Aug. 7, 1951 D. J. WALTON 2,563,569

CAN OPENER

Filed April 7, 1948 3 Sheets-Sheet 1

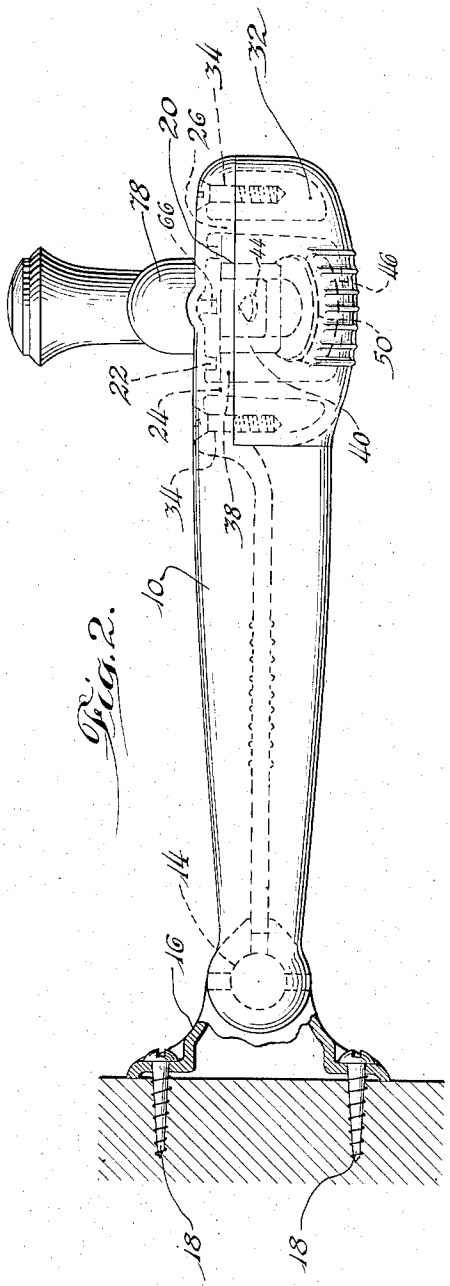


Fig. 2.

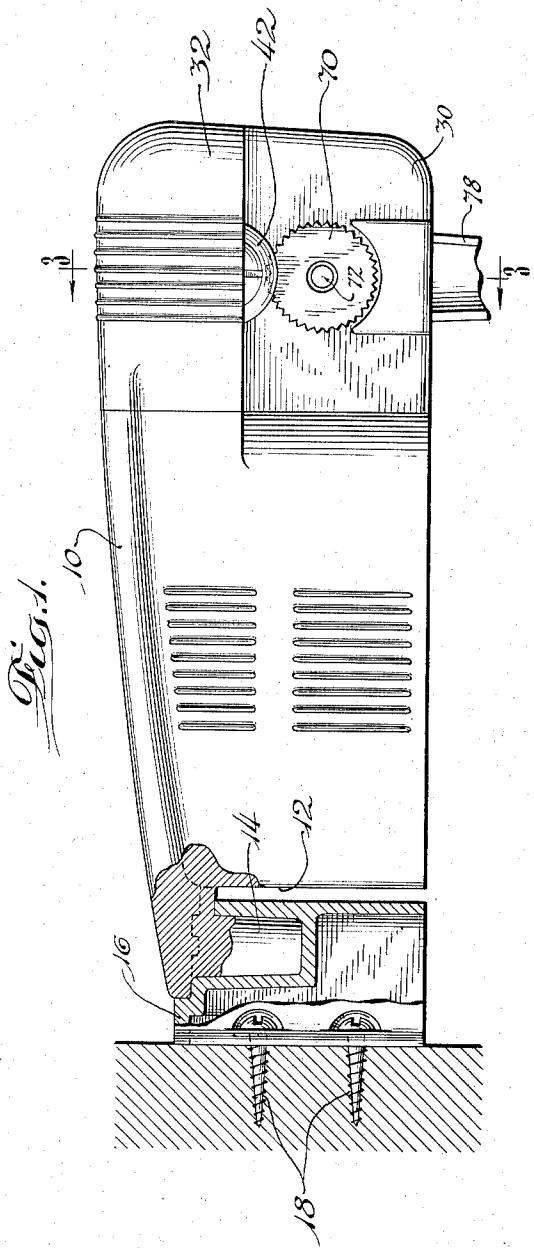


Fig. 1.

