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SOLENOID OPERATED CLOSURE REMOVER FOR BOTTLES
WITH AUTOMATIC CLOSURE EJECTORS

2,657,599

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2 Sheets-Sheet 1

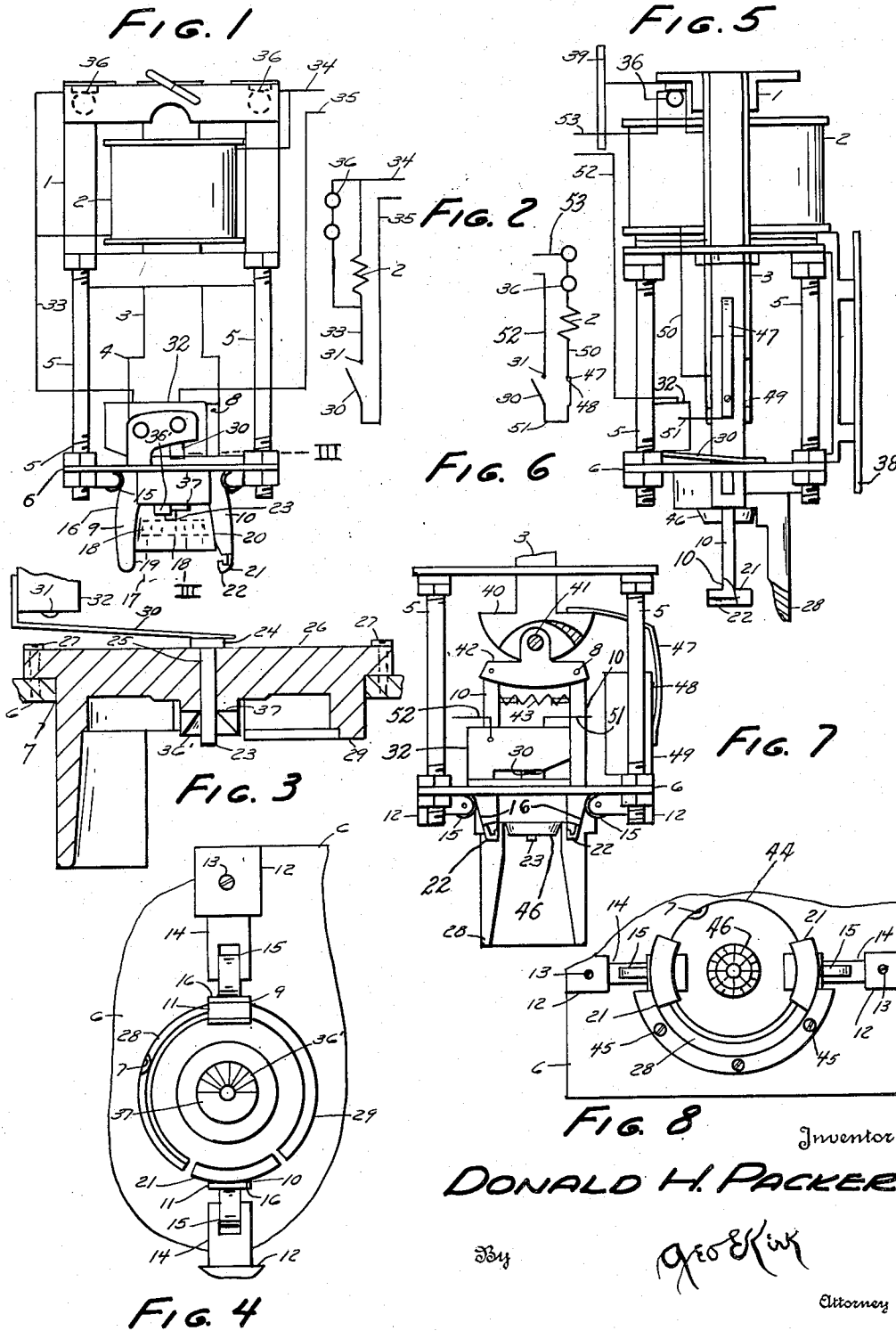


FIG. 8
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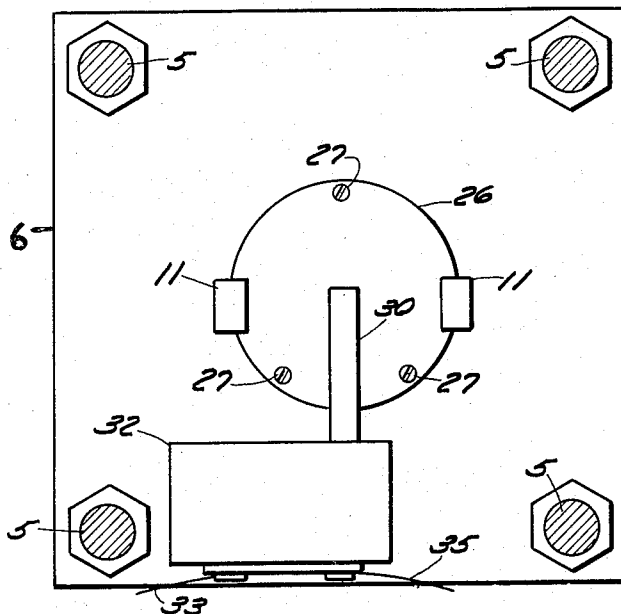


FIG. 9

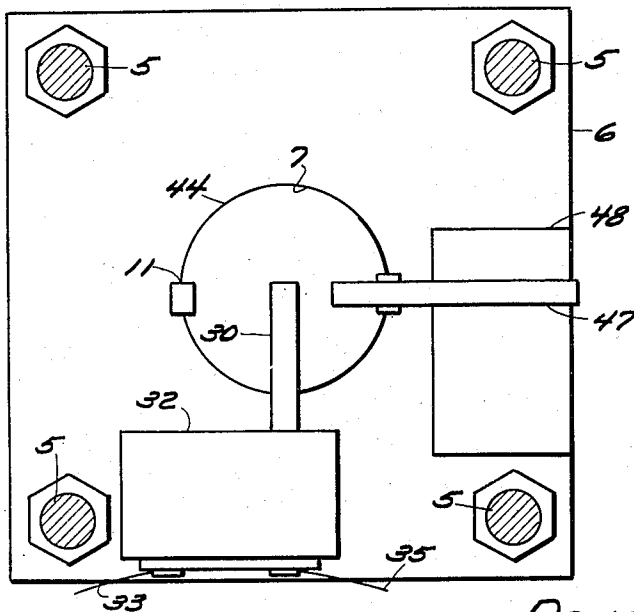


FIG. 10

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SOLENOID OPERATED CLOSURE REMOVER
FOR BOTTLES WITH AUTOMATIC CLOSURE EJECTORS

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Application August 15, 1952, Serial No. 304,627

4 Claims. (Cl. 81-3.2)

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This application is a continuation-in-part of application Ser. No. 60,682, filed November 18, 1948, and now Patent No. 2,612,065 issued on September 30, 1952.

This invention relates to power operated grapples, especially for releasing an attached element from assembly.

This invention has utility when incorporated in an unsealing device, more particularly for crimped edge thin disks as tight closure means for the pour-out opening of bottles.

