Feb. 15, 1938. R. EARLING 2,108,257

DETECTOR MECHANISM FOR CROWN CAP ASSEMBLING MACHINES

Filed May 16, 1934 3 Sheets-Sheet 1

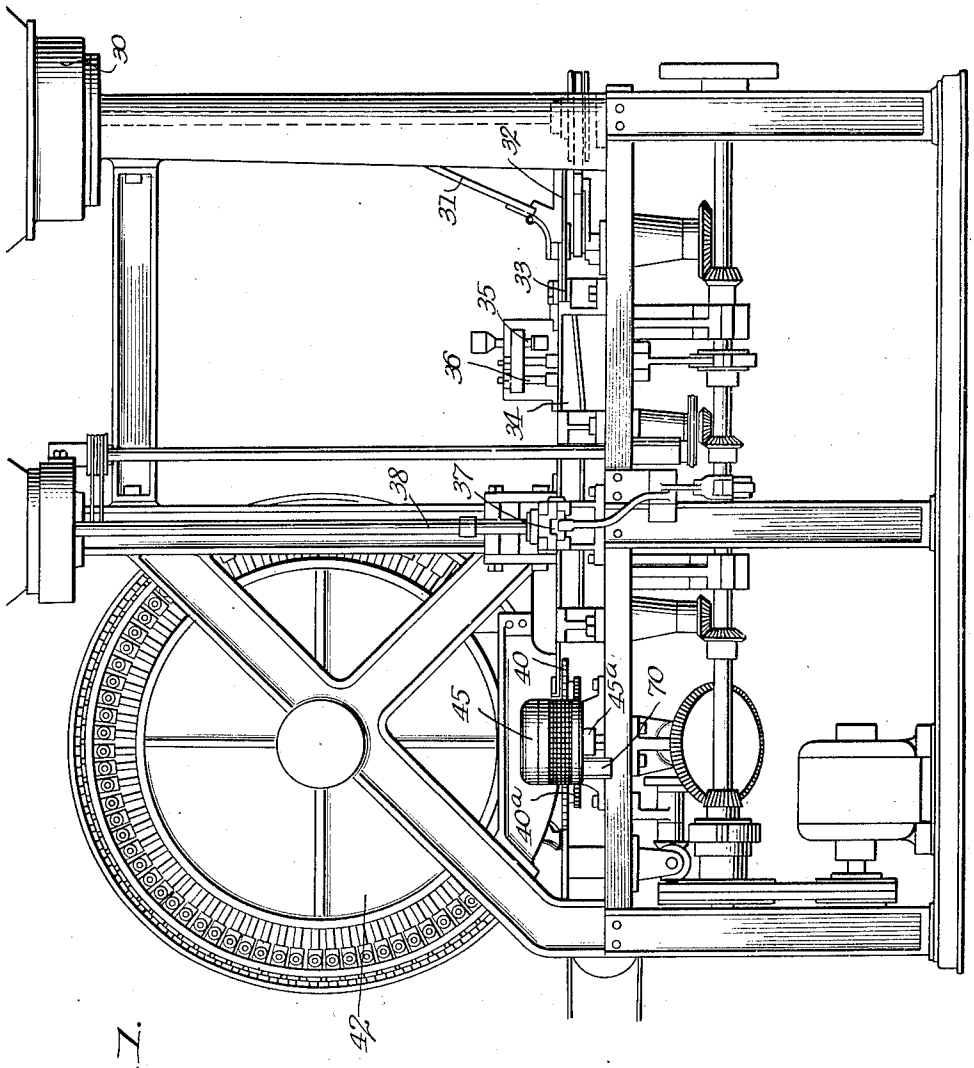


Fig. 1.

