April 28, 1959 M. W. GIESKIENG 2,883,810

MISSING CROWN DETECTORS FOR BOTTLE CAPPING MACHINES

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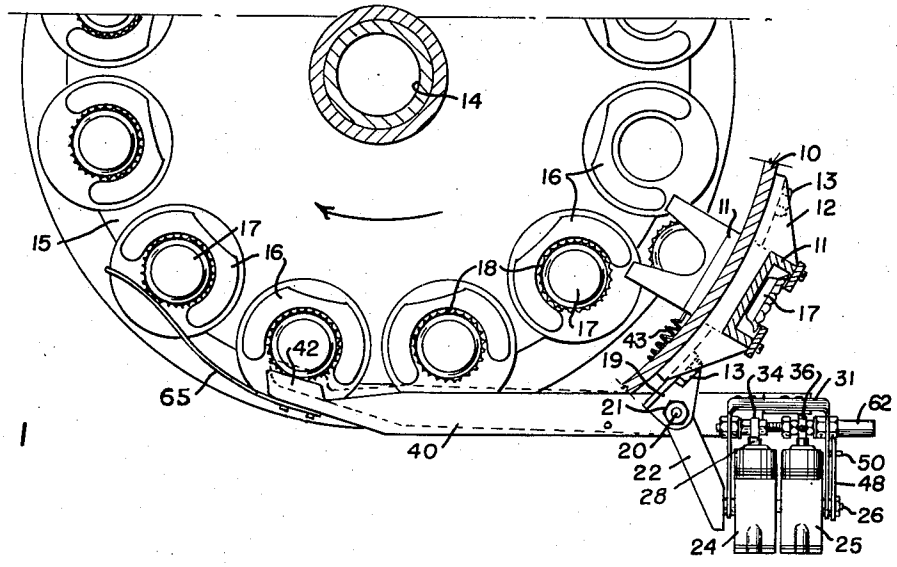


