Aug. 8, 1961 F. E. ABERER 2,994,953

WALL TYPE POWER-OPERATED CAN OPENER

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Fig. 1.

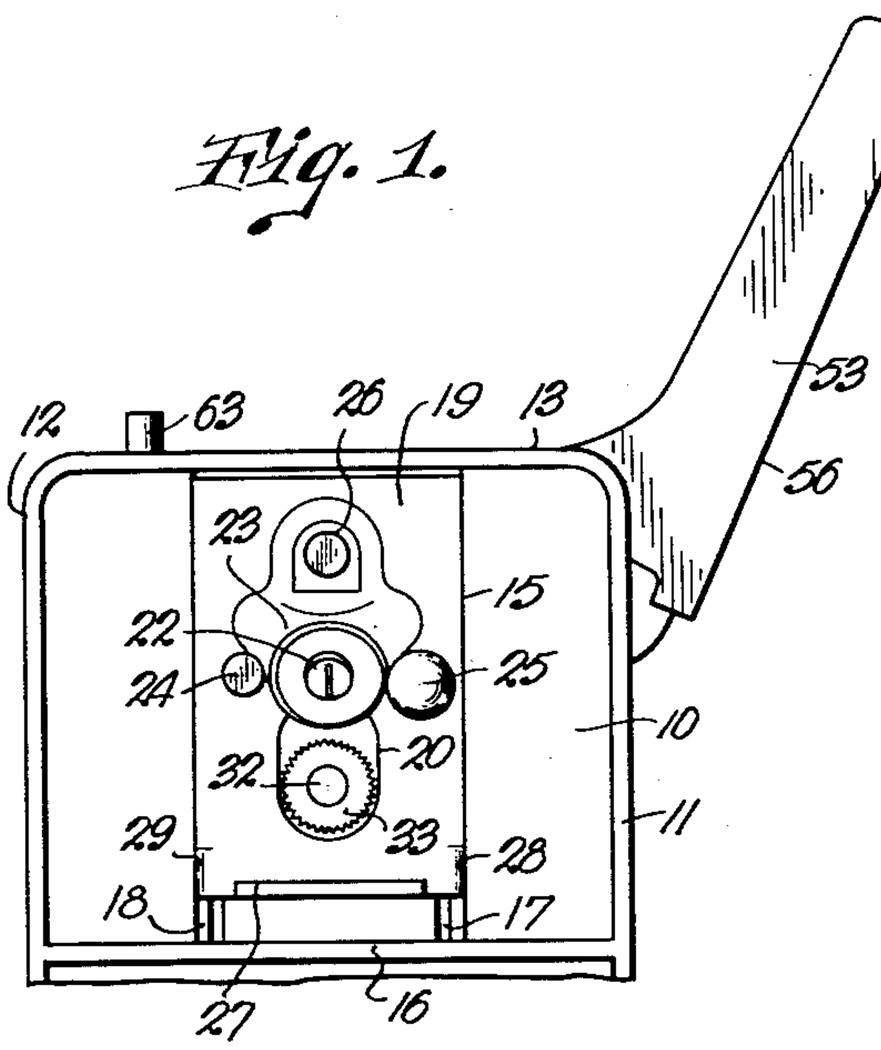
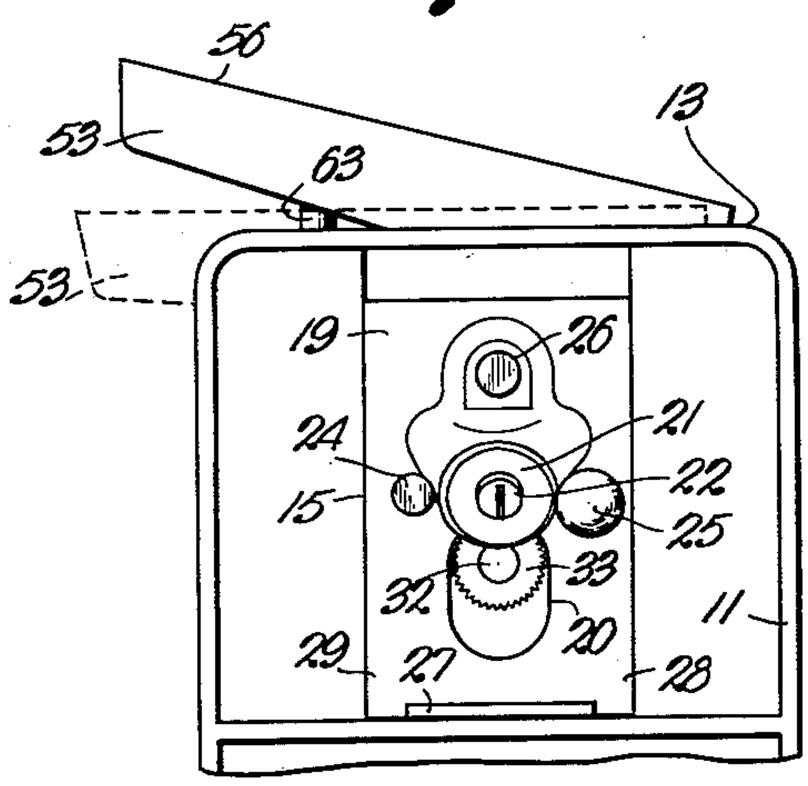


