May 1, 1962 J. F. G. BOWLBY 3,031,752

ELECTRIC CAN OPENER

Filed Aug. 29, 1961 3 Sheets-Sheet 1

Fig. 1

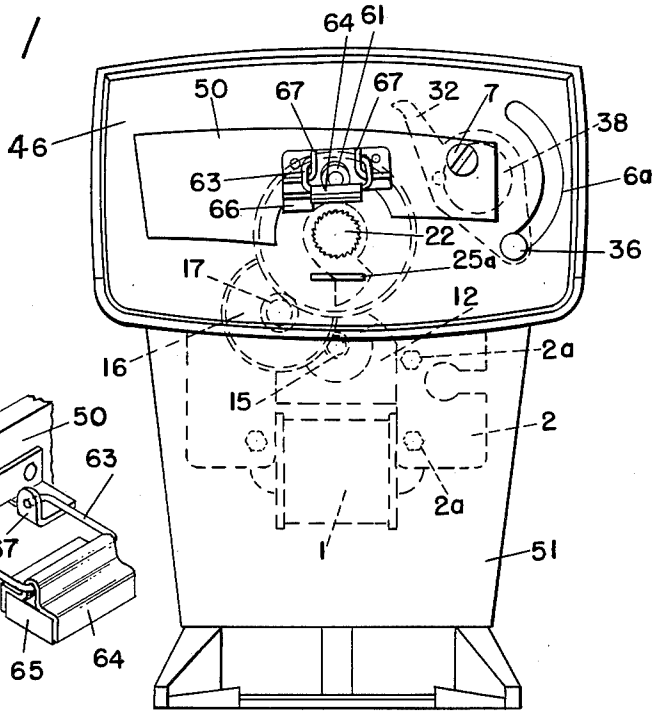


Fig. 1A

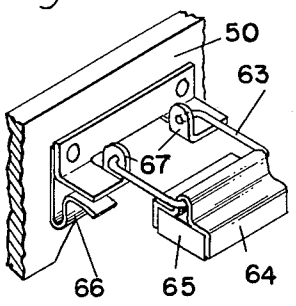
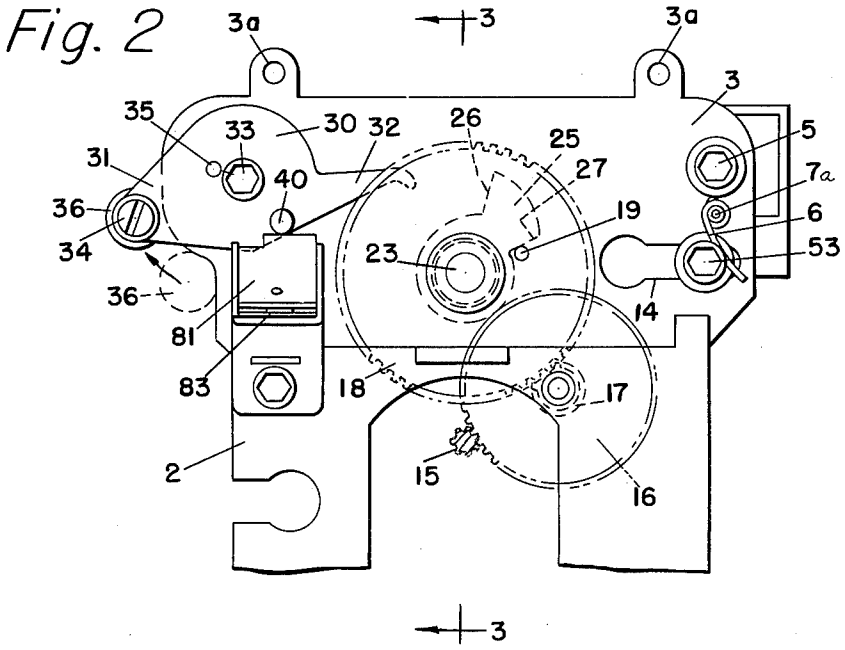


