

[54] CAN OPENER DEVICE

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[51] Int. Cl.B67b 7/38

[58] Field of Search.....30/4, 6.4, 8, 8.5, 9

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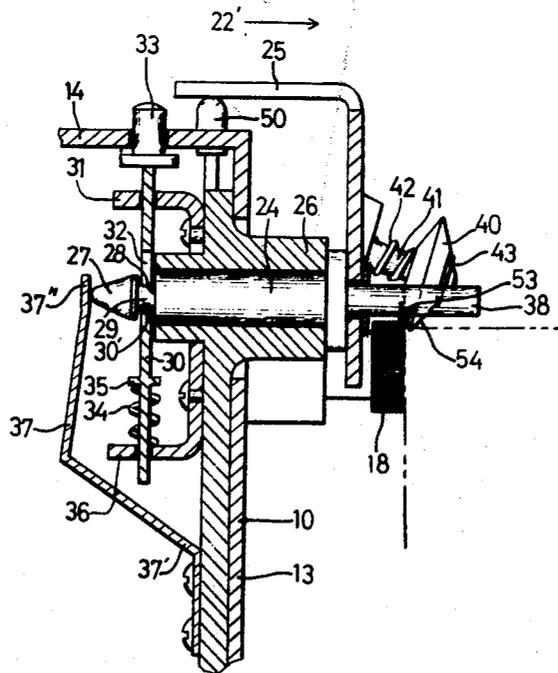
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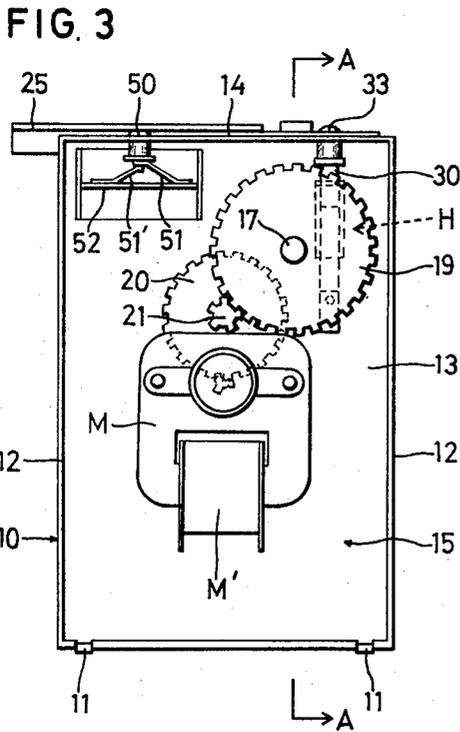
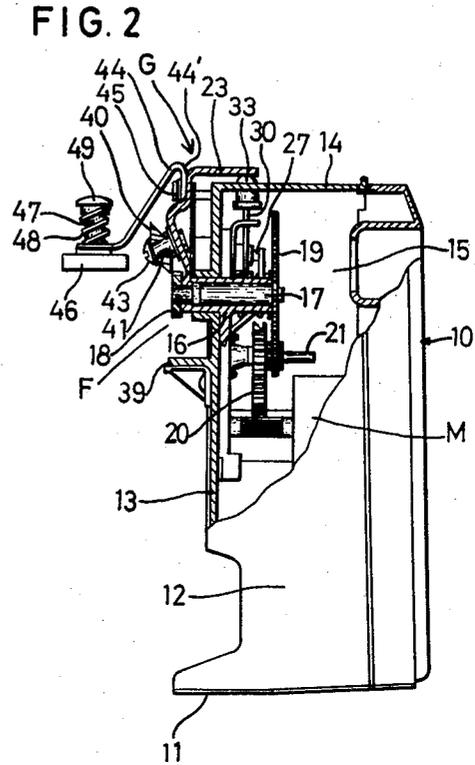
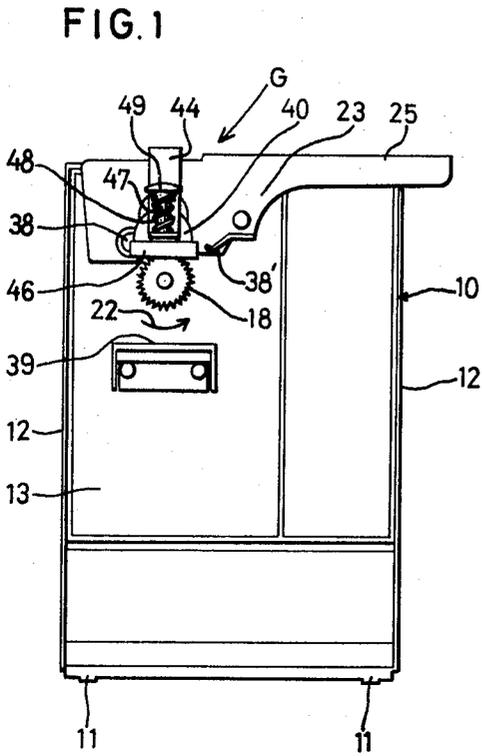
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[57] ABSTRACT

