Nov. 21, 1961 R. D. UTHOFF 3,009,244

CAN OPENER

Filed June 27, 1960 3 Sheets-Sheet 1

Fig. 1

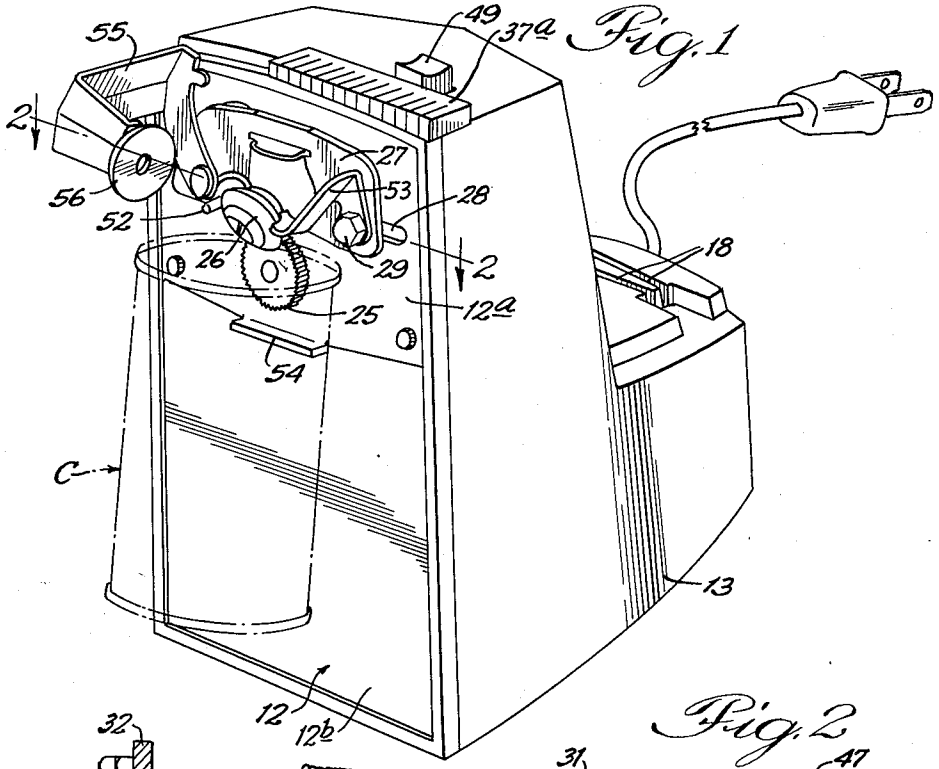


Fig. 2

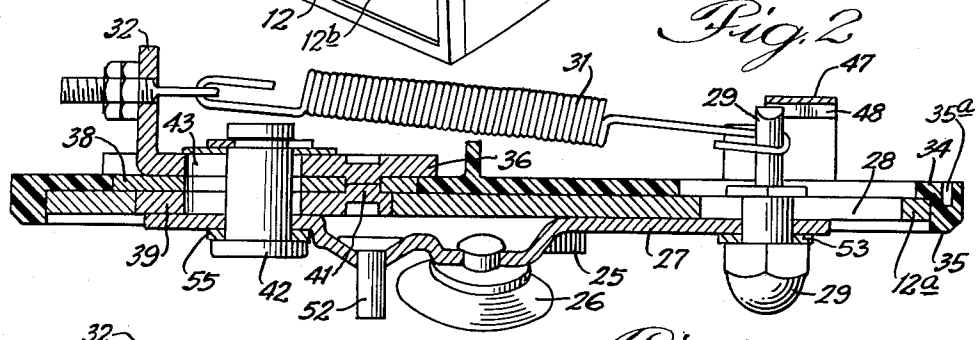
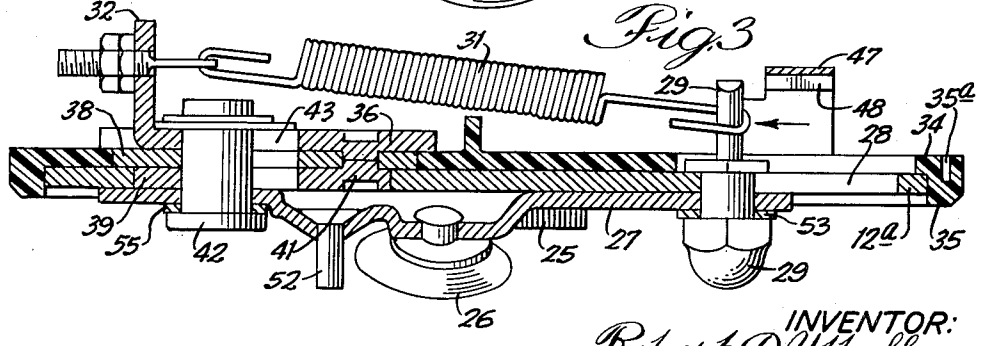


