# United States Patent [19]

**West**

[11] **3,864,898**

[45] **Feb. 11, 1975**


[54] **AUTOMATIC CONTAINER CAPPING AND LID DISPENSING DEVICE**


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[22] Filed: **Aug. 21, 1973**

[21] Appl. No.: **390,243**

[52] **U.S. Cl.** ..... **53/328,** 53/309, 221/297

[51] **Int. Cl.** ..... **B65b 7/28**

[58] **Field of Search** ..... 53/287, 305, 306, 309, 53/319, 322, 323, 324, 328; 221/297, 292, 293



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,050,788 | 1/1913 | Baltzley | 53/309 X |
| 1,169,775 | 10/1914 | Cornwall | 53/305 |
| 1,824,660 | 9/1931 | Darner | 53/309 |
| 2,088,010 | 7/1937 | Petersen | 53/305 |
| 2,315,827 | 4/1943 | Tansley | 221/297 X |



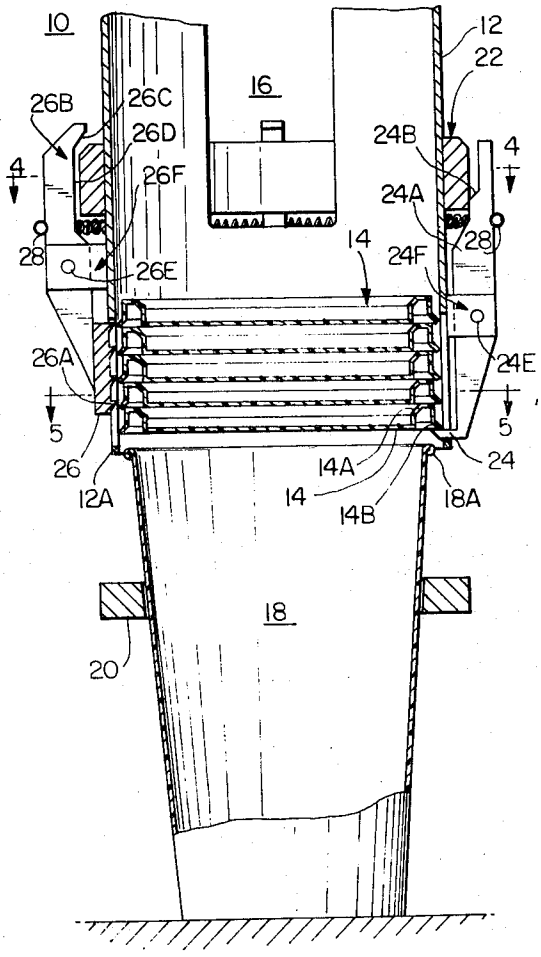
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[57] **ABSTRACT**

An automatic container capping and lid dispensing device is provided in which a vertical magazine of stacked horizontally disposed lids is vertically reciprocated toward and away from a vertically disposed container beneath the magazine. Such downward stroke of the magazine releases the lowermost lid therein and seats it on rim of the container to cap the latter. The return stroke prepares the stack of lids for the next dispensing and capping stroke.