Fig. 2.



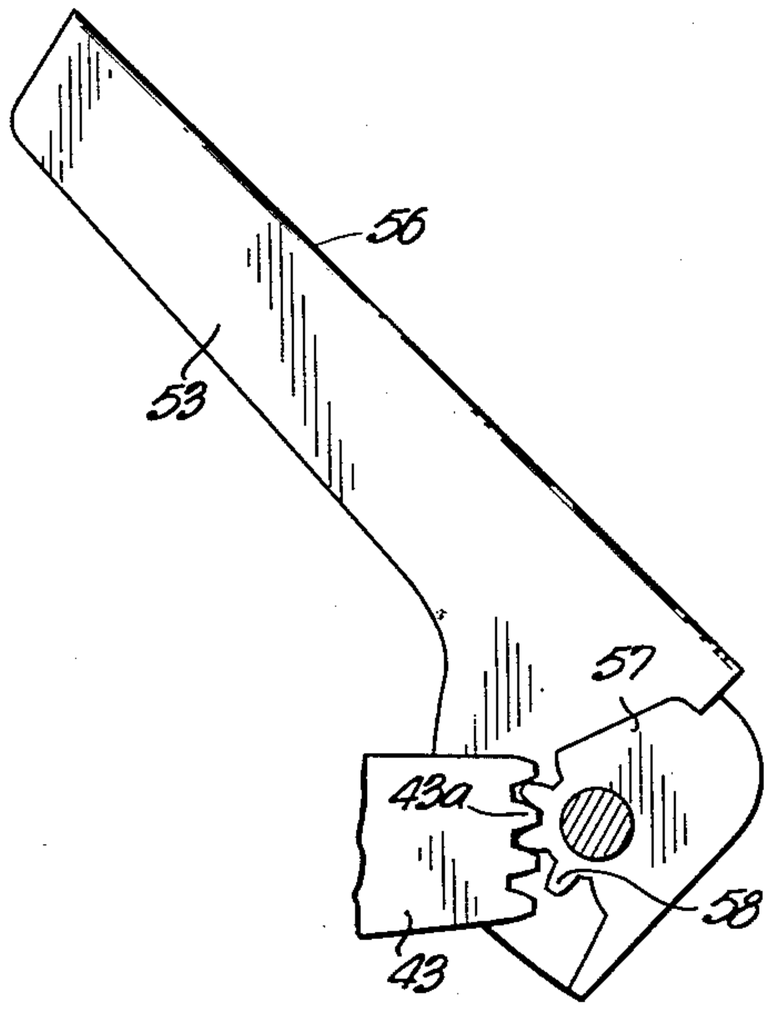


Fig. 8.

