April 28, 1959 H. BRISTOL 2,883,745

CAN OPENER

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FIG. 1

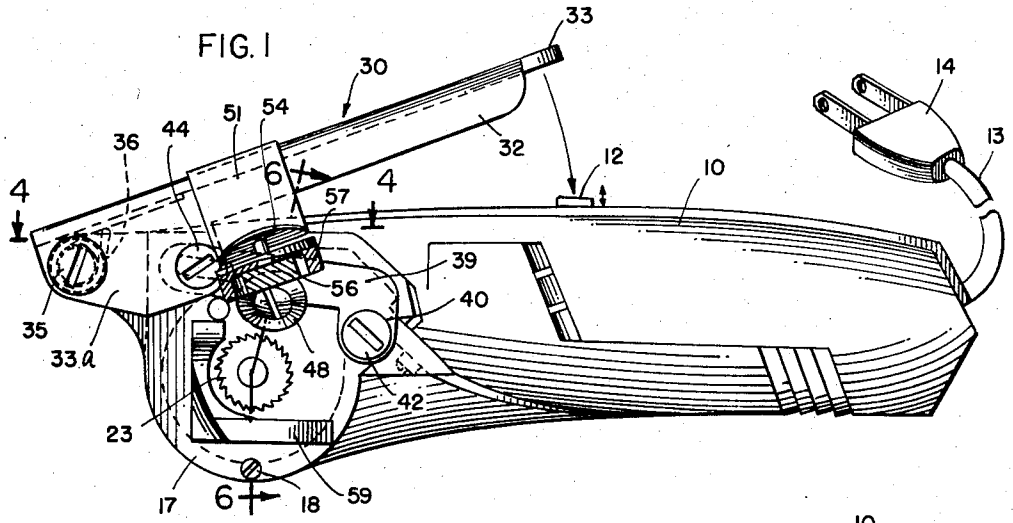


FIG. 2

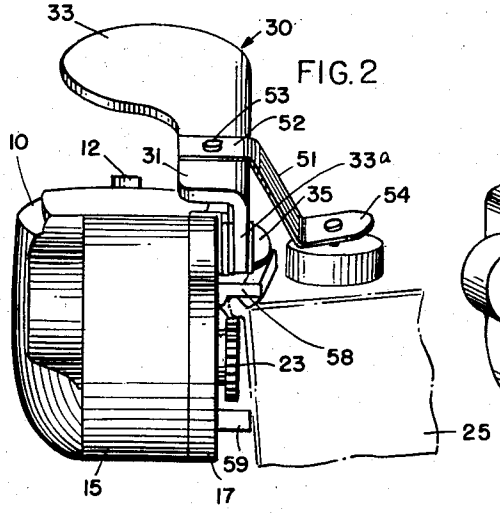


FIG. 3

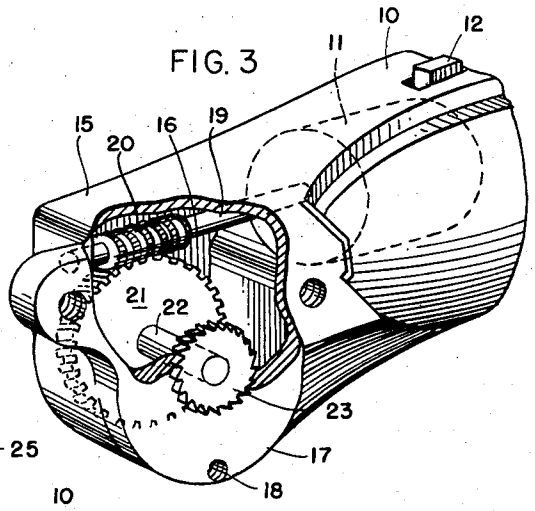
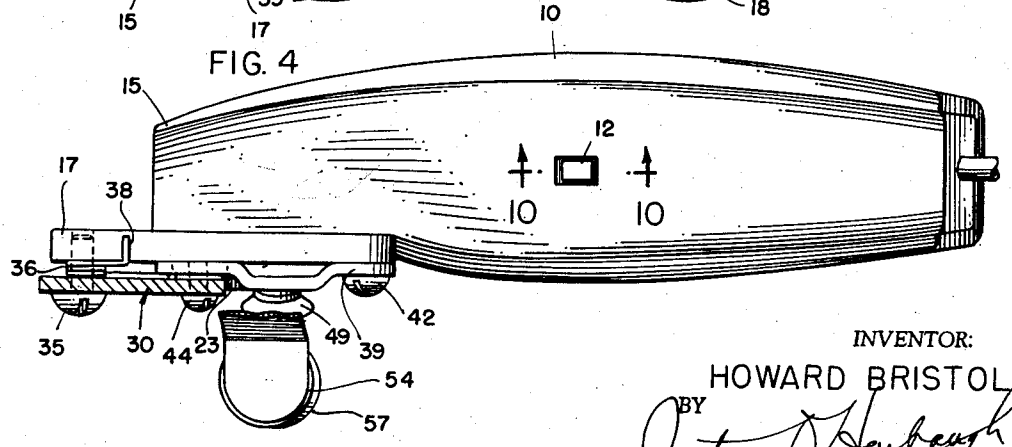


