July 7, 1959 F. E. ABERER ET AL 2,893,116

POWER-OPERATED CAN OPENER

Filed May 29, 1957 2 Sheets-Sheet 1

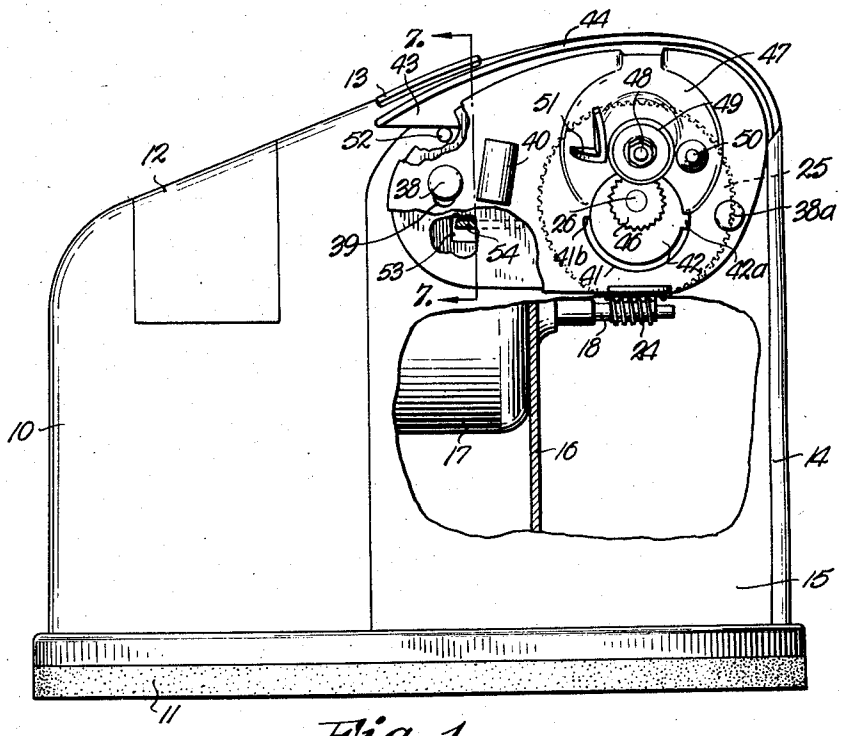


Fig. 1.

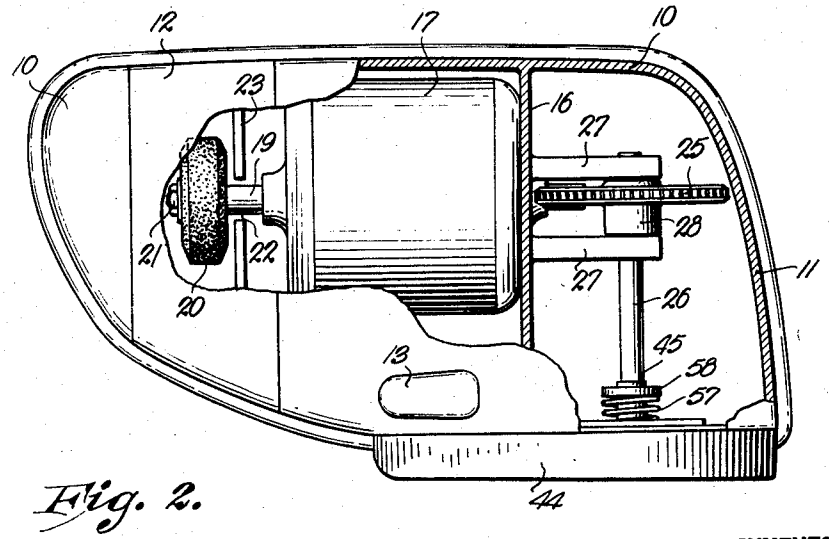


Fig. 2.