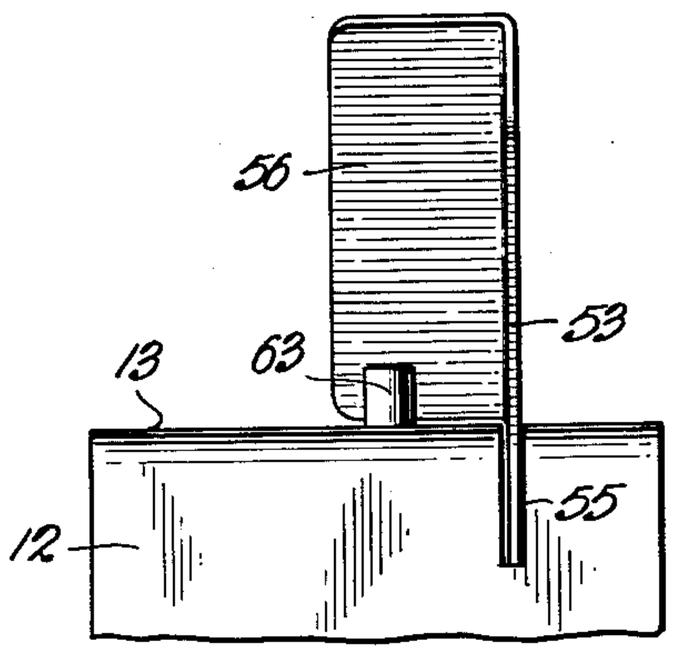


Fig. 7.

INVENTOR.
Frank E. Aberer
BY
Thos E. Scofield
ATTORNEY.

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WALL TYPE POWER-OPERATED CAN OPENER

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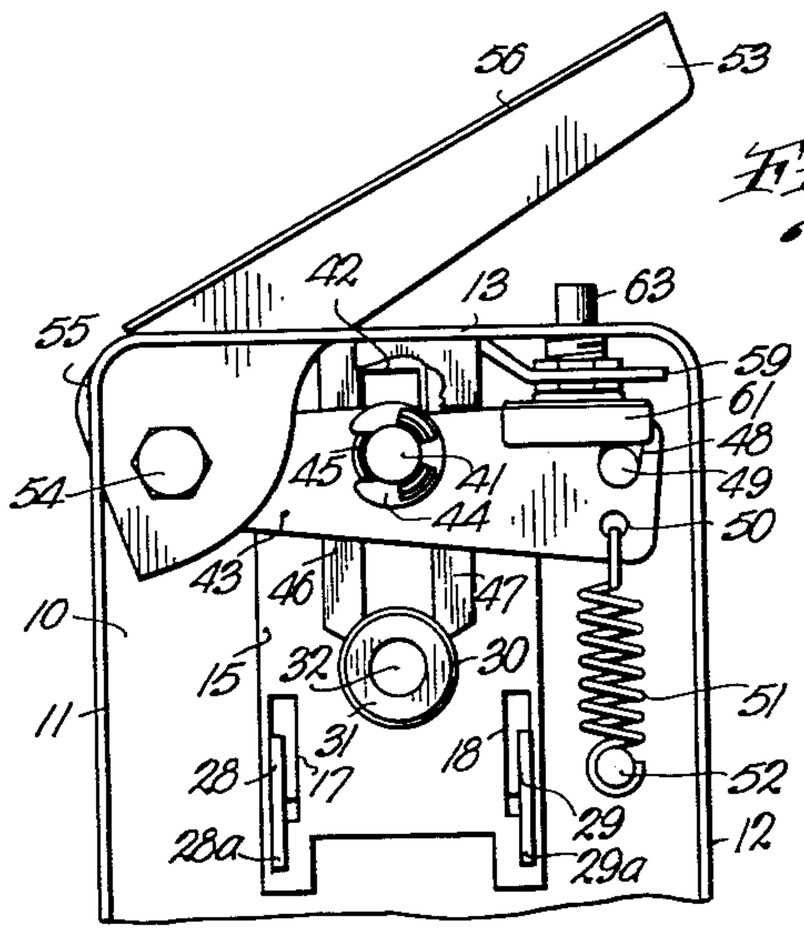

Fig. 4.

