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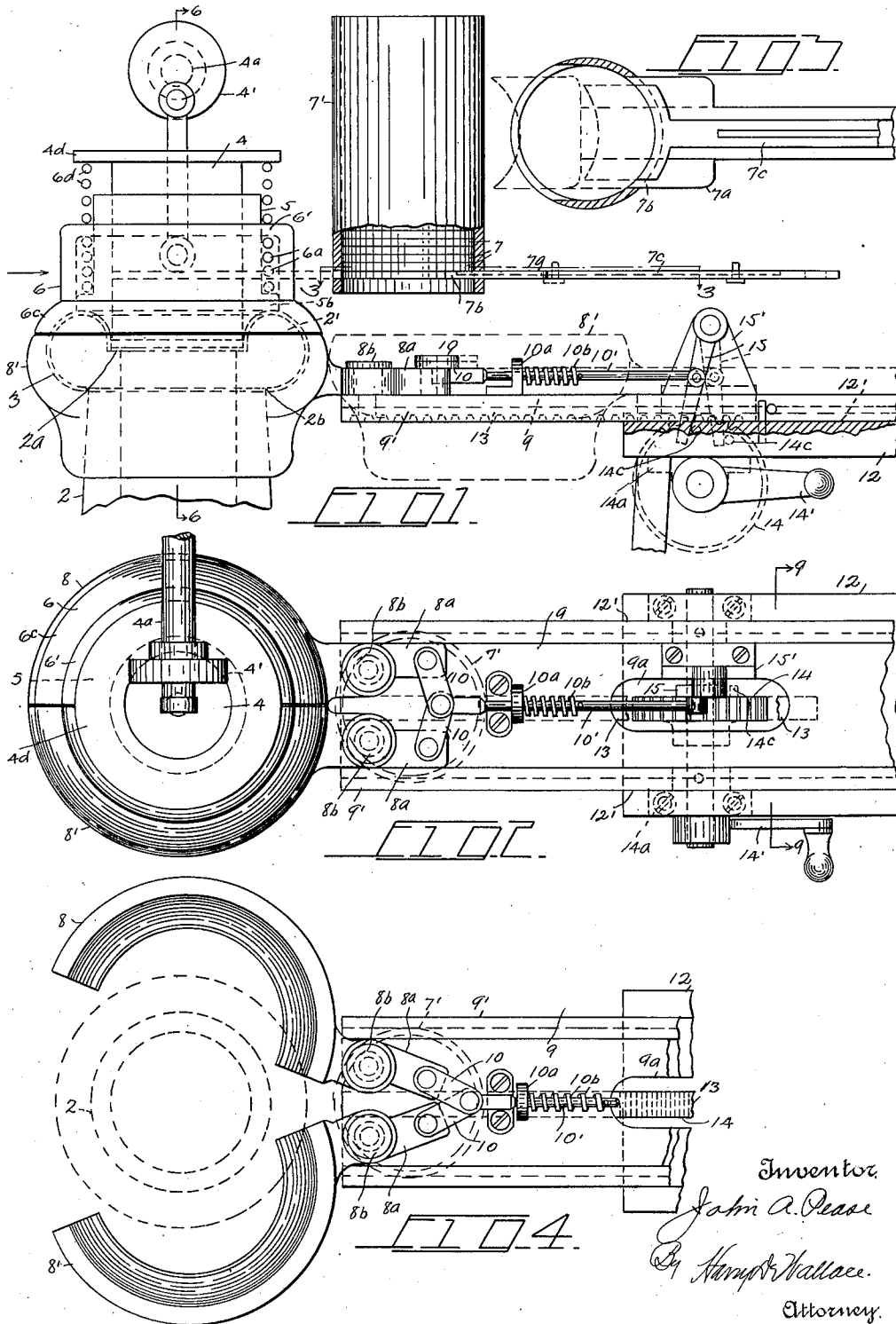
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APPARATUS FOR APPLYING BOTTLE CLOSURES

