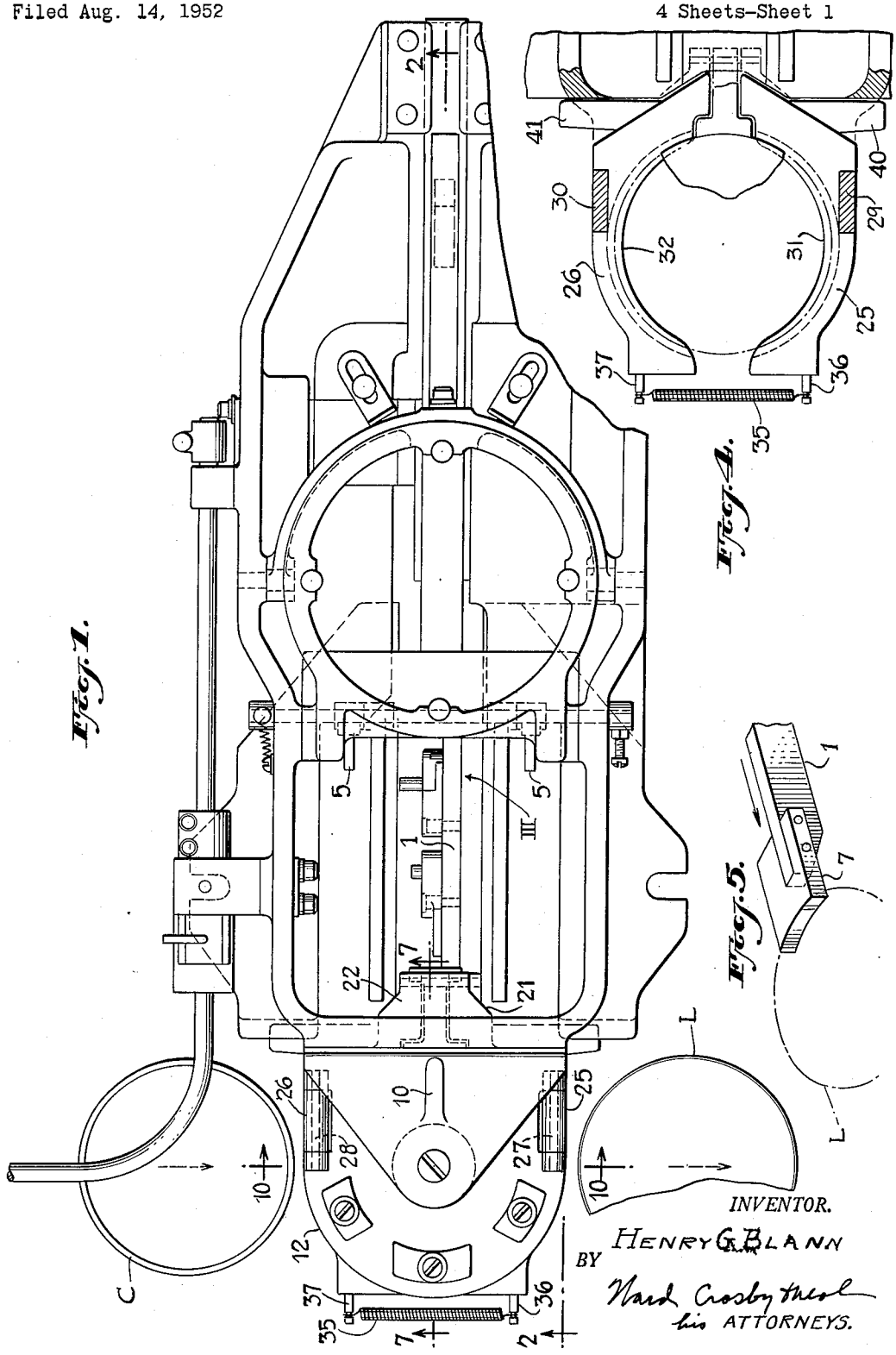
Sept. 13, 1955 H. G. BLANN 2,717,730

APPARATUS FOR APPLYING CLOSURE LIDS TO CONTAINERS

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Sept. 13, 1955 H. G. BLANN 2,717,730