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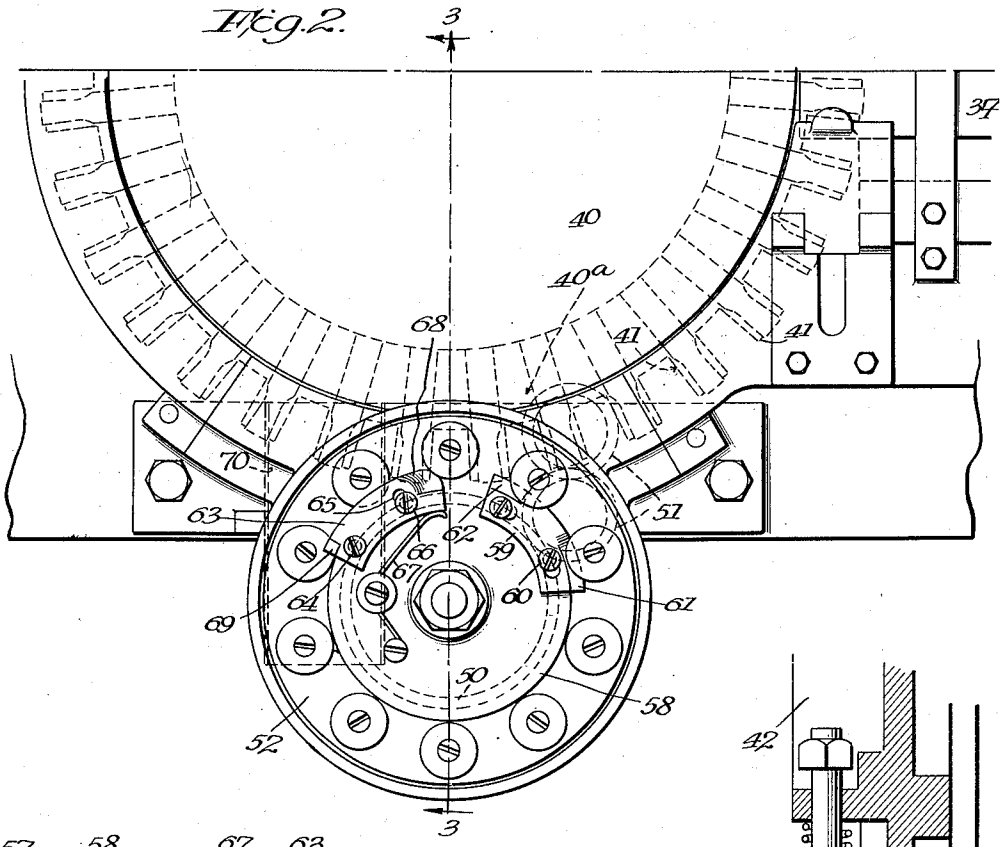
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DETECTOR MECHANISM FOR CROWN CAP ASSEMBLING MACHINES

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Fig. 2.