A can opener comprising a body frame, a feeder wheel, a movable frame pivotally supported on the body frame by a detachable shaft inserted in a bearing member carried by said body frame, a cutter rotatably supported by said movable frame and a holding mechanism for keeping said shaft in the inserted position, the shaft being pushed out toward the front of said body frame by operating said holding mechanism thereby making the cutter together with said movable frame easily removable.

3 Claims, 10 Drawing Figures





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FIG. 8

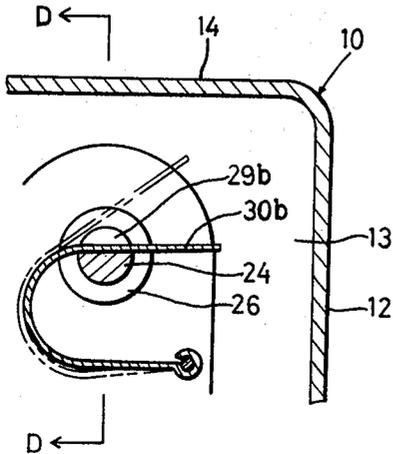


FIG. 9

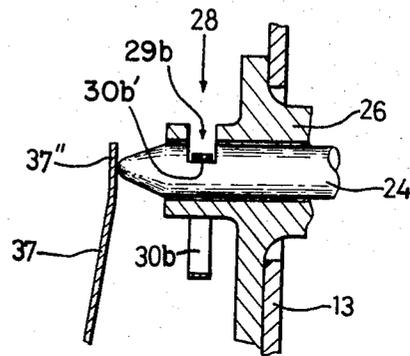
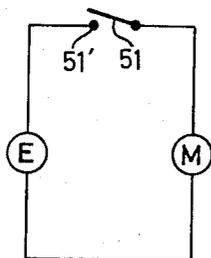


FIG. 10



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CAN OPENER DEVICE

The present invention relates generally to a can opener and more particularly to the improvement of the can opener which can open a can at its one end surface by rotating the can in a position where said surface of the can is cut into by a cutter

near a rim of the can. When a cutter becomes contaminated with the contents of a can in opening the can with the use of this kind of can opener, the cutter must be exchanged or cleansed completely before opening another can of a content other than previous one. However, it is practically impossible to wipe the contaminated cutter completely, because a feeder wheel, guide members and so on are arranged closely near the cutter. Then it is considered to wash the contaminated portions using, for example, a brush but there is the trouble that the can opener having electrical parts and other parts requiring protection from water can not be easily washed because of the penetration of water into these parts. In this case, it is also considered to take off the contaminated cutter from the can opener body and wash it, but then the content of the can such as fat will attach to hands of an operator and so the operator, particularly when the operator is a woman keeping her fingers made up beautifully, dislikes such washing work extremely.

An object of the present invention is to provide a can opener in which a cutter and a movable frame carrying it are separated from a body frame of the can opener without touching the cutter directly and a new or a cleaned cutter can be adapted.

Another object of the present invention is to provide a can opener in which a cutter and its movable frame can be skillfully adapted to or removed from a body frame of a can opener.

