G. KIRKEGAARD.

BOTTLE FILLING AND CAPPING MACHINE.

APPLICATION FILED FEB. 20, 1907.

924,360. **Patented June 8, 1909.**

2 SHEETS—SHEET 1.

Fig. 1.

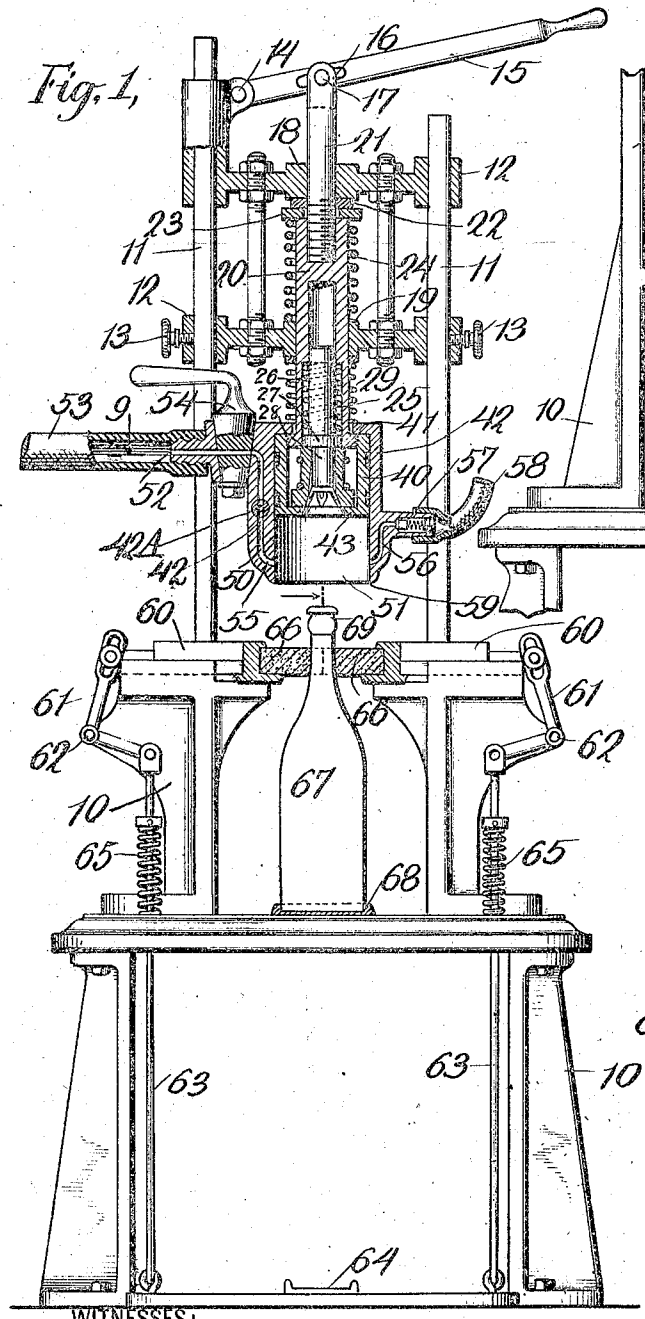


Fig. 2.

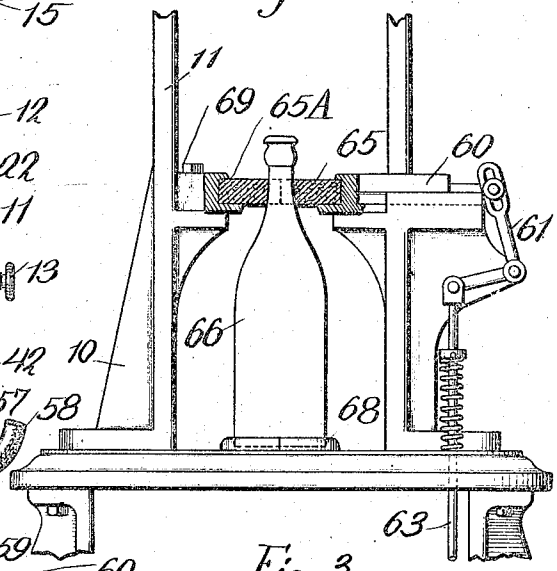


Fig. 3

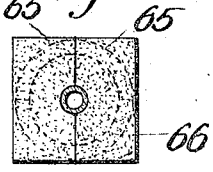
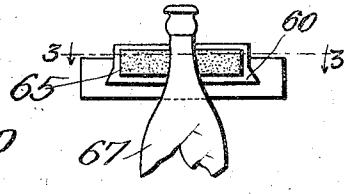


Fig. 4



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2 SHEETS—SHEET 2.

