July 5, 1955 K. F. MILLER ET AL 2,712,176

CAN OPENER

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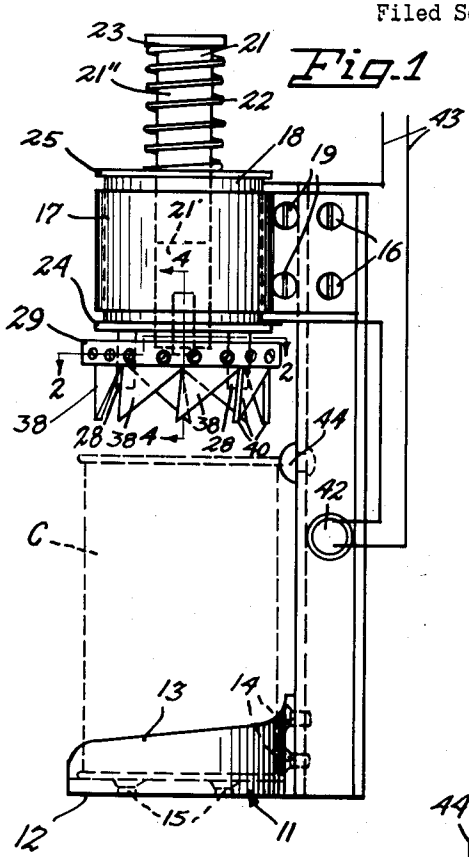


Fig. 1

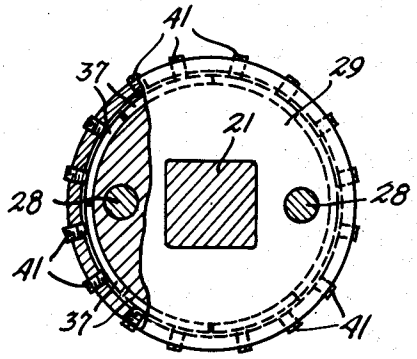


Fig. 2

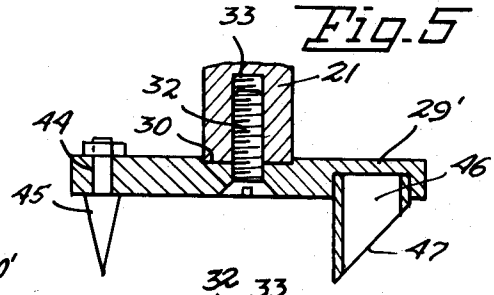


Fig. 5

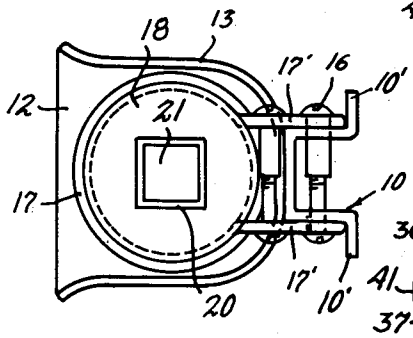


Fig. 3

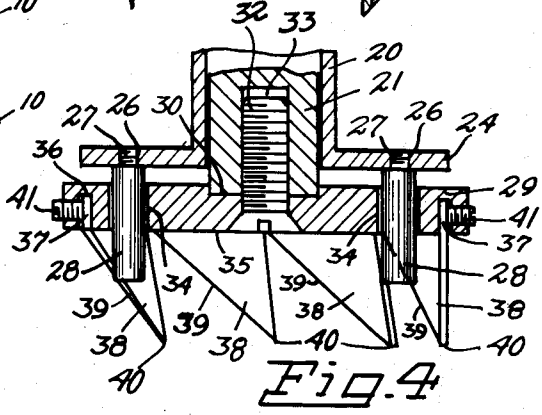


Fig. 4

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# CAN OPENER

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6 Claims. (Cl. 30—4)

The present invention relates to can openers and more particularly to a solenoid actuated can opener.

One object of the invention lies in the provision of a solenoid actuated can opener which may be properly operated by means of one hand thus avoiding the necessity of using both hands to open a can as is presently found necessary.

Another object of the invention is to provide a can opener of aforementioned character embodying a novel construction and arrangement through the medium of which the device is adapted to remove the complete end of a can or upon substitution of an adaptor head perforate the can for pouring.

Other objects of the invention are to provide a can opener of the character described which will be comparatively simple in construction, strong, durable, highly efficient and reliable in use, compact and which may be manufactured at low cost.

All of the foregoing and other objects of the invention will become apparent from a study of the following specification taken in connection with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views and wherein a preferred form of the invention is shown. It should be understood however that the drawings and description are illustrative only and are not intended to limit the invention except insofar as it is limited by the claims.