APPARATUS FOR APPLYING CLOSURE LIDS TO CONTAINERS

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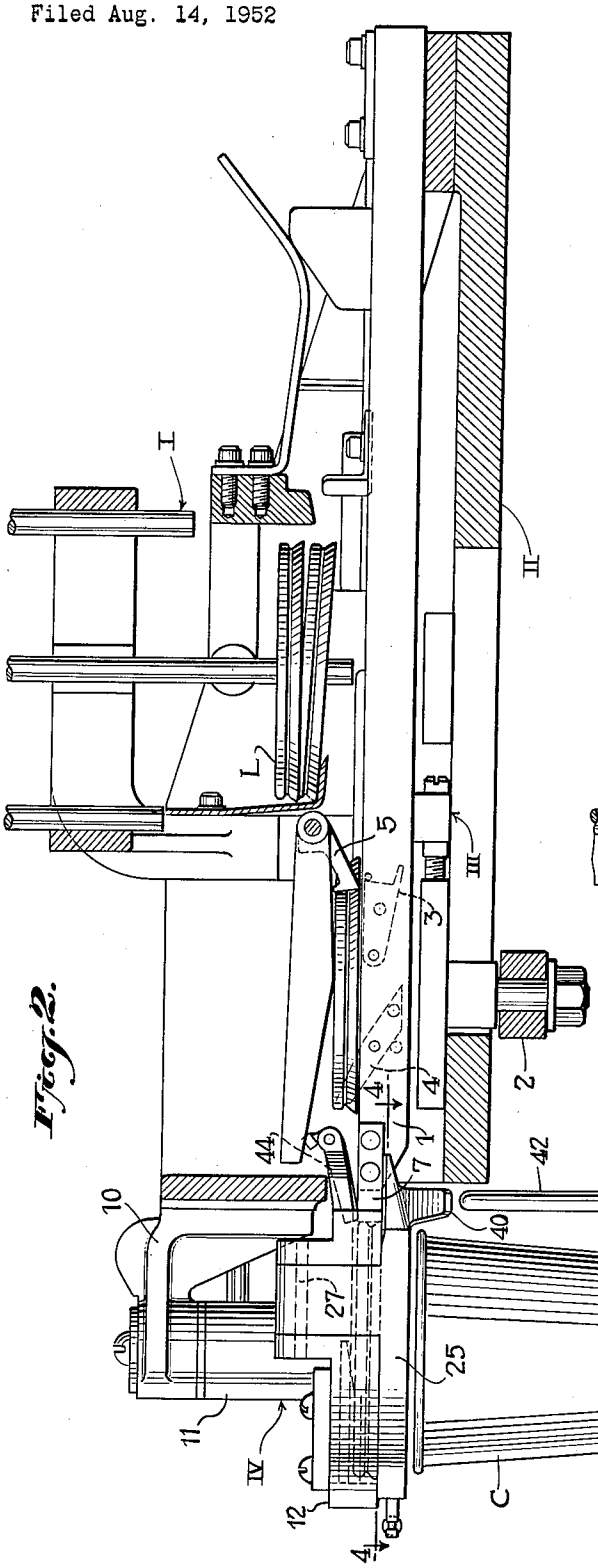


Fig. 2.