Filed March 16, 1928

2 Sheets-Sheet 1



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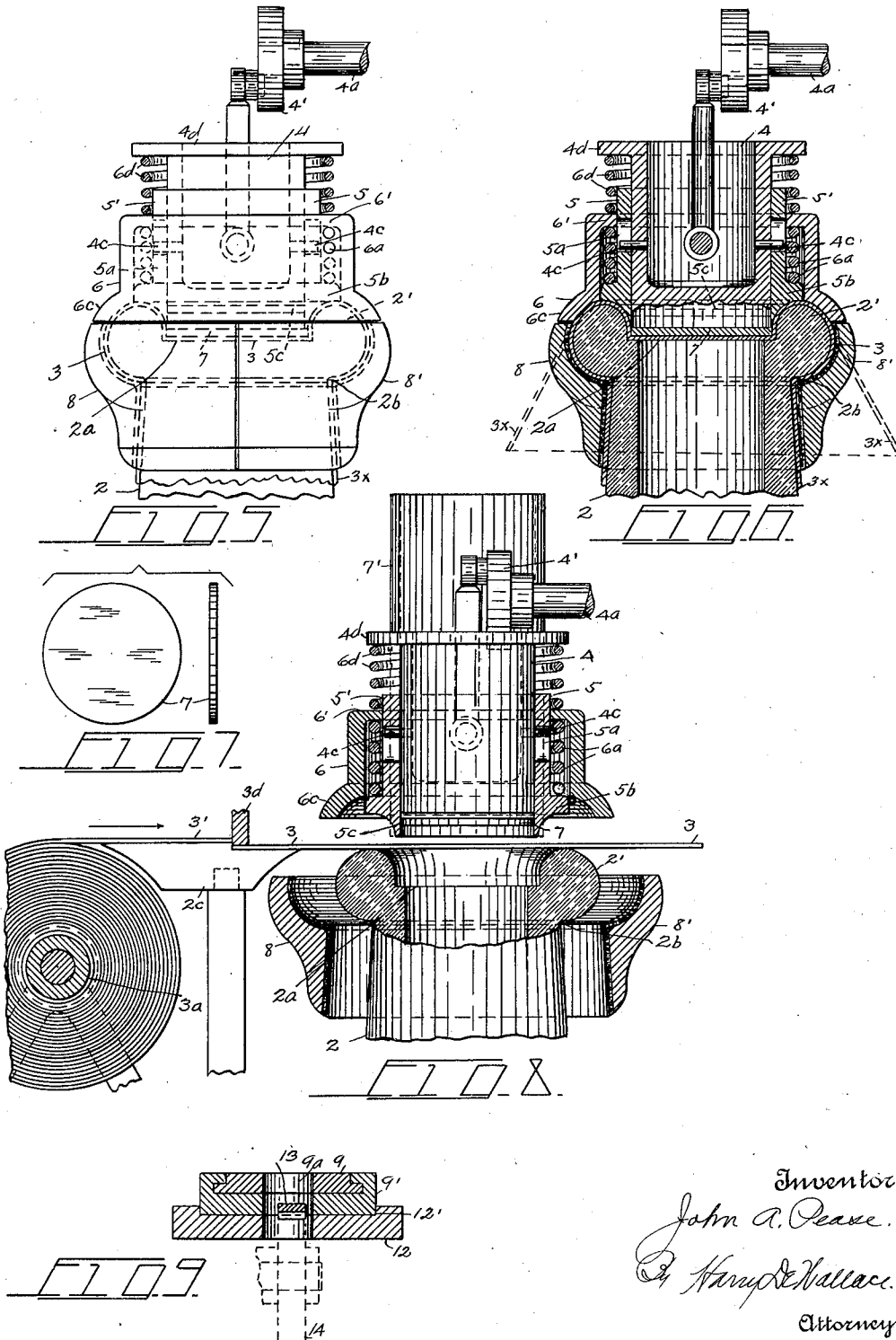
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2 Sheets-Sheet 2



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APPARATUS FOR APPLYING BOTTLE CLOSURES

Application filed March 16, 1928. Serial No. 262,284.

This invention relates to an apparatus for applying milk bottle closures of the hood type, and has for its primary object to facilitate the constructing and applying of two-
ply closures to the filled bottles at one operation.

A further object is to provide a hood-like closure, which consists of a sheet of very thin gage metal, such as aluminum, preferably derived from an endless strip and fed over the bottle mouth, and a fiber disc superposed thereon, the two members then being forced into the bottle mouth, the sheet of aluminum being of such area as to enable its marginal portions to be conformed to the entire bead, as well as the adjacent portion of the bottle neck in such manner that the hood may be self-retaining. It has been found that sheet aluminum of about one or two thousandths of an inch thickness may be readily conformed to the bead and the neck of the bottle, and as this particular metal possesses relatively great pliability, and being devoid of springiness, insures its ready molding to almost any shape, and there is no danger of the hood becoming loose or displaced by the ordinary handling of the bottle. I prefer aluminum to any other metal or the fibrous materials in common use, because of the aforesaid characteristics, and also for the reason that it is not liable to tarnish, corrode or accumulate dust or other unsanitary matter. A further object is to provide novel mechanical means for conforming the metal member of the closure to the top portion of the bead, in combination with novel means for conforming and clamping the marginal portion of said member to the underside of the bead and the adjacent neck portion. A further object is to provide means for moving the clamping mechanism relatively to the capping position for enabling the capped bottles to be removed and replaced by others, the said means being complementary to said clamping mechanism.

