

May 29, 1951

S. J. CLARK
BOTTLE OPENER

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2 Sheets-Sheet 1

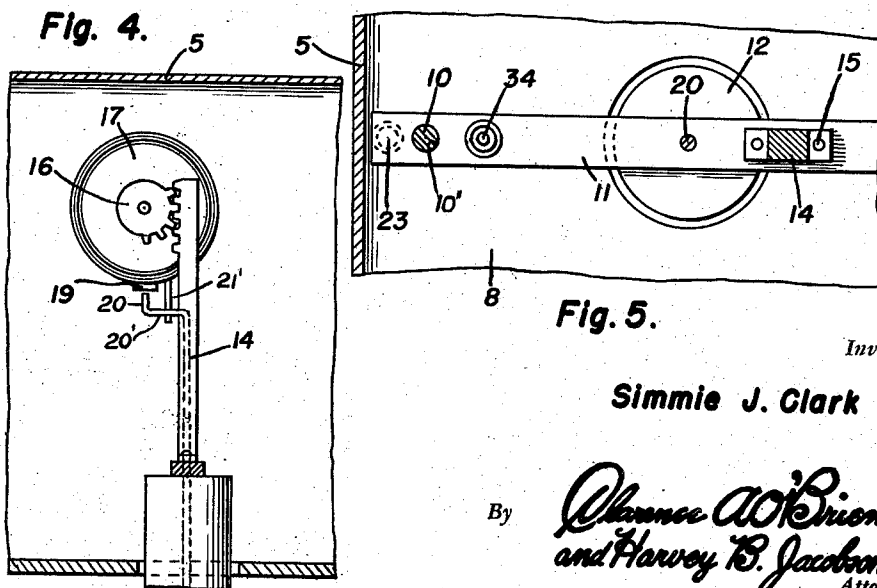
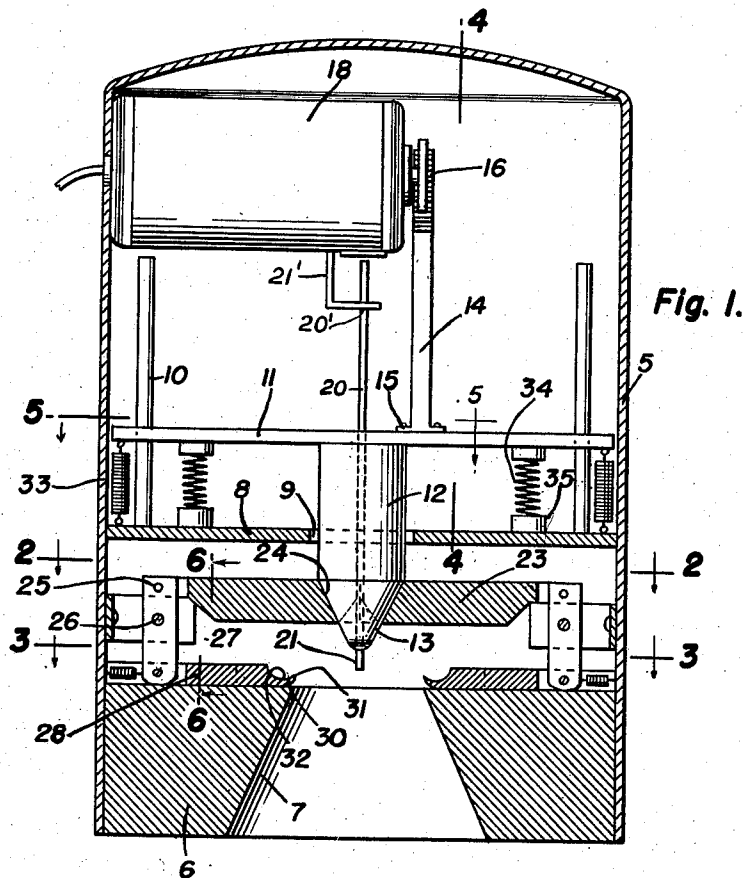


Fig. 5.

