July 24, 1956 O. H. HANBY 2,755,547

CAN OPENER

Filed April 21, 1955 2 Sheets-Sheet 1

Fig. 2.

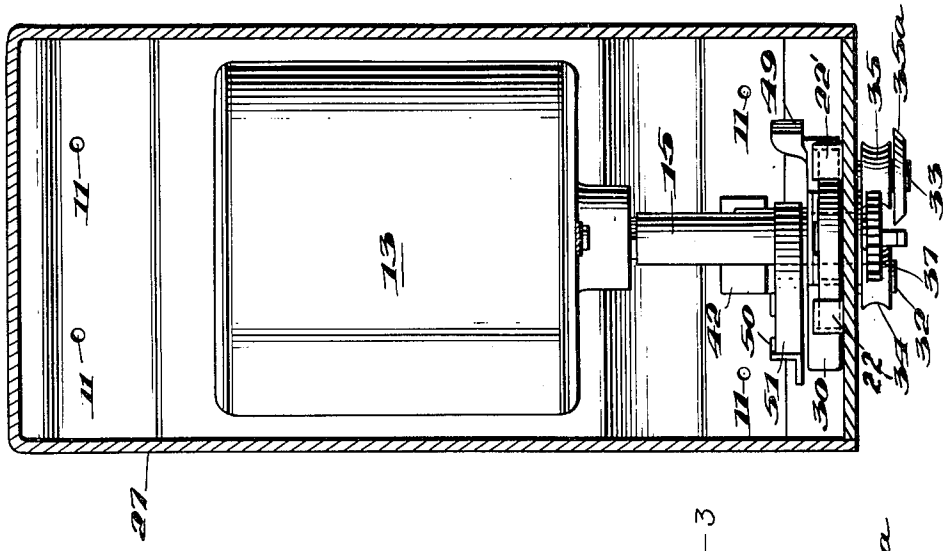


Fig. 1.

