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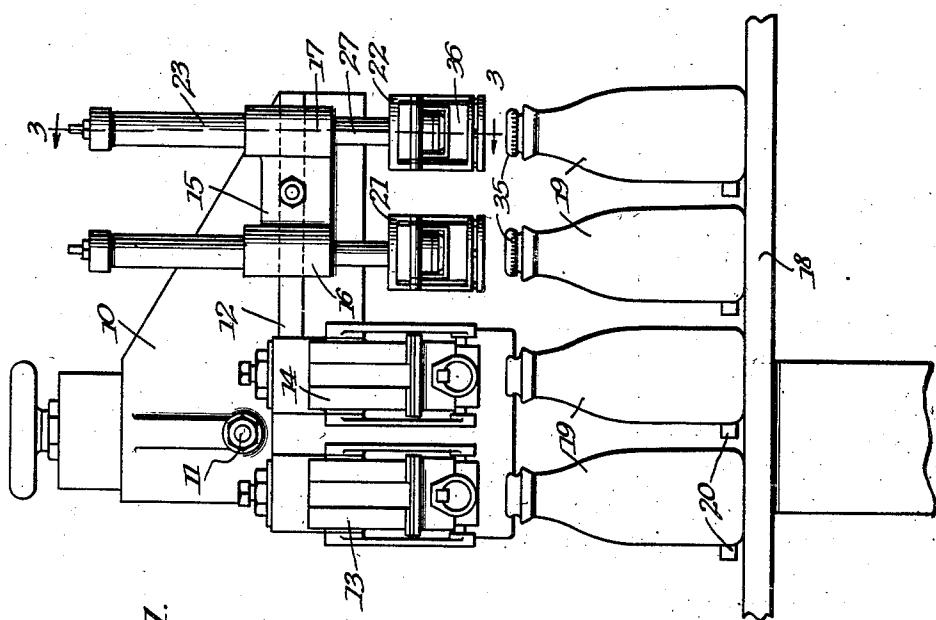
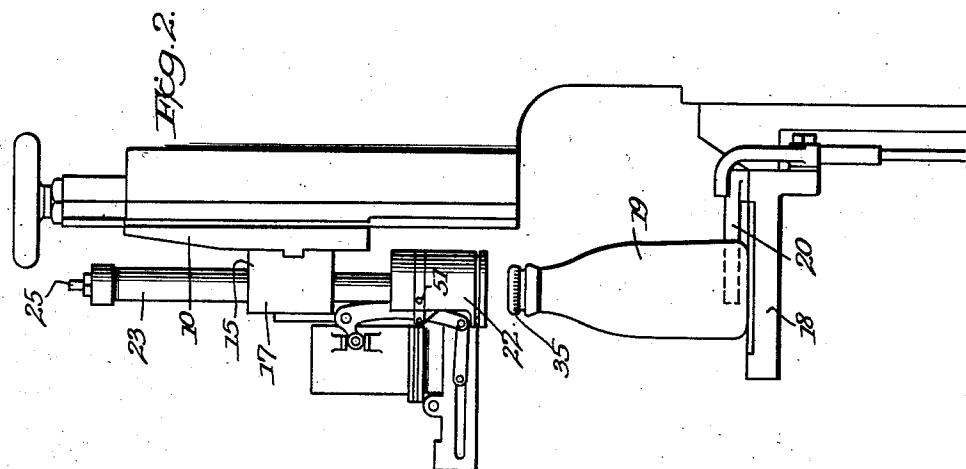
G. W. BOOTH