In the drawing:—

Figure 1 is a side elevation, partially in section, showing the parts as they appear at the end of a capping operation. Fig. 2 is a top plan view of the same. Fig. 3 is a horizontal

section, taken on line 3—3 of Fig. 1, showing the means for feeding and applying the fiber discs. Fig. 4 is a broken plan view showing the clamping mechanism extended for releasing the bottles. Fig. 5 is an end elevation, taken in the direction of the arrow in Fig. 1. Fig. 6 is a vertical cross-section taken on line 6—6 of Fig. 1. Fig. 7 is respectively a face and edge view of one of the fiber discs. Fig. 8 is a sectional view, similar to Fig. 6, showing the plunger and related parts in the inoperative positions, and the clamping means spread apart as in Fig. 4; also showing the means for severing and feeding the sheets of metal towards the capping position. And Fig. 9 is a vertical cross-section taken on line 9—9 of Fig. 2.

It is to be expressly understood that the drawings are merely illustrative of the principle of the invention, showing by way of example, one manner in which the invention may be practiced.

In the drawing, 2 represents a portion of the neck of an ordinary milk bottle, 2' the bead that surrounds the sunken mouth, 2^a the annular ledge or bottom of the mouth upon which the closures are usually seated, and 2^b is the abrupt shoulder at the intersection of the neck with the bead.

The closure in the present case comprises two members, one a relatively thin flat sheet of aluminum, or like pliable metal 3, which is preferably derived from an endless strip 3', the latter being coiled around a drum 3^a, the said strip being fed by any suitable means across a table 2^c towards the bottle in the plane of the top surface of the bead 2', the said sheet being severed from the strip 3' in advance of the capping operation by a shearing member as 3^d. The sheets 3 are preferably substantially square in plan, and but one or two thousandths of an inch in thickness. The medial portion of sheet 3 is forcibly depressed into the mouth of the bottle by the usual plunger, as 4, which may be reciprocated vertically by an eccentric 4' driven by a shaft 4^a, by any suitable source of power (not shown). The plunger 4 is supported in part and is guided by a sleeve 5 having a barrel 5', which is formed with opposed lon-

5 longitudinal slots 5^a, that are loosely engaged by pins 4^c carried by the plunger (see Figs. 6 and 8), and by which arrangement the plunger may be moved independently of the sleeve during a portion of its upward and downward strokes, the said slots preferably being shorter than the full strokes of the plunger and enabling the latter to raise and lower the sleeve during the final movements of said strokes. The lower end of sleeve 5 is formed with an external annular flange 5^b whose bottom overhangs and conforms to the flare of bead 2', said sleeve being formed at its rear side with a horizontal slot 5^c (see Fig. 8), to facilitate the entrance of the second member of the closure comprising a fiber reinforcing disc, as 7, which is superposed upon the member 3 (see Fig. 6).

6 represents another sleeve that loosely telescopes the sleeve 5, and is formed near its top with an inturned flange 6'. Sleeve 6 is resiliently supported by a coil spring 6^a, which bears respectively against the flanges 5^b and 6'. The lower end of sleeve 6 is formed with a bell-flange 6^c, which conforms to that portion of the bead 2' that lies beyond the flange 5^b (see Fig. 6). Above the sleeve 6 is disposed a coil spring 6^d which engages respectively the flange 6' and a corresponding flange 4^d of the plunger. The springs 6^a—6^d are preferably of different gage and strength, and tend to resist each other and at the same time provide the requisite resilience to enable the sleeves 5 and 6 to properly perform their work.

The spring 6^a is of greater strength than the spring 6^d so as to compress the latter for enabling the lower or bell-end of sleeve 6 to be lifted slightly above the disc-feeding slot 5^c when the plunger is in its uppermost or idle position.