**14 Claims, 5 Drawing Figures**



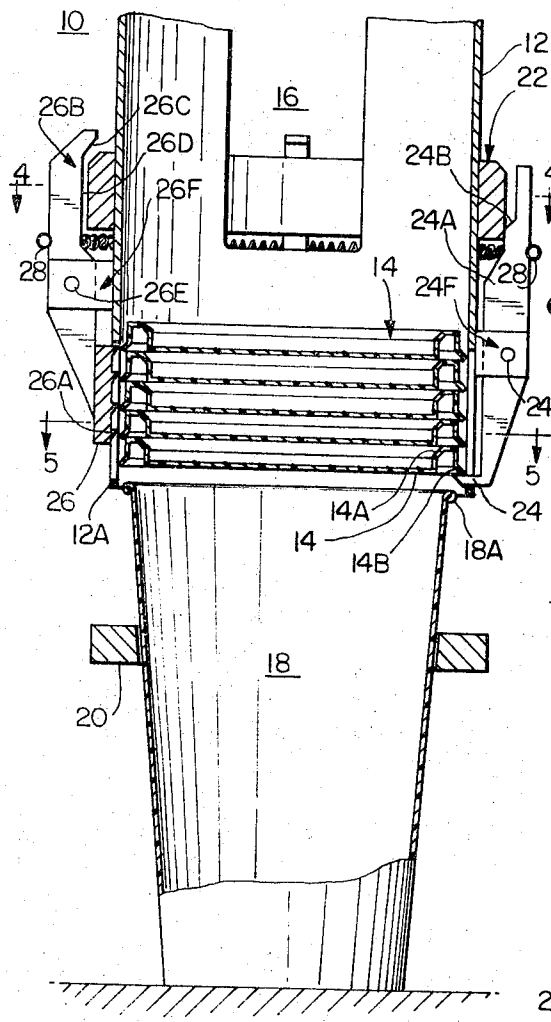



FIG. 1

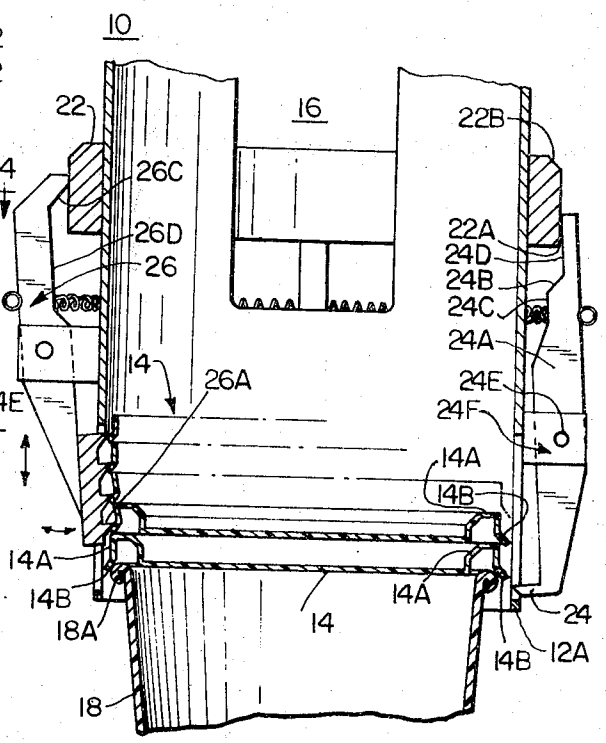



FIG. 2

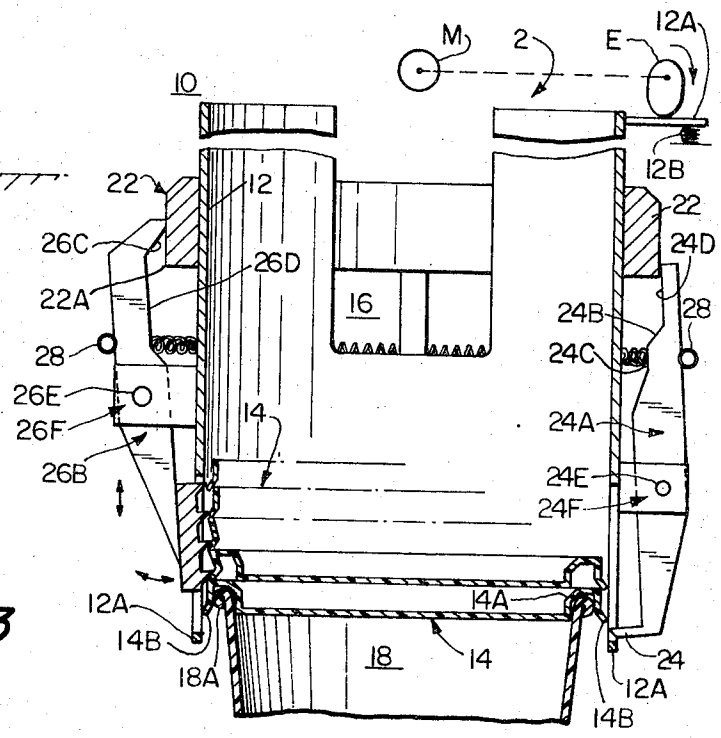



FIG. 3

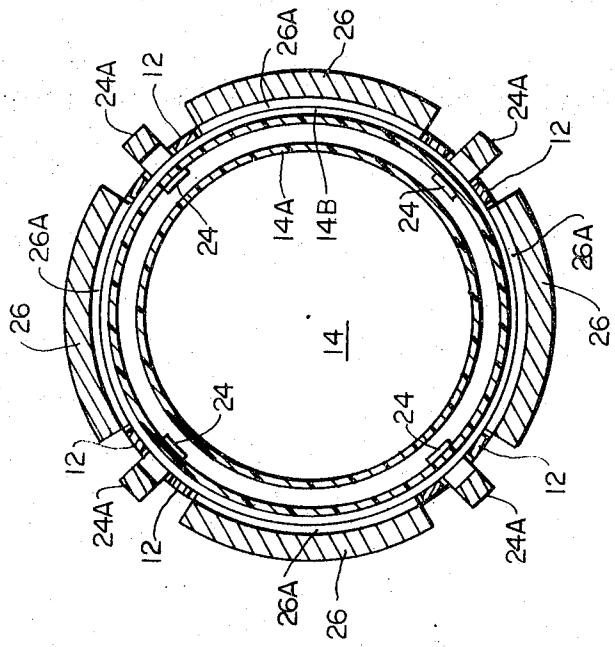

26A
26
24A
12
24
14A
14B
14
26A
26
24A
12
24
24
12
24A
12
26A
26
24A

FIG. 5

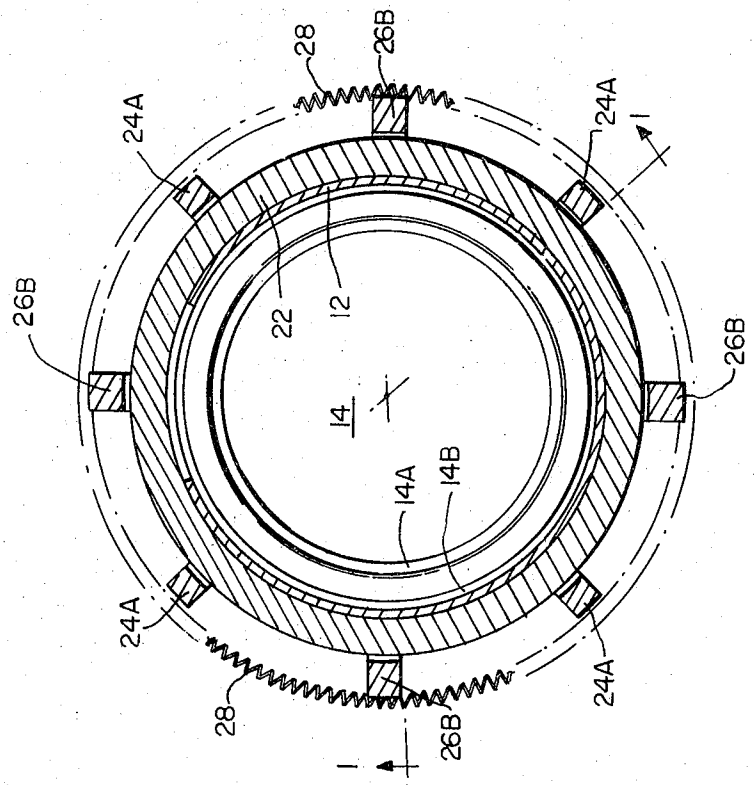

28
26B
24A
24A
1
22
12
14
26B
14A
14B
24A
24A
28
26B
1

FIG. 4

# AUTOMATIC CONTAINER CAPPING AND LID DISPENSING DEVICE

This invention relates to container capping devices and more particularly to means for dispensing lids for containers or the like from a magazine and placing the lid on the container as it is dispensed.

## BACKGROUND OF THE INVENTION

In the dispensing of stacked container lids, one at a time for the purpose of applying each dispensed lid to a container, it has been customary to use a coin feed type mechanism which slidably displaces the lowermost lid from a stack of lids in a loadable magazine and then apply the lid to the container with yet another mechanism, synchronously related or timed with the dispensing mechanism.