2,139,573

COMBINED CAPPING AND PRINTING MACHINE

Filed Aug. 28, 1935

2 Sheets-Sheet 1



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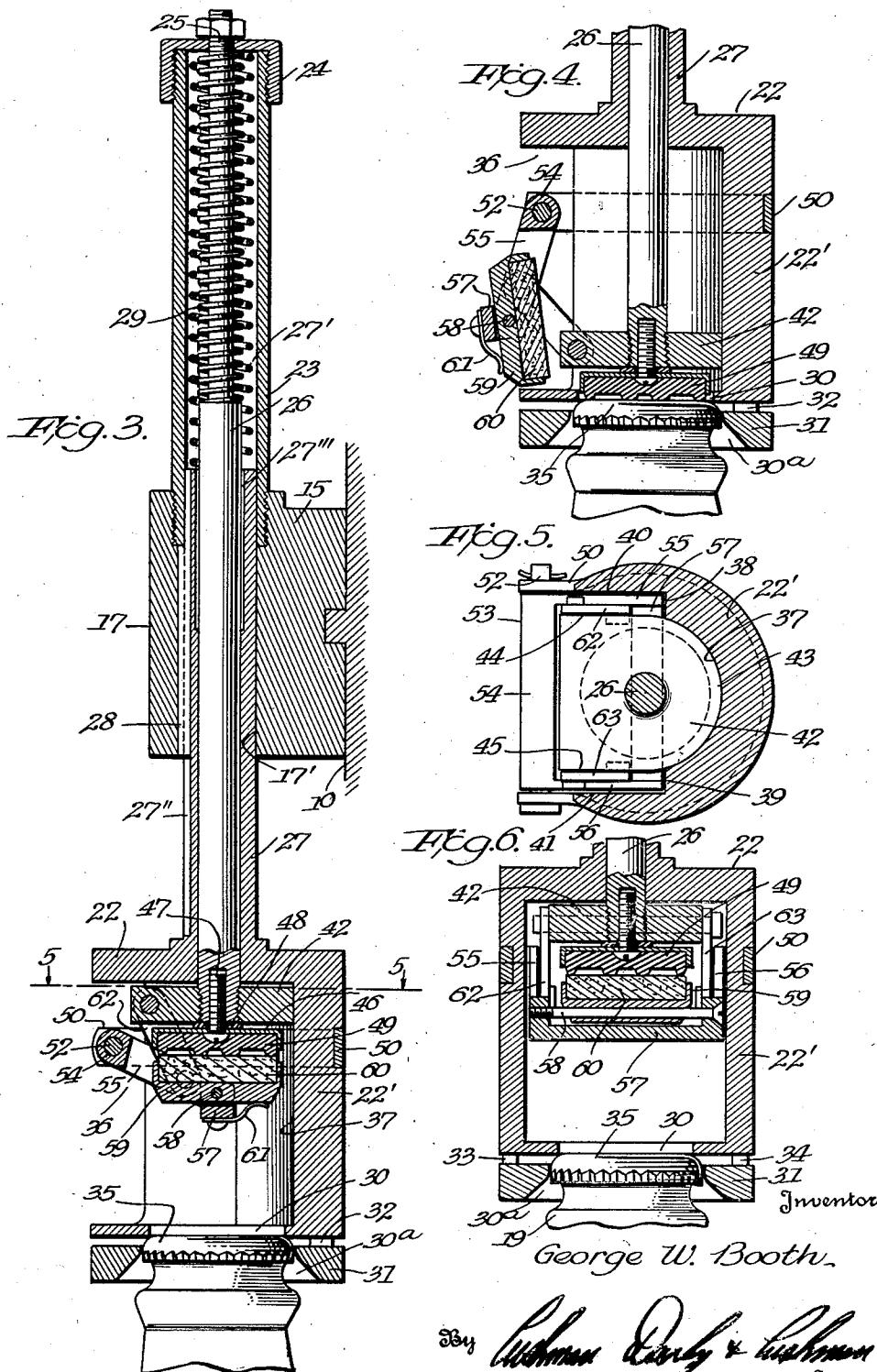
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,139,573

## COMBINED CAPPING AND PRINTING MACHINE

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16 Claims. (Cl. 226—84)

The present invention relates to apparatus for substantially continuously capping filled containers and printing on the applied caps. Heretofore, it has been the usual practice to apply the required printing matter to sheets and then punch out the caps. In the merchandising of perishable products, such as milk, it is often desired to print the bottling date on the cap. With the caps printed at the factory, it is necessary for the bottler to order a sufficient supply of each date to take care of the maximum possible demand and any surplus becomes useless and must be thrown away.

It is an object of the present invention to provide means preferably operated concomitantly with capping mechanism whereby only so many caps are printed as are actually applied to filled containers.