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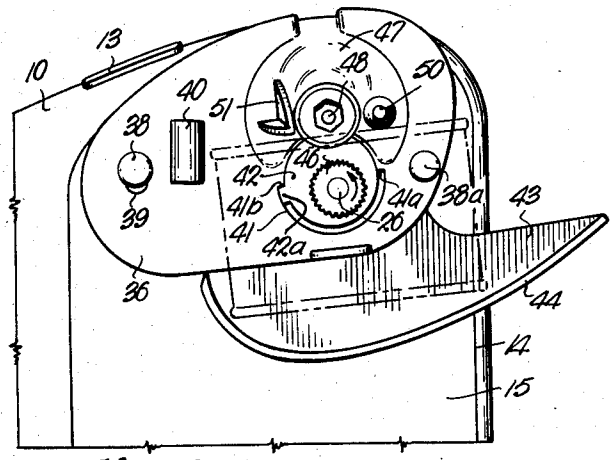


Fig. 3.

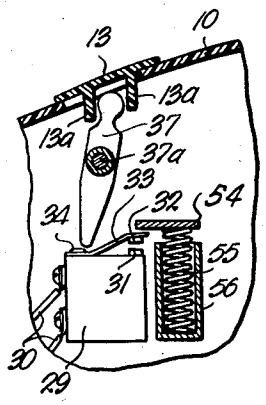


Fig. 6.

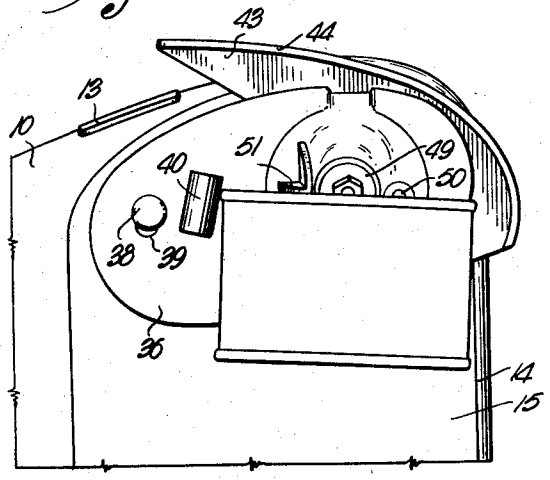


Fig. 4.

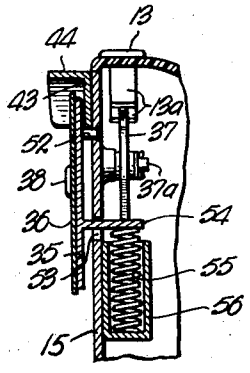


Fig. 7.

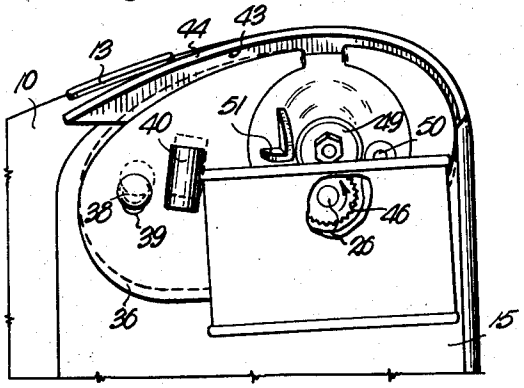


Fig. 5.

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2,893,116

POWER-OPERATED CAN OPENER

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Application May 29, 1957, Serial No. 662,464

7 Claims. (Cl. 30—4)

This invention relates to power-operated can openers and refers more particularly to a power-operated can opener wherein the power source is actuated by the puncturing of the can, continued in operation until the can is cut and, then, stopped, the latter two steps performed without any further manipulation of the can opener on the part of the operator after puncturing the can.

An object of the invention is to provide a power-operated can opener wherein only the puncturing of the can is hand performed, the entire cutting operation and the shutting off of the power being performed without further intervention on the part of the operator.

Another object of the invention is to provide a power-operated can opener which is simple in construction, rugged, having a minimum number of parts and which is relatively cheap to manufacture.

Yet another object of the invention is to provide a power-operated can opener wherein all steps of the can opening process which offer any danger or hazard to the operator are performed without manual manipulation of the opener by the operator.

Another object of the invention is to provide a power-operated can opener wherein all of the parts are readily accessible for repair or replacement.

Another object of the invention is to provide a power-operated can opener wherein the power source for the can opening operation may be employed for other kitchen purposes such as to operate a knife sharpener, the power source being connected to the can opener at all times when running yet only operating a limited portion thereof.

Another object is to provide such a dual purpose can opener wherein the main can opener mechanism to maintain the power source running is actuated only when an incompletely cut can is engaged in the opener, separate actuating means being provided to start the power for the other purpose.