The above and other objects of the present invention will be apparent from the description with respect to some embodiments of the present invention taken along with the appended drawing in which;

FIG. 1 is a front view of a can opener according to the present invention,

FIG. 2 is a side view of the can opener partly broken away to show a section taken along the line A—A in FIG. 3,

FIG. 3 is a rear view of the can opener with the rear wall being removed,

FIG. 4 is an enlarged rear view of a partial cross section of the holding mechanism shown in FIG. 3,

FIG. 5 is a side view of a partial cross section taken along the line B—B in FIG. 4,

FIGS. 6 and 8 are rear views of partial cross section of embodiments similar to but other than that shown in FIG. 4,

FIGS. 7 and 9 are views of partial cross sections taken along the lines C—C and D—D in FIGS. 6 and 8 respectively and

FIG. 10 is an electrical wiring diagram.

Referring to FIGS. 1-5, a housing frame 10 is composed of a base member 11, side walls 12, a front wall 13, a top plate 14 and a rear wall (not shown), forming a hollow chamber 15. In a bearing member 16 carried by the front wall 13 there is rotatably mounted a shaft 17 of a can feeding device F which is described below and a toothed feeder wheel 18 is screwed to the outer end of said shaft while a large gear 19 is fixed to the inner end of said shaft. The latter gear is connected mechanically to an armature shaft of an electric motor M through a gear 20 carried by the shaft 21 and so on and is driven to rotate the feeder wheel 18 in a direction (shown by the arrow 22) when the electric motor M is connected to a source of electrical current.

Next, in a cutter operating mechanism G, a movable frame 23 is pivotally supported by and fixedly connected to a shaft 24 so as to rotate in a plane parallel to the front wall 13 and the free end portion of said movable frame 23 is provided with an integral handle 25 formed to extend over part of the top plate 14. Said shaft 24 is rotatably and removably mounted in a bearing member 26 extending through the body frame 10 with the inner end portion 27 of the shaft 24 being shaped in the form of a cone and the intermediate portion 28 being provided with a groove 29.

On the other hand, in a holding mechanism H, an engage piece 30 with an opening 32, which is situated on the prolonged axis of the shaft 24 in the case of insertion of said shaft 24, is provided so that the piece may reciprocate in a direction crossing said prolonged axis and around the upper portion of said piece is provided a stopper member 31 which prevents said opening 32 from deviating largely from the axis of said shaft 24 by contacting with said stopper member 31, the upper most position of the piece being thus limited. This engage piece 30 is usually biased towards a push button 33 which is mounted on the upper end of said piece 30, by means of a spiral spring 34 which is compressingly inserted between a spring holder 35 extending from said piece and a spring seat 36 extending from the side of the body frame 10 and when the shaft 24 is to be inserted into the opening 32, the cone 27 of the shaft 24 is forced in said opening 32 to lower the engage piece 30. Being forced further, the shaft 24 pushes the free end portion 37' of a spring plate 37, whose one end 37' is connected to the body frame 10 and whose other end 37'' is resiliently movable along the axis of the shaft 24 to the position of the cone 27 shown in FIG. 5, and the arrangement shown in FIG. 5 is attained. In this case, of course, the engage piece 30 enters the groove 29, preventing the shaft 24 from escaping freely in the axial direction. Thus, when the shaft 24 is to be drawn out, the engaged edge 30' of the engage piece 30 is disengaged from the groove 29 by pushing down the button 33 and at the same time the movable frame 23 and the shaft 24 are pushed out in the direction of the arrow 22' by the biasing force of the spring plate 37 acting towards the shaft 24 with the shaft 24 being in turn caught in a situation where the movable frame 23 is easily removed.