Fig. 3



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Nov. 21, 1961 R. D. UTHOFF 3,009,244

CAN OPENER

Filed June 27, 1960 3 Sheets-Sheet 2

Fig. 4

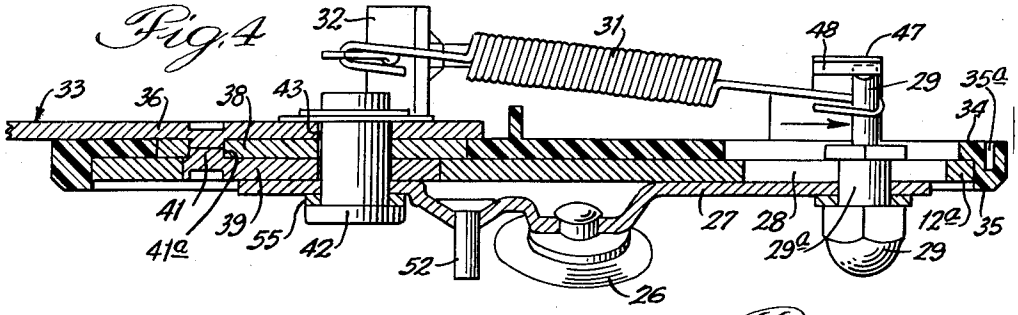


Fig. 5

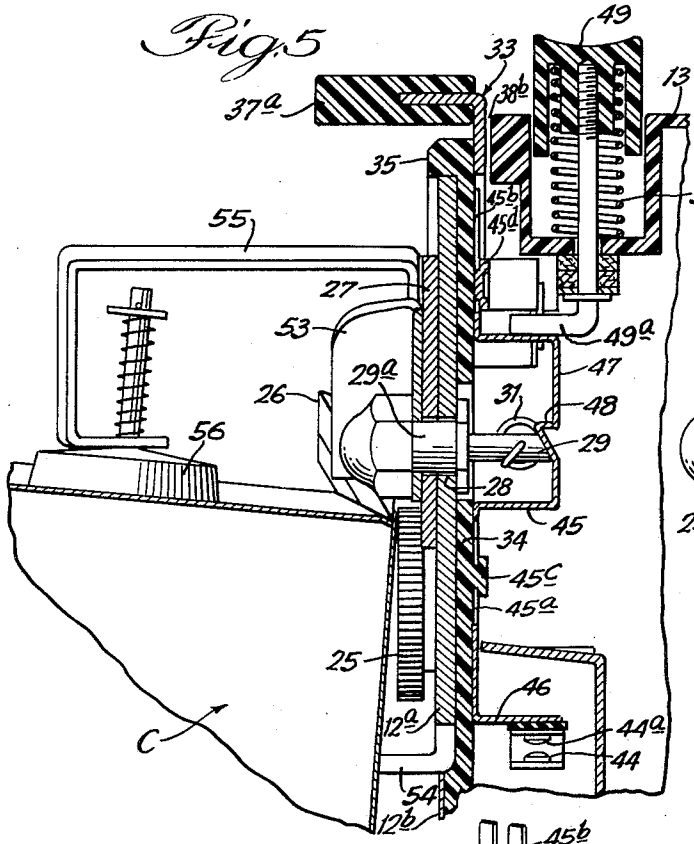


