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C. S. OCHS

3,444,983

CLOSURE CAP SELECTOR CHUTE

Filed April 27, 1967

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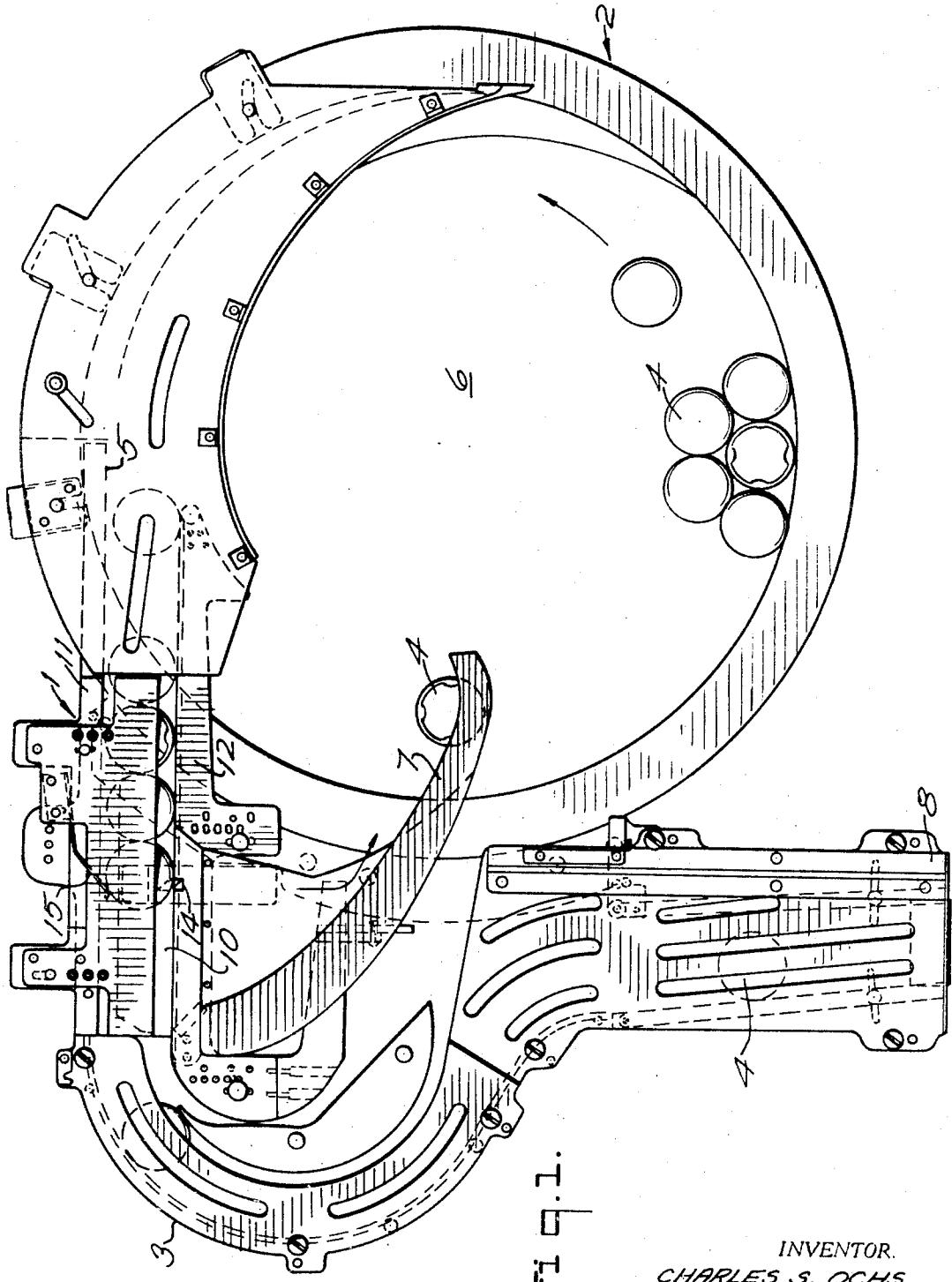


FIG. 1.

