Nov. 25, 1958 B. KLASSEN 2,861,336

ELECTRIC CAN OPENER

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Fig. 1.

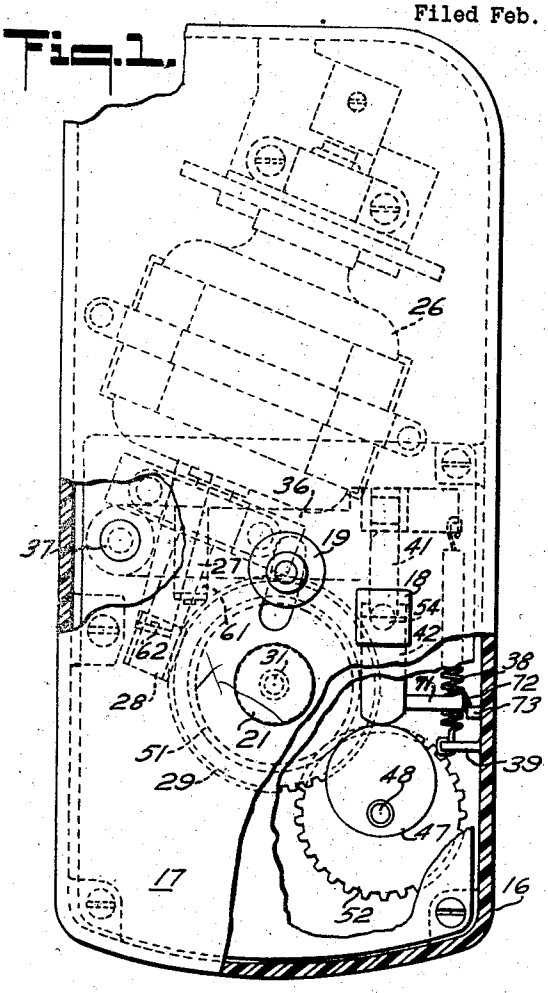


Fig. 3.

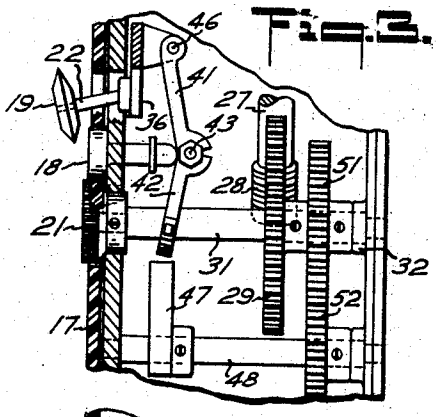
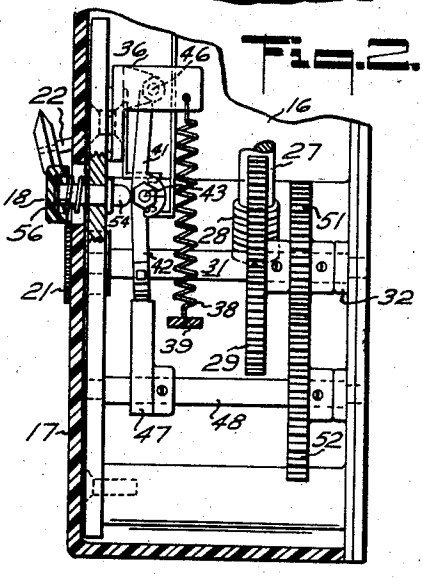


Fig. 2.



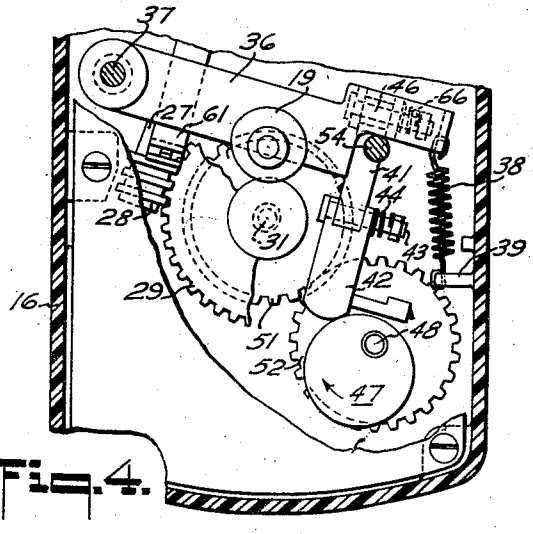
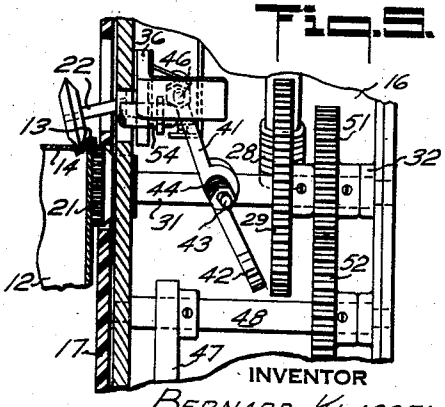


Fig. 4.