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2 Sheets-Sheet 2

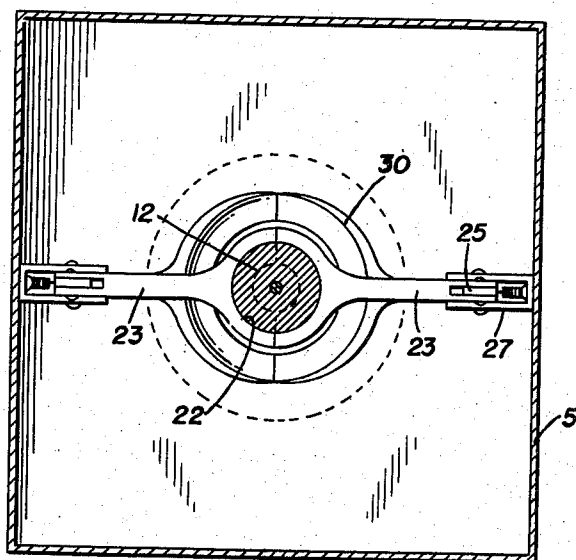


Fig. 2.

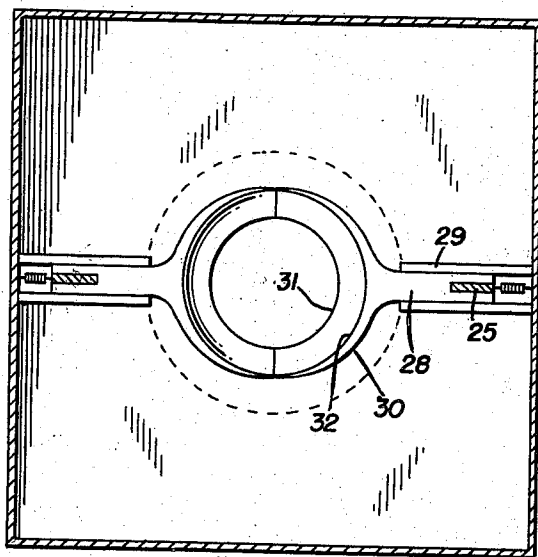


Fig. 3.

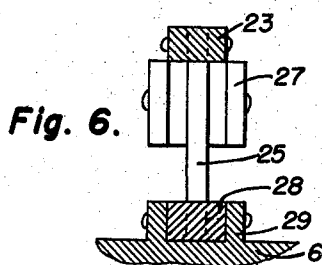


Fig. 6.

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BOTTLE OPENER

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13 Claims. (Cl. 81—3.2)

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The present invention relates to new and useful improvements in bottle openers adapted to remove crimped caps from bottles, jars or the like and more particularly to a power operated device of this character.

An important object of the present invention is to provide a bottle opener including a stationary holder for the neck of a bottle and in which the neck of the bottle is inserted for holding the bottle firmly and in a protected position to prevent injury to a person should the neck be broken during the opening operation and also embodying a plunger for depressing the cap at its center and spreading it along its edges thereby freeing the cap from the bottle while the bottle is held in the holder.

A further object of the invention is to provide an electric motor for operating the plunger in a manner to raise and release the plunger together with spring means for moving the plunger downwardly to strike a sharp blow on the top of the cap and also to provide gripping jaws for the lower edges of the cap to support the same while the plunger strikes a blow on the top of the cap and in which the jaws are moved into a gripping position by the downward movement of the plunger.

Another object of the invention is to provide a bottle opening mechanism of this character in which the jaws are raised for quick acting movement to effect a quick and safe removal of the cap from the bottle.

A still further object is to provide a device of this character of simple and practical construction, which is efficient and reliable in operation, relatively inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a vertical sectional view.

Figures 2 and 3 are transverse sectional views taken respectively on the lines 2—2 and 3—3 of Figure 1.

