Sept. 12, 1950 J. LAMPL 2,522,382

CAN OPENER

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FIG. 1

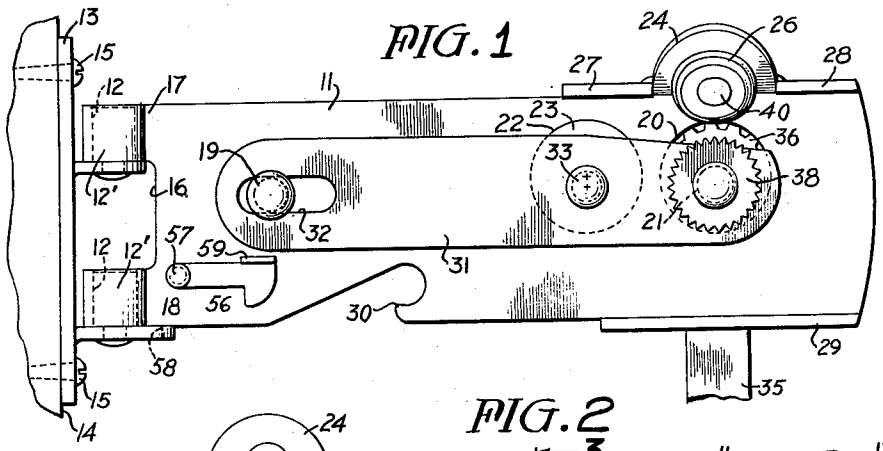
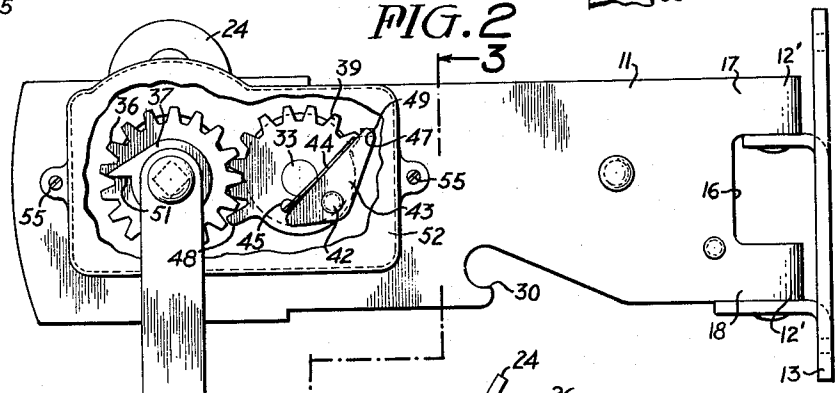
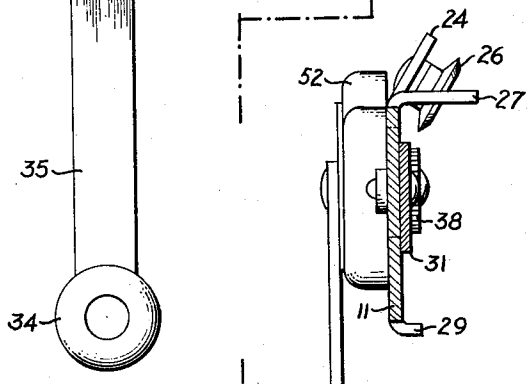


