

March 14, 1967

W. J. R. NEKOLA
CROWNING HEAD

3,308,604

Filed March 10, 1965

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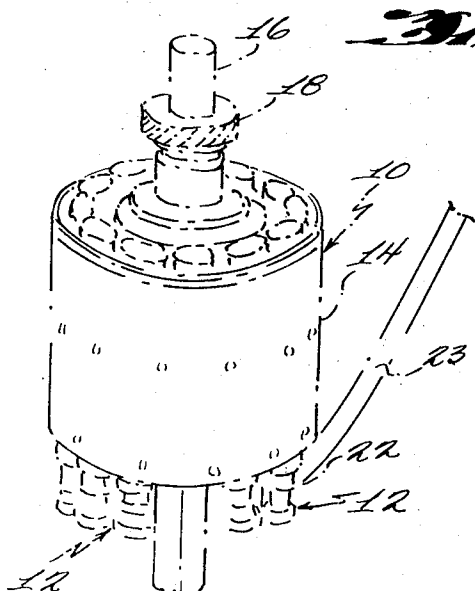


Fig. 1

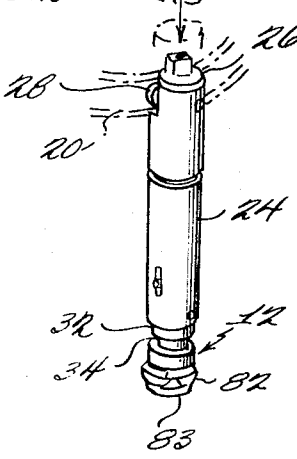


Fig. 5

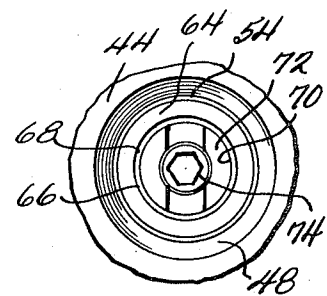
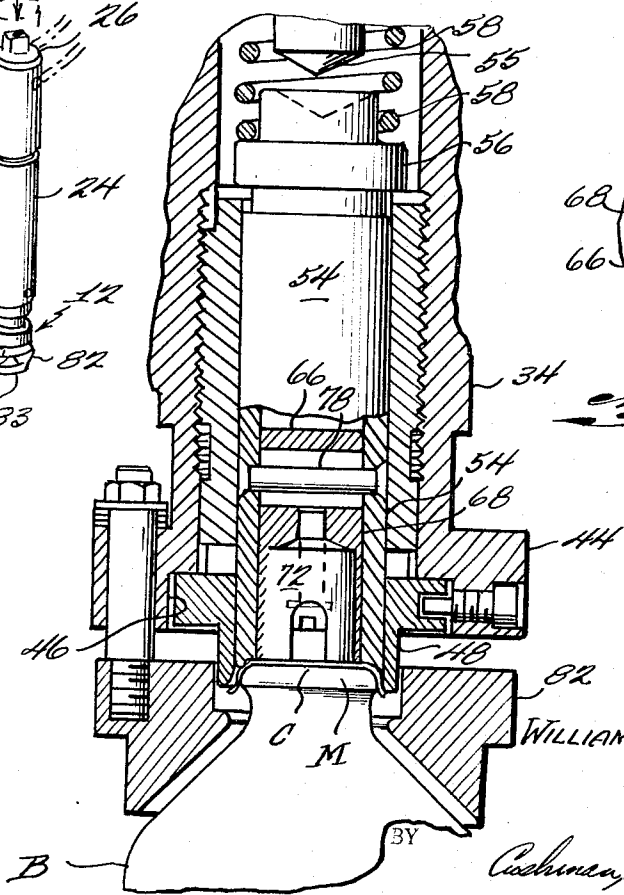


