Jan. 30, 1962 E. S. ROGERS ET AL 3,018,548

WALL-TYPE POWER-OPERATED CAN OPENER

Filed Dec. 27, 1960 2 Sheets-Sheet 1

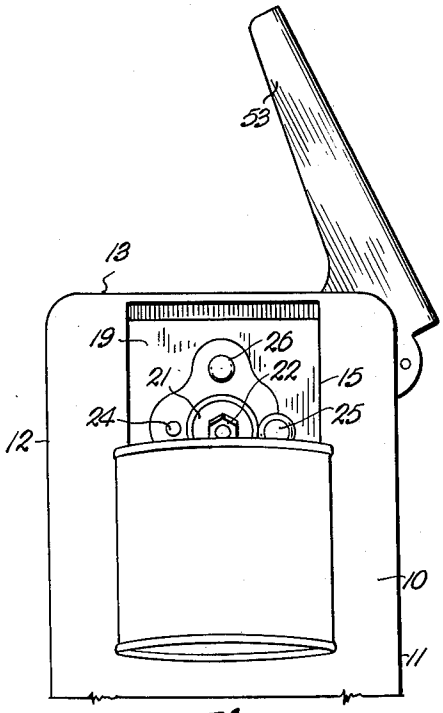


Fig. 1.

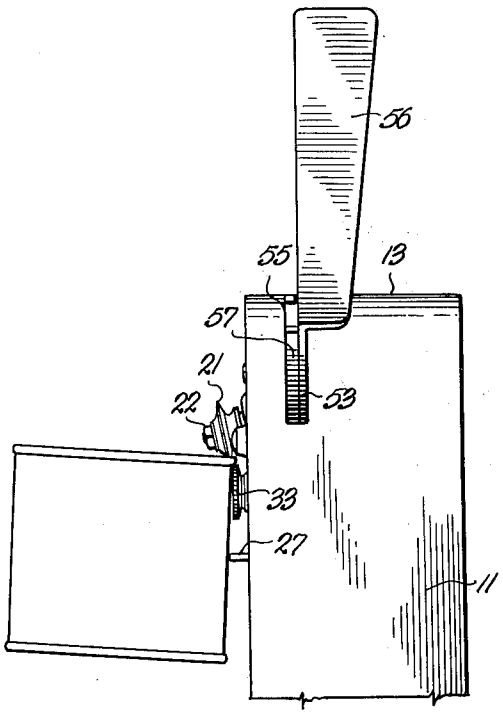


Fig. 2.

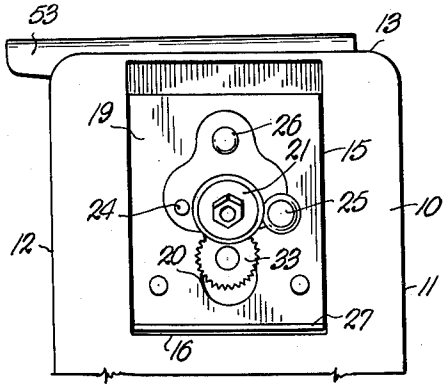


Fig. 3.

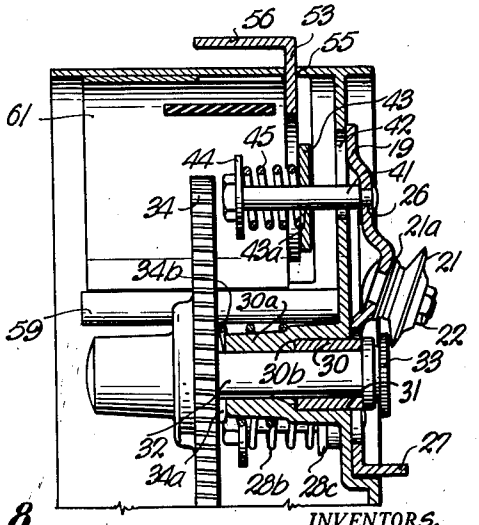


Fig. 8.

INVENTORS.
Ezra S. Rogers
Robert J. Scott
BY
ATTORNEY.