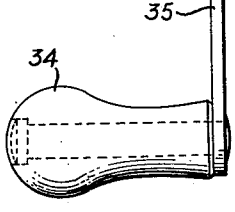
FIG. 2





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FIG. 3



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FIG. 4

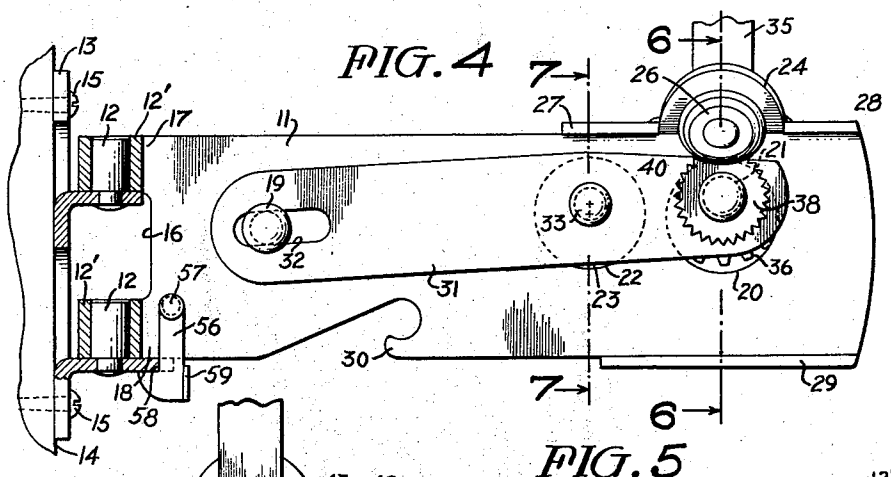


FIG. 5

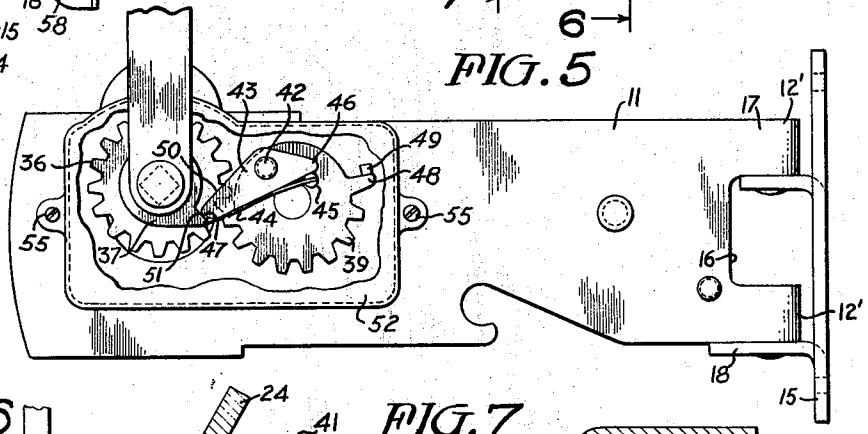


FIG. 6

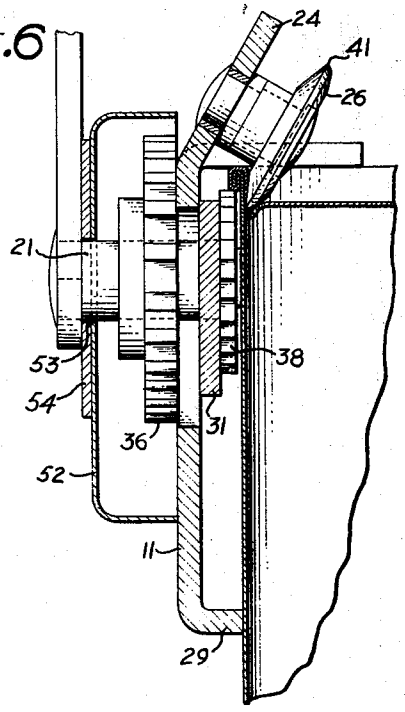
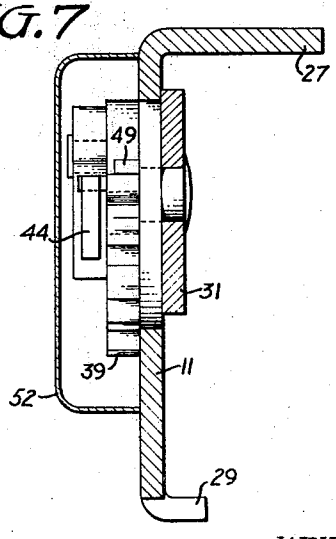


FIG. 7



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CAN OPENER

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7 Claims. (Cl. 30—9)

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This invention relates to can openers, and more particularly to an improvement in a can opener of the type comprising a serrated roller and a cutting wheel and wherein the cutting and gripping mechanism is automatically releasable by a reversing movement of the handle.