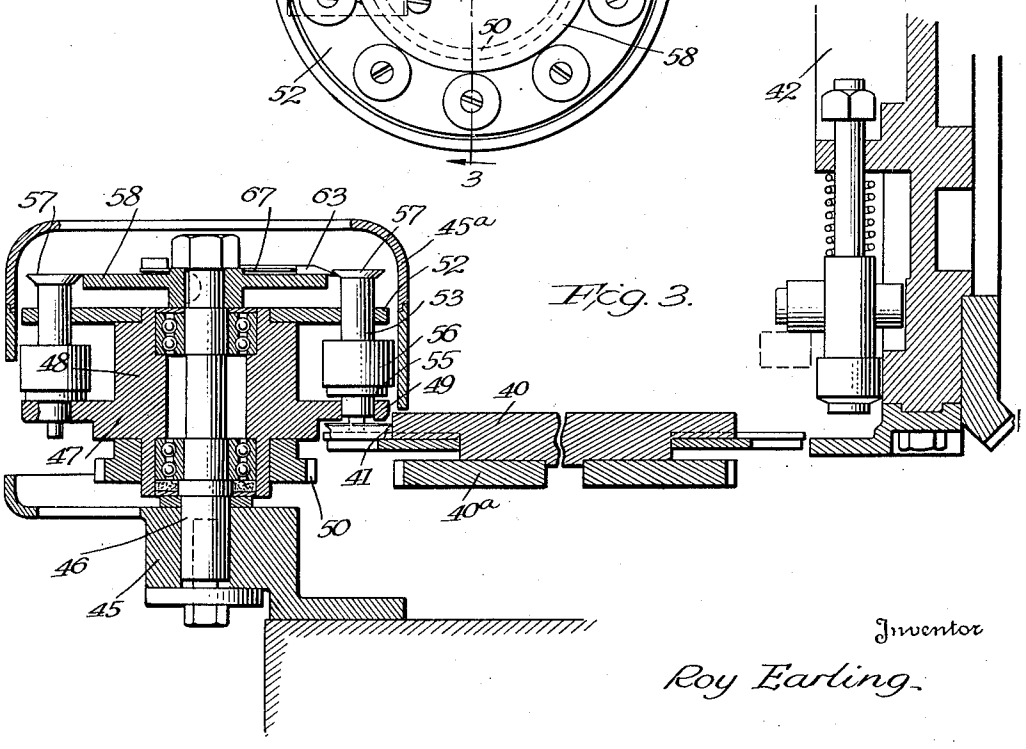


Fig. 3.

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DETECTOR MECHANISM FOR CROWN CAP ASSEMBLING MACHINES

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Fig. 4.

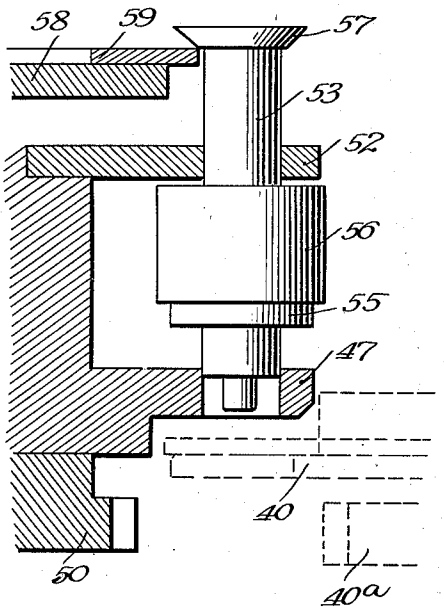


Fig. 5.

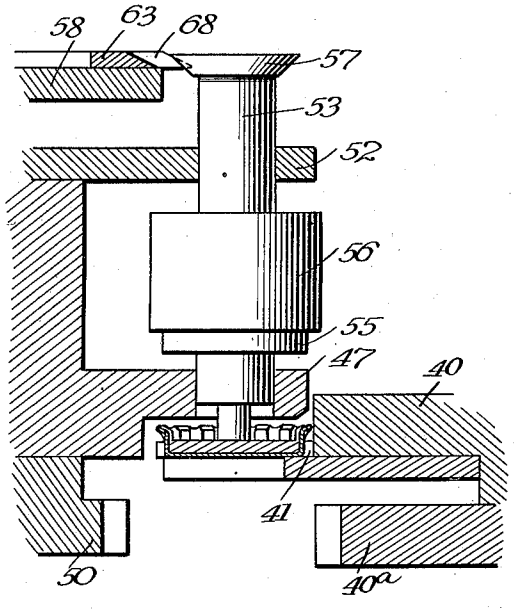
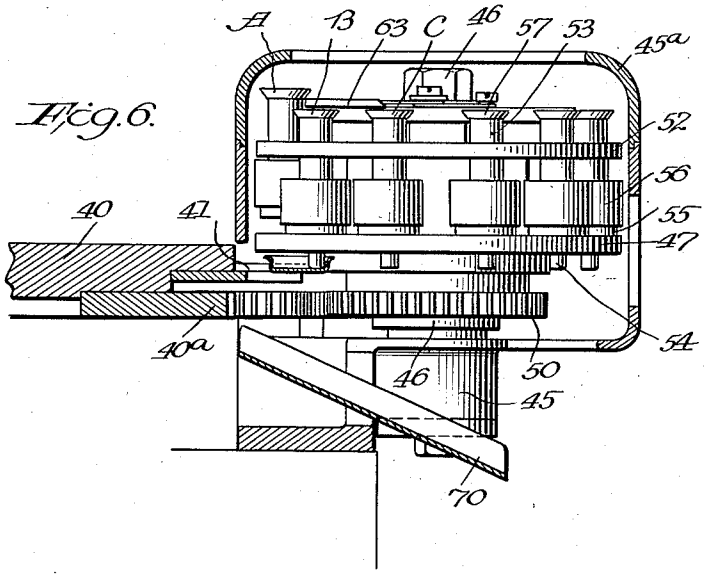


Fig. 6.