Fig. 8

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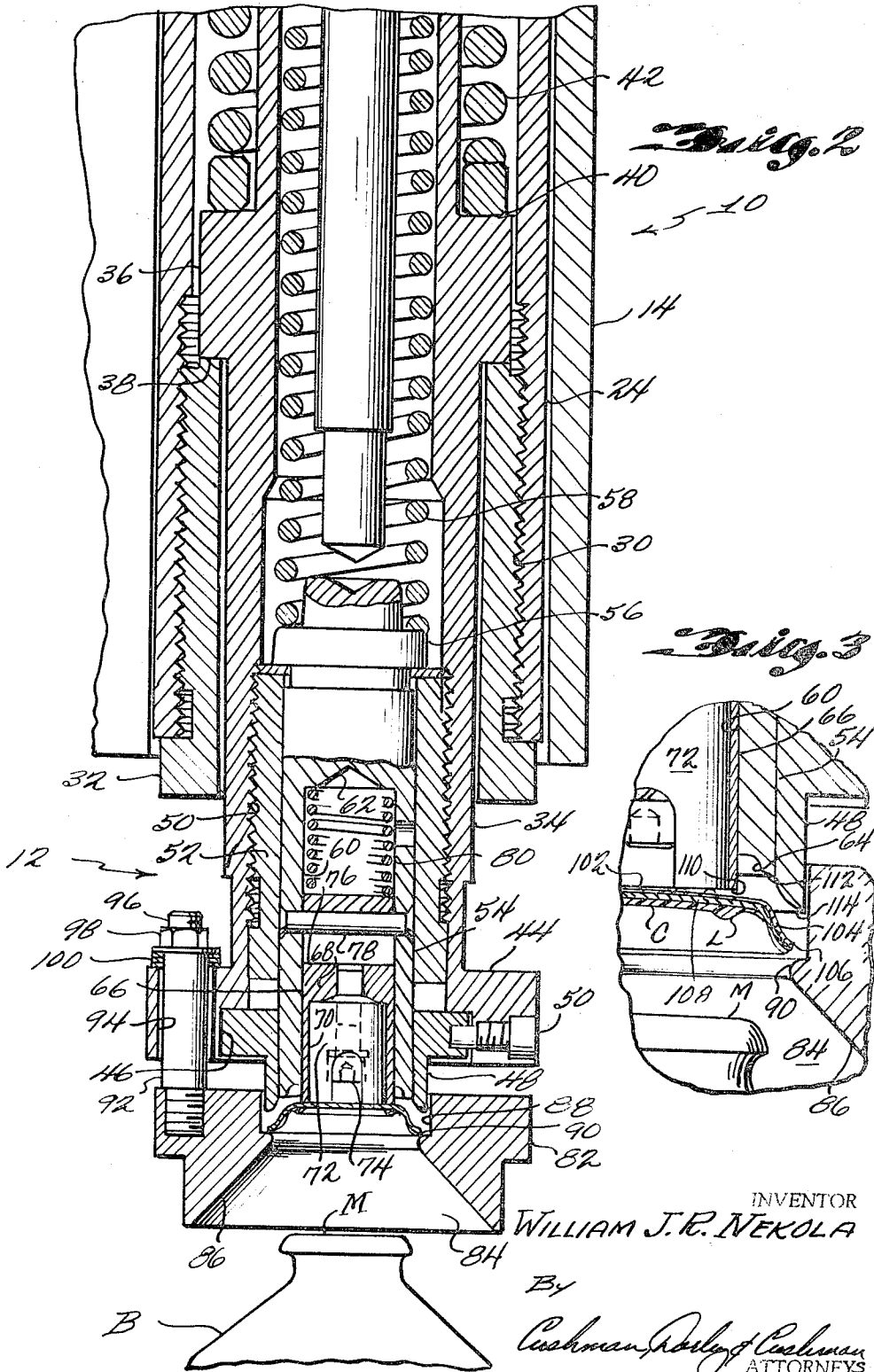
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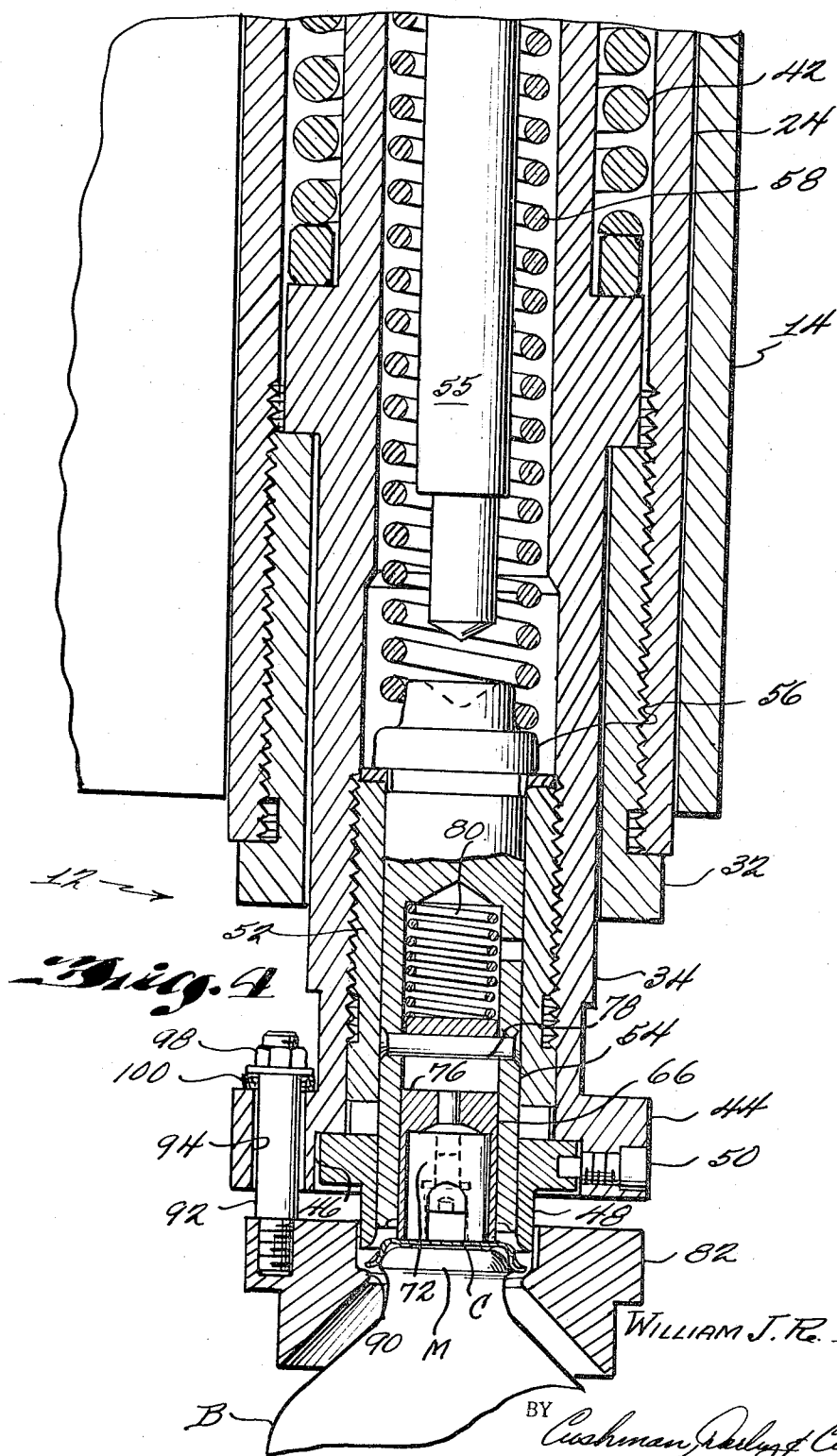
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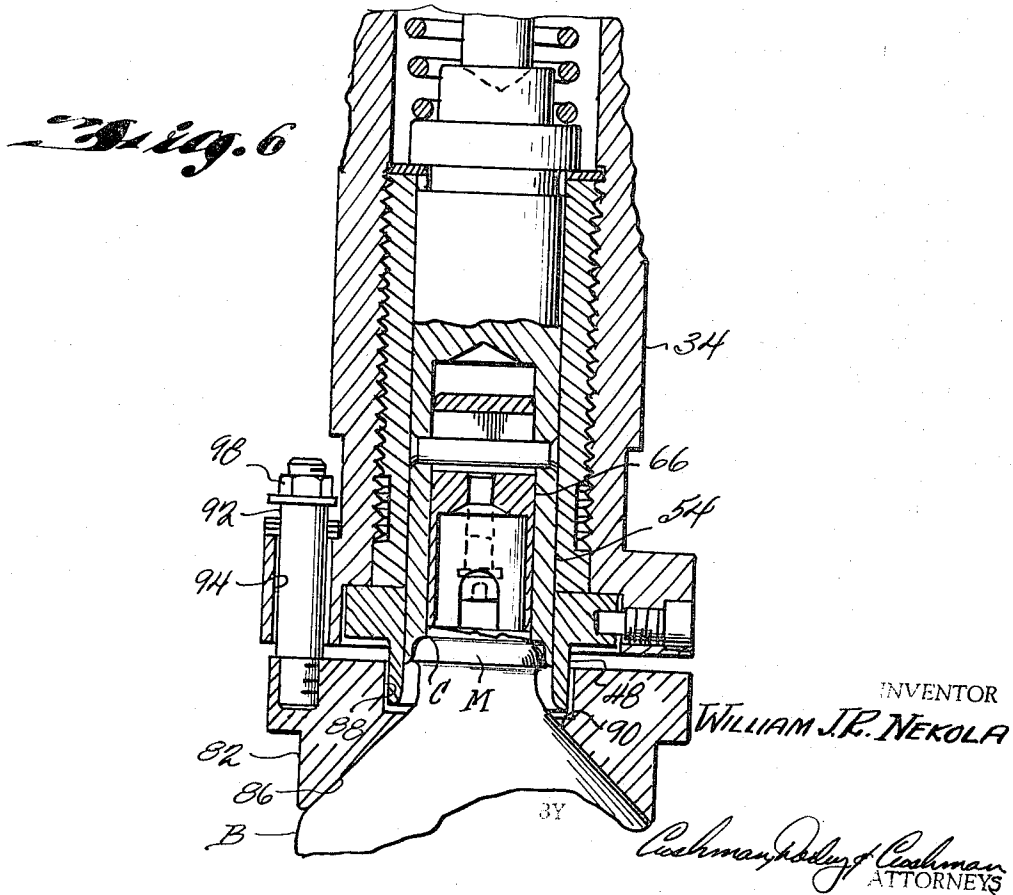
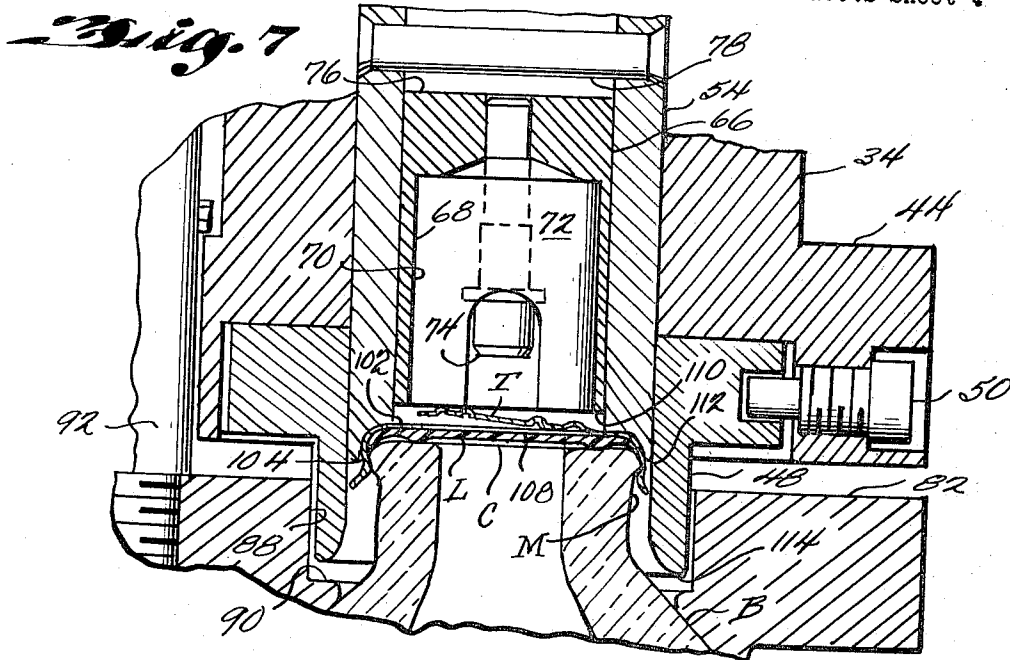
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3,308,604