Fig. 1

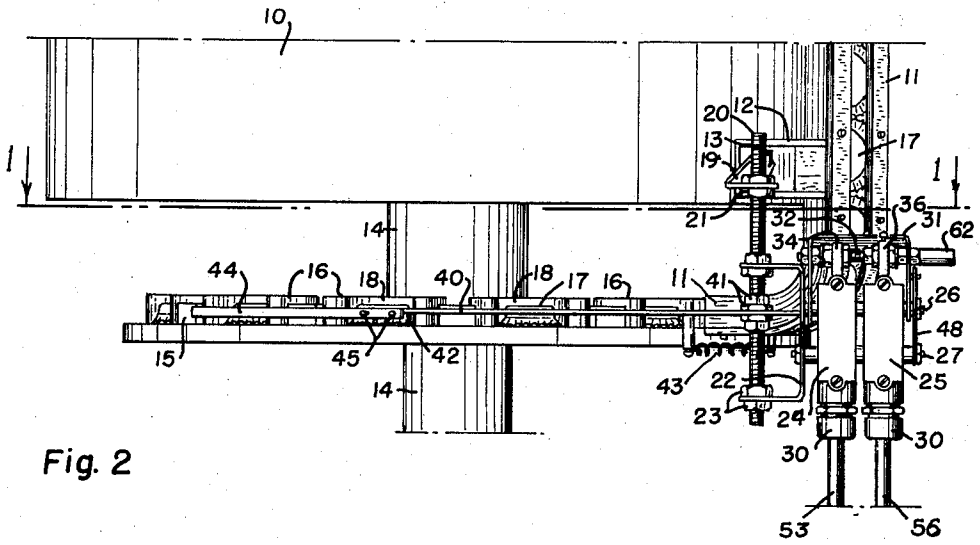


Fig. 2

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Fig. 3

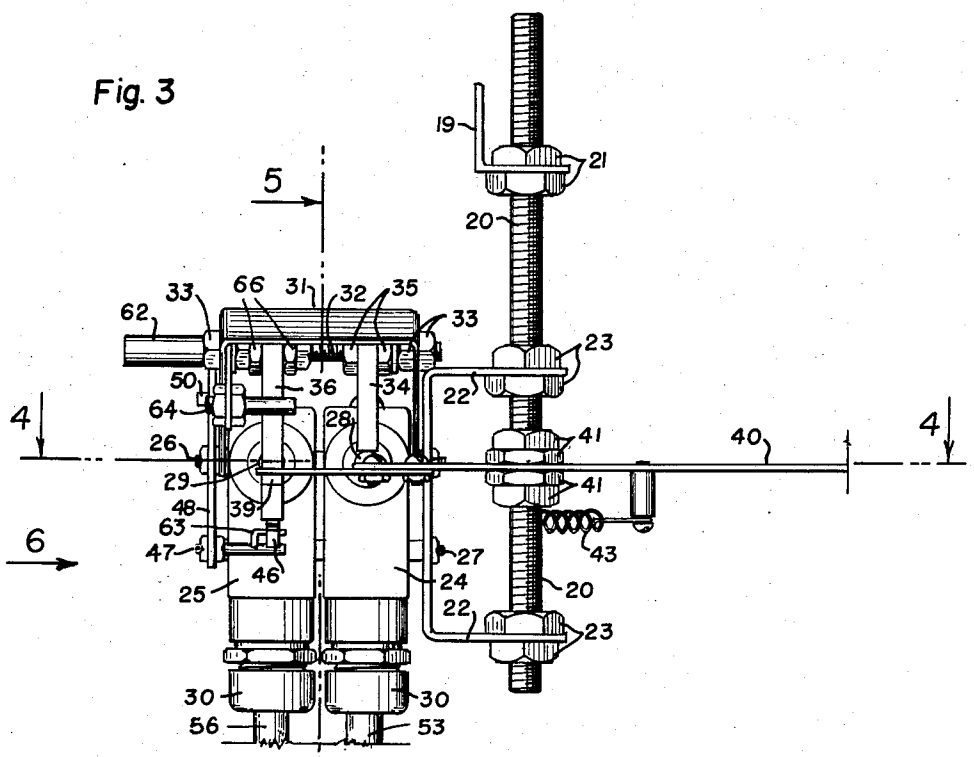
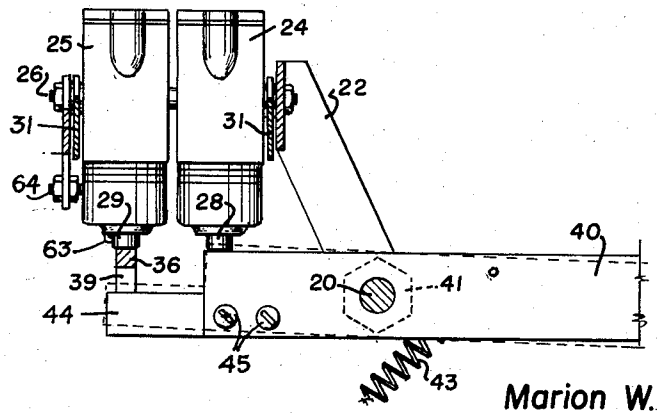


Fig. 4



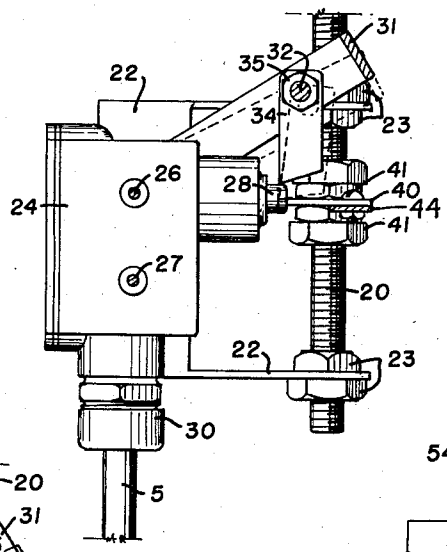
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Fig. 5