Another object of the invention is to provide a power-operated can opener wherein the puncturing of the can also trips the actuation of the power source, while the force exerted on the can opener parts by the cutting of the can maintains the power source in operation until the can is cut, whereupon the power source is automatically shut off.

Other and further objects of the invention will appear in the course of the following description thereof.

In the drawings, which form a part of the instant invention and are to be read in conjunction therewith, an embodiment of the invention is shown and, in the various views, like numerals are employed to indicate like parts.

Fig. 1 is a side view with parts cut away of the inventive power-operated can opener and sharpener.

Fig. 2 is a top plan view with parts cut away of the can opener and sharpener of Fig. 1.

Fig. 3 is a side view of a portion of the inventive can opener and sharpener before a can is engaged between the can holding and cutting portions thereof.

Fig. 4 shows the can opener and sharpener of Fig. 3 with the can to be cut engaged in the can cutting mechanism immediately after the actuating of the power source.

Fig. 5 is a side view similar to those of Figs. 3 and 4 showing in dotted lines the position of the can cutting portion of the opener without a can engaged therein and, in full lines, its position during the can cutting process.

Fig. 6 is a view from the rear of the parts shown in side view in Fig. 7.

Fig. 7 is a view taken along the lines 7—7 of Fig. 1 in the direction of the arrows.

Referring to the drawings, at **10** is shown a housing having a base **11**, a removable opening **12** and a sliding hand switch **13** mounted thereon. The front face of the housing has an opening **14** running substantially the height of the housing. A front plate **15** fills the opening **14** and is of rigid, strong construction such as a metal plate. Motor mounting plate **16** (Fig. 2) extends rearwardly from the front plate **15** normal thereto and is fixed by welding or other attachment thereto. Power source **17** is fixedly mounted on mounting plate **16** and has primary drive shaft **18** extending from one end thereof behind the front plate and secondary drive shaft **19** extending in the other direction under the opening **12**. The power source drives both of the drive shafts simultaneously. Fixed to the secondary drive shaft **19** by nut **21** is abrasive wheel or disk **20**. Abrasive wheel **20** is employed to sharpen knives or the like. Secondary drive shaft **19** extends through an opening **22** in wall **23** which separates the motor chamber from the sharpening chamber containing the abrasive wheel.

Worm gear **24** (Fig. 1) is mounted on primary drive shaft **18** and engages spur gear **25** which is fixed to can opener drive shaft **26**, the drive shaft **26** being rotatably supported by arms **27** on plate **16**. The spur gear **25** is positioned between the two arms **27** and is spaced therefrom by bearing sleeve **28**. Thus, rotation of primary drive shaft **18** also rotates spur gear **25** and drive shaft **26**. The necessary direction of shaft **26** is counterclockwise in Fig. 1.

Control mechanism for the power source or motor **17** which, in this instance, is shown as an electric motor, comprises switch **29** (Fig. 6) which is connected to any suitable source of electric supply by a conventional electric cord not shown and has leads **30** to the motor **17**. Primary contact **31** on the switch box is opposed by secondary contact **32** on spring arm **33**, the latter fixed to the switch by stud **34**. Manual means for actuating the switch **29** include the slidable hand switch **13** having downwardly extending legs **13*a*** and control lever **37** pivotally fixed to the housing **10** by shaft **37*a***. Slide movement of switch **13** back and forth on the housing **10** causes the arm **37** to depress the spring mount **33** or release it to make or break the contact which controls the motor. The hand switch **13** is that mechanism employed to actuate the motor **17** to use the sharpening disk **20**. The construction which is employed to actuate the switch **29** to use the can opener and drive the motor in power can opening will now be described.

Our present invention relates primarily to means for (1) turning on the motor **17** in the process of engaging and puncturing a can, (2) also providing means by which the motor is maintained in operation during the entire process of cutting the can and (3) providing means for shutting off the motor after the can has been cut. Manual manipulation of any part or parts of the can opener is required only during the initial stage of engaging and puncturing the can and in removal of a can from the opener. The maintenance of the power source in operation and the turning off of the power source is entirely automatic thereafter.