The discs 7 are stacked in an ordinary upright magazine, as 7', from which the lowermost disc of the stack is fed towards the capping position by the usual ejector or shuttle 7^a, which may be operated by any well known means for example that shown in the J. L. Goldie Patent No. 1,711,838. The ejector 7^a preferably comprises a main body, having a yoke 7^b which engages and moves the disc clear of the magazine, and a member 7^c slidable thereon, which completes the feeding operation, as may be understood from Figs. 1 and 3. Upon entering the interior of the sleeve 5 the disc 7 gravitates a short distance, but is preferably temporarily held from escape by a slight choke of the bore of the sleeve. The feed of disc 7 takes place the instant the plunger and related parts reach the elevated position, shown in Fig. 8, towards which position the plunger first moves upwardly alone a distance equal to the play of pins 4^c in the slots 5^a. By this arrangement, the sleeve 6 owing to the relaxing of the springs 6^a—6^d also moves upwardly, but to a slightly less ex-

tent than the plunger, while the sleeve 5 remains seated in the bottle mouth until it is finally lifted by the pins 4^c engaging the top ends of slots 5^a. This delayed movement disposes the lower end of the sleeve 5 in a lower plane than the corresponding end of sleeve 6, and considerably lower than the bottom of plunger 4, as may be understood from Fig. 8, and accordingly exposes the slot 5^c sufficiently to permit the feeding of another disc 7. The timing of the operations of the several parts should be such that, immediately following the delivery of the disc 7 to the chamber of sleeve 5, the plunger descends and compresses spring 6^d as well as spring 6^a, which effects the depressing of sleeves 5 and 6, but owing to the engagement of the bottom end of sleeve 5 with the metal member 3, and the resistance offered by said member, the travel of sleeves 5 and 6 is slower than that of the plunger while the pins 4^c traverse the slots 5^a. As the pressure of the springs 6^a—6^d increases, it gradually depresses the medial portion of sheet 3 into the mouth of the bottle during the slight interval in which the plunger is moving downwardly alone, and when the pins 4^c engage the bottom of the slots 5^a the plunger, and sleeves 5 and 6, as well as the disc 7, are all moved as one part, for completing the molding and seating of the closure upon the ledge 2^a, as shown in Figs. 1, 5 and 6. The final downward movement of the sleeves 5 and 6 conform the sheet 3 to the whole top portion of the bead 2', and causes the marginal portions 3^x of the sheet to droop, substantially as shown by dotted lines in Fig. 6. This assembling, and applying of the metallic and fibrous members of the closure to the bottle mouth and bead, is then followed by the molding and clamping of the margin 3^x, to conform to the remaining portion of the bead and shoulder 2^b, as shown in Fig. 6. This clamping operation is effected by similar semi-circular clamping jaws, 8—8', said jaws being formed with rearwardly extending arms 8^a, the latter being pivoted by devices 8^b to an elongated support 9, which is slidable in a base 9' sufficiently to enable the jaws 8—8' to be opened and closed, as shown in Figs. 4 and 8. The arms 8^a of the clamps extend rearwardly of the pivots 8^b and are connected by links 10, to the free ends of which is pivotally connected a rod 10', that is supported and guided by a bracket 10^a, the said rod beyond the bracket being fitted with a spring 10^b whose tension tends to open the jaws 8—8', as shown in Figs. 4 and 8. The support 9 and base 9' are slidably mounted upon a table 12, which may be provided with a way 12' in which the base is movable. The underside of the base 9' may be fitted with a rack, as 13, which meshes with a gear 14, operable by crank 14', by which the clamp and its supports 9—9' may be moved towards and away from the bottle, in a horizontal plane, as

shown in Fig. 1. The gear 14 is supported by bearings 14^a secured to the underside of the table 12. The support 9 and base 9' are correspondingly slotted, as at 9^a, and in said slot depends a lever 15 which is pivoted to an upright bracket 15', as shown at the right in Figs. 1 and 2. The lever 15 is also pivoted to the rear end of the rod 10' and its free end is disposed parallel to one face of the gear 14, and in the path of a pin 14^c carried by said gear, and by which the said lever is rocked in the direction for closing the jaws 8—8' against the tension of spring 10^b, as shown in Figs. 1 and 2. The pin 14^c is so arranged that it engages the lever 15 slightly in advance of the final movement of the clamp towards the capping position, shown in Figs. 1 and 2, and during the last slight rotation of gear 14 pin 14^c swings the lever 15 as from the dotted line to the full line position, shown in Fig. 1, which effects the spreading of arms 8^a and the closing of the jaws 8—8', as shown in Fig. 2. At the first slight rotation of gear 14 in the opposite or clockwise direction, the lever 15 is moved back into the inoperative position by the tension of spring 10^b, which also spreads the jaws 8—8', as shown in Fig. 4, ready for the clamp to be again shifted rearwardly for enabling the capped bottles to be removed, and so on. I have shown a crank for operating the gear 14, but it will be understood that the said gear may be operated by any suitable connection with the shaft 4^a, and that the ejector 7^a, as well as the drum 3^a may also be operated in a well-known manner by said shaft. The source of power for operating the several parts of the apparatus and details of the means for effecting said operations may follow any well-known or usual construction, and it is not deemed necessary to show or describe the same in the present case. The jaws 8—8' are preferably lined with felt or other cushion material to prevent injury to the jaws or bottle, as well as to compensate for any slight irregularities of the bead or neck. In the foregoing, the timing or sequence of operation referred to may be manually effected, or automatically, the latter by any well known means which constitutes no part of the present invention.