In my invention the rotation of an operating handle in one direction primarily engages the lip of a can between the serrated wheel and the cutter, and further rotation of the handle in the same direction shears the lid from the can, whereas a rotation of the handle in a reverse direction moves the serrated wheel and cutter apart to release the lip of the can from its engagement therebetween.

Can openers having a fixed cutting blade as well as those having a cutting wheel are well known. Likewise well known is the general type of can opener wherein the shearing operation is accomplished by the rotation of an operating handle. Can openers are also known which may operate to shear the lid from the can when an operating crank is turned in one direction and which effect the releasing of a can upon initial reverse rotation of the handle.

None of such can openers of which I have knowledge contains as simple and fool proof a construction as mine. In addition, none of said can openers elevates the sheared portion of the can lid to a position where it may be readily grasped before the shearing operation is completed.

It is an object of my invention to provide a can opener with a single operating handle which, upon rotation in one direction, initially grips the can, and upon continued rotation in the same direction shears the lid therefrom.

It is a further object of my invention to provide a can opener of simple and improved construction operated by a single operating handle which, upon rotation in one direction, first grips and then shears the lid from a can, and which, upon reverse rotation of the handle, releases said can opener from its can-cutting engagement.

A further object of my invention is to provide a can opener which tilts the can lid to a desired extent just before said lid is completely severed so as to permit the easy grasping of the can lid before the severing action is completed.

A further object of my invention is to provide a can opener having the desired characteristics described which is simple in operation and which may be readily and economically manufactured.

A further object of my invention is to provide a can opener having a novel reversing mechanism

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for releasing the can from cutting engagement with the can opener.

A further object of my invention is to provide a can opener of the desired character described having a suitable cover for certain parts of the operative mechanism thereof.

A further object of my invention is to provide a can opener having a novel reversing mechanism for releasing the can from cutting engagement with the can opener associated with a novel mechanism for engaging the can and placing the parts in cutting position upon an initial forward rotation of the operating crank.

A further object of my invention is to provide a novel adjustable support and clamping means for a can opener of the desired character described.

A still further object of my invention is to provide a can opener which comprises a freely rotatable cutting wheel associated with a serrated driving wheel operatively connected with an eccentric whereby an initial clockwise rotation of the handle effects a partial rotation of the eccentric so as to cause the serrated wheel to approach the cutter, and means holding the serrated wheel in operative engagement with the can until removed from said engagement by a counter-clockwise rotation of the handle.

Another further object of my invention is to provide a can opener in which a cutting wheel on a fixed axis is operatively associated with an opposed and relatively shiftable driving wheel, by virtue of a driving gear affixed to an operating handle, and a cam and a mutilated gear associated with a spring loaded pawl, whereby rotation of the handle for cutting is freely permitted, but wherein reverse rotation of the handle engages the pawl and causes a limited partial rotation of the mutilated gear and the cam so as to effect a release of the can from between the serrated and cutting wheels.

Another further object of my invention is to provide a can opener wherein a pawl affixed to a mutilated gear may engage a cam affixed to a driving gear rotatable by a handle, and whereby the clockwise rotation of the driven gear partially rotates said mutilated gear and said pawl thereby causing the serrated wheel to approach the cutting wheel, and wherein counter-clockwise rotation of said driving gear partially rotates said mutilated gear and said cam in a reverse direction to a limited extent so as to move said serrated wheel away from said cutting wheel.

Another further object of my invention is to provide a novel association between the cutting

wheel and the serrated wheel of a can opener whereby a partially severed can top is tilted upwardly during the close of the cutting operation.

Other objects and advantages will appear and be brought out more fully from the following description considered with reference to the accompanying drawings throughout which like parts are designated by like numbers.

In the drawings:

Figure 1 is an elevational view of my novel can opener viewed from the side upon which the cutting parts are located.

