May 23, 1944. O. A. KOEHLER 2,349,502

BOTTLE CAP RECLAIMING MACHINE

Filed Aug. 13, 1942 2 Sheets-Sheet 1

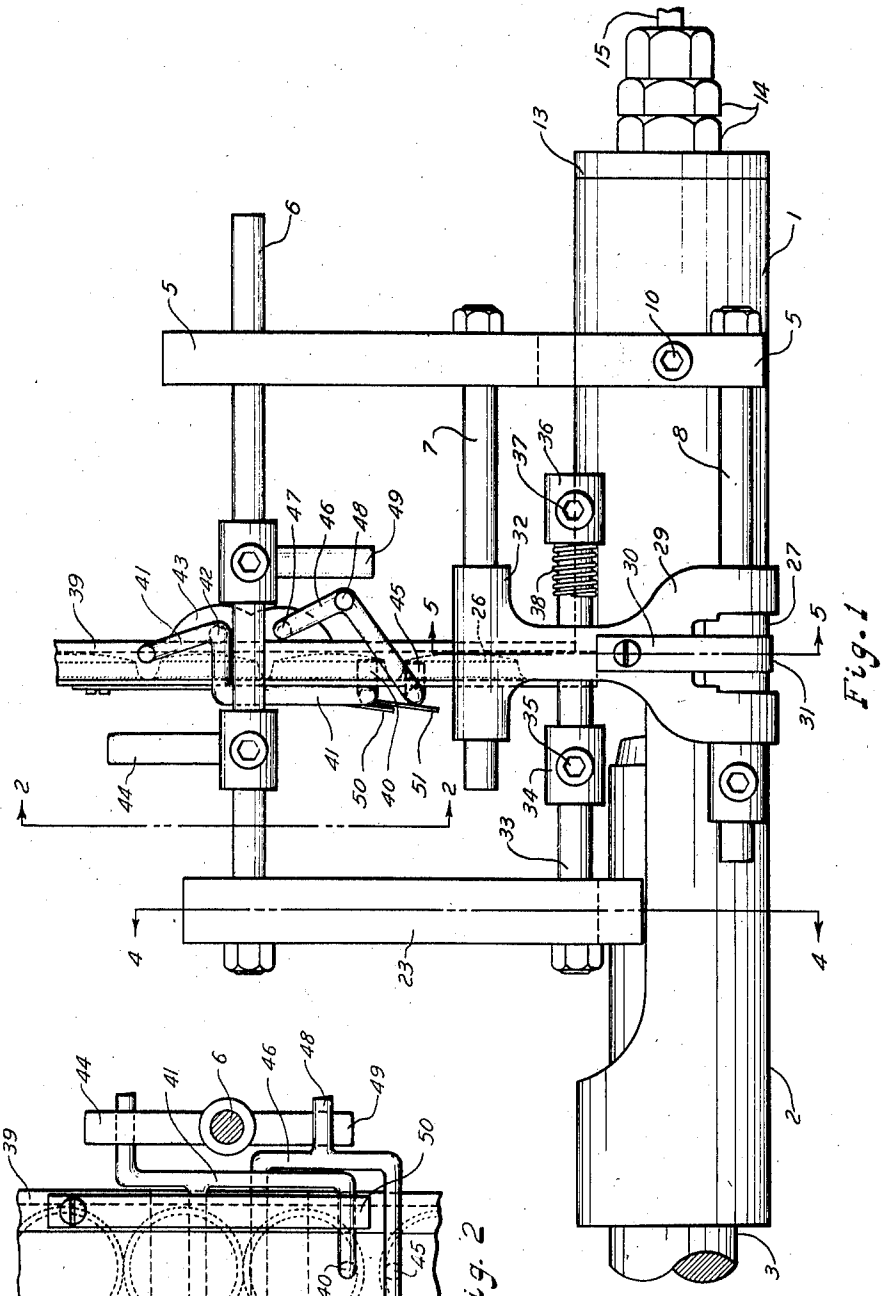


Fig. 1

Fig. 2

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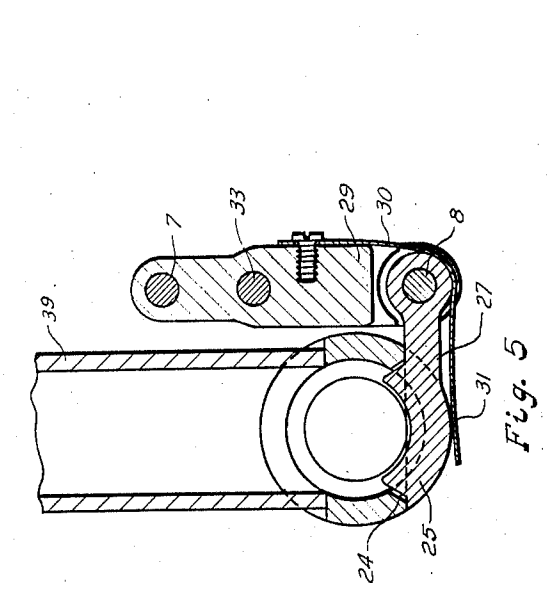


Fig. 5

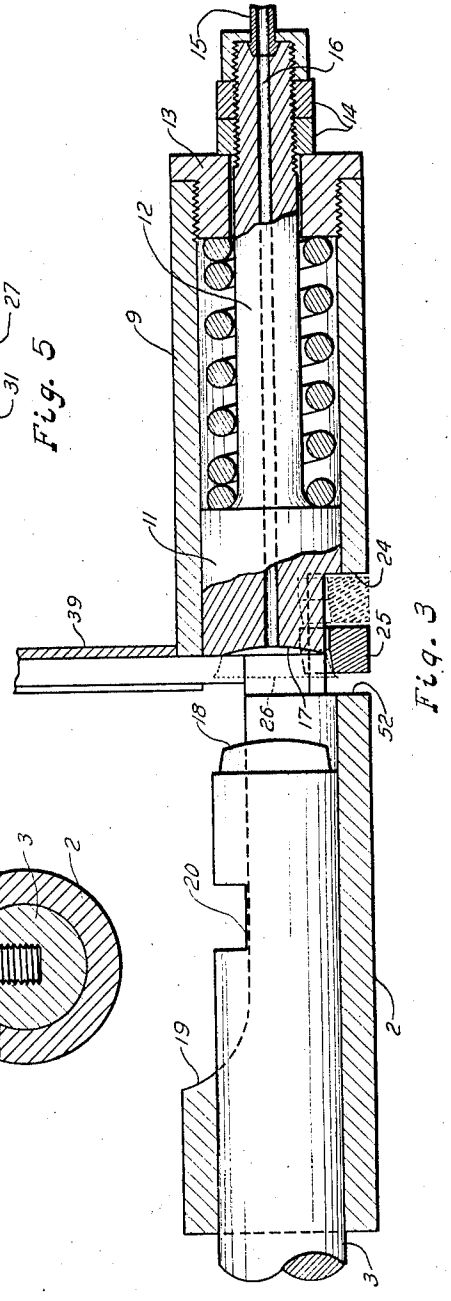


Fig. 3

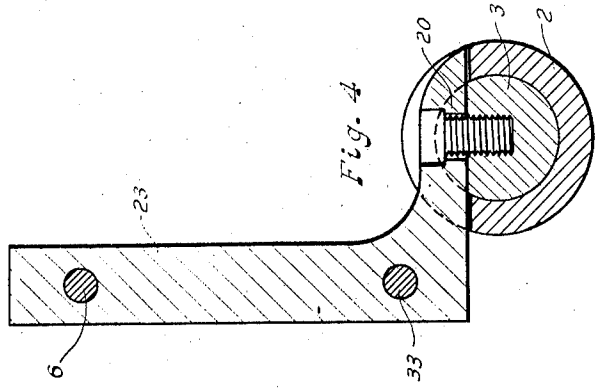


Fig. 4

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UNITED STATES PATENT OFFICE

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BOTTLE-CAP RECLAIMING MACHINE

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Application August 13, 1942, Serial No. 454,668

5 Claims. (Cl. 113—38)

The invention relates to a device for reclaiming caps or crowns employed in sealing bottles or similar containers for liquids, such as beer, soda water, and the like.