Fig. 5,

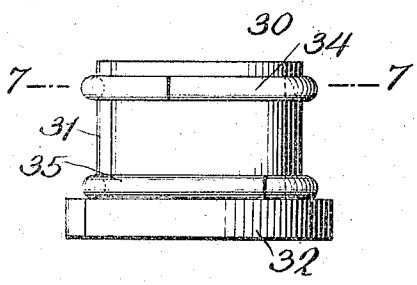


Fig. 6,

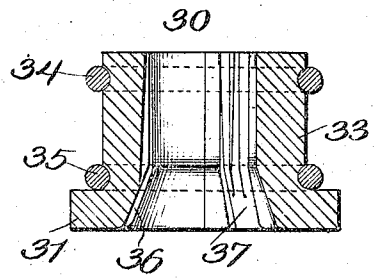


Fig. 7,

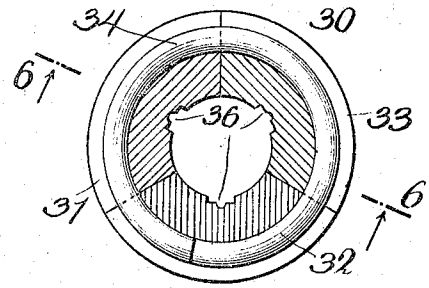


Fig. 8,

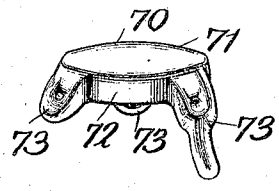
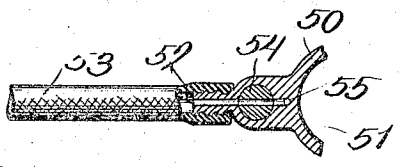


Fig. 9,



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UNITED STATES PATENT OFFICE.

GEORG KIRKEGAARD, OF NEW YORK, N. Y., ASSIGNOR TO IMPERIAL STOPPER COMPANY, A CORPORATION OF MAINE.

BOTTLE FILLING AND CAPPING MACHINE.

No. 924,360. Specification of Letters Patent. Patented June 8, 1909.

Application filed February 20, 1907. Serial No. 358,475.

To all whom it may concern:

Be it known that I, GEORG KIRKEGAARD, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, United States of America, have invented certain new and useful Improvements in Bottle Filling and Capping Machines, of which the following is a specification.

My invention relates to a bottle filling and capping machine and its object is to provide an efficient apparatus for securing bottle stoppers or caps over the mouths of bottles or jars which have been filled under pressure.

I will describe my invention in the following specification and point out the novel features thereof in claims.

Referring to the drawings, Figure 1 shows in side elevation, partly in section, my improved bottle capping machine. Fig. 2 shows in side elevation, partly in section, a modified form of one part of the mechanism shown in Fig. 1. Fig. 3 is a sectional plan view of a closing device which may be applied to the neck of a bottle, the section being taken through the line 3—3 of Fig. 4. Fig. 4 is a sectional side elevation showing this closing device. Fig. 5 is a side elevation of a bottle capping head which I have invented and which I use in carrying out this invention. Fig. 6 is a sectional side elevation of the structure shown in Fig. 5. Fig. 7 is a plan view of the bottle capping head which is shown in Figs. 5 and 6. This bottle capping head has been made the subject of a separate application for patent filed by me under date of October 1, 1906, Serial Number 336,831. Fig. 8 is a perspective view of a bottle cap which I have invented and which may be used in conjunction with the present invention for capping bottles. Fig. 9 is a sectional plan view of a filling valve and its associated parts, the section being taken on the line 9 of Fig. 1.