Such equipment has a number of disadvantages, not the least of which are cost, complexity and bulk, precluding the use of such equipment for all but high volume situations where its cost, complexity and size are not parameters of impracticability.

Furthermore, such equipment requires lid designs which are compatible with coin feeding, thus eliminating nested, thin-walled, low cost plastic and other lids from this form of automated dispensing.

Thus, there is an established need in the art for a low cost lid dispensing and capping unit for containers which effects its functions in an optimally limited space, is not unduly limited to particular lid designs and which is readily adaptable to use with many types of equipment such as automatic filling machines, vending machines and the like.

## OBJECTS OF THE INVENTION

It is an object of the present invention to provide a new and novel means for dispensing container lids one by one from a stack of lids in a magazine.

It is another object of the present invention to provide a new and novel means for dispensing container lids one by one from a stack of lids in a magazine and to cap a container with said lid as it is dispensed.

Another object of the present invention is to provide a new and novel lid dispensing and container capping device which performs its dual function with but a single operating stroke.

Still another object of the present invention is to provide a new and novel lid dispensing and container capping device which is optimally simple in construction, of optimally minimum dimensions, low in cost, rapid in operation and operable with low cost, thin-walled lids of plastic or the like.

Yet another object of the present invention is to provide a lid dispensing and container capping device having a tubular vertical magazine of stacked lids which utilizes a single short stroke vertical displacement of the entire magazine to effect dispensing of a lid and capping of a container therewith.

These and other objects of the present invention will become more fully apparent with reference to the following specifications and drawings which relate to a preferred embodiment of the invention.

## SUMMARY OF THE INVENTION

A vertically extending tubular magazine is mounted for vertical reciprocation in a combined cam and bearing and holds a plurality of stacked and/or nested container lids each disposed transversely of the magazine. At the lower end of the magazine are a set of releasable leveling and dispensing detents selectively engaging the lowermost lid in the magazine, said detents being interspersed about the periphery of the lower end of the magazine with a set of clamping shoes which engage the lids and cause them to seat on and cap a container at the lowermost reach of each reciprocation of the magazine.

The leveling and dispensing detents and the lid clamping shoes are synchronously staggered in operation and timed to the reciprocations of the magazine by the combined cam and bearing to dispense one lid at a time and cap a container with that lid for each reciprocation of the magazine.



## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation in partial cross-section of a disperser and capper of the present invention at or toward the uppermost position of a reciprocation of the magazine;

FIG. 2 is a similar view to FIG. 1 representing a lower position of the magazine and an intermediate actuation of the leveling and dispensing detents and clamping shoes of the present invention just prior to the container capping operation;

FIG. 3 is a view similar to FIGS. 1 and 2 representing the lowermost or container capping position of the present invention;

FIG. 4 is a cross-section taken along line 4—4 of FIG. 1; and

FIG. 5 is a cross-section taken along line 5—5 of FIG. 1.

## DETAILED DESCRIPTION OF THE INVENTION

Referring in detail to the drawings and with particular reference to FIGS. 1, 2 and 3, the dispenser and capper 10 of the present invention is shown as including a vertically disposed tubular magazine 12 of any suitable cross-sectional configuration (although specifically shown as having a circular cross-section) in which a plurality of lids 14 of a size coextensive with the cross-section of the magazine 12 have been stacked in a nested configuration by way of a vertical loading slot 16 as is known in the art.

Each of the lids 14 have inverted U-shaped peripheral rims or flanges 14A with the outermost lip 14B thereof flared outwardly of the lid 14 into substantial juxtaposition or immediate adjacency to the internal walls of the magazine 12. The fit of the lids 14 within the magazine 12 is such that they will feed downwardly therein in their stacked configuration by the action of gravity.

As best shown in FIGS. 2 and 3, the outwardly flared lip 14B of the lids 14 is designed to snap over the rolled top rim portion 18A of a drinking cup or container 18 which is positioned in a holder or retaining means 20 of any suitable configuration coaxially beneath the magazine 12 and lids 14.