FIG. 4



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FIG. 5

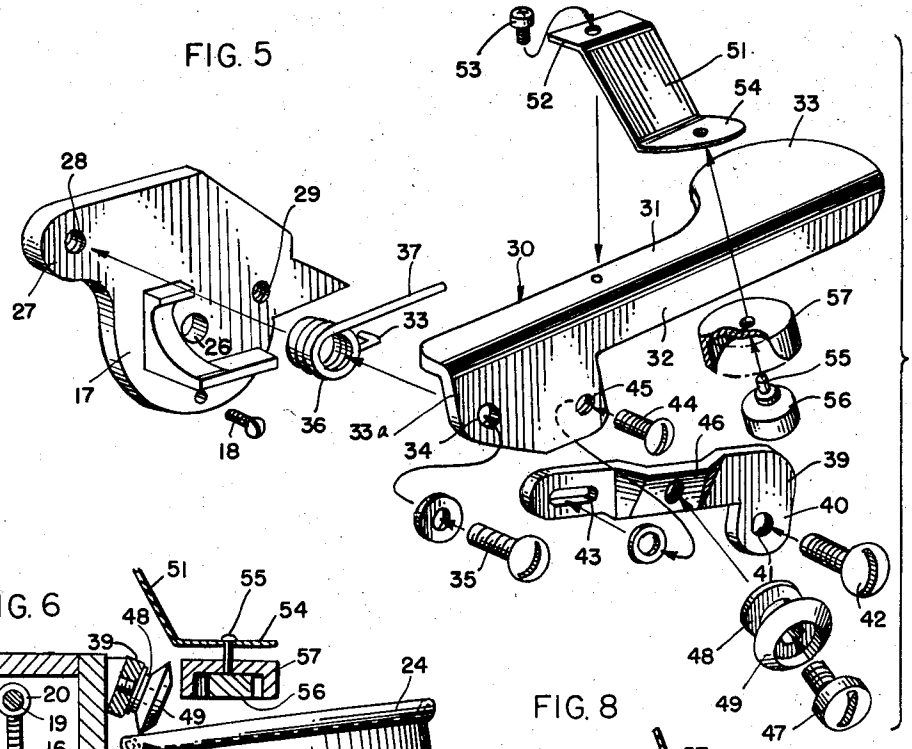


FIG. 6

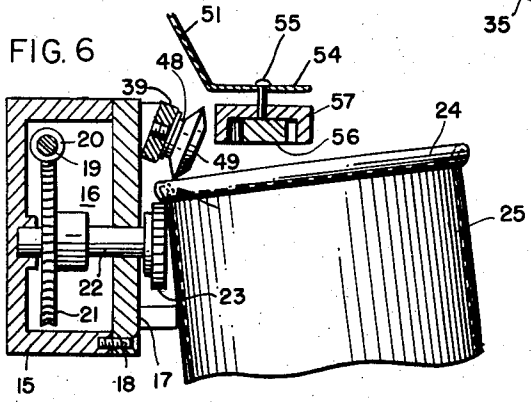


FIG. 8

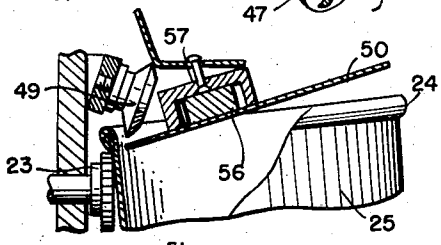


FIG. 7

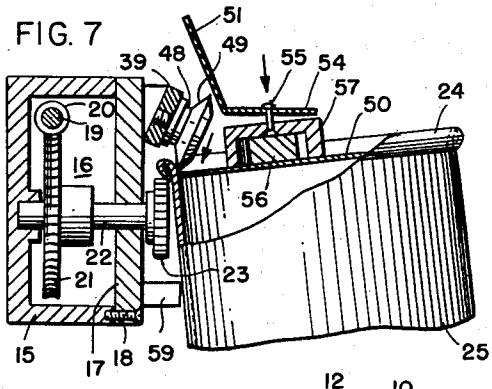


FIG. 9

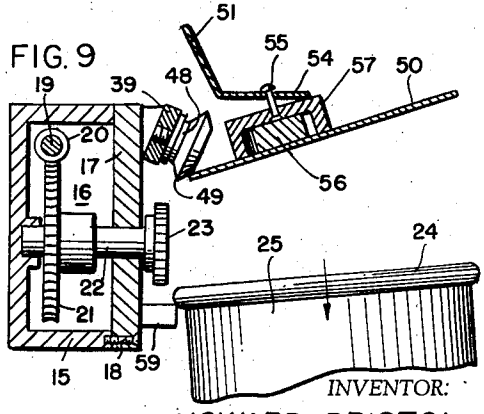
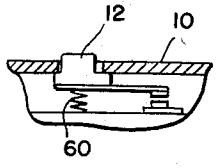


FIG. 10



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United States Patent Office 2,883,745 Patented Apr. 28, 1959

2,883,745

CAN OPENER

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Application November 1, 1957, Serial No. 693,874

12 Claims. (Cl. 30—4)

This invention relates to a can opener, and more especially to a power operated can opener equipped with means for retaining the severed end of a can during and after the opening thereof.

An object of this invention is to provide a power driven can opener, wherein the movement of a single element thereof serves to clamp a can in cutting position with respect thereto and energizes the motor that supplies the power therefor. Still another object is in the provision of a motor driven can opener equipped with a manually movable element operative to actuate the motor and to press the cutting blade of the opener through the top of the can preparatory to the severance thereof, and in which such penetration is accomplished through a novel mechanical advantage whereby the manual manipulation of the movable element is accomplished with ease and facility.

Another object of the invention is that of providing an arrangement for holding or retaining the end of the can, and for automatically positioning such end so that it can be readily grasped and withdrawn before (if desired) the can is released from the grip of the opener. Still another object is to provide a can opener of the type described, in which the severed end of a can is tilted or angled upwardly along one side thereof to present a convenient area thereon for grasping and thereby enable the end to be withdrawn from the can and opener.