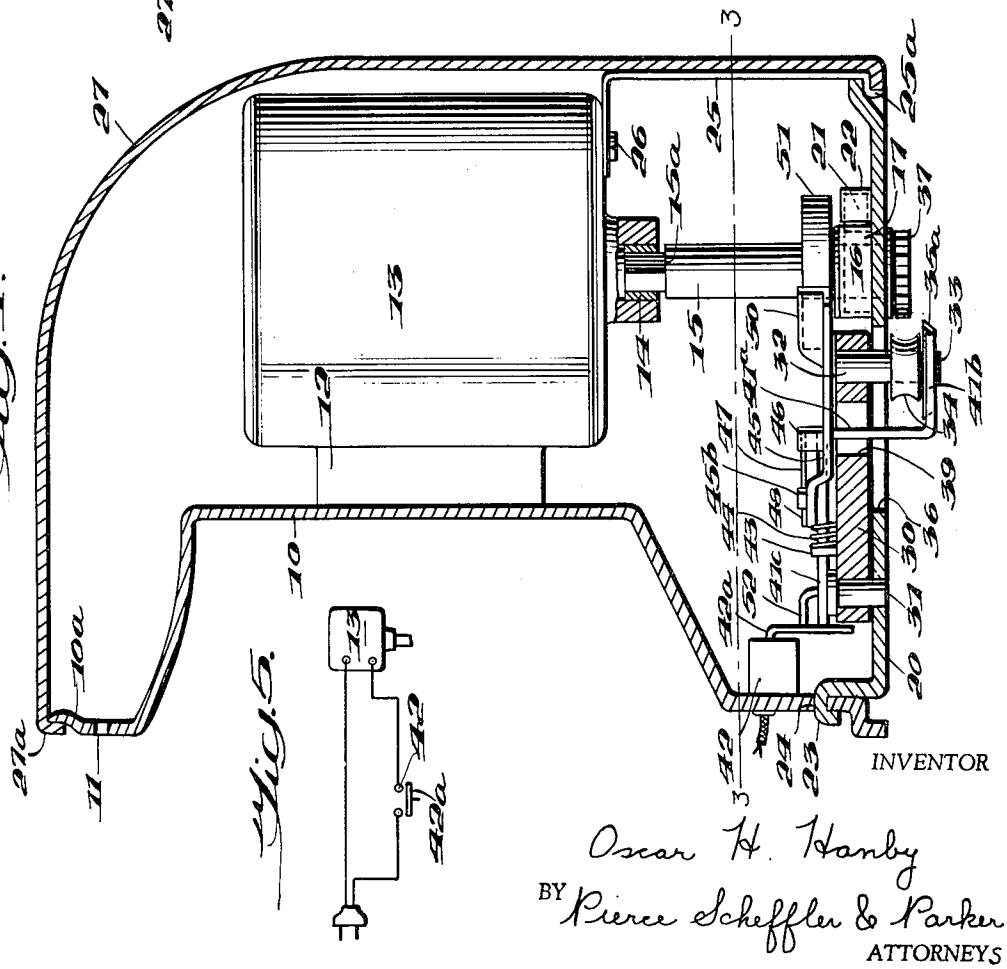


Fig. 3.



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July 24, 1956 O. H. HANBY 2,755,547

CAN OPENER

Filed April 21, 1955 2 Sheets-Sheet 2

Fig. 4.

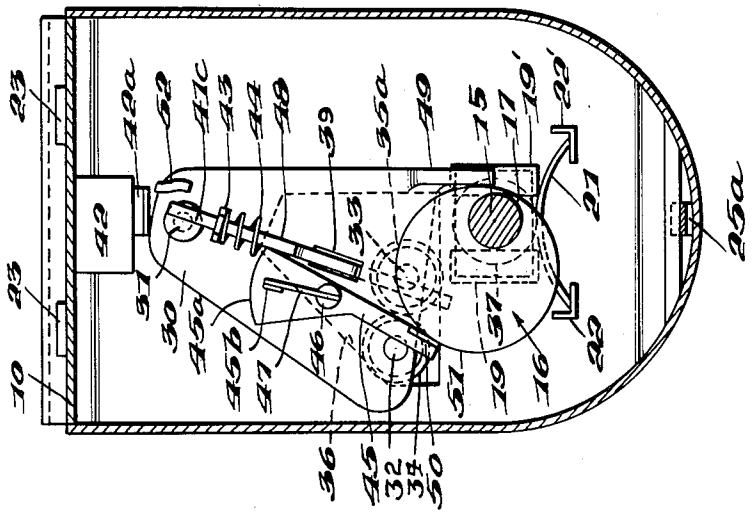
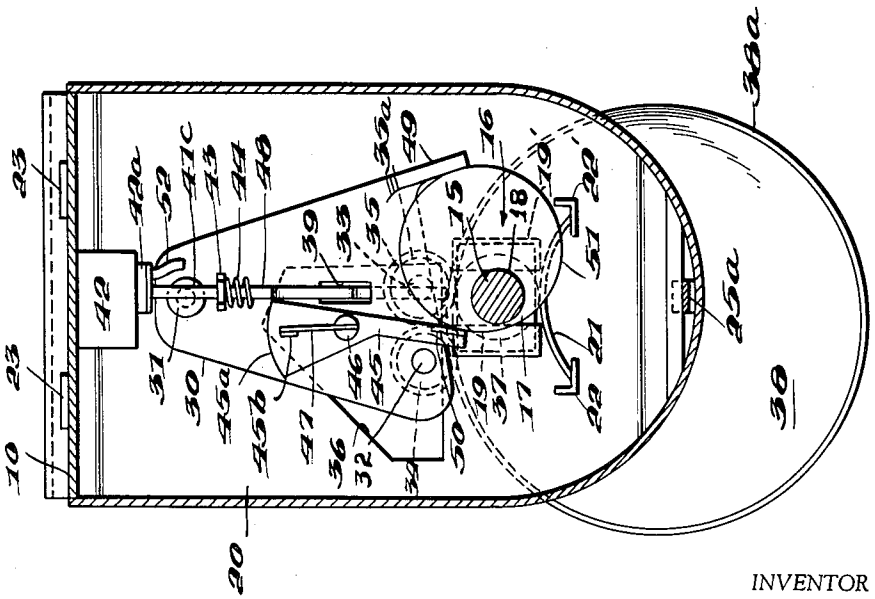


Fig. 5.



