T. A. NISSINEN.

BOTTLE CAPPING MACHINE.

APPLICATION FILED JAN. 4, 1912.

1,043,132. **Patented Nov. 5, 1912.**

Fig. 1.

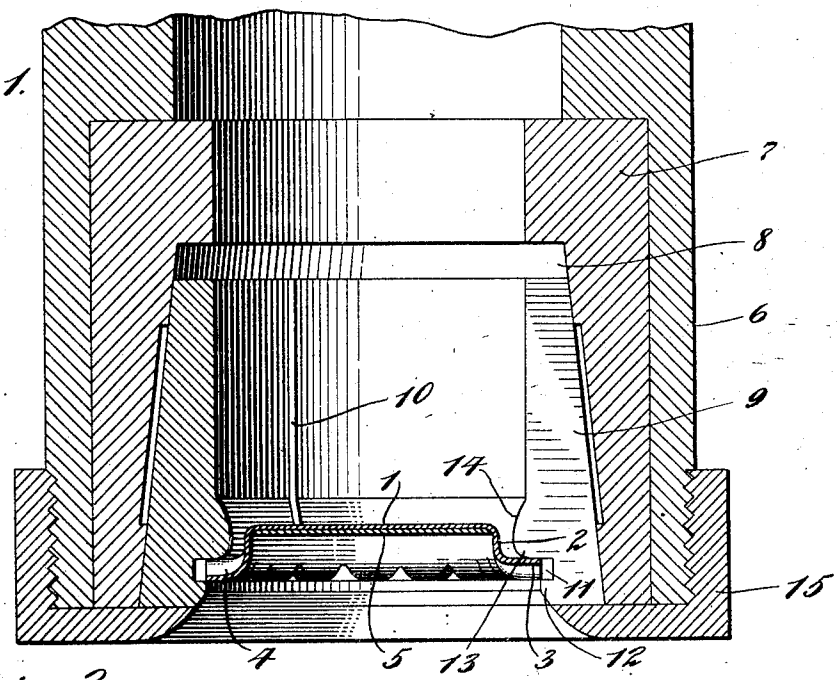

Fig. 2.

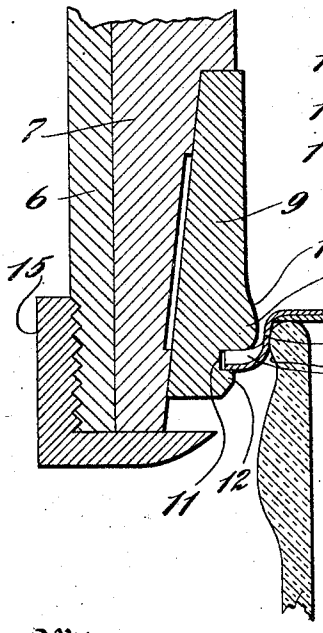

Fig. 3.

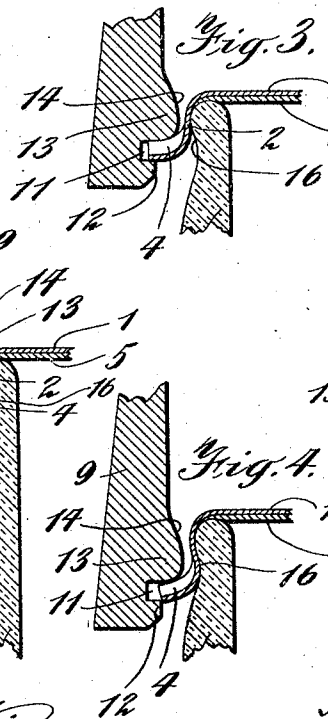

Fig. 5.