Fig. 5.



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ELECTRIC CAN OPENER

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10 Claims. (Cl. 30—4)

This invention relates to power driven can openers, and is more specifically directed towards a can opener adapted for household use in which actuation of a single control effects the initial piercing of the can lid as well as the subsequent removal of the lid from the can body.

An object of the present invention is to provide a can opener in which a small motor drives the moving parts of the apparatus, and in which the number of parts are reduced to a minimum, thereby reducing the cost of the apparatus and eliminating most maintenance or operational difficulties.

Another object of this invention is to provide an electric can opener of the character described in which a single control is manually actuated to effect a depression of a cutter element through a can lid and impart a rotation to the can for completely severing the lid, such rotation continuing only so long as the control remains in its actuated or operative position.

A further object of my invention is to provide a can opener of the above type in which a novel drive mechanism is utilized which is positive in action in both driving and releasing a can being opened.

An additional object of the invention is to provide a can opener as above described in which the cutting element is urged towards its associated can drive wheel with a resilient force whereby a proper can bead clamping action may be automatically obtained irrespective of the height of or irregularities in the can bead.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a front elevational view of the can opener of the present invention, portions of the housing and support plate being broken away.

Figure 2 is a side elevational view with most of the the housing removed, and the parts being illustrated in their normal inoperative position.

Figure 3 is a view similar to Figure 2, but illustrating the position of the parts upon actuation of the starter button.

Figure 4 is another front elevational view showing the parts in their operative position.

Figure 5 is a side elevational view of the parts illustrated in Figure 4.

In broad terms, the apparatus of the present invention is adapted to receive a can **12** which includes a peripheral bead **13** and cover or lid **14**, and completely sever such lid from the can body. To accomplish this, there is provided a suitable vertically movable cutter mechanism, a can drive wheel, and means for moving the cutter downwardly to pierce the lid **14** and effect a rotation of the

drive wheel upon actuation of a simple push button or similar manually engageable control. As will be presently explained, all of the moving parts are operated by a fractional horse-power electric motor, thereby requiring no effort on the part of the user other than depressing the control button.

Referring to the drawing, the can opener mechanism will be seen to be substantially entirely enclosed in a housing **16**, the only exposed portions extending through suitable openings in the front wall **17** of the housing, and including a push button control **18**, a cutter **19**, and a knurled can drive wheel **21**. The cutter as illustrated is in the form of a disk having a sharpened peripheral edge, the disk being journalled on a short shaft **22**, but it will be apparent to those skilled in the art that any other type of cutter could be utilized which is capable of entering through the can lid **14** and then severing such lid upon can rotation.

Mounted within the housing **16** is an electric motor **26** which includes a power output shaft **27**, the latter having a worm gear **28** provided at the distal end thereof. Gear **28** is operatively engaged with a gear **29**, the latter being mounted on a shaft **31** which is supported in bearings **32** carried by the front and rear walls of the housing. Drive wheel **21** is carried on the forward end of shaft **31**, and as previously explained, such drive wheel is positioned exteriorly of the housing so as to be in a position to engage the can bead **13** and rotate the can. From the foregoing, it will be understood that upon energization of motor **26**, drive wheel **21**, through gears **28** and **29** and shaft **31**, will commence rotating and continue to rotate until the motor is deenergized.

Referring now to cutter **19**, the latter is mounted for vertical reciprocating movement. This is important so that in its uppermost or inoperative position, as shown in Figure 2 of the drawing, a can may be positioned with the bead thereof in engagement with the drive wheel **21**. Then, upon downward movement of the cutter to its operative position, illustrated in Figure 5, the cutter will pierce the can lid **14** and the can bead will be properly clamped between the cutter and drive wheel whereby the can will be rotated by the wheel and the lid cut from the can.

