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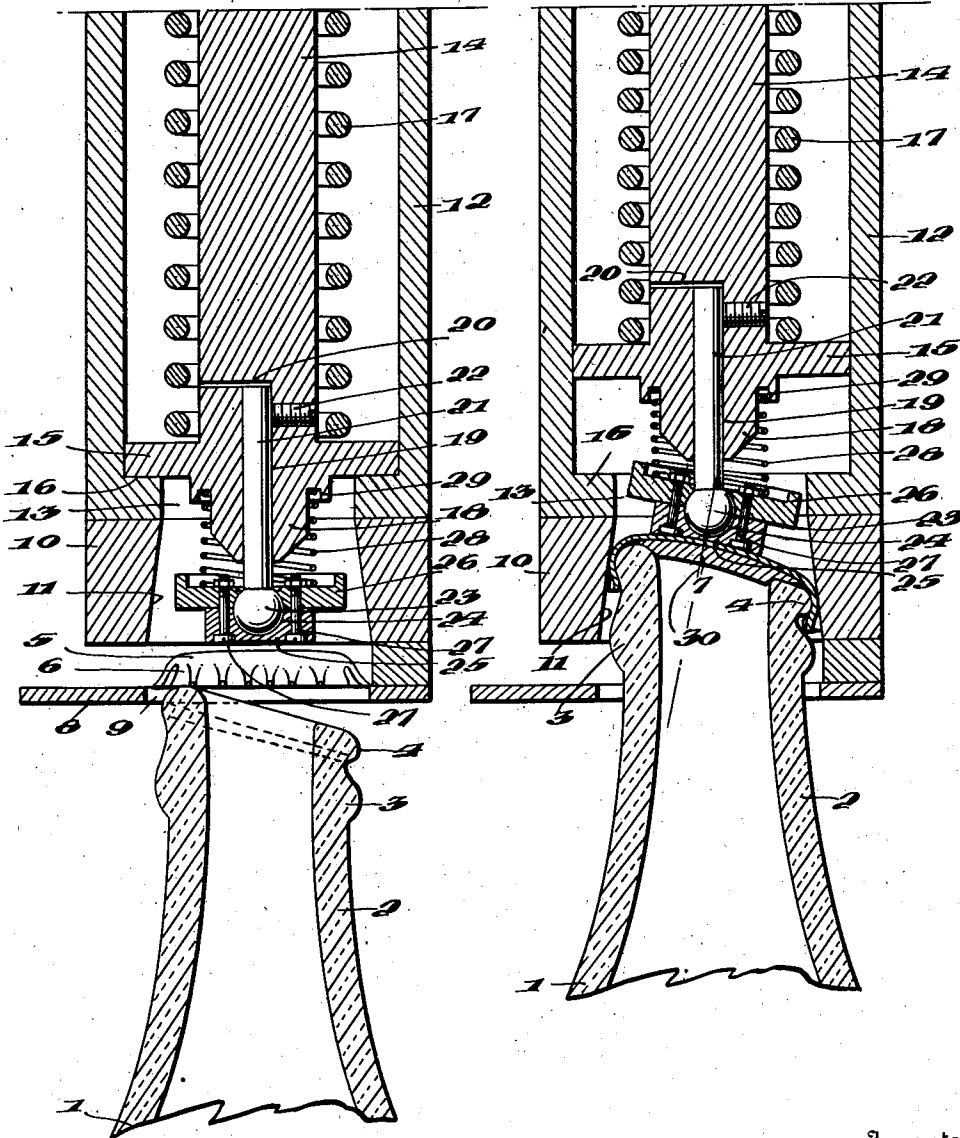
2,427,376

BOTTLE CROWNING MACHINE

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Fig. 1.

Fig. 2.



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BOTTLE CROWNING MACHINE

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9 Claims. (Cl. 226—84)

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This application is a continuation-in-part of my prior application filed January 3, 1940, Serial No. 312,279, now Patent No. 2,340,353, granted February 1, 1944.