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WALL-TYPE POWER-OPERATED CAN OPENER

Filed Dec. 27, 1960 2 Sheets-Sheet 2

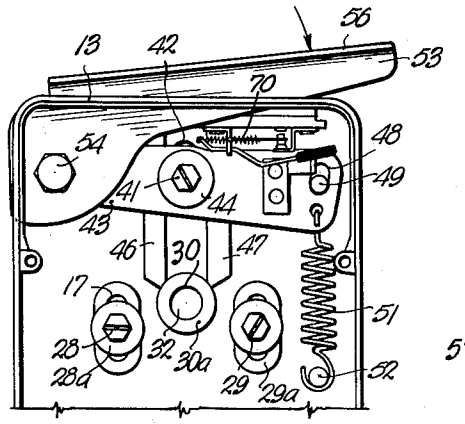


Fig. 5.

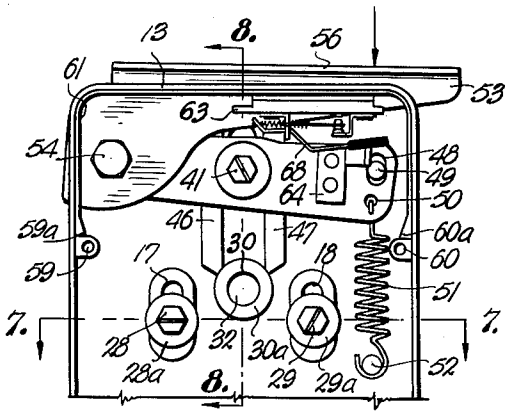


Fig. 6.

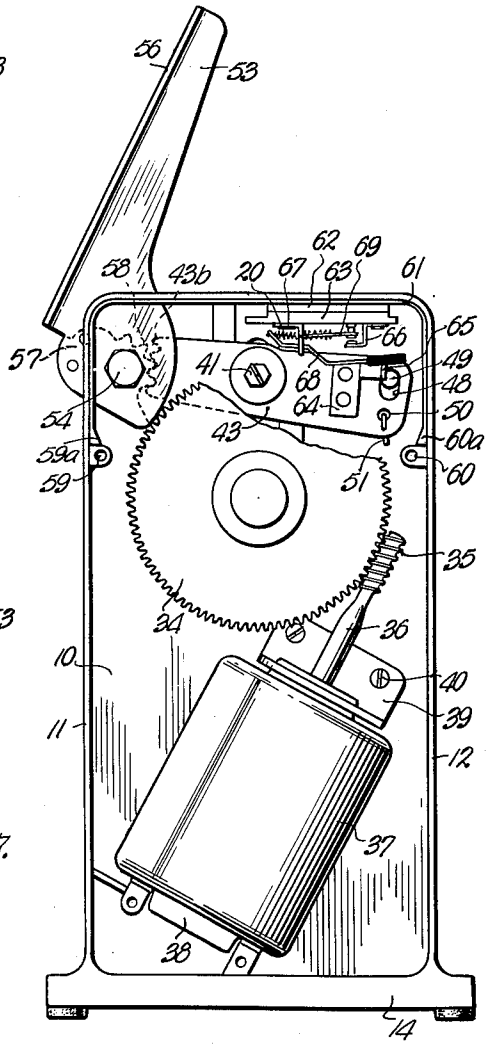


Fig. 4.

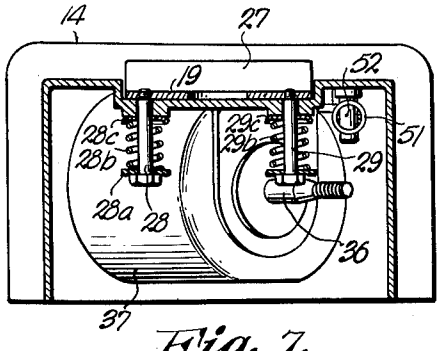


Fig. 7.

INVENTORS.
Ezra S. Rogers
Robert J. Scott
BY Thos E. Scofield
ATTORNEY.

United States Patent Office 3,018,548 Patented Jan. 30, 1962

3,018,548

WALL-TYPE POWER-OPERATED CAN OPENER

Ezra S. Rogers, Parkville, and Robert J. Scott, Blue Springs, Mo., assignors to John C. Hockery, Independence, Mo.

Filed Dec. 27, 1960, Ser. No. 78,520
7 Claims. (Cl. 30—4)

This invention relates to power-operated can openers and refers more particularly to one in which the power drive is actuated by the lever arm which engages the cutter and feed wheels with the can, the power drive being actuated when a certain degree of pressure is applied to the can just before it is cut.

This invention is an improvement over the application of Frank E. Aberer, Serial No. 2,442, filed January 14, 1960, for "Wall-Type Power-Operated Can Opener," issued as U.S. Patent 2,994,953 on August 8, 1961.

