July 28, 1942. J. M. HOTHERSALL 2,290,879

METHOD OF HANDLING CONTAINERS

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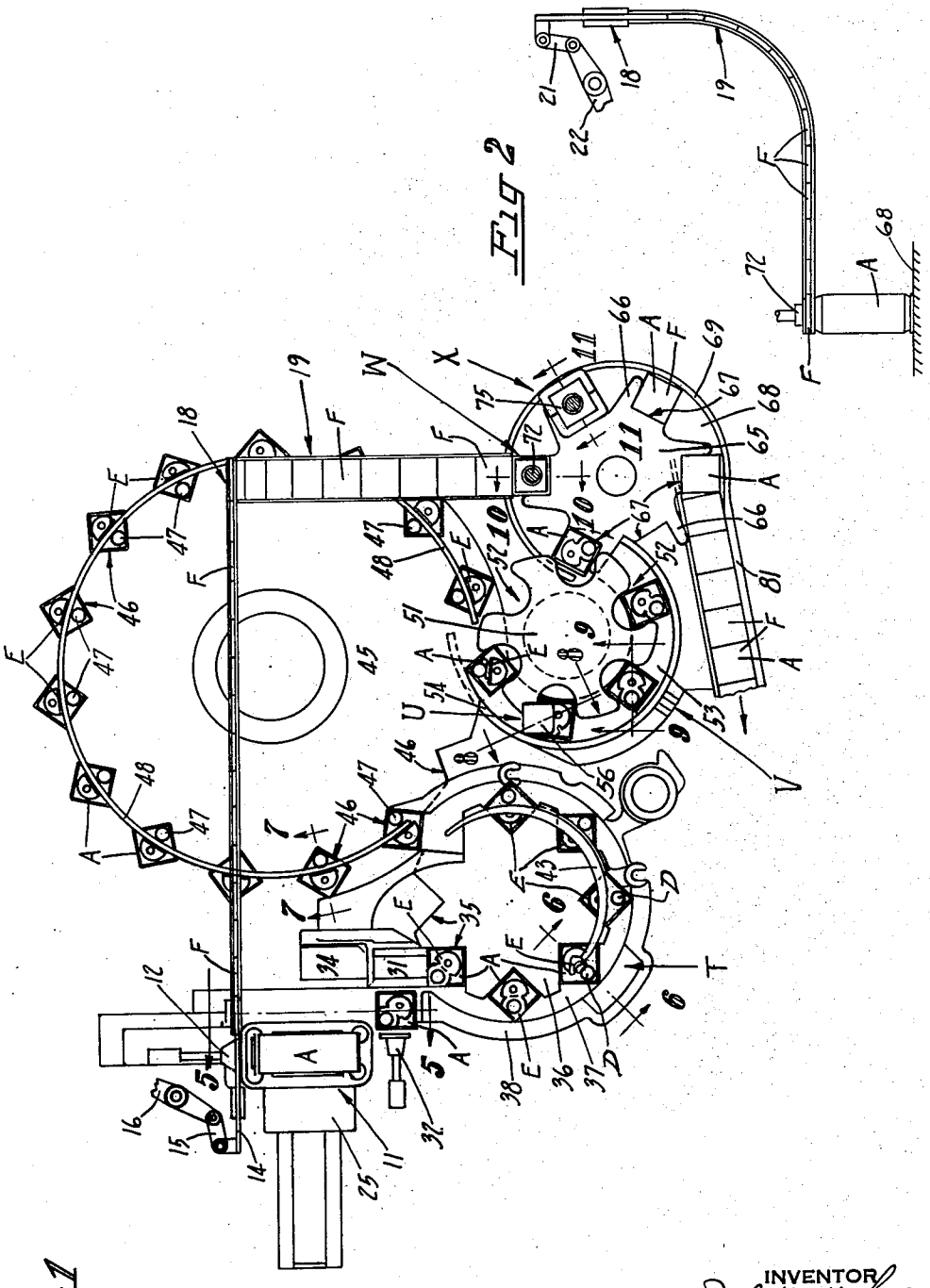


