

May 21, 1968

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3,383,836

MACHINES FOR FITTING CLOSURES ON BOTTLES

Filed May 11, 1966

2 Sheets-Sheet 1

FIG. 1

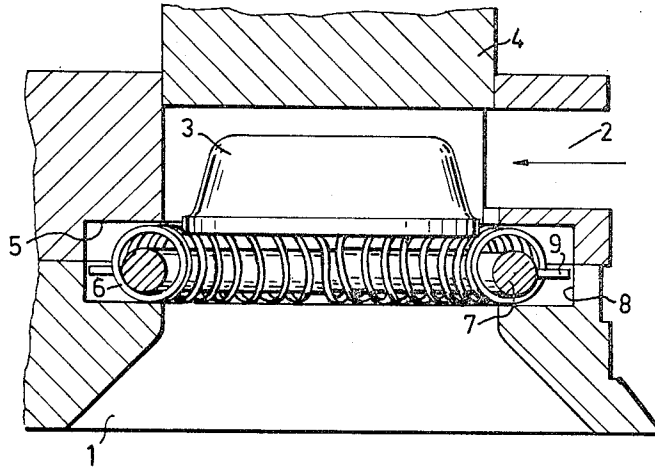
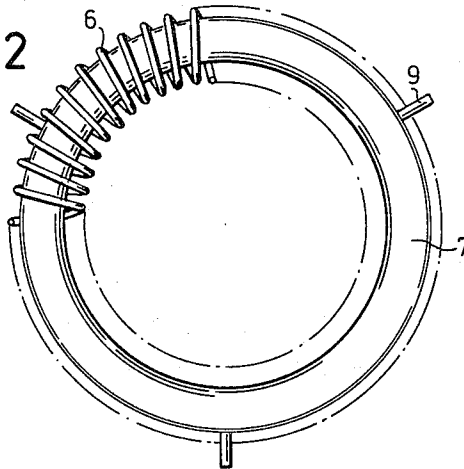


FIG. 2



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FIG. 3

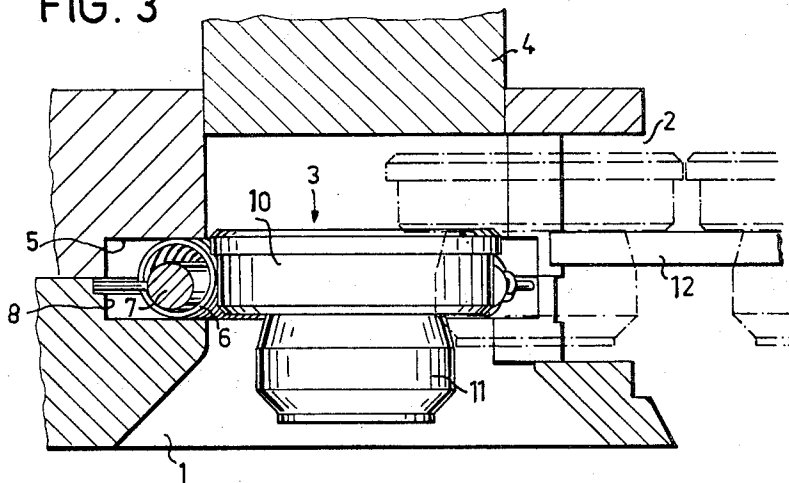
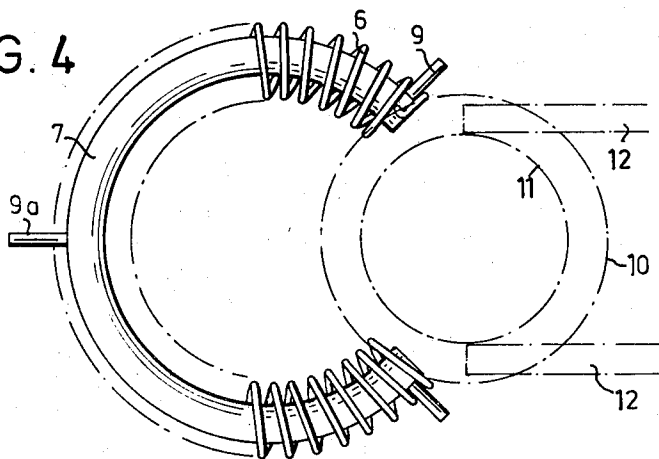


FIG. 4



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MACHINES FOR FITTING CLOSURES ON BOTTLES

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Filed May 11, 1966, Ser. No. 549,196

Claims priority, application Sweden, May 13, 1965,
6,288/65

8 Claims. (Cl. 53—358)

ABSTRACT OF THE DISCLOSURE

It is known in machines for fitting closures on bottles to insert the bottle neck from below into a channel in a head, in which the closure cap is introduced sideways and pressed from above onto the bottle mouth by means of a plunger. It is also known to have an annular spring projecting radially into the channel to support the closure cap before it is pressed onto the bottle. When the bottle with the cap pressed thereon is withdrawn downwards, the cap is drawn through the annular spring, which thereby is momentarily widened.