Another object is to provide readily exchangeable printing pads or plates so that successive ones may be utilized to print the date as required.

A further object is to provide simple and efficient inking means for the printing pads or plates.

While the invention is not limited as regards the type of cap to be applied and printed upon, I have shown in the accompanying drawings mechanism for applying the substantially flat disc closures as disclosed, for example, in my U. S. Patent No. 1,956,217, granted April 24, 1934. A practical embodiment of the invention is shown in the accompanying drawings in which:

Figure 1 is a front elevation of the apparatus; Figure 2 is a side elevation;

Figure 3 is a section of the printing mechanism substantially on line 3—3 of Figure 1;

Figure 4 is a section of the printing head proper as in Figure 3, but with the parts in different relation;

Figure 5 is a section substantially on the line 5—5 of Figure 3; and

Figure 6 is a section of the printing head taken in a plane at right angles to the section of Figure 4.

The main apparatus may be the same as that shown in the patent to Lloyd and Huntley, No. 1,957,464, granted May 8, 1934. In that patent a pair of capping heads are shown as carried by a vertically reciprocating slide. In the present instance, a laterally projecting arm or bracket 10 is fixed to the slide by means of a mating longitudinally extending rib and groove and a bolt 11. On its front face the arm is provided with a horizontally extending rib 12 engaged by mounting means for the two capping heads 13

and 14, and also by a carrier 15 for the printing mechanisms. No description of the capping mechanisms is required here, these being as shown in the above mentioned Lloyd and Huntley patent, and more particularly described in the patent to Huntley and Rau, No. 1,956,218, granted April 24, 1934.

The carrier 15 has substantially cylindrical end enlargements 16 and 17 which are provided with vertical bores, that of enlargement 17 being indicated at 17', Figure 3. The axes of these bores are spaced apart exactly as the vertical axes of the capping heads, this same space existing between the axes of capping head 14 and of the bore of enlargement 16.

Extending beneath the capping and printing mechanisms is a table 18 over which a series of bottles 19 is adapted to be intermittently moved by means of feeding fingers 20, these being pivoted to a reciprocating bar in the manner disclosed in Patent No. 1,957,464, above mentioned. These feeding fingers are spaced exactly as the axes of the capping and printing mechanisms and at each reciprocation of their actuating bar move the engaged bottles a distance equal to the distance between alternate fingers. In Figure 1 the feeding fingers may be assumed to be at the end of their feeding stroke, two bottles 19 being coaxial with the capping heads and the two preceding bottles, capped in the last operation of the machine, coaxial with the printing mechanisms. The bottle feed is effected during the period in which member 10 is moving upward from capping and printing position and downward to capping and printing position.

I have here shown two capping heads and two printing heads 21 and 22. It will be understood that one of each could be utilized and, in such case, the extent of each feeding movement of fingers will be equal to the distance between adjacent fingers. On the other hand, if groups of three or more cappers and printers were used, the extent of feed would be increased accordingly so that the entire group of capped containers would be moved under the printing heads during each reciprocation of member 10. In the latter case, however, the groups could be moved as the result of several shorter feeding strokes so long as the groups are properly advanced during reciprocation of member 10.

The printing mechanisms are of identical construction and for the purpose of specific description, reference will be had to the one at the right of Figure 1, this being shown also in Figure 2 and in detail in Figures 3 to 6.

Bore 17' has at its upper end a threaded enlargement in which is screwed the lower end of a vertically extending tubular member 23 with its inner walls flush with the walls of bore 17'. 5 A cap 24 is threaded on the upper end of member 23 and has a central aperture through which projects the upper reduced extremity 25 of a rod or plunger 26, a nut being threaded on the extremity 25 above cap 24. The head 22 comprises 10 a housing 22' having an upward hollow cylindrical extension 27 in which rod 26 has a sliding fit, the extension 27 having a sliding fit in bore 17' and in tubular member 23, a compression spring 27' being engaged between the upper end of the 15 extension and cap 24. Extension 27 has a longitudinal groove 27'' in which is engaged a spline 28 fitted in bore 17' and in the lower end of tubular element 23, whereby the extension and housing are held against rotation. A compression 20 spring 29 is interposed between cap 24 and a shoulder at the lower end of the reduced upper portion 25 of rod 26. Spring 29 has a normal diameter no greater than that of rod 26 and tubular extension 27 has an enlargement 27''' at its 25 upper end adapted to receive spring 29 so that these parts may be telescoped without interference.