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UNITED STATES PATENT OFFICE

2,108,257

DETECTOR MECHANISM FOR CROWN CAP ASSEMBLING MACHINES

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Application May 16, 1934, Serial No. 726,013

7 Claims. (Cl. 209—82)

The present invention relates to a detector mechanism particularly adapted for use with a crown cap assembling machine and designed to detect and eject defective caps.

The principal object of the invention is to provide a mechanism which will remove from a cap manufacturing machine any cap which is not of proper manufacture. More particularly, the invention involves the provision of means for removing from a crown cap assembling machine any cap which is not provided with a liner.

In manufacturing crown caps, it is customary to feed metal shells and the cork or cork composition liners for the same into an assembling machine in such a manner that a liner will be placed in each metal shell. The feeding of the liners sometimes becomes impeded, with the result that metal shells pass through the machine without receiving liners and are discharged into the same receptacle or stack with properly formed caps, that is, caps comprising lined shells. Unlined caps are of course of no value to the bottler and it is therefore desirable to separate such caps from the properly assembled caps at a point prior to the discharge of the caps from the machine.

By the present invention, means is provided to engage each cap passing through an assembling machine, and the engaging means is so designed that if a cap, that is, a metal shell, contains no liner, it will be automatically ejected from the machine. On the other hand, the engaging means will in no way interfere with the passage through the machine of caps which are provided with proper liners.

Another important object of the invention is to provide a mechanism which will detect and eject unlined caps, which mechanism comprises a minimum number of moving parts and is so designed that it may be readily applied to a cap manufacturing machine.

Various arrangements for detecting and ejecting unlined cap shells have heretofore been provided but these previous mechanisms have included a relatively large number of moving parts and, in some instances, have necessitated the use of electrical contact making means operated by the passage of caps through the machine to detect defective caps.

In the present application, the detector mechanism of my invention is shown applied to a cap assembling machine of well known construction and which is embodied in the invention disclosed in the application of John D. Elder, Serial No. 714,167, filed March 5, 1934, Machine and method of manufacturing spot caps. The machine with which the invention is illustrated includes means to assemble metal shells and cushion liners and apply an adhesive to each shell before the liner is inserted therein. The assembled shell and liner are subsequently delivered, by a transfer dial or conveyor, to a pressure dial through which they then move. During the movement of the shell and liner through the pressure dial, they are maintained under pressure for a sufficient period of time to cause the liner to be firmly secured to the shell.

It will, of course, be understood that the detector mechanism of the present invention is applicable to crown cap manufacturing machines of numerous other types and that the use of the ejecting mechanism is not limited to use in the manufacture of crown caps. In fact, as will be obvious from the following specification, the mechanism is readily applicable to machines for making any type of lined container closure and can operate in conjunction with cap handling elements of numerous types. Furthermore, the present mechanism may be used to detect and eject closures which are deficient in various respects, its use not being necessarily limited to the detection and ejection of crown caps lacking a liner.

Other objects and advantages of the invention will be apparent from the following drawings, in which:—

Figure 1 is a side elevation of a cap manufacturing machine having the mechanism of the present invention applied thereto,

Figure 2 is a plan view of a section of a cap manufacturing machine, showing a portion of a transfer dial for moving caps from the feeding mechanism to the pressure dial of the machine and the application of my detector mechanism to the transfer dial,

Figure 3 is a vertical sectional view taken on a line corresponding to the line 3—3 of Figure 2 and showing the detector mechanism of the present invention, the transfer dial and a portion of the pressure dial of a cap assembling machine, the central portion of the transfer dial being omitted,

Figure 4 is a vertical sectional view of a portion of the detector mechanism taken on line 4—4 of Figure 2,

Figure 5 is a vertical sectional view of the detector mechanism taken on the line 5—5 of Figure 2 and showing an engaging element of the detector mechanism in engagement with a cap containing a liner; and

Figure 6 is a side view of the detector mechanism, looking from the left in Figure 2, the casing of the mechanism and the transfer dial of the cap assembling machine being shown in vertical section.