An object of the instant invention is to provide a power-operated can opener with a simple, positive, powerful lever action for engaging and initially cutting the top of the can, with an additional assist to the cutting operation from the power source.

Another object of the invention is to provide a power-operated can opener which trips the power source or motor both to rotate the engaged can and cut it, the power source actuation prior to and in aid of the puncturing of the can.

Another object of the invention is to provide a power-operated can opener which is exceedingly simple in construction, relatively cheap to manufacture, rugged and able to withstand long operation and use without necessity for repair or replacement.

Another object of the invention is to provide a simply constructed power-operated can opener which is easy to disassemble and wherein all of the parts are readily accessible for cleaning, replacement or repair.

Another object of the invention is to provide a power-operated can opener wherein the lever which manipulates the cutting and can feeding wheels relative to one another in the can opening operation also actuates, when moved to a certain can engaging position less than that position actually puncturing the can, the power driving apparatus for automatic cutting of the can whereby to aid the puncturing operation.

Another object of the invention is to provide a power-operated can opener wherein the arm which actuates the power drive is normally resiliently biased away from the "on" position whereby certain release of operator force thereon after actuation automatically switches off the power drive, yet a switch action is provided which will maintain the power drive on during the entire can cutting operation, without an initial turn-off between the power operation before puncturing, the puncturing step itself or the power operation after puncture.

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 specification and are to be read in conjunction therewith, embodiments of the invention are shown and, in the various views, like numerals are employed to indicate like parts.

FIG. 1 is a partial front view of the upper end of the can opener employing the invention with the actuating arm at a first position of engagement (prepuncture) between the cutting and feeding wheels with the can to be cut therebetween.

FIG. 2 is a partial right-hand side view of the can opener of FIG. 1 with the parts in the same relative position.

FIG. 3 is a partial front view of the can opener of FIGS. 1 and 2 with the actuating arm at the extreme closed position whereby to maximally engage the cutter and feed wheels.

FIG. 4 is a rear view of the entire power-operated can opener of the previous figures with a portion of a worm gear cut away to better illustrate the arrangement of the parts, the view showing the actuating arm and associated parts in the relationship assumed when a can is first engaged between the cutter and feed wheel before application of force to initially pierce the can, that position being the same as shown in FIGS. 1 and 2.

FIG. 5 is a partial rear view of the upper portion of the can opener of FIG. 4 (but with the worm gear and motor drive shaft removed) showing the relationship assumed by the actuating arm and associated parts when force just short of that necessary to pierce the can is applied.

FIG. 6 is a rear view similar to that of FIG. 5 but showing the relationship of the actuating arm and associated parts immediately after piercing of the can. The power switch is actuated in both FIGS. 5 and 6.

FIG. 7 is a horizontal section through the can opener of FIG. 4 along the line 7—7 of FIG. 6 in the direction of the arrows.

FIG. 8 is a view taken along the line 8—8 of FIG. 6 in the direction of the arrows.

Referring first to FIGS. 1, 2 and 4, a frame or housing is provided having front plate or wall **10**, side walls **11** and **12**, top wall **13** and bottom wall **14**. A rear cover of one type or another is furnished, but does not form a part of the instant invention or a part of the framework upon which the operating parts are hung. Both side walls, top wall and bottom wall are fixed to or integral with the front plate or wall **10**.

Referring to FIGS. 1 and 3 particularly, a recessed slideway **15** is formed in the front wall or plate **10**. Top wall **13** overlies the upper end of the slideway **15** while a ledge **16** underlies the lower end of the slideway. A pair of slots **17** and **18** (see FIGS. 5 and 6) extend through the floor of the slideway **15**.