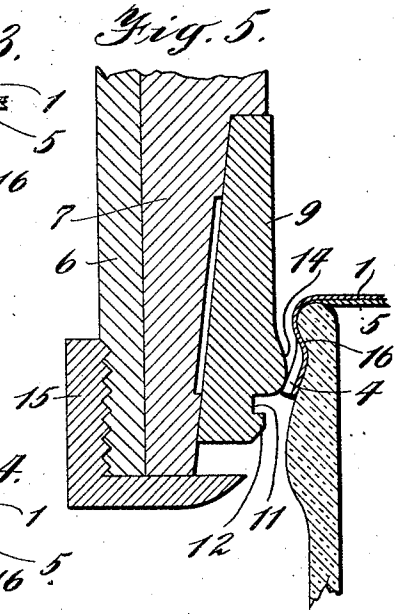

Fig. 4.

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UNITED STATES PATENT OFFICE.

TOIMI A. NISSINEN, OF NEW YORK, N. Y., ASSIGNOR TO FREDERICK G. ZINSSER, OF HASTINGS-UPON-HUDSON, NEW YORK.

BOTTLE-CAPPING MACHINE.

1,043,132. Specification of Letters Patent. Patented Nov. 5, 1912.

Application filed January 4, 1912. Serial No. 669,338.

To all whom it may concern:

Be it known that I, TOIMI A. NISSINEN, a subject of the Czar of Russia, a legal resident of Helsingfors, Finland, at present residing at the city of New York, in the borough of Bronx and State of New York, have invented certain new and useful Improvements in Bottle-Capping Machines, of which the following is a full, clear, and exact description.

This invention relates to machines and devices for applying sealing caps to bottles and similar vessels.

The object of the invention is to provide a machine or device for carrying out the method described and claimed in my companion application for patent Serial No. 669,339, filed Jan. 4, 1912. The method referred to in said application consists, generally stated, in exerting a downward pressure upon a part of the flange of the cap between its outer edge and the body of the cap, while simultaneously supporting the outer edge of the flange, to draw the cap down over the mouth of the bottle and provide the sealing pressure, and finally withdrawing the support from beneath the edge and continuing the downward pressure on the intermediate portion of the flange to lock the latter under the bead on the bottle.

Various forms of capping heads or devices may be used for accomplishing this action upon the bottle cap, but the form I have disclosed is believed to be the most simple and effective. The same will now be described in connection with the accompanying drawing, in which:

Figure 1 is a vertical central section of the capping head showing one of the caps therein ready for application to the bottle. Figs. 2, 3, 4 and 5, are fragmentary sectional views of the capping head, the cap and the bottle, showing the successive stages of the method of applying the cap to the bottle.

The cap adapted for this method of closure comprises the usual body portion or disk 1, a substantially vertical annular flange 2 depending therefrom, and a substantially horizontal corrugated rim 3 extending radially outward from the lower edge of the vertical flange 2. The rim 3, however, is not necessarily horizontal, as it may incline slightly upward or downward without departing from the spirit of the invention. The usual sealing disk 5 is confined within the cap and against the disk 1.

The capping head, as illustrated, consists of the tubular portion 6 in which is located a socket 7 having a conical axial chamber 8 therein. Within this conical chamber is placed a die 9 made preferably in three or more sections separated on vertical radial planes by slight spaces 10, enabling the die to expand and contract, which movements are accomplished by causing the die to travel vertically along the conical chamber against the walls on which it rests. The limit of this vertical movement is determined by the shoulder at the upper extremity of the conical chamber and by the ring 15 at the lower extremity thereof, the latter screwing upon the tube 6 and serving as a retainer for the die and socket 7, as well as a stop for the former. Around the lower inner surface of the die is formed an annular groove 11, of such width vertically as to just receive the corrugated edge of the rim 3. The lower side of this groove is bounded by a ledge 12, while the upper side is bounded by the over-hang 13, which extends toward the vertical axis of the die substantially more than the ledge 12, the inner face of the over-hang having a curved surface 14.

Referring now to the operation by which the capping head applies the cap to the bottle, the cap is first adjusted in the die preparatory to applying it to the bottle, as shown in Fig. 1, the rim of the cap fitting friction tight into the entrance of the groove 11. A bottle is then placed centrally below the cap and either the capping head is brought downward or the bottle is forced upward to make the capping stroke. In either case, after the top of the bottle enters and seats within the cap, the die 9 moves upward, and, owing to the conical shape of the socket, also inward, causing the rim 3 to enter the annular groove 11, as seen in Fig. 2.