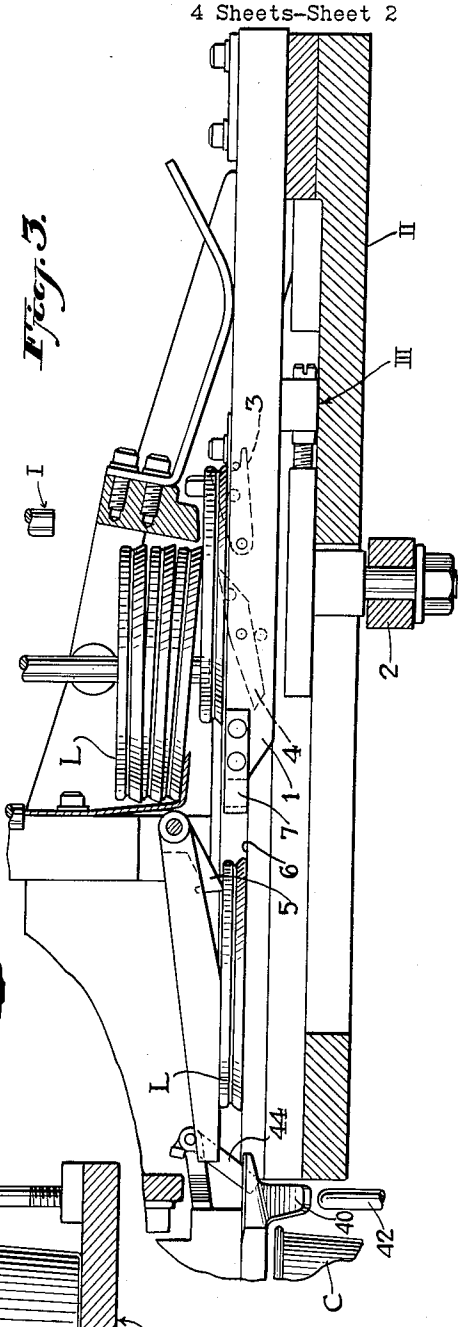


Fig. 3.

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Fig. 7.

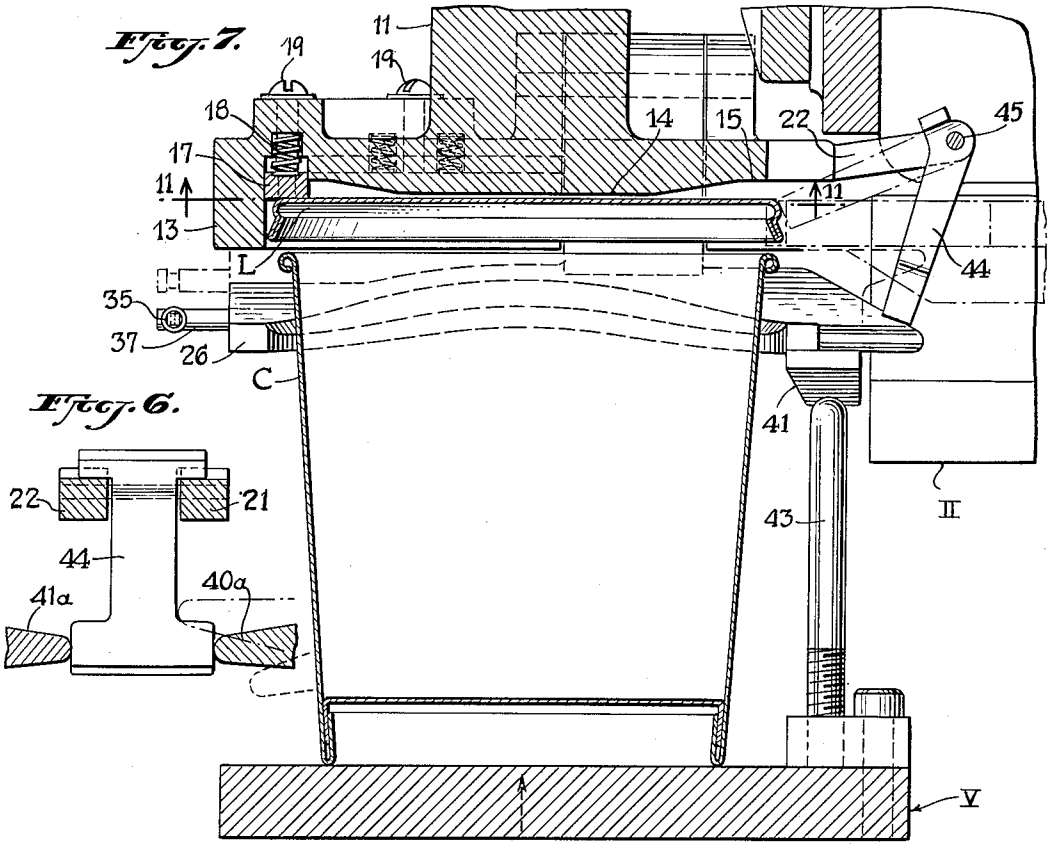


Fig. 6.

Fig. 8.