Like characters of reference designate corresponding parts in all of the figures.

10 designates a base or framework upon which the various parts of my apparatus are mounted. 11, 11 are vertical standards connected with this framework and arranged to support certain of the parts. 12 designates a head or supporting-carriage slidably mounted upon these standards and arranged to be held thereon at desired heights by means of hand screws 13, 13. At a point 14 on this supporting-carriage is pivoted a hand lever 15. 16 designates a slot in this hand lever. A pin 17 is arranged to pass through the slot 16.

20 designates a spindle slidably mounted in the supporting-carriage 12. A connecting shaft 21 is secured into the upper end of this spindle and locked thereto by means of a nut 22. A collar 23 may be interposed between this nut and the top of the spindle. The spindle and the connecting shaft are suitably guided by the supporting-carriage at 18 and 19. A compression spring 24 between the part 19 of the supporting-carriage 12 and the collar 23 serves the purpose of normally maintaining the spindle and its associated parts in their upper position. The nut 22 striking upon the portion 18 of the supporting-carriage limits the upward movement of these parts. The spindle is hollow and is arranged to carry a compression shaft 25 which is pressed outward from the spindle by means of a compression spring 26. This compression shaft 25 is constructed to form a shoulder 27 and a plunger 28 which extends below it and which is somewhat smaller in diameter than the shoulder 27.

30 designates a forming-head which is constructed of three sectors 31, 32 and 33, which are substantially alike in construction and which are held together by means of springs 34 and 35. The inner surface of each of these sectors is provided with a cam groove 36. The construction and operation of this forming-head are specifically described in my former application for patent Serial Number 336,831.

40 designates a piston which is attached to the lower end of spindle 20 as is shown at 41. This piston is arranged to carry two packing rings 42, 42. The lower portion of the piston is provided with an annular rim 43 which extends inward under the forming-head 30 and therefore holds the latter between this rim and the lower end of the spindle 20. This rim 43 also prevents the compression spring 26 from forcing the compression shaft and forming-head out of the spindle 20.

50 designates a casing which forms a cylindrical filling chamber 51. The upper portion of this casing extends over the lower end of the spindle 20 and is supported thereby.

52 designates an inlet port to which a supply-pipe 53 is connected. 54 is a valve

which connects this inlet port with the cylindrical filling chamber through a second port 55.

56 is an outlet passage from the cylindrical filling chamber which is connected with the discharge-pipe 58 through a safety valve 57 of any well known construction.

A spring 29 may be interposed between the portion 19 of the supporting-carriage 12 and upper part of the filling chamber casing 50. The lower end of this cylindrical filling chamber casing 50 is constructed to form a somewhat sharp edge as is shown at 59.

60, 60 designate a pair of slides which are horizontally guided in properly constructed slots in the supporting-frame 10. These slides 60 are connected by means of bell-crank levers 61, 61, which are pivoted at 62, 62 in the supporting-frame 10, with vertical rods 63, 63 which are in turn connected with a treadle 64. These vertical rods 63, 63 are arranged to be pressed upward by means of springs 65, 65 to move the slides 60, 60 outward.

66, 66 designate two packing-blocks of rubber or other suitable material which are mounted upon the slides 60, 60, and each of these packing-blocks is provided with a semi-circular opening which, together, are adapted to fit tightly around the neck of a bottle 67. In the modification of my apparatus which I have shown in Fig. 2 there is but one of these slides 60 shown with its associated packing-block 66. This slot is connected as before described with a vertical rod 63 through the bell-crank lever 61. In this case another packing-block 66^A is arranged to be permanently attached to a portion of the supporting-frame 10 by means of a bolt 69.

70 designates a bottle cap which I have invented and which may be applied to the necks of bottles by the apparatus which forms the subject of the present invention. This bottle cap comprises a disk 71 inside of which may be a lining of cork or other suitable material, a depending annular flange 72 and a plurality of depending fingers 73, 73.