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3,308,604

CROWNING HEAD

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20 Claims. (Cl. 53—343)

The present invention relates to a crowning mechanism and more particularly to an improved crowning head for applying caps, such as crown type caps or roll-on type caps, to the mouth or lip of either bottles or crowns.

A typical crowning mechanism is disclosed in United States Patent No. 2,184,493, Wiltie I. Gladfelter, issued Dec. 26, 1939, and assigned to the same assignee as the present application. In the aforementioned Gladfelter patent, the crowning mechanism includes a plurality of vertically reciprocable cylinders, each having a crowning die including a throat ring for crimping or ironing the skirt of a crown type cap about the bead on the mouth or lip of the container and a magnetic presser foot for initially receiving and supporting the cap and then applying the cap to the mouth with sufficient crowning pressure. While such a crowning mechanism has been quite successful in applying conventional steel crowns to bottles and cans, certain difficulties have been encountered in recent years with the use of these crowning heads because of the increased speed necessary for operation of the crowning mechanism to accommodate for the increased speed of operation of the filling machines. Also difficulties have been encountered with these crowning heads when using the new type caps provided with a pull tab therein. Because of the increased speed at which crowning mechanisms must operate to accommodate the output of present day filling machines, the caps must be accurately aligned or centered with respect to the bottle to enable proper crowning procedures, and mechanisms such as shown in the Gladfelter patent did not maintain sufficiently accurate control over the cap and the container throughout the crowning operation when accomplished at high speeds. Further, the use of such prior crowning mechanisms on caps provided with pull tabs often caused the weakened score lines on the cap to tear during the crowning operation thus damaging the closure. Damage often occurred in the area where a cap skirt depends from the top portion of caps even without the pull tabs, especially when the cap was made with an aluminum outer shell.