We have provided means adaptable to a conventional can opener which will achieve these objects. Therefore, the can engaging and cutting apparatus itself is not, per

se, new. We have substantially employed the mechanism disclosed in our Patent No. 2,694,855, entitled "Can Opener," issued November 23, 1954. Certain structure of our inventive apparatus is identical or substantially so with comparable features of that patent, and thus will not be described in unnecessarily complete detail.

Referring first to Fig. 7, next to front plate **15** is positioned primary plate **35**. Secondary outer plate **36** abuts in face to face sliding contact primary plate **35**. Stud **38***a* engages one side of the two plates through openings therein while stud **38** engages an opening in primary plate **35** and a slot **39** in the secondary plate **36**. The slot **39** permits limited up and down movement of the rear end of plate **36** about the forward stud or rivet **38***a* as a hinge. Plate **36** is always urged downwardly, however, by a coiled compression spring (not shown) confined between the plates within confronting semicylindrical pockets formed by struck out portions of the plates (**40** on plate **36**), whereby plate **36** normally occupies the position illustrated in Figs. 1, 3, and 4. This pivotal adjustability is to allow for can seams passing between the feed and cutter wheels, is described in the above patent, and will not be further set forth here.

Plate **36** contains a large aperture **41** in which disk **42** is located. As shown in Figs. 1 and 3, the aperture **41** is shaped to provide stop shoulders **41***b* and **41***a* cooperating with a radial lug **42***a* on a disk in order to limit rotation of the latter in two directions. Disk **42** can thus turn approximately 180° in either direction in aperture **41**. Plate **35** has a circular registering aperture therein to receive a circular plug (not shown) on the rear of the disk **42** for rotation therein. The thickness of the plug is equal to or only slightly greater than the thickness of plate **35**. The lever **43**, which is positioned between the front plate **15** and the plates **35** and **36**, has a smaller opening therein through which a sleeve bearing **45** (Fig. 2), eccentrically mounted on the plug, extends, as well as through an opening in the front plate **15**. Lever **44** is fixed to sleeve bearing **45** which, in turn, is fixed to the circular plug fastened to the rear side of disc **42**. As the circular plug is centered on circular disc **42** (as in the above patent) while the sleeve bearing **45** is asymmetrically mounted on the plug and shaft **26** extends through the bearing, plug and disc, movement of lever **44** from the position of Fig. 3 to that of Fig. 4 operates to cam plates **35** and **36** (and cutter **49**) from the upper cam releasing position of Fig. 3 to the can engaging position of Fig. 4 and then the can cutting position of Fig. 5. The relationship of the disk, plug and bearing sleeve **45** to plates **36**, **35** and **15** is the same as the construction shown in the above patent.

Can opener drive shaft **26** extends through the sleeve bearing **45**, the plug and the disk **42**, as may be seen in Figs. 1 and 3, and has feed wheel **46** threadedly mounted thereon. Since the shaft **26** extends through the bearing sleeve **45** and the disk **42**, as well as the unseen plug, rotation of the shaft **26** does not rotate the disk, plug or bearing sleeve. However, the lever **43** is seized to the bearing sleeve **45** and rotation of the lever **43** around the shaft **26** will elevate (Fig. 3) or lower (Figs. 4, 5 and 1) the two plates **35** and **36** relative the shaft **26**.

Spring **57** on sleeve **45** (Fig. 2) abuts disk **58** which is fixed to the bearing sleeve **45** and serves to exert force on the plates **35** and **36** and the lever **43**, to urge the feed wheel **46** toward the exposed face of disk **42**, thus resiliently maintaining **35**, **36** and **42** against the outer face of front plate **15** a washer or shim (not shown) being interposed between the two, however, to reduce frictional resistance to turning of the feed wheel.

Above aperture **41**, plate **36** has an outwardly dished boss portion **47** carrying a downwardly inclined spindle **48** which has in turn a cutter wheel **49** rotatably journaled thereon. Forwardly and rearwardly of the zone of action of cutter wheel **49** are a pair of fixed shoulder members **50** and **51** adapted to engage the upper rim of a can to stabilize it during the cutting operation, as will be described presently. It can now be seen, as in Patent No. 2,694,855, that plate **35** together with its secondary auxiliary plate **36** forms a swivel carrier for the cutter wheel, by virtue of which the cutter wheel can be shifted through an arc about the axis of the shaft **26** as a center, and can be positioned in either limit position; even when the carrier is thus positioned, however, the cutter wheel can move slightly in a direction generally radial to said axis by virtue of the manner in which the auxiliary secondary plate **36** is hinged at **38***a* to the main plate **35**.

