means of a novel mechanical release which is interposed between the solenoid armature and a one-revolution clutch or other mechanism which is actuated thereby to operate the picker. This releasable element is operated positively whenever the solenoid is energized, and when so operated it actuates the picker. Immediately after such operation, however, the releasable element is automatically released and returned to its normal position of rest, thus preventing further operation of the picker until the solenoid has been deenergized and then subsequently energized again as by the next succeeding operation of the bottle-actuated switch.

Although the novel features which are believed to be characteristic of this invention are pointed out more particularly in the claims appended hereto, the invention itself may be better understood by referring to the following description, taken in connection with the accompanying drawing forming a part thereof in which a specific embodiment of the invention has been set forth for purposes of illustration.

In the drawing,

Fig. 1 is a side elevation, partly in section, showing a one-revolution clutch mechanism embodying the present invention as applied to a cap picker of the type referred to above;

Fig. 2 is a partial sectional view through the one-revolution clutch, taken on line 2—2 of Fig. 3;

Fig. 3 is a vertical sectional view along the line 3—3 of Fig. 1, showing the one-revolution clutch in front elevation;

Fig. 4 is a side elevation of the picker solenoid, the one-revolution clutch and the interposed mechanical release mechanism; and

Fig. 5 is a detail view showing the solenoid armature and the mechanical release mechanism in elevated position before being released.

In the following description and in the claims certain specific terms have been used for convenience in referring to various details of the invention. These terms, however, are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawing more in detail, Fig. 1 shows a portion of a cap picker of the type dis-

closed in the above-mentioned Goodwin and Martin application and includes a stationary frame 5 attached to a pedestal 6 which is adapted to rest upon the floor in a convenient position with respect to the bottle filling machine.

The frame 5 supports a cap supply chamber 7 into which the preformed caps 8 are fed in a manner disclosed in the said Goodwin and Martin application. The picker mechanism for picking the caps from chamber 7 includes a cylindrical housing 9 mounted on the frame 5, and a sleeve 10 extending outwardly through housing 9 and carrying a collar 12 which is engaged by a forked arm 13 pivoted at 14 to a bracket 15 on the frame of the machine. The arm 13 is attached to a link 17 by means of which the sleeve 10 and associated parts of the picker mechanism are reciprocated.

The picker mechanism is operated by a one-revolution clutch which may be of any standard construction, one form of which is illustrated in Figs. 2, 3 and 4. As shown therein, the link 17 is connected to an eccentric 18 which is attached by means of screws 19 to a housing 20. The housing 20 is rotatably mounted on the shaft 22 of a motor 23. The shaft 22 carries a clutch head 25 having an inclined helical surface 26 terminating in a shoulder 27. A key 28, which slides in a slot 29 in the eccentric 18, is held by a spring 30 in a position to engage the shoulder 27 and thereby cause the eccentric 18 to rotate with the shaft 22. When retracted the key 28 is released from the clutch head 25 and allows the eccentric 18 to stop rotating.

The key 28 is actuated by an arm 32 (Fig. 3) which is pivoted as at 33 to the frame of the machine and is held downwardly by a spring 34. The arm 32 is provided with an inclined forward surface 35 (Figs. 3 and 4) adapted to engage a slot 36 in the key 28 for retracting the same when the key rotates into engagement with said surface. A brake 37 may be used to operate as a drag on the housing 20 to stop the same from rotation when the key 28 is withdrawn.

The arm 32 is attached to a link 40 which is pivotally connected to a lever 41, one end of which is pivoted to the frame of the machine at 42, as shown in Figs. 4 and 5. The lever 41 and associated mechanisms are adapted to be actuated by an electromagnet or solenoid 44 having a core or armature 45, in a manner which will now be described.

In the embodiment of the invention illustrated, a recess 46 extends vertically through the lever 41 adjacent the free end thereof as shown in Figs. 4 and 5. A flat link 47 is pivoted to the solenoid core 45 at 48, and this link 47 extends downwardly through the recess 46 in lever 41. The link 47 contains a pin 50 which projects outwardly from the edge of the link beneath the lever 41, the purpose of pin 50 being to engage and raise the lever 41 when the link 47 and core 45 are raised by the energization of solenoid 44.

As illustrated in Figs. 4 and 5, the recess 46 in lever 41 is appreciably wider than the link 47 which projects downwardly through said recess, hence it is possible for the link 47 to move laterally or toward the left or right within recess 46 as viewed in Figs. 4 and 5. The downward movement of lever 41 about its pivot 42 is limited by the link 40 attached to arm 32 of the clutch operating mechanism. Fig. 4 shows the solenoid 44 deenergized and the lever 41 in its "down" position, and at such time the pin 50 adjacent the lower end of link 47 is spaced a short distance below the lever 41 so that it does not contact said lever. At the outer end of lever 41 there is rigidly mounted an upstanding finger 51 which projects inwardly adjacent the vertical edge of link 47 and is adapted to abut against said edge when the link 47 is raised.