Fig. 2



May 1, 1962 J. F. G. BOWLBY 3,031,752

ELECTRIC CAN OPENER

Filed Aug. 29, 1961 3 Sheets-Sheet 2

Fig. 3

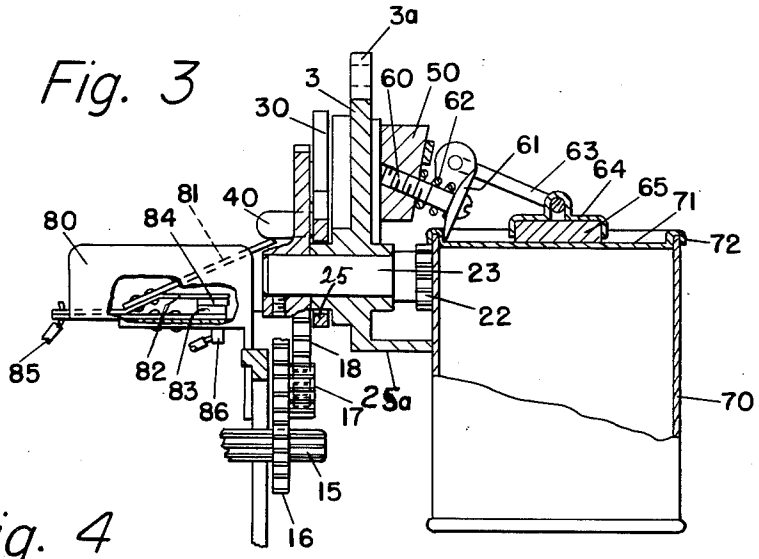


Fig. 4

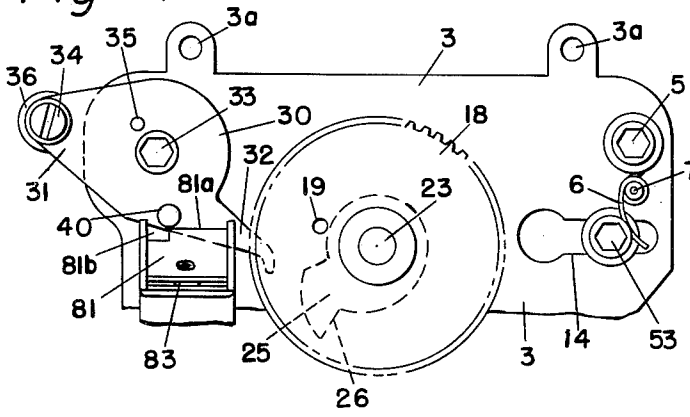


Fig. 5

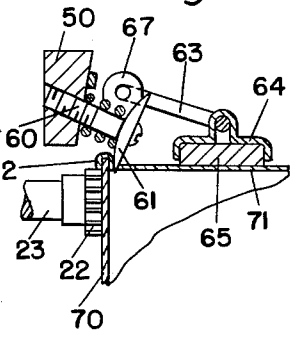


Fig. 6

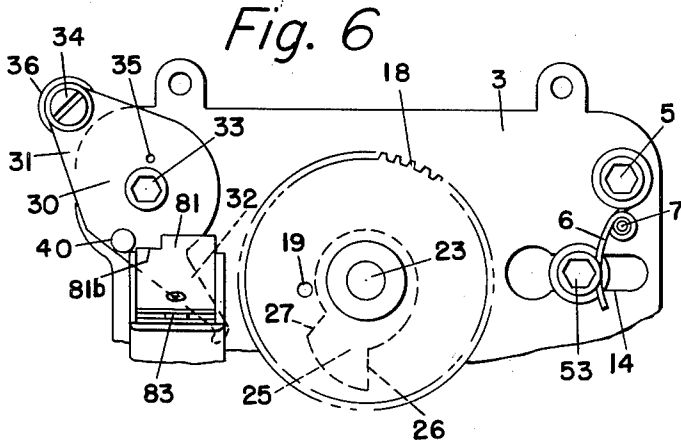
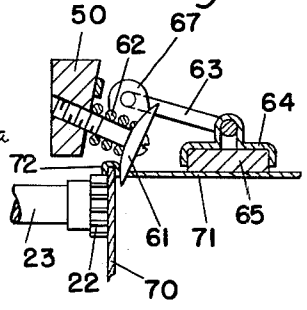