As shown in FIG. 1, in the uppermost position of the magazine 12, the latter being reciprocated by means of any suitable known mechanism in the art through sequential short reciprocal strokes along its own axis, the said magazine 12 is so disposed with respect to an annular guide bearing and cam means 22 as to result in the stack of lids 14 being held within the magazine, beneath the lowermost lid 14, by a plurality of leveling

and dispensing detents **24** engaging the flared lip portion **14B** of the said lowermost lid **14.** This position of the magazine also results in a disengaged condition of a plurality of arcuate clamping shoes **26** having internal horizontal arcuate bosses **26A** having a substantially conformal overlapping fit with the outer top edge of the rim portions **14A** of the lowermost lid **14** in the magazine **12** and several additional lids **14** next adjacent thereto when the said shoes **26** are engaged with the rims **14A** of those lids **14.**

The interspersed arrangement of the clamping shoes **26** and the leveling and dispensing detents **24** are shown in FIG. **5** together with their relationship to the rim **14A** and outer lip **14B** of the lids **14.**

The detents **24** are mounted on one end of respective upstanding follower arms **24A** having a cam rise **24B** and two adjacent dwells **24C** and **24D** at the opposite ends thereof adjacent the fixed annular bearing guide and cam ring **22.**

The lowermost rim **22A** of the cam ring **22** is the actuating cam surface for the detents **24** and the sloping upper rim **22B** of the cam ring **22** is the actuating cam surface for the clamping shoes **26** as will be hereinafter more fully described in conjunction with the description of operation of the present invention.

The clamping shoes are mounted on upstanding follower arms **26B** having a rise **26C** and dwell **26D** adjacent the cam ring **22.**

The general orientation of the said follower arms **24A** and **26B**, the cam ring **22** and the magazine **12** are shown in FIG. **4.**

Both sets of follower arms **24A** and **26B** are pivoted intermediate the upper and lower ends thereof at **24E** and **26E**, respectively, by means of brackets **24F** and **26F** mounted on the outer surface of the magazine **12** as shown in FIGS. **1, 2** and **3.**

Also, by any suitable conventional means, the follower arms **24A** and **26B** are biased toward the cam ring **22** such as by a garter spring **28.**

## OPERATION

Referring to FIGS. **1, 2** and **3,** the assuming FIG. **1** to be the initial or dwell position of the dispenser and capper **10,** an uncapped container **18** is moved beneath the magazine **12** in coaxial alignment therewith such that the cup rim or head **18A** is indexed beneath the open portion of the rim **14A** of the lowermost lid **14** in the lid stack in the said magazine **12.**

At this point in time the respective dwell surface **24B** and **26D** of the follower arms **24A** and **26B** are engaged by the cam ring **22,** holding the leveling and dispensing detents **24** beneath the lowermost lid **14** in engagement with the flared lip **14B** and holding the clamping and capping shoes **26** and the annular bosses **26A** thereof out of engagement with the lids **14.**

As the magazine **12** is axially displaced downward to the position of FIG. **2,** the rise **24B** of the follower arms **24A** engages the lower rim **22B** of the cam ring **22** and progressively causes each follower arm **24A** to pivot the leveling and dispensing detent **24** thereon out from under the lids **14** when the dwell **24D** reaches the cam ring **22.**

While this action is taking place, the rise **26C** on the follower arms **26B** engages the upper edge surface **22B** of the cam ring **22** and progressively forces the clamping shoes **26** into engagement with the rims **14A** of the lids **14** such that the internal bosses **26A** of the clamping and capping shoes **26** engage the flared lip **14B** of the said lids and force same down and into the outer corner of the rim portion **14A** on the next lowest lid.

