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POWER PIERCE ARRANGEMENT FOR POWER OPERATED CAN OPENER

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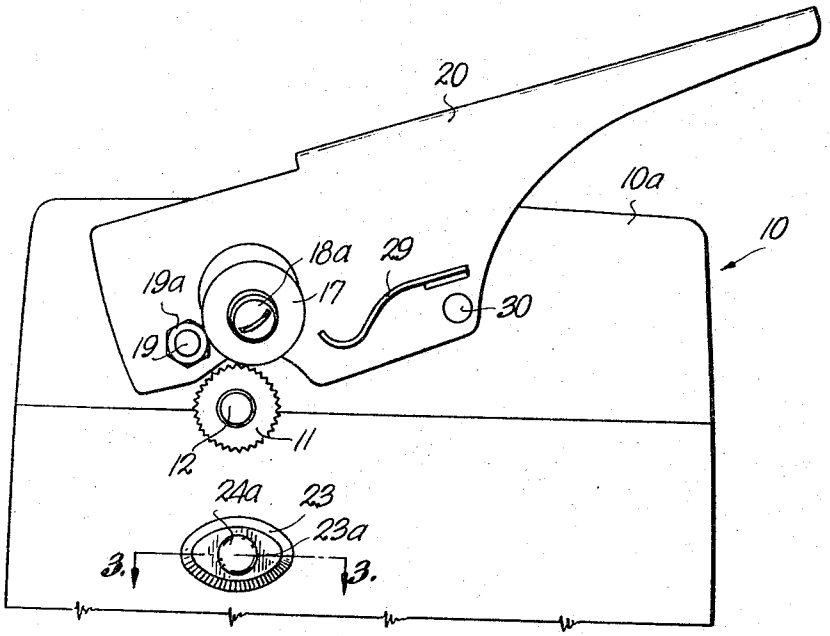


Fig. 1.

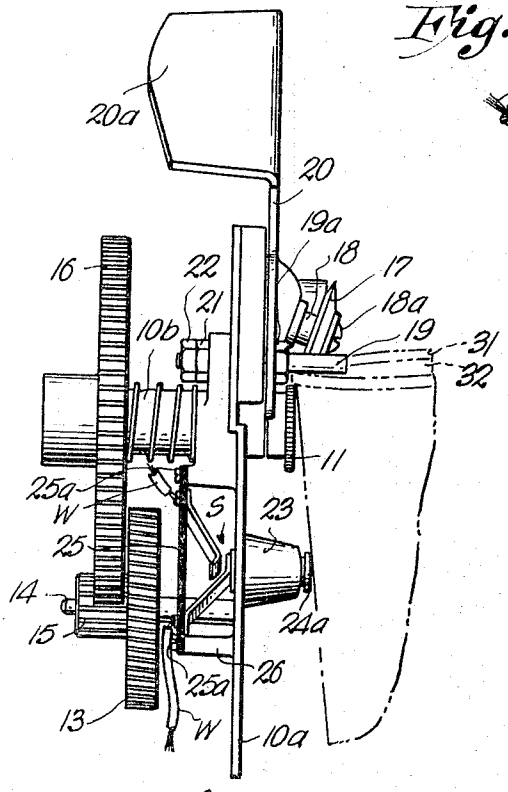


Fig. 2.

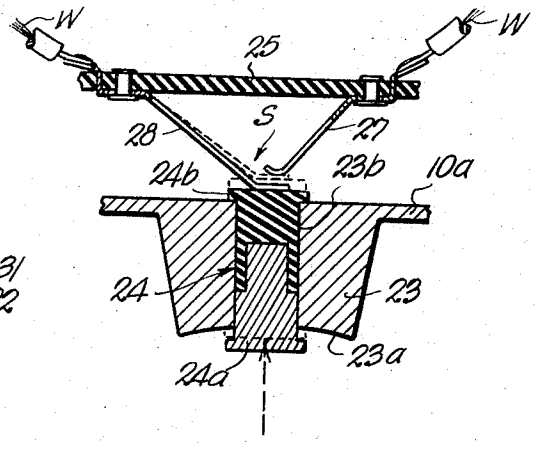


Fig. 3.