An important object of the present invention is to provide an improved crowning mechanism for applying caps to bottles or cans, the capping head of the mechanism maintaining accurate control over the cap from the time of reception of the same throughout the entire crowning operation so that the cap may be positively centralized with respect to the mouth of the container while being placed on the mouth and so that the cap can be crowned on the container without damage to the cap.

Another object of the present invention is to provide an improved crowning head for use with high speed crowning mechanisms, the crowning head having means thereon which permits supporting the cap free of the presser foot until after the cap has made initial contact with the mouth of the container, the presser foot then engaging the cap and further assisting in the centralization

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of the cap on the mouth as crowning pressure is applied thereto.

Ancillary to the immediately preceding object, it is a further object of the present invention to provide an improved type of presser foot for a crowning head which not only assists in centralizing the cap with respect to the mouth of the bottle but so supports the cap during the ironing of the skirt about the bead of the mouth that the top portion of the cap and the upper portion of the annular skirt of the same are completely backed up to prevent any damage thereto.

Still another object of the present invention is to provide an improved type of crowning head having a permanent magnet therein which is shielded from the other elements of the crowning head so that the magnetic flux can be concentrated in a particular area and maintained uniform, the longevity of the magnet also being increased.

A further object of the present invention is to provide a crowning head with a container guide element supported therefrom and movable with respect thereto, the container guide element also functioning as an auxiliary cap platform for supporting the cap should the cap become inadvertently dislodged from the magnetic means normally supporting the same prior to application on a container.

A still further object of the present invention is to provide an improved crowning head for use with caps having a pull tab formed therein by an incision which is at least partially semi-circular and by weakened score portions extending from the ends of the incision, the crowning mechanism having a presser foot which prevents tearing of the score lines of the tab during crowning.

Ancillary to the immediately preceding object, it is a further object to provide a crowning mechanism for use on such caps which has means therein for permitting the pull tab to raise slightly out of the plane of the top portion of the cap when the depending skirt of the cap is being ironed about the bead of the mouth or lip of the container.

These and other objects and advantages of the crowning head of the present invention will appear more fully in the following specification, claims and drawings wherein:

FIGURE 1 schematically discloses an exploded view of the crowning head of the present invention in combination with the crowning mechanism which is shown in broken lines.

FIGURE 2 is an enlarged vertical sectional view through the crowning head of the present invention and through a portion of the crowning mechanism, the view illustrating the first stage of operation, namely, the normal positioning of the various elements of the crowning head just prior to and after reception of a cap.

FIGURE 3 is an enlarged fragmentary view of a portion of the crowning head of the present invention, the view illustrating the relative normal positions of the various elements of the crowning head as shown in FIGURE 2.

FIGURE 4 is a vertical sectional view similar to FIGURE 2 but illustrating the second stage of the crowning operation of the crowning head wherein initial contact of the cap is made with the mouth of the container.

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FIGURE 5 is a vertical sectional view of the crowning head similar to FIGURES 2 and 4 but illustrating the third stage of the operation, namely, the engagement of the presser foot with the crown and the applying crowning pressure thereby vertically to the cap and container.

FIGURE 6 is a vertical sectional view similar to FIGURE 5 but illustrating the fourth or final stage of crowning wherein the skirt of the cap is ironed about the bead of the mouth or lip of the container.

FIGURE 7 is an enlarged fragmentary view of FIGURE 6 better illustrating the final crowning stage and disclosing in detail the tab on the cap moving out of the plane of the top portion of the cap due to the ironing of the skirt about the bead of the mouth or lip of the container.

FIGURE 8 is a fragmentary bottom plan view of the crowning head looking up into the crowning throat ring, presser foot, and plunger.

Referring now to the drawings wherein like character or reference numerals represent like or similar parts and in particular to FIGURE 1, there is disclosed a typical crowning mechanism generally designated by the numeral 10 incorporating a plurality of crowning heads generally designated by the numeral 12. The crowning mechanism 10 is of the general type as disclosed in the hereinbefore mentioned Gladfelter Patent No. 2,184,493, it being understood that the improvement herein described relates primarily to the crowning head. The crowning mechanism 10 includes a cylindrical or drum-shaped body portion 14 rotatably mounted on a stationary post 16 by suitable bearing (not shown). A worm gear 18 fixedly supported on body portion 14 and meshing with a drive gear (not shown) driven off of a suitable source of power, such as a filling machine drive, rotates the drum-shaped body portion 14 about the post 16. The plurality of crowning heads 12 are individually vertically reciprocable with respect to the body portion 14, each of the crowning heads being reciprocated by means of a cam 20 mounted on the stationary post 16 within the body portion 14.

As the body portion 14 rotates the crowning heads past a cap receiving station 22, caps supplied by a chute 23 from a suitable cap hopper (not shown) are individually fed into each crowning head. As the crowning head 12 receives a cap, a container such as a bottle or can, is positioned beneath the crowning head on a container platform mounted on a rotating table (not shown). The individual crowning head 12 is lowered by the cam 10 and the cap carried therein is positioned on the mouth of the container positioned therebeneath and the crowning operation begins. When the crowning operation has been completed, the cam 20 elevates the crowning head 12 away from the crowned or closed container and the container is then discharged from its platform and the procedure is repeated.