Fig. 6

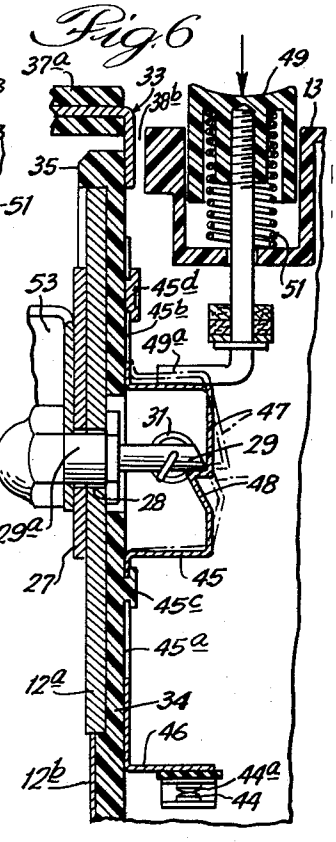


Fig. 7

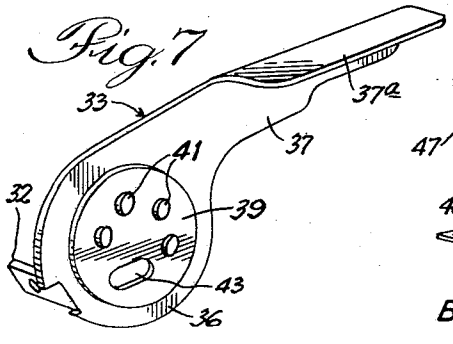
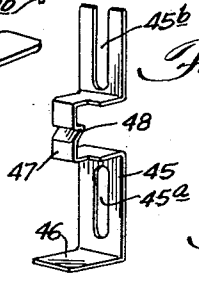


Fig. 8



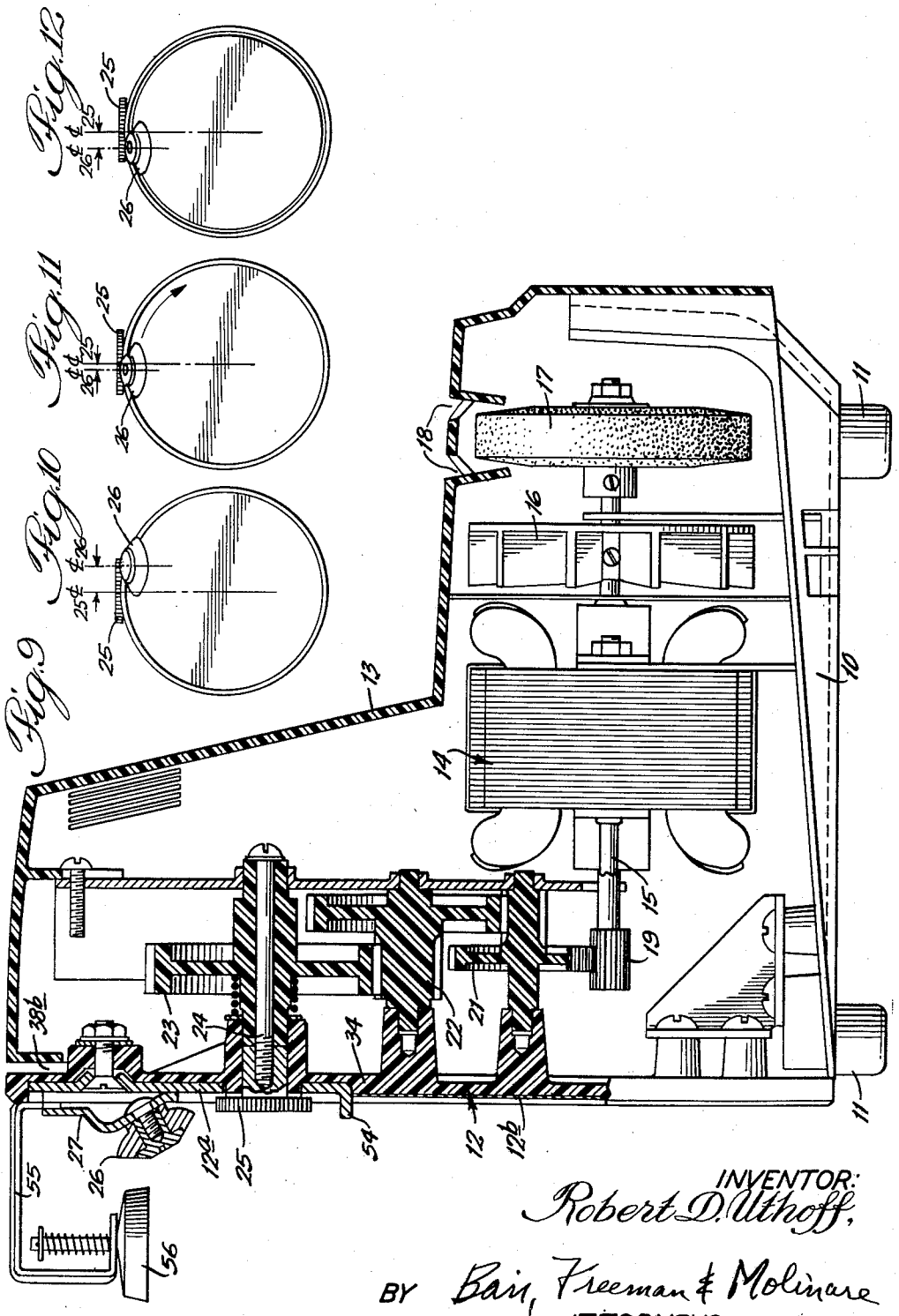
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CAN OPENER