INVENTOR.
CHARLES S. OCHS

BY

Norman M. Hallan
ATTORNEY

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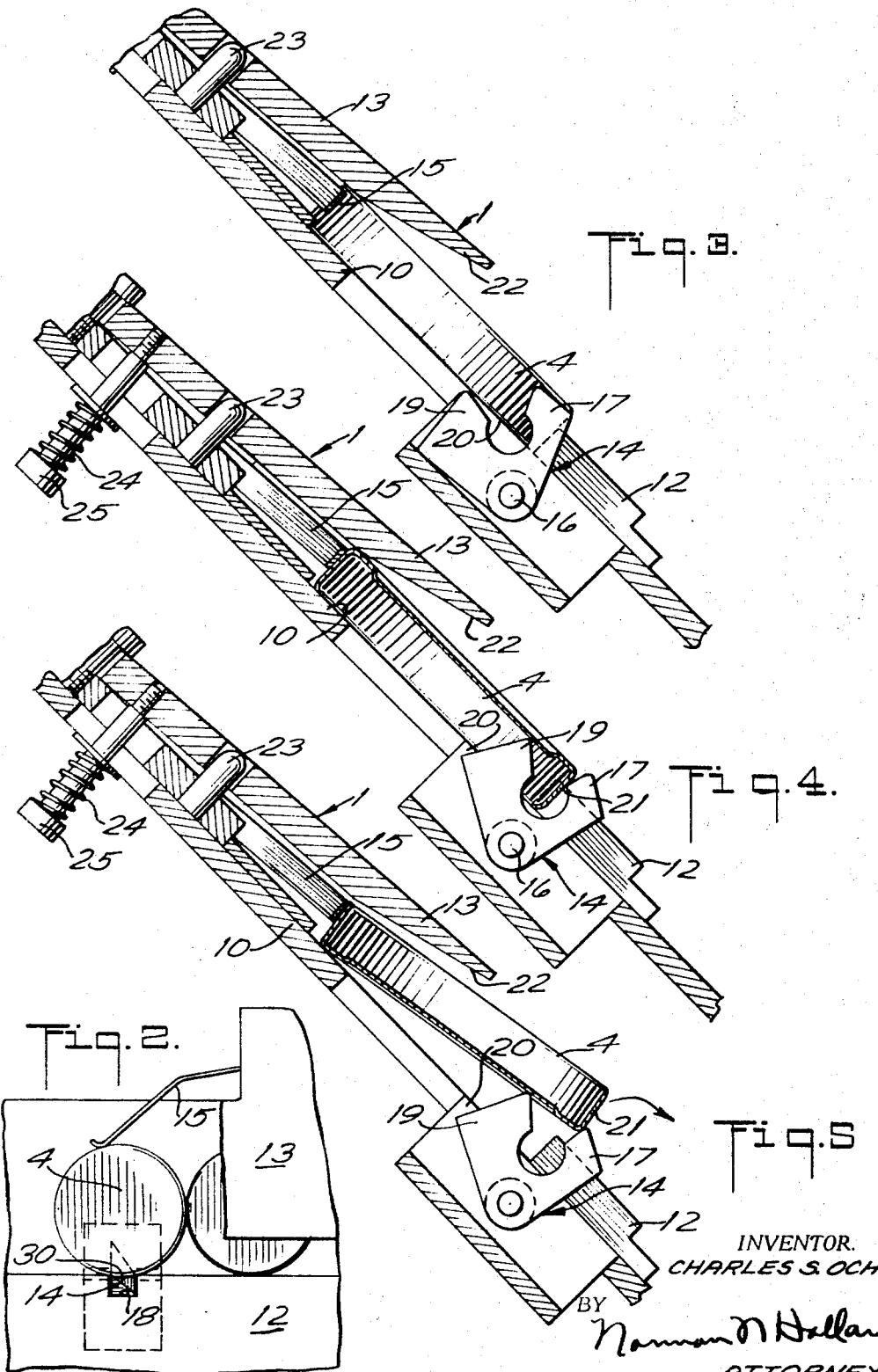