Housing 22', which is substantially cylindrical, is provided with a circular lower opening 30 coaxial, as here shown, with rod 26, this opening having a downward continuation 30a formed in a ring 31. The ring 31, as here shown, is slightly spaced below the housing proper and is supported by means of studs 32, Figures 3 and 4, and 33, 34, 35 Figure 6. The portion 30a of the opening is downwardly flared and serves upon engagement of the head with the cap 35 of a capped container to center the cap. The portion 30 of the opening is of smaller diameter than the cap so as to be able to abut the margins of the latter as clearly shown in Figures 3, 4 and 6. Forwardly the housing has a wall removed to provide an opening 36. Opposite this opening, the housing has a substantially semi-cylindrical wall 37, the edges of which terminate in uni-planar shoulders 38 and 39, which extend outwardly to the parallel vertical surfaces 40 and 41.

The lower end of rod 26 is threaded in a bore 50 in a plate 42 which has a curved edge 43 slidably guided by the surface 31, the curved edge 43 merging into the parallel lateral edges 44 and 45. A cup 46 is secured beneath plate 42 by means of a screw 47 threaded into the tapped lower end of rod 26, a yieldable washer 48 being interposed between cup 46 and plate 42. Cup 46 has positioned therein a printing pad 49, here assumed to be of rubber. The pad may be held in place by any suitable means, such as an adhesive, and is removable for replacement. The cup is of 60 such diameter as to be enabled to pass through aperture 30 to bring pad 49 into printing engagement with a cap 35, the pad being adapted to adjust itself for uniform printing pressure by reason of the equalizing capability of cup 46 as provided by the yieldable centralized washer 48.

Set in a horizontal peripheral recess in the housing below the top wall housing cavity is a band 50, being secured by means of screws as at 51, Figure 2. The extremities of the band project 70 parallelly beyond the edges of opening 36 and are pierced to receive and support a pin 52. A substantially rectangular frame generally designated at 53 has a cross bar 54 bored to receive pin 52 and extending between the extremities of band 50. Arms 55 and 56 integral with the ends

of bar 54 extend adjacent housing surfaces 40 and 41 and have their free ends connected by an integral bar 57. The top of bar 57 is substantially horizontal in the normal position of parts shown in Figure 3, the arms supporting thereabove a horizontal pin 58 on which is rockably mounted a cup 59 whose lower surface is slightly above the top surface of bar 57. Cup 59 carries an inking pad 60. A leaf spring 61 secured to bar 57 engages the bottom of cup 59 to bias the same slightly, the spring yielding to permit the inking pad to come squarely into engagement with the printing pad as shown in Figure 3. Arms 55 and 56 are connected by means of links 62 and 63 with the forward portions of sides 44 15 and 45 of plate 42.

In Figures 1 and 2, the reciprocating support 10 is assumed to be at the top of its stroke, so that the capping and printing heads are well above the tops of containers therebeneath. As 20 the support 10 moves downwardly the caps 35 of the containers beneath heads 21 and 22 will enter openings 30a to be centered thereby, the lower edges of openings 30 then engaging the caps to arrest downward movement of the heads. Member 10, however, continues its downward movement, the carrier 15 riding downwardly on extensions 27 and carrying the tubular elements 23 which in turn, through spring 29 carry rod 26 and plate 42 downwardly. As this occurs, 30 links 62 and 63 act on arms 55 and 56 to swing frame 53 outwardly through opening 36 so that the same is moved to the side of the path of plate 42 and the printing pad allowing the latter to engage and print the top of the cap, final printing pressure being yieldably exerted through spring 29. During the described printing operation, the two bottles 19 at the left of Figure 1 have been capped. As member 10 now rises the housings remain at rest until the inking pad 40 comes to the position of Figure 3, the same being lifted due to the engagement of cap 24 with the nut at the upper end of rod 26. Upon engagement of the printing pad with the inking pad the housing is lifted and carried to its initial position. It will be noted from Figure 3 that the top of plate 42 is somewhat spaced from the lower surface of the housing top wall. This means that the housing is lifted by means of links 62 and 63, frame 53 and band 50, the reaction of the housing 50 thus firmly engaging the inking pad with the printing pad. The inking pads are accordingly preferably renewed before they are worn sufficiently to enable the tops of plates 42 to engage the top walls of the housings. 55