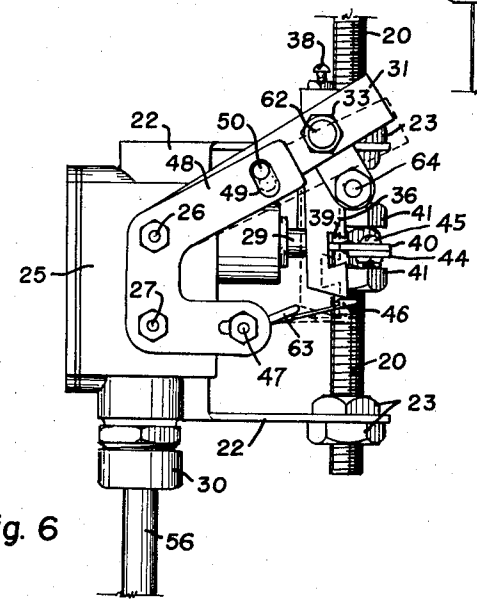


Fig. 6

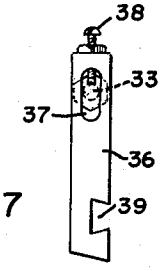


Fig. 7

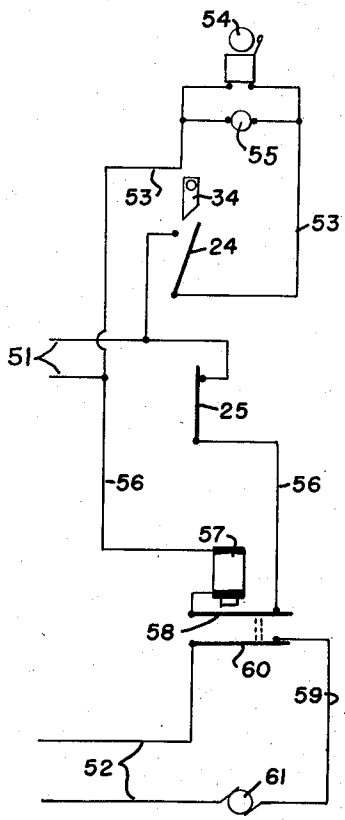


Fig. 8

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2,883,810

MISSING CROWN DETECTORS FOR BOTTLE CAPPING MACHINES

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Application February 11, 1957, Serial No. 639,444

9 Claims. (Cl. 53—52)

This invention relates to an automatic signal and control device for bottle crowning machines of the type in which bottle crowns are fed into crown-receiving heads, mounted in a rotating turret, which carry the crowns to a crowning mechanism. Occasionally the crowns will become clogged in the crown feeding mechanism so that the crown-receiving heads will be devoid of crowns and the bottles will issue uncrowned or possibly damaged.

The principal object of this invention is to provide an attachment which can be quickly, easily and economically applied to any conventional bottle crowning machine and which will act to instantly signal the machine operator that a crown is missing on a crown-receiving head so that the trouble can be quickly corrected.

It is, of course, not economically practical to stop a crowning machine for a single uncrowned bottle, however, if the bottles continue to discharge uncrowned, it is essential the machine be stopped until the fault can be discovered and corrected. Therefore, another object of this invention is to provide a missing-crown-detector attachment which will give a warning signal when the first empty crown-receiving head appears, so that the operator can check and reset the detector without stopping the crowning machine and to so construct the detector that should a second empty crown-receiving head appear before the warning has been heeded, the crowning machine will be automatically stopped until the cause of the trouble has been removed.

A further object is to provide means in a missing-crown-detector which will insure the crowns being in the proper position in the crown-receiving heads before the crowning mechanism is reached.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

Fig. 1 is a fragmentary plan view of a conventional, rotating, turret in a bottle crowning machine illustrating the relation of the improved missing-crown-detector thereto;

Fig. 2 is a fragmentary front elevational view of the turret and detector of Fig. 1;

Fig. 3 is a rear elevational view of the improved detector removed from the crowning machine;

Fig. 4 is a horizontal section through the detector looking downwardly on the line 4—4, Fig. 3;

Fig. 5 is a cross section taken on the line 5—5, Fig. 3;

Fig. 6 is a left end view of the improved missing-crown-detector;

Fig. 7 is a detail view illustrating the construction of a delayed action pawl employed in the improved detector; and

Fig. 8 is a circuit diagram illustrating the electrical circuits employed in the detector.