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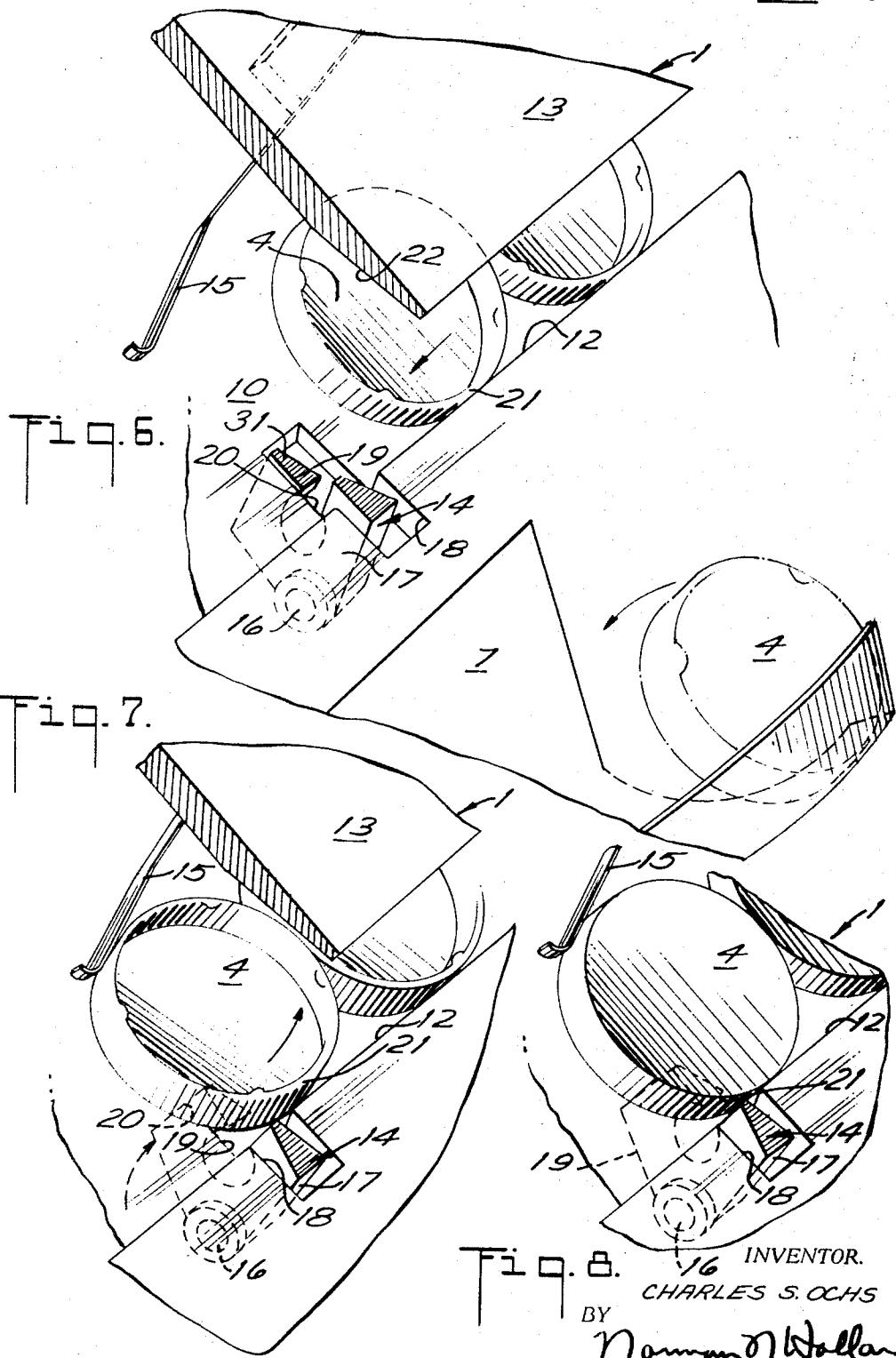
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CLOSURE CAP SELECTOR CHUTE