Filed June 27, 1960 3 Sheets-Sheet 3



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Patented Nov. 21, 1961

3,009,244
CAN OPENER

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Filed June 27, 1960, Ser. No. 38,819
9 Claims. (Cl. 30—4)

This invention relates to can openers and more particularly to power-operated can openers and to controls therefor.

Power-operated can openers as heretofore proposed have been used with various types of automatic controls which start the driving motor when the can is clamped in cutting position and automatically stop the motor. It is desirable to be able to start the motor under manual control and to have it stop at completion of a can opening operation. In prior can openers which automatically stop the motor, the mechanisms have been relatively complex and expensive and have not been entirely reliable when used with different types or sizes of cans.

It is one of the objects of the present invention to provide a can opener which is started manually and which is automatically stopped at the end of a can opening operation by a mechanism which is relatively simple and inexpensive, and which functions with complete reliability on substantially all sizes and shapes of cans.

Another object is to provide a can opener in which the action on the cutter wheel during cutting retains a latch to maintain the motor control switch closed and removal of the reaction at the end of the cutting operation releases the latch and allows the switch to open to stop the motor.

According to the feature of the invention, the cutter wheel is carried by a carriage which is horizontally shiftable and which is shifted horizontally in one direction and maintained at one position by cutting reaction on the cutter wheel to hold the switch closed, and which is shifted horizontally in the opposite direction from said one position to a second position by a spring, to allow the switch to open at the end of a cutting operation.

According to another feature of the invention, the carriage carrying the cutter wheel is mounted for horizontal sliding at one end and is moved in an arcuate path at its other end to move the wheel into and out of its cutting position. This movement brings the cutter wheel accurately, and with a high degree of leverage, into cutting engagement with the can and also enables the wheel to be moved easily away from the can at the end of a cutting operation to release it.

A further object of the invention is to provide a can opener in which the control switch for the motor is latched in closed position by a moveable latch member, which engages a latch part on the carriage to hold the latch engaged when the carriage is moved in one direction to one position by cutting pressure on the cutter wheel, and to release the latch when the carriage is moved further in the same direction, to a second position, by a spring at the end of the cutting operation.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of a completed can opener embodying the invention;

FIG. 2 is a partial enlarged section on the line 2—2 of FIG. 1, showing the parts in cutting position;

FIG. 3 is a view similar to FIG. 2 showing the parts in the position they occupy at the end of a cutting operation;

FIG. 4 is a view similar to FIG. 2 showing the parts in the position they occupy when the cutter is elevated to receive or release a can;

FIG. 5 is a partial, vertical section showing the parts in cutting position with the switch open;

FIG. 6 is a view similar to FIG. 5 showing the switch closed and latch in closed position;

FIG. 7 is a perspective view of the operating lever for the carriage;

FIG. 8 is a perspective view of the latch plate;

FIG. 9 is a central, vertical section through the completed can opener with parts shown in elevation;

FIG. 10 is a diagrammatic plan view showing the relationship of the feed wheel and cutter wheel to a can during initial movement of the cutter wheel to its cutting position;

FIG. 11 is a view similar to FIG. 10 showing the cutter wheel and feed wheel in the cutting position; and

FIG. 12 is a view similar to FIGS. 10 and 11 showing the position of the feed wheel and cutter wheel at the end of a cutting operation.