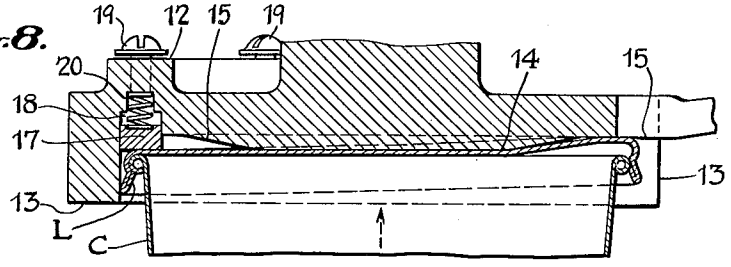
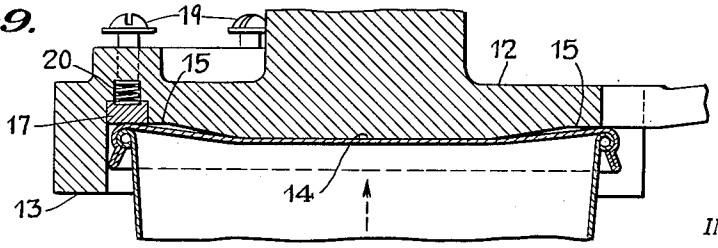


Fig. 9.



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Fig. 10.

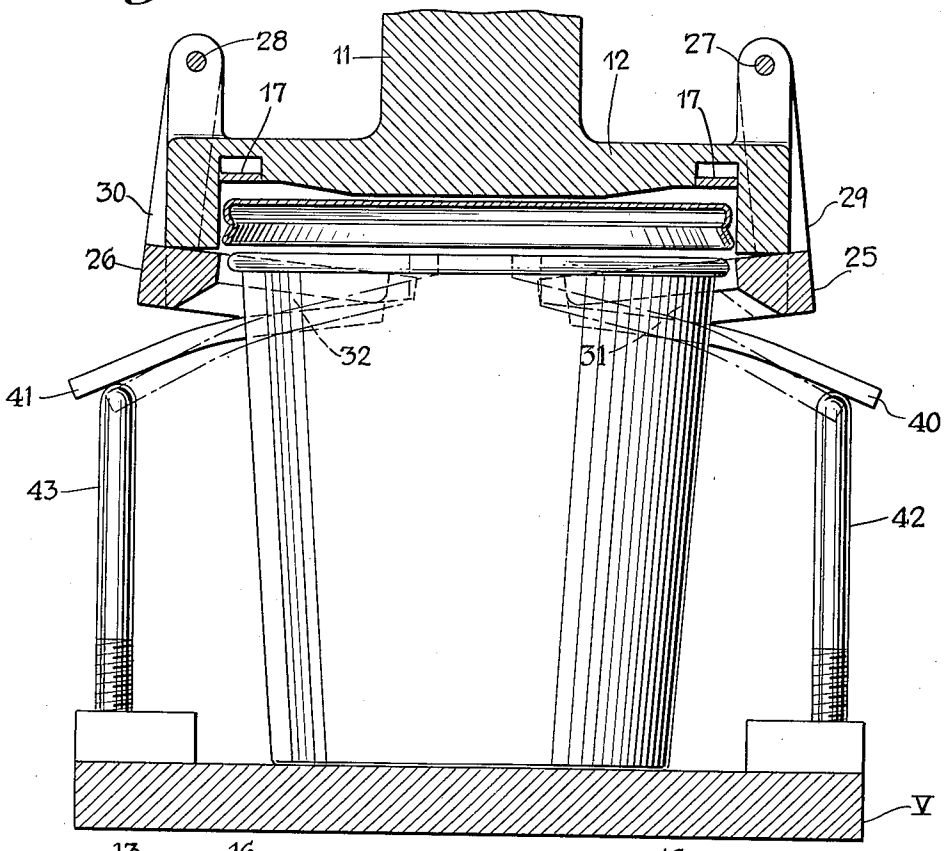


Fig. 11.