In the drawing,

Figure 1 is a view in side elevation of an opener constructed in accordance with the present invention showing a can mounted thereon by broken lines;

Figure 2 is a fragmentary cross section taken at line 2—2 of Figure 1;

Figure 3 is a top plan view of the opener;

Figure 4 is a cross sectional view through the invention taken substantially on the line 4—4 of Figure 1; and

Figure 5 is a fragmentary view similar to that of Figure 4 and showing a modified adaptor plate or disc.

Referring now to the drawing in detail it will be seen that the embodiment of the invention which has been illustrated comprises a metallic standard **10** which when viewed in cross section (Figure 3) is substantially channel shaped and has outstanding flanges **10'** on the free edges of the channel lips. This affords a member using a minimum amount of material and yet provides sufficient strength and rigidity for proper functioning of the invention.

Releasably fixed to the lower end of the standard **10** and disposed at right angles thereto we provide a supporting base **11** which consists of a horizontally disposed bottom plate **12** defined on three sides by an undulatory upstanding wall **13** drilled at the rear side to receive stub bolts **14** for releasably securing the base **11** to the standard **10**. Figure 1 discloses by broken lines that the bottom **12** is formed with screw receiving openings **15** through which screws may be applied to anchor the can opener to a table or other supporting surface if desired.

At its upper end the standard **10** is provided with



spaced upper and lower transversely extending aligned holes adapted to receive clamping bolts **16—16** which are employed to secure a clamping band **17** to the standard **10**. The clamping band **17** encircles the coil **18** of a conventional solenoid and is provided with an additional pair of clamping bolts **19** which extend through the ears **17'** of the clamping band in advance of the front face of the standard **10** and thus permit selective clamping pressure to be applied to the solenoid coil **18** for purpose of vertically adjusting the coil within the band without loosening the band **17** from the standard **10**.

It is obvious from a study of Figure 3 of the drawing that the solenoid coil **18** encircles a sleeve **20**, angular in cross section, here shown to be square, which is preferably formed from a nonmagnetic material such as copper or brass and is adapted to receive the cross sectionally angular plunger **21** for nonrotatable reciprocal movement therein. The plunger is formed, in the present disclosure, square in cross section to agree with the sleeve **20** and consists of the conventional nonmagnetic lower end portion **21'** and the magnetic upper end portion **21''** as is conventional in solenoids of this type. The nonmagnetic portion **21'** is normally disposed within the solenoid with the plunger in the raised position yieldably supported by means of a compression spring **22** disposed between the top face of the solenoid **18** and an outwardly disposed shoulder **23** formed on the upper end of the plunger **21**. Obviously electrical energization of the solenoid coil **18** will cause the magnetizable portion **21''** to be drawn inwardly into the coil thus forcing the lower end of the plunger downwardly.

The sleeve **20** is provided with an integral outstanding flange **24** at its lower end and also a flange **25** which is secured to its upper end in any suitable manner after the sleeve is disposed within the coil **18**. The lower flange **24** is provided with a number of vertically disposed internally threaded openings **26** which receive the studs **27** of depending fingers **28** and thereby rigidly fix the fingers to the flange **24**.

At the lower end of the plunger **21** we provide an annular disc **29** which has a central recess **30** commensurate in plan shape and size with the angular shape of the plunger **21**. The lower marginal end portion of the plunger **21** is disposed within the recess **30** and is anchored therein by means of a set bolt **32** which extends through the disc **29** and is threadedly engaged into an internally threaded opening **33** axially arranged in the lower end of the plunger **21**. Axially aligned with the fingers **28**, the disc **29** is provided with vertically disposed apertures **34** sufficiently enlarged over the size of the fingers **28** to freely pass the fingers therethrough and when the plunger **21** is disposed in its raised position, as shown in Figure 4, the fingers **28** extend through the apertures **34** a distance below the bottom face **35** of the disc **29**. An annular groove **36** is formed in the bottom face of the disc **29** outside of the apertures **34** and this groove is designed to receive the tangs **37** of a plurality of can opening blades **38**.

As most conveniently discerned in Figure 4 the blades **38** are provided with angular sharpened cutting edges **39** which terminate downwardly in perforating points **40** each disposed in overlapped relation to a portion of the cutting edge **39** of a contiguous blade **38**. It will thus be seen that as the cutter blades **38** are moved downwardly the cutting edge of a next adjacent blade **38** enters the portion punctured by the point **40** thus insuring that the complete top of the can will be severed and removed from the can. It has been found that the top, by friction, remains within the annular arranged blades **38** and must be removed by the fingers **28** upon upward movement of the disc **29**. Obviously the annular cutting element formed by the plurality of blades **38** may be formed in

a single blade if found desirable, but for convenience of sharpening and replacing broken blades we have found it desirable to provide a plurality of blades each of which is secured by a pair of set bolts **41** that extend radially through the peripheral edge of the disc **29** into the grooves **36** and impinge against the tang **37** of their respective blade **38**, thus releasably securing them within the groove.