To accomplish the foregoing vertical reciprocation of the cutter, the latter is carried on an intermediate portion of an arm **36**, such arm being mounted adjacent one end thereof on a pivot pin **37** to permit a swinging movement of the arm and consequent reciprocation of the cutter. A tension spring **38** is affixed to the other end of the arm and to a fixed block **39** on the housing so that in absence of interference from any other member, the arm would be pulled in a clockwise direction (as viewed in Figures 1 and 4 of the drawing), and the cutter resiliently forced towards the drive wheel. The spring **38** is of sufficient strength to cause the cutter to enter the can lid, and it will be recognized that since the cutter is resiliently moved downwardly, the can bead **13** will be clamped between the cutter and drive wheel with a substantially uniform pressure, irrespective of the bead size.

In view of the above, means are provided for normally maintaining the arm and the cutter carried thereby in a raised or inoperative position and for likwise returning the same to such inoperative position following a cutting cycle. As herein illustrated, such means includes an upper link **41** and a lower link **42**, the adjacent ends of the links being of arcuate opposed configuration and connected by a pin **43**. Such ends are so formed as to permit a collapsing of the links about pin **43** in one direction, while resisting collapsing in an opposed direction. The pin is also provided with a torsion spring **44** for normally maintaining the links in longitudinal alignment. The upper end of link **41** is pivotally attached to arm **36**

by a pin 46 positioned intermediate the cutter 19 and tension spring 38. The lower end of link 42 is adapted to normally ride on the periphery of a cam 47, the latter preferably comprising a disk-like member eccentrically mounted on a shaft 48 disposed in parallel subjacent relationship to the drive wheel shaft 31. For a purpose presently to be explained, it will be noted that shaft 48 is driven by shaft 31 through a pair of gears 51 and 52 mounted on the respective shafts.

It will also be noted that the connection between links 41 and 42 is positioned adjacent and in alignment with the push button 18, the latter having a plunger 54 adapted to engage the links at their connection, but normally urged towards the front of the housing, i. e., to an inoperative position by a spring 56.

With the foregoing constructional details, the operation of the apparatus will now be discussed, certain remaining portions of the mechanism not previously referred to being explained in connection with such operation. Figures 1 and 2 illustrate the position of the parts in their inoperative position, links 41 and 42 being vertically aligned, link 42 resting on the high point of cam 47 so that the arm 36 is raised to its uppermost position, and cutter 19 is in spaced relation to the can drive wheel so as to permit the insertion of a can bead therebetween. After a can has been inserted with the bead 13 overlying the drive wheel 21, the user may depress button 18 against the action of the spring 56. Such button movement will cause the button plunger 54 to force the links into a collapsed condition, as shown in Figure 3, and release the lower end of link 42 from its engagement with cam 47. Due to the action of the torsion spring 44, the links will resume a longitudinally aligned relationship, but with the lower end of link 42 laterally spaced from the cam, as illustrated in Figure 5.

It will be understood that once the links have been collapsed, the spring 38 will pull arm 36 downwardly which produces a twofold result. First, the cutter 19 which is carried on the arm will move downwardly towards the drive wheel, piercing the can lid and clamping the can bead between the cutter and wheel. Secondly, it will be noted that arm 36 carries one leaf 61 of a contact switch, and upon downward movement of the arm such leaf will engage a stationary contact 62, thereby energizing motor 26, and effecting a rotation of shaft 31 and the can drive wheel 21 so as to rotate the can 12, and likewise rotating shaft 48 and its associated cam 47. Thus, so long as button 18 remains depressed, the can 12 will be rotated, and the cutter will sever the lid 14 therefrom in a generally conventional manner.

Once the lid has been completely severed, the operator may release the control button, and the button spring 56 will return the button and its associated plunger to its normal inoperative position. Immediately preceding such action, it will be appreciated that since arm 36 has been moved to its lower position, and the links are carried on such arm, the plunger will be in engagement with the upper link 41 rather than at the pivotal connection between the links, but as previously explained, spring 44 will maintain the links in longitudinal alignment, but angularly inclined relative to their normal vertical position. With the plunger removed from engagement with link 41, a torsion spring 66 provided at the connection between link 41 and arm 36 will cause the longitudinally aligned links to move from their inclined position shown in Figure 5 towards their vertical position illustrated in Figure 2. This return may be completed when the high point on cam 47 is directed downwardly (see Figure 5), and since such cam is rotating, when the high point of the cam is uppermost (see Figure 2) the cam will force the aligned links upwardly, and result in a raising of arm 36, a similar raising of the cutter, and opening of the motor switch, thereby deenergizing the latter.