This invention relates to an improvement in Bottle crowning machines, and more particularly to crowning heads that are generally used in connection with low pressure filling machines, i. e., a crowning machine that is separate from the beverage filling machine, and is especially designed to crown either a bottle having a slanting mouth or the ordinary beverage bottle without any change whatever in the machine.

The ordinary beverage bottle has a crowning ring and mouth normal to the axis of the bottle, whereas a slanting mouth bottle, shown in my prior patent, No. 1,773,291, and in my prior application on Bottles, Serial No. 312,279, filed January 3, 1940, now Patent No. 2,340,353, has a crowning ring and mouth arranged in a plane at an acute angle to the axis of the bottle.

The crown cap is provided with an apron on the periphery thereof adapted to be held on the mouth of the bottle and crimped by the crowning head around the crowning ring. During the crimping action, pressure must be applied uniformly to the upper surface of the crown cap to provide for effective sealing of the crown on the bottle.

The crowning heads used heretofore for crowning ordinary bottles cannot be used to crown a bottle with a slanting mouth, because the fixed end of the crown plunger will not apply uniform pressure to the cap when applied to the slanting mouth.

The object of this invention is to improve the construction of the crowning head to adapt it to crown either a bottle with a slanting mouth or an ordinary bottle, and to apply uniform pressure to the crown cap on either bottle for effective sealing action, this adaptation to either type of bottle being possible automatically without change in the head.

This object is accomplished by the combination of a throat, a crown plunger terminating in a shoe that has a universal connection with the plunger, preferably as near to the bottom of the shoe as it is mechanically possible to make this, has the positive effect of pressing the side of the mouth of the bottle together with the adjacent portion of the crown against the inside wall of the throat and lessening the pressure on the opposite or lower side of the mouth of the bottle but not with sufficiently lessened pressure to affect the crowning operation. In addition to the

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sidewise pressure there is still the inherent pressure all around the apron of the crown caused by the downward motion and accompanying pressure of the crowning head assembly which is required to complete the crowning operation.

I have shown a preferred embodiment of the invention in the accompanying drawings, in which:

Fig. 1 is a vertical section through the crowning head and slanting mouth bottle, with the shoe in normal position before the crowning operation; and

Fig. 2 is a similar view, with the shoe in crimping position.

The drawings show the invention applied to a slanting mouth bottle of the character set forth in my prior application, Serial No. 312,279, filed January 3, 1940. The bottle is designated generally by the numeral 1 and has the usual neck 2 axially aligned with the length of the bottle. At the upper end of the neck 2 is a reinforcing or holding ring 3 terminating in a crowning ring 4. Just above the bottle is shown the crowning head assembly.

The standard crown is shown at 5, having a peripheral apron 6 adapted to be crimped around the ring 4. The inside of the crown 5 is lined with a gasket 7 of yieldable material such as cork in position to extend over the mouth of the bottle when the crown is sealed thereon.

The crowning head assembly includes a crown platform 8 having an opening 9 therein large enough to receive the mouth and neck portion of the bottle, as shown in Fig. 2. Above the platform 8 is the crimping throat 10 having a conical inner wall 11 adapted to crimp or bend the apron 6 onto the crowning ring 4.

A casing 12 is connected with the throat 10 and has an opening 13 in the lower end thereof registering with the conical wall 11. Housed within the casing 12 is a crown plunger 14 adapted for relative reciprocating movement in the usual way. A guide ring 15 on the plunger 14 is in position to be seated upon a shoulder 16 in the casing 12, as shown in Fig. 1. The usual coiled spring 17 is sleeved over the plunger 14 and bears against the guide ring 15, normally tending to urge the plunger downward. The tension of the spring 17 may be adjusted at its upper end in the usual way.

The lower end portion 18, below the guide ring 15, is reduced in diameter, and has a bore 19 extending therein, preferably vented at 20. A pin 21 is mounted in the bore 19 and adjustably secured in place therein by a set screw 22. The

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lower end of the pin 21 is formed in a ball portion 23.

The ball portion 23 is fitted in a socket 24 formed in a plunger shoe. This shoe is shown as consisting of a head member 25 and a plate 26 detachably secured together on opposite sides of the ball portion 23 by screws 27. The head member 25 is shown as slightly concave at the bottom to accommodate the slightly convex surface of the crown cap. A coiled spring 28 is interposed between the plate 26 and a seat 29 around the reduced end 18 of the plunger.