Fig. 7



May 1, 1962 J. F. G. BOWLBY 3,031,752

ELECTRIC CAN OPENER

Filed Aug. 29, 1961 3 Sheets-Sheet 3

Fig. 8

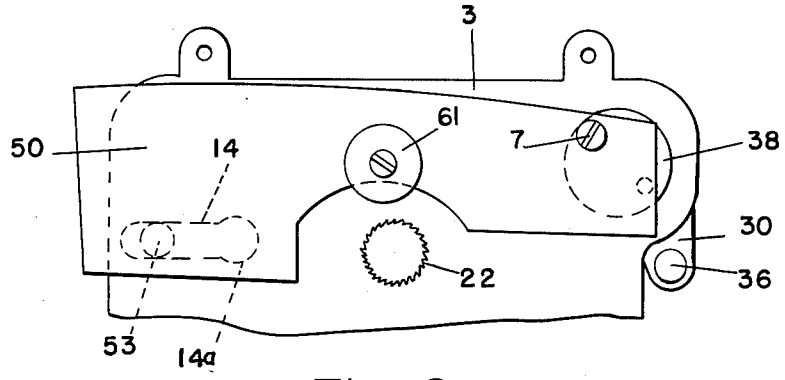


Fig. 9

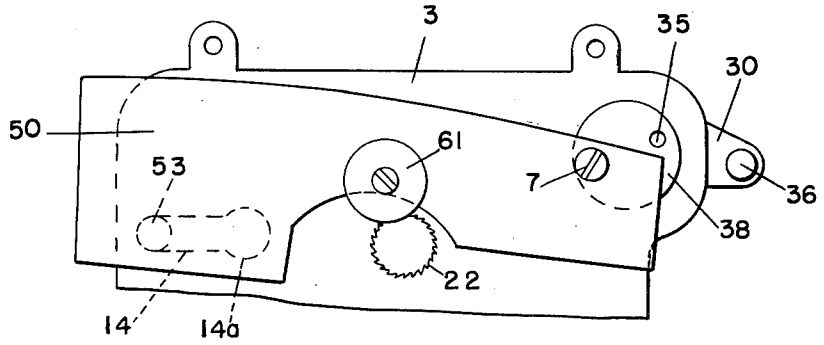
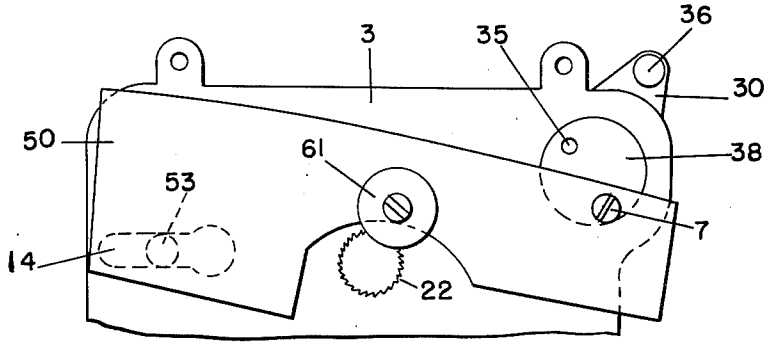


Fig. 10



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ELECTRIC CAN OPENER

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Filed Aug. 29, 1961, Ser. No. 134,696
6 Claims. (Cl. 30—4)

This invention relates to a can opener and more specifically to a can opener operated by an electric motor.

An important object of the invention is to provide an electric motor which is activated by a switch moved into circuit-closing position by a lever for rotating a can-engaging drive wheel and also to initially force the cutter into a position for penetrating the top of the can as the switch is closed.

A further object of the invention is to provide switch means that is automatically activated when the top of the can is fully cut so as to shut off the motor.

Another object of the invention is to provide a can opener which utilizes a relatively inexpensive two-pole shaded electric motor for developing sufficient torque to puncture the top of the can as well as to provide power to cut the top of the can.

Still another object of the invention is to provide a simple, efficient and reliable can opener which is relatively inexpensive to manufacture.

Other further objects and advantages of the invention will be apparent from the following description and accompanying drawings, wherein

FIGURE 1 is a front elevational view of the electric can opener,

FIGURE 1A is a fragmental perspective view of the mounting means for the magnet which holds the cut can top,

FIGURE 2 is a fragmental rear elevational view of the can opener shown in FIGURE 1 at the start of the can opening operation,

FIGURE 3 is a sectional view taken on lines 3—3 of FIGURE 2, showing the cutter at the start of the can opening operation,

FIGURE 4 is a fragmental rear elevational view of the can opener showing the electric switch elements in closed position,

FIGURE 5 is a fragmental sectional view showing the cutter in can-cutting position,

FIGURE 6 is a view similar to FIGURE 4 showing the switch elements in open position,

FIGURE 7 is a sectional view showing the cutter after the cover is completely cut,

FIGURE 8 is a fragmental elevational view of the pivoted faceplate (with the parts holding the magnet removed for clarity) showing the cutter at the starting position,

FIGURE 9 is a view similar to FIGURE 8 showing the cutter during its can-cutting position, and

FIGURE 10 is a view similar to FIGURE 8 showing the cutter in its final position after the cover has been completely cut.