Figure 2 is an elevational view of my can opener from the opposite side shown in Figure 1 and upon which the crank and operating mechanism is located, with the parts in a different operating position from that of Figure 1.

Figure 3 is a sectional view taken on the line of 3—3 of Figure 2.

Figure 4 is a view substantially the same as shown in Figure 1 but with operating mechanism shown in can cutting position and the can opener supporting mechanism shown in section.

Figure 5 is a fragmentary view of my novel operative mechanism in an extreme position of its releasing movement.

Figure 6 is a sectional view taken on the line 6—6 of Figure 4, showing a can engaged in my can opener during a cutting operation.

Figure 7 is a sectional view taken on the line 7—7 of Figure 4.

Referring more particularly to the drawings, I show an elongated can opener frame 11 pivotally mounted by means of pins 12 to a wall bracket 13 which may be secured to a wall 14, as by means of screws 15. Said frame has a cutout portion 16 providing an upper leg 17 and a lower leg 18 which may be bent into bearing sleeves 12' for engagement with the pins 12 so as to provide a sturdy vertical pivotal support for the can opener. Said frame is further provided with a fixed shouldered pin 19, a hole 20 for the orbital oscillation of a shaft 21, and a circular hole 22 between said pin 19 and said hole 20 for rotatable confinement of an annular eccentric disk 23 as hereinafter more fully appears. An ear 24 on said frame 11 extends upwardly at an angle to the plane of said frame and provides a fixed support for a freely rotating cutting wheel 26, while flanges 27, 28 and 29, stuck out from the frame, serve to strengthen it. These flanges 27, 28 and 29 serve also as can-positioning guides to hold a can in correct alignment with the cutting wheel 26. An optional hook bottle opener 30 may be formed in the lower portion of the frame.

A lever 31 is journalled at one of its ends on the pin 19 through a slot 32 in said lever 31. Said lever 31 is further journalled between its ends upon an eccentric bearing pin 33 affixed to the eccentric disk 23 rotatably mounted in the frame 11 so that the rotation of said disk 23 imparts an orbital up-and-down motion to the right-hand end of the lever 31 as best illustrated in Figure 1. The movement of the lever 31 resembles that of a connecting rod between a piston and crankshaft in an engine but is restricted to less than a complete revolution of the disk 23.

A handle 34 is mounted upon a crank 35 keyed to the shaft 21. Said shaft 21 is rotatably mounted in the right-hand end of said lever 31 and extends through the hole 20 for orbital rotation therein. Keyed to the shaft 21, in addition to the crank 35 is a full gear 36, a cam 37 and a serrated wheel 38.

Eccentrically and rigidly affixed to said eccentric disk 22 is a mutilated gear 39 adapted to mesh with the full gear 36 during certain operating cycles.

It will now appear that the rotation of the crank 35 in either direction will, if said gears 36 and 39 are in mesh, cause the mutilated gear 39 and the eccentric disk 23 to rotate, thereby rotating the eccentric bearing pin 33 and oscillating the lever 31 so as to orbitally raise or lower the shaft 21 within the hole 20. The mutilated gear 39, being eccentrically mounted upon the eccentric disk 23, in like manner to the lever 31, oscillates in unison with the lever 31 and thereby retains a substantially fixed center-to-center relationship to the full gear 36 which is carried by the lever 31.

The cutting wheel 26 is rotatably mounted on a stud 40 seated in the ear 24 of the frame 11 at an angle with respect to the plane of the serrated wheel 38, and with the cutting edge 41 of the cutting wheel 26 adjacent to the outer edge of said serrated wheel 38 when the serrated wheel is in its uppermost position.

Pivotally mounted upon the mutilated gear 39 (Figures 2 and 5) by means of a pin 42 I provide a pawl 43. A spring 44 is mounted in a slotted pin 45 also on the gear 39 against which pin one end 46 of the pawl is normally urged by the spring. The other end 47 of the pawl projects beyond the teeth at one end of the mutilated gear 39. At the other end of the mutilated gear I provide an enlarged tooth or stop 48 which prevents the clockwise rotation of the mutilated gear or the counter-clockwise rotation of the full gear beyond their position shown in Figure 2. A stop 49 is secured in the frame 11 diametrically opposite the position of the enlarged tooth 48 shown in Figure 2 for limiting the counter-clockwise rotation of the mutilated gear by the engagement of said enlarged tooth 48 with said stop 49, as shown in Figure 4.