Only those elements of a conventional bottle crowning machine which are essential in describing the functions of the improved detector have been illustrated in Figs. 1 and 2. The latter elements have been designated by numeral as follows: housing **10**, crown chute **11**, crown chute guide bracket **12**, crown chute attachment screw **13**, turret shaft **14**, turret **15**, crown-receiving heads **16**, and crowns **17**.

In the conventional machine the crowns **17** descend in the crown chute **11** by gravity and the lowermost crown rides against the periphery of the turret **15** until a crown-receiving notch **18** in a receiving-head **16** aligns with the delivery extremity of the chute. The lowermost crown then enters the head and is carried thereby, in the direction of the arrow in Fig. 1, to a crown crimping mechanism which places the crown on the bottle and crimps it in place thereon. The crowned bottles are then continuously discharged from the machine.

This invention is designed to detect whether a crown is missing in one of the heads **16** before the latter reaches the crimping position. The improved missing-crown-detector is attached to the crowning machine in any desired manner, such as by means of an angle attachment clip **19** which is secured beneath one of the crown chute attachment screws **13**.

A threaded, bracket rod **20** extends through, and vertically downward from the attachment clip **19** to support the missing-cap-detector mechanism. The rod **20** may be secured in any desired vertical position in the clip **19** by means of clamp nuts **21** threaded upon the rod.

A U-shaped, frame member **22** is mounted on the bracket rod **20** in any desired angular and vertical position between two pairs of clamping nuts **23**. A first, normally-open push type "signal" switch **25** and a second, normally-closed push type "stop" switch **25** are mounted in vertical, parallel relation on the frame member **22** by means of an upper attachment bolt **26** and a lower attachment bolt **27**.

The push type switches may be any of the commercial types operable by a very slight depression of a protruding plunger or button. Such a button is illustrated at **28** on switch **24**, which will be herein designated as the "signal button," and at **29** on switch **25**, which will be herein designated as the "stop button." Such switches are available on the market under the trade-name "Micro" and are provided with wiring nipples **30** from which electrical conductors extend.

The two legs of a U-shaped pawl yoke **31** are pivotally mounted on the upper attachment bolt **26**. The yoke **31** extends upwardly and forwardly to a position above the switch buttons **28** and **29** and supports a threaded pawl rod **32** which extends through and between the legs of the yoke and is secured thereto by means of clamp nuts **33**. A suitable handle **62** is mounted on the extremity of the pawl rod by means of which the yoke **31** may be manually lifted.

A locking pawl **34** is fixedly mounted on the pawl rod **32** between suitable clamp nuts **35**. The locking pawl **34** is aligned with the signal button **28** of the switch **24** and so positioned, that it will maintain the signal button **28** in the depressed position until the yoke **31** is raised. When the yoke **31** is raised, the signal button will snap outwardly to a position below the pawl **34** to support the yoke in the elevated position as shown in Fig. 5. A delayed-action pawl **36** is mounted to swing from the pawl rod **32**, between guide nuts **66**, and in alignment with the stop button **29** of the switch **25**. The forward arc of swing of the delayed action pawl is limited by means of a stop lug **64** supported from the yoke **31**.

The rod **32** passes through a vertically-elongated rod slot **37** in the pawl **36** so that the latter pawl can be

vertically adjusted relative to the rod by means of a set screw 38 as shown in Fig. 7. The delayed action pawl 36 is relatively longer than the locking pawl 34 and extends downwardly below the stop button 29. The pawl 36 is provided with a lever clearance notch 39 in its forward edge which is normally in horizontal alignment with the "stop" button 29.