Having thus described my invention, what I claim, is—

1. In a device for assembling and applying two-part milk bottle closures, composed of a sheet of pliable metal and a fibrous disc, means to feed the sheet over the bottle mouth and to position said disc over said sheet in registry with the bottle mouth, means to engage and force the disc and the medial portion of said sheet into the mouth, means to conform the adjacent portion of said sheet to the portion of the bead that extends into the mouth, and means positioned below and movable laterally relative to the last named means to conform the marginal portion of

said sheet to the remaining portion of the bead and the adjacent portion of the bottle neck.

2. In a device for assembling and applying a two-part milk bottle closure, composed of a sheet of pliable metal and a fibrous disc, means to sever said sheet from a continuous strip, means to simultaneously feed said sheet and said disc over the bottle mouth, means to engage and force said disc and the medial portion of said sheet into the bottle mouth, means to conform a portion of said sheet surrounding said disc to the adjacent portion of the bead, and means positioned below and movable laterally relative to the last named means to mold and compress the marginal portion of said sheet to the portion of the bead that overhangs the neck and also to the neck adjacent its intersection with the bead.

3. An apparatus for applying two-part closures to the mouths and necks of milk bottles, composed of a continuous strip of pliable sheet-metal, means to sever and feed angular sheets of the metal over the bottle mouths, means to move fibrous discs into registry with the medial portions of said sheets, means to engage and force the discs and corresponding portions of the metal into the mouths, means to simultaneously conform the adjacent portions of said sheets to the portions of the beads that flare from the circumference of said discs, means positioned below and movable laterally relative to the last named means to conform the marginal portions of said sheets to annular shoulders and at the intersection of the beads with the bottle necks, and means to contract and expand the last named conforming means and to move said means towards and away from the bottles.

4. A device for applying hooded closures to the mouths and necks of milk bottles, including means to feed sheets of pliable metal over the mouths, means to engage and force the medial portions of said sheets into the mouths, means to simultaneously conform portions of said sheets to the portions of the beads that rise above the bottom planes of the mouths, means comprising a pair of horizontally slidable jaws to gather and compress the marginal portions of said sheets against the remaining portions of the beads and the adjacent portions of the bottle necks while the medial portions of the sheets are forcibly held seated in the mouths, and means to relax the pressure upon said jaws and to open and move said jaws away from the bottles, while the latter are being removed and replaced.

5. An apparatus for assembling and applying two-part milk bottle closures composed of a sheet of pliable material and a fibrous disc, comprising means to feed the sheet over the bottle mouth and to position said disc in registry with the bottle mouth and above said sheet, plunger means

adapted to engage and force the disc and the medial portion of said sheet into the mouth, means carried by the plunger means and movable therewith to conform the adjacent portion of the sheet to the portion of the bead that
5 extends into the mouth, and horizontally movable and laterally swinging jaws cooperating with the last named means to conform the remaining portion of the sheet about the head
10 and the adjacent portion of the bottle neck.

6. An apparatus for assembling and applying two-part milk bottle closures composed of a sheet of pliable material and fibrous disc, comprising means to feed the
15 sheet over the bottle mouth and to position said disc in registry with the bottle mouth and spaced above said sheet, means to force the disc and medial portion of the sheet into the mouth and to conform the adjacent portion of the sheet to the portion of the bead
20 that extends into the bottle mouth, and means movable at right angles to the last named means and cooperating therewith to conform the remaining portion of the sheet about the
25 bead and the adjacent portion of the bottle neck.

In testimony whereof I affix my signature.

JOHN A. PEASE.

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