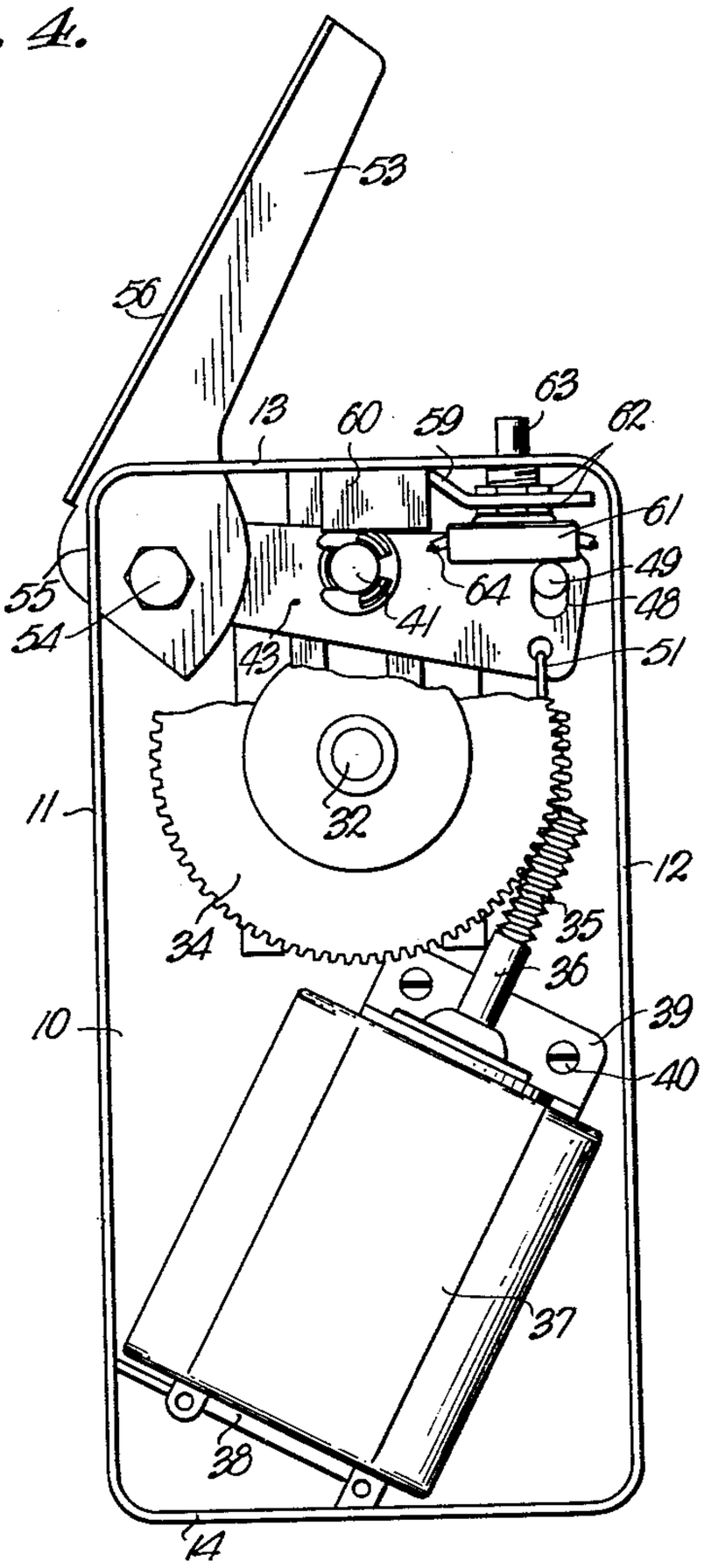

Fig. 3.