The delayed action pawl 36 can be swung against the stop button 29 to depress the latter and open the switch 25. A latch-hook-spring 46 is provided, with which the lower extremity of the pawl 36 will engage, under certain conditions to be later described to retain the stop button in the depressed position. The latch-hook-spring is secured to and extends from a latch stud 47, adjustably mounted in a side frame plate 49, and which in turn is mounted upon the extremities of the upper and lower attachment bolts 26 and 27. The degree of upward movement of the latch-hook-spring is limited by means of a hooked stop member 63 fixedly extending from the latch stud 47.

The side frame plate 48 is also provided with a stop opening 49 into which a stop pin 50 projects from the yoke 31 to limit the upward and downward movements of the latter.

A feeler lever 40, having a long extremity and a short extremity, is rotatably mounted on the bracket rod 20 between two pairs of jam nuts 41 so as to swing in a horizontal plane. The feeler lever is vertically adjusted on the bracket rod 20, by means of the nuts 41, so as to be positioned in the plane of the crowns 17 when the latter are in place in the receiving heads 16.

The long extremity of the feeler lever 40 is provided with a feeler shoe 42 which rides against each passing crown and against the turret 15 and the heads 16 intermediate the crowns 17. The feeler shoe is constantly urged to the riding positions by means of a suitable tension spring 43 which is tensioned between the lever 40 and any suitable attachment on the machine such as to the crown chute 11.

The short extremity of the feeler lever 40 extends across the signal button 28 of the signal switch 24. A narrower, auxiliary lever extension 44 is adjustably secured to the short extremity of the lever 40, by means of suitable attachment screws 45, and extends horizontally across the forward edge of the delayed action pawl 36 normally in alignment with the lever clearance notch 39.

The electrical circuits of the detector are illustrated in Fig. 8 in which detector power supply leads are indicated at 51 and machine driving motor leads are indicated at 52. The signal switch 24 is placed in a first circuit 53 from the leads 51 to an audible signal device 54 and a visible signal device 55. The stop switch 25 is placed in a second circuit 56 from the leads 51 which includes, in series, a motor starting solenoid 57 and a circuit breaker switch 58. The solenoid 57 simultaneously opens the circuit 56, at the breaker switch 58, and a motor circuit 59, through a motor switch 60 to the machine driving motor 61.

Operation

Let us assume that the pawl yoke 31 is being supported on the button 28 by the locking pawl 34 and that the driving motor 61 is operating the crowning machine as shown by the circuit diagram in Fig. 8. The crowns 17 are flowing down the crown chute 11 into the successive notches 18 in the passing crown heads 16. Each successive crown is passing against the feeler shoe 42.

Now let us assume that a crown fails to enter one of the crown heads 16. When this empty head reaches the feeler shoe 42, it will allow the latter to swing forwardly toward the axis of the turret 15 causing the short extremity of the feeler lever to move rearwardly and depress the signal button 28. The auxiliary lever extension 44 also swings rearwardly at this time but this rearward movement is received in the lever notch 39 so that no movement will be imparted to the delayed-action pawl 36. The locking pawl 34 now drops in front of the button 28 maintaining the latter depressed.

The signal devices 54 and 55 are now operated to call the operator's attention to the missing crown while the machine continues to operate. When the operator responds and removes the uncapped bottle, he lifts the yoke 31 by means of the handle 62 to return the detector to its original operating position with the switch 24 open and the yoke 31 again supported on the signal button 28.

Should a second empty head 16 reach the feeler shoe 42 before the operator has reset the detecting device, the shoe will again move forwardly toward the axis of the turret. The notch 39, due to the previous actuation, has descended below the stop button 29 so that the lever extension 44 will contact the front edge of the delayed action pawl 36 and swing the latter rearwardly against the stop button 29 to depress the latter and open the switch 25. The lower extremity of the delayed-action pawl 36 will be engaged by the latch-hook-spring 46 so as to maintain the button 29 depressed and the switch 25 in the open position. This will de-energize the solenoid 57 to open the second circuit 56 at the switch 58 and also open the motor circuit 59 at the switch 60. This stops the crowning machine and prevents restarting until the crown detector has been reset by lifting the yoke 31 to its original supported position.