Fig. 1

Fig 2

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Fig. 3

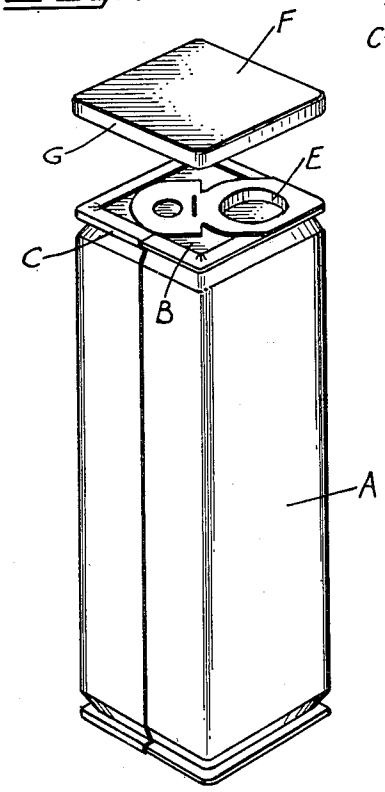


Fig. 4

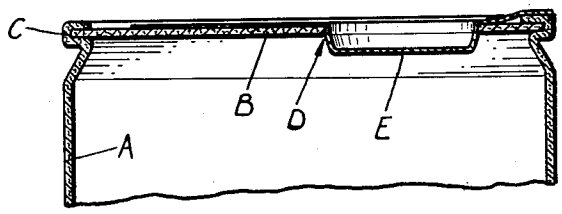


Fig. 5

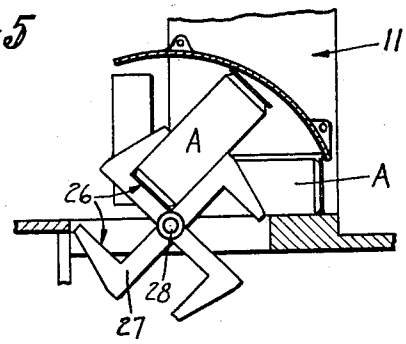


Fig. 6

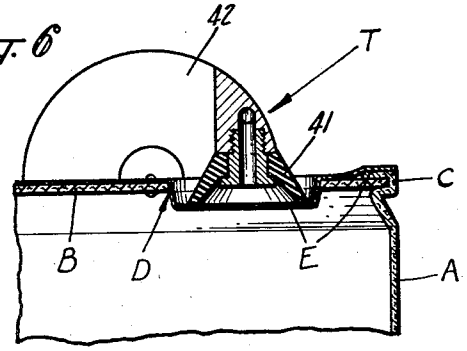
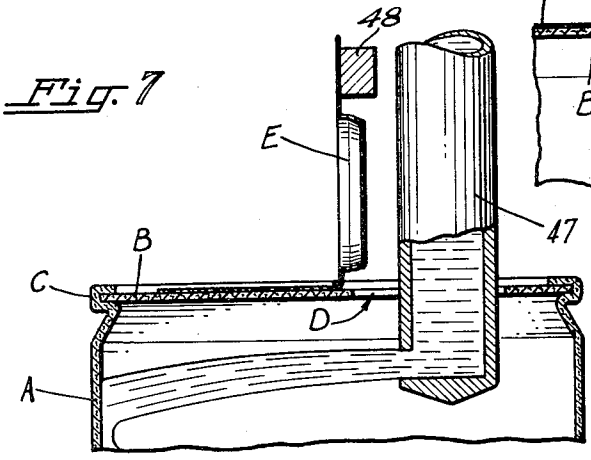