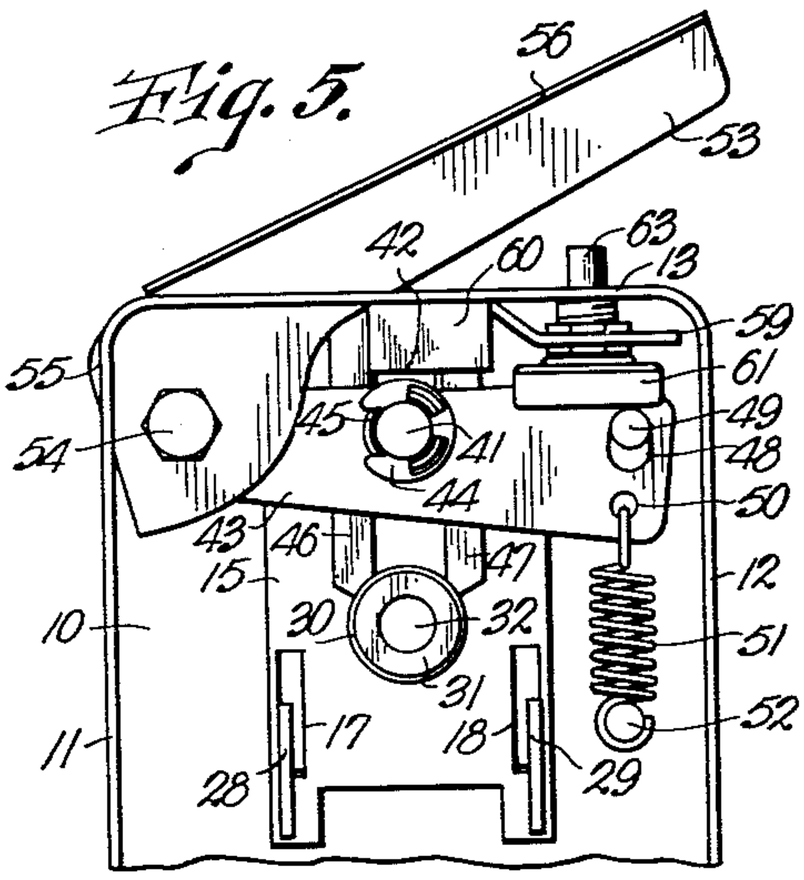

Fig. 5.

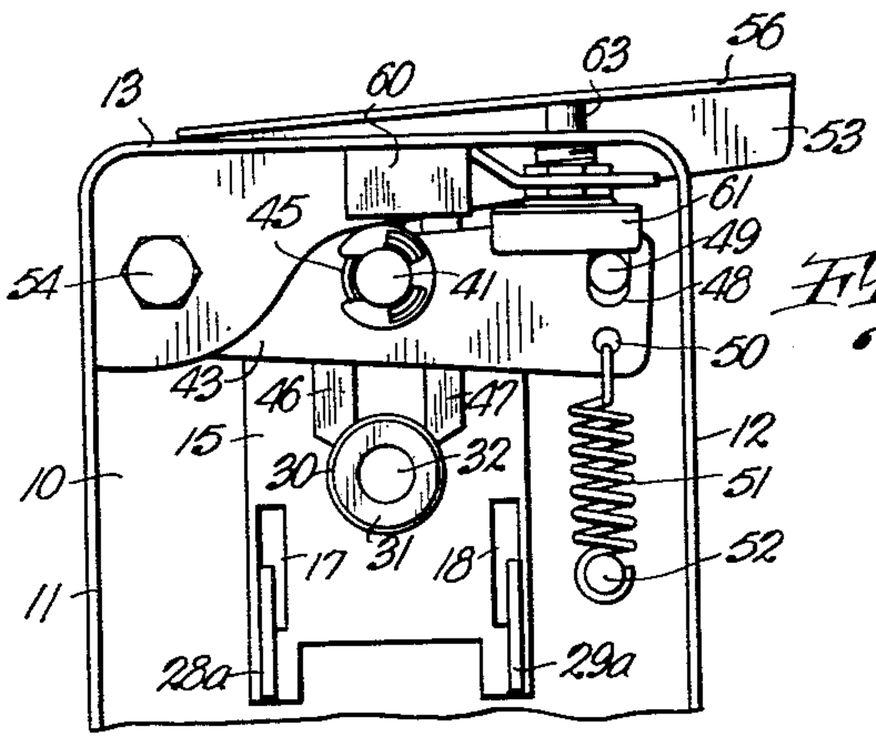

Fig. 6.