Charles S. Ochs, Lancaster, Ohio, assignor to Anchor Hocking Glass Corporation, Lancaster, Ohio, a corporation of Delaware

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10 Claims

ABSTRACT OF THE DISCLOSURE

A selector is included in a portion of a feed chute of the type used to feed container closure caps from a cap supply source to a container sealing machine. The selector has a pivotally mounted selecting cam mounted at one side of the cap chute having a sensing arm which is engaged and moved by the outer edge of each cap passing through the chute and a spaced ejecting arm which is raised in the path of the cap. Where the caps pass through the chute with their tops uppermost the raised ejecting arm moves within the cap but has no effect on the passage of the cap past the ejector cam. Where the cap is inverted with its cover down, the raised ejecting arm strikes the cap cover thereby tilting the cap so that the cap is removed from the chute by the force of gravity or a spring finger on the opposite side of the chute.

Background of invention

This invention relates to a selector for use in a feed chute such as, for example, are used to pass cup-like closure caps from a feed hopper to a sealing machine. The selector passes caps which are properly oriented with their tops uppermost and rejects inverted caps and returns them to the cap hopper.

A variety of such devices are presently employed using one form of selecting device or another. The most effective prior selectors of this type are relatively complex and for this reason are not easily changed for handling varying sizes of caps. As will be evident from the following description, the cap selector of the present invention performs an effective and relatively rapid cap selecting operation and at the same time has an extremely simple form so that the selector may be used with varying sizes of closure caps with relatively simple adjustments usually requiring only an adjustment in the width of the cap feeding chute adjacent to the selector.

The relatively simple parts of the selector are readily manufactured from low-friction materials and are so disposed that the selection is done with a minimum cap contact and without any damage to the caps selected. The simple design also is relatively rugged and is readily adjusted and cleansed and thus is particularly useful in food packaging operations.

Accordingly, an object of the present invention is to provide an improved cap selector.

Another object is to provide a cap selector readily adjustable for variations in cap sizes.

Another object of the present invention is to provide a cap selector with a minimum number of movable parts.

Another object of the present invention is to provide a simplified and effective cap selector which is particularly suited for use in food packaging equipment.

Another object of the present invention is to provide a cap selector having only minimal contact with the moving caps.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described or will be indicated in the appended claims, and various advantages not referred to

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herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description forming a part of the specification, wherein:

FIG. 1 is a plan view of a preferred embodiment of the cap selector in accordance with the present invention positioned between a cap feeding hopper and a cap supply chute;

FIG. 2 is an enlarged fragmentary detailed plan view of the cap selector of FIG. 1;

FIGS. 3-5 are vertical sectional views through the cap selector illustrating its action with properly and improperly oriented closure caps;

FIG. 6 is a fragmentary perspective view partially cut away of the cap selector of FIG. 1 and corresponding to FIG. 3;

FIG. 7 is a fragmentary perspective view of the cap selector corresponding to FIG. 5 and illustrating an inverted cap being rejected; and

FIG. 8 is a fragmentary perspective view corresponding to FIG. 4 illustrating a properly oriented cap passing through the selector without being rejected.

Summary of the invention

FIG. 1 shows a cap selector 1 in accordance with the present invention in position between a cap feed hopper 2 and a cap feeding chute 3 of the type used, for example, to feed caps to a cap applicator of a sealing machine.