Due to the scarcity of metal, cork and other materials used in the manufacture of bottle caps, it is desirable to reclaim caps which already have been used and distorted so that they may be used repeatedly before they are entirely worn out.

It is an object of this invention to provide a machine for reclaiming caps of the character referred to. It is desired to reshape the caps to approximately their original form so that they may engage the bottle and be clamped securely thereon and seal the contents within the container.

It is also desired to provide a machine of this character which will work automatically at fairly high speeds, thus economizing in labor, time and expense.

The invention lies in the detailed construction of the various parts making up the complete device, said device being disclosed for clearer understanding in the drawings herewith wherein:

Fig. 1 is a side elevation of a device embodying the invention.

Fig. 2 is a broken front elevation showing the mechanism for feeding the caps into the machine, the view being taken on the line 2—2 of Fig. 1.

Fig. 3 is a broken longitudinal section through the reciprocating and stationary dies for shaping the caps.

Fig. 4 is a sectional detail taken on the line 4—4 of Fig. 1 and illustrating the connection between the plunger and the upright thereon.

Fig. 5 is a sectional detail on the line 5—5 of Fig. 1 showing the position of the gate which retains the caps in front of the two dies.

The device is shown as mounted upon a base portion including the stationary die assembly 1 and the guide sleeve 2 in which the reciprocating die member 3 is slidable. Secured upon the base is an upright post 5 which serves as a guide for the slidable rod 6 and as a support for the stationary rods 7 and 8. This post is secured to the housing 9 of the socalled stationary die by means of bolts 10 or other equivalent devices.

The socalled stationary die shown at 11 in the housing is in fact mounted resiliently. It is adapted to yield and has a stem 12 thereon extending through a nut 13 in the end of the housing 9 and has stop nuts 14 screwed thereon to engage with the end of the housing. It has a spring about said stem holding said die in position with the nut 14 against the nut 13. An air line indicated at 15 is secured to the end of the stem 12 in any suitable manner to allow the introduction of air into the passage 16 longitudinally of the stem and die member. The forward end of the stationary die is formed with a shallow saucer-shaped recess 17 to engage with the cap as it is fed into position for operation. The stationary die is so-called because the spring is heavy and holds the die in approximately stationary position.

The reciprocating die 3 may be connected to any mechanical means for reciprocation and ordinarily it is moved by connection with the crank arm of a motor. The forward end of the die is formed with a reduced projection 18 thereon shaped to engage with a bottle cap. It is of the proper dimensions to shape the cap into bottle engaging shape. This is accomplished by forcing the central portion of the cap into the recess 17, thus bringing the outer margin of the cap inwardly to the required extent to engage the bottle. The upper portion of the guide sleeve 2 is cut away at 19 to permit connection of the die 3 to the upright frame member 23, see Fig. 4. Thus as the plunger of the reciprocating die is moved to and from the seat 17 in the stationary die, the frame member 23 is also moved back and forth.

The lower side of the housing 9 of the stationary die is cut away, as shown at 24, to allow the movement of a gate member 25 therein. Said gate member is adapted to fit below the seat in the stationary die and form a support for a bottle cap indicated at 26 and retain the cap in position to be engaged by the reciprocating die 18. This gate is mounted resiliently, as shown in Fig. 5, so that caps which may be jammed into the seat may move downwardly without damage to the machine.