Slide **19** (FIGS. 1 and 3) is of only slightly lesser width than the slideway **15** whereby to slide in precise fashion therein, while its length is that distance less than the total length of the slideway which it is desired that the cutter and feed wheels be movable apart. Slot **20** is formed through slide **19** substantially centrally thereof and runs vertically therein. Cutter wheel **21** is mounted so that its lower edge is canted inwardly toward the slide **19** in well-known fashion by securing it to an angled post **21***a* by nut **22**. The post is mounted on an outwardly flared portion **23** of the slide **19**. Conventional posts **24** and **25** are mounted on each side of the cutter wheel **21** whereby to properly position the can edge for the cutting operation. These posts are fixed to the slide **19** and extend outwardly therefrom alongside the cutter wheel. An opening **26** is formed through slide **19** above the cutter wheel to receive a shaft to be described. A shelf **27** projecting at right angles to the slide outer face extends from the lower edge of the slide immediately below the cutter wheel **21** and slot **20** whereby to properly position the body of a can angularly relative to the wheels engaging it in the process of cutting the can. Referring to FIGS. 5, 6 and 7, rearwardly extending posts **28** and **29** having enlarged heads are fixed to the rear face of slide **19**, extend through slots **17** and **18**, respectively, and have washers **28***a* and **29***a* mounted thereon to receive in abutment one end of compression springs **28***b* and **29***b* which also abut against washers **28***c* and **29***c* lying against the rear face of slide recess **15**. Washers **28***c* and **29***c* slide against the rear face of slideway **15** in vertical up and down motion of slide **19**, springs **28***b* and **29***b* maintaining the lower portion of slide **19** in sliding abutment with the slideway **15**.

Referring particularly to FIGS. 5, 6 and 8, an opening **30** in the slideway **15** receives a cylindrical bearing **31** fixedly therein. Opening **30** is defined by rearward extension **30***a* of slideway **15** which also fixedly receives bearing **31** in recess **30***b* thereof. Bearing **31** extends forwardly beyond the face of slideway **15** and is received in slot **20** of slide **19** to an outward extension substantially that of the front face of slide **19**. Thus, up and down movement of slide **19** is limited both by impingement upon the upper wall **13** and lower shelf **16** and the impingement of the upper and lower ends of slot **20** upon bearing **31**.

A drive shaft **32** is rotatably received within bearing **31** and extension **30***a* and has feed wheel **33** removably threaded upon the front end thereof which extends adjacent slide **19** and worm gear **34** removably fixed to the other end thereof. The front face of spur gear **34** is adjacent to the rear end of extension **30***a*, spaced by washer **34***a* therefrom, and a suitable spring **34***b* abutting the front face of gear **34** may be provided to resiliently retain the feed wheel in frictional sliding contact with the front end of bearing **31**. The teeth of worm gear **34** are engaged by a worm **35** on drive shaft **36** driven by a suitable electric motor or other power source **37** mounted at an angle on platform **38** supported by lower wall **14**, engaged by flange **39** secured by screws **40** to front wall **10**. The electric lines from the motor are not shown, but they are conventional.

A shaft **41** (FIG. 8) is received in previously-mentioned opening **26** in slide **19** where it is fixed to the slide and vertically movable therewith. Shaft **41** extends through a slot **42** formed in the floor of slideway **15**. A first lever arm **43** extending essentially transverse to the vertical center of front wall **10** has an opening **43***a* (FIG. 8) through which extends shaft **41** to a distance therepast in the rearward direction. A washer **44** retained by the enlarged rear head of shaft **41** confines a compression spring **45** between the front face of the washer **44** and the rear face of first lever arm **43**, thus biasing lever arm **43** toward the front plate or wall **10**. This resilient bias forces the first lever arm **43** against a pair of bars **46** and **47** formed rearwardly from the floor of slideway **15** on the rear face thereof.

Thus it is seen that the slide **19** in slideway **15** is resiliently but yieldably retained against the slideway front face or surface by the action of spring **45** on shaft **41** and by the action of springs **28***b* and **29***b* on washers **28***c* and **29***c* engaging the rear face of slideway **15** in a sliding motion.

The left-hand end of first lever arm **43** (as seen in FIG. 4) has spur gear teeth **43***b* formed therein. Slot **48** is formed in the right-hand end of first lever arm **43** as seen in FIGS. 5, 6 and 4 to receive stud or rod **49** attached to front wall **10**, the rear face thereof. Opening **50** in the right-hand end of first lever arm **43** receives one end of tension coil spring **51**, the other end thereof being hooked around stud **52** also fixed to the rear face of wall **10**.