Figure 4 is a fragmentary vertical sectional view taken on a line 4—4 of Figure 1.

Figure 5 is a fragmentary horizontal sectional view taken on a line 5—5 of Figure 1, and

Figure 6 is an enlarged fragmentary sectional view taken on a line 6—6 of Figure 1 and showing the guide for one of the sliding gripping jaws.

Referring now to the drawings in detail where-

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in for the purpose of illustration I have disclosed a preferred embodiment of the invention the numeral 5 designates a housing which is open at its bottom and adapted for attaching to a stationary supporting structure in any suitable manner. The open lower end of the housing is provided with a block or plug 6 having a tapering central opening 7 adapted for receiving the neck of a bottle when inserted upwardly through the opening, the size of the opening being adapted to tightly engage the neck of the bottle below the cap to tightly hold the bottle in position therein.

A horizontal partition 8 is suitably secured in the housing 5 and is formed with a central opening 9. Rising from the partition 8 adjacent opposite sides thereof is a pair of vertical guide rods 10 on which a horizontal bar 11 is slidably mounted for vertical movement by means of openings 10' formed adjacent the ends of the bar. To the underside of the bar 11 is suitably secured a cylindrical plunger 12 which extends downwardly freely through the opening 9, the lower end of the plunger being tapered as shown at 13.

A vertical rack bar 14 is secured at its lower end to the bar 11 by flanges 15 at the lower end of the rack bar, the upper portion of the rack bar being operatively engaged by a pinion 16 having interrupted teeth as shown at 17. The pinion is driven by an electric motor 18 suitably secured to the upper portion of the housing 5.

The bottom of the motor 18 is provided with a conventional switch 19 arranged for operation by the upper end of a vertical rod 20 which extends vertically through the center of the plunger 12 for vertical sliding movement therein, the lower end of the rod 20 extending below the plunger as shown at 21. The rod 20, as best illustrated in Figure 4, is provided with an offset portion 20' which is arranged to rest on and be supported by a bracket member 21', the latter being suitably attached to the bottom of the motor 18.

The tapered lower end 13 of the plunger 12 is engaged in the similar circular inner ends 22 of a pair of horizontally disposed arms 23, the semi-circular ends of the arms being beveled as shown at 24 to conform to the taper 13 of the plunger as shown in Figure 1 of the drawings.

The other ends of each of the arms 23 are pivoted to the upper ends of vertical links 25, the links being pivoted intermediate their ends on pins 26 supported in U-shaped brackets 27 secured to the opposite sides of the housing 5.

A pair of horizontally sliding jaws 28 are pivoted at one end to the lower ends of the links 25, the

jaws being mounted for sliding movement between spaced parallel guides 29 suitably secured on the inner surface of the block 6.

The free ends 30 of the jaws 28 are positioned adjacent the inner end of the opening 7 and diametrically opposite sides thereof and are of semi-circular construction as shown in Figure 3 of the drawings to conform to the curvature of a neck of a bottle. The inner curved edges of the ends 30 of the jaws are formed with tapering upwardly curved lips 31 to provide a channel 32 at the upper surface of the jaws at the curved ends 30 thereof as shown to advantage in Figure 1 of the drawings.

Coil springs 33 have one end attached to the partition 8 and their other ends attached to the underside of the bar 11 adjacent the ends of said bar. Coil spring members 34 are positioned under the bar 11 adjacent the ends thereof with the lower ends of the members seated in sockets 35 suitably secured to the upper surface of the partition 8.

In the operation of the device the neck of a bottle is inserted upwardly in the opening 7 at the lower end of the housing 5 and is tightly held in said opening. The opening 7 is sufficiently large to permit the movement of the cap of the bottle entirely through the opening to engage the lower end 21 of the rod 20 to thus move the rod 20 upwardly and close the switch 19 for the motor 18. The pinion 16 is then driven by the motor to raise the rack bar 14 and thus raise the bar 11 and plunger 12 until the interrupted teeth 17 of the pinion are moved into position with the teeth of the rack bar whereupon the rack bar 14 is released from the pinion. During the raising movement of the rack bar 14 and bar 11 the springs 33 are placed under tension and upon releasing of the rack bar the springs 33 will pull the bar 11 and plunger 12 downwardly with sudden force to strike the top of the cap of the bottle.