INVENTOR.
Frank E. Aberer
BY Thos E Scofield
ATTORNEY.

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WALL TYPE POWER-OPERATED CAN OPENER

Frank E. Aberer, Kansas City, Kans., assignor to John C. Hockery, trustee for Henry J. Talge and Foster L. Talge, Independence, Mo.

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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.

An object of the 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.

Another object of the invention is to provide a power-operated can opener which does not trip the motor to rotate the engaged can and cut it until the can has been punctured.

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 can 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 also actuates, when forced to a certain position, the power driving apparatus for automatic cutting of the can.

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 and release of force thereon after actuation automatically switches off the power drive.

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 front view of the upper end of a can opener embodying the invention with the actuating arm at the extreme open position whereby to separate a maximum distance the cutter and feed wheels.

FIG. 2 is a view similar to that of FIG. 1 showing in full lines the actuating arm at the opposite extreme from that of FIG. 1 with the cutter and feed wheels together (when a can is not engaged between the cutter and feed wheels) and with the actuating arm depressed to operate the power switch in dotted lines.

FIG. 3 is a rear view of an entire power-operated can opener embodying the invention, with a portion of the spur 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.

FIG. 4 is a partial rear view of the upper portion of the can opener similar to FIG. 3 (but with the spur gear and motor drive shaft removed) showing the relationship assumed by the actuating arm and association parts when

force just short of that necessary to pierce the can is applied.

FIG. 5 is a rear view similar to that of FIG. 4 but showing the relationship of the actuating arm and associated parts immediately after piercing of the can, but before application of further force to actuate the power switch.

FIG. 6 is a rear view smiilar to that of FIG. 5, but with the actuating arm sufficiently depressed so as to actuate the power switch and power cut the can engaged between the cutter wheel and the feed wheel.

FIG. 7 is a side view of the top of the can opener from the right in FIG. 4, showing the actuating arm in relationship to the power switch.

FIG. 8 is a view showing the engagement of the actuating arm and first lever arm from a front view taken of the upper right hand corner of the opener in FIG. 1 with the housing cut away.

Referring first to FIGS. 1, 2 and 3, 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, the top wall and bottom wall are fixed to or integral with the front plate or wall **10**.

Referring to FIGS. 1 and 2, 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. 4–6) extend through the floor of the slideway **15**.

Slide **19** (FIGS. 1 and 2) of thickness equal to the depth of slideway **15**, is positioned in the slideway **15** for vertical movement therein. Slide **19** 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 ormed through slide **19** substantially centrally thereof and runs vertically therein. Cutter wheel **21** is mounted so its lower edge is canted inwardly to the slide **19** in well known fashion by securing it to an angled post (not shown) by bolt **22**. The post is mounted on an outwardly faired 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 along side the cutter wheel. An opening **26** is formed through the 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 projects 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. 4–6, inclusive, rearwardly extending flanges **28** and **29** are fixed to the rear face of the slide **19**, extend through slots **17** and **18**, respectively, and have downwardly extending leg portions **28***a* and **29***a* which overlie and slide against the rear face of the front wall **10** and rear face of the slideway **15** in vertical up and down motion of the slide **19**.

Referring to FIGS. 4–6, an opening **30** through the front wall **10** and slideway **15** receives a cylindrical journal **31** which extends beyond the face of slideway **15** and

is received in slot **20** of slide **19** to an outward extension substantially that of the face of the 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 slots **20** upon the journal **31**.