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CAN OPENER

Filed April 7, 1948 3 Sheets-Sheet 2

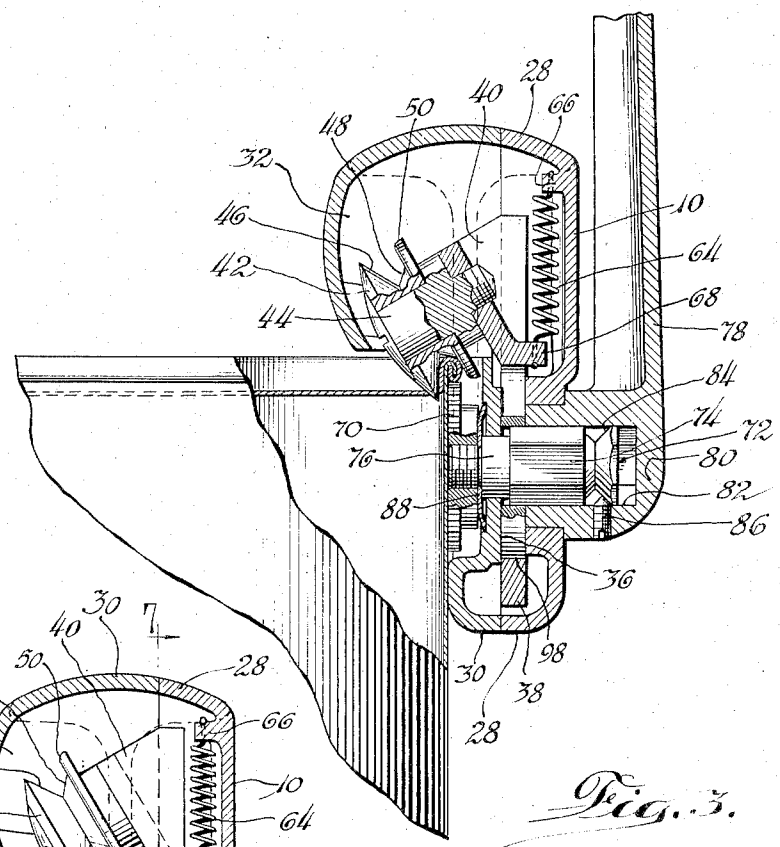


Fig. 3.

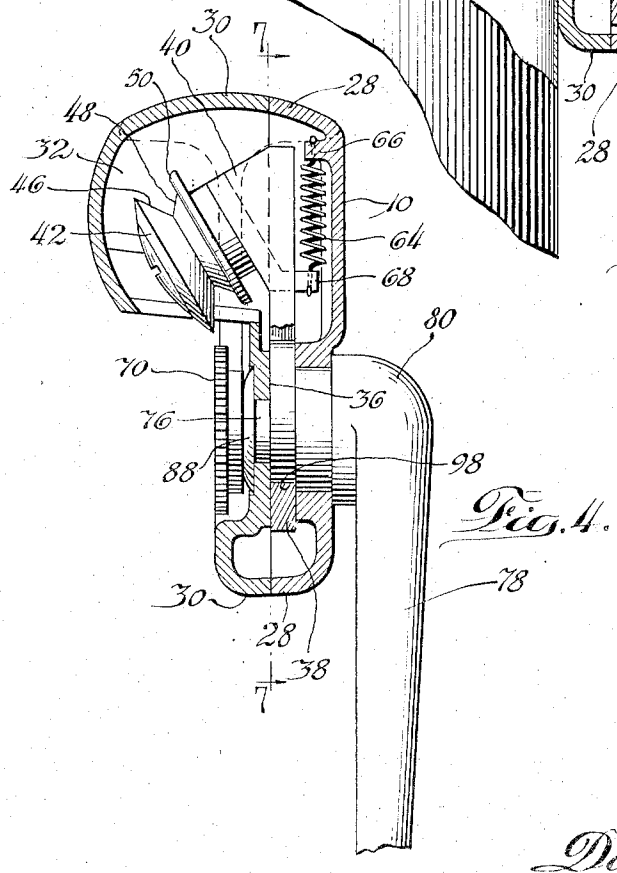


Fig. 4.