A locking stud **52** (Fig. 7) limits the counterclockwise (in Fig. 1) travel of lever **43**, even before the abutment of the tab **42***a* with the shoulder **41***a* between the disk **42** and the plate **36**. Therefore, the flange **44** cannot engage the top of the plate **36** to exert force thereupon since its underside abuts the stud **52** before this encounter.

Aside from the stud **52** limiting the action of the lever **43**, previously described, the construction and operation of the can opener assembly positioned outward from and including the front plate **15** are substantially the same as that shown in Patent No. 2,694,855. As described, the bearing sleeve (not shown) is offset from the center of the disk **42** so that the axis of the shaft **26** is eccentrically positioned relative to the axis of the disk. Thus, when the lever **43** is in the position of Fig. 1, the feed wheel occupies a position wherein its upper margin overlaps the lower margin of the cutter wheel **49**. On the other hand, by turning the lever **43** to the position of Fig. 3, the feed wheel is in a position spaced away from the cutter wheel. It should be noted that it is the plates **35** and **36** which move relative the front plate **15**, not plate **15** relative them. Thus, the feed wheel **46** remains in the same vertical position on the front plate **15** while the plates **35** and **36** and the cutter wheel on plate **36** move upwardly or downwardly relative the feed wheel.

The apparatus will now be described which actuates the power source and keeps it operating until the can is cut, then shutting it off. Referring to Fig. 7, and also Fig. 6, it will be seen that an opening **53** is formed in and extends through front plate **15** behind the primary plate **35**. A shelf or arm **54** is rigidly fixed to the back of plate **35** and extends through the opening **53**. A coil spring **55** abuts the underside of arm **54** and is received in an open-ended receiver **56** whereby to constantly urge the arm **54** upwardly. It should be noted that nothing is preventing the plates **35** and **36** from rotating in a counterclockwise direction (in Fig. 1) when the cutter wheel is positioned relative the feed wheel as in the manner of Fig. 1. The only thing which would prevent rotation at all is the tab **42***a* on the disk **42**, while even it is not in a position to prevent counterclockwise rotation. Therefore, the spring **55** yieldingly maintains the two plates against such rotation. The displaced position of the arm **54** can be seen in Fig. 1 relative the mounting axis of shaft **26**. Referring to Fig. 6, it is seen that the arm **54** overlies the end of the spring **55** on the switch **29** whereby when the arm **54** is forced downwardly it will turn on the power source.

The process of engaging a can is shown in Fig. 3. The lever **43** is rotated in a clockwise direction until the rim **44** abuts the underside of plate **36** and tab **42***a* abuts shelf **41***b*, the latter limiting its clockwise movement. A can rim may be inserted under the edge of the cutter wheel and the lever **43** moved in counterclockwise direction to lower the cutter wheel upon the rim to puncture the can. As the lever **43** moves around and the cutting edge engages the top of the can to be punctured, a rotational force on the plate **36** is exerted around the shaft **26**. As lever **43** is moved from the position of Fig. 3 to that of Fig. 4, the rotation of the disk **42** cams down the cutter wheel **49** on the top surface of the can, driving the underside of the can rim against the wheel **46**. Continued rotation of lever **43** exerts force against the top of the can by the cutter wheel. This force is transmitted back

in equal reaction to the cutter wheel to the plate **36**. This force tends to move the plate **36** from the dotted line showing of Fig. 5 to the full line showing thereof. Such motion forces the arm **54** down against the action of the spring **55** and touches off the switch **29** which starts the motor into action. This initiation of the cutting action begins only when the can is broken through, as it takes the amount of compression required to puncture the can to actually move the plates **35** and **36** around the shaft **26** against the spring **55**. With the can punctured and the motor started, the feed wheel is driven in the direction of the arrows shown in Fig. 5. It thus will be seen that the force due to the impingement of the metal portion of the can top against the cutter wheel edge, under the impetus of the feed wheel gripping the underside of the can rim, is applied along a line displaced from the center of the axis of shaft **26**. This force is transmitted to the plate **36** through the shaft **48** mounting the cutter wheel. Such force tends to rotate the plate **36** around the shaft **26** in a counterclockwise direction in Fig. 5. The strength of the spring **55** must be so regulated as to be slightly less than the force required to displace the plate **36** into the full line position of Fig. 5 and maintain the arm **54** in depressed position connecting the contacts **31** and **32**, thus keeping the motor in operation. The motor continues running until the can has been completely cut. Once the can top has been completely cut, there is no further force exerted upon the cutter wheel by the can top and the spring **55** returns plate **36** to the dotted line position of Fig. 5. The motor is thus turned off when the can top is cut. Any tendency for the can to tilt due to uneven application of force to its top in the cutting thereof is obviated by the bracing arms **51** and **50** which abut the upper can rim during the cutting process.