With reference to Fig. 5, it will be seen that the gate member is formed to fit within the opening in the housing 9, the upper portion of said gate being formed on the arc of a circle and in position to hold the cap in proper alignment. The gate is formed upon an arm 27 pivoted at 28 to the lower end of the cross head 29. A spring 30 secured to the cross head is bent to engage at 31 to the lower side of the gate and hold it resiliently in cap-engaging position. This spring acts only to allow downward yielding of the gate so as to avoid jamming, as the caps are fed downwardly. It has nothing to do with the opening of the gate, which is accomplished by a lateral sliding movement of the cross head 29 on the rods 7 and 8. The cross head 29 is shown best in Fig. 1. It is forked at its lower end to engage with the end of the gate arm and is extended upwardly to connect with a sleeve 32, said sleeve being mounted upon the rod 7 for a supporting and sliding movement. Said arm is mounted upon a rod 33 upon which it is slidable.

Said rod 33 is connected rigidly to the upright frame member 23 and is hence reciprocated laterally, as seen in Fig. 1, with the movement of the reciprocating die. Mounted upon the rod 33 is a collar 34 secured adjustably thereon by a set screw 35. At the end of the sliding rod 33 is a collar 36 secured thereon by the set screw 37. Between the collar 36 and the cross arm 29 is a coil spring 38.

It will be seen that when the plunger of the reciprocating die is moved to the right of the position shown in Fig. 1, the collar 34 will eventually engage the upright portion of the cross head 29, and move said cross head to the right of the position shown therein, thus moving the gate into open position. When the reciprocating die is withdrawn the end of the spring 38 will shortly engage the upright portion of the cross head and move it to the left of the position there shown, thereby again closing said gate. It will be seen that there is a slight amount of lost motion between the movement of the frame and the movement of the cross head. The spring 38 upon the rod serves to reduce the shock of engagement with the cross head and also to prevent injury to the apparatus by any tendency of the frame to move too far into closed position.

The bottle caps are fed into position to be engaged by the die through a chute 39. Said chute is shown broken off in the different views but it will be understood that the caps will be fed into the upper end of the upright chute by any desirable feeding means not forming a part of this invention. The cap will drop by gravity downwardly through the chtue and will be fed therefrom into the seat 25 by fingers projecting into the open side of the chute.

Two separate fingers engage the caps to deliver the said caps in timed sequence into the seat. There is an upper finger 40 projecting through the open side of the chute to engage below the stack of caps which are in the chute above the same. This finger is mounted upon an arm 41 which is curved around the side of the chute and extends upwardly therefrom. It is supported upon a pivot arm 42 mounted in journals 43 in the side of the chute. The arm is extended downwardly past the pivot and bent laterally to be engaged by post 44. The lower finger 45 is mounted upon an arm which is bent laterally to the side of the chute and extended upwardly in an angular position, as shown at 46 in Fig. 1, and pivoted at its upper end in a journal 47 upon the side of the chute. There is a laterally extending member 48 on the lever extending in the path of a post 49 mounted upon the rod 6. The two cap engaging levers are held in position against the housing and into engagement with the caps by means of leaf springs 50 and 51 on the forward side of the chute. They will be moved from cap engaging position by the movement of the frame 23 and rod 6.

Thus when the frame member 23 and rod 6 are moved to the right of the position shown in Fig. 1 the post 44 will engage the upper end of the arm 41 and thus swing the upper finger 40 out from engagement with the caps. On the backward movement of the frame and rod the post 49 will engage with the arm 48 upon the lower lever arm and move the finger 45 from cap-engaging position. Thus when the reciprocating die is moved to a position slightly to the left of that shown in Fig. 1 the lower finger 45 will be moved from engagement with the lower cap, allowing it to drop. The upper finger simultaneously will be in position to hold the caps above from dropping. As the frame moves forward with the reciprocating die the finger 45 will be allowed to be swung by the spring 50 into cap-engaging position while the contact of the post 44 with the arm 41 will release the caps above so that one may drop into contact with the lower arm 45. This movement of the fingers is so timed that the upper finger will hold the stack of caps above it while the lower finger will release the lowermost of the caps. Said lower finger will then move back to receive a cap when the upper finger is moved from cap-holding position. As this feeding of caps into the seat is operated in response to the movement of the reciprocating die it will be seen that the timing of the releasing fingers may be easily accomplished.