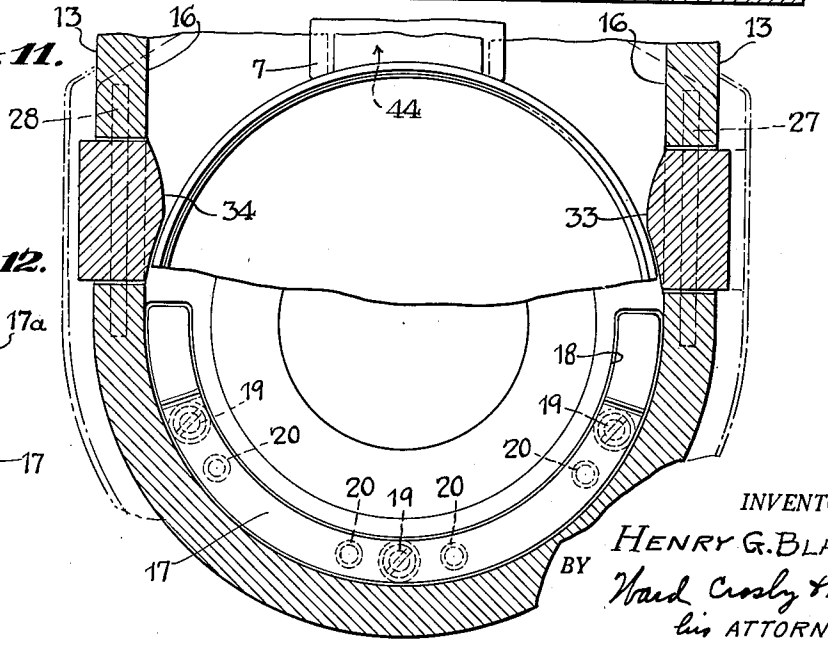
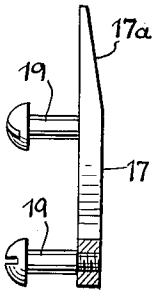


Fig. 12.



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United States Patent Office 2,717,730
Patented Sept. 13, 1955

2,717,730

APPARATUS FOR APPLYING CLOSURE LIDS TO CONTAINERS

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Application August 14, 1952, Serial No. 304,368

8 Claims. (Cl. 226—84)

This invention relates to apparatus for applying closures to containers, sometimes referred to as "capping mechanism."

The invention is intended primarily for applying paper caps, covers or lids of the snap-on type having a depending flange so formed as to snap over and lock beneath or tightly engage a beaded edge of a container, such as a paper container. Lids of this type are exemplified in J. D. Reifsnyder Patents No. 2,233,498, granted March 4, 1941, and No. 2,493,086, granted January 3, 1950. Such lids are so made that in applying them it is necessary to spring the flange or skirt radially outwardly over the beaded edge until the interlocking inwardly extending portion of the flange can pass beneath the bead.

In view of the desire to have a tight fit, a substantial force is necessary to spring the flange outwardly over the beaded edge of the container; and this makes it extremely difficult to apply such lids without damage to the lids or containers. This problem is aggravated when the lids are to be applied to filled containers in conjunction with automatic filling machines.

It is an object of this invention to provide apparatus for applying snap-on closures in an accurate and efficient manner.

Another object is to provide mechanism which may be used in conjunction with related apparatus for filling containers, and especially paper containers.

A further object of the invention is to provide a capping head or "bell" adapted to be used in a capping machine for applying closures of the snap-on type.

Other objects, features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of an embodiment of the invention shown in conjunction with cooperating mechanism for feeding lids and diagrammatically illustrating the feeding of containers;

Fig. 2 is a side elevational view, partly in section, of the embodiment shown in Fig. 1;

Fig. 3 is a segmental view similar to Fig. 2 showing certain of the parts in a different position;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a perspective view of a lid pusher finger shown in Figs. 1, 2 and 3;

Fig. 6 is an enlarged sectional view taken on line 6—6 of Fig. 7;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 1 and showing the parts at the commencement of the capping operation;

Figs. 8 and 9 are views similar to Fig. 7 but showing the parts in successive stages of the capping operation;

Fig. 10 is a cross-sectional view taken on line 10—10 of Fig. 1;

Fig. 11 is a cross-sectional view taken on line 11—11 of Fig 7; and

Fig. 12 is a side elevation of a part of the device shown in Fig. 11, with a portion broken away.

Referring to the drawings and more particularly to Figs. 1 and 2: the present embodiment of the invention comprises a suitable lid supply magazine designated in general as I mounted on a table or supporting frame designated in general as II which also carries means designated in general as III for conveying successive lids, such as L, from the magazine I to a capping head or bell designated in general as IV secured rigidly to the delivery end of the table II in feed alignment with the magazine I and disposed over a transversely extending container conveyor table having a vertically movable section designated in general as V for raising a container, such as C, into axial alignment with a lid carried in the head IV. The particular structural details of the magazine I and lid conveyor III per se are not claimed as a part of this invention and only such parts thereof will be described in detail as necessary or helpful to an understanding of this invention.