INVENTOR.
Robert J. Scott

BY

Seofield, Kokjer, Seofield & Lowe
ATTORNEYS.

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# POWER PIERCE ARRANGEMENT FOR POWER OPERATED CAN OPENER

Robert J. Scott, Lake Tapawingo, Mo., assignor to Rival Manufacturing Company, a corporation of Missouri

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9 Claims. (Cl. 30—4)

This invention relates to power operated can openers and deals more particularly with a novel means for initiating turning of the can prior to piercing the end of the can by the cutting element.

One "power pierce" approach to reducing the reactive thrust forces required for the penetration of the end of a can by a cutting element mounted on a hand lever is disclosed in the McLean application Ser. No. 386,948, filed Aug. 3, 1964. My invention is directed to a novel and improved means for initiating turning of the can during the time that piercing pressure is applied on the end of the can by the hand lever mounted cutting element.

One of the principal objects of the invention is to provide a power operated can opener of the character described which includes a simple, rugged, economical and extremely efficient mechanism for energization the drive motor and thusly initiating the corresponding of the can as the cutting element is brought into pressure contact with the end of a can and before the end is actually pierced by the cutting element.

Another object of the invention is to provide a "power pierce" arrangement which utilizes the can, pivoted about the feed wheel, to depress a plunger and thereby initiating the electric motor drive action. The use of the can itself in direct mechanical linkage with the plunger enables the manufacturer to easily preset the amount of force that need be exerted on the hand lever by the operator prior to energization of the motor circuit.

Other and further objects of the invention, together with the features of novelty appurtenant thereto, will appear in the course of the following description.

In the accompanying drawing, which forms a part of the specification and is to be read in conjunction therewith, and in which like reference numerals indicate like parts in the various views;

FIG. 1 is a fragmentary front elevational view of the upper portion of the power operated can opener embodying the inventive subject matter, the operating parts shown in the position to receive a can between the feed wheel and the cutting element;

FIG. 2 is a fragmentary side elevational view of the can opener unit absent a protective casing and with the can engaged between the feed wheel and the cutting element and its side bearing against the plunger, said can being shown in broken lines and partially broken away; and

FIG. 3 is an enlarged fragmentary sectional view taken along the line 3—3 of FIG. 1 in the direction of the arrows.

Referring now to the drawing, reference numeral **10** generally designates a body or frame of a typical power operated can opener. This frame can be die cast as a unit or fabricated in any desired manner. Generally speaking, the principal part of the frame comprises the vertical or upright plate **10***a*. In commercial practice, this frame cooperates with an open front box-like casing (not shown), the frame usually forming the front wall and providing the support for the parts of the can opener. The case or housing may be of any suitable design or contour and inasmuch as it forms no part of the present invention and is not considered necessary to the understanding thereof, it is not shown.

The serrated or toothed rotary can feed wheel for the can opener is indicated at **11**. This is located on the front side of plate **10***a* and is secured to a feed wheel



drive shaft **12** which extends through and is rotatably supported in an appropriate bearing sleeve **10***b* formed as an integral part of plate **10***a*.

Referring particularly to FIG. 2, the motive power for the can feed wheel is supplied by a conventional electric motor (not shown) which is mounted in a similar fashion to that disclosed in the above mentioned McLean application. The armature shaft of the motor is drivingly connected to the feed wheel shaft **12** by means of a gear train involving a helical gear **13** directly connected to a driving gear (not shown) on the motor shaft. Gear **13** is carried on shaft **14** which is secured to and projects from plate **10***a*. Gear **13** has a reduction gear **15** mounted on its face and rotatable about shaft **14**. Gear **15** is drivingly connected to the final driven gear **16** which is in turn secured to the feed wheel drive shaft **12**. Thus, whenever the motor circuit is energized and the armature of the motor is rotating, the feed wheel **11** will simultaneously rotate but at a much reduced rate of speed. The motor is controlled by a switch S, the details of which will be later described. The switch is in series in the motor circuit (not shown), being connected with the source of power and with the motor by conventional wiring W.