The hopper 3 as illustrated is a conventional means for successively feeding closure caps 4 into the feed end 5 of a cap feed chute 3. Such hoppers are known which include magnets or other means on a rotating disc 6 to engage and carry the caps 4 successively to the entrance end 5 of the chute 3. Where a cap selector is used in accordance with the present invention, the caps 4 may be fed into the chute 3 positioned randomly with the cap cover either uppermost in the chute or against the chute bottom. Those caps 4 which are inverted and which have their tops against the chute bottom are selected and rejected by the cap selector 1 of the invention, as will be more fully described below, and are returned by the means of a return chute 7 so that they fall back into the rotating hopper 2. Properly oriented caps 4 move past the cap selector 1 and down the cap feeding chute 3 to its exit end 8.

The cap selector 1 portion of the cap chute 3 includes a cap supporting bottom 10 and upper and lower side rails 11 and 12 respectively for forming a cap guiding channel. A cover 13, resiliently attached to the chute as further described below, partially covers the cap guiding channel. A cap selector cam 14 is mounted at the lower side rail 12 opposite a spring finger 15 having its lower end positioned to resiliently engage the moving caps 4 and being adjustably mounted adjacent the upper rail 11. In order to permit adjustment of the cap chute including the selector portion for handling the caps of differing size the lower rail 12 is detachably connected by pins and a plurality of mounting holes so that the chute channel may be adjusted to accommodate caps of varying diameter.

FIGS. 2-8 illustrate the cap selector 1 in detail including its cap selecting action. FIGS. 3 and 6 show the cap selector cam 14 pivotally attached to the bottom 10 of the cap chute by a mounting pin 16 and having a cap sensing arm 17 positioned partially within a slot 18 in the lower cap rail 12. At the opposite end of the cam 14 a cap ejecting arm 19 is accommodated within a slot 20 in the cap chute bottom 10. The arms 17 and 19 of the selecting cam 14 are proportioned so that the cap sensing arm 17 protrudes from the slot 18 and in the path of the moving closures 4 when the cap ejecting arm 19 below the cap

engaging surface of the cap chute bottom 10. When the skirt or edge 21 of an advancing cap 4 moves past the cap ejecting cam 14, it engages the sensing arm 17 forcing it into the slot 18 in the lower side rail 12 thereby requiring an upward movement of the cap ejecting arm 19 to the position shown in FIGS. 4 and 5. When the closure cap 4 is centered with respect to the cap selecting cam 14, the cap is resiliently urged against the lower side rail 12 and the cam 14 by the spring finger 15.

FIGS. 4 and 8 show the action of the cap selector cam 14 to a correctly oriented cap having its cover uppermost. When the cap 4 is in this position, it is seen that the cap ejecting arm 19 even though raised above the bottom 10 of the cap chute has entered into an open space within the cap 4. The selector cam 14 even though turned to this position is seen to remain clear of the moving cap 4. As the cap progresses further down the chute 3, its skirt 21 clears the opposite arm 17 of the cap selector cam and the cam is free to swing back to its original position.

Where the cap 4 has its top downward adjacent the bottom of the cap chute, the swinging movement of the selector cam 14 resulting from its engagement with the cap 4 results in the cap being tilted over the lower rail 12 in the position illustrated in FIGS. 5 and 7. In this position the force of the spring finger 15 or gravity or both cause the tilted cap 4 to slide downwardly out of the cap chute over the rail 12 and to be returned to the hopper 2 or other cap feeder in the manner illustrated in FIG. 1.

FIGS. 3-5 illustrate the preferred mounting for the cap chute cover 13 which preferably has a bevelled edge 22, as illustrated, to facilitate the above tilting of the cap 4. In addition, in order to assure that improperly oriented or inverted caps are swung clear of the chute 3 by the cam 14, the cover is resiliently mounted on guide pins 23 and is held downwardly under the force of coil springs 24 confined between the cap chute bottom 10 and the cover mounting bolts 25.

