May 29, 1956 W. E. VANDRE 2,747,443

AUTOMATIC BOTTLE CAP REMOVER

Filed Jan. 19, 1955

Fig. 1

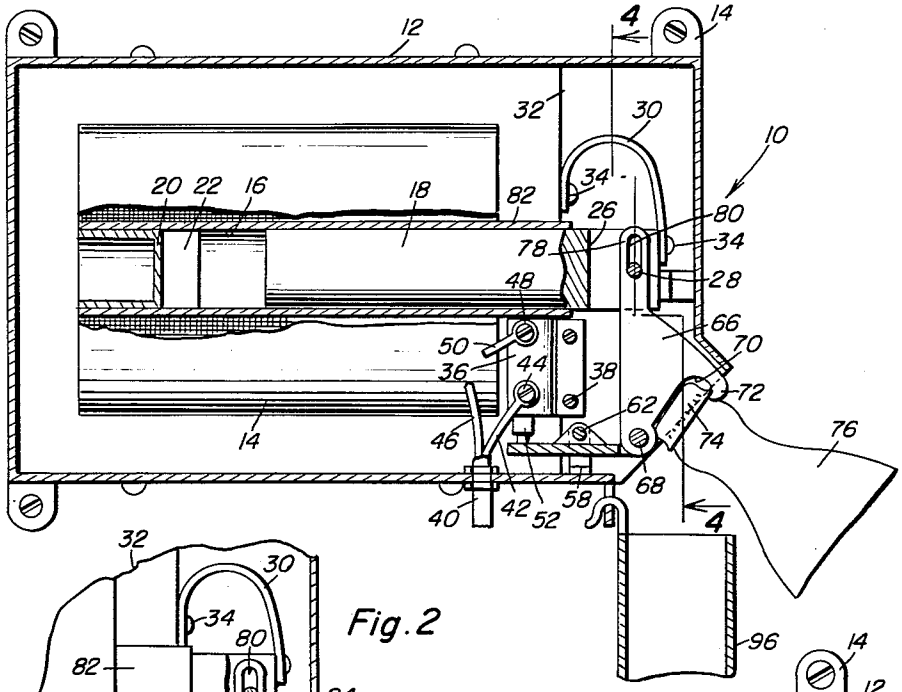


Fig. 2

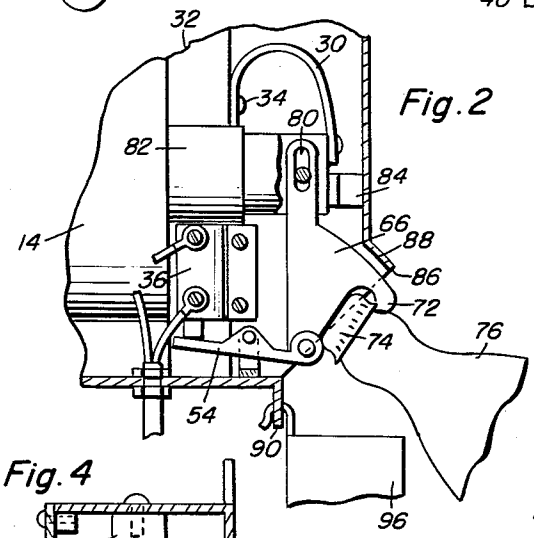


Fig. 3

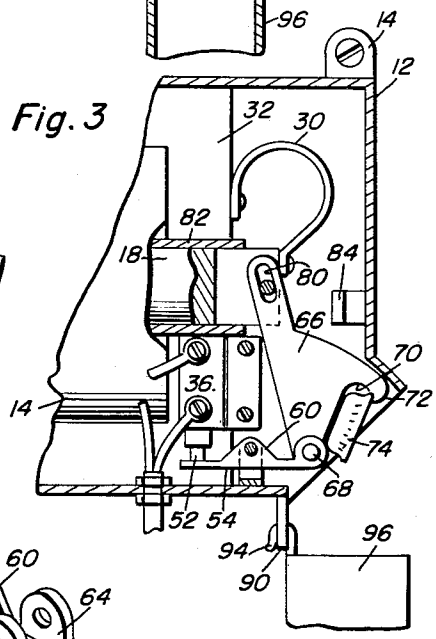


Fig. 4

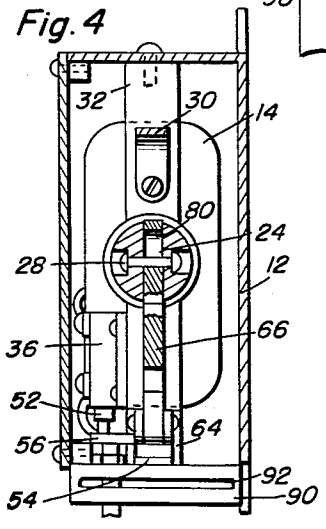
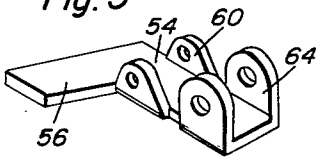


Fig. 5



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AUTOMATIC BOTTLE CAP REMOVER

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4 Claims. (Cl. 81—3.2)

The present invention generally relates to new and useful improvements in bottle openers, and more specifically provides a device adapted to remove crimped bottle caps that is power operated and automatically actuated by movement of the bottle and bottle cap in relation to the bottle cap remover.