Yet a further object is in the provision of a hand-held, motor driven can opener having a single manually controlled operating lever that is movable downwardly to energize the motor and clamp a can in position for having the upper end thereof severed; and in which such operating lever supports a magnet in a manner such that the end of the can is firmly held thereby, and having a positional relation with respect to the cutting blade of the opener (which is also carried by the operating lever) such that the severed end of a can is pivoted upwardly by the magnet about an axis defined at the point of engagement of the end with the cutting blade, whereby the outer portion of the can end is spaced above the can to afford room for a person's fingers therebetween. Additional objects and advantages of the invention will become apparent as the specification develops.

An embodiment of the invention is illustrated in the drawings, in which:

Figure 1 is a side view in elevation of a can opener embodying the invention, and in which certain of the parts are shown in section;

Figure 2 is a front view in elevation of the can opener, and wherein a can is partially illustrated by broken lines;

Figure 3 is a broken perspective view of the head end of the can opener, but in which parts are removed and a section of the casing is broken away to illustrate the motor and drive gear arrangement;

Figure 4 is a longitudinal sectional view taken generally along the line 4—4 of Figure 1;

Figure 5 is an exploded perspetive view showing the relation of the operating lever and its associated components;

Figure 6 is a vertical sectional view taken along the line 6—6 of Figure 1, illustrating the relationship of the elements when a can is first placed in cutting position with respect thereto;

Figure 7 is a vertical sectional view similar to that of Figure 6, but showing the position of the components after the cutting blade thereof has punctured the top of the can;

Figure 8 is a vertical sectional view similar to that of Figures 6 and 7, but showing the position of the severed can end after the cutting operation is terminated;

Figure 9 is a vertical sectional view similar to those of Figures 6 through 8, but illustrating the final position of the components and severed can end after the can has been released from the opener; and

Figure 10 is a broken longitudinal sectional view taken along the line 10—10 of Figure 4.