The details of the crowning mechanism and of the means for supporting the containers beneath the crowning heads are not given herein as they are fully disclosed in the aforementioned United States Patent No. 2,184,493. It will be appreciated by those skilled in the art that arrangements of crowning mechanisms other than that disclosed in the aforementioned patent could be used so long as the crowning head is moved relative to the container. For example, the container could be lifted up to the crowning head by vertically reciprocable container supporting platforms rather than the crowning head being lowered down to the container.

Referring now to FIGURES 1 and 2, it will be noted that the crowning head 12 includes an elongated cylinder 24 open at its lower end and provided at its upper end with a cover 26. Suitably mounted adjacent the upper end of elongated cylinder 24 is a cam roller or follower 28 which cooperates with the track of the previously mentioned cam 20. The elongated cylinder 24 is interiorly threaded at 30 adjacent its lower end for receiving

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an exteriorly threaded sleeve nut 32 which is arranged to support the various elements of the crowning head 12 therein. In more detail, an elongated tubular sleeve member 34 extends upwardly within the cylinder 24 and terminates adjacent the upper end of the same. The tubular sleeve element 34 is provided with an annular flange 26 thereon defining a first or downward facing shoulder 38 and a second or upwardly facing shoulder 40. The downwardly facing shoulder 38 is arranged to abut against and be supported by the inner end of the sleeve nut 32 thereby limiting the downward movement of the sleeve element 34 relative to cylinder 24 while permitting upward movement relative thereto. The upwardly facing shoulder 40 provides a stop for the lower end of a relatively strong spring 42, the upper end of the spring operatively abutting against the cover 26 of the cylinder 24. As is now apparent, sleeve element 34 is normally urged downwardly by spring 42 to a position where the shoulder 38 engages the end of the sleeve nut 32.

Tubular sleeve element 34 at its lower end is provided with an enlarged annular flange 44 which has an enlarged chamber 46 therein concentric with the bore through the sleeve element. The upper portion of a crowning throat ring 48 is received and supported within the chamber while the lower portion extends out of the sleeve. Suitable set screws 50 extending through the flange 44 support the throat ring 48 fixedly within the chamber 46 of the sleeve element 34. Sleeve element 34 is provided with interior threads 50 in its bore above chamber 46 for receiving an exteriorly threaded sleeve nut 52 which retains an elongated presser foot 54 in the crowning cylinder. Since the upper end of the sleeve element 34 is open, a presser foot stop rod 55 fixedly supported on the cover 26 of cylinder 24 extends centrally down through the sleeve element and terminates above the upper end of presser foot 54 when the presser foot is in its normal position. The purpose of rod 55 and its coaction with the presser foot 54 will be described later in the specification.

Presser foot 54 which is centered by the sleeve nut 52 for reciprocation relative to the throat ring is provided on its end extending out of the upper end of the sleeve nut with a shoulder 56 that abuts against the upper end of the sleeve nut 52 thus limiting the downward movement of the presser foot, the shoulder 56 also providing an upwardly facing seat for the lower end of a presser foot compensating spring 58 which is somewhat lighter than the spring 52. The upper end of the presser foot compensating spring 58 bears against a member or part (not shown) fixed with respect to the tubular sleeve element 34 whereby the presser foot 54 is normally urged downwardly into seating engagement with the upper end of the sleeve nut 52. The springs 42 and 58 function in a substantially similar manner to those springs disclosed and described in the aforementioned Gladfelter patent and, therefore, a further detailed description of the same is not repeated herein.

It will be noted by reference to FIGURES 2 and 4-7 inclusive, that the presser foot 54 is provided with an elongated bore 60 therein, the bore being a closed bottom bore at its upper end as indicated at 62 and open at its lower end. Additionally, it will be noted that the presser foot 54 is provided with a cap receiving surface cavity 64 which is complementary in shape and size to the top portion of a cap as well as the upper portion of the annular depending skirt of the cap. The importance of the provision of the cap receiving surface cavity 64 on the presser foot 54 will be described in detail later in the specification when the operation of the crowning head is described.

A relatively cylindrical-shaped plunger 66 is slidably mounted in the bore 60 of the presser foot 54. The plunger 66 includes a brass sleeve member 68 having a cylindrical bore 70 at its lower end for reception of a permanent horseshoe magnet 72, the magnet 72 being re-

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tained in the sleeve member 68 by a set screw 74. At the upper end of the brass sleeve member 68 there is provided a longitudinally elongated and transversely extending slot 76. A pin 78 fixedly supported at its ends by the presser foot 54 extends through the slot 76 and limits the vertical movement of the plunger 66 with respect to the presser foot 54. A very light spring 80 bearing at one end against the closed bottom 62 of the bore 60 and at the other end against the top of the plunger 66 urges the plunger 66 in a downward direction to its normal position as shown in FIGURE 2.

As best shown in FIGURES 2, and 4 to 7, inclusive, a container guide element 82 is supported from the lower end of the sleeve element 34. In more detail, the container guide element 82 is provided with an aperture or hole 84 therethrough, the hole 84 having its lower portion 86 complementary in shape to the neck portion of a container to be closed whereas the upper portion 88 is cylindrical and of a diameter to receive the lower end of the crowning throat ring 48. A shoulder 90 is provided between the upper portion 88 and the lower portion 86 of the aperture 84 through the container guide ring, the shoulder 90 having an internal diameter slightly less than the maximum diameter of the flanged edge of a cap whereby the shoulder 90 acts as a secondary platform should the cap become inadvertently dislodged from the plunger.

The container guide element 82 is supported beneath the sleeve element 34 by means of a pin 92 threaded into the container guide element and extending upwardly through an enlarged bore 94 in the flange 44 of the sleeve element. The upper end of the pin is provided with threads 96 which receive a stop nut 98. A number of spacer elements 100 fitting between the stop nut 98 and the upper surface of the flange 44 determine the lowermost position of the container guide element 82 relative to the crowning throat ring 48. By adding or removing spacer washers 100 the position of the container guide element 82 relative to the crowning throat ring 48 may be easily adjusted to a desired distance.