The cap assembling machine with which the present invention is illustrated may be briefly described as including a hopper **30** for metal shells, the shells being delivered from the hopper by a chute **31** and positioned upon a transfer plate **32** with their skirts extending upwardly. The shells are moved from the transfer plate **32** by a removing means **33** which conducts the shells to a horizontally disposed step-by-step conveyor **34**. During their movement upon the step-by-step conveyor, the shells pass beneath a device **35** which deposits adhesive in the shell and, upon a slight continued movement of the shell to the left, this adhesive is spread over the inner side of the top of the inverted shell by a spreading means **36**. The conveyor **34** next moves the shells past a mechanism **37** which positions a cushion liner of cork or cork composition in each shell, the liners being supplied from a tube **38** through which they move by gravity.

Continued movement of the step-by-step conveyor **34** carries the shell and the liner therein to a rotating transfer dial or conveyor **40** as shown in Figure 2.

The transfer dial **40** has pockets **41** circumferentially spaced about its upper periphery and a shell and liner is intended to be positioned in each of these pockets by the conveyor **34**. It may be stated that the transfer dial is provided for the purpose of moving the caps to a pressure dial **42** which holds the assembled shells and liners under pressure for a sufficient period of time to permit the adhesive to substantially harden so that the two parts will be firmly secured together.

All of the mechanism which has been described above is well known and is disclosed and described in detail in the application of John D. Elder, referred to above.

The detector mechanism of my invention includes a base **45** which is secured upon the frame of the cap assembling machine adjacent the periphery of the transfer dial **40** as shown in Figures 2 and 3. A casing **45***a* fits upon the base **45** to enclose the moving parts of the mechanism. A vertical post **46** is fixed centrally of the base **45** and a rotating member **47** including a hub portion **48** and a horizontal flange **49** is rotatably supported upon the post **46** by means of anti-friction bearings. The member **47** has a ring gear or pinion **50** secured to its lower face, which pinion is rotated through a train **51** of idler gears driven from a ring gear or pinion **40***a* fixed to the lower portion of the rotating transfer dial **40**.

The rotating member **47** includes a flat ring **52** fixed to the upper end of the hub **48**. Ring **52** and the flange portion of the member **47** are provided with circumferentially spaced and vertically aligned apertures in which are positioned cap engaging elements **53** which, as shown in Figure 3, are formed as plungers provided with depending pins **54** at their lower ends. The elements **53** are preferably rotatable in the apertures. The plungers or cap engaging elements **53** are provided with annular flanges **55** which normally bear upon the upper side of the flange **49**. A ring **56** rests upon each flange **55**, these rings being of sufficient weight to tend the plungers or cap engaging elements to the lowered position shown at the left in Figure 3 and in Figure 6. It will be understood that suitable means of any other form may be provided to tend the plungers or cap engaging elements to the downward position shown.

Each cap engaging element **53** is provided with a tapered head **57** having its side walls inwardly and downwardly inclined at a relatively sharp angle.

A disk **58** is fixed to the upper end of the stationary post **46** above the rotating member **47** and an arcuate cam plate **59** projects from the periphery of the disk **58**, this cam plate extending from a point spaced from the periphery of the transfer dial **40**, as shown in Figure 2, to a point immediately adjacent the periphery of the transfer dial. The plate **59** is held upon the disk **58** by means of machine screws **60** extending through arcuate slots extending longitudinally of the plate, the provision of the slots enabling the plate to be adjusted circumferentially of the disk **59**. The outer arcuate edge of the plate **59** overhangs the periphery of the disk **58** and the upper face of the projecting portion of the plate is upwardly bevelled at its outer edge **61** in a longitudinal direction. The upper face of the inner edge **62** of the plate **59** is downwardly bevelled. By this arrangement, the tapered heads **57** of the plungers or cap engaging elements moving about the disk **58** will ride upwardly along the bevelled surface **61**, thence along the plate **59** and off the downwardly bevelled portion **62**.