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United States Patent Office

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2,755,547

# CAN OPENER

Oscar H. Hanby, Grandview, Wash.

Application April 21, 1955, Serial No. 502,924

5 Claims. (Cl. 30—4)

This invention relates to can openers and in particular to those of the type adapted to be driven by an electric motor or other source of power.

In my prior United States Patent No. 2,603,857 issued July 22, 1952, a construction is described wherein the cutting cycle is initiated when the can is introduced to the opener. Pressure by the can upon a switch lever functions to start the motor driving the can top removing mechanism and the action is then entirely automatic until the can top has been removed after which the can is released, the motor stops and the mechanism is then readied for a second cycle of operation, also all automatically. In the construction shown in my prior patent, two electric switches are required for controlling operation of the motor. One of these switches is actuated by pressure from the can so as to initiate the cutting cycle and the other switch is actuated by a movable carriage component of the mechanism, the other switch closing a holding circuit to the motor which keeps the motor running for a predetermined time after the can top has been cut off and the can removed in order that the mechanism will be certain to regain its starting position.

The object of the present invention is to provide an improved construction wherein the need for a second switch is eliminated. In particular, this objective is attained by a second actuator for the switch lever that is energized by pressure from the can body, the second actuator being mounted on the carriage element and functioning to maintain pressure upon the switch lever to keep the contacts of the latter closed so long as the carriage remains in the position it occupies when a can top is being cut off.

Another object of the invention is to provide a can opener construction wherein those parts likely to become dirty and clogged with food are easily separated from the remainder of the can opener mechanism for cleaning.

The foregoing as well as other objects and advantages inherent in the invention will become more apparent from the following detailed description of an exemplary construction when considered with the related drawings.

In these drawings Fig. 1 is a vertical side view partly in section and partly in elevation;

Fig. 2 is a vertical front view partly in section and partly in elevation;

Fig. 3 is a horizontal section taken on line 3—3 of Fig. 1 showing the mechanism in the position of cutting off the top of a can;

Fig. 4 is a view similar to Fig. 3 showing the mechanism restored to its starting position after the cutting operation has been completed, and

Fig. 5 is a schematic wiring diagram of the drive motor and the single control switch.

With reference now to the drawings, the can opener includes a back support plate 10 having spaced apertures 11 at the top and bottom portions thereof to receive screws by which to mount the plate in a suitable location upon a wall. Fixed to the support plate 10 is a bracket 12 to which a motor 13 is secured, the motor shaft facing vertically downward and terminating in a non-cylindrical



socket 14 adapted to receive the upper, similarly contoured end 15*a* of a drive shaft 15. The lower end of shaft 15 is journalled for rotation in a sleeve bearing assembly 16 comprising a rectangular bearing block 17 having a central opening 18 therethrough which serves as the bearing for the shaft 15 which passes through this opening 18, the block 17 being mounted for limited transverse movement in guides 19, 19' which engage the sides of the block. The guides 19, 19' are mounted on a horizontal base plate 20, and a convex leaf spring 21 the ends of which are anchored in spaced abutments 22, 22' also on base plate 20 bears at its central convex portion against the bearing block 17 urging the latter in the direction towards the rear support plate 10 for a purpose which will become clearer as the description progresses.