Fig. 7



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Fig. 8

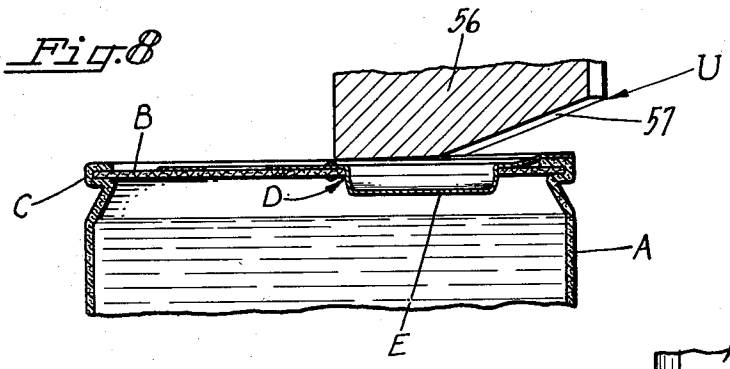


Fig. 9

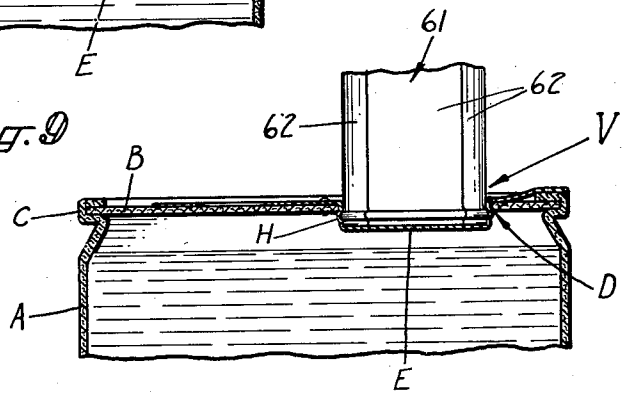


Fig. 10

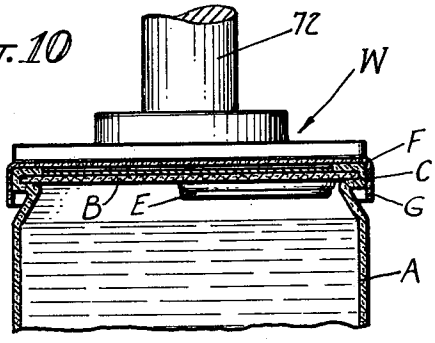
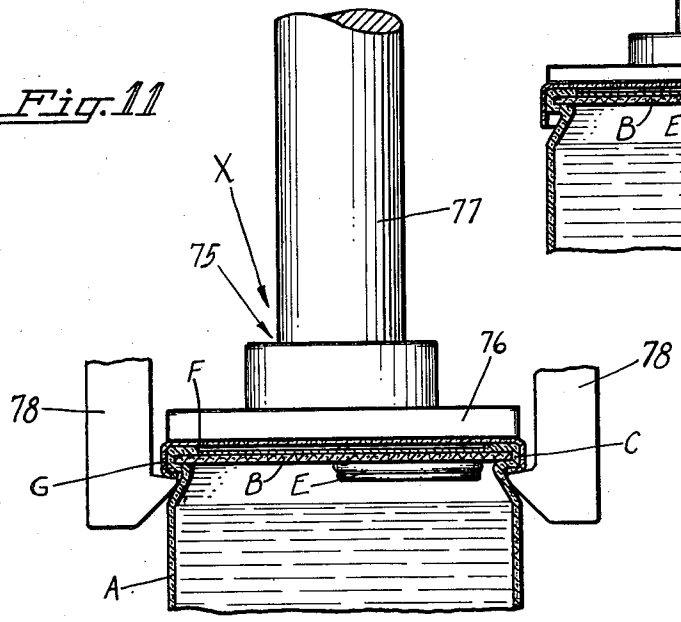


Fig. 11



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UNITED STATES PATENT OFFICE

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METHOD OF HANDLING CONTAINERS

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Application March 21, 1940, Serial No. 325,263

3 Claims. (Cl. 226—75)

The present invention relates to a method of handling containers which are adapted to be sealed with a protective overcap and has particular reference to the several steps of providing the containers with overcaps to protect them during shipment and storage, of removing the overcap just prior to filling, of replacing the overcap on the container and of permanently sealing it in place for reshipment of the container.

In the packaging of certain products in containers having dispensing openings adjacent a section of the container over which the contents is poured during dispensing, it is desirable to protect against contamination the usual pouring lip adjacent the dispensing opening of the container. In order to properly protect such surfaces the instant method contemplates temporarily applying the overcap to the container as soon as the latter is made and shipping the capped container to the filling plant with the overcap in place. Just prior to filling the container the overcap is removed. The container is then filled and sealed, and immediately the overcap is replaced and permanently secured to the container so that contamination of surfaces coming in contact with the product will be prevented.

An object, therefore, of the invention is the provision of a method of protecting containers against contamination wherein empty containers having sealing caps and temporarily applied overcaps are temporarily opened, the containers being separated from the overcaps, filled and sealed while so separated, and then the overcaps are reunited with the containers to further protect the containers against contamination.