The cam 37, which is keyed to the shaft 21, lies in the plane of the pawl 43 so that a clockwise rotation of the handle 34 (Figure 2) initially causes the mutilated gear 39 to run off of the full gear 36, and subsequently causes the cam 37 to engage the back 50 of the pawl and to flex the spring 44 thereby permitting the cam 37 to slip past said pawl 43 at each successive clockwise revolution of the crank. The enlarged tooth 48 meanwhile holds the mutilated gear 39 against further counter-clockwise rotation due to the engagement of said tooth with the stop 49.

A counter-clockwise rotation of the crank turns the full gear 36 and hence the cam 37 into the position shown in Figure 5 wherein the cam face 51 has engaged the end 47 of the pawl. Continued counter-clockwise rotation of the crank brings about an inter-engagement of the gears 36 and 39 and a clockwise rotation of the mutilated gear 39 until the enlarged tooth 48 on said mutilated gear engages the full gear 36 thereby preventing further clockwise rotation of said mutilated gear (Figure 2).

A cover 52, of a size and shape suitable for covering the gears 36 and 39 and their associated mechanism, may be provided upon the side of the frame opposite from the serrated wheel 38 to protect the gears, the cam 37, and the pawl 43, and to avoid posible injury to the fingers of an operator. Said cover 52 has a hole 53 to accommodate the shaft 21. A thrust washer 54 for the

crank 35 preferably is provided between said cover and said crank. The cover 52 may be secured to the frame 11 as by screws 55.

To removably secure the frame 11 on the pins 12, I provide a hook-shaped latch 56 pivoted to the frame 11 by a pin 57. Said latch may engage a slot 58 formed in an ear of the bracket 13 whereby the frame 11 is adjustably held in a desired position of extension from the wall 14 and also may be releasably locked against vertical movement upon said pins 12. A fingerpiece 59 aids the manipulation of said latch 56. The frame 11 may be swung parallel with the wall 14 when said latch 56 is released from engagement with the slot 58.

The axes of the cutting wheel pin and the driving wheel pin or shaft are preferably inclined toward one another at approximately 30° included angle, but at least greater than 0° and not more than about 45°.

In the operation of my can opener, the handle 34 is turned to its limit of counter-clockwise rotation as shown in Figure 2, thus bringing the enlarged tooth 48 of the mutilated gear 39 into engagement with the full gear 36 and preventing further counter-clockwise rotation of said full gear as above stated. In this position the serrated wheel 38 is spaced from the cutting wheel 26 permitting the insertion of the lip of a can therebetween, while the top and side of the can may be held against the flanges 27, 28 and 29, and the eccentric bearing pin 33 is at the lower limit of its movement.

The handle 34 is next turned in a clockwise direction from the position illustrated in Figure 2, resulting in the rotation of the mutilated gear 39 in a counter-clockwise direction until the cutting wheel 26 and the serrated wheel 38 are in can-cutting position, whereupon said mutilated gear runs off the full gear 36, just as the enlarged tooth 48 engages the stop 49 to prevent the continued counter-clockwise rotation of said mutilated gear. Continued clockwise rotation of the handle rotates the serrated wheel 38 which carries the edge of the can with it for cutting engagement with said cutting wheel 26. At each successive clockwise rotation of the handle 34 the cam 37 slips by the back 50 of the pawl 43 by depressing the spring 44 in a counter-clockwise direction.

Upon completion of the cutting operation, the lid having been severed from the can, the handle is given a counter-clockwise rotation as heretofore described, resulting in the spacing of the serrated wheel 38 from the cutting wheel 26, whereby the lip of the can is released.