Immediately prior to the striking of the lower end 13 of the plunger with the cap the tapered end 13 of the plunger will engage the arms 23 to slide the arms outwardly and thus move the jaws 28 inwardly through their connection with the arms 23 by the link 25. The inner ends 30 of the jaws 28 will accordingly be moved under the crimped cap of the bottle and with the edges of the cap seated in the channel 32 of the jaws, the cap thus being supported against downward movement at the time the plunger 12 strikes the top of the cap.

By depressing the center of the cap by the lower end of the plunger 12 the side edges of the cap will thus be spread apart to free the cap from the bottle and the cap will then drop through the opening 7 when the neck of the bottle is removed therefrom.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claims.

I claim:

1. A bottle cap remover comprising a housing having an opening for receiving the neck of a

capped bottle, a plunger in the housing reciprocable toward the top of a cap to exert an impact force thereagainst, means for moving said plunger in position to deliver said impact force and for releasing the plunger, a pair of arms slidably positioned in a horizontal plane adjacent the bottle receiving opening, means disposed in the path of downward movement of the plunger and directly actuated thereby for moving said arms relative to each other to engage under the skirt of the cap and support the cap in alignment with the plunger.

2. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing, means for reciprocating said plunger in the housing toward the top of the cap to exert an impact force thereagainst, means for moving said plunger in position to deliver said impact force and for releasing the plunger, a pair of arms slidably positioned in a horizontal plane adjacent the bottle receiving opening and adapted to engage under the skirt of the top, cam operating means disposed in the path of downward movement of the plunger and communicated with said arms for imparting cap engaging movement to the arms responsive to contact thereof by the plunger.

3. An opening device for capped containers comprising a housing having an aperture for receiving one end of an object, a plunger operable in the housing, power operated means for moving said plunger in position to deliver an impact force and for releasing said plunger, a pair of arms slidably positioned in a horizontal plane adjacent the aperture to engage the object, means disposed in the path of downward movement of the plunger and actuated thereby for moving said arms in an object engaging position to support the object in vertical alignment with the plunger.

4. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, means for forcing said plunger into striking contact with the top of the cap, power operated means for actuating said foregoing means, means in the housing and slidably disposed on a plane transverse to the axis of the plunger for engaging the lower edge of the skirt of the cap and supporting the cap in alignment with the plunger and means directly actuated by the plunger for operating said foregoing means.

5. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, resilient means for urging said plunger into striking contact with the top of the cap, means movably positioned in the housing adjacent to the opening and lying in a plane transverse to the axis of the plunger for engaging the lower edge of the skirt of the cap and supporting the cap in alignment with the plunger and means directly actuated by the plunger for operating said foregoing means.

6. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, means for forcing said plunger into striking contact with the top of the cap, power operated means for actuating said foregoing means, means in the housing and slidably disposed on a plane transverse to the axis of the plunger for en-

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gaging the lower edge of the skirt of the cap and supporting the cap in alignment with the plunger and means directly actuated by the plunger for operating said foregoing means, and means actuated by the bottle upon movement thereof into the housing for controlling said power operated means.

7. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, resilient means for urging said plunger into striking contact with the cap, power operated means for tensioning and releasing said foregoing means, means movably disposed in the housing transverse to the path of movement of the plunger for engaging the lower edge of the skirt of the cap and supporting the cap in alignment with the plunger, and means positioned in the path of movement of the plunger and directly actuated by the plunger for actuating said foregoing means.

8. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, resilient means for urging said plunger into striking contact with the cap, power operated means for tensioning and releasing said foregoing means, means movably disposed in the housing transverse to the path of movement of the plunger for engaging the lower edge of the skirt of the cap and supporting the cap in alignment with the plunger, and means positioned in the path of movement of the plunger and directly actuated by the plunger for actuating said foregoing means, said last means including a pair of opposing complementary members disposed parallel with and above the means for engaging the cap, said members having their ends intersecting the path of movement of the complementary plunger and pivoted links connecting said members and said means for engaging the cap whereby lateral outward movement of the members responsive to movement of the plunger will effect an inward lateral movement of the means for engaging the cap.

9. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, resilient means for urging said plunger into striking contact with the cap, power operated means for tensioning and releasing said foregoing means, means movably disposed in the housing transverse to the path of movement of the plunger for engaging the lower edge of the skirt of the cap and supporting the cap in alignment with the plunger, and means positioned in the path of movement of the plunger and directly actuated by the plunger for actuating said foregoing means, said last means including a pair of opposing complementary members disposed parallel with and above the means for engaging the cap, said members having their ends intersecting the path of movement of the complementary plunger and pivoted links connecting said members and said means for engaging the cap whereby lateral outward movement of the members responsive to movement of the plunger will effect an inward lateral movement of the means for engaging the cap, and means for normally retaining the complementary ends of the members in close engagement.

10. A bottle cap remover comprising a housing

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having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, a transverse movable support on one end of the plunger, a fixed partition transversely positioned in the housing and disposed parallel to the plunger support, resilient means connected between the partition and plunger support for urging the support relative to the partition and the plunger relative to the opening, power operated means for moving said support away from the partition and tensioning the resilient means, release means associated with the power operated means, a pair of arms slidably positioned in the housing transversely to the path of movement of the plunger and adapted to engage the skirt of the cap and support the cap in alignment with the plunger and means positioned in the path of movement of the plunger for actuating said arms.

11. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, a transverse movable support on one end of the plunger, a fixed partition transversely positioned in the housing and disposed parallel to the plunger support, resilient means connected between the partition and plunger support for urging the support relative to the partition and the plunger relative to the opening, power operated means for moving said support away from the partition and tensioning the resilient means, release means associated with the power operated means, a pair of arms slidably positioned in the housing transversely to the path of movement of the plunger and adapted to engage the skirt of the cap and support the cap in alignment with the plunger and means positioned in the path of movement of the plunger for actuating said arms, said last means including a pair of complementary cam members positioned parallel to the arms and pivoted connecting links between the cam members and arms.

12. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, a transverse movable support on one end of the plunger, a fixed partition transversely positioned in the housing and disposed parallel to the plunger support, resilient means connected between the partition and plunger support for urging the support relative to the partition and the plunger relative to the opening, power operated means for moving said support away from the partition and tensioning the resilient means, release means associated with the power operated means, a pair of arms slidably positioned in the housing transversely to the path of movement of the plunger and adapted to engage the skirt of the cap and support the cap in alignment with the plunger and means positioned in the path of movement of the plunger for actuating said arms, and means actuated by the bottle upon the positioning thereof in the opening for controlling the power operated means.

13. A bottle cap remover comprising a housing having an opening for receiving the neck of a capped bottle, a plunger operable in the housing to deliver an impact force on the top of the cap, a transverse movable support on one end of the plunger, a fixed partition transversely positioned in the housing and disposed parallel to the plunger support, resilient means connected be-

tween the partition and plunger support for urging the support relative to the partition and the plunger relative to the opening, power operated means for moving said support away from the partition and tensioning the resilient means, release means associated with the power operated means, a pair of arms slidably positioned in the housing transversely to the path of movement of the plunger and adapted to engage the skirt of the cap and support the cap in alignment with the plunger and means positioned in the path of movement of the plunger for actuating said arms, said power operated means including a rack bar extending from the support opposite to the plunger and a motor having a gear on the

armature shaft thereof mounted in the housing, the gear being enmeshed with the bar.

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