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

A shaft **41** 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 extending essentially transverse to the vertical center of front wall **10**, designated at **43** has an opening (not shown) through which extends shaft **41** to a distance therepast in the rearward direction. A clip **44** fixed to the rearward end of shaft **41** confines a resilient spring **45** between the front face of the clip 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 retained against the slideway front face or surface by the action of spring **45** on shaft **41** with legs **28***a* and **29***a* engaging the rear face of the slideway **15** in sliding motion, as well.

The left-hand end of first lever arm **43** (as seen in FIGS. 3–6, inclusive) has spur gear teeth **43***a* formed therein as seen in FIG. 8. Slot **48** is formed in the right-hand end of first lever arm **43** as seen in FIGS. 3–6, inclusive, to receive stud or rod **49** attached to front wall **10** (rear face). Opening **50** in the right-hand end of first lever arm **43** receives one end of resilient coil spring **51**, the other end thereof being hooked around stud **52** also fixed to the rear face of front 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**. The arm or lever **53** lies 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 the extent required by the position in FIGS. 1 (the most extreme) and 3. Flange **56** extends at right angles to lever arm **53** and, when in the positions of FIGS. 2 and 6, to actuate the switch, extends in a substantially horizontal orientation. Fixed to the front side (FIG. 8) of second lever arm or actuating arm **53** is a metal flange piece **57** having spur gear teeth **58** formed thereon so as to engage spur gear teeth **43***a* 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. 3–6, 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.

A clip **59** is riveted or otherwise fixedly attached to the lower face of upper wall **13**, and has downwardly depending flange **60** to receive in abutment a rear wall.

Switch **61** is fixed to clip **59** by bolts **62** and has a spring loaded plunger **63** extending through an opening (not shown) in the top wall **13**. Suitable electrical connections **64** connect to the power source or electric motor **37**. Plunger **63** is so positioned, as may be seen in FIG. 7, to be engaged by flange **56** when the latter is sufficiently depressed toward the top wall **13** of the can opener.

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

(1) With the view taken from the rear as in FIGS. 3–6 and with the actuating arm or second lever arm **56** in the position of FIG. 1, the engaged spur gears between the two lever arms have moved the engaged (left) end of the first lever arm **43** up as far as possible, thus moving the slide-lever engaging shaft to the top of slot **42** and moving the slide plate to the top of its channel or slideway. At the opposite end of the first lever arm, stud **49** and the top of slot **48** on that side, firmly engage with spring **51** pulling that end of the arm firmly downwardly. Thus, from the rear view, the right end of the first lever arm is as low as possible, the left end of the engaging arm is as high as possible, slide **19** is at its uppermost position and wheel **21** is free of wheel **35** to receive a can.

(2) The second position involves the motion of the actuating or second lever arm **56** from the position of FIG. 1 to that of FIG. 2, if no can is engaged, or FIG. 4 if a can is engaged. In FIG. 2, we are seeing arm **56** 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 **58** and **43***a* is moved downwardly to the position where the top of slot **20** in the slide plate **19** abuts the journal **31** and the bottom of slide plate **19** abuts shelf **16**. This is as low as slide plate **19** can go. However, by depressing the second lever arm **53** until its flange **56** is substantially flat on the top wall **13**, first lever arm **43** can be rotated around central shaft **41** penetrating it, against the action of resilient spring **51** to where stud **49** in slot **48** at the other end of the first lever arm is about midway thereof. There is no particular significance to this position as far as can cutting or piercing goes, but above is the action.

(3) Looking at FIGS. 3, 4 and 5, in FIG. 3 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 on the left end to an intermediate position while insufficient force has been applied to the engaged can to cause the right-hand end to rise against spring **51**. FIG. 4 then shows the position to which it is probable that the actuating arm may rotate clockwise and first lever arm **43** may rise on the right side against spring **51** before the can is pierced. This is due to the resistance of the metal of the can to cutter wheel **21**. FIG. 5 shows the next stage with the can actually pierced with operator hand pressure maintained at the same level. Note that the right-hand end of first engaging lever **43** has dropped so stud **49** is at the top of slot **48** under action of spring **51**, while the actuating arm **53** remains at about the level of FIG. 4. Further application of force to the main actuating arm lowers it to contact the switch plunger **63** and start the motor. Note that, in FIG. 6, the gearing action on the left-hand side of first lever arm **43** has raised the right-hand end thereof against the action of spring **51** so stud **49** is about midway in slot **48**.