Referring now to the front side of the can opener, and more particularly to FIG. 1, reference numeral **20** indicates a pivotal hand lever which serves to provide a movable support for the can cutting element. The cutter element is in the form of a cutter wheel **17**, which is mounted for free rotation on the usual stud **18** anchored in the lever **20** and held by screw **18***a*.

Secured to the front side of lever **20** is an elongate pin member assembly **19**, best seen in FIG. 2, and which includes a forwardly or outwardly projecting cylindrical portion. The forwardly projecting portion acts as a can guide and facilitates the locating of the rim of the can between cutter wheel **17** and feed wheel **11**. The cylindrical portion extends forwardly from a polygonal, nut-like intermediate head **19***a*. The portion opposite head **19***a* extends through an aperture in lever **20** and through an appropriate bearing passageway in plate **10***a*. Nuts **21** and **22** are threaded onto the inner end of the pin assembly to hold it in position in the frame. The pin assembly serves as the pivot mounting for hand lever **20**.

Located directly below feed wheel **11** is plunger mounting **23**. The mounting, as best seen in FIGS. 2 and 3, is formed with or affixed to plate **10***a* and is shown as having a flattened frusto-conical shape with a beveled front surface **23***a* forming its outer extremity. A plunger **24** loosely and slidably fits within an appropriately sized cylindrical hole **23***b* in mounting **23**. The plunger is constructed of a metallic half **24***a* and a dielectric half **24***b*, which will act as an insulator. Each half forms a flange at its outer extremity with each flange having a larger diameter than hole **23***b*, precluding unwanted disengagement.

The switch S is located on the back side of the can opener plate **10***a* and comprises an electrically non-conductive base **25**. Base **25** is secured to suitable supports **26**, which are formed as a part of the frame member, by screws **25***a*.

The non-conductive base **25** has mounted thereon the angled and overlapping contact arms **27** and **28**. The arms are constructed of resiliently electrically conductive material, and the outer arm **28** is normally free of contact with and spaced outwardly from the outer end of contact arm **27**. Contact arm **28** yieldably bears against the inner extremity of plunger **24***b*, and forces the plunger outwardly in the solid line position as shown in FIGS. 2 and 3. When the plunger is pushed in the direction of the arrow in FIG. 3, insulated flange end **24***b* contacts and flexes switch arm **28** into contact with switch arm **27** as shown in the broken lines in FIG. 3. When arms **28** and

make electrical contact the circuit is thereby closed ıergizing the drive motor.

The hand lever **20** is provided at its upper edge with a :arwardly turned flange portion **20***a* which overlies the ıp edge of the basic frame structure **10**. The entire ver pivots about the cylindrical projection **19** and may ɜ raised or lowered accordingly. The can lever also ırries the resilient forward can guide **29** secured to the ver by rivet **30**.

In operation, lever **20** is lifted, thereby defining an appropriate space between the peripheries of feed wheel **11** nd cutter wheel **17**. The space is sufficient to permit ıe insertion of the rim or flange of a can with the upper dge of the rim abutting the cylindrical projection **19** hen in position.