Referring to the drawings:

Fig. 1 is a rear or back view of an embodiment of the invention in a decapper for the crown seal of bottles as for beverages, catsup, and the like;

Fig. 2 is a wiring diagram of the electric circuit for the unit of Fig. 1, in which the flasher circuit is in parallel with the power solenoid, with the switch to be operated by a thrusting of a sealed bottle top into position to be de-capped;

Fig. 3 is an enlarged view on the line III-III, Fig. 1, of the switch operating plunger mounting;

Fig. 4 is a bottom plan view looking up from the underside of Fig. 1 at the grapple device; portions of the mounting being broken away;

Fig. 5 is a side elevation of a somewhat different embodiment of the decapper from the showing in Fig. 1;

Fig. 6 is a wiring diagram of the electric control of the unit of Fig. 5, with the flasher and solenoid in series, and a second or cut-out switch for the circuit;

Fig. 7 is a partial side elevation looking from the left into the lower portion of the unit of Fig. 5, a portion being broken away and the grapple being in the power operated upper thrust position, as distinguished from the down drop or inoperative position of the showing in Fig. 5;

Fig. 8 is a bottom plan view of the grapple of the unit of Fig. 5, portions of the mounting being broken away;

Fig. 9 is a plan view of the base plate of the device of Fig. 1, showing the parts directly mounted thereon and omitting the operable structure features depending theretoward and extending therethru; and

Fig. 10 is view similar to Fig. 9, of the base plate of the device of Fig. 5.

A frame 1 provides mounting for a solenoid coil 2, from which there is normally downwardly projecting a core 3 having a head 4. Frame extension rods or stud bolts 5 from the frame 1 mount a frame lower or base plate 6 with a central

opening 7 therethru in alignment with the downward direction of the core 3.

The lower portion of the head 4 has pivot mountings 8 for depending arms 9, 10, extending thru notches 11 diametrically in the opening 7. In blocks 12, adjusting screws 13 locate in-and-out sliding of guide arms 14 terminally carrying antifrictionally mounted rollers 15 to ride against outer faces 16 of the cooperating arms 9, 10, of the grapple. The faces 16 are of cam action and configured such that in the energizing of the coil 2, the core 3 rises to pull along therewith the arms 9, 10, for such to ride upward.

In the operation of the unit, neck portion 17 of a sealed bottle has crimped down portion 18 of the bottle cap seal therefor thrust upward between plane inner face 19 of the arm 9 and opposing inner face 20 of the arm 10. The arm 10 lower free end has an arc portion 21 with its inner side outwardly offset from the face 20 to provide a slightly upwardly hooked flange 22 of a jaw.

The upward thrusting of the crown seal cap having the flange 18, has the central disk portion of the cap contact a plunger or pin 23. A head 24 determines the downward limit for the pin 23 extending thru a central port or opening 25 in grapple mounting fitting 26 in the opening 7 of the base plate 6 of the frame. An overhanging flange portion of the fitting 26 is assembled with the plate 6 by screws 27. In the range of slightly over 90°, a guide skirt 28 provides a face for the operator to slide the capped bottle end toward the pin 23. An opposite complimentary considerably shorter guide side flange 29 is a factor in assisting the operator, at register position with the pin 23, against having the bottle cap away from proper centralized position.

A leaf spring 30 acts at all times on the head 24 of the pin 23 to hold the pin 23 downward or toward depressed position. The spring 30 as lifted acts thru a contact 31 in a microswitch housing 32. The circuit therefrom is by way of a line 33 to the coil 2 and thence by a line 34 to a source of electric current supply, as 110 volt 60 cycle power current, circuit completing line from which is by a line 35 to the mounting for the switch arm 30 at the microswitch 31. A display sign or flasher 36 is shown as in parallel with the coil 2.

The upward thrust of the capped bottle directed by the guides 28, 29 and the arm faces 19, 20, of the grapple unit, is effective automatically thru the pin 23 and spring 30 to close the normally open switch 32, which energizes the coil 2,

causing upward retraction of the core 3 against its gravity descent. This upward pulling of the arms 9, 10, further assists in centralizing the capped bottle as to the pin 23. As the upward limit of this pull is effective, the arm 9 is merely an opposing guide while the jaw flange 22 of the arm 10 enters under the lower edge of the crown seal crimped down flange to flare such outwardly away from the neck of the bottle. In practice, this effectively depresses the central portion of the disk of the cap. This central depression of the capping disk is augmented by about 170° angular annular wall 36' at the side of the pin 23 away from the arm 10. Beside the pin 23 toward the arm 10 is a planar portion 37, thereby leaving clearway for the distortion of the crimped edge disk cap, which in the practice hereunder is sufficient for the spring 30 to move the pin 23 downward, with the resulting opening of the switch 32. This experience is that the distorted disk of the bottle cap provides clearance for the unit to de-energize itself. The cap distortion is such for its normal falling clear of the bottle thus opened. However, the operator in withdrawing the bottle from the decapping operation, may slide such down for the jaw 22 to linger against the distorted crimping and further snap the cap clear of the bottle.