Another object is the provision of such a method of handling containers wherein the replaced overcaps are finally and permanently secured in place on the containers to prevent contamination.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a schematic plan view of an apparatus for carrying out the steps of the instant method invention;

Fig. 2 is a schematic end view of portions of the apparatus as viewed from the right in Fig. 1;

Fig. 3 is an enlarged exploded view in perspective of a container with a closure element which is adapted to be protected by an overcap, the latter being shown in spaced relation above the container;

Fig. 4 is an enlarged sectional view of the upper end of the container shown in Fig. 3, without the overcap; and

Figs. 5 to 11, inclusive, are sectional detail views taken substantially along the respective lines 5—5, 6—6, 7—7, 8—8, 9—9, 10—10 and 11—11 in Fig. 1, the different views being drawn to various scales, the several views showing the container and detailed parts of the apparatus used in carrying out the various steps of the instant method.

As a preferred embodiment of the instant method invention the steps of the method are carried out in connection with empty milk containers A (Fig. 3) of the character disclosed in United States Patent 2,085,979, issued July 6, 1937, to me. The top B of such a container is preferably secured in a projecting crimped edge or seam C and is formed with a filling and dispensing opening D (Fig. 7) which is adapted to be closed and sealed after filling with an attached and hinged friction plug closure element E. These several container parts are all shown in the aforesaid patent.

Immediately upon completion of its manufacture the container is closed by insertion of its closure element into its dispensing opening and its entire top surface is then covered with a protective overcap F. This overcap is preferably made of thin cellulosic material, such as for example, "Cellophane" or the like, and is of the form of a slip cover type cap having depending surrounding marginal flanges G.

The empty container is shipped and stored with the overcap F in place according to the present invention. At the filling plant where the milk is filled into the containers through their openings D, the overcap is temporarily removed, the closure element E is opened, the container is filled, the closure element is reclosed and then sealed. The overcap is then replaced and permanently sealed to the container. These steps are effected in a sterile apparatus so that contamination of the exposed top surface of the container is even prevented during the time the overcap is temporarily out of place.

The drawings illustrate one form of apparatus for carrying out the instant method steps of the invention. In such an apparatus the containers A with attached overcaps F are fed into a magazine 11 (Fig. 1) where they are retained in horizontal position, lying on one side, and in a vertical stack. The containers are individually removed from the bottom of the magazine but just

prior to this removal its overcap is withdrawn. Removal of the overcap is preferably effected by a suction cup 12 which is located adjacent one end of the magazine. Actuation of the suction cup may be brought about in any suitable manner operating in time with the other moving parts of the apparatus.

The suction cup 12 draws the removed overcap F back back into a horizontal runway 13 which crosses over the top of the apparatus. A plunger or pusher 14 operating in the entrance end of the runway and which is actuated by a link 15 and a lever 16 in time with the other moving parts of the apparatus, strips the overcap off the suction cup and pushes it on edge along the runway.

Succeeding overcaps as they are removed from their containers are pushed into the runway and thus push each other along toward the discharge end of the runway. The horizontal runway terminates near the discharge end of the apparatus and here a second pusher device 18 (see also Fig. 2) moving down from above transfers the advanced overcaps individually into the top of a vertical curved runway 19. This pusher device 18 is actuated by a link 21 and a lever 22 which are operated in suitable manner in time with the other moving parts of the apparatus. When the overcaps reach the terminal end of this runway they are disposed in a flat horizontal position ready to be re-assembled with the containers from which they were removed but which at such time are upright or in vertical position.

While the removed overcaps F are being pushed along this path of travel toward the discharge end of the apparatus, the containers from which the overcaps were removed are propelled along another predetermined path of travel along which various operations are performed prior to rejoining their overcaps as will now be described.

The lowermost container A in the magazine 11 having been stripped of its overcap is pushed sidewise out of the magazine by a pusher 25 which is actuated in any suitable manner operating in time with the other moving parts of the apparatus. The pushed-out container, still in a horizontal position, is received in a pocket 26 (Fig. 5) of a swastika shaped star wheel 27 disposed adjacent the magazine 11. The star wheel is carried on a short shaft 28 which is intermittently rotated through quarter turns in a suitable manner operating in time with the other moving parts of the apparatus. Rotation of the star wheel through one quarter turn brings the removed container A into an upright position, i. e., with its top uppermost.

While the container A is in this upright position it is pushed sidewise out of the star wheel pocket 26 and onto a receiving table 31 (Fig. 1). This latter transfer of the container is preferably effected by a pusher 32 which is actuated in any suitable manner in time with the other moving parts of the apparatus.