Referring to FIGURE 1, the can opener comprises an electric motor, indicated generally by numeral 1, suitably mounted on a frame member 2 by bolts 2*a*. The electric motor used preferably is a conventional 2-pole shaded intermittent duty induction motor, for example 2 amps. operating on 110–120 volts, 60 cycles. The motor is adapted to drive can drive wheel 22 through a suitable gear train shown in FIGURES 1 to 3. The drive wheel cooperates with cutter 61 which is adapted to cut the top 71 of a metal can 70 as shown in successive stages in FIGURES 3, 5 and 7. The motor is controlled by a spring leaf switch supported on bracket 80 and having contacts 83 and 84 connected respectively to electric leads 85 and 86 which are connected to the motor 1 as shown

in FIGURE 3. Contact 84 is mounted on contact arm 82 carried by the spring biased dielectric switch activator lever 81 which normally keeps contacts 83 and 84 in spaced-apart position and when the free end of the activator 81 is depressed the contacts 83 and 84 are brought into abutment and electrical contact as shown in FIGURE 3.

Motor 1 is provided with a drive shaft which carries a toothed pinion 15 at its free end, as shown in FIGURES 2 and 3. Pinion 15 drives idler gear 16 suitably mounted on frame member 2. Gear 16 is provided with an integral pinion 17 which in turn meshes with a drive gear 18 suitably mounted on shaft 23 which is rotatably supported in upper frame member 3, as shown in FIGURE 3. Shaft 23 carries a toothed can-drive wheel 22 which is adapted to engage the outer surface of the chime 72 of the can 70 and to bring the top 71 of the can into cutting contact with cutter wheel 61. Drive wheel 22 serves to rotate the can 70 while the top 71 thereof is being cut.

Frame member 3 is provided at one end with an elongated slot 14 which is enlarged at 14*a* for slidably receiving bolt 53. Bolt 53 is unitary with faceplate 50 which is adapted to pivot on bolt 53 from the position shown in FIGURE 8 to intermediate position, shown in FIGURE 9, and to its lowermost position, shown in FIGURE 10. The bolt 53 is also adapted to slide horizontally within the slot 14, as shown in FIGURES 8 to 10. A spring is provided on frame 3 having one end retained by a bolt 5 on frame 3, its intermediate portion wound over pin 7*a*, and the other free end 6 urged against bolt 53 as shown in FIGURE 2 to urge the bolt 53 for movement within the slot 14. The other end of faceplate 50 is provided with an opening through which a thumbscrew 7 passes freely. Thumbscrew 7 is adapted to be retained in a threaded bore in a rotatable crank disc 38. Crank disc 38 is rotatably supported in frame member 3 as shown in FIGURES 8 to 10.

As shown in FIGURE 1A, faceplate 50 is provided with brackets 67 on which are hinged a pair of swingable bails 63. Bails 63 carry at their free ends a holder 64 which retains a magnet 65. Magnet 65 is adapted to contact the top 71 of can 70, as shown in FIGURE 5, and will retain the top after it is fully cut. A cocking spring member 66 is mounted beneath brackets 67, as shown in FIGURE 1A, which is adapted to contact the top edge of chime 72 when the can is rotated clockwise as the cover is cut so as to keep the can in alignment with the cutter 61. Extension member 25*a* (see FIGURES 1 and 3) integral with frame member 3 is adapted to abut the body of the can during the cutting operation and serves to align the can vertically.

A circular cutter blade 61 is freely mounted on rod 60 which is retained on face plate 50, as shown in FIGURE 3. The rod is positioned at an angle of about 15° from the vertical axis of faceplate 50. A coil spring 62 is positioned between the rear face of the cutter 61 and faceplate 50 so that the cutter is slightly and yieldably movable on rod 60 during the cutting operation to adjust to the chime contour of the can to be opened.

A switch-actuating element 30 is retained on the rear of crank disc 38 at the central axis thereof by bolt 33, as shown in FIGURES 2, 4 and 6. The switch-actuating element 30 and crank disc 38 are adapted to rotate together on their common central axis. Switch-actuating element 30 is provided with a strike extension 32, an actuating arm extension 31 and a switch-activating pin 40. Locking pin 35 extends through crank disc 38 and switch-actuating element 30 so as to lock them together and thereby ensure that both will rotate together when handle 36, attached to actuating arm 31 by bolt 34, is moved upwardly from its lowermost position, shown in

FIGURE 1, to its upward position shown in dotted lines in FIGURE 1. When handle 36 is moved upwardly from its lowermost position, shown in FIGURE 1, it will rotate switch-actuating element 30 counterclockwise on its axis and thereby bring pin 40 into contact with switch activator element 81, as shown in FIGURE 2, which will start the motor 1 and thus start rotation of the gear train previously described.