Cap conveyor feed

The lid conveyor III comprises a feed slide **1** (Figs. 1 and 2) slidably mounted on the table II for reciprocation from left to right and is movable in timed relation by suitable linkage, such as **2**. The slide **1** has a retracting finger **3** for withdrawing a lid from the stack upon rearward movement (Fig. 3) and a feed finger **4** for feeding the finger forwardly toward the capping head upon forward movement (Fig. 2) to position a lid at a first feed stage where it is held by fingers, such as **5**, while the slide **1** move on its return stroke allowing the lid to fall to the top **6** of the table II ahead of the slide **1**. The forward end of the slide **1** is provided with a pusher finger **7** (see also Fig. 5) for feeding the lid L to the capping head IV on the forward stroke of the slide **1**.

Capping head

The capping head IV (Figs. 1 and 2) is supported from the frame II by means of a bracket **10** to which is rigidly secured a neck portion **11** of the capping head body whose lower end **12** is provided with a cavity for receiving a lid L (Figs. 7–9). This cavity is formed by a side wall flange **13** and an upper wall whose central zone **14** projects downwardly below an upwardly disposed annular portion **15**. The side wall flange **13** is generally U-shaped (Fig. 11) in plan view with the bottom of the U being semi-circular and disposed on the side of the head opposite the pusher finger **7** and the sides of the U being spaced apart in substantial parallelism to provide a feed opening **16** in register with the pusher **7** for receiving a lid L. A contact member, such as an arcuate shoe **17**, is disposed in a groove **18** recessed in the annular wall portion **15** closely adjacent the semi-circular portion of the side wall **13** and is supported by screws, such as **19**, which are slidably disposed in the body end **12**. A plurality of helical compression springs, such as **20**, are seated in corresponding bores and interposed between the body and shoe **17** so as to urge the shoe downwardly below the annular wall portion **15** (Fig. 8) and permit it to be moved upwardly to a position where its lower surface is flush with said upper wall portion **15**. The forward ends of the shoe **17** are tapered as at **17a** to permit a lid to pass thereover.

Means for releasably supporting a lid L in the cavity will now be described (Figs. 1, 4 and 2). A pair of oppositely disposed arms **25—26** are separately pivotally supported as at **27—28** from lugs provided on the lower end **12** of the body of the head IV. The arms **25—26** are provided with portions **29—30** (Fig. 10) disposed in radial recesses provided in the head end **12** and with inwardly extending arcuate ends **31—32** which have lower beveled edges disposed to lie beneath the lower edge of the flange of a lid in concentric register therewith (Figs. 4 and 10). The portions **29—30** are provided with throat

restricting protuberances 33—34 which project inwardly beyond the interior wall of the feed throat 16 (Fig. 11) so disposed and shaped as to engage the groove on the sides of the lid L and and support it in the cavity while holding it against the arcuate side wall after it has been inserted through the feed opening 16. The arms 25—26 are releasably urged inwardly by a helical tension spring 35 (Figs. 1 and 4) whose opposite ends are secured to studs 36—37 carried by the arms 25—26.

The arms 26—27 are provided with outwardly extendings wings 40—41 (Figs. 4, 10 and 7) whose outer ends are disposed over and engageable by actuating plins 42—43 mounted on and extending upwardly from the vertically movable container table section V, so that upon upward movement of the container the arms 25—26 will be moved from the dotted line to the solid line positions shown in Figs. 7 and 10.

A detent arm or latch 44 (Figs. 6 and 7) has its upper end freely pivotally mounted at 45 between a pair of extending arms 21—22 formed integrally with the lower end 12 of the head body and its lower end is disposed for movement between portions 40*a*—41*a* of the wings 40—41. The latch 44 in its lower position (Fig. 6) serves to hold the arms 25—26 partially open until after the capped container is removed and the catch lies in the path of movement of a lid being fed by the pusher 7 into the head IV so that the movement of a succeeding lid into the head swings the latch upwardly and releases the arms 25—26 to return to their closed position under the action of spring 35.

Operation

With containers C being fed (by suitable mechanism not shown) in the direction of the arrows (Fig. 1) successively and intermittently on to the movable panel V and in register with the capping head IV and with a supply of lids L provided in the magazine I the mechanism operates in the manner now to be described, it being understood that the various parts are suitably interconnected in timed relation.