The upright container received on the table 31 is immediately advanced by a pusher 34 which is actuated in any suitable manner. This pusher moves the container into a pocket 35 of a rotatable turret 36 which is intermittently revolved in time with the other moving parts of the apparatus. During its travel with the conveyor the container is supported on a table 37 and is retained within its pocket by a curved guide rail 38 secured to the table adjacent its outer edge.

While the container is in the turret 36 it is brought to rest at a closure element opening station generally indicated by the letter T. At this station there is located a suction cup 41 (Fig. 6) which is carried on an oscillating disc 42. The disc is mounted in a bearing formed in a frame of the apparatus and is actuated in any suitable manner to bring it into engagement with the closure element E of the container. While thus engaged a vacuum is drawn on the cup so that the closure element will adhere to it. The cup is then turned back and this action lifts the closure element away from its closed position in the container and places it into an open position, thus exposing the filling opening D.

Upon the next step movement of the turret 36, the closure element of the container which has just been opened is caught behind or inside a curved guide rail 43. The vacuum is then released from the cup and the container is thereupon permitted to advance with the turret and its closure element is held open by the guide rail.

As the turret 36 continues to advance the opened container, it brings it adjacent a container carrying turret 45 (Fig. 1) of a filling machine. This filling turret is continuously rotated in suitable manner in time with the other moving parts of the apparatus. The container is received in a pocket 46 of the turret. There are a plurality of these pockets spaced around the periphery of the turret and above each pocket there is located a filling nozzle 47 (see also Fig. 7) which may be connected with a suitable supply of the milk to be filled into the containers.

A container received in the filling turret is carried on a lifter plate and its closure element continues in open position, being held open by a curved guide rail 48 which extends around the path of travel of the container. As soon as the container is placed on its lifter plate the latter raises the container up so that the filling nozzle 47 enters into the container through the filling opening D as shown in Fig. 7. The nozzle then discharges milk or other liquid into the container.

This filling takes place as the container is being carried by the turret through nearly one complete revolution of the latter. Near the end of this circular travel, the flow of milk from the nozzle is cut off and the now completely filled container is lowered to its original level. This brings it away from the nozzle. The container is then transferred to a closing star wheel 51. In this transfer the opened closure element E runs off the terminal end of the curved guide rail 48 and is thus released for reclosing.

The closing star wheel 51 is intermittently rotated in any suitable manner in time with the other moving parts of the apparatus and is formed with spaced pockets 52 into which the containers are received from the filling turret. Star wheel 51 propels a received filled container along a curved path of travel while it is supported on a stationary table 53. A curved guide rail 54 secured to the table adjacent the outer periphery of the star wheel retains the moving containers in the star wheel pockets.

During the travel of a filled container A around its path of travel with the star wheel 51, it is first moved through a closing station U where the opened closure element E brushes against a stationary closing block 56 (Figs. 1 and 8), having a tapered bottom surface 57. This block is supported in any suitable manner above the path of travel of the containers and as a container moves under it the tapered surface 57 pushes the closure element down into

the dispensing opening D and firmly presses it home into closed position as shown in Fig. 8.

After this closing operation the continued rotation of the star wheel brings the filled and closed container into a sealing station V. Here a sealing head 61 (Fig. 9) having a plurality of expansible jaws 62 disposed above the path of travel of the containers, moves down into the plug section of the closed closure element E. While in this position the jaws are spread apart or expanded and this action expands the plug section and thus forms a projecting bead H (Fig. 9) which engages under the container top B at the edge of the dispensing opening D. This expanding action seals the closure element E in place. Actuation of the sealing head 61 and its jaws 62 may be effected in any suitable manner in time with the other moving parts of the apparatus.

The filled and sealed container A is now ready for its overcap F. The star wheel 51 next brings the container into a discharge turret 65 (Fig. 1) which has projecting fingers 66 setting off container pockets 67. This turret is intermittently rotated in suitable manner and in time with the other moving parts of the apparatus.

In coming into a pocket 67 of the turret 65, a finger 66 comes in behind and sweeps the container out of its star wheel pocket and positions it fully within the pocket of the turret. The turret thereupon propels the container along a curved path of travel, the container being supported on a table 68 which is an extension of the star wheel table 53. A curved guide rail 69 secured to the table adjacent its outer edge retains the container in its turret pocket.