It will be understood that after the arrest of the housings through abutment with the container caps springs 27' are compressed upon the continued downward movement of the carrier 15, such relative movement being possible by reason of the lost motion connections between the carrier and housings. As the carrier rises, springs 27' expand and the parts are extended to the relation shown in Figure 3 and the housings are again carried upwardly clear of the capped containers. As soon as the housings are thus lifted, 60 the bottles may be initiated.

From the above, it will be seen that I have provided relatively simple means whereby a series 70 of intermittently fed bottles may be capped and printed, and it will be evident that the improvements may be readily applied to the apparatus of Patent No. 1,957,464, above mentioned. It will be understood that the invention is susceptible 75

of varied embodiment and that accordingly I do not limit myself except as in the following claims.

I claim:—

1. Apparatus of the class described comprising a vertically reciprocating member, a capping head carried by said member, a printing head carried by said member, and means for intermittently feeding a series of containers under said heads, said heads acting upon each downward movement of said member and entirely as a result of such downward movement to cap a container and print the previously applied cap of the preceding container.

2. Apparatus according to claim 1 wherein a plurality of capping heads and an equal number of printing heads are provided, each feeding movement of the containers being of such extent as to bring under the printing heads the entire group of containers previously capped by said plurality of capping heads.

3. Apparatus of the class described comprising means for intermittently feeding a line of upright containers, a vertically reciprocating member, a capping head carried by said member above the line of containers, a printing head carried by said member above the line of containers, the capping head preceding the printing head as regards the direction of container feed, said heads being spaced apart a distance the same as the intermittent feeding distance of the containers and acting upon each downward movement of said member and entirely as a result of such downward movement to cap a container and to print the previously applied cap of the preceding container, the containers being fed during the upward movement of said member.

4. Apparatus according to claim 3 wherein a plurality of capping heads and an equal number of printing heads are provided, the containers being fed between each operative action of the heads to bring under the printing heads the entire group of containers previously capped by said plurality of capping heads.

5. Apparatus for printing container caps comprising a vertically reciprocating member, an element carried by said member and having a lost motion connection therewith, said element being adapted to engage and center a cap as said member moves downwardly, the cap arresting said element while said member continues its downward movement, and a printing plunger carried by said member and brought into operative engagement with said cap at the end of the continued downward movement of said member.

6. Apparatus for printing container caps comprising a vertically reciprocating member, an element carried by said member and having a lost motion connection therewith, said element being adapted to engage and center a cap as said member moves downwardly, the cap arresting said element while said member continues its downward movement, and a printing plunger carried by said member and brought into operative engagement with said cap at the end of the continued downward movement of said member, there being cushioning means between said member and said plunger.

7. Apparatus for printing container caps comprising a vertically reciprocating member, a housing carried by said member and having a lost motion connection therewith, said housing having a bottom opening downwardly flared for centering the cap as said housing moves downwardly with said member, the upper portion of said opening being of such size that the margins there-

of abut the centered cap to arrest downward movement of said housing, and a printing pad in said housing above said opening and carried by said member, continued downward movement of said member subsequent to the arrest of said housing bringing said pad into printing engagement with the top of the cap.

8. Apparatus for printing container caps comprising a vertically reciprocating member, a housing carried by said member and having a lost motion connection therewith, said housing having a bottom opening downwardly flared for centering the cap as said housing moves downwardly with said member, the upper portion of said opening being of such size that the margins thereof abut the centered cap to arrest downward movement of said housing, and a printing pad in said housing above said opening and carried by said member, continued downward movement of said member subsequent to the arrest of said housing bringing said pad into printing engagement with the top of the cap, said member in its upward movement lifting the pad and then the housing from engagement with said cap.