Upon the rearward movement of the slide 1 (Fig. 3) the finger 3 withdraws a lid rearwardly from the bottom of the stack and upon forward movement of the slide finger 4 feeds it forward to the position indicated in Fig. 2 where it is restrained by the fingers 5 (Figs. 1 and 3) against rearward movement as the slide returns on its back stroke. When the slide 1 moves rearwardly from beneath the lid, which was previously restrained by the fingers 5, the lid falls to the surface 6, in the position shown in Fig. 3. On the next forward stroke of the slide 1 the slide finger 7 pushes the lid from the position shown in Fig. 3 to the position shown in broken lines (Fig. 2) within the head IV, with the results now to be described.

As the lid moves into the throat 16 (Fig. 11) it first lifts the detent arm 44 (see also Figs. 2 and 3), whose function will be later referred to, and then as it engages the throat restricting protuberances 33—34 on the arms 25—26 the arms move outwardly against the tension of the spring 35 (Fig. 1) until the maximum diameter of the lid has passed the restrictions 33—34, at which time the spring 35 urges them inwardly to hold the lid against the recess wall flange 13 and a peripheral margin portion of the lid beneath the shoe 17. The arms 25—26 at this time are disposed toward the lid to hold it in the cavity of the head, as shown in Figs. 2 and 11. The container table section V now moves upwardly (Figs. 7 and 10) and as its upper edge approaches the head IV (broken line position of the arms 40—41) the arcuate portions 31—32 guide the container so that its lip enters the lid. Upon further movement of the section V the pins 42—43 engage the wings 40—41 of the arms 25—26 causing the arms to move outwardly against the tension spring 35 (to the solid line position) so as to release the lid engaging portions 33—34.

When the container is moved upwardly from the position shown in Fig. 7 to that shown in Fig. 8 the shoe 17 exerts a down pressure on that side of the lid causing the lid to be first urged toward the container lip in a limited peripheral zone. Upon further relative movement the downwardly extending central zone 14 of the head exerts pressure on the corresponding central zone of the lid, thus causing the lid peripheral flange to be flexed outwardly to facilitate the gradual and progressive insertion of the container beaded lip into the cooperating recess of the lid (Fig. 9).

When the lid has thus been secured to the container the table section V moves downwardly carrying the pins 42—43 away from the wings 40—41 and in order to retain the arms 25—26 sufficiently open to permit withdrawal of the capped container from the head the latch 44 swings downwardly from the position shown in Fig. 2 to that shown in Fig. 3 and its lower end (Fig. 6) falls between the portions 40*a*—41*a* before the pins 42—43 are moved to a position of releasing the arms 25—26. Then as the succeeding lid is fed into the capping head the latch 44 is moved upwardly, as heretofore described, to release the arms 25—26 to closed position.

Having thus described my invention with particularity with reference to its preferred form, it will be obvious to those skilled in the art, after understanding my invention, that other changes and modifications may be made therein without departing from the spirit and scope of my invention, and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What I claim is:

1. For use in a capping device for applying snap-on lids to containers a capping head comprising, a body provided with a cavity in its lower face for receiving said lid, means for supporting a lid in said cavity, the upper wall of said cavity projecting downwardly in a central zone below an upwardly disposed annular portion, said upwardly disposed annular portion providing a recess and a contact member yieldably supported below said upper wall annular portion toward one side of said cavity for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess, whereby upon the movement of a container into contact with the lid disposed in said cavity a central area of said lid will be engaged by said downwardly projecting upper wall and a marginal lid portion will be engaged by said yieldable member to urge the engaged marginal portion of the lid into seating engagement on said container before the opposite marginal portion of the lid is seated on said container.

2. For use in a capping device for applying snap-on lids to containers a capping head comprising, a body provided with a cavity in its lower face for receiving said lid and a laterally extending passageway through one side of the cavity side wall through which a lid may be introduced into said cavity toward the opposite side wall, means for supporting a lid in said cavity, the upper wall of said cavity projecting downwardly in a central zone below an upwardly disposed annular portion, said upwardly disposed annular portion providing a recess and a contact member yieldably supported below said upper wall annular portion adjacent said opposite side wall for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess, whereby upon the movement of a container into contact with the lid disposed in said cavity a central arm of said lid will be engaged by said downwardly projecting upper wall and a marginal lid portion will be engaged by said yieldable member to urge the engaged marginal portion of the lid into seating engagement on said container before the opposite marginal portion of the lid is seated on said container.