The can opener of the invention as best seen in FIG. 9 comprises a frame including a horizontal base **10**, which may conveniently be supported on legs **11**, and a vertical face-plate **12**. The operating parts of the can opener may be enclosed in a housing **13** which may conveniently be molded of plastic or the like and which fits closely against the base plate at its bottom and against the vertical face plate **12** at its top and forward sides. The housing encloses a driving motor indicated generally at **14**, having a horizontal shaft **15** extending from opposite ends thereof. Toward the rear of the housing the shaft **15** may carry a fan or blower **16** to circulate coolant air over the motor and beyond the fan may carry a knife-sharpening wheel **17**. The cover **13** is formed with slots **18** through which knives may be inserted to contact the wheel **17** and be sharpened thereby.

At its forward end the shaft **15** carries a pinion **19** which meshes with the lower gear of a reducing gear set that includes a first gear and pinion set of which the gear is designated at **21**, a second gear and pinion set of which the pinion is designated at **22**, and an output gear **23**. The output gear **23** is secured to a shaft **24** which carries a can feed wheel **25** lying adjacent to and in front of the face plate **12**. The feed wheel **25** may be of the usual construction with a knurled periphery to engage the flange of a can to be opened and to hold the can in cutting engagement, with the cutter wheel to be described hereinafter, to cut the top therefrom.

A cutter wheel **26** is adapted to be moved into cutting relation to the feed wheel **25** such that it will engage and cut the can to be opened. The axis of the cutting wheel as shown is tilted forward at a slight angle to the horizontal so that the sharp rim of the cutting wheel will engage and cut the top of the can closely adjacent to the can's flange and will roll the cut edge inward adjacent to the side wall of the can. The axis of the cutting wheel lies approximately in a plane including the axis of the shaft **24** in the cutting position, but is preferably tilted very slightly relative to such plane for better cutting and is further moveable into and out of such plane as described hereinafter.

According to a feature of the present invention, the cutting wheel **26** is carried by a carriage **27** in the form of a plate generally parallel and moveable relative to the front plate **12**. One end of the carriage, as shown at the right in FIGS. 1, 2 and 3, is mounted for horizontal sliding movement relative to the face plate **12**. For this purpose, the face plate is formed with a horizontally extending slot **28** through which a pin **29** carried by the carriage **27** is slidably extended. The carriage is pref-

erably urged to the left as seen in FIGS. 2 and 3 by a spring **31** connected at one end to the pin **29** and its opposite end to a bracket **32** formed on a lever **33** and projecting rearwardly from the face plate. The pin **29** has a portion **29***a* slightly smaller than the small dimension of slot **28**, as best seen in FIGURES 5 and 6, to insure only horizontal sliding movement therebetween.

As best seen in FIGS. 1 and 9, the face plate **12** includes an upper metal mounting plate indicated at **12***a* and a lower name plate **12***b*, forming the front surface of the can opener, and which are mounted in a molded plate **34** having a rim molding **35** around its periphery, a portion of the rear of molding **35** being recessed at **35***a* to receive cooperating edges of the cover **13**. The carriage **27** overlies and moves against the metal face plate **12***a* as shown.

The operating lever **33** includes a generally circular hub portion **36** which overlies the rear surface of the face plate portion **34** and an extending arm portion **37**, as best seen in FIG. 7, which terminates in a finger piece **37***a*. As seen in FIGS. 5 and 6, the arm portion **37** extends through a vertical slot **38***b* defined by the cover **13** and can be moved pivotly in a vertical plane as described hereinafter to operate the can opener.

The operating arm **33** further includes a circular disc **38** secured to the hub portion **36** and fitting rotatably in a circular opening in the backing plate **34** of the face plate. A disc **39**, similar to disc **38**, is secured to the face of the disc **38** and fits rotatively in a circular opening in the metal face plate **12**. The hub portion **36** and disc **39** are secured together by forming depressions therein as indicated at **41** which are welded or otherwise suitably connected through openings **41***a* in disc **38**. In this way the operating arm is mounted for rotation about the discs **38** and **39** which are rotatable in parts **34** and **12***a* of the face plate **12**.

At its other end, the carriage **27** is connected to the operating lever **33** by means of a pin **42** secured to the carriage **27** and extending through an elongated slot **43** formed in the operating lever **33** adjacent to but spaced from its axis of pivoting. The pin **42** is slightly smaller than the small dimension of slot **43**, as best seen in FIGURE 4, to provide means for effecting movement of carriage **27** by swinging of lever **33**. When the can opener is in its cutting position as shown in FIGS. 2, 11 and 12, the elongated slot **43** lies generally horizontal with its longitudinal axis parallel to that of the slot **28** through which the pin **29** extends, so that the carriage **27** can shift horizontally. When the operating lever is swung upward to its open position to receive and release a can, the pin **42** will be engaged and swung upwardly in a generally arcuate path to move the cutter wheel **26** away from the can to the position illustrated in FIG. 4.