The coiled spring 28 holds the crown plunger shoe in horizontal position so that the bottom thereof will be parallel with the top of the crown 5 before crowning action takes place and also so that the shoe will be held in horizontal position before the crown is inserted into place for application to the crowning ring. Otherwise, the shoe might assume an oblique position, tilting into the path of the crown on the platform 8, and the edge thereof be in the way of the movement of the crown into position.

In the operation of the crowning head, the bottles would be presented to the head in the usual manner for successive application of crown caps thereon. The bottle is held substantially in the position shown in Fig. 1 while the crowning head is moved downward thereover to the position shown in Fig. 2 to crimp the crown onto the crowning ring 4.

Referring to Fig. 1, the crown 5 is shown in position over the mouth of the bottle; the crowning head assembly has moved downward permitting the crown 5 to be engaged with the extreme top of the mouth of the bottle, and immediately thereafter the crown plunger shoe 25—26 engages the top of the crown. With a slightly further movement of the crown plunger shoe 25—26 downward the entire area of the bottom of the shoe is in contact with the top of the crown. From then on until the downward movement of the crown plunger is completed the pressure of the shoe on top of the crown increases thus causing the gasket 7 of yielding material to be compressed uniformly throughout the circumference of the mouth of the bottle. At the same time, the casing 12 has moved down moving the throat 10 over the crown on the mouth of the bottle. The yielding mounting of the plunger 14 causes the shoe to apply pressure to the crown as the conical wall 11 causes the apron 3 to be crimped around the crowning ring 4 throughout the circumference of the bottle.

In crowning an ordinary bottle having a flat top or with a mouth that is perpendicular to the axis of the bottle, the crown plunger shoe engages the top of the crown and holds the same downward against the top of the crowning ring with the same pressure all around the mouth of the bottle. The apron of the crown thereby engages the inner wall of the throat with the same degree of pressure throughout the entire circumference of the throat, and consequently, there is an equal pressure throughout the periphery of the apron of the crown. Where the throat is formed with a cylindrical, rather than a conic, inner wall it is usually so constructed as to permit a certain amount of yielding to prevent breaking the mouth of the bottle.

In crowning a bottle having a slanting mouth, the crown plunger shoe 25—26 has its axis changed from that coincident with the axis of the bottle to that represented by the line 30, and the bottom face of the crown plunger shoe 25—26

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is, of course, at right angles to this inclined axis and parallel and in contact with the top face of the crown 5. While there is enough downward pressure throughout the entire periphery of the apron of the crown together with pressure exerted on the yielding gasket 7 to hold the gas pressure inside the bottle, there is considerably more pressure exerted against the inside face of the throat at the high side of the bottle than at the low side thereof. The throat presents lateral pressure against the high side of the bottle in a direction parallel with the slanting line of pressure of the inclined plunger shoe, which is not applied at the low side of the bottle. This means that in applying a crown to a bottle having a slanting mouth with a plunger equipped with a shoe connected therewith through a universal joint, more pressure will be exerted by the bottle and crown against the wall of the throat at the high side of the mouth of the bottle than is exerted against the wall of the throat at the low side of the mouth of the bottle. At the latter point, only the crimping pressure is applied due to the forcing of the throat over the bottle. This makes it possible to apply the crowning pressure on top of the crown without tipping over the bottle. At the same time the shoe presses the crown and gasket tightly against the mouth of the bottle so that the crimping by the throat will hold the crown in this sealed position.

This is accomplished without regard to the circumferential position of the bottle, or whether the slanting mouth bottles are mixed in with ordinary bottles as presented to the crowning head. The universal mounting of the shoe assures uniform crowning of the respective types of bottles as presented.

In the crowning of the ordinary beverage bottles, practically all crowning machines have some form of compensating mechanism designed to prevent breakage of the bottles that may be slightly longer or may have a slightly over-size crowning ring. These devices operate in such a way as to become inoperative at the moment when sufficient pressure has been exerted on the crown and then permit the head to complete its downward movement to the full length of the stroke. I have not shown any compensating mechanism in the drawings because the crown plunger, universally mounted shoe, throat, crown and slanting mouth of the bottle, together with all operative features pertaining thereto, do not interfere with such compensating mechanism; the usual mechanism may be used in the usual way.