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Aug. 7, 1951 D. J. WALTON 2,563,569

CAN OPENER

Filed April 7, 1948 3 Sheets-Sheet 3

Fig. 5.

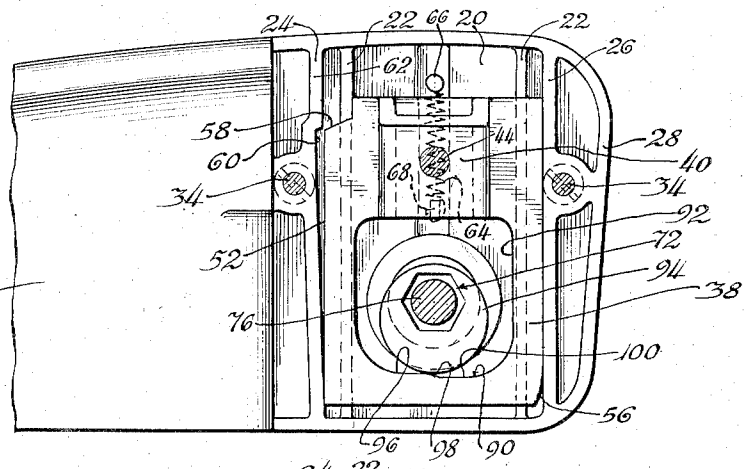


Fig. 6.

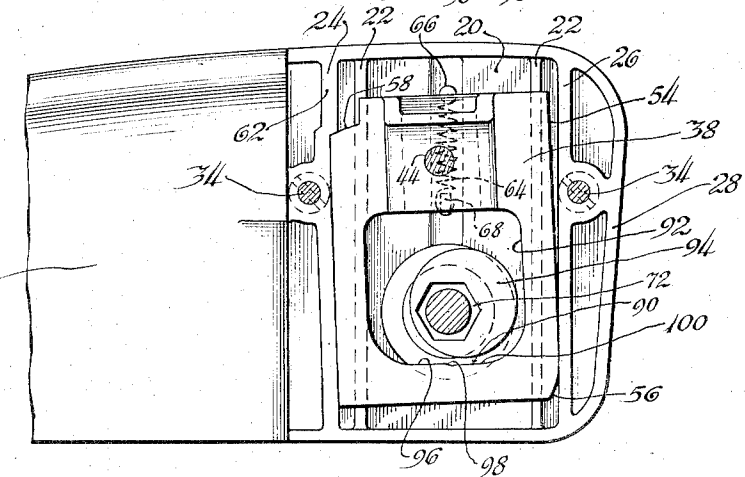
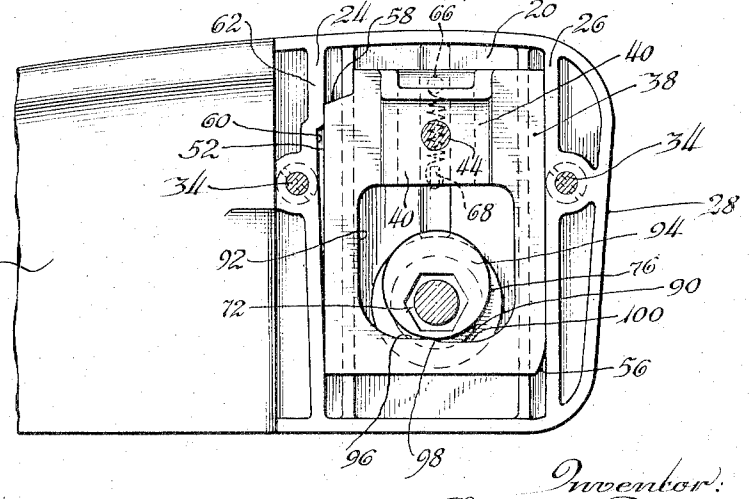


Fig. 7.



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UNITED STATES PATENT OFFICE

2,563,569

CAN OPENER

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Application April 7, 1948, Serial No. 19,551

9 Claims. (Cl. 30—9)

1

The present invention relates to can openers and more particularly to a can opener having improved means for moving the cutter to an operative can severing position and releasably locking the same in this position along with means for insuring return of the cutter to inoperative position when the locking means is released.