The motor **14** is controlled by a switching and latch-mechanism best shown in FIGS. 5 and 6. As shown, this mechanism comprises normally open contacts **44** and **44***a* which are in circuit with the motor. The contacts are adapted to be closed by a slidable latching plate **45** which is mounted for vertical sliding movement on the rear face of the face plate backing sheet **34**, and which has at its lower end an angular extension **46** overlying and engageable with the upper contact **44***a* to move it downward into engagement with the lower contact **44**. The latching plate has a pair of spaced track slots, **45***a* and **45***b*, which cooperate with headed pins, **45***c* and **45***d*, to maintain latch plate **45** slidably adjacent sheet **34**. The latching plate further includes a U-shaped portion **47** overlying the inner end of the pin **29** and formed intermediate its height with a latching projection **48** tapered at its lowered end and terminating in an abrupt latching shoulder at its upper end. The U-shaped portion **47** of the latching plate is flexible so that it can bend outwardly to the dot dash line position shown in FIG. 6 to pass the inner end of the pin **29** when the latching plate is depressed. The latching plate is adapted to be operated by a button **49** extending through an aperture in the upper side of the housing **13**. The button is urged upwardly by a coil spring **51**, button **49** carries an angular extension **49***a* at its lower end to engage the upper portion of the U-shaped off-set **47** in the latching plate **45** to force it downwardly.

The carriage **27** is preferably provided with guide means to hold a can being cut in proper position. As shown, this guide means includes a pin **52** at one side of the cutter wheel **26** and a curved guide plate **53** secured to the carriage and lying at the opposite side of the cutter wheel. In addition, the face plate **12** may be provided with an outwardly extending flange **54** spaced below the feed wheel **25** to engage the side wall of a can during cutting so as to hold it against tilting. The carriage may also carry a generally U-shaped arm **55**, pivotally mounted theeron, and carrying a magnet **56** at its free end to overlie the top of a can being cut and hold the top away from the can when it is completely severed from the can C.

To open a can with the can opener of the invention, the finger piece **37***a* is raised to swing the arm **37** counter-clockwise as seen in FIG. 1, thereby to raise the cutting wheel **26** to a position above and slightly to the right of the feed wheel **25** as the parts are seen in FIG. 1. In this position the cutting wheel **26** will lie approximately as shown in FIGS. 9 and 10 relatively to the feed wheel **25** so that the rim of a can to be opened can be inserted between the feed wheel and cutting wheel with the lower edge of the can's projecting rim resting on the top of the feed wheel **25**. With the can held in this position, the operating arm **33** may be swung back clockwise and downward to the position shown in FIG. 1. During this movement the cutting wheel **26** will be moved downwardly and to the left relatively to the feed wheel **25** so that the lower edge of cutter **26** will be brought into engagement with the top of the can adjacent to and inside of the can's rim in the usual manner. During the final stages of this movement the cutter wheel will preferably penetrate the top of the can, as seen in FIG. 5, to be in a position to cut out the top of the can when the feed wheel is driven.

Due to the pressure on the cutter wheel **26** by the can and due to the fact that the cutter wheel in its final movement moves to the left as seen in FIGS. 2, 3 and 4, the pressure of the can on the cutter wheel will hold the carriage **27** slightly to the right of its extreme left hand position with the parts occupying the position shown in FIGS. 2 and 11. At this time the cutter wheel lies slightly above and very slightly to the left of the axis of the feed wheel as illustrated in FIG. 11 with the axis of the feed wheel and the cutter wheel lying generally in a vertical plane normal to the line of movement of the carriage **27**.

The can is now ready to be cut and the cutting operation may be initiated by pressing downward on the switch button **49**. This operation will move the latch plate **45** downward, the U-shaped portion **47** springing out over the end of the pin **29** as illustrated in FIG. 6 until the latching projection **48** is below the pin as shown in full lines in FIG. 6. At this time, the normally open contacts, **44** and **44***a*, will be closed to start the motor and the contacts will be held closed by the latching engagement of the latch portion **48** with the end of the pin **49** as shown in FIGS. 2 and 6.