The operation and apparatus just described is only theoretically practical, since after the cam 47 has raised the links and arm and effected a deenergization of the motor, the inertia of the latter will cause the cam to continue rotating, and spring 38 could pull the arm downwardly to its operative position. Accordingly, in order to maintain the links and arm in their uppermost inoperative positions, I provide an extension 71 extending laterally from the lower end of link 42. The end of the extension is provided with a spring-loaded catch 72 normally extending outwardly therefrom. The housing is provided with a lug 73 which is in alignment with the catch when the links are in their vertical relationship. Consequently, upon return of the links from their aligned inclined position to their vertical position upon release of the control button, the cam 47 will raise the links and catch 72 will resiliently snap past the lug 73 and hold the links and arms in their upper inoperative position, notwithstanding the motor inertia continuing to drive the cam 47. Thus, at the start of any cycle of operation, the cam 47 will not necessarily be disposed with its high point uppermost as shown in the drawing. It will also be understood that when the button 18 collapses the links, the extension 71 will be freed from the lug and the previously discussed action will occur.

From the foregoing description, it will be understood that while the mechanism is extremely simple, it will act entirely automatically, and effectively fulfill the requirements of cutting the can lid without effort on the part of the user other than depressing the control button.

What is claimed is:

1. Apparatus of the character described comprising a motor, a motor switch, a can drive wheel operatively connected to said motor for rotation therewith, a vertically movable can cutter overlying said drive wheel, means releasably holding said cutter in an upper position, a control member operatively connected with said cutter holding means and operable in one position to release the same and with said motor switch for closing the latter, and means resiliently moving said cutter downwardly towards said drive wheel upon actuation of said control member and resiliently maintaining the cutter adjacent the drive wheel.

2. Apparatus as set forth in claim 1 including motor driven means returning said cutter to said upper position upon movement of said control member to a second position and following opening of said motor switch.

3. An electric can opener including a motor, a shaft having a can drive wheel mounted thereon, means interconnecting said motor and shaft for rotating the latter upon motor energization, a vertically movable can cutter overlying said drive wheel, means normally maintaining said cutter in an uppermost inoperative position, a manually engageable control member, motor switch means, movement of said control member in one direction effecting a closing of said motor switch means and operative engagement of said member with said means for maintaining the cutter in its inoperative position and releasing the latter, and spring means forcibly urging said cutter downwardly upon said engagement of said control member and said cutter maintaining means.

4. A can opener including a can drive wheel, a motor operatively connected to said drive wheel, a can cutter overlying said drive wheel and selectively movable towards and from said wheel, means including a pair of normally aligned collapsible links maintaining said cutter in an upper position, a control member manually movable to collapse said links, a spring connected to and resiliently moving said cutter downwardly towards said wheel upon collapsing of said links, means returning said links to their aligned position, and means to raise said links and said cutter upon contra movement of said control member.

5. Apparatus of the character described comprising a motor having a switch, a can drive wheel operatively connected to said motor, a vertically movable can cutter

overlying said drive wheel, a pair of links pivotally connected together, means normally urging said links into longitudinal alignment, a spring operatively connected to said cutter urging the latter downwardly towards said drive wheel, one of said links being operatively connected to said cutter, a cam driven by said motor, the other of said links being operatively associated with said cam, said cam in one position urging said links upwardly to raise said cutter and in another position permitting said spring to pull said cutter downwardly, a control element movable to collapse said links and moving the same away from said cam, and means independent of said cam for releasably maintaining said links in an uppermost position.

6. A can opener including a can drive wheel, a motor operatively connected to said drive wheel, a pivotally mounted arm overlying said wheel and having a can cutter thereon movable from and towards said wheel upon selective pivotal movement of said arm, motor switch means operable to energize said motor upon downward pivotal movement of said arm, a cam driven by said motor, spring means connected to said arm and resiliently urging the same downwardly towards said drive wheel, means operatively connecting said cam and arm for selectively raising and lowering the same, and manually engageable control means engageable with said connecting means for releasing the latter.

7. Apparatus as set forth in claim 6 including means independent of said cam releasably maintaining said arm in an upper position, said last named means releasing said arm upon actuation of said control means.

8. Apparatus of the character described comprising a motor, a motor switch, a can drive wheel operatively connected to said motor for rotation thereof, a vertically movable can cutter overlying said drive wheel, means including a pair of collapsible normally aligned links releasably holding said cutter in an upper position, a control member movable to engage and collapse said links, and a spring operatively connected to said cutter resiliently urging the latter downwardly and towards said drive wheel upon collapsing of said links.

9. Apparatus as set forth in claim 8 including cam means operatively engageable with said links for raising the same and said cutter upon release of said control member.

10. Apparatus as set forth in claim 9 including means for releasably holding said links in said raised position.

References Cited in the file of this patent

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