Projecting upwardly from the rear edge of base plate 20 are a pair of spaced hook like portions 23 which are adapted to engage correspondingly spaced slots 24 at the lower end of support plate 10 thus holding the rear of the plate 20 in position. The front portion of plate 20 is held in position by means of a downwardly projecting spring tongue 25 which is secured at its upper end by screw 26 to the underside of the motor 13, the lower end of the tongue 25 terminating in a latch portion 25*a* which engages the underside of the front central portion of base plate 20. A cover member 27 may be provided, as shown, to enclose the motor 13 and the back plate 10 as well as the components carried by the base plate, the cover being provided at the top with a downwardly turned flange portion 27*a* which engages behind an offset portion 10*a* extending across the top of the back plate 10. This arrangement permits the base plate 20 and the component parts carried thereby to be easily removed from the back support plate 10 for cleaning, it being necessary only to first remove the cover member 27 then pull outwardly upon the lower end of tongue 25 thus releasing the latch portion 25*a* from the underside of the bast plate 20 and then remove the hook portions 23 of the latter from the slots 24 in the back plate 10. Base plate 20 together with the component parts mounted thereon is then completely freed and can be removed for cleaning, the drive shaft 15 being disconnected, of course, from the socket 14 merely by downward movement of the base plate 20.

A carriage 30 in the form of a plate is mounted pivotally at the upper side base plate 20 by means of a pivot pin 31, near the rear end of the carriage, the carriage being movable in a plane parallel with the base plate 20. Close to the front end of the carriage 30 and depending below the same on stub shafts 32 and 33 are mounted a guide roller 34 and a cutter element 35, respectively, the cutter element being formed as a rotary disc and having a peripheral knife edge portion 35*a*. It will be noted from Figs. 1 and 3 that the base plate 20 is provided with a sector like cut-out portion 36 to accommodate the stub shafts 32, 33. The cutter 35 and guide roller cooperate with a knurled feed roller 37 adapted to engage the inner side of the bead 38*a* at the top of the can 38. See Fig. 3.

The carriage plate 30 is also provided with a central elongated slot 39 through which is passed and guided the offset portion 41*a* of a rod 41 which functions to close switch contacts to start the motor 13 and initiate a cutting cycle when the can 38 is put into position to have the top cut off. It will be seen that the forward end 41*b* of rod 41 below plate 20 is adapted to be contacted and pressed backward by the side wall of the can 38 to the position shown in Fig. 1 and that the rear end 41*c* of this rod above plate 30, when in such position, presses upon the actuating member or lever 42*a* of a switch 42 that is mounted upon the inner face of back plate 10 near the lower end thereof, thus effecting closure of the switch contacts (see circuit diagram in Fig. 5) and energization of motor 13. It will also be noted from Fig. 1 that the

rear end portion 41c of rod 41 passes through a combined guide and abutment 43 at the upper side of carriage plate 30 and that a helical spring 44 surrounds the rod portion 41c at the side of abutment 43 opposite the switch 42. One end of spring 44 bears against the abutment 43 and the other end of the spring is anchored to the rod portion 41c, the arrangement thus being that rod 41 is loaded or biased by the spring 44 in the direction away from switch 42. That is, the switch contacts are not closed unless pressure is applied to the front end of rod 41 by the side of a can 38.

As seen most clearly in Figs. 2 and 3, the carriage plate 30 also includes a trip lever 45 mounted pivotally intermediate its ends at the upper side of plate 30 on a stationary pivot pin 46 upstanding from plate 30. The rear portion of lever 45 includes an arcuate rear edge 45a and an abutment 45b at the upper side thereof against which bears the free end of a cantilever leaf spring 47. The opposite end of spring leaf 47 is anchored to the stationary pivot pin 46 and the effect of the spring action is to bias trip lever 45, as seen in Fig. 3, in a counterclockwise direction. So long as pressure is maintained against the rod 41 by the side of can 38 the rear arcuate edge 45a of the trip lever can pass by and in front of an abutment 48 on rod 41. However, when the can body is removed and rod 41 moves forward to the position shown in Fig. 4, the abutment 48 likewise moves forward and will be engaged by the rear portion of trip lever 45 thus acting as a stop for the latter. This arrangement is necessary to reset the mechanism to its starting position as will become clearer as the description proceeds.