The operation of the improved crowning head 12 of the present invention will now follow with a detailed description of the various phases or stages of crowning.

At the outset, the cap C disclosed throughout the drawings is a crown type of cap having a top portion 102 and a downwardly depending annular skirt 104 (FIGURE 3) which is usually corrugated or fluted. At the lower end of the skirt 104 the free edge of the same is flared outwardly as indicated at 106. While the cap C may be a conventional type of crown having a steel shell with the usual corrugated skirt and a suitable cork or plastic liner, it is preferably a tear off type of crown cap such as disclosed in the Jerry F. Scharf co-pending United States application Ser. No. 372,612 filed June 4, 1964, now Patent No. 3,195,755, and assigned to the same assignee as this application. The cap disclosed in the aforementioned Scharf application is provided with an aluminum outer shell defined by the top portion 102 and the depending skirt 104, the top portion having a pull tab T therein formed by an incision which is at least partially semi-circular and by score lines extending from the incision toward and down a portion of the skirt 104. A steel backing disc 108 is provided on the interior of the shell S intermediate a plastic liner L or the like. While the shell S is preferably made of aluminum, it could also be made of a thin gauge steel thus not necessitating the steel reinforcing disc 108 intermediate the shell and liner. Caps of this type do not require the use of an opener to remove the same from a container, it merely being necessary to pull the tab and tear the skirt when removing the cap from the container.

Another cap which could be used with the crowning head of the present invention which includes the improved presser foot 54 and plunger 66 is disclosed in the Jerry F. Scharf and Vinson S. Potts pending application

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Ser. No. 367,434 filed May 14, 1964, now Patent No. 3,246,784. The cap disclosed in the aforementioned Scharf and Potts patent application is also a tear off type of cap but differs somewhat with respect to the details of the tab and further in that the skirt is not flared outwardly at its lower free edge, the cap being known in the trade as a "roll on" cap. When such a cap is used, suitable roll-on dies are substituted in place of the crowning throat for ironing the skirt of the cap about the bead on the mouth or the lip of the container.

The cap illustrated in the drawings and described in connection with the operation of the crowning head of the present invention is a cap of the type disclosed in Scharf application Ser. No. 372,612, but it will be appreciated that the invention is not necessarily limited to this specific type of cap as the crowning operation would be substantially identical for a "roll on" cap or a conventional "crown" cap.

Referring first to FIGURES 1 and 2, caps C are fed down the cap supply chute 23 to the cap receiving station 22. As the dome-shaped body portion 14 of the crowning mechanism 10 rotates one of the crowning heads 12 past the cap receiving station 22, the discharge end of the chute 23 will be positioned closely adjacent an opening 83 provided in the side of the container guide element 82. A single cap is delivered, usually by a blast of air and the weight of other caps in the chute, through this opening 83 into the area of the throat of the container guide element 82 above the shoulder 90. As the cap travels into this throat area it is immediately picked up by the magnet M of a container B which has been or will be conveyed onto a platform of a rotating table or turret (not shown).

The crowning head 12 at the time it receives the cap C is in its uppermost position with respect to the container B and the various elements of the crowning head such as the crowning throat ring 48, presser foot 54, and plunger 66 are in their normal downward position relative to each other and to the crowning cylinder 24 which carries the same, their position being best shown in FIGURES 2 and 3. At this time it is important to note that the plunger 66 has its lowermost edge 110 positioned or spaced below the lowermost edge 112 of the presser foot 54 by a vertical distance in the order of one-sixteenth ($\frac{1}{16}$) of an inch. Also, it is important to note that the lowermost edge 114 of the crowning throat ring 48 is positioned or spaced below the lowermost edge 110 of the plunger 66, the vertical distance separating these two edges also being in the order of one-sixteenth ($\frac{1}{16}$) of an inch. The above-mentioned positions of the three elements of the crowning head, namely, the crowning throat 48, the presser foot 54, and the plunger 66 are critical to the over-all operation of the crowning head in that such positioning first ensures initial centering of the cap C relative to the container B, then permits the cap C to engage the mouth M of the container prior to the cap being contacted by the presser foot, and then further permits a final centralizing of the cap by the presser foot as crowning pressure is being applied. Further, it is important to note that the lower surface of the plunger 66 which engages the top portion 102 of the cap is generally planar so that the cap can shift laterally with respect to the same, if necessary, during engagement of the cap by the presser foot and during seating of the cap in the cap receiving surface cavity 64 of the presser foot.

Referring now to FIGURE 4 of the drawing which illustrates the second stage of the crowning operation, it will be noted that the crowning cylinder 24 has moved vertically downwardly relative to the container B. As mentioned at the outset, this relative movement may be accomplished by providing the crowning cylinder with the cam follower 28 riding in the cam track of cam 20, thus causing the crowning cylinder 24 to move downwardly

with respect to the body portion 14. Also, it will be understood that the container C could be elevated with respect to the crowning cylinder 24 to accomplish the same crowning operation. Between the position shown in FIGURE 2 and the position shown in FIGURE 4, the container B has moved relative the crowning head 12 to a position where the neck of the container extends into the aperture 84 through the container guide element 82 with the mouth M of the container being positioned above the shoulder 90 in the area defined by the cylindrical bore 88. The container guide element 82 has not as yet moved relative to the sleeve element 34 as it has not come into actual physical contact with the container B. In FIGURE 4, the plunger 66 which is supporting the cap C thereon by the magnet 72 has caused the cap to make initial physical contact with the mouth M of the container B and further downward movement of the cylinder 24 will cause the plunger 66 to begin compression of the very light compensating spring 80 as the presser foot starts its movement toward the cap C and relative to the plunger 66.