When the switch **13** is actuated, both of the drive shafts turn; thus the abrasive wheel **20** and the feed wheel **46** both turn simultaneously. However, if there is no can interposed between the feed wheel and the cutter wheel and they are not moved to the position of Fig. 1, there can be no maintenance of the switch closed while a can is being cut and the only control over the motor will be the switch **13**.

From the foregoing it will be seen that the invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all material hereinabove set forth or shown in the drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. A power operated can opener comprising a power source, a drive shaft driven by said power source, a plate rotatably journaled on said drive shaft, means limiting the rotation of said plate in both directions around said shaft to a restricted arc between a first and a second extremity, resilient means tending to maintain the plate at the first extremity of said arc, actuating means for said power source, means cooperating with said plate to contact said actuating means on rotation of the plate to the second extremity of its arc, a cutter wheel carried by said plate and at least substantially fixed relative thereto whereby at least some of any forces applied to the cutter wheel are applied to said plate, a feed wheel fixedly mounted on said drive shaft to rotate therewith relative said cutter wheel, one of said wheels movable toward and away from the other wheel to permit engagement and disengagement of a can rim therebetween, the feed wheel and drive shaft driven in rotation by said power source in such direction that force from the feed wheel applied to the cutter wheel through a can being cut tends to rotate the plate around the drive shaft from the first to the second extremity, and means for initially rotating said plate from the first extremity to the second extremity whereby to actuate said power source when a can is positioned between the cutter wheel and the feed wheel.

2. A power-operated can opener as in claim 1 wherein the resilient means tending to maintain the plate at the first extremity of its arc exerts slightly less force than the force which is applied to the cutter wheel by the action of the feed wheel on a can in the process of cutting said can.

3. A power-operated can opener comprising a power source, a drive shaft driven by said power source, a primary plate rotatably journaled on said drive shaft, a frame plate mounting said drive shaft, means limiting the rotation of the primary plate in both directions around said shaft to a restricted arc between a first and a second extremity, resilient means tending to maintain the primary plate at the first extremity of said arc, actuating means for said power source, means cooperating with said primary plate to contact said actuating means on rotation thereof to the second extremity, a cutter wheel carried by said primary plate and at least substantially fixedly mounted relative thereto whereby at least some of any forces applied to the cutter wheel are applied to the primary plate, a feed wheel mounted on said drive shaft to rotate therewith relative said cutter wheel, one of said wheels movable toward and away from the other wheel to permit engagement and disengagement of a can rim therebetween, the feed wheel and drive shaft rotating in such direction that force from the feed wheel applied to the cutter wheel through a can being cut tends to rotate the plate around the drive shaft from a first to a second extremity and means for initially rotating said primary plate from the first extremity to the second extremity whereby to actuate said power source when a can is positioned between the cutter and the feed wheel.

4. A power-operated can opener as in claim 3 wherein the means for limiting the rotation of the primary plate comprises a slot in the frame plate and an arm fixed to the primary plate and extending into said slot.

5. A power-operated can opener as in claim 3 wherein the resilient means tending to maintain the primary plate at the first extremity is mounted on the frame plate.

6. A power-operated can opener as in claim 5 wherein the resilient means cooperates with the arm on the primary plate extending through the slot in the frame plate.

7. A power-operated can opener as in claim 3 wherein the actuating means for the power source is mounted on the frame and the means for limiting rotation of the primary plate comprises a slot in said frame plate and an arm fixed to the primary plate and extending therethrough, the arm operable to contact the switch when it approaches the second extremity.

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