With the can so positioned that its rim or flange **31** over the can feed wheel **11** but under the can guide **9**, as best seen in FIG. 2, the cutter wheel will then be irectly over the end of the can. The user then moves he free end of lever **20** downwardly and presses it in ressure contact, but not piercing, the end of the can hown at **32**. The can is now firmly held at a slight ngle away from the vertical plate **10***a*, lightly pressing gainst the flanged end **24***a* of the plunger with a force nsufficient to close switch S. At this step of the operaion, feed wheel **11** acts as a fulcrum point with the can tself being an additional level. A slight but positive mount of force exerted on lever **20** and thusly transnitted by cutter wheel **17** against the can end **32** is suffiient to cause the can's left side, as seen in FIG. 2, to nove inwardly against the metallic flanged end **24***a* of plunger **24**. This movement is sufficient to displace the plunger and to "make" the switch contact, e.g. flex contact arm **28** into electrical connection with contact arm **27**. The motor will then be started, and with continued downward pressure on lever **20** the can cutter wheel pierces into and through the end of the can and moves into overlapping relationship with the feed wheel while the cutting continues. The downward thrust force needed on the free end of the hand lever which causes cutter wheel **17** to penetrate through the end of the can is greatly reduced by the simultaneous advance in feeding of the can with respect to the cutter wheel. Once the free end of the lever is depressed and the feed wheel and the cutter wheel are overlapping in a cutting relationship, the can, which is acting in a lever fashion, keeps the plunger **24** in its displaced state and thus maintains the switch in its "ON" or contact closed position. The resilient can guide **29** and cylindrical projection **19** both cooperate with the shearing force of cutter wheel **17** to maintain the can in a properly oriented cutting position.

When the can lid has been completely severed and the lever **20** lifter, the natural flexure of contact arm **28** will force the plunger outwardly and cause the switch to break its contact, thus deenergizing the motor and returing the entire apparatus to its "OFF" condition.

From the foregoing, it will be seen that this 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.

Since many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

**1.** In an electrically powered can opener having an upright frame, a rotary feed wheel, and an electric motor drivingly connected with said feed wheel, the combination therewith of



a hand lever pivotally attached to the frame of said can opener,

a cutting element mounted on said lever and movable into and out of overlapping cutting relationship with said feed wheel,

a normally open switch controlling the energization of said motor,

means mounted on said frame of said can opener below said feed wheel engageable by the side of a can, said means operable as a result of the inward force of the side of said can toward said frame against said means to close said normally open switch in response to bringing said cutting element into pressure contact with the end of the can to be opened, said pressure contact resulting in said inward force that is transmitted through said can to said means.

**2.** The combination of claim **1** wherein said switch includes a switch arm resiliently biased toward the open position,

said closing means having a non-conductive portion, said non-conductive portion contacting said switch arm.

**3.** The combination of claim **2** wherein said closing means includes a plunger slidably fitted within a mounting projecting from the side of said frame,

said plunger including said non-conducting portion in contact with said resiliently biased switch arm.

**4.** The combination in claim **3** wherein said mounting extends horizontally past a vertical plane which would include the forwardmost extremity of the feed wheel.

**5.** In an electrically powered can opener having an upright frame, a rotary feed wheel and an electric motor drivingly connected with said feed wheel, the combination therewith of

a hand lever pivotally attached to the frame of said can opener,

a cutting element mounted on said lever and movable into and out of overlapping relationship with said wheel,

a plunger slidably fited within a mounting projecting from a portion of the frame under said wheel, said plunger extending from the interior of said frame past the forwardmost extremity of said feed wheel,

said plunger to be engaged by the side of the can and being laterally displaced within said mounting in response to pressure on the end of the can from said cutting element, and

a switch operable to energize said electric motor upon displacement of said plunger.

**6.** The combination as in claim **5** including a can guide means also mounted on said lever and operable to engage the rim of a can flange during movement of said cutting element toward cutting relationship with the feed wheel.

**7.** The combination in claim **5** wherein said plunger loosely fits within said mounting, said plunger being provided with flanges at each end to preclude unwanted disengagement from said mounting.

**8.** The combination as in claim **5** wherein said switch includes a switch arm resiliently biased toward the open position and yieldably forcing said plunger outwardly.

**9.** The combination in claim **7** wherein said plunger has a non-conductive end contacting said resiliently biased switch arm.


**References Cited by the Examiner**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,995,818 | 8/1961 | Scott et al. | 30—4 |
| 3,012,320 | 12/1961 | Embray | 30—4 |
| 3,031,751 | 5/1962 | Hart | 30—4 |
| 3,060,568 | 10/1962 | Nisenson | 30—4 |
| 3,130,492 | 5/1964 | Knapp | 30—4 |



WILLIAM FELDMAN, *Primary Examiner.*

G. WIEDENFELD, *Assistant Examiner.*