Referring next to FIGURE 5, the third stage of the crowning operation has occurred in that the presser foot 54 has moved downwardly with the crowning ring 48 to a position where the top portion 102 and the upper portion of the downwardly depending skirt 104 are fully encompassed in and physically engaging the cap receiving surface cavity 64 of the presser foot. If there is any slight inaccuracy in the position of the cap C relative to the mouth M of container B while in the second stage of the crowning operation, this inaccuracy is compensated for by the cavity 64 as it will centralize the cap C when the presser foot 54 begins to engage the cap. In other words, the cap C can shift laterally with respect to the planar engaging surface of the plunger 66 as it begins seating in the complementary cap receiving cavity 64 of the presser foot 54. Once the presser foot 54 has made full engagement with the cap C as shown in FIGURE 5, the cap will be fully centered on the mouth M of the container B and continued downward movement of the crowning cylinder 24 causes the compensating spring 58 to compress, this spring exerting a predetermined sufficient crowning pressure on the presser foot 54 which is transferred by the presser foot to the cap C and container B. It will be noted that in the third stage of the crowning operation, the container guide element 82 still has not made physical contact with the neck of the container B and thus has not moved relative to the crowning throat ring 48. However, the container guide element 82 has moved closer to the container B.

The final or fourth stage of the crowning operation is best illustrated in FIGURE 6 and the enlarged fragmentary FIGURE 7. While the presser foot 54 is maintaining the predetermined vertical crowning pressure on the cap C and container B, the crowning cylinder 24 has moved still further downwardly so as to move the sleeve element 34 and the crowning throat 48 carried thereby to a position where the edge 106 of the cap is initially engaged by the lower leading end 114 of the crowning throat and then ironed inwardly about the bead of the mouth M as the crowning throat causes the flanged edge to contract. At an intermediate position between the position shown in FIGURE 5 and that shown in FIGURES 6 and 7, the container guide element 82 makes physical contact with the neck of the container B and since it cannot move further downwardly, the throat ring 48 moves relative to the same. As the crowning throat 48 causes the skirt of the cap to be ironed about the bead on the mouth M of the container B, the stretching of the metal in the shell of the cap C causes the pull tab T of the cap to spring upwardly out of the plane of the top portion 102 of the cap. At this point, it is well to note that the external diameter of the plunger 66 is greater than the size of the tab T and consequently when the tab T begins to push upwardly, it can move the plunger 66 upwardly against the light spring pressure of the spring 80 and fit

into the space formerly occupied by the plunger. The magnet 72 which initially held the cap C by its magnetic attraction of the steel disc 108 beneath the shell of the cap, has only enough magnetism to lightly support the shell 104 and this magnetism is easily overcome as well as the spring force of the spring 80 by the tab T springing upwardly due to the ironing of the skirt 104 about the lip of the mouth M of the container B.

It is important to note that during the ironing operation by the throat ring 48 on the skirt 104 of the cap C, the top portion 102 of the cap and at least the upper or curved portion of the skirt 104 of the cap is completely backed up by physical contact with the surface of the cavity 64 of the presser foot 54, the cavity having a complementary shape and size to these portions of the cap. By such an arrangement of applying vertical crowning pressure over this entire area of the cap during the ironing operation of the skirt about the lip of the mouth of the container, there is no chance for the cap to be damaged or for the score lines of the tab T or the metal adjacent to the score lines being torn.

The downward movement of the crowning throat ring 48 is limited by the engagement of the end of the pressure foot stop rod 55 with the upper end of the presser foot 54. The length of rod 55 can be adjusted so as to vary the downward stroke of the throat ring 48 to accommodate different conditions of crowning which would occur if different types of caps or different types of containers such as bottles or cans were used.

After the cap C has been applied to the container B as illustrated in FIGURES 6 and 7, the cylinder 24 is moved away from the crowned container and when the crowned container is completely clear of the container guide element 82, the container is conveyed off of its container supporting platform and the crowning head is ready to receive another crown and apply the same to a new container.

It was mentioned earlier in the specification that the container guide element 82 was provided with a shoulder 90 which functions as an auxiliary cap platform. It will be appreciated that the internal diameter of the opening or aperture 86 at the point of the shoulder 90 is slightly greater than the internal diameter of the throat ring 48 and thus when the throat ring has ironed the cap skirt about the lip of the mouth of the container, the free edge of the skirt will be able to easily pass through the opening at the area of the shoulder 90 in the container guide element 82.

The shoulder 90 comes into effect as a cap supporting platform only when a cap is inadvertently dislodged off of the magnet 72 of plunger 66. It is still possible to crown the container even if this condition occurs as the presser foot 54 has means thereon, namely, the cavity 64, for centralizing the cap.

The crowning head of the present invention described above and illustrated in the drawing fully and efficiently accomplishes the objects and advantages of the present invention. However, it will be perceived by those having skill in the art that certain changes, adjustments, and modifications may be made to the crowning head or to a crowning mechanism incorporating the crowning head of the present invention without departing from the principle and spirit of the invention.

Therefore, the terminology used throughout the specification is for the purpose of description and not limitation, the scope of the invention being defined in the claims.

What is claimed is:

1. In a crowning head for applying to a mouth of a container a crown type cap having a top portion and an annular skirt depending therefrom, the skirt having an outwardly flared free edge, the improvement comprising: means for initially receiving and holding a cap; a presser foot normally positioned above the top portion of the cap when the cap is initially held by said means, said presser foot having a cap receiving surface cavity therein comple-

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mentary in size and shape to the top portion and a portion of the depending annular skirt of the cap; and a throat ring having a bore therein with a diameter sufficient to receive at least a portion of the skirt of the cap but less than the diameter of the outwardly flared edge of the skirt of the cap.

2. The crowning head as claimed in claim 1 in which said presser foot has a bore therein opening to the surface cavity and in which said means for initially receiving and holding a cap includes a plunger slidable in said bore and normally extending below said presser foot when receiving the cap, said plunger including a magnet.

3. The crowning head as claimed in claim 2 in which said plunger includes a nonmagnetic sleeve shielding said magnet from the presser foot and said magnet being mounted within said sleeve.