In can openers of the type which have rotary traction means for effecting relative movement between the can and the opener, the cutter and traction means are normally movable with respect to each other so that they can be separated to allow a can to be placed in severing position with respect to the opener, or the opener to be placed on the can when the opener is of the hand or portable type. Such openers include mechanism for positively moving the cutter and traction means toward each other to cause the cutter to be brought into piercing engagement with the end of a can inside the peripheral bead thereon and the traction means to be brought into driving engagement with this bead. Quite frequently in openers of this type the operating parts, namely, the cutter and traction means, are held in the latter position by friction alone and not positively so that they may slip out of operative position. In addition such openers commonly fail to include means for insuring return of the operating parts to their initial or inoperative position after a severing operation has been completed and the can removed from engagement with the opener or a means for holding the parts in inoperative position when the opener is not in use so that they must be manipulated before the opener can be used. This would seem to be a simple operation but for those persons not mechanically inclined it often presents difficulties. The present invention is concerned with means for obviating these deficiencies of the present openers.

Accordingly it is a primary object of the invention to provide a can opener with a new and improved means for moving the cutter and can feeding means between operative and inoperative positions along with improved means for locking the parts in operative position.

Another object of the invention is the provision of a new and improved can opener as above described in which the means for moving the cutter and can feeding means is automatically actuated to move these parts to operative position and lock them in that position upon movement of the can feeding actuating means in a feeding direction and which automatically releases the parts for movement to inoperative

2

position when the can feeding actuating means is moved in the opposite direction.

A further object of the invention is the provision of a new and improved can opener in which spring means are provided for automatically returning the cutter to inoperative position upon completion of a severing operation so that the opener is always ready to receive a can without preparatory manipulation.

Yet another object of the invention is the provision of a new and improved can opener which is exceedingly simple in construction and operation so that it is inexpensive to manufacture and which is sturdy and compact in construction and has its operating parts almost wholly enclosed.

These and other objects, advantages and capabilities of the invention will become apparent from the following description wherein reference is had to the accompanying drawings, in which:

Fig. 1 is a side elevational view of the improved can opener of the present invention and a wall bracket for securing the same to a wall, with portions thereof broken away to disclose the construction more clearly;

Fig. 2 is a top plan view of the can opener of the present invention and the wall bracket, the latter being shown partly in section;

Fig. 3 is a vertical sectional view on an enlarged scale taken on the line 3—3 of Fig. 1, showing the parts of the opener in operative position and a portion of a can in cutting position;

Fig. 4 is a sectional view of the can opener similar to Fig. 3 but showing the parts of the opener in inoperative position;

Fig. 5 is a view on an enlarged scale of the opener of the present invention taken generally in the plane of the cutter plate and showing the position this plate and the cam means assume upon initial piercing of a can top;

Fig. 6 is a view similar to Fig. 5 but showing the parts in operative can severing position; and

Fig. 7 is another view similar to Fig. 5 but showing the parts in inoperative position.

In the drawings the principles of the invention are shown applied to a wall type can opener which, as shown in Figs. 1, 2 and 3, comprises a main body or frame member 10 generally T-shaped in vertical cross-section except at its opposite ends. At its rear end the frame 10 is recessed as indicated at 12 in Fig. 1 and is provided with a vertical post or stud 14 which is adapted to be received in a complemental socket in a wall bracket 16 for rotational movement

relative thereto. This bracket may be secured to a wall or other fixed support by means of screws 18 or other fastening means and supports the opener rigidly upon the wall. However, because of the pivotal connection between the frame and bracket, the frame may be swung from an inoperative position in generally parallel relation to the wall to an operative position normal to the wall or at any other angle to the wall and furthermore if desired the frame may be lifted from connection with the bracket so that the can opener can be entirely removed from the wall when not in use.

The frame 10 may be a die casting and at its forward end it is conformed, as best seen in Figs. 2, 3 and 5, to form one-half of a housing which encloses certain of the operating parts of the opener. As indicated in Fig. 5, the inner side of this forward end of the frame member presents a generally flat surface 20 which has a pair of ribs 22 upstanding therefrom. These ribs are finished on their upwardly facing sides as seen in Fig. 5 to form flat surfaces for a purpose which will appear. In addition to these ribs 22, rear and front guide ribs 24 and 26, respectively, are also formed upon the flat surface 20 and project upwardly therefrom to a somewhat greater height than the ribs 22. Each of these ribs is finished on its inner face for a purpose which will be described hereinafter.