The two foregoing actions are such that the clamping action of the clamping and capping shoes **26** is accomplished prior to a full release of the lids **14** by the leveling and dispensing detents **24.**

Continued downward displacement of the magazine **12** to its lowermost position of travel in FIG. **3** will force the lowermost lid **14** onto the rim **18A** of the cup **18,** with the flared lip **14B** of the lid riding out and over the cup rim **18A** and the cup rim **18A** thereby seating in the rim **14A** of the lid **14.** The inner surface of the clamping shoes **26** beneath the lowermost boss **26A** comprises a skirt portion or the like imposing a lateral constraint on the lowermost lid **14** to insure registry of the rim **14A** with the rim **18A** of the container **18.**

With the clamping and capping pads **26** still gripping the remaining lids **14** in the stack of lids in the magazine **12,** the back-stroke of the magazine **12** is commenced in this capping and dispensing cycle the clamping shoes **26** retain their grip on the remaining lids in the clamping shoes through the position shown in FIG. **2** and until the levelling and dispensing detents **24** are returned to position beneath the lids **14** by the rises **24B** and dwells **24C** on their respective follower arms **24A** acting against the cam ring **22.**

Then, prior to reaching the top of the back-stroke (position of FIG. **1**) the clamping shoes **26** release the lids **14** in the lid stack to drop by gravity onto the leveling and dispensing detents **24,** thus positioning the now lowermost lid **14** in the lid stack for the next dispensing and capping stroke of the magazine **12.**

The clamping shoes **26** are fully released by the rises **26C** on their respective follower arms **26B** leaving the upper cam surface **22B** of the cam ring **22** and the resultant engagement of the dwell **26D** with the cam ring **22.**

The next cycle is commenced upon placing a new cup **18** in place beneath the unit **10** in the cup or container holder **20.**

The holder **20** can be a turret, a fixed socket or any suitable form of cup holder for automated and high speed use as well as for intermittent or random dispensing of the lids **14** and the resultant capping of cups **18** or other containers.

Any suitable mechanism can be utilized to drive the tubular magazine **12** through its reciprocal strokes, including manual actuation. For example, as shown in FIG. **3,** a motor M driving an eccentric E acting against a drive follower **12A** on the magazine **12** can provide the reciprocation in conjunction with a return spring **12B,** all as schematically shown.

In a turret or other automated configuration of the cup holder **20,** for example, the holder **20** would be synchronized with and/or trip the actuating mechanism of the tubular magazine **12** such that the stroke would take place as the cup **18** is brought in to its final coaxial position with the magazine **12** and lids **14.**

It should be noted at this time, referring to FIGS. **1, 2** and **3,** that the lowermost end **12A** of the tubular magazine **12** extends downward to at least the lowermost extremity of the leveling and dispensing detents **24** such that the lowermost lid **14** and the rims **14A** and **14B** thereof are enclosed by the magazine **12** to an extent precluding lateral displacement of the lid **14** being dispensed therefrom and forced onto the rim **18A** of

the container **18.** capping device which is particularly well adapted for high speed volume use but which is simple enough and thus, low enough in cost, for a wide variety of intermittent or sporadic modes of use.

The present invention may be modified as would occur to one of ordinary skill in the art without departing from the spirit and scope of the present invention.

I claim:

**1.** In a lid dispensing and container capping means the combination comprising:

elongated tubular magazine means for holding a plurality of container lids in a substantially coaxial stack adjacent an open dispensing end of said magazine;

bearing means mounting said magazine means for reciprocating movement of said magazine;

said bearing means including cam means;

leveling and dispensing detent means mounted on said magazine and extending in-board of said open dispensing end thereof to preclude said stack of said lids from dispensing in a first position of said magazine means relative to said bearing means;

said detent means being constrained by said cam means to a position outboard of said magazine means in a second position of said magazine means relative to said bearing means;

clamping means mounted on said magazine means adjacent said dispensing end thereof and extending through the periphery of said magazine and constrained by said cam means into selective engagement with a plurality of said lids in said stack;

said clamping means being out of engagement with said lids when said detent means is inboard of said magazine means and in engagement with said lids when said detent means is outboard of said magazine means.

**2.** The invention defined in claim **1,** wherein said detent means comprises a plurality of detents spaced about the periphery of said magazine means, each said detent being mounted on a follower arm extending therefrom into proximity with said bearing means;

said follower arms having rise and dwell surfaces thereon engaging said cam means in response to reciprocating movement of said magazine means relative to said bearing means.