During this part of travel of the container, it first moves into a capping station W where it comes to rest directly under the terminal end of the curved overcap runway 19 hereinbefore mentioned. At this station the outermost overcap in the runway is pushed out and is deposited on the top of the container as shown in Figs. 2 and 10.

In applied position the top surface of the overcap F lies flat against the top of the container, entirely covering the closure element, and the depending marginal flanges G of the overcap extend down over the top seam edge C adjacent the sides of the container. This transfer of the overcap from the runway to the container is preferably effected by a pusher or plunger 72 (Figs. 1 and 10) which is disposed above the runway and which is actuated in any suitable manner operating in time with the other moving parts of the apparatus.

After this positive application of the overcap F onto the container, the latter is advanced to an overcap sealing station X. At this station a sealing head 75 (Figs. 1 and 11) is disposed above the path of travel of the containers. This head preferably includes a hold-down plate 76 carried on a vertical stem 77 and also includes a plurality of laterally movable jaws 78 which are disposed one along each side of the container.

The container and its overcap are moved vertically into this head and in so doing the plate 76 engages against the top of the overcap and holds it firmly in place on the container while the jaws move inwardly against the depending flanges G of the overcap. This wipes or tucks them up under the projecting top seam C of the container and also stretches the flanges firmly over and around the seam C.

While the jaws 78 are still in this sealing position the hold-down plate moves further down against the container top and thereby tightly squeezes the tucked-in edges of the overcap flanges against the container. Since the container is usually covered with an overall paraffin coating the overcap edges are pressed into this coating and the paraffin thus serves as an adhesive for permanently sticking the overcap edges in place. The actuation and operation of the sealing head hold-down plate 76 and jaws 78 are performed in time with the other moving parts of the apparatus.

This sealing of the overcap F in place on the filled and sealed container A completes the operations and steps with which the present invention is concerned. The container is thereupon discharged from the apparatus being shifted into a discharge runway 81 which leads to a suitable place of deposit.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the steps of the process described and their order of accomplishment without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the process hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A method of handling a container having a dispensing opening and a hinged closure therefor disposed adjacent a portion of the container over which the contents may be poured and having an overcap for protecting such pouring portion, which comprises applying suction to the overcap to remove the same from a container, feeding the removed overcap along a predetermined path of travel, advancing the uncapped container along another path of travel and hinging said closure outwardly to open position during such advancing movement, filling the container through its dispensing opening while the container is being further advanced and while holding said hinged closure in open position, moving said hinged closure inwardly to close the dispensing opening after the filling step, moving the filled and closed container into position adjacent the fed overcap, and replacing the overcap on the container.

2. A method of handling a container having a dispensing opening and a hinged closure therefor disposed adjacent a portion of the container over which the contents may be poured and having an overcap for protecting such pouring portion, which comprises applying suction to the overcap to remove the same from a container, feeding the removed overcap along a predetermined path of travel, advancing the uncapped container along another path of travel and applying suction to said closure to hinge the same outwardly to open position during such advancing movement, filling the container through its dispensing opening while the container is being further advanced and while holding said hinged closure in open position, moving said hinged closure inwardly to close the dispensing opening after the filling step, moving the filled and closed container into position adjacent the fed overcap, and applying and permanently deforming the overcap over the container end having the closed dispensing opening.

3. A method of handling a container having a dispensing opening and a hinged closure plug

therefor disposed adjacent a portion of the container over which the contents may be poured and having an overcap for protecting such pouring portion, which comprises arranging the capped containers into a stack, applying suction to the overcaps to remove the same from the containers while in the stack, feeding the overcaps along a predetermined path of travel away from the stack, successively removing the uncovered containers from the stack, advancing the removed containers along a predetermined path of travel other than the path of travel of the overcaps, applying suction to said plug closures of the containers to hinge the same outwardly to open position during such advancing movement, filling the containers with their contents through the exposed dispensing opening and while the containers are being further continuously advanced and while holding said hinged closure plugs of the containers in open position, moving said closure plugs inwardly after the filling operation to close said dispensing openings, deforming said hinged closure plugs to lock the same in sealing engagement within their respective dispensing openings, moving the filled and closed containers to meet the fed overcaps at a place removed from said stack, successively replacing said overcaps onto their respective filled containers, and then permanently deforming and reshaping the replaced overcaps over the ends of their respective filled containers having such closed and sealed dispensing openings.

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