In operating this device a bottle 67 is placed upon a portion 68 of the supporting-frame 10 which is provided for this purpose. The operator then depresses the treadle 64 and thereby forces the packing-blocks or collars 66, 66 in against the neck of the bottle 67. The supporting-carriage 12 is then moved downward until the lower edge 59 of the cylindrical filling chamber 51 is brought into close contact with the packing-collar 66 and is forced into the latter slightly by means of the spring 29. The sharp edge of the casing 50 will cause the latter to be depressed somewhat into the resilient surface of the packing-collars, and the under portions of the slides 60 are constructed as shown to come directly underneath this edge in order to firmly support the packing. When the parts have been thus moved into the desired position they may be held therein by means of the hand screws 13, 13. The valve 54 may then be turned to open a passage from the supply pipe 53 to the cylindrical filling chamber and the desired fluid will thereby be forced into the bottle 67.

The parts above described will form means for retaining pressure about the mouth of the bottle so that the pressure from the supply pipe 53 will be maintained in the bottle itself. A cap 70 has been placed upon the lower end of the compression shaft 25 and retained in position by the forming-head 30. If desired the compression shaft 25 may be magnetized to assist in retaining the cap in its proper position as the cap itself is generally constructed of magnetic material. Now, when the lever 15 is moved downward the compression shaft with its cap is moved down until the latter is arrested by coming in contact with the mouth of the bottle. A further movement of the lever 15 will cause this cap to be pressed tightly down upon the bottle under the action of spring 26 and the packing material within the cap will thus become forcibly compressed. The forming-head 30 is then moved down past the mouth of the bottle and the cam grooves 36 in the forming-head will cause the fingers or lugs 73, 73 to be pressed in under the rim or bead 69 about the mouth of the bottle. The forming-head is constructed as shown of separate sectors to prevent undue pressure upon the parts from breaking the bottle. During the downward movement of the cap-applying head, the space in the filling chamber around the bottle neck becomes more and more restricted, owing to the downward movement of the piston 43 in its cylindrical bore. The fluid in this chamber is accordingly expelled outward through passage 56 and pipe 58, and when the piston has fully descended to the point where the cap applying operation takes place, almost all the entire body of this fluid is expelled. At this time the bottle neck projects upward into the cavity of the piston 43 and the latter rests upon the flat upper surface of the packing blocks 65. Owing to the special shape of the piston, the amount of fluid which is retained in the bore and spilled during the removal of the bottle, is comparatively slight. It may be seen that the pressure about the mouth of the bottle is maintained at all times during this operation. If desired an auxiliary valve 42^A may be inserted in the passage 42 in order to increase this pressure slightly during the operation. If the pressure becomes too high for any cause the safety valve 57 will release it. The lever 15 will now be released and the spring 24 will cause the latter and its connected parts to be re-

turned to their former position. The supporting-carriage 12 may now be raised to remove the filling chamber from the bottle and the treadle may be released to cause the packing-collars to be moved away from the neck of the bottle.

It is to be understood that the rim or shoulder 43 of the piston 40 which supports the forming-head 30 upon the spindle 20 may be constructed to hold these parts loosely in order to leave the various sectors of the forming-head free to move outward against the action of the springs 34 and 35.

I have described my invention as applied to a bottle cap of specific construction in order to illustrate my improved apparatus. It may, however, be applied to other forms of bottle caps with very slight modification of the parts.

What I claim is.—

1. In a bottle filling and capping machine, the combination of a pair of packing-collars, means for moving said collars together around the neck of a bottle, a casing having an inlet orifice and arranged to form a filling chamber, means for moving said filling chamber down against the packing-collars to inclose the mouth of the bottle, and means within the inclosure formed by the casing and packing collars for capping the bottle.

2. In a bottle filling and capping machine, the combination of a supporting-frame, a slide therein transverse to the axis of a bottle, packing actuated by said slide to surround the neck of a bottle, a casing having an inlet orifice and arranged to form a filling chamber, said casing being arranged to be moved down parallel with the axis of the bottle against the packing to inclose the mouth of the bottle, and means within the inclosure formed by the casing and packing collars for capping the bottle.