A second cam plate **63** is provided upon the disk **58** and extends from a point adjacent the periphery of the transfer dial **40** and outwardly therefrom about the disk. Cam plate **63** has a swinging movement upon a stud **64** which extends through an aperture in the plate and into the disk **58**. The plate **63** has a transverse slot **65** adjacent its inner end through which passes a stud or machine screw **66**. The free end of a spring **67** secured to the disk **58** bears upon the inner end of cam plate **63** to normally hold it in outward position as shown in Figure 2, the slot **65** permitting the plate **63** to swing inwardly with respect to the screw **66** and spring **67** in a manner hereinafter described. The cam plate **63** also extends past the periphery of the flange **58** and is upwardly beveled at **68** on its inner edge and downwardly bevelled at its outer edge **69**. By this arrangement, the tapered heads of the plungers or cap engaging elements may ride upwardly upon the bevelled edge **68** and along the plate **63**, to move off the plate at the outer bevelled edge **69**. A chute **70**, shown in Figures 2 and 6, is fitted in the base **45** and has its upper end positioned beneath the periphery of the transfer dial **40** and the path of movement of cap engaging elements leaving the dial.

It will be noted that disk **58** and plates **59** and **63**, together serve as a cam plate to guide the vertical movements of the cap engaging elements **53**.

Operation of the cap detector mechanism is as follows:

The rotation of the transfer dial **40** will cause the caps positioned in the pockets **41** of the dial by the conveyor **37** to be moved opposite the cap detector mechanism. The gearing between the transfer dial and the rotary member **47** of the cap ejecting mechanism is so arranged that the cap engaging elements **53** will, in effect, intermesh with the pockets **41** of the transfer dial. That is to say, one of the cap engaging elements will be aligned with each pocket of the transfer dial as the rotary member **47** and the transfer dial rotate with each other.

As a cap engaging element 53 of the detector mechanism moves about the stationary disk 58 in a counter-clockwise direction, its tapered head will engage the bevelled surface 61 of the cam plate 59, raising the entire engaging element. As shown in Figure 4, the engaging element will be raised a sufficient distance by the cam plate 59 to have the pin 54 at its lower end pass above the upwardly extending skirt of the inverted cap which is seated in the pocket 41 of the transfer dial into which or above which the engaging element is then moving. The tapered head of the engaging element will then ride down the inclined surface 62 at the inner end of the cam plate 59 and off the end of the cam plate so that the pin 54 at the lower end of the engaging element will drop into the cap positioned in the aligned pocket 41. The weighted ring 56 provided on the engaging element will insure that the latter will drop promptly after leaving the cam plate 59.

If the cap which is positioned in the pocket 41 of the transfer dial is complete, that is, if it comprises both a metal shell and a cushion liner, the engaging element 53 will naturally not drop as far as if no liner is in the metal shell and the engaging element will be kept partially raised as shown in Figure 5 so that its flange 55 will not contact with the flange 49 on the rotating member. The continued rotation of the member 47 will move the tapered head 57 of the engaging element against the inclined inner edge 68 of the cam plate 63 as shown in Figure 5 and the upward inclination of the surface 68 will cause the tapered head to ride up and upon the cam plate as shown at A in Figure 6, lifting the engaging element so that its pin 54 will be raised above the upper edge of the skirt of the cap as the engaging element and cap move in diverging paths with the rotating bodies which carry them. In short, the presence in a pocket 41 of the transfer dial of a cap having a liner therein will cause the engaging element to be kept raised sufficiently far that its tapered head will ride upon the cam plate 63 and up and out of the cap.

In the event that no liner is positioned in a cap which comes opposite the detector mechanism, the corresponding engaging element of the detector mechanism will drop a greater distance in the cap. Because of this, the continued rotation of the member 47 will cause the tapered head 57 of the engaging element to stay beneath the cam plate 63 as shown at B in Figure 6 and the pin 54 on the engaging element will pull the cap or metal shell out of the pocket 41 of the transfer dial and will slide it around on the base 45 of the detector mechanism to the chute 70 down which the shell will slide. Shells received from the chute may be again placed in the shell hopper of the assembly machine.

The cap engaging element 53 shown at position C in Figure 6 is also beneath the cam plate 63, having engaged a cap which contained no liner and having fed the cap to the chute 70.

The present mechanism is also efficient for removing from the assembling machine any caps having liners therein of insufficient thickness, since the engaging element 53 will drop a greater distance into such a cap and will therefore pass beneath the cam plate 63 instead of riding above it, causing the defective cap to be withdrawn from the assembling machine.