The side elevation of the unit of Fig. 5 shows a mounting bracket 38, which may be placed conveniently at the fountain or other serving place for beverages or other items. Not only as a reminder to the operator that the unit is functioning, but supplementally to publicize the service item or some other phase to the trade, the flasher 36 may act on a display or sign 39, say as a transparency.

The solenoid core 3 (Figs. 5, 7) is shown with a head 40, providing pivot bearing 41 for a rocking crosshead 42 in which are the pivot mountings 8 for the pair of grapple jaws 10, herein shown as normally thrust outward by a compression helical spring 43 for the outer faces 16 thereof to ride snugly against the rollers 15. The pair of arc portions 21 permit omission of the guide flange region 29 of Figs. 1, 3, 4, especially as the jaws are stabilized by the spring. At the opening 7 in the plate 6 there is mounted a fitting 44 by screws 45 against the lower side of the plate 6, instead of above as in Fig. 3. In lieu of the outwardly cylindrical half rim 36' (Figs. 3, 4) there is adopted (Figs. 5, 7, 8) a full circle inward and outward taper rim 46. Regardless of whether the cap disk be distorted, the upward limit of travel of the plunger core 3 has its head 40 strike a leaf spring 47 to shift it clear of its normally closed contact 48 at a second microswitch housing 49. One way from the microswitch housing 49 is a line 50 to the coil 2. The other way from the housing 49 is a line 51 to the microswitch 32. A power current supply line 52 is to the housing 32. In series with the

coil 2 is the flasher 36 to a power circuit completing supply line 53. The upward travel of the core head 40 in opening the second switch 47, 48, de-energizes the coil 2, for the gravity descent at once of the core 3, as the operator removes the decapped bottle from the unit, thereby clearing the pin 23 from the removed crimped distorted rim of the closure disk for the bottle.

What is claimed and it is desired to secure by Letters Patent is:

1. A closure remover for containers wherein the closure is a disk with a peripheral flange depending therefrom in holding relation with the container, said remover comprising a seat provided with a container closure directing guide portion and a central slideway therethru, there being a rim portion downwardly extending from the slideway and having lateral clearance relatively thereto, a pin in the slideway adapted to extend downward beyond the rim, a switch element adapted to be upwardly thrust from the seat by positioning a container-carried closure in the seat, a contact in position to be engaged by the element into closing relation of a switch formed by said element and contact, an electric circuit from the switch including a solenoid coil, a core actuable by the energized coil for movement relatively to the seat, grapple means slidably mounted in association with the guide portion of the seat, said grapple means including an arm connected to the core and provided with a jaw shiftable to engage the closure disk flange and pull the flange upward to flex the disk central portion against the rim portion with the central portion thereby bowed away from the clearance and free of the pin and thereby de-energizing the coil in advance of removing the container from the guide, whereby upon lowering the container the downdropped grapple means kicks the released closure clear of the container.

2. A closure remover of claim 1 wherein a second and normally closed switch is provided in said circuit, and actuated-core-carried means for opening the second switch.

3. A closure remover of claim 1, wherein the grapple includes diametrically from said arm a second arm swingably depending from the core, and antifriction means directing the second arm toward the jaw-carrying arm sufficiently for the second arm to engage the closure.

4. A closure remover of claim 3 wherein the second arm is provided with a jaw at its free end and opposing the jaw of the other arm of the grapple.

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