Let us now consider that the position of the bottle remains fixed and the capping head moves downward, although the same effects will be produced if the capping head remains fixed and the bottle moves upward. It will be seen that the outer edge of the rim 3 is supported by the ledge 12, and whil the downward movement of the over-hang 13 is uniform with that of the ledge 12, the for-

mer impinges upon the upper surface of the rim 3 at a point nearer the vertical flange 2, so that as the die 9 moves downward there will be a drawing downward upon the vertical flange 2 which will compress the sealing disk 5 against the top of the bottle. The action which takes place may be compared with that of a lever, the rim 3 having its fulcrum at the line where it joins the flange 2, with its free end supported upon the ledge 12, and with the power applied at an intermediate point by the over-hang 13. The free end or outer edge tends to move faster than the intermediate part which is acted upon by the over-hang, but since it can not do so, the pivotal point must yield downward and this motion is transmitted through the vertical flange 2 to the top disk of the cap, which compresses the packing disk against the bottle. The pressure which may thus be obtained is limited only by the strength of the metal of which the cap is made. As the capping head continues downward the edge of the rim 3 is gradually drawn out of the groove 11, and the metal of the rim is bowed toward the bottle neck, as seen in Figs. 3 and 4, causing it to bend or form around and under the bead 16 on the bottle. The rim finally leaves the groove 11 entirely and is then unfolded and forced against the neck of the bottle immediately beneath the bead by the rounded face of the over-hang 13, in which position the cap is held under the pressure that was initially applied. It will be seen that the bowing or inward movement of the intermediate portions of the flange is due to the fact that its outer extremity can not move as rapidly as the intermediate portions must, and as the metal must go somewhere, it naturally travels around and under the bead, and as the outer edge is not freed from the ledge 12 until the intermediate portions have been carried under the bead, the pressure on the packing disk will not be eased to any extent when the outer edge of the rim leaves the ledge 12.

It will be seen that the stroke of the capping head, or of the bottle, in the capping operation, may be of any length, regardless of the length of the bottle, since the movement of the head of the bottle through the hollow die 9 is unobstructed. It will be seen that in this capping head there is no plunger or support for the disk 1 of the cap, while the cap is being applied to the bottle, for this is not necessary inasmuch as the sealing pressure which is ordinarily obtained by such a plunger, is afforded by the action of the die upon the flange only of the cap. The absence of this plunger avoids the necessity of regulating the stroke of the capping machine to compensate for variations in the length of bottles, and accordingly bottles varying in length within wide limits can be capped with this machine without danger of breakage, while at the same time imparting an effective seal to each bottle. Since the periphery of the cap is cramped in the groove during the capping operation, the die becomes a gripping device which acts only upon the edge of the cap and without the aid of the aforesaid plunger, draws the cap down tightly over the mouth of the bottle.

Having described my invention, I claim:

1. A capping head provided with gripping means for embracing opposite faces of the flange of the cap, said means having a longitudinal movement with respect to the bottle whereby a sealing pressure is exerted upon the cap after the cap is seated upon the bottle, in combination with means for securing the cap while under such pressure, to the bottle.

2. A capping head provided with means for gripping the flange of the cap, consisting of an internal annular groove of such dimensions as to closely embrace the flange of a bottle cap above and beneath, said means having a longitudinal movement with respect to the bottle whereby after the cap is seated on the bottle the flange is positively engaged in the groove and a sealing pressure is exerted upon the cap.

3. In a bottle capping machine, a capping head having an internal annular groove of such dimensions as to closely embrace the flange of a bottle cap, the upper wall of the groove extending nearer the axis of the cap than the lower wall, whereby a downward movement of the head with respect to the cap will cause the flange of the cap to be positively engaged between the walls of said groove and the cap be thereby drawn downward against the bottle.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

TOIMI A. NISSINEN.

Witnesses:
WALDO M. CHAPIN,
WILLIAM C. LANG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."