An object of this invention is to provide a bottle cap remover that is automatically actuated upon downward pivotal movement of the bottle after it has been inserted into the cap remover which eliminates the necessity of downward pressure on the bottle that is normally utilized in manually opening such bottles.

A further object of the present invention is to provide an electromagnet together with switch means for operating the electromagnet wherein the switch will be closed upon downward pivotal movement of a bottle and bottle cap when the cap is inserted in the remover so that the electromagnet will remove the cap from the mouth of the bottle.

Still another important object of the present invention is to provide an automatic bottle cap remover that is simple in construction, efficient in use, well adapted for its intended purposes, and relatively inexpensive to manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a longitudinal, vertical sectional view taken substantially upon a longitudinal center line passing through the automatic bottle cap remover of the present invention;

Figure 2 is an enlarged fragmental sectional view showing the position of the elements of the invention when downward pressure is exerted upon the bottle for actuating the electromagnet;

Figure 3 is an enlarged fragmental sectional view similar to Figure 2 showing the relationship of the elements after the cap has been removed from the bottle;

Figure 4 is a transverse, vertical sectional view taken substantially upon a plane passing along section line 4—4 of Figure 1 showing the structural details of the cap remover; and

Figure 5 is a perspective view showing the construction of the pivotal switch actuating arm for actuation of the electromagnet.

Referring now specifically to the drawings, it will be seen that the numeral 10 generally designates the automatic bottle cap remover of the present invention which includes a generally rectangular hollow casing 12 having mounting lugs 14 projecting from one edge thereof for attachment to a suitable supporting surface. Positioned centrally and horizontally within the casing 12 is an electromagnet 14 having a hollow cylindrical central bore 16 having a slidable core 18 mounted therein. A suitable closure 20 is provided for one end of the bore 16 and a stop cushion member 22 may be provided in the bottom

of the bore 16 for engagement with the inner end of the sliding core 18.

The outer end of the sliding core 18 is provided with spaced projecting lugs 24 which form a slot 26 having a transversely extending pin 28 mounted therein. Secured to the outer end of the lugs 24 is one end of a bowed flat leaf spring 30 that is secured to a supporting wall 32 within the casing 12. The spring 30 is secured to both the sliding core 18 and the supporting wall 32 by suitable rivets 34 or other fastening means.

Positioned under the sliding core 18 is a switch 36 secured by suitable fastening members 38 to the supporting surface 32 and connected to an electrical conductor 40 having one wire 42 connected to a terminal 44 and the other wire 46 connected to the electromagnet 14. Secured to the other terminal 48 is a conductor 50 from the electromagnet 14 wherein the switch 36 will connect the electromagnet 14 to a source of electrical energy. Projecting from the switch 36 is a spring urged plunger 52 which is engaged by one end of an elongated switch actuating arm 54 that is provided with a lateral offset end 56. The arm 54 is pivotally secured to a U-shaped bracket 58 mounted in the bottom of the casing 12 by a pair of pivot lugs 60 and a transverse pivot pin 62 extending therethrough.

At the end of the actuating arm 54 remote from the laterally offset portion 56 which engages the switch plunger 52, is a pair of upstanding pivot lugs 64 that is connected to the bottom end of an opening member 66 by a pivot pin 68. The opening member 66 is provided with a recessed portion 70 which forms a hook 72 for engagement over a bottle cap 74 on the open end of a bottle 76. The upper end of the removing member is provided with an elongated projection 78 having a slot 80 therein which is positioned over the transverse pin 28 extending between the lugs 24 in the sliding core 18.

The electromagnet 14 is provided with a tubular sleeve 82 in the center thereof which projects outwardly beyond the forward edge of the electromagnet 14 which forms a guide for the longitudinal movement of the core 18. Also, the casing 12 is provided with a stop member 84 on the end wall thereof which forms a stop for limiting the outward movement of the core 18 when the electromagnet is de-energized wherein the outward movement will be caused by the spring tension of the U-shaped or bowed spring 30. Also, the casing 12 is provided with an opening 86 defined by a downwardly and outwardly inclined wall portion 88 which permits access to the cap removing member 66. Projecting downwardly from the lower edge of the opening 86 is an elongated lug 90 having an elongated slot 92 therein for receiving the hook portion 94 of a receptacle 96 which receives the caps 74 after they are removed from the bottle 76.