The forward end of the frame 10 may also be provided with a peripheral flange 28 as indicated in Figs. 4 and 5 for cooperating with a matching peripheral flange 30 on a cover plate 32. This cover plate may be secured to the frame by any suitable means such as a pair of screws 34 (Figs. 2 and 5) projecting through the frame and threaded into the cover plate. The forward portion of the frame and the cover plate thus form a housing for completely enclosing the operating parts except for the traction means and that portion of the cutter which engages a can.

Below the level of the cutter the cover plate has a flat part 36 which engages upon the outer surface of the guide ribs 24 and 26 so that a recess is formed between the frame and cover plate which receives the lower end of a cutter plate 38. This plate is slidable within the housing between the ribs 22 on the frame member and the flat inner surface 36 of the cover plate. If desired, this surface may be provided with ribs on its inner side corresponding with the ribs 22 on the frame member 10 to reduce friction.

The major portion of this cutter plate 38 is flat but it has a lug 40 formed on its upper end at an inclination to the plane of the plate. A disc cutter 42 is rotatably supported upon this lug by means of a shouldered pin or screw 44 which is threaded into the lug 40 in a plane normal thereto. The cutter is of more or less conventional construction and has a sharp cutting edge and a beveled face 46. The face 46 engages the innerside of the side wall of a can during a severing operation and turns down the severed edge of the top so that no rough edges are presented by this severed edge. The disc cutter also has a counterbevel 48 and an annular flange 50 for engaging on the top and outer side, respectively, of the peripheral bead of a can, as indicated in Fig. 3. These parts of the cutter cooperate to hold the can with the lower side of its top bead engaged with the traction means.

The cutter plate 38 has parallel generally plane rear and forward edges 52 and 54, respectively, that slidably engage the inner finished sides of

the guide ribs 24 and 26, respectively. These ribs guide movement of the plate relative to the frame, as will hereinafter appear in the description of the operation of the device. The lower end of the forward edge 54 of the cutter plate is curved as indicated at 56, while the rear edge is notched or offset adjacent its upper end, as indicated at 58. This notch is adapted to be engaged in an offset 60 in the rear guide rib 24. Thus the guide ribs 24 and 26 cooperating with the front and rear edges 52 and 54, respectively, of the cutter plate, guide movement of the plate in a plane parallel to the frame in a manner which will be described in greater detail hereinafter in connection with the description of the operation of the opener.

When the cutter plate is in the position shown in Fig. 7 with its forward edge 54 in engagement throughout its length with the forward guide rib 26, and the plane part of the rear edge 52 engaged for at least a portion of its length with a portion 62 of the rear guide rib 24, above the offset 60 and parallel to the front guide rib, the plate is constrained for linear movement. However, when it has been moved downwardly to the position shown in Fig. 5, the notch or offset 58 in the plate is opposite the offset 60 in the rear guide rib 24 so that the plate may be rocked to the position shown in Fig. 6. The curved lower end 56 of the forward edge of the plate prevents binding of the plate during this rocking movement.

Normally the plate is biased upwardly to the position indicated in Fig. 7 by a tension coil spring 64 secured at one end to a lug 66 on the frame, and at the other end to a rearwardly projecting lug 68 on the cutter plate 38.

Driving means for effecting relative movement between the can and opener to cause the cutter 42 to sever the end of a can when the parts are in operative position is provided which consists of a serrated or toothed traction wheel 70 fixedly secured at one end of an actuating shaft 72. The shaft is of polygonal cross-section throughout the major portion of its length, as indicated at 74, and has an intermediate part 76 rotatably journaled in the cover plate 32. In assembling the opener the traction wheel 70 which is press-fitted, threaded, or otherwise fixedly secured to the inner end of the actuating shaft 72 is secured in position after the cover plate has been fixed to the frame.

A crank arm or handle 78 having an operating knob at one end and a shouldered hub 80 at the other which is journaled in the forward end of the frame member 10 is provided for rotating the shaft and thus operating the traction means. A portion of the polygonal end 74 of the actuating shaft is loosely received in a complementary shaped socket or recess 82 in the hub. Thus the shaft and the hub are fixed against relative rotation but the shaft is axially movable with respect to the hub. Such movement is limited by means including a groove 84 in the periphery of the polygonal end of the shaft which has tapered sides and a set screw 86 threaded into the hub and having a conical tip projecting into the tapered groove as seen in Fig. 3. Normally the shaft and traction wheel are urged outwardly of the hub by a spring washer 88 on the shaft 72 which reacts between the traction wheel and the front or outer side of the cover plate.