The carriage plate 30 at the front end thereof includes an abutment 49. This abutment as well as an abutment 50 at the front end of trip lever 45 lie in the path of a cam 51 which is secured upon the drive shaft 15. When the mechanism is in the starting position as shown in Fig. 4 and a can is introduced thus pressing in upon the rod 41 to energize motor 13, drive shaft 15 and cam 51 will be caused to rotate in a clockwise direction. Since the periphery of cam 51 engages the abutment 49 on carriage 30, continued rotation of the cam will cause the carriage 30 and hence also guide roller 34 and cutter roller 35 thereon to move to the position shown in Fig. 3 wherein the can bead 38a is gripped between guide roller 34 and the knurled edge of feed roller 37, and the knife edge 35a of cutter disc 35 penetrates the side wall of the can to start the cut. As the feed roller 37 continues to rotate the can the top portion of the can will be cut off just below the bead 38a. When this has taken place, the can and its contents can then be removed from the mechanism.

During removal of the can top, abutment 50 on trip lever 45 remains in contact with and hence follows the periphery of cam 51, and trip lever 45 is able to turn clockwise about its pivot pin 46 against the counter force exerted by its biasing leaf spring 47 and without interference since the rear arcuate edge 45a of the trip lever will clear the abutment 43 on rod 41. When, however, the can has been removed and there is no longer any inward pressure therefrom against rod 41, the latter will move forward past the rear corner of trip lever 45 to the position shown in Fig. 4. In this position, abutment 43 limits rotation of trip lever 45 in a clockwise direction to the position indicated. Consequently, the trip lever 45 is, in effect, locked with carriage plate 30 since there can be no further relative movement therebetween, and continued rotation of the cam 51 will thus cause the carriage 30 to move about its pivot pin 31 back to the starting position shown in Fig. 4, and release the top of the can that has been cut off.

It will be remembered that one of the features of the present construction over applicant's prior patent No. 2,603,857 is that only one switch is required. This is made possible by the fact that the carriage 30 at the rear, pivotally mounted and thereof includes a member 52 adapted to also cooperate with the switch lever 42a of switch 42 in such manner that when the carriage 30 occupies the position shown in Fig. 3, member 52 presses against switch lever 42a and will hold the contacts of switch 42 closed regardless of the position of rod 41. Thus when rod 41 moves forward from the Fig. 3 position to the Fig. 4 position after the can top has been cut off and the can removed, the switch contacts will remain closed and motor 13 will continue to run until the carriage 30 has been shifted back to its starting position as shown in Fig. 4 and member 52 releases its pressure upon switch lever 42 thus opening the switch contacts and stopping the motor 13.

The construction according to the present invention enjoys all of the advantages of my prior patented construction in that it is entirely automatic in operation, and need never be touched by human hands either to start or to stop the same. Moreover, only one hand is required in use, this being the hand in which the can is held thus leaving the other hand free to hold a saucepan or other culinary vessel ready for transferring the contents of the can after opening. The present construction also has an advantage in addtion to the elimination of one of the switches, in that the bottom plate member on which is supported the carriage, guide roller, cutter roller and feed roller can be easily removed from the remainder of the device for purposes of cleaning.

Still another advantage lies in the lateral adjustability of the bearing block 17 for the drive shaft 15, it being noted that the leaf spring 21 urges the block 17 and hence also drive shaft 15 and the knurled feed roller 37 yieldingly in the direction of the guide roller 34. Consequently, the gripping components (feed roller 37 and guide roller 34) are self-adjusting to take care of cans having different bead thicknesses.