It will be noted that when the delayed action pawl 36 moves upwardly with the yoke after a complete stop, the latch-hook-spring 46 will tend to follow the pawl upwardly. The upward movement of the latch-hook-spring is, however, limited by the hooked stop member 63 so that the pawl can pull free from the hooked latch.

Occasionally, a crown 17 will become tilted or displaced in its crown-receiving head 16 so that it will not properly seat upon a rising bottle. To prevent this a relatively long, curvated, flexible, leaf-type sweep spring 65 is mounted on the end of the long extremity of the feeler lever 40 which gently rides against each successive crown to sweep it into proper poosition in the notch 18 of the head 16 as it passes to the crowning position.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:

1. A missing-crown-detector for bottle crowning machines of the type having a rotating turret supporting a circumferentially arranged plurality of heads in which crowns are positioned comprising: a frame member; an electric switch carried by said frame member; a feeler lever pivotally supported from said frame to rotate in a horizontal plane and having a long and a short extremity, the long extremity of said feeler lever being resiliently urged against the crowns carried by said heads and the short extremity being positioned to close said electric switch when a missing crown allows the long extremity to swing toward the axis of said turret so as to complete an electric signal circuit; and means acting to retain said switch closed until manually released.

2. A missing-crown-detector for bottle crowning machines of the type having a rotating turret provided with a plurality of circumferentially arranged crown-receiving heads comprising: a vertical bracket rod; means for attaching said rod in a vertical position adjacent the periphery of the turret of said machine; a feeler lever having a long and short extremity rotatably mounted on said bracket rod in the plane of said heads; resilient means urging the long extremity of said feeler lever into con-

tact with the crowns carried by said heads; an electric signal switch supported from said bracket rod; a push-button on said switch for closing the circuit of the latter, said push-button being positioned in the path of movement of the short extremity of said feeler lever, so that when the long extremity of said feeler moves forwardly in consequence of a missing crown, said short extremity will move rearwardly to depress said push-button to close a signal circuit; a liftable pawl support positioned above said push-button; and a locking pawl normally resting on said push-button and supporting said pawl support and adapted when said button is depressed to move into the return path of said button to maintain the latter in the depressed position until said pawl support is manually lifted.

3. A missing-crown-detector as described in claim 2 having a second stop switch supported adjacent said signal switch; a second push-button on said second switch for opening the circuit of the latter; and means for causing the shorter extremity of said feeler lever to actuate said second push-button should a second rearward movement of said short extremity occur while the first push-button is depressed to open a machine operating circuit.

4. A missing-crown-detector as described in claim 3 in which the means for causing the shorter extremity of said feeler lever to actuate said second push-button comprises: a delayed-action pawl suspended from said pawl support and positioned between said short extremity and said second push-button and provided with a clearance notch positioned to allow said short extremity to move freely towards said second push-button when said pawl support is supported in the raised position by said first push-button and to place said delayed action pawl in button-operating position when said pawl support is lowered

so that the second movement of said short extremity will depress said second button.

5. A missing-crown-detector as described in claim 4 having latch means engageable with said delayed-action pawl to maintain said second button depressed until said pawl-support is manually raised.

6. A missing-crown-detector as described in claim 5 having an elongated flexible crown sweep mounted on and projecting from the long extremity of said feeler lever and adapted to contact each crown after it leaves said feeler lever to restore the crown in proper position in its head.

7. A missing-crown-detector having a first means for closing a first electric signal circuit upon the occurrence of a first missing crown and a second means for opening a second electric motor control circuit upon the occurrence of a second missing crown.

8. A missing-crown-detector as described in claim 7 having means for manually resetting the first means to prevent operation of said second means.

9. A missing-crown detector for bottle crowning machines having a series of crowns traveling in a rotating turret comprising: a feeler lever pivotally mounted to swing in the plane of said crowns; resilient means urging one extremity of said lever into contact with said crowns; and an electrical switch supported adjacent said lever and adapted to be actuated in consequence of the swinging movement of said lever.

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