A preferred shape of the selector cam 14 is illustrated for the selecting action described above. The cam 14 itself may be freely mounted on the mounting pin 16 for movement between the extreme positions as illustrated in FIGS. 3 and 5. The outer end of the sensing arm 17 is preferably bevelled as illustrated at 30 in FIG. 2 to facilitate the movement of the arm 17 into the slot in rail 12 as each cap 4 moves into engagement with the arm 17. Similarly the outer edge of the ejecting arm 19 is also bevelled as illustrated at 31 in FIG. 6 to facilitate the return movement of the cam 14 and to insure that it clears the lower edge of the cap skirt when properly oriented caps 4 move past the selecting cam 14. It should be noted that the cam 14 is only forced to the selecting position shown in FIG. 4 when each cap 4 is centered with respect to the cam 14 with the cap skirt at the cam slot. Prior to the time when the cap 4 reaches this position and after it moves beyond this position it is seen that there is clearance between the skirt of cap 4 and the sensing arm 17.

It will be seen that an improved high speed cap selector has been provided which is useful with a wide variety of cap sizes. The cap selector of the present invention is relatively simple and is adapted for use with presently used cap applicators and cap feeding hoppers. The selector is also capable of operating at high speeds so that it may be used with high speed cap feed hoppers and sealing machines. As the cap selector has a minimum number of moving parts its set-up, maintenance, repair and cleaning are simplified and the cap selector has an extremely long life which minimizes replacement costs.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be under-

stood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

- 5 1. A cap selector comprising the combination of a cap guiding chute having a bottom and cap guide at one side, an ejecting means having two camming portions operatively coupled together and movably mounted in said chute for movement between a first position partially above the chute bottom and a second position below said first position, and means at the said cap guide operatively coupled to said ejecting means for raising it responsive to the movement of a cap thereagainst.
- 10 2. A cap selector comprising the combination of a cap guiding chute having a bottom and cap guiding rail at one side, means for urging caps against said rail, a means having two camming portions operatively coupled together and movably mounted in the bottom of said chute for movement between a first position partially above the chute bottom and a second position below said first position, and cam means at said rail operatively coupled to said ejecting means for raising it responsive to the movement of a cap against said cam means.
- 15 3. The selector as claimed in claim 2 in which said cam means and said ejecting means comprise a unitary member pivotally mounted on said chute for movement about an axis generally longitudinal of said chute.
- 20 4. The selector as claimed in claim 2 in which said urging means comprises a spring positioned for engaging caps in said chute on the cap side remote from said cam means.
- 25 5. The cap selector as claimed in claim 2 which further comprises a cover on said cap guiding chute extending over only a portion thereof and having a free edge spaced from said cam means.
- 30 6. A cap selector comprising a cap guiding chute, a cap guide rail on one side of said chute, means for urging caps against said guide rail, and a movably mounted cap selector cam having a first camming portion positioned for engaging the cap skirts adjacent said rail and a second camming portion positioned for entering said chute responsive to said first camming portion being engaged by the cap skirts for engaging and tilting inverted caps in said chute having their tops lowermost.
- 35 7. The cap selector as claimed in claim 6 in which said selector cam is pivotally mounted on an axis directed generally transversely of said chute.
- 40 8. The cap selector as claimed in claim 6 in which said urging means comprises a spring arm positioned on said chute opposite to said first camming portion.
- 45 9. A cap selector comprising a cap guiding chute, a guide rail on one edge of said chute, means for urging caps toward said guide rail, a slot in said guide rail, and a cap selector cam pivotally mounted for movement about an axis directed generally transversely of said chute and having a first camming portion positioned at said slot for engaging the cap skirts adjacent said rail and a second camming portion adapted for entering said chute responsive to said first camming portion entering said slot on being engaged by the cap skirts thereby engaging and tilting inverted caps in said chute having their tops lowermost whereby said caps pass over said guide rail.
- 50 10. The cap selector is claimed in claim 9 in which said chute comprises a cover extending from the side opposite said guide rail only partially toward said guide rail providing an exit slot for inverted caps.

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RICHARD E. AEGERTER, Primary Examiner.

U.S. Cl. X.R.