Next, guide members 38 and 38' extending through the front wall 13 are both for preventing the undesirable movement of a can in during the opening by tightly contacting the top of the can with said guide members. The member 38 is formed on the axis of the movable frame 23 integrally therewith and the member 38' is overlappingly fixed on the rear surface of the movable frame 23 and both members extend farther than the feeder wheel 18 as shown in FIG. 5. A projection 39 which is carried by the front wall 13 and extends outwards is for receiving the body of a can somewhat obliquely and is extending under the feeder wheel slightly farther than the feeder wheel 18 thereunder. A circular cutter 40 having edges on its periphery is rotatably supported around a shaft 41 which extends in the oblique downward direction from the movable frame 23 and is usually disposed in the forward position by means of a compression spring 42 which is inserted between the cutter 40 and the root portion of the shaft 41. The movement of the cutter 40 from shaft 41 is prevented by screwing a bolt with a large head 43 into the shaft 41. Further, a bifurcated arm 44, of which one branch 44' is removably secured to the movable frame 23 by a mounting pin 45, is for holding a magnet piece 46 to attract the lid cut off from a can allowing said magnet piece to move up and down and the magnet piece 46 is secured at the lower end of a suspender 47 which is inserted in an opening bored at the end of said arm 44. 48 is a compression spring and 49 is a stopping member.

A switching button 50, which is mounted on the top plate 14 so that it may protrude and be depressed freely, is situated at the position where the button 50 can contact with the lower surface of the handle 25 and can be depressed to actuate a movable contact 51 which is adapted to cooperate with the button 50, thereby energizing the electric motor M. The movable contact 51 and a fixed one 51' are both attached to an insulating supporter plate 52 formed on the body frame and are electrically connected as shown in FIG. 10.

The operation of the device constructed as mentioned above is as follows. When the handle 25 disposed at the position shown in FIG. 1 is raised, an end rim 53 of the can is placed on the feeder wheel 18 and then the handle 25 is lowered, the cutter 40 cuts into the top 54 of the can near the end rim 53, the switch composed of contacts 51 and 51' closes and the electric motor M is energized to rotate the feeder

wheel 18. Accordingly, the feeder wheel 18 and the cutter 40 rotate in the situation shown in FIGS. 1, 2 and 5 and the latter cuts the top of the can near the end rim 53, the can itself being rotated. The lid of the can cut off from the can body is drawn by the magnet piece 46 to be held and is prevented from falling into the can.

When it is necessary to take away the cutter after the opening operation or a can containing canned fruits such as oranges need be opened after a can containing fat such as lard is opened, the movable frame 23 and the shaft 24 are both forced forward by the spring plate 37 when the button 33 is pushed down and the shaft 24 remains still in the bearing member 26 and is held there without falling down in a situation where it can be easily taken away. As the result, it is possible to wash the contaminated members such as the cutter 40 quite separately from the frame 10 by gasping the handle 25 and taking this away. In this case, it is, of course, unnecessary for the operator to touch the contaminated portions and moreover all operations can be effectuated with one hand.

Next, FIGS. 6-9 are all for showing embodiments similar to but modifications of the holding mechanism H and those members which can be considered the same as in the previous can opener are given the same references as in the previous figures in order to give brief descriptions for saving the repetition of the detailed ones. An engage piece 30a shown in FIGS. 6 and 7 has its one end secured to the front wall 13 of the body frame 10 and the other end extending through slot 55 to the outside of the frame at its free end. The intermediate portion of this engage piece is composed of a curved resilient plate and is always biases towards the shaft 24 to engage with the groove 29a of said shaft when the shaft 24 is inserted as shown. Of course, the engage edge of this piece is ordinarily situated around the prolonged axis of the shaft. For this purpose, the uppermost position and the lowermost one of the slot 55 formed in the side wall of the body frame 10 are so determined that the engagement between the engage piece and the groove is released in the case of the pulling out of the shaft (which operation can be effectuated by moving the free end of the engage piece to the position shown by imaginary lines in FIG. 6) and in addition the engage edge 30a' may not deviate from the prolonged axis of the shaft after the pull out of the shaft.

The shaft 24 shown in FIGS. 8 and 9 is provided with the engage groove 29b provided on a part of the cylindrical surface of the shaft 24, with which groove engages the engage piece 30b with its free end formed according to the idea embodied in FIGS. 6 and 7, provided that the handle 25 is placed at the position for opening operation as shown in FIGS. 1 and 3, but said engage edge 30' contacts with the lower portion of the shaft 24 which has no groove as shown in FIG. 9, with the shaft 24 being pushed out towards the front of the body frame when the handle 25 is raised upwards in FIG. 1 and is further curved to the left of FIG. 1.