Actuating arm or second lever arm **53** comprises a flat piece of material, preferably metal, which is pivotally mounted on bolt **54**, the latter being received in an internally threaded opening (not shown) on the rear side of front wall **10**. Arm or lever **53** lies to the rear or in back of first lever arm **43**. It is also received in slot **55** which extends entirely across the top wall **13** and down side walls **11** and **12**, the latter to a lesser extent, the former to (1) the extent required by the position in FIGS. 1, 2 and 4, and (2) also a greater extent to permit insertion of the can between the feed and cutter wheels. Flange **56** extends at right angles to lever arms **53** and, when in the positions of FIGS. 5, 6 and 8, extends in a substantially horizontal orientation. Fixed to the front side of second lever or actuating arm **53** is a metal flange piece **57** which has spur gear teeth **58** formed thereon so as to engage spur gear teeth **43***b* on

first lever arm **43**. Teeth **58** are so arranged that, when the second lever arm **53** is rotated or pivoted in a counterclockwise direction in FIGS. 4, 5 and 6, it raises the left-hand end of first lever arm **43** in the same views and lowers the same in clockwise rotation in the same views.

Referring to FIG. 4, a pair of rod-like extensions **59** and **60** are formed integral with or fixedly attached to side walls **11** and **12**, inwardly thereof, whereby to form a pair of projections operable to receive sheet **61**. The latter is configured to fit closely inside the upper ends of walls **11** and **12** and the underside of wall **13** rearwardly of slot **55**. Stops **59***a* and **60***a* serve to limit the forward extension of sheet **61**. Flange **62** extends downwardly and then horizontally to the rear to receive switch platform **63** in horizontal position thereon. Fixed to the rear face of lever **43** is flange **64** carrying rearwardly extending arm **65** which underlies the right-hand side of switch platform **63** in the view of FIG. 4.

The switch mechanism comprises a contact arm **66** fixed to the right-hand side of switch platform **63** and comprising, in the view of FIG. 4, an S-shaped member having the top leg of the S fixed to the platform and the lower leg of the S extending to the left in FIG. 4. A conventional electric connection is made between arm **66** and motor **37**, not shown. Angle **67**, fixed to the left underside of platform **63** pivotally mounts actuating arm **68** in the downwardly extending leg thereof and has the horizontal leg thereof fixed to platform **63**. Contact arm **69** is pivoted at its left-hand end in FIG. 4 on the downwardly extending leg of angle **67** and has a contact on its other end extending downwardly adapted to make and break electrical contact with member **66** according to motion of arm **69**. On its upper side is a stop adapted to position arm **69** a particular distance away from its contact point on member **66**. A spring **70** is connected at its left-hand end to the left-hand end of actuating arm **68** in FIG. 4 and at its right-hand end centrally of contact arm **69**.

The manner of operation of the switch may be seen by contrasting FIGS. 4 and 5. In FIG. 4, the switch actuating arm **68** is at such a downward position that spring **70** biases the contact arm **69** upwardly against the upper stop on the underside of platform **63** whereby to break electrical contact. There is another conventional electrical contact between angle **67** and motor **37** to provide a complete circuit through the switch when arm **69** contacts member **66**. When right-hand end of actuating arm **68** (in FIG. 4) is moved upwardly a certain distance by arm **65**, the portion thereof on the left-hand side (in FIG. 4) of the pivot on member **67**, by means of spring **70**, biases contact arm **69** downwardly to the position of FIG. 5 to complete electrical contact through the switch and start motor **37**. When the right-hand side of actuating arm **68** (in the view of FIG. 4) moves downwardly to a certain position, spring **70** snaps actuating arm **69** upwardly to break the contact and stop motor **37**. The switch mechanism shown is conventional and does not by itself or per se comprise the instant invention.

The basic operating positions and actions are as follows, the operation described therewith:

(1) With the view taken from the rear as in FIGS. 4, 5 and 6, and with the actuating or second lever arm **53** in a position even further to the right in FIG. 1 and to the left in FIG. 4 than that shown, the engaged spur gears between the two lever arms will have moved the engaged (left in FIG. 4 view) end of the first lever arm **43** up as far as possible, thus moving the slide-lever engaging shaft **41** to the top of slot **42** and moving slide plate **19** to the top of channel or slideway **15**. At the opposite end of first lever arm **43**, stud **49** and the top of slot **48** firmly engage, with spring **51** pulling that end of the arm firmly downwardly. Thus, from the view of FIG. 4, the right end of the first lever arm **43** is as low as possible, the left end thereof is nearly as high as possible, slide **19** is

nearly at its uppermost position and cutter wheel **21** is free of feed wheel **33** to receive a can.

(2) The second position involves motion of the actuating or second lever arm **53** from the previously described position (not illustrated) to that of FIGS. 1, 2 and 4, with a can engaged. This position, best seen in FIGS. 1 and 2 as to the can engagement, involves no penetration or cutting of the can, merely the positioning of it between the cutter and feed wheels ready for the puncturing and cutting operations. For the operator to move the arm **53** further toward the top wall **13** will involve greater application of force than mere free movement.