(4) Release of the actuating arm **53** permits the action of spring **51** to pull the right side of first lever arm **43** down, thus gearing up the upper actuating arm to the position of FIG. 5 if the can is still engaged or that of FIG. 1 if the can is removed.

(5) 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, is 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 my application Serial No. 706,608, filed January 2, 1958, entitled "Power-Operated Can Opener," which issued into Patent No. 2,902,757 on September 8, 1959, has a rearward portion thereof, not shown in FIGS. 1 and 2, 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 flanges **28***a* and **29***a* in slots **18** and **19** 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 my invention, I 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 journal 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 journal and extending entirely therethrough, a feed wheel on the end of said drive shaft next 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 face 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 second lever arm for starting and stopping said driving means.

2. Apparatus as in claim 1 including means connected to the slide-lever engaging shaft resiliently biasing the first lever arm toward the rear face of the plate.

3. Apparatus as in claim 1 wherein the means engaging the second and first lever arms comprises a pair of spur gear portions engaging one another.

4. Apparatus as in claim 3 wherein the second lever arm is mounted on the side of the first lever arm away from said plate and the spur gear portion on the second lever arm is fixed to the side thereof next the inside face of the front wall so that the first lever arm slides against the said second lever arm side.

5. Apparatus as in claim 1 including resilient means biasing the end of the first lever arm on the other side of the slide-lever engaging shaft from the engagement of the two lever arms normally downwardly, 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 last-mentioned slot whereby to limit the downward movement of the first lever arm under action of the resilient biasing means.

6. In a power operated can opener, a frame, including a vertical front plate and horizontal top wall, said front plate having front and rear faces and upper and lower ends, the upper end connected to said horizontal top wall, a substantially vertical slideway formed in the front of said plate, a slide received in said slideway adapted to move vertically therein, a journal 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 journal and extending entirely through said journal, a feed wheel on the end of said drive shaft next 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 including an actuating arm having a portion thereof received in a slot through said horizontal top wall and a flange thereon extending at all times substantially normal to the plane of said plate, actuating means operated by said flange for starting and stopping said driving means including a switch fixed to the inside surface of the top wall and having an actuating plunger spring biased to a normal off position extending through an opening in said top wall, the flange on the actuating arm engaging the switch actuating plunger when the actuating arm is moved to a position substantially parallel to the top wall.

7. In a power operated can opener, a frame including a substantially vertical front plate and horizontal top wall, said 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 journal 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 journal and extending entirely through said journal, a feed wheel on an end of said drive shaft next 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 in said frame, a first lever arm mounted on the rear face of said plate, a slide-lever engaging shaft extending through a slot in said plate, attached to the slide at one end, and connected to the first lever arm substantially centrally thereof, a second lever arm, means mounting the second lever arm on the plate rear face for pivotal movement around one end thereof adjacent one end of the first lever arm, means engaging the pivotally mounted 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, resilient means biasing the end of the first lever arm on the other side of the slide-lever engaging shaft from the engagement downwardly, a slot in the first lever arm on the end biased downwardly, means on the rear side of said plate extending into the last mentioned slot and limiting the downward movement of the first lever arm under action of the resilient biasing means, said second lever arm received in a slot in said top wall whereby to permit said second lever arm to pass into said top wall, a flange on said second lever arm adapted to overlie closely against said top wall when said second arm is in said slot, a switch fixed relative to the inside surface of the top wall and having an actuat-

ing plunger spring biased normally to off position extending through an opening in the top wall, the horizontal flange on the second lever arm engaging the switch actuating plunger when the second lever arm is sufficiently forced into said slot in the top wall, the driving means for said drive shaft including a power source actuated by said switch.

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