A striker plate 25 is carried on shaft 23 on which it is freely rotatable and is positioned adjacent the forward face of drive gear 18, as shown in FIGURES 2 and 3. Striker plate 25 is provided with extension sides 26 and 27. A pin 19 is fixed on one face of gear 18 facing striker plate 25. When gear 18 is rotated counterclockwise (as viewed in FIGURE 2), pin 19 will engage the side 27 of striker plate 25, and will thus rotate the striker plate on its supporting shaft 23 to the successive positions shown in FIGURES 4 and 6. When this movement occurs the side 26 of striker plate 25 will strike extension arm 32 of switch-actuating element 30, thereby rotating switch-actuating element 30 from the position shown in FIGURE 2 to the successive positions shown in FIGURES 4 and 6. The spring 6, biasing the plate 3, will then carry the rotation of switch-actuating element 30 to the position shown in FIGURE 6. As previously described, when handle 36 is moved upwardly from its starting position, shown in FIGURE 1, switch-actuating element 30 is rotated and pin 40, carried by the element 30, is brought into contact with the free edge 81*a* of spring activated dielectric switch activator lever 81, thereby depressing it so as to bring switch contact points 83 and 84 into electrical contact as shown in FIGURE 2. During the travel the contacts 83 and 84 are in abutment so that the motor continues to operate. When pin 40 travels past the cut out portion 81*b* of activator 81, as shown in FIGURE 6, the pin 40 releases its downward pressure on the free edge of activator 81, causing the activator to spring back to its normal position, whereupon the contacts 83 and 84 are brought out of electrical contact, thus causing the motor to be automatically stopped.

Another important feature of this invention resides in the coaction of the switch-actuating element and faceplate for applying an initial cutting torque on the cutter 61 for puncturing the top 71 of the can 70 at the start of the cutting operation. When handle 36 is moved upwardly from its starting position, shown in FIGURE 1, extension arm 32 will be struck by striker plate 25, as previously described, thereby causing switch-actuating element 30 to rotate on its axis. Since switch-actuating element 30 is fixedly connected to crank disc 38 by pin 35, as previously described, crank disc 38 will also rotate on the same axis. When this occurs faceplate 50 will then pivot downwardly from its position shown in FIGURE 8 to the position shown in FIGURE 9 with considerable force which will force the cutter 61 to puncture the top 71 of the can 70, as shown in FIGURE 5. When this occurs, the load on the motor is reduced and the motor continues to supply sufficient power to rotate drive wheel 22 against the cutter 61 so as to completely cut the top 71 of the can 70 adjacent the chime. When the cover 71 is completely cut it tends to drop within the can but is held by the magnet 65. At the same time due to the yielding action of spring end 6, faceplate 50 is forced to the right, and being connected by thumbscrew 7 to rotatable disc 38, will rotate to the lowermost position shown in FIGURE 10, at which position pin 40 on switch-actuating element 30 will pass beyond the cut-out portion 81*b* of switch activator 81, as shown in FIGURE 6. As previously described, when this occurs the motor is automatically stopped.

The entire frame and gear assembly previously described is adapted to be mounted and retained in a suitable casing 51 made of plastic material and the like. The frame member is retained in the casing by bolts passing through openings 3*a* provided in frame member 3 as shown in FIGURE 2. The casing 51 is provided with legs so that it can be supported on a table or it may be suspended by suitable means at its rear on a wall.