(3) In FIG. 3, arm **53** is seen in the position it would take without a can between the cutter and feed wheel when the first lever arm, by action of the engaged spur gears **57** and **43***b* is moved downwardly to the position where the top of slot **20** in the slide plate **19** abuts the bearing **31** and the bottom of slide plate **19** abuts shelf **16**. This is as low as slide plate **19** can go.

(4) Looking at FIGS. 4, 5 and 6, in FIG. 4 is seen the position of second lever arm **53** when a can rim has just been engaged between and by cutter wheel **21** and feed wheel **33**. First lever arm **43** has been geared downwardly from its previously described extreme upward position of the left end thereof to an intermediate position, while insufficient force has been applied to the engaged can to cause the right-hand end of arm **43** to rise against tension of spring **51**. FIG. 5 then shows the position to which it is probable that (*a*) the actuating arm **53** may rotate clockwise and (*b*) first lever arm **43** may rise on the right-hand side thereof against tension of spring **51** before the can actually is pierced. This is due to the resistance of the metal top of the can to cutter wheel **21** and varies somewhat according to the sharpness of the cutter wheel, the metal of the can top, etc.

(5) FIG. 6 shows the next stage with the can actually pierced with operator hand pressure maintained at the same level. The right-hand end of first engaging lever **43** has dropped a limited distance so that stud **49** is approximately central of the length of slot **48** under action of spring **51**, while the actuating arm **53** has dropped a slight amount toward plate **13**. Despite these small changes, the switch is so designed and installed that contact and motor operation are maintained.

(6) The dynamics of operation of arm **43** are as follows: (*a*) With no can engaged or engageable between the cutter and feed wheels, oscillation of the main lever arm **53** in counterclockwise and clockwise direction in FIG. 4 serves to alternatively move the left-hand side of the lever arm (in FIG. 4 view) upwardly and downwardly. This causes the cutter wheel and slide to move upwardly and downwardly also. (*b*) When a can is engaged as in FIGS. 1 and 2, further clockwise rotation of lever arm **53** in the view of FIG. 4 does not further lower the left-hand side of arm **43** alone as a fulcrum is provided at shaft **41** since slide **19** is fixed in position until the can is punctured. Thus, in addition to the left-hand end of lever **43** moving downwardly, the right-hand end of lever arm **43** moves upwardly around the fulcrum of shaft **41**. As the actuating arm **68** of the switch is already (and always) in contact with arm **65**, the movement of the right-hand end of arm **43** to a position where stud **49** is intermediate slot **48** actuates the power source through the switch, thus driving feed wheel **33** to aid in puncturing the can. Shortly after the motor starts operating and presumably before the right-hand end of lever **43** rises much further, the can is punctured, which has two effects. In the first place, the slide **19** can drop downwardly due to the puncturing of the can, thus dropping the shaft **41** therewith and lowering the fulcrum previously mentioned. This in turn drops at least slightly the right-hand end of the lever **43**. The latter would tend to disconnect the switch except for two factors. In the first place, the switch is designed to go to the "on" position on only a very slight rise of the actuating arm **68** and, secondly, the hand force applied by the operator tends to continue the downward motion of the left-hand end of lever **43** thus tending to raise the right-hand end thereof around the new lower fulcrum. Thus the power actuation continues until the can is cut.

(7) Release of the actuating arm **53** permits the action of spring **51** to pull the right side of first lever arm **43** downwardly, thus gearing up the upper actuating arm to slightly above the position of FIG. 5 if the can is still engaged.

(8) Vertical irregularities in the can rim encountered during cutting of the can, when the feed wheel drives the rim of the can in cutting engagement with the cutter wheel, are compensated for by vertical movement of the can cutter wheel, slide **19** upon which it is mounted, and first lever arm **43** through its right-hand end as viewed in FIGS. 4–6, against the action of spring **51**. Shaft **41** connected to the rear face of slide **19** moves vertically in slot **42**, in this action. The cutter wheel being of the form shown in Aberer "Power-Operated Can Opener," Patent No. 2,902,757, September 8, 1959, has a rearward portion thereof, best seen in FIGS. 2 and 8, which rides on the top edge of the can rim. Limited in and out movement of cutter wheel **21** and, thus, plate **19**, to compensate for in and out variation in the can rim while the can is being cut, is provided by virtue of the hinge mounting of plate **19**, with its lower end secured by posts **28** and **29** in slots **17** and **18** and the resilient mounting of post **41** which is attached to the rear face of plate **19** at one end and has resilient spring **45** mounted on the other.