4. The crowning head as claimed in claim 3 in which said nonmagnetic sleeve of said plunger is brass.

5. In a crowning head of the type movable relative to a container for positioning a cap having a skirt on the mouth thereof and then ironing the skirt of the cap about the mouth of a container, the improvement comprising: a presser foot for centralizing and holding the cap on the mouth of the container, said presser foot having a cap receiving surface cavity therein complementary in size and shape to the top portion and a portion of the depending annular skirt of the cap whereby the cap is positively centered when being moved onto the mouth of the container and whereby the top portion and a portion of the annular skirt is positively backed against the mouth of the container as the skirt is being ironed about the mouth of the container.

6. In a crowning head movable relative to a mouth of a container for applying thereto a crown type cap having a top portion and an annular skirt depending therefrom, the skirt having an outwardly flared free edge and the top portion having a tab formed therein by an incision which is at least partially semicircular and weakened score portions extending from the ends of the incision, the improvement comprising: a throat ring having a bore therein, said throat ring being arranged to engage the free edge of the cap when the cap is positioned on the mouth of a container to stretch and iron the skirt of the cap about the mouth of the container; a presser foot slidably mounted within the bore of the throat ring and movable relative thereto, said presser foot having a bore therein greater in diameter than the tab of said cap; and a plunger mounted within the bore of and slidable with respect to said presser foot, said plunger being capable of upward movement relative said presser foot when said presser foot is applying capping pressure to the cap and said throat ring is ironing the skirt of the cap about the mouth of the container and causing the tab to move upwardly at an angle out of the normal plane of the top portion of the cap.

7. The crowning head as claimed in claim 6 including spring means normally urging said plunger downward with respect to said presser foot, and means to limit downward movement of said plunger to a position where its lower end is slightly below the lower end of said presser foot.

8. The crowning head as claimed in claim 7 in which said plunger has an elongated slot therethrough and in which said limit means includes a pin member carried by said presser foot and extending through the slot in said plunger.

9. The crowning head as claimed in claim 6 in which said presser foot has a cap receiving surface cavity therein complementary in size and shape to the top portion and a portion of the depending annular skirt of the cap.

10. The crowning head as claimed in claim 6 in which said plunger includes a cylindrical nonmagnetic sleeve having a closed bottom bore opening at its lower end and a permanent magnet carried in the bore for initially re-

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ceiving and holding said cap as the cap is being positioned on the mouth of the container.

11. The crowning head as claimed in claim 10 in which said presser foot is provided with a cap receiving surface cavity therein complementary in size and shape to the top portion and a portion of the depending annular skirt of the cap.

12. In a crowning head movable relative to a mouth of a container for applying thereto a crown type cap having a top portion and an annular skirt depending therefrom, the improvement comprising: a presser foot for centralizing the cap on the mouth of the container and applying capping pressure to the cap, said presser foot having a bore therein closed at one end; a plunger mounted in the bore of and slidable with respect to the presser foot; means to limit sliding movement of said plunger relative said presser foot; spring means normally urging said plunger to a position where its lower end extends below the lower end of said presser foot; means on said plunger for receiving and supporting the cap as the cap is being applied to the mouth of the container; and means for ironing the skirt of the cap about the mouth of the container when the cap is being held on the mouth of the container by said presser foot.

13. The crowning head as claimed in claim 12 in which said plunger has its lower end normally extending below the lower end of said presser foot in the order of $\frac{1}{16}$ of an inch.

14. The crowning head as claimed in claim 13 in which said presser foot is provided with cap receiving surface cavity therein complementary in size and shape to the top portion of and a portion of the depending annular skirt of the cap whereby the presser foot assists in centralizing the cap after the cap initially contacts the mouth of the bottle and then backs up the top portion of and the portion of the skirt of the cap as said skirt is being ironed about the mouth of the container.

15. In a crowning head movable relative to a mouth of a container for applying thereto a crown type cap having a top portion and an annular skirt depending therefrom, the skirt having an outwardly flared free edge and the top portion having a tab formed therein by an incision which is at least partially semi-circular and by weakened score portions extending from the ends of the incision, the improvement comprising: a throat ring having a bore therein, said throat ring having its lower end arranged to engage the free edge of the cap when the cap is positioned on the mouth of a container for stretching and ironing the skirt of the cap about the mouth of the container; a presser foot slidably mounted within the bore of the throat ring and generally having its lower end spaced upwardly from the lower end of said throat ring, said presser foot having a cap engaging surface and a bore closed at one end and open to said cap engaging surface; and a plunger mounted within the bore of and slidable with respect to said presser foot, said plunger having a generally planar cap engaging surface and being of a diameter greater than the tab of said cap, said plunger having its lower end normally positioned intermediate the lower end of said throat ring and the lower end of said presser foot, said plunger including a magnet for initially receiving and retaining the cap thereon until the cap engages the mouth of the container and the presser foot applies capping pressure to the cap.

16. The crowning head as claimed in claim 15 including a first spring means to urge said plunger to its normal position with respect to said presser foot and said throat ring and a second spring means to urge said presser foot to its normal position with respect to said throat ring.

17. The crowning head as claimed in claim 15 in which the lower end of said presser foot is spaced one-sixteenth ($\frac{1}{16}$) of an inch from the lower end of said plunger and in which the lower end of said plunger is

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spaced one-sixteenth ($\frac{1}{16}$) of an inch from the lower end of said throat ring.

18. The crowning head as claimed in claim 15 in which the cap engaging surface on the end of said presser foot is a cavity complementary in size and shape to the top portion and the upper portion of the skirt of said cap.

19. The combination as claimed in claim 15 in which said plunger further includes a brass sleeve surrounding said magnet and shielding the same from said presser foot and throat ring.

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20. The crowning head as claimed in claim 15 including a container guide element having an aperture therethrough with a portion thereof complementary in shape to the neck of the container and a second portion cylindrical and of a diameter sufficient to receive the lower end of said throat ring, means operatively supporting said guide element from said throat ring for movement relative to said throat ring.

No references cited.

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