3. In a bottle filling and capping machine, the combination of a supporting-frame, slides therein, mechanism for actuating the slides transversely to the axis of a bottle, packing collars carried by the slides and arranged to surround the neck of a bottle, a casing having an inlet orifice and arranged to form a filling chamber, said casing being arranged to be moved down against the packing-collars to inclose the mouth of a bottle, means for holding the casing against the packing-collars under pressure, and means within the inclosure formed by the casing and packing collars for capping the bottle.

4. In a bottle filling and capping machine, the combination of a frame arranged to form a support for a bottle, slides loosely mounted in said frame, resilient packing-collars carried by said slides, mechanism including levers connected with the slides, springs arranged to actuate the slides in one direction, a treadle arranged to actuate the slides in the opposite direction to cause the packing-collars to surround the neck of a bottle upon the supporting-frame, a casing having an inlet orifice and arranged to form a filling chamber, said casing arranged to be moved down at right-angles to the movement of the packing-collars against the packing-collars to inclose the mouth of a bottle, means for holding the casing against the packing-collars under pressure, and means within the inclosure formed by the casing and the packing-collars for capping the bottle.

5. In a bottle filling and capping machine, the combination of a frame arranged to form a support for a bottle, horizontally disposed slides loosely mounted in said frame, resilient packing-collars carried by said slides, mechanism including levers connected with the slides, springs arranged to actuate the slides in one direction, a treadle arranged to actuate the slides in the opposite direction to cause the packing-collars to surround the neck of a bottle upon the supporting-frame, a casing arranged to form a cylindrical filling chamber having an inlet passage, a valve for controlling the inlet passage, a safety valve connected with the filling chamber; standards for supporting the casing, said casing being arranged to be moved down upon the standards until it meets the packing-collars to inclose the mouth of the bottle, means for holding the casing against the packing-collars under pressure, and means within the inclosure formed by the casing and the packing-collars for capping the bottle.

6. In a bottle filling machine, a part having a cylindrical bore, a piston having capping means working in said bore, means for closing the open end of said bore and adapted to embrace a bottle whereby the neck of the latter projects into said bore, means for depressing said piston with its capping means onto said bottle, said piston having a hollow portion snugly fitting the bottle neck, whereby the clearance is made a minimum when the piston is depressed, and means for supplying fluid to the cavity of said bore.

7. In a bottle filling machine, a part having a cylindrical bore, a piston having capping means movable in said bore, means adapted to close around a bottle neck and close the open end of said bore, means for supplying fluid to said bore, and means for depressing said piston into intimate proximity with the means for closing the lower end of said bore, said piston having a cavity to receive the bottle neck, whereby the clearance is reduced to a minimum amount during the filling action.

8. In a bottle filling machine, a part having a cylindrical bore, a piston working in said bore, capping means within said piston, and means separate from said piston and

coöperating therewith to close the open end of said bore and to contract about the neck of a bottle.

9. In a bottle filling machine, a carriage having a cylindrical bore, a spindle having a piston working in said bore, means for resiliently depressing said carriage when the spindle is depressed, means for limiting the movement of the carriage and contracting about the neck of the bottle, and capping means within said piston.

10. In a bottle filling machine, a depressible carriage having a cylindrical bore, a spindle having a piston working in said bore, capping means within said piston, means for supplying fluid to the lower portion of said bore, a fluid pressure relief valve communicating with the lower end of said bore, and means adapted to close the lower end of said bore and contract about the neck of a bottle.

11. In combination, a carriage having a cylindrical bore, a spindle having a piston working in said bore, capping means within said piston, a plurality of slides moving transversely to the path of movement of said carriage, and packing blocks carried by said slides and adapted to embrace the neck of a bottle.

12. In combination, a depressible carriage having a bore, a spindle having a piston working in said bore, capping means within said piston, means for supplying fluid to the lower portion of said bore, a pair of slides in the path of depression of said carriage, and packing blocks carried by said slides and adapted to contract about a bottle and close the lower end of said bore.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORG KIRKEGAARD.

Witnesses:

ERNEST W. MARSHALL,

ELLA TUCH.