The axially movable construction above described accommodates the opener to irregularities in the side wall of a can. Thus binding is avoided when, for example, the vertical bead on a can is

passing through the opener. The construction described above has another advantage, namely, journaling of the operating handle 78 in the frame 10, and the shaft 72 in the cover plate 32 rigidifies the whole driving mechanism assembly.

It has previously been mentioned that the cutter plate 38 is normally maintained in an inoperative position, indicated in Figs. 4 and 7, by the tension spring 64. The plate is moved from this position to an operative position in which the cutter is in piercing engagement with the end of a can inside the peripheral bead thereon, and the traction wheel is in driving engagement with the underside of this bead as shown in Figs. 3 and 6 by cooperating cam means forming one of the features of the present invention. This means includes a cam face 90 formed on the lower edge of an opening 92 in the cutter plate, and a disc cam 94 eccentrically secured on the polygonal portion of the shaft 72, as indicated in Fig. 5. The disc cam is of substantially the same thickness as the plate 38 and is disposed in the opening therein so that a compact construction results. The cam face 90 has an upwardly inclined portion 96 terminating in a high point 98 and a downwardly curved part 100 opposite the inclined part 96. The edge of the disc cam cooperates with these parts of the cam face to move the cutter plate linearly and allow rocking movement thereof into and out of an operative position when the shaft 72 is rotated in opposite directions in a manner which will now be described.

When the cutter plate 38 is in inoperative position, as shown in Figs. 4 and 7, the low point on the disc cam 94 is opposite the high point 98 on the cam face 90 on the cutter plate. In this position the top of the traction wheel 70 and the bottom of the disc cutter 42 are separated from each other sufficiently to permit the peripheral bead on a can to be inserted therebetween and the can then to be held in vertical severing position.

With the can held in this position the crank handle 78 is turned in a clockwise direction, thus causing the shaft 72 and disc cam 94 to be rotated in a counterclockwise direction as seen in Fig. 5. Rotation of the shaft in this direction through 180° brings the high point on the disc cam 94 into engagement with the high point 98 on the cam face 90 as shown in Figs. 3 and 5. During the course of this movement the cutter plate 38 which is guided by ribs 24 and 26 is moved linearly downwardly to a position where the offsets in the guide rib 24 and rear edge 52 of the cutter plate are brought opposite each other. At this point the disc cutter 42 will have been drawn down sufficiently to pierce the end of the can and to press the lower side of the bead on the can against the traction wheel 70 so that continued rotation of the shaft will cause the can to move relative to the opener.

As the can begins to move relative to the opener upon continued rotation of the operating handle in the same direction, the cutter begins to sever the top of the can. When this occurs a thrust is exerted by the cutter against the upper end of the cutter plate directed to the left, as seen in Fig. 6, so that the cutter plate is rocked to the left, bringing the notch 58 in the rear edge of this plate into full engagement with the offset 60 in the guide rib 24. This locks the plate in its lowermost operative position so that the cutter and traction means are held in operative position throughout continued rotation of the actuating shaft and they will continue to be held in this

position even though rotation of the shaft may be interrupted momentarily.

After the top has been completely severed, the cutter plate may be returned to inoperative position by rotating the handle in counterclockwise direction. This rotates the traction wheel 70 in the opposite direction causing the can to move with respect to the opener in the opposite direction to that which it moves when cutting is taking place. Thereupon the upper end of the cutter plate 38 is rocked to the right as seen in Fig. 6, thus disengaging the cooperating detent offsets in the guide rib 24 and the edge 52. This releases the cutter plate for movement to inoperative position so that as the handle is further rotated and the low point of the disc cam is brought opposite the cam face 90, the spring 64 draws the cutter plate upwardly to its inoperative position.

In a wall type opener the disc cam 94 is secured on the shaft 72 in such a position angularly relative to the handle 78 that the low point of the disc cam is opposite the high point on the cam face 90 when the operating handle is in the depending position shown in Fig. 4.