In order to keep the annular spring centered coaxially with the channel and to damp vibrations of the spring at the withdrawal of the cap, the invention proposes to provide a ring, which is loosely surrounded by the spring and which has pins extending between the windings of the spring. These pins cooperate with guiding surfaces on the head to permit axial movement of the ring while keeping it centered coaxially with the channel.

The ring and the spring can be open to provide a lateral opening for the sideways insertion of caps with a downwardly extending stopper portion.

This invention relates to an improvement in machines for fitting closures on bottles by pressure, comprising a vertical guiding opening for the bottle neck, a lateral opening in the upper end of the guide opening for inserting the closures in the latter, a pressure member movable from above into the guide opening and a radially extensible supporting member extending radially into the guide opening for supporting the bottle closure before pressing it onto the bottle, said supporting member being in the form of an annular spring placed in a peripheral groove surrounding the guide opening.

It has previously been suggested to provide a device of this kind, in which the annular spring is maintained in centered position in the groove by abutments extending axially from the border edge of the groove, the annular spring being urged against said abutments by an initial tension.

In a device of this kind the distance by which the annular spring can project into the guide opening is strongly limited by the fact, that the abutments themselves cannot be allowed to extend radially into the guide opening and must have a certain radial thickness to receive the necessary strength. When the closure is dragged through the annular spring together with the bottle neck which had been inserted therethrough from below, the spring loses every kind of support and at the high velocities prevailing vibrations and impact stresses will arise, which lessen the guiding effect and weakens the strength of the spring.

The invention is based on the principles of providing supporting abutments limiting the contraction of the annular spring towards the axis of the guide opening in such manner, that they instead of cooperating with the outer side of the spring facing the guide opening, cooperate with the inside of the parts of the windings of the spring situated within the groove.

This is according to the invention obtained by means

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of a thoroidal ring surrounded by the windings of the spring with a play and centered relative to the guide opening by means of abutments extending between the spring windings and cooperating with guide surfaces within the groove.

By this device further advantages are obtained. The ring, which by its gravity rests against the spring windings acts as a damper on vibrations within the spring. The device further makes it possible to execute the spring open or with an interruption along its periphery for the insertion of closures, having a long stopper portion extending a considerable distance below an abutment flange adapted to abut against the upper border of the bottle mouth. This makes it possible to fit the closure with a reduced axial height above the annular spring of the lateral opening for inserting the closures and with a relatively reduced axial stroke of the pressure member and to insert the closures into the machine by simple straight horizontal movement to its resting position on the annular spring.

Two examples of embodiments, to which the invention is in no way limited, will be described below with reference to the accompanying drawings.

FIG. 1 is an axial vertical sectional view through the part of the machine comprising the guide opening and the pressure member.

FIG. 2 is plane view of the annular spring and the inner ring associated therewith.

FIG. 3 is a view similar to FIG. 1 of a device with an open annular spring for closures having an oblong stopper portion.

FIG. 4 is a view similar to FIG. 2 of the annular spring and the inner ring of the device according to FIG. 4.

As can be seen from FIGS. 1 and 3 the device has a downwards conically widening guide opening 1, in which the neck of a bottle to be provided with a closure is to be inserted from below. At the upper end of the guide opening 1 there is a lateral opening 2, through which the bottle closures 3 are to be inserted in any known manner. A pressure member or piston 4 is vertically reciprocatably guided in the upper part of the guide opening for pressing the closure 3 on the mouth of a bottle inserted from below. Between the lateral opening 2 and the lower mouth of the guide opening 1 the latter is provided with a peripheral groove 5, in which is lodged an annular spring 6, which is extensible towards the bottom of the groove 5 and which has a portion extending into the guide opening to form an abutment for supporting the closure 3 in centered position. The windings of the annular spring 6 enclose with a certain play a thoroidal, solid ring 7, which is slidably guided in vertical direction along the bottom wall 8 of the groove 5 by means of pins 9 extending radially from the ring 7 between the windings of the spring.

When the bottle neck has been inserted from below into the guide opening 1 and through the annular spring 6 and when the closure 3 by means of the piston 4 has been pressed onto the bottle mouth and the bottle thereafter is withdrawn downwards, the annular spring 6 is somewhat extended by the border of the closure 3, the inner ring 7 sinks a little downwards relative to the spring and when the closures have passed through the annular spring the ring 7 will by its inertia damp the return contraction of the annular spring to the initial form. Simultaneously the spring is maintained in centered position within the guide opening by the fact, that the inner ring 7 is kept centered within the groove 5 by the pins 9.