The upper edge of lever 41 adjacent recess 46 contains a V-shaped notch 52, and the link 47 contains a complementary depending projection 53 which is fastened to the side of said link and is adapted to engage in the notch 52 of lever 41 when the solenoid is deenergized as shown in Fig. 4, to so position the link 47 that the pin 50 engages and lifts the lever 41 when the link is again raised. The pin 50, however, is spaced below the lever 41 to provide sufficient clearance for the projection 53 to be lifted out of the notch 52 before the lever 41 is actuated.

When solenoid 44 is energized, as by the closing of a bottle-actuated switch on a capping machine (not shown), the solenoid core 45 and link 47 are raised. The pin 50 of link 47 thereby engages the lower edge of lever 41 and raises the lever about its pivot 42, causing arm 32 of the clutch mechanism to release the key 28 and permitting the key to engage the shoulder 27 which causes the eccentric 18 to rotate. The upward movement of link 47 causes its projection 53 to be withdrawn from notch 52 of lever 41 and causes the inwardly projecting finger 51 to strike against the vertical edge of link 47 and swing link 47 about its pivot 48 toward the right as viewed in Fig. 5, a distance sufficient to move the pin 50 of link 47 entirely within the recess 46 of lever 41, thereby releasing the lever 41 and permitting lever to drop down to the initial position which it occupied before solenoid 44 was energized. The lever 41 is thus mechanically disconnected from the link 47 and remains disconnected until the link is again lowered by deenergization of the solenoid 44. When the link 47 again falls the pin 50 is restored to operative position by the projection 53 striking the notch 52. Fig. 5 shows the position of the parts immediately upon energization of solenoid 44, with the finger 51 engaging the edge of link 47 and with lever 41 just about to begin the descent to its initial position.

In the embodiment of the invention shown herein for purposes of illustration, when lever 41 descends to its initial starting position, it releases the arm 32 of the clutch mechanism and permits said arm to rest upon the surface of the eccentric 18. As the eccentric rotates the slot 36 of key 28 engages the inclined surface 35 of the arm 32, thereby gradually withdrawing the key 28 until it reaches the original position illustrated in Fig. 2, thereby disengaging the clutch and bringing the eccentric 18 to rest. In this way the eccentric is caused to rotate once each time the solenoid 44 is energized, and this will be true regardless of the length of time the solenoid remains energized. It will thus be seen that, when this novel mechanical release is employed as illustrated in the picker mechanism of a capping machine, even when the picker solenoid is energized for an unduly prolonged period, the lever 41 controlling the clutch mechanism will nevertheless be automatically released and returned to its normal position of rest, thus preventing further operation of the picker until the solenoid 44 has been deenergized and then subsequently energized as by the next succeeding operation of the bottle-actuated switch.

Although a specific embodiment of the invention has been shown for purposes of illustration,

it is to be understood that various changes and modifications may be made therein as will be readily apparent to a person skilled in the art. Furthermore, the mechanical releasing mechanism of the invention may, of course, be used for various other purposes and in various other types of machines, without departing from the scope and spirit of the invention as defined in the appended claims.

What is claimed is:

1. The combination with a horizontal pivoted lever of electromagnetic means including a link pivoted to hang in a substantially vertical position, said lever containing a recess wider than said link and enclosing said link so as to permit same to move laterally and vertically in said recess, a catch on the edge of said link spaced beneath said lever when the link is lowered by deenergization of the solenoid, said catch being adapted to enter the recess in said lever when released, a projection on said link and a cooperating notch in said lever adapted to mate when the link is lowered by deenergization of the solenoid to position said catch beyond said recess in position for lifting said lever when said electromagnetic means is again energized, and an upstanding finger on said lever adjacent the edge of said link and adapted, when the link is raised to the upward limit of its travel, to shift said link laterally to release said catch and to thereby permit said lever to descend while the electromagnetic means remains energized.

2. The combination with a one-revolution clutch and means including a horizontal pivoted lever for actuating said clutch, of electromagnetic means including a link pivoted to hang in a substantially vertical position, said lever containing a recess wider than said link and enclosing said link so as to permit same to move laterally and vertically in said recess, a catch on the edge of said link spaced beneath said lever when the link is lowered by deenergization of the solenoid, said catch being adapted to enter the recess in said lever when released, a projection on said link and a cooperating notch in said lever adapted to mate when the link is lowered by deenergization of the solenoid to position said catch beyond said recess in position for lifting said lever when said electromagnetic means is again energized, and an upstanding finger on said lever adjacent the edge of said link and adapted, when the link is raised to the upward limit of its travel, to shift said link laterally to release said catch and to thereby permit said lever to descend while the electromagnetic means remains energized, whereby said clutch operates for one revolution regardless of the length of time during which said electromagnetic means remains energized.

LUDWIG F. BOSCHEN.