In operation, the bottle 76 is inserted into the cap remover 10 with the cap 74 hooked under the inturned hook portion 72 in the usual manner. Normally, it is necessary to exert considerable force downwardly on the bottle 76 to remove the cap 74. In this invention, it is only necessary to exert a slight pressure downwardly on the bottle 76, and normally, the weight of the bottle 76 together with the contents therein will be sufficient to move the member 66 downwardly with the transverse pin 28 sliding in the slot 80 and the arm 54 pivoting about pivot pin 62 due to the downward movement of the pin 68 extending through the lower end of the member 66. The downward movement of the end of the arm 54 secured to the member 66 will cause upward movement of the lateral offset 56 on the other end of the arm 54, thereby causing the spring plunger 52 to move inwardly and closing the switch 36, thereby energizing the electromagnetic coil 14 and retracting the movable core 18 in a very quick and positive manner. The inward movement of the sliding core 18 will cause the upper end of the member 66 to

pivot rearwardly about pivot pin **68**, thereby jerking or removing the cap **74** from the bottle **76**, after which the cap **74** will drop downwardly into the receptacle **96** provided therefor. As soon as the downward pressure on the member **66** is removed, the spring tension of the spring **30** will urge the core **18** outwardly and the spring urged plunger **52** will normally urge the arm **54** downwardly at the lateral offset end **56** thereof and the removing member **66** will be returned to its normal position. Figure 2 illustrates the position of the elements of the invention as slight downward pressure is exerted on the bottle **76** for compressing the plunger **52** and moving the member **66** downward slightly. As illustrated in Figure 3, the cap **74** has been removed and the core **18** has moved to its innermost limit wherein the member **66** has been pivoted about the axis formed by the pivot pin **68** and the cap **74** is ready to drop into the receptacle **96** and the plunger **52** in the switch **36** has been returned to its normal position and the spring **30** will return the sliding core **18** to its normal extended position against stop member **84**.

With the device of the present invention, a person opening several bottles **76** at one time may hold several bottles in each hand and by successive positioning of successive bottle caps into the cap removing device of the present invention, all of the caps **74** may be removed, thereby greatly facilitating the opening operation of bottles. The device of the present invention will be especially useful in commercial establishments that normally serve bottled beverages or the like, and the time consumed as well as the energy may be saved, thereby permitting more efficient operation and less time wasted in opening the bottles.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A bottle cap remover comprising a main support, a reciprocating member mounted on said support, means for operating said reciprocating member, means for selectively actuating said operating means, a cap removing member slidably and pivotally attached to said reciprocating member, a hooked portion on said cap removing member for engaging under a cap on a bottle, and interconnecting means extending between the cap removing member and the selective actuating means for operating the reciprocating member upon movement of the cap removing member caused by movement of the bottle and cap thereon thereby moving said reciprocating member and moving the hooked portion away from the bottle in a direction for removing the bottle cap.

2. A bottle cap remover comprising an electromagnet, a sliding core mounted within said electromagnet, spring means urging said core outwardly, switch means for connecting said electromagnet to a source of electrical energy for selectively moving said core inwardly, an actuating arm for said switch means, a cap removing member pivotally and slidably attached to the outer end of said core, a hooked portion on said cap removing member for engaging the cap on a bottle, and means interconnecting said switch actuating arm and said cap removing member for closing said switch upon movement of the cap removing member caused by the force of the bottle thereby moving the core inwardly and moving one end of the cap removing member inwardly and removing the cap from the bottle, said switch means including a spring urged plunger, said switch actuating arm having one end engaging said plunger and the other end pivotally connected to the cap removing member with the center being pivotally attached to a stationary support whereby movement of the end of the arm attached to the cap removing member will move the plunger and close the switch.

3. A bottle cap remover comprising an electromagnet, a sliding core mounted within said electromagnet, spring means urging said core outwardly, switch means for connecting said electromagnet to a source of electrical energy for selectively moving said core inwardly, an actuating arm for said switch means, a cap removing member pivotally attached to the outer end of said core, a hooked portion on said cap removing member for engaging the cap on a bottle, and means interconnecting said switch actuating arm and said cap removing member for closing said switch upon downward movement of the cap removing member caused by the force of the bottle thereby moving the core inwardly and moving one end of the cap removing member inwardly and removing the cap from the bottle, said cap removing member being slidably connected to said core for permitting reciprocation of said core and pivotal movement of said cap removing member.

4. A bottle cap remover comprising an electromagnet, a sliding core mounted within said electromagnet, spring means urging said core outwardly, switch means for connecting said electromagnet to a source of electrical energy for selectively moving said core inwardly, an actuating arm for said switch means, a cap removing member pivotally and slidably attached to the outer end of said core, a hooked portion on said cap removing member for engaging the cap on a bottle, and means interconnecting said switch actuating arm and said cap removing member for closing said switch upon downward movement of the cap removing member caused by the force of the bottle thereby moving the core inwardly and moving one end of the cap removing member inwardly and removing the cap from the bottle, said electromagnet being positioned in a hollow casing, and stop means for limiting the longitudinal movement of said core.

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