As the device according to the present invention is of such construction as described above, there is a feature that after the opening operation of a can, the cutter 40 contaminated with canned foods can be taken away together with the movable frame 23 from the body frame 10 to make it possible to wash the cutter member separately from the body frame. Because the shaft 24 of the movable frame 23 and the holding mechanism H therefore are constructed for the removal and mounting of the movable frame as described above, the cutter can be pushed out to the position for easy removal without touching directly the contaminated cutter by effectuating such simple motion as shifting or curving the engage piece, or turning the movable frame and the latter can be held without being fully separated from the frame. Moreover the movable frame can be simply adapted to the body frame only by inserting the shaft 24 in the bearing member 26 to become ready for opening operation. Thus the present invention provides the convenience with which the contaminated cutter is separated, washed and again adapted.

Although the present invention was described with preferred embodiments, it should be understood that many changes and modifications can be possible without departing from the spirit and the scope of the present invention as claimed in appended claims.

What I claim is:

1. A can opener comprising a housing frame, a feeder wheel rotatably mounted on said housing frame, a movable frame, a cutter rotatably supported on said movable frame and positioned against said feeder wheel whereby an end rim of a can to be opened can contact said feeder wheel when said cutter is cutting into the lid of said can near said end rim, said cutter having a form for cutting into said lid when said feeder wheel is rotated, means for rotating said feeder wheel, a bearing member provided through said housing frame, a shaft detachably positioned in said bearing member and fixedly connected to and pivotally supporting said movable frame, said shaft having a groove therein, an engage piece slideably mounted on said bearing member and having an opening with said shaft extending therethrough in a position whereby said piece can engage said groove in a direction crossing the axis of said shaft, a push button positioned at the upper end of said piece, a spring biasing said engage piece towards said push button and a spring biasing said shaft in an axial direction outwardly of said housing frame, said piece opening periphery capable of engaging said shaft groove when said shaft is inserted through said piece and the engagement between said piece and said shaft being released by pushing said button whereby said shaft can be pushed outwardly of said housing frame.

2. A can opener comprising a housing frame, a feeder wheel rotatably mounted on said housing frame, a movable frame, a cutter rotatably supported on said movable frame and positioned against said feeder wheel whereby an end rim of a can to be opened can contact said feeder wheel when said cutter is cutting the lid of the can near said end rim, said cutter having a form for cutting said lid when said feeder wheel is rotated, means for rotating said feeder wheel, a bearing member provided through said housing frame, a shaft detachably extending through said bearing member and fixedly connected to and pivotally supporting said movable frame, said shaft having a groove, and engage piece connected at one end to said housing frame and curving across said shaft groove when said shaft is inserted in said bearing member, said piece having a free end extending outwardly through said housing frame, a spring biasing said shaft in its axial direction outwardly of said housing frame, and said piece having an intermediate portion capable of extending into said shaft groove when said shaft is inserted in said bearing member and said shaft can be pushed from said bearing member upon the lifting of said piece releasing the engagement between said piece and said shaft groove.

3. A can opener comprising a housing frame, a feeder wheel rotatably mounted on said housing frame, a movable frame, a cutter rotatably supported on said movable frame and positioned against said feeder wheel whereby an end rim of a can to be opened can contact said feeder wheel when said cutter is cutting the lid of the can near said end rim, said cutter having a form for cutting into said lid when said feeder wheel is rotated, means for rotating said feeder wheel, a bearing member mounted through said housing frame, a shaft detachably extending through said bearing member and fixedly connected to and pivotally supporting said movable frame, said shaft having a groove extending across a portion of the periphery of said shaft, and engage piece connected at one end to said housing frame and curving across said shaft groove upon the insertion of said shaft in said bearing member and a spring biasing said shaft in its axial direction outwardly of said housing frame, a part of said piece being capable of entering said shaft groove and disengageable from said groove by rotating said shaft by pivoting said movable frame whereupon said shaft can be pushed outwardly of said housing frame.

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