The can opener has a casing 10 that is elongated in one direction, and is adapted to be hand-held. As seen in Figure 3, a motor 11 is mounted within the casing 10 adjacent the forward end thereof, and a depressible or push-button switch 12 extends upwardly through the top wall of the casing and is adapted to complete the electric circuit through the motor when it is depressed. An electric cord 13 extends outwardly through the rear end of the casing 10, and at its outer end is equipped with a plug 14 adapted to be inserted into a convenience outlet, such as a wall socket. The casing may be formed of plastic or any other suitable material.

Formed integrally with the casing 10, or separately secured thereto depending on the type of construction, is a head 15 defining a compartment 16 therein. Access to the compartment is afforded through a removable wall 17 that may be secured to the remainder of the box-like head by screws 18. The shaft 19 of the motor 11 extends into the compartment 16, and is equipped with a worm gear 20 therein. The worm 20 is in meshing engagement with the drive gear 21 rigidly mounted on a shaft 22 journalled in the head 15. The shaft 22 projects outwardly from the removable closure wall, and is equipped at its outer end with a drive wheel 23 provided along the circumferential surface thereof with spaced teeth adapted to bite into a bead or rolled edge 24 of a can 25, as shown in Figures 7 and 8.

Referring to Figure 5, it is seen that the wall 17 is provided centrally with a passage 26, through which the shaft 22 extends, and adjacent the upper forward end thereof is provided with an ear 27, apertured as shown at 28. The wall is also apertured at 29, and the function of both apertures will be described hereinafter. Mounted for pivotal movement with respect to the casing 10 is an operating lever or arm 30, that is generally L-shaped in cross section and has a flat top wall 31 and depending web flange 32.

The wall 31 adjacent the rear end thereof is enlarged as shown at 33, to provide a surface adapted to be engaged by a person's thumb to effect depression of the lever. Adjacent its forward end, the web 32 is enlarged as shown at 33*a*, and has an aperture 34 therein alignable with the aperture 28 so as to permit the passage of a screw 35 therethrough. The screw 35 extends freely through the aperture 34 and is threadedly received within the aperture 28 and defines a pivotal axis for the operating lever 30. The lever is biased into the position illustrated in Figure 1 by a helical spring 36 having an elongated end 37 that seats against the undersurface of the lever wall 31, and is also equipped with a laterally turned end 38 that seats against the upper edge of the wall 17. It will be apparent that the spring is confined between

the enlargement 33 of the lever and wall 17 by the cap screw 35.

Operatively associated with the control arm 30 is a cam arm 39 having a depending ear 40 at one end provided with an aperture 41 that freely passes a cap screw 42 therethrough, which is threadedly received within the aperture 29 in the wall 17. The screw 42 defines a fulcrum for the cam arm 39. Adjacent the forward end of the cam arm is an elongated slot 43 that slidably receives a cap screw 44 therein that has an end portion threadedly received within an aperture 45 provided in the enlarged portion 33*a* of the operating lever 30. The cam arm 39 throughout the central portion thereof is inclined upwardly and outwardly, as shown at 46, and is apertured in this intermediate portion for threadedly receiving the end portion of a cap screw 47 used in rotatably mounting a knife or cutting blade 48 thereon. The cutting edge 49 of the blade is beveled so as to facilitate penetration thereof through the upper end 50 of the can 25.

Extending downwardly from the operating arm 30 is a bracket or support 51 having a laterally turned upper end 52 that lies along the wall 31 of the operating arm, and is secured thereto by a screw 53 which extends through an aperture therefor in the bracket and is threadedly received within an aligned aperture in the arm. At its lower end, the bracket 51 is also turned laterally in the opposite direction, as shown at 54, and is centrally apertured for passing a mounting pin 55 therethrough, secured at its lower end to a magnet 56 concealed within an annular cover 57. The pin 55 is freely movable along the longitudinal axis thereof through the aperture in the support, and such aperture is sufficiently large so as to permit the pin to wobble or swing laterally therein.

Figures 1 and 2 in particular show that the wall 17 is equipped with a guide 58 extending outwardly therefrom, that rides along the upper edge of the bead 24 of a can during a cutting operation to constrain the same against pivotal movement that tends to be transferred thereto by rotation of the drive wheel 23. Further, the wall 17 along the lower edge thereof is provided with a transversely extending rail 59 that engages the circumferential edge of the can 25 to incline the can outwardly, as shown in Figure 2, for positively positioning the bead 24 along the top of the drive wheel 23. Figure 10 shows the details of an exemplary push-button switch 12 which is normally biased in open position by a spring 60.