The cutting operation will proceed in the usual manner with the feed wheel **25** turning the can against the cutting wheel **26** until the top of the can is completely severed therefrom. At this time the cutting pressure on the cutting wheel will be removed and the carriage **27** will be shifted to the left to the position shown in FIGS. 3 and 12 by the spring **31**. As shown in FIG. 3 this movement will move the pin **29** away from the latching projection **48** so that the latching plate **45** will be released and may be moved upward under the bias of the main contact spring blade which carries contact **44***a*, thereby

permitting contacts 44 and 44*a* to separate. If desired, a separate spring could be utilized to restore plate 45. The opening of the contacts will stop the motor promptly at the end of the cutting operation so that no excess travel will be involved and the can is now ready to be removed. This may be accomplished by again raising the lever 33 to move the cutting wheel away from the feed wheel so that the can is free to be lifted out. The parts are then in a position to receive a second can to be opened in a succeeding operation.

It will be noted that when the motor is running the sharpening wheel 17 will be driven and may be used to sharpen knives in the usual manner. To maintain the motor operating during the knife sharpening operation, the lever 33 may be lifted part way to bring the pin 29 into registry with the latching projection 48. At this time when the button 49 is depressed the latching plate will be latched in its lower position to hold the contacts 44 and 44*a* closed so that the motor will continue to operate. To stop the motor the lever 33 may be swung downward to its position as shown in FIG. 1, whereupon the parts will assume the position shown in FIG. 3 to release the latching plate and allow the switch to open.

While one embodiment of the invention has been shown and described in detail, it will be understood that this is illustrative only and is not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A power operated can opener comprising a frame, a feed wheel journaled in the frame, a motor operatively connected to the feed wheel to drive it, a carriage movably mounted on the frame, a cutter wheel mounted on the carriage, means to move the carriage to a cutting position in which the cutter wheel overlaps the rim of the feed wheel to grip a can between them, the carriage being shiftable in a line substantially normal to a plane including the axes of the feed wheel and of the cutter wheel when they are in cutting position, cutting pressure on the cutter wheel urging the carriage in one direction along said line, resilient means urging the carriage in the other direction along said line to shift the carriage when the cutting pressure is removed at the end of a cutting operation, a control device for the motor, and means operated by the last mentioned shifting of the carriage, by the resilient means, to operate the control device to stop the motor.

2. A power operated can opener comprising a frame, a feed wheel journaled in the frame, a motor operatively connected to the feed wheel to drive it, a carriage movably mounted on the frame, a cutter wheel mounted on the carriage, means to move the carriage to a cutting position in which the cutter wheel overlaps the rim of the feed wheel to grip a can between them, the carriage being shiftable in a line substantially normal to a plane including the axes of the feed wheel and of the cutter wheel when they are in cutting position, cutting pressure on the cutter wheel urging the carriage in one direction along said line, resilient means urging the carriage in the other direction along said line to shift the carriage when the cutting pressure is removed at the end of a cutting operation, a switch to control the motor, manual operating means to close the switch, and latch means to hold the switch closed including a part movable with the carriage, to hold the switch closed when the carriage is urged in said one direction by cutting pressure on the cutter wheel, and to release the switch so that the switch may open when the carriage is shifted by the resilient means at the end of the cutting operation.

3. A power operated can opener comprising a frame including a flat upright face plate, a feed wheel journaled in the frame on an axis normal to the face plate, a motor operatively connected to the feed wheel to drive it, a carriage mounted for movement on the face plate in a plane parallel thereto, first means horizontally displaced from the feed wheel for guiding one end of the carriage for horizontal linear movement toward and away from the feed wheel, second means for moving the other end of the carriage in an arcuate path parallel to the face plate, a cutter wheel carried by the carriage and movable in one position of the carriage to a cutting position vertically overlapping the rim of the feed wheel to grip a can between them, said second means also mounting said other end of the carriage for horizontal movement, cutting pressure on the cutter wheel urging the carriage horizontally in one direction, resilient means urging the carriage horizontally in the other direction, a control device for the motor, and means operated by horizontal movement of the carriage in said other direction to operate the control device to stop the motor.