Just before the lid of the can is completely severed, said lid is tilted upwardly so as to be readily grasped by virtue of the novel relationship between the cutting edge 41 of the wheel 26 and the serrated wheel 28. The cutting wheel 26 is disposed at an angle to the plane of the serrated wheel 38 as hereinbefore noted. The axis of the cutting wheel is preferably offset slightly from that of the serrated wheel when the latter is in cutting position. By this arrangement the cutting edge 41 bears down upon the top of the can lid adjacent to the cutting area slightly rearwardly of the tangential contact of the can lip with the serrated wheel. The edge of the lid is thereby pushed downwardly by the inclined face 41 of the cutting wheel tending to tilt the lid upwardly so that it may be readily grasped before the completion of the cutting operation. The

cutting wheel 26 and the angle of the cutting edge 41 thereof should have sufficient thickness and be sufficiently great, respectively, to prevent the jamming and binding of the cutting wheel during the cutting operation. The proportions illustrated have been found satisfactory.

It should be noted that the movement of the serrated wheel 38 towards the cutting wheel 26, in the initial clockwise rotation of the crank 35, is not a straight-line but a curved-line movement, wherein the serrated wheel is swung upwardly towards the cutting wheel, at the same time the serrated wheel is turning and grips the under side of the can lip and tends to roll into its operative proximity to the cutting wheel. The resultant of these curved-line and rolling movements is a smooth, progressive, initial can piercing operation which is achieved by a minimum of effort.

Although I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to include any and all equivalent devices.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A can opener comprising, a supporting frame, a lever journalled upon the frame, and a shaft rotatably mounted on the lever, a crank, a cam, a full gear and a driving wheel keyed to said shaft, an eccentric bearing oscillatably connecting said lever to said supporting frame, a mutilated gear operatively connected to said bearing and engageable with said full gear, a spring urged pawl pivotally mounted on said mutilated gear and engageable with said cam in one direction of rotation of said shaft initially to cause the engagement of said mutilated gear with said full gear, a stop on said mutilated gear, an extension on said supporting frame engageable by said stop to limit the rotation of said mutilated gear in one direction and said stop being also engageable with said full gear to limit the rotation of said mutilated gear in the opposite direction, and a cutter mounted upon the supporting frame in spaced relationship to said driving wheel at one limit of rotation of said mutilated gear and in proximate, can-cutting relationship to said driving wheel at the opposite limit of rotation of said mutilated gear.

2. A can opener comprising, a supporting frame, a lever journalled upon the frame substantially parallel to the plane of said frame, and a shaft rotatably mounted on the lever, a crank, a cam, a full gear and a driving wheel keyed to said shaft, an eccentric bearing oscillatably connecting said lever to said supporting frame, a mutilated gear rigidly affixed to said bearing and engageable with said full gear, a spring urged pawl pivotally mounted upon said mutilated gear and engageable with said cam in one direction of rotation of said shaft initially to cause the engagement of said mutilated gear with said full gear, a stop on said mutilated gear, an extension on said supporting frame engageable by said stop to limit the rotation of said mutilated gear in one direction and said stop being also engageable with said full gear to limit the rotation of said mutilated gear in the opposite direction, and a cutter mounted upon the supporting frame in spaced relationship to said

driving wheel at one limit of rotation of said mutilated gear and in proximate, can-cutting relationship to said driving wheel at the opposite limit of rotation of said mutilated gear.