In use of the can opener, the plug 14 is inserted into a convenience outlet and the casing 10 is gripped in one hand. The lip or bead 24 of a can 25 is placed along the upper end of the toothed drive wheel 23, as shown in Figure 6. Thereafter, the operating lever 30 is depressed—that is, pivoted in a clockwise direction as viewed in Figure 1, about the pivotal axis defined therefor by the screw 35. Such downward movement brings the cutter 48 into adjacency with the top or upper end 50 of the can, as shown in Figure 6, and ultimately the cutter penetrates or punches through the can end, as shown in Figure 6. At this time, the switch 12 is depressed by engagement thereof with the enlarged end portion 33 of the operating lever.

Energization of the motor 11, which follows actuation of the switch 12, rotates the worm 20, drive gear 21 and drive wheel 23. Since the notched periphery of the drive wheel 23 is in tight frictional engagement with the can bead 24, the can is caused to rotate and the cutter 48 then severs the top 50 of the can along the circumference thereof to free it entirely from the can. Thereafter, the operating lever 30 may be released, which permits it to swing upwardly into the position shown in Figure 1, because of the biasing force imparted thereto by the spring 36. Such movement of the operating lever deactuates the switch 12 and retracts the cutter 48 from the can to release it from the opener, as shown in Figure 9.

The force required to move the operating lever downwardly to the extent necessary to force the cutter 48 through the top of the can, is not excessive because of the mechanical advantage obtained through the cam arm 39 which carries the cutter. The lever is pivoted about an axis defined by the screw 42 which affords the fulcrum therefor, and also pivots about the axis of the screw 44 which is freely slidable through the elongated slot 43. Therefore, when the operating lever swings downwardly, the screw 44 moves slightly toward the right in the view of Figure 1, through the slot 43; and at the same time the slotted end of the lever is pushed downwardly to drive the cutter through the can top. Thus, the relative movements of the operating lever 30 and arm 39 are those of scissors; and consequently, the effective lever arm through which the downward force is applied to the cam arm 39 is greater than the actual length thereof.

Inspection of Figure 1 will make it clear that the operating lever 30 moves through a greater distance than the arm 39; and since the holder (or, more specifically, the magnet 56) is directly carried thereby while the cutter 48 is carried by the arm, the magnet necessarily moves through a greater distance than the cutter. Further, as shown in Figure 7, the magnet and cutter are both in engagement with the top 50 of the can when the operating lever is swung to the lowermost position thereof. Thereafter, the magnet tends to move upwardly at a more rapid rate than the cutter 48 when the operating lever is released, as is apparent from Figures 8 and 9. As a result of this, the severed top 50 of the can is pivoted upwardly about an axis defined by the point of engagement thereof with the cutter 48. Again, both Figures 8 and 9 demonstrate this relation.

Therefore, immediately after the operating lever is permitted to move upwardly through a short distance, the top 50 of the can along one side thereof becomes separated or spaced therefrom (see Figure 8), whereby it is readily grasped for removal before the can is released from the can opener or, more specifically, is released from the frictional grip of the drive wheel 23 and cutter 48. Similarly, if the operating lever is permitted to return to its initial position before the severed can top is removed, the top is still maintained in an inclined plane to afford ease in grasping the same, as Figure 9 indicates. The inclination of the can top also forces material which may be clinging to the undersurface thereof to drain toward its lowermost edge, from which it may then fall into the can below rather than being spilled.

While in the foregoing specification an embodiment of the invention has been set forth in considerable detail for purposes of adequate illustration thereof, it will be apparent to those skilled in the art that numerous changes may be made in those details without departing from the principles and spirit of the invention.

I claim:

1. In a power operated can opener, a casing adapted to be hand-held and having a motor mounted therein and having also a depressible switch carried in the top wall thereof for controlling said motor, a worm gear driven by said motor, a drive gear in engagement with said worm, a shaft fixed to said drive gear and being equipped with a drive wheel positioned exteriorly of said casing for drivingly engaging the rim of a can to effectuate rotation thereof, an operating lever pivotally secured to said casing for swinging movement downwardly toward the upper wall thereof to depress said switch, a lever arm fulcrumed on said casing and pivotally secured to said operating lever so as to be moved thereby, a cutter disc rotatably carried by said lever arm in general alignment with said drive wheel for movement theretoward when said operating lever is swung downwardly, and a magnet holder carried by said operating lever in general alignment with said cutter for gripping a can top severed by said cutter, said lever arm being connected with said operating lever at a point closer to the pivotal axis thereof

than said magnet holder to enforce a greater movement of the holder than that of the cutter when said operating lever is manipulated.