To operate the can opener, the motor lead is plugged into a 110–120 volt A.C. outlet. The handle 36 is positioned in its lowermost down position within the guide slot 6*a* provided in plate 46, as shown in FIGURE 1. An unopened metal can 70 is manually positioned so that the cutter 61 is located on the inside of the chime 72, as shown in FIGURE 5, so that the lip of the can is under the edge of the cutter. At the same time the body of the can abuts the drive wheel 22 and the magnet 65 rests on the top 71 of the can. Handle 36 is then moved upwardly about half way in the slot 6*a* at which point pin 40 will contact the switch activator 81 and thus start the motor which will drive gear 18 in clockwise direction. Pin 19 on gear 18 will then contact the striker plate 25 and also cause it to rotate in a clockwise direction until it strikes the extension arm 32 of switch-actuating element 30. Faceplate 50 will then be pivoted downwardly with sufficient force to cause cutter 61 to puncture the top 71 of the can as shown in FIGURE 7. The motor will continue to rotate drive wheel 22 which in turn will rotate the can against the cutter 61 until the cover 71 has been completely cut. While the can is being rotated the upper edge of the chime 72 will be in contact with guide spring 66, shown in FIGURE 1A, so as to maintain the can in its cutting position. The cut cover 71 will then drop slightly within the can and when this occurs the switch will be opened to stop the motor as explained previously. It is not necessary to hold the can during the opening operation. In order to remove the opened can, handle 36 is then swung downwardly to its original starting position and the can is removed while the cut cover 71 is retained by the magnet.

The exposed working parts of the can opener can be readily disassembled for cleaning by simply removing thumbscrew 7. Faceplate 50 can then be removed by releasing bolt 53 from slot 4. The cutter 61 and drive wheel 22 can then be easily cleaned. The faceplate 50 is then replaced and retained in place by replacing thumbscrew 7.

It will be readily seen that the construction of the present invention is simple and has a minimum number of parts which will not require replacement or repair over long periods of time and constant use. The parts are simple in construction, easy to assemble and relatively inexpensive to make.

It will be apparent that changes and modifications may be made in the various details and elements previously described and that equivalent elements may be used to perform their functions in the combination of elements previously described which are intended to be included within the scope of the appended claims.

I claim:

1. An electric motor-operated can opener comprising a supporting frame member, a drive wheel carried by said frame member for engaging and rotating a can having closure ends, a movable plate pivoted at one end thereof on said frame member, a cutter wheel carried by said pivoted plate, a switch-actuating element operatively connected to the other end of said plate, an electric motor carried on said frame member for rotating said drive wheel, switch means to control said electric motor, means on said switch-actuating element to control said motor, striker means to contact said switch-actuating element and transmit momentary leverage to said plate, whereby said pivoted plate is moved and the cutter wheel punctures the cover of said can and continues to completely cut the cover from the can while the can is rotated by said drive wheel.

2. An electric motor-operated can opener as defined in claim 1, wherein the pivoted end of said movable plate is supported in an elongated slot in the supporting frame and is guided for movement therein, the opposed end of

said movable plate being connected to a rotary crank disc carried on the supporting frame member.

3. An electric motor-operated can opener as defined in claim 2, wherein the crank disc is connected to the switch-actuating element, a pin carried by said switch-actuating element for controlling the electric motor.

4. An electric motor-operated can opener as defined in claim 3, wherein the electric motor is controlled by switch means comprising a spring actuated lever adapted to make and break electric contact of points in the motor circuit, said lever having a free edge adapted to be mechanically contacted and depressed and having a cut-out portion at one end, whereby said pin carried by the switch-actuating element is adapted to ride and contact the said free edge of said lever for actuating said motor and to release contact therewith at said cut-out portion to cut off said motor.

5. An electric motor-operated can opener comprising a supporting frame, an electric motor carried on said frame, switch means for controlling said motor, a drive wheel carried on a shaft supported by said frame for engaging and rotating a can having closure ends, a drive gear on said shaft, a train of speed reduction gears mounted on said frame operatively geared to said motor and drive gear, a movable plate pivoted at one end thereof on said frame member, a cutter wheel carried by said plate, a crank disc rotatably supported in said frame, the other end of said movable plate being connected to said

crank disc, a switch-actuating element connected to said crank disc, a striker rotatably carried on said drive wheel shaft, a pin on said drive gear, said pin being adapted to contact and rotate said striker, said striker upon rotation being adapted to strike said switch-actuating element and rotate same together with the crank disc, whereupon said movable plate is moved to bring the cutter wheel into operative cutting position to puncture and cut the can cover while the can is rotated against said cutter, a pin extending from said switch-actuating element, said pin being adapted to actuate the switch means for positioning same in off and on motor drive positions.

6. An electric motor-operated can opener as defined in claim 5, wherein the electric motor is controlled by switch means comprising a spring actuated lever adapted to make and break electric contact of points in the motor circuit, said lever having a free edge adapted to be mechanically contacted and depressed and having a cut-out portion at one end, whereby said pin carried by the switch-actuating element is adapted to ride and contact the said free edge of said lever for actuating said motor and to release contact therewith at said cut-out portion to cut off said motor.

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