To permit one hand operation of the can opener we provide a finger actuated push button **42** on the standard **10** which is connected in series with the solenoid **18** in a conventional electrical circuit indicated by the numeral **43**. When the can C is placed upon the supporting base **11** and properly positioned beneath the opening elements by the upstanding wall **13** and the abutment button **44**, a finger of the hand holding the can may depress the button **42** to effect operation of the can opener.

In Figure 5 we have shown a modified form of disc **29'** which omits the groove **36** and the apertures **34** and is provided with a vertically disposed aperture **44** adapted to receive and secure a vent spout punch **45**. Diametrically opposed to the punch **45** is a hollow pouring spout punch **46** having an angled cutting face **47** so that a can may be simultaneously formed with a vent and pouring spout upon operation of the can opener.

Having thus described our invention, we claim:

1. A can opener comprising a vertically reciprocal solenoid actuable normally raised plunger angular in cross section; an angular sleeve reciprocally containing said plunger for precluding axial rotation thereof and having an outstanding flange at its lower end; a solenoid coil encircling said sleeve for actuating said plunger; a horizontally disposed annular disc carried by said plunger at its lower end; said disc having an annular groove in its lower face for receiving the tangs of cutting blades and a number of apertures vertically disposed in said disc within said groove; depending fingers carried by said flange and commensurate in number with said apertures and axially aligned therewith for movement therethrough, whereby a can lid may be ejected from said opener; a plurality of cutting blades having tangs disposed in said groove and downwardly angled cutting edges having points overlapping the adjacent edges of contiguous blades; a plurality of radially disposed set bolts threadedly extending through the peripheral face of said disc and into said groove and releasably securing the blades therein; a standard supporting said can opener; and a can supporting base for positioning a can under said disc to be opened by said blades upon actuation of said solenoid.

2. A can opener comprising a vertically reciprocal solenoid actuated normally raised plunger angular in cross section; an angular tubular guide reciprocally containing said plunger and having an outstanding flange at its lower end; a horizontally disposed annular disc carried by said plunger at its lower end, said disc having an annular groove in its lower face for receiving the tangs of cutting blades and at least one aperture in the disc and within said groove; depending fingers commensurate in number with said apertures carried by said flange and axially aligned to extend through and beyond said apertures when said disc and plunger are in the raised position, for ejecting a lid from the opener; a plurality of cutting blades having tangs disposed in said groove; downwardly angled cutting edges on the blades and having points overlapping the adjacent edges of contiguous blades; and means releasably securing the blades in said groove.

3. A can opener comprising a vertically reciprocal solenoid actuated normally raised plunger angular in cross section; an angular sleeve reciprocally containing said plunger for precluding axial rotation thereof; a disc carrying depending can opening elements; said disc having in its upper face a recess identical in size and shape to the cross sectional configuration of said plunger and containing the lower marginal end of said plunger; and a set bolt threadedly engaged with said plunger and releasably uniting said disc and said plunger.

4. The invention as defined in claim 3 wherein said angular sleeve has an outstanding flange at its lower end; said disc having an annular groove in its lower face for receiving the tangs of cutting blades and at least one aperture extending vertically through said disc within said groove; depending fingers commensurate in number with said apertures carried by said flange and axially aligned to extend through said apertures when said disc and plunger are in the raised position, for ejecting a lid from the opener; said can opening elements comprising a plurality of cutting blades having tangs disposed in said groove and downwardly angled cutting edges having points overlapping the adjacent edges of contiguous blades; and means releasably securing the blades in said groove.

5. A can opener comprising a vertically reciprocal solenoid actuated normally raised plunger; a horizontally disposed annular disc carried by said plunger at its lower end; said disc having an annular groove in its lower face for receiving the tangs of cutting blades; at least one cutting blade having a tang disposed in said groove and a plurality of downwardly angled cutting edges having points overlapping a portion of a contiguous edge; and means releasably securing the blade in said groove.

6. A can opener comprising a vertically reciprocal solenoid actuated normally raised plunger; a horizontally disposed annular disc carried by said plunger at its lower end; can opening elements carried by said disc and disposed downwardly to strike and open a can upon actuation of said plunger; and means releasably securing the elements and said disc.



No references cited.