2. In a power driven can opener, a casing having a motor mounted therein, a depressible switch extending through a wall of said casing and being arranged with said motor for controlling the operation thereof, an operating lever pivotally mounted adjacent an end thereof on said casing for movement between a position remote from said casing and adjacent thereto for depressing said switch, a magnet holder carried by said operating lever intermediate the ends thereof, a cam arm pivotally mounted adjacent an end thereof on said casing and connected adjacent the other end thereof to said operating lever for pivotal and longitudinal movements with respect thereto, a cutter rotatably mounted upon said cam arm intermediate the ends thereof in general alignment with said magnet holder, a drive wheel rotatably supported by said casing below said cutter and in general alignment therewith, and drive means connecting said wheel and motor for rotating the wheel when said motor is energized, said drive wheel and cutter being cooperatively related for rotating a can to sever the top thereof with said magnet holder gripping the top of such can.

3. The can opener of claim 2 in which said casing is provided with a guide pin extending outwardly therefrom for engagement with the upper surface of a can to constrain pivotal movement thereof during the rotation imparted thereto by said drive wheel, and in which a rail extends transversely of said casing below said drive wheel for limiting the adjacency of a can thereto while the top thereof is being severed.

4. In a can opener structure of the character described, a casing, a cutter wheel mounted upon said casing and having a roughened periphery for establishing frictional engagement with the bead of a can, means for rotating said drive wheel, an operating lever pivotally mounted upon said casing for selective movement toward and away from the same, a cam arm carried by said casing for pivotal movement with respect thereto, means connecting said arm adjacent an end thereof to said operating lever for both pivotal and longitudinal movements, a cutter rotatably mounted upon said arm in general alignment with said drive wheel, and a magnet holder carried by said operating lever in general alignment with said cutter, the connection between the arm and lever being effective to pivot said arm downwardly and bring said cutter into adjacency with said drive wheel when said operating lever is moved downwardly, and said magnet holder being carried by the operating lever at a point more remote from the pivotal axis thereof than the connection of the cam arm thereto, whereby said magnet holder moves through a greater distance than said cutter when the operating lever moves between the positions of remoteness and adjacency with said casing.

5. The can opener of claim 4 in which spring means are provided for biasing said operating lever toward its position of remoteness with respect to said casing.

6. In a can opener structure of the character described, a casing equipped at one end with a head, a drive wheel rotatably supported by said casing for engaging the bead of a can to rotate the same, an operating lever pivotally mounted adjacent an end thereof on said head for swinging movement between a position remote from and adjacent to the casing, a cutter wheel interconnected with said operating lever for movement generally toward and away from said drive wheel, and a can-top holder for gripping the top of a can during and after severance thereof and being carried by said operating lever in general alignment with said cutter, the movement through which said holder travels being greater than that of the cutter when said operating lever is pivoted between its positions of remoteness and adjacency with said casing so as to cause the severed top of a can to pivot upwardly along its outer edge when the operating lever is returned to its aforesaid position of remoteness following a can opening operation.

7. The can opener of claim 6 in which said holder comprises a permanent magnet.

8. The structure of claim 7 in which spring means are provided for biasing said operating lever in a position of remoteness with respect to the casing.

9. The structure of claim 6 in which said operating lever comprises an inverted, generally L-shaped member, in which a bracket is secured adjacent one end to said lever and extends downwardly and outwardly therefrom, and in which said holder comprises a magnet carried by said bracket adjacent the lower end thereof.

10. In a can opener structure of the character described, a casing equipped adjacent one end thereof with a head, a drive wheel rotatably carried by said head exteriorly thereof for gripping engagement with a bead of a can to rotate the same, an elongated operating lever pivotally mounted adjacent an end thereof on said head and being movable between pivotal positions of remoteness and adjacency with said casing, a cam arm pivotally mounted adjacent an end thereof on said head, connector means pivotally securing said arm adjacent the other end thereof to said operating lever intermediate the ends thereof and affording both pivotal and longitudinal movement of said arm with respect to said lever during travel thereof between the aforesaid positions of remoteness and adjacency, and a cutter rotatably mounted upon said arm for cooperative engagement with said drive wheel to sever the top of a can when the operating lever is moved into adjacency with said casing.

11. The structure of claim 10 in which said connector means comprises a pin extending through said arm, and in which said arm is provided with an elongated slot slidably and pivotally receiving said pin therein.

12. The structure of claim 11 in which spring means are provided for biasing said operating lever toward its position of remoteness with respect to the casing.

No references cited.