In the operation of the machine the caps will be fed in timed relation with the movement of the reciprocating die so that as the die 18 is moved forwardly it will engage within the cap 26 upon the gate 25 and force it into the recess 17 in the stationary die. This engagement of the cap by the die will force the closed top of the cap into recess 17 and draw the rim of the cap inwardly against the surface 18 of the movable die. Thus it will straighten out any irregularities in the rim of the cap which engages the bottle and thereby make certain that the cap will securely clamp against a bottle upon which it may be subsequently mounted. When the reciprocating die moves away from the stationary die the rim of the cap 26 will tend to drop from its seat as the gate is moved to the right of the position shown in Fig. 3 through the operation of the cross arm as previously described. It has been found however, that the caps tend to adhere to the stationary die. For this reason a steady stream of air at several pounds pressure is forced through the passage 16 longitudinally of the stationary die to engage behind the cap and thus tend to release it. It will be understood that the air pressure is continuous throughout the operation of the machine.

A further provision for the release of the cap, should it adhere to the reciprocating die, is the forward edge 52 of the housing 2. The rim of the cap, should it adhere to the die, will engage the edge of the housing and be stripped thereby from the die.

It will be understood that the cap reclaiming device operating in the manner described will reform the caps into proper shape for re-use rapidly and accurately. One of these machines will reshape caps at high speed, delivering the caps ready for use at a rate in excess of four hundred per minute. The action of the machine will be entirely automatic necessitating no attention further than occasional inspection.

What is claimed is:

1. In a bottle cap reforming machine, a stationary die having a cap receiving recess, a reciprocating die movable to and from said stationary die, a frame movable by said reciprocating die, a chute adapted to deliver caps by gravity to a position in front of said stationary die, means operated by the movement of said frame to control the dropping of said caps, a gate operably attached to said frame for movement into position to support a cap adjacent said recess for reforming and to then release it, and means to remove said cap from said stationary die.

2. In a bottle cap reshaping machine a die having a bottle cap receiving recess in one end thereof, a reciprocating die movable to and from

engagement with a bottle cap in said recess, power driven means to actuate said reciprocating die, a frame movable by said reciprocating die, means operated by movement of said frame to deliver caps by gravity to position for reshaping in said recess, a gate to receive and support said caps between said dies, and a crosshead on said frame operatively connected with said gate to move said gate from cap supporting position to release said cap as said reciprocating die is moved into engagement with said cap.

3. In a machine for reforming bottle caps, a stationary die, a recessed seat therein to receive a bottle cap, a reciprocating die, power driven means to move said reciprocating die toward and away from said recess, a frame mounted on said reciprocating die and slidable therewith, means to deliver caps by gravity between said dies, a cross head, means on said frame to engage and move said cross head, and a gate on said cross head movable therewith to and from a cap supporting position below said recess.

4. In a machine for reforming bottle caps, a stationary die, a recessed seat therein to receive a bottle cap, a reciprocating die, power driven means to move said reciprocating die toward and away from said recess, a frame mounted on said reciprocating die and slidable therewith, means to deliver caps by gravity between said dies, a supporting post, rods on said post, a cross head slidably mounted on said rods, means on said frame to engage and move said cross head, and a gate on said cross head extending below said stationary die into position to support said caps, said gate being movable out of supporting position as said reciprocating die is moved into said recess.

5. In a bottle cap reshaping device a stationary die, a housing therefor, a post on said housing, a reciprocating die, means to move said reciprocating die to and from operative engagement with said stationary die, a frame on said reciprocating die for movement therewith, said frame including an upper rod slidable in said post and a lower rod, a cross head, means on said post to slidably support said cross head, means on said lower rod to engage and move said cross head, a cap feeding device actuated by said upper rod to deliver caps between said dies, and a gate on said cross head and movable thereby to and away from cap supporting position below said dies.

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