4. A power operated can opener comprising a frame including a flat upright face plate, a feed wheel journaled in the frame on an axis normal to the face plate, a motor operatively connected to the feed wheel to drive it, a carriage mounted for movement on the face plate in a plane parallel thereto, first means horizontally displaced from the feed wheel for guiding one end of the carriage for horizontal linear movement toward and away from the feed wheel, second means for moving the other end of the carriage in an arcuate path parallel to the face plate, a cutter wheel carried by the carriage and movable in one position of the carriage to a cutting position vertically overlapping the rim of the feed wheel to grip a can between them, said second means also mounting said other end of the carriage for horizontal movement, cutting pressure on the cutter wheel urging the carriage horizontally in one direction, resilient means urging the carriage horizontally in the other direction, a control switch for the motor, manual means to close the control switch, and latch means to hold the control switch closed when the carriage is urged horizontally in said one direction and to release the control switch so that said switch may open when the carriage is shifted horizontally in said other direction at the end of the cutting operation.

5. A power operated can opener comprising a frame including a flat upright face plate, a feed wheel journaled in the frame on an axis normal to the face plate, a motor operatively connected to the feed wheel to drive it, a carriage mounted for movement on the face plate in a plane parallel thereto, first means horizontally displaced from the feed wheel for guiding one end of the carriage for horizontal linear movement toward and away from the feed wheel, second means for moving the other end of the carriage in an arcuate path parallel to the face plate, a cutter wheel carried by the carriage and movable in one position of the carriage to a cutting position vertically overlapping the rim of the feed wheel to grip a can between them, said second means also mounting said other end of the carriage for horizontal movement, cutting pressure on the cutter wheel urging the carriage horizontally in one direction, resilient means urging the carriage horizontally in the other direction, a normally open control switch for the motor, a latch plate slidable relative to the face plate and engageable with the switch to close it, manually operable means to selectively move the latch plate to switch closing position, and the guiding means including a part engageable with the latch plate to hold it in switch closing position when the carriage is urged horizontally in said one direction and to release the latch plate so that the switch may open when the carriage is moved horizontally in said other direction at the end of the cutting operation.

6. A power operated can opener comprising a frame including a flat upright face plate, a feed wheel journaled in the frame on an axis normal to the face plate, a motor operatively connected to the feed wheel to drive it, a carriage mounted for movement on the face plate in a plane parallel thereto, first means horizontally displaced from the feed wheel for guiding one end of the carriage for horizontal linear movement toward and away from the

feed wheel, second means for moving the other end of the carriage in an arcuate path parallel to the face plate, a cutter wheel carried by the carriage and movable in one position of the carriage to a cutting position vertically overlapping the rim of the feed wheel to grip a can between them, said second means also mounting said other end of the carriage for horizontal movement, cutting pressure on the cutter wheel urging the carriage horizontally in one direction, resilient means urging the carriage horizontally in the other direction, a normally open control switch for the motor, a latch plate slidable relative to the face plate and engageable with the switch to close it, manually operable means to selectively move the latch plate to switch closing position, and the guiding means including a part engageable with the latch plate to hold it in switch closing position when the carriage is urged horizontally in said one direction and to release the latch plate so that the switch may open when the carriage is moved horizontally in said other direction at the end of the cutting operation, and the latch plate being resilient to spring over and into engagement with said part when the latch plate is moved by the manually operable means.

7. The can opener of claim 3 in which the means for moving the other end of the carriage in an arcuate path comprises a disc rotatable on and parallel to the face plate, and a pin and slot connection between the disc and the carriage which lies substantially horizontal when the carriage is in cutting position.

8. In a power operated can opener having a feed wheel and a cutter, a motor drivably connected to the feed wheel, a horizontally movable part carrying one of said feed wheel or cutter and urged in one direction by cutting pressure thereon against a resilient restoring means and

in the other direction by said resilient restoring means, a control means including a normally open switch controlling the motor, a latch plate having a latching projection thereon and movable in one direction to close the switch, manually operable means to selectively move the latch plate in said one direction, and a latch element on said horizontally movable part engageable with the latching projection when the part is urged in said one direction by cutting pressure, to latch the latch plate in its switch-closing position and to release the latch plate when said part is moved in said other direction at the end of the cutting operation.

9. In a power operated can opener having a feed wheel and a cutter, a motor drivably connected to the feed wheel, a horizontally movable part carrying one of said feed wheel or cutter and urged in one direction by cutting pressure thereon against a resilient restoring means and in the other direction by said resilient restoring means, a control means including a normally open switch controlling the motor, which switch is movable to a closed condition when an uncut can top is interposed between the feed wheel and cutter, the horizontally movable part being operatively associated, under the bias of said resilient restoring means, with the control means to restore the switch to an open position upon the complete severance of the top from a can.

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