**3.** The invention defined in claim **1,** wherein said clamping means comprises a plurality of clamping shoes, conformally shaped to said lids and spaced about the periphery of said magazine means, each said clamping shoe being mounted on a follower arm extending therefrom into proximity with said bearing means;

said follower arms having rise and dwell surfaces thereon engaging said cam means in response to reciprocating movement of said magazine means relative to said bearing means.

**4.** The invention defined in claim **1,** wherein said detent means comprises a plurality of detents spaced about the periphery of said magazine means, said detents being mounted on respective first follower arms extending therefrom into proximity with said bearing means; and

wherein said clamping means comprises a plurality of clamping shoes, conformally shaped to said lids and spaced about the periphery of said magazine means in alternating positions with said detents, said clamping shoes being mounted on respective second follower arms extending therefrom into proximity with said bearing means;

said first and second follower arms having rise and dwell surfaces thereon engaging said cam means in response to reciprocating movement of said magazine means relative to said bearing means.

**5.** The invention defined in claim **4,** wherein said rise and dwell surfaces on said first and second follower arms are interrelated to constrain predetermined coordinated displacements to said clamping shoes and said detents.

**6.** The invention defined in claim **1,** wherein said clamping means is displaced from said detent means such that the outermost lid in said stack rests on said detent means in the inboard position of the latter and at least the next adjacent lid in said stack is held by said clamping means when said detent means is in said outboard position, thereby permitting said outermost lid to be dispensed from said magazine means and the remainder of said lids to be retained therein for each reciprocation of said magazine means relative to said bearing means.

**7.** Capping means for containers comprising:

magazine means holding a plurality of container lids in a substantially vertical stack with each said lid disposed substantially horizontally;

holding means for positioning an open mouthed container beneath said magazine means with the open mouth of said container in registry with said stack of lids;

bearing means mounting said magazine for reciprocation on its longitudinal axis toward and away from said holding means;

said lids and the mouth of said container having conformally shaped coacting rim structures to effect a force fit therebetween; and

lid retaining and release means cooperating with said magazine and synchronized with the reciprocations thereof releasing the lowermost lid in said stack and retaining the remainder of said lids therein as said magazine approaches said container and subsequently applying a substantially vertical force to said rim structure of said lowermost lid to effect said force fit of said lid to said container.

**8.** The invention defined in claim **7,** wherein said lid retaining and release means laterally constrains said lowermost lid during application of said substantially vertical force.

**9.** The invention defined in claim **7,** wherein said lid retaining and release means comprises:

detent means selectively extending inboard of said magazine means beneath said lowermost lid in said stack; and

clamping means selectively engageable with a plurality of said lids to retain all but the said lowermost of said lids in said magazine;

said clamping means including: boss means overlapping said rim structure of at least said lowermost lid to apply said substantially vertical force thereto during the reciprocation of said magazine, and skirt means beneath said boss means effecting a lateral constraint to said lowermost lid to maintain registry between the said rim structure thereof and that of said container mouth.

**10.** The invention defined in claim **9,** wherein said lid retaining and release means further includes actuating cam means engaging said bearing means selectively

moving said detent means and said clamping means into and out of engagement with said stack of lids in predetermined sequence synchronized with said reciprocation of said magazine means.

**11.** The invention defined in claim **10**, wherein said bearing means includes cam surfaces thereon; and

wherein said actuating cam means comprise first and second pivoted follower arm means mounting said detent means and said clamping means, respectively, to said magazine means;

said follower arm means including rise and dwell surfaces sequentially engaging said cam surfaces on said bearing means during reciprocation of said magazine means.

**12.** The invention defined in claim **1**, wherein said open end of said magazine means terminates below said detent means and said clamping means to laterally constrain said lid means independently of said detent and clamping means.

**13.** The invention defined in claim **7**, wherein said magazine means includes a dependent portion extending below said lid retaining and release means and enshrouding the mouth of said container to laterally constrain said lid means independently of said lid retaining and release means when said lowermost lid is applied to said container.

**14.** The invention defined in claim **7**, wherein the said release of said lowermost lid, retention of the remainder of said lids and subsequent application of substantially vertical force to said rim structure of said lowermost lid to effect said force fit of said lid to said container all occur during a single continuous stroke of said magazine.

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