It will thus be apparent that I have provided a can opener which is exceedingly simple in construction and which contains no fragile parts so that it is not subject to breakage even though it is used roughly. Moreover, action of the parts is positive when moving the cutter to operative position and when moving it to inoperative position, making the opener extremely reliable in operation. An additional advantage arises from the fact that the operating parts except for the traction wheel and the portion of the cutter which engages the can top, are all enclosed within the housing so that the opener presents a neat appearance, is easy to keep clean, is compact in size and its operating parts are not so likely to be damaged by accident. Furthermore, the two parts of the housing may be readily disengaged for making adjustments or repair.

While the invention has been described as applied to a wall type can opener, it should be apparent that it is not so limited and that the principles of the invention can readily be applied to other types of openers. It will also be apparent that the disc cutter described is for the purpose of illustration and that other cutters of more or less conventional construction are adaptable for use on an opener incorporating the principles of the present invention. Numerous other variations and modifications may be made without departing from the underlying principles of the invention. I, therefore, desire, by the following claims, to include within the scope of the invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. In a can opener a supporting structure, a traction wheel rotatably carried by said supporting structure, a carrier movably mounted on said supporting structure, a cutter mounted on said carrier, actuating means for rotating said traction wheel, means including a cam on said carrier and a cam rotated by operation of said actuating means in a forward direction for moving said carrier in a direction to force the cutter into piercing engagement with the top of a can and the bead on said can into driving engagement with the traction wheel, and means on the support and carrier to guide and confine movement of the carrier to a substantially linear direction until the cutter has

reached can piercing position and then to free the carrier for limited rocking movement and said carrier and support being formed to provide a detent for holding said carrier at rocked position and said cutter and traction wheel in operative severing relation to the can top during continued rotation of the actuating means in the same direction, the connection between said cutter and carrier transmitting the thrust on said cutter incident to severing of the can top to said carrier to cause the latter to be rocked to locked position upon rotation of the actuating means sufficient to initiate severing of the top.

2. In a can opener, a body member forming a support, a traction wheel and a cutter mounted on said support for straight-line and rockable movement relatively from an inoperative position at which the top rim of a can may be inserted between the same to an operative severing position at which said cutter is in piercing engagement with the top of a can and the rim of said can is in driving engagement with the traction wheel, rotatable means to rotate said traction wheel, actuating means including means rendered operative by rotation of said rotatable means to cause said cutter and traction wheel initially to move relatively to operative severing relationship with the can when the rotatable means is rotated in one direction and then to sever the top of said can, and detent means including a stationary detent on said support and a detent moved adjacent said stationary detent upon relative straight-line movement of the cutter and traction wheel and rockable from said position into locking engagement with the stationary detent in response to the thrust exerted on said cutter when severing of the can top starts, and out of locking position when the direction of rotation of said rotatable means is reversed.

3. In a can opener, a body member forming a support, a traction wheel rotatably carried by said support, a cutter, a carrier for said cutter movable linearly relative to said support to bring said cutter into and out of piercing engagement with the top of a can and the rim of the can into driving engagement with the traction wheel, rotatable means to rotate said traction wheel, means rendered operative by rotation of said rotatable means to move said carrier linearly in a direction to bring the cutter to piercing position, and guide means on the support and carrier to guide movement of the carrier linearly including complemental offsets on the carrier and support arranged to allow rocking movement of the carrier after the can top has been pierced in response to the thrust exerted on the cutter during severing and conformed to hold said carrier in said rocked position until a reversal in the direction of rotation of the rotatable means reverses the direction of the thrust exerted on the cutter.

4. In a can opener, a body member forming a support, a traction wheel rotatably carried by said support, a cutter, a carrier for said cutter mobable linearly relative to said support to bring said cutter into and out of piercing engagement with the top of a can and the rim of the can into driving engagement with the traction wheel, rotatable means to rotate said traction wheel, means rendered operative by rotation of said rotatable mean to move said carrier linearly in a direction to bring the cutter to piercing position, guide means on the support and carrier to guide movement of the carrier linearly including complemental offsets on the carrier and support arranged to allow limited rocking movement of the carrier after the can top has been pierced in response to the thrust exerted on the cutter during severing and conformed to hold said carrier in said rocked position until a reversal in the direction of rotation of the rotatable means reverses the direction of the thrust exerted on the cutter, and yieldable means to separate said cutter and can top when the carrier is released from rocked position.

5. In a can opener, a support, a traction wheel rotatably carried on said support, rotatable means to rotate said traction wheel, a carrier plate having opposite generally parallel