In conclusion, it will be understood that the particular construction illustrated can be departed from in various minor particulars without, however, departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In a motor driven can opener, the combination comprising an upright back support plate, a motor mounted upon said back plate for rotation in one direction only, a horizontal base plate detachably connected to said back plate, a drive shaft rotatably mounted upright on said base plate, said drive shaft including means at the upper end thereof for detachable connection with the motor shaft and a feed roller and cam secured thereon, a carriage pivotally mounted upon said base plate, said carriage including thereon a cutter member, a guide member cooperative with said feed roller and an abutment engaged by said cam upon initial rotation thereof for effecting a turning movement of said carriage about its pivot mounting to thereby cause the can bead to be gripped between said guide member and feed roller and the can side wall to be punctured by said cutter member, and a tripping device mounted upon said carriage and effective upon completion of the can cutting operation for returning said carriage to its initial position, said tripping device being engageable with and actuatable by said cam upon continued rotation of the latter in said given direction.

2. In a motor driven can opener, the combination comprising a fixed support, a drive shaft rotatably mounted on said support and coupled to said motor for rotation in one direction only, a cam and feed roller carried by and rotatable with said shaft, a carriage pivotally mounted upon said support, said carriage including thereon a cutter member, a guide member cooperative with said feed roller and an abutment engaged by said cam upon initial rotation thereof for effecting a turning movement of said carriage about its pivot mounting to thereby cause the can bead to be gripped between said guide member and feed roller and the can side wall to be punctured, a tripping device effective upon completion

of the cutting operation for returning said carriage to its initial position, said tripping device being engageable with and actuatable by said cam upon continued rotation of the latter in said given direction, an electrical switch mounted upon said support, the contacts of said switch being connected in and controlling an electrical circuit between a source of electrical power and said motor, dual means for applying pressure to said switch contacts for closing the same to thus energize said motor, said contacts remaining closed only so long as the pressure thereon is maintained, one of said pressure applying means being constituted by means actuated by the can wall when a can is introduced for opening and the other of said pressure applying means being disposed on said carriage and operable to maintain pressure on said switch contacts only when said carriage occupies its can cutting position.

3. In a motor driven can opener, the combination comprising an upright supporting back plate, a motor mounted upon said back plate for rotation in one direction only, a horizontal base plate connected to said back plate, said plate having a central cut-out portion, a drive shaft rotatably mounted upright on said base plate, said drive shaft including means at the upper end for connection with said motor and a feed roller and cam secured thereon, a carriage mounted pivotally upon the upper side of said base plate, said carriage having stub shafts depending therefrom and extending through the cut-out portion in said base plate, a guide member rotatably mounted on one of said stub shafts for cooperation with said feed roller, a cutter member rotatably mounted on another of said stub shafts and an abutment engaged by said cam upon initial rotation thereof for effecting a turning movement of said carriage about its pivot mounting in the direction to cause the can bead to be gripped between said guide member and feed roller and the can side wall to be punctured by said cutter member, a



trip lever pivotally mounted upon said carriage, said trip lever being engaged at one end thereof continuously with the periphery of said can so as to follow the same, an electrical switch mounted upon said back plate, the contacts of said switch being connected in and controlling an electrical circuit between a source of electrical power and said motor, a rod member mounted on said carriage for movement longitudinally of itself, the front end of said rod member being adapted to be pressed upon by the can body when introduced for opening and the rear end of said rod being adapted to close said switch contacts in response to the pressure applied to said rod from the can, means carried by said carriage and operable only when said carriage occupies the can cutting position for maintaining said switch contacts closed, said rod including an abutment thereon movable with said rod upon release of the pressure from the can into a position engaging the opposite end of said trip lever and limiting pivotal movement of said trip lever on said carriage whereby continued rotation of said cam will cause said carriage to be shifted to its initial position.

4. A motor driven can opener as defined in claim 3 wherein said base plate is made detachable from said back plate, and the upper end of said drive shaft is detachably connected to said motor whereby said base plate, carriage and the members carried thereby including said guide member, said cutter member, said drive shaft and cam and feed rollers may be removed for cleaning.

5. A motor driven can opener as defined in claim 3 wherein said drive shaft is mounted rotatably on said base plate in a laterally adjustable bearing sleeve, and spring means urging said bearing sleeve and hence also said drive shaft and feed roller in the direction of said guide member.

No references cited.