The embodiment illustrated in FIGS. 1 and 2 is specially adapted for flat closures of the cap-type generally used for closing bottles containing carbonated beverages in which a stopper portion to be inserted into the bottle neck practically or not at all extends beyond the lower border of the collar portion of the cap.

For closures of the type shown in FIG. 3 having a flange 10 adapted to rest against the upper edge of the bottle mouth and a stopper portion 11 extending a considerable distance below the flange it would, if the embodiment of FIGS. 1 and 2 was used, be necessary to give the lateral opening 2 a considerable height above the annular spring and the closure would have to be displaced downwards a considerable distance after its insertion into the guide opening to be brought to the position illustrated in FIG. 3. A reduction of the total height of the machine, a simplification of the guiding of the closure to the position ready for fitting on the bottle, reduction of the necessary working stroke of the piston 4 and a simpler and more secure function of the machine are obtained according to this embodiment by forming the spring and the plain ring 7 therein as open rings with a space between the free ends thereof of sufficient width to permit the passage of the stopper portion 11 of the closure 3 through said space.

In the embodiment illustrated in FIG. 3 the flange 10 of the closure 3 is shown to have a slightly outwardly protruding upper edge which rests upon the inwards projecting portion of the annular spring to maintain the closure in vertical position and with the lower part of the periphery of the flange 10 centered within the inside of the annular spring. By placing two pins 9 near the outermost ends of the ring 7, the ends of the spring 6 can be hooked on said pins so as to permit the necessary initial tensioning of the spring, so that it can form an inwards projecting, resiliently extensible support for the closure. One of the pins, preferably the one with the reference 9a in FIG. 4, extends into a recess in the bottom surface 8 of the groove to prevent the ring 7 from being turned. In this embodiment it will be possible independently of the downwards extending stopper portions of the closures to push them sideways directly with the underside of the flange 10 onto the upper side of the annular spring, e.g. by means of guiders 12 cooperating with the undersides of the flanges 10. Closures on their way towards the inside of the guide opening 1 are shown in mixed lines in FIGS. 3 and 4. It is, however, evident, that the lateral opening 2 must have a height corresponding to the total height of the closure, but this height can be obtained by a downwards extension of the lateral opening below the level of the spring 6, which does not demand special structural solutions and makes it possible to keep a sideways insertion in combination with a short stroke of the pressure piston 4.

The invention is not limited to the embodiments above described and illustrated and can be subject to several modifications within the scope of the appended claims. Thus for guiding the ring 7 in vertical direction within the groove, instead of using horizontal pins 9 engaging the bottom wall of the groove, it is possible to provide pins extending axially from the ring 7 between the windings of the spring and engaging axial bores in the upper or lower horizontal sides of the grooves or in both.

I claim:

1. In a machine for fitting closures on bottles by pressure, comprising a vertical guide opening for the bottle neck, a lateral opening in the upper part of the guide opening for inserting the closures in the latter, a pressure member vertically displaceably guided in the upper end of the guide opening and a radially resilient support projecting radially into the guide opening for supporting the closures before pressing and having the form of an annular spring located within a groove peripherally surrounding the guide opening; a thoroidal inner ring surrounded with a play by the windings of the annular spring and centered relative to the guide opening by abutments extending from the thoroidal ring between the windings of the annular spring and engaging guiding surfaces within the groove.

2. A machine as claimed in claim 1, in which the annular spring is mounted on the inner ring with an initial tension.

3. A machine as claimed in claim 1, in which the abutments for centering the inner ring are formed by pins extending radially from the inner ring between the windings thereof, the free ends of said pins slidably engaging guide surfaces within the groove.

4. A machine as claimed in claim 3, in which at least one of the abutments projects into a recess in the bottom wall of the groove.

5. A machine as claimed in claim 1, in which the abutments for centering the inner ring are formed by pins extending axially from the ring between the windings of the annular spring, the ends of said pins extending outside the spring being displaceably guided in axial bores opening towards the inside of the groove.

6. A machine according to claim 1 in which both the annular spring and the ring enclosed thereby have uninterrupted, closed annular shape.

7. A machine according to claim 1, in which both the annular spring and the inner ring are interrupted to form an opening between two free ends for the sideways insertion of the downward extending portion of bottle closures having an upper flange to be inserted above the annular spring.

8. A machine according to claim 3 in which the ring has centering abutments near its two free ends limiting said opening, the annular spring being kept under initial tension with its ends engaging said two abutments.

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