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.

As 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 drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim:

1. In a power-operated can opener, a plate having front and rear faces and upper and lower ends, a substantially vertical slideway formed in the front face of said plate, a slide received in said slideway adapted to move vertically therein, a bearing received in and extending through an opening through said plate and having a portion thereof extending through a slot in said slide, a drive shaft rotatably received in said bearing and extending entirely therethrough, a feed wheel on the end of said drive shaft next to said slide, a cutter wheel rotatably mounted on said slide for vertical movement therewith, means for driving said drive shaft positioned adjacent to said plate, a first lever arm mounted on the rear side of said plate, a slide-lever engaging shaft extending through a slot in said plate, attached to the slide at one end thereof, and connected to the first lever arm substantially centrally thereof, a second lever arm, means mounting the second lever arm on the rear face of said plate for pivotal movement around one end thereof adjacent one end of the first lever arm, means engaging the pivotal end of the second lever arm with the adjacent end of the first lever arm whereby pivotal movement of the second arm in one direction raises the engaged end of the first lever arm and pivotal movement in the opposite direction lowers the engaged end of the first lever arm, and actuating means operated by the first lever arm for starting and stopping said driving means.

2. Apparatus as in claim 1 wherein said actuating means comprises a switch operated by means connected to said lever arm on the other side of said slide connec-

tion thereto from the engagement thereof with the first lever arm.

3. In a power-operated can opener, a frame, said frame including a normally vertical front plate and normally horizontally top wall, said front plate having front and rear faces and upper and lower ends, the upper end of said front plate connected to said horizontal top wall, a substantially vertical slideway formed in the front face of said plate, a slide received in said slideway adapted to move vertically therein, a bearing received in and extending through an opening through said plate and having a portion thereof extending through a slot in said slide, a drive shaft rotatably received in said bearing and extending entirely through said bearing, a feed wheel on the end of said drive shaft next to said slide, a cutter wheel rotatably mounted on said slide for vertical movement therewith, means for driving said drive shaft positioned adjacent to said plate, means for moving said slide and cutter wheel up and down relative to said shaft and feed wheel, said moving means including an actuating arm having a portion thereof received in a slot through said horizontal top wall and a lever arm connected to said slide substantially centrally thereof, actuating means including a switch next the front plate rear face and below the top wall, said switch having an actuating arm spring-biased to the normal "off" position, and means connected to said lever arm for operating the switch actuating arm.

4. In a power-operated can opener, a plate having front and rear faces and upper and lower ends, a substantially vertical slideway formed in the front face of said plate, a slide received in said slideway adapted to move vertically therein, a bearing received in and extending through an opening through said plate and having a portion thereof extending through a slot in said slide, a drive shaft

rotatably received in said bearing and extending entirely therethrough, a feed wheel on the end of said drive shaft next to said slide, a cutter wheel rotatably mounted on said slide for vertical movement therewith, means for driving said drive shaft positioned adjacent to the rear face of said plate, a first lever arm, a slide-lever engaging shaft extending through a slot in said plate, attached to the slide at one end thereof, and connected to the first lever arm substantially centrally thereof, resilient means biasing one end of the first lever arm on one side of the slide-lever engaging shaft normally downwardly, means limiting the downward movement of the first lever arm under action of said resilient biasing means, means for alternately raising and lowering the end of the first lever arm on the other side of said slide-lever shaft from said resilient biasing means, and actuating means operated by said first lever arm for starting and stopping said driving means.

5. Apparatus as in claim 4 including means on the first lever arm between the resilient biasing means and slide-lever engaging shaft for operating said actuating means.

6. Apparatus as in claim 4 wherein the means limiting the downward movement of the first lever arm under action of the resilient biasing means comprises a slot in the first lever arm on the end thereof biased downwardly and means on the rear side of the plate extending into the said slot.

7. Apparatus as in claim 4 wherein a top plate is fixed to the upper end of the first mentioned plate and extends normally horizontally therebehind, and the actuating means operated by the first lever arm include a switch fixed relative to the under side of said top plate and means on said first lever arm below said top plate to work said switch.

No references cited.