3. A can opener comprising, a frame having a slot, an annular bearing spaced from said slot, and an opening spaced from said slot and said bearing, a disk rotatable in said bearing, a pivot oscillatable in said slot, a lever connected to said pivot and eccentrically mounted upon said disk for oscillation relative to said frame during the rotation of said disk, a shaft rotatably mounted on said lever and extending through said opening, a full gear, a cam, and a manually rotatable means keyed to said shaft, a mutilated gear engageable with said full gear affixed to and rotatable with said disk, a pawl pivotally secured to said mutilated gear and engageable with said cam in one extreme position of rotation of said mutilated gear so as to turn said mutilated gear into operative engagement with said full gear when said shaft is rotated in a counter-clockwise direction, an enlarged tooth upon said mutilated gear engageable with said full gear for limiting the counter-clockwise rotation of the full gear, a stop upon the frame engageable with said enlarged tooth for limiting the counter-clockwise rotation of the mutilated gear when said shaft is rotated in a clockwise direction, said cam slipping past said pawl during said clockwise rotation of said shaft, a cutter mounted upon said frame, a driving wheel keyed to said shaft adjacent said cutter and relatively removed from said cutter at said limit of counter-clockwise rotation of said shaft, said driving wheel being moved to a proximate can-cutting and gripping relationship to said cutter at said limit of counter-clockwise rotation of said mutilated gear and remaining in said can-cutting and gripping relationship during the continued rotation of said shaft in a clockwise direction.

4. A can opener comprising, a supporting frame, a lever journalled upon the frame, and a shaft rotatably mounted on the lever, an operating handle, a cam, a full gear and a driving wheel keyed to said shaft, an eccentric member oscillatably connecting said lever to said supporting frame, a mutilated gear operatively connected to said member and engageable with said full gear, a spring urged pawl pivotally mounted with respect to said mutilated gear and engageable with said cam in one direction of rotation of said shaft to cause the engagement of said mutilated gear with said full gear, a stop on said mutilated gear, an extension on said supporting frame engageable with said stop to limit the rotation of said mutilated gear in the opposite direction, and a cutting wheel angularly mounted upon the supporting frame in spaced relationship to said driving wheel at one limit of rotation of said mutilated gear and in proximate, can-cutting relationship to said driving wheel at the opposite limit of rotation of said mutilated gear, one side of said cutting wheel being bevelled and formed with a relatively narrower rim portion than body portion, said rim portion normally pressing downwardly upon the lid of a can to tilt said lid upwardly prior to the complete severance of the lid from the can.

5. In a can opener of the character described, a main supporting frame, an eccentric journalled in the frame, a secondary supporting frame journalled to said eccentric for oscillation relative to said main frame, a shaft rotatably carried by said secondary frame, a handle, a serrated wheel, a cam and a full gear affixed to the shaft, and a mutilated gear affixed to the eccentric and engageable with the full gear, a pin affixed to said mutilated gear, a pawl pivotally mounted upon the mutilated gear, a spring secured to the pin normally urging the pawl to one extreme of rotation against said pin, said pawl in one direction of rotation of the cam being engageable with said cam to effect partial rotation of the mutilated gear.

6. A can opener comprising, a supporting frame, a lever journalled upon the frame, and a shaft rotatably mounted on the lever, an operating handle, a cam, a full gear and a driving wheel keyed to said shaft, an eccentric member oscillatably connecting said lever to said supporting frame, a mutilated gear operatively connected to said member and engageable with said full gear, a spring urged pawl pivotally mounted with respect to said mutilated gear and engageable with said cam in one direction of rotation of said shaft to cause the engagement of said mutilated gear with said full gear, a stop on said mutilated gear, an extension on said supporting frame engageable with said stop to limit the rotation of said mutilated gear in one direction and said stop being also engageable with said full gear to limit the rotation of said mutilated gear in the opposite direction, and a cover affixed to said frame and, together with said frame, confining said full gear and said mutilated gear, said frame having a hole providing a bearing for said shaft.

7. A can opener comprising a frame, a lever oscillatably supported on the frame, a cutter mounted on the frame, a can-driving wheel mounted on the lever, a crank for rotating said wheel, automatic cutter-adjusting means comprising a full gear and a mutilated gear, an eccentric connection between said frame and said lever, said mutilated gear being associated with said eccentric for rotating the same and being rotatable therewith, and with said full gear, said full gear being operably connected with said crank and said mutilated gear whereby rotation of said crank rotates said mutilated gear and said eccentric connection to retract said wheel from said cutter and whereby rotation of said crank in an opposite direction advances said wheel into juxtaposition with said cutter and permits continued rotation of said crank in said last-named direction to rotate said wheel for advancing a can against said cutter and for severing the lid thereof.

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