9. Apparatus for printing container caps comprising a vertically reciprocable carrier, a housing having a hollow upward extension slidable in a vertical bore in the carrier, said housing having a bottom opening whose margins are adapted to center and abut a cap to arrest downward movement of the housing, a plunger slidable in said extension and carrying a printing pad in the housing above the housing opening, and a connection between the carrier and plunger whereby upon continued downward movement of the carrier after arrest of said housing the plunger is moved downwardly relative to the housing to bring said printing pad into printing engagement with the centered cap.

10. Apparatus of the class described comprising a capping head and a printing head mounted side by side, a support beneath said heads, and means for approaching the heads and support unitarily so that of a pair of containers positioned beneath said heads on said support, one is capped and the other, capped in a previous operation of the apparatus, is printed, the capping and printing operations being completed during the unitary approachment of the heads and support.

11. Apparatus for printing container caps comprising a vertically reciprocating member, an element carried by said member and having a lost motion connection therewith, said element being adapted to engage and center a cap as said member moves downwardly, the cap arresting said element while said member continues its downward movement, a printing plunger carried by said member and brought into operative engagement with said cap at the end of the continued downward movement of said member, an inking pad, and means for moving said inking pad from an operative position to a position outside the path of said plunger during said continued downward movement of said member.

12. Apparatus for printing container caps comprising a vertically reciprocating member, an element carried by said member and having a lost motion connection therewith, said element being adapted to engage and center a cap as said member moves downwardly, the cap arresting said element while said member continues its downward movement, a printing plunger carried by said member and brought into operative engagement with said cap at the end of the continued downward movement of said member, there be-

ing cushioning means between said member and said plunger, an inking pad, and means for moving said inking pad from an operative position to a position outside the path of said plunger during 5 said continued downward movement of said member.

13. Apparatus for printing container caps comprising a vertically reciprocating member, a housing carried by said member and having a lost 10 motion connection therewith, said housing having a bottom opening downwardly flared for centering the cap as said housing moves downwardly with said member, the upper portion of said opening being of such size that the margins thereof 15 of abut the centered cap to arrest downward movement of said housing, a printing pad in said housing above said opening and carried by said member, continued downward movement of said member subsequent to the arrest of said housing 20 bringing said pad into printing engagement with the top of the cap, an inking pad for said printing pad, and means for moving said inking pad from operative position to a position outside the path of the printing pad during said continued 25 downward movement of said member.

14. Apparatus for printing container caps comprising a vertically reciprocating member, a housing carried by said member and having a lost motion connection therewith, said housing having 30 a bottom opening downwardly flared for centering the cap as said housing moves downwardly with said member, the upper portion of said opening being of such size that the margins thereof abut the centered cap to arrest downward movement of said housing, a printing pad in said housing above said opening and carried by said member, continued downward movement of said member subsequent to the arrest of said housing 35 bringing said pad into printing engagement with the top of the cap, said member in its upward 40

movement lifting the pad and then the housing from engagement with said cap, an inking pad for said printing pad, and means for moving said inking pad from operative position to a position outside the path of the printing pad during said continued downward movement of said member and for returning said inking pad to operative position during the upward movement of said member.

15. Apparatus for printing container caps comprising a vertically reciprocable carrier, a housing having a hollow upward extension slidable in a vertical bore in the carrier, said housing having a bottom opening whose margins are adapted to center and abut a cap to arrest downward movement of the housing, a plunger slidable in said extension and carrying a printing pad in the housing above the housing opening, a connection between the carrier and plunger whereby upon continued downward movement of the carrier 20 after arrest of said housing the plunger is moved downwardly relative to the housing to bring said printing pad into printing engagement with the centered cap, an inking pad for said printing pad, and means for moving said inking pad from operative position to a position outside the path of the printing pad during said continued downward movement of the carrier.

16. Apparatus of the class described comprising a vertically reciprocating member, a capping head carried by said member, a printing head carried by said member and including a printing pad and a cooperating inking pad, and means for intermittently feeding a series of containers under said heads, said heads acting upon each downward movement of said member to cap a container and print the previously applied cap of the preceding container.

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