I claim:

1. In a machine for applying a crown cap to a bottle having a slanting mouth, the combination of a crown plunger, a pin secured to the crown plunger and extending downwardly therefrom with a ball on the lower end thereof, a crowning head including top and bottom plates embracing the ball and secured thereon for universal movement, and a coiled spring sleeved over the pin and interposed between the head and plunger tending to maintain the head in a level position relative to the plunger.

2. In a machine for applying a crown cap to a container having a slanting mouth, the combination of means for applying a cap on the mouth of the container, a head for applying pressure to the cap on the mouth, means mounting said head for universal movement, and means normally tending to hold the head in a position normal to the axis of the container.

3. In a machine for applying a crown cap to

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a container having a slanting mouth, the combination of a crown plunger, a pin having telescopic connection with the crown plunger, means for detachably connecting the pin with the plunger, a head for applying pressure to the cap on the mouth, means mounting said head on the pin for universal movement, and resilient means bearing upon the head and tending to hold the head in a level position.

4. In a machine for applying a crown cap to a container having a slanting mouth, the combination of annular means adapted to surround the mouth of the container, pressure applying means including a shoe in position to engage the cap on the container in said annular means for applying pressure thereto, and means mounting said shoe for universal movement to conform to the slant of the cap on the slanting mouth of the container, said universal mounting means being normally located in the annular means when the shoe bears on the cap on the bottle.

5. In a machine for applying a crown cap to a container having a slanting mouth, the combination of annular means adapted to surround the mouth of the container, pressure applying means including a shoe in position to engage the cap on the container in said annular means for applying pressure thereto, and means mounting said shoe for universal movement to conform to the slant of the cap on the slanting mouth of the container, said universal mounting means being normally located in the annular means when the shoe bears on the cap on the bottle, said annular means being constructed for sealing the cap on the mouth of the container while held by the pressure applying means.

6. In a machine for applying a crown cap to a container having a slanting mouth, the combination of annular means adapted to surround the mouth of the container, pressure applying means including a shoe in position to engage the cap on the container in said annular means for applying pressure thereto, and means mounting said shoe for universal movement to conform to the slant of the cap on the slanting mouth of the container, said universal mounting means being normally located in the annular means when the shoe bears on the cap on the bottle, said universal mounting means having a center of universal movement in close proximity to the cap-engaging portion of the shoe.

7. In a machine for applying a crown cap to

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a bottle having a slanting mouth, the combination of an annular crimping throat adapted to receive the neck portion of the bottle therein and constructed for crimping the cap on the mouth of the bottle, a crown plunger, a crowning head having an engaging face in position to bear in the throat upon the cap on the slanting mouth of the bottle and apply pressure thereto during the crimping of the cap, and means mounting the crowning head on the plunger for universal movement to conform to the slant of the cap on the mouth of the bottle, said universal mounting means being located normally in the throat when the head bears on the cap on the bottle.

8. In a machine for applying a crown cap to a bottle having a slanting mouth, the combination of an annular crimping throat adapted to receive the neck portion of the bottle therein and constructed for crimping the cap on the mouth of the bottle, a crown plunger, a crowning head having an engaging face in position to bear upon the cap on the slanting mouth of the bottle and apply pressure thereto during the crimping of the cap, means mounting the crowning head on the plunger for universal movement to conform to the slant of the cap on the mouth of the bottle, and means normally tending to maintain the crowning head in a level position relative to the crown plunger.

9. In a machine for applying a crown cap to a bottle having a slanting mouth, the combination of a crown plunger, a pin secured to the crown plunger and extending downwardly therefrom with a ball on the lower end thereof, and a crowning head including top and bottom plates substantially flat throughout the major portion of the area of the head and divided on a line substantially at the center of the ball and embracing the ball for universal movement relative thereto, and means detachably connecting the plates together for replacement.

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REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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