In some instances, the liner of the cap may be of a thickness to cause the engaging element aligned therewith to be held at such a height that the upper edge of the tapered head 57 of an engaging element 53 will be either exactly horizontally aligned with the lower edge of the inclined surface 68 of the cam plate 63 or raised just sufficiently far above the latter as to bring the two edges into almost abutting contact. With the two edges opposed in this manner, the engaging element might become locked with respect to the cam plate 63 were it not for the fact that the cam plate 63 is mounted for inward swinging movement against the action of the spring 67. However, since the cam plate may swing inwardly, any damage by reason of the abutting relationship of the engaging element and cam plate will be prevented and the continued movement of the engaging element along the cam plate will cause it to ride upwardly upon the inclined surface 68 of the latter.

After moving off the cam plate 63, the engaging element 53 will remain in lowered position until it again comes in contact with the cam plate 59.

It will be appreciated from the above that the mechanism of the present invention will separate caps according to whether the caps are of a desired configuration, i. e., in the present instance, according to whether they contain liners and are therefore of a predetermined depth.

It will be understood that the invention is not limited to the details of construction shown in the drawings and described in the specification and that the example of the use of the mechanism which has been given does not include all of the uses of which the mechanism is capable; also, that the phraseology employed in the specification is for the purpose of description and not of limitation.

I claim:—

1. A mechanism for gauging caps upon a cap conveyor, comprising a rotatable member, cap engaging means movable in said member, means to position said engaging means on a cap, cam means to move said engaging means out of engagement with a cap of a predetermined configuration, means to hold said engaging means in contact with a cap not of said predetermined configuration, said cam means being movable with respect to said engaging means to prevent the latter from being held against movement by contact thereof with a cap of improper configuration.

2. A mechanism for gauging caps upon a cap conveyor, comprising a supporting means, cap engaging means movable in said supporting means, means to position said engaging means in contact with a cap, a control member to move said engaging means out of engagement with a cap of a predetermined configuration, means to hold said engaging means in contact with a cap not of said predetermined configuration, said control member being movable with respect to said engaging means to prevent the latter from being held against movement by contact thereof with a cap of improper configuration.

3. A mechanism for gauging caps upon a cap conveyor, comprising a rotatable member, cap engaging means vertically movable in said member, means to position said engaging means on a cap, cam means to move said engaging means out of engagement with a cap of a predetermined configuration, means to hold said engaging means in contact with a cap not of said predetermined configuration, said cam means being movable with respect to said engaging means to prevent the latter from being held against movement by contact thereof with a cap of improper configuration.

4. A mechanism for gauging caps upon a con-

veyor, comprising a cap engaging element, means to move said element into the path of normal movement of the caps, into engagement therewith and then retract said element from the path of movement of the caps, and means to remove said element from engagement with a cap of predetermined configuration as the element is retracted from the path of movement of the caps, and to retain said element in engagement with a cap not of said predetermined configuration as it is retracted from the normal path of the caps.

5. A mechanism for gauging caps upon a conveyor, comprising a vertically movable cap engaging element, means to move said element into the path of normal movement of the caps, into engagement therewith and then retract said element from the path of movement of the caps, and means to remove said element from engagement with a cap of predetermined configuration as the element is retracted from the path of movement of the caps, and to retain said element in engagement with a cap not of said predetermined configuration as it is retracted from the normal path of the caps.

6. A mechanism for gauging caps upon, which caps are supported upon a conveyor, comprising a rotary support having a portion thereof overlapping the conveyor, a cap engaging element carried in said rotary support to move into and out of the path of movement of the caps on the conveyor, means to move said element into engagement with the caps on the conveyor, and means to remove said element from gripping engagement with a cap of predetermined configuration as the element moves away from said conveyor and to retain said element in engagement with a cap not of said predetermined configuration as it moves away from said conveyor to conduct the cap from the conveyor.

7. A mechanism for gauging caps, which caps are supported upon a conveyor, comprising a rotary support having a portion thereof overlapping the conveyor, a cap engaging element carried in said rotary support to move into and out of the path of movement of the caps on the conveyor, means to move said element into engagement with the caps on the conveyor, and cam means to remove said element from gripping engagement with a cap of predetermined configuration as the element moves away from said conveyor, said element being weighted to be retained in engagement with a cap not of said predetermined configuration as it moves away from said conveyor to conduct the cap from the conveyor.

ROY EARLING.