3. For use in a capping device for applying snap-on lids to containers a capping head comprising, a body provided with a cavity in its lower face for receiving said lid, said cavity having an end wall and a depending side

wall of generally U-shape to provide an opening at one side for the insertion of a lid and an abutment on the opposite side for centering said lid in said cavity, said end wall being provided with an annular recess and a centrally disposed projection, means for releasably supporting a lid in said recess, and an arcuate shoe extending substantially less than the circumferential extent of said annular recess disposed in said recess adjacent the abutment and yieldably held downwardly below the end wall of said annular recess and movable upwardly above the centrally disposed end wall.

4. For use in a capping device for applying snap-on lids to containers a capping head comprising, a body provided with a cavity in its lower face for receiving said lid, oppositely disposed pivoted segments normally positioned beneath said cavity for supporting a lid and movable outwardly to release said lid, said segments having portions projecting laterally inwardly from respectively opposite sides of said passageway for holding said lid against said opposite side wall, the upper wall of said cavity projecting downwardly in a central zone below an upwardly disposed annular portion, a contact member yieldably supported below said upper wall annular portion toward one side of said cavity for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess, whereby upon the movement of a container into contact with the lid disposed in said cavity a central area of said lid will be engaged by said downwardly projecting upper wall and a marginal lid portion will be engaged by said yieldable member to urge the engaged marginal portion of the lid into seating engagement on said container before the opposite marginal portion of the lid is seated on said container.

5. For use in a capping device for applying snap-on lids to containers a capping head comprising, a body provided with a cavity in its lower face for receiving said lid, a pair of oppositely disposed pivotally supported arms yieldably held in supporting position, for supporting a lid in said cavity, a pivotal latch member for holding said arms in position to release a cap from said cavity, the upper wall of said cavity projecting downwardly in a central zone below an upwardly disposed annular portion, and a contact member yieldably supported below said upper wall annular portion toward one side of said cavity for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess.

6. In a machine of the character described the combination of, a capping head provided with a cavity in its lower face for receiving a lid, the upper wall of said cavity projecting downwardly in a central zone below an upwardly disposed annular portion, a contact member yieldably supported below said upper wall annular portion toward one side of said cavity for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess, means for inserting a lid in said cavity, means for releasably supporting said lid in said cavity, a vertically movable container support below said head for moving a container into engagement with a ild supported in said head, and means movable in timed relation with said container support for releasing said lid support.

7. In a machine of the character described the combination of, a capping head comprising a body provided with a cavity in its lower face for receiving said lid and a laterally extending passageway through one side of the cavity side wall through which a lid may be introduced into said cavity toward the opposite side wall, said passageway having a restricted throat for holding a lid toward said opposite side wall, the upper wall of said cavity projecting downwardly in a central zone below an annular portion to provide an upwardly extending recess, a contact member yieldably supported below said upper wall annular portion toward one side of said cavity for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess, a pusher member for feeding a lid through said passageway past said throat, oppositely disposed pivotally mounted arms for supporting a lid in said cavity, a vertically movable container support disposed below said head for moving a container into engagement with a container supported in said head, and means carried by said container support for moving said arms outwardly upon upward movement of said support to permit said container to be inserted into said lid.

8. In a machine of the character described the combination of, a capping head comprising a body provided with a cavity in its lower face for receiving said lid and a laterally extending passageway through one side of the cavity side wall through which a lid may be introduced into said cavity toward the opposite side wall, said passageway having a yieldable restricted throat for holding a lid toward said opposite side wall, the upper wall of said cavity projecting downwardly in a central zone below an annular portion to provide an upwardly extending recess, a contact member yieldably supported below said upper wall annular portion toward one side of said cavity for engaging a corresponding marginal edge portion of said lid to resist its movement upwardly into said recess, a pusher member for feeding a lid through said passageway past said throat, oppositely disposed pivotally mounted arms for supporting a lid in said cavity, means for resiliently holding said arms in supporting position, a vertically movable container support disposed below said head for moving a container into engagement with a container supported in said head, means carried by said container support for moving said arms outwardly upon upward movement of said support to permit said container to be inserted into said lid, and a latch operable upon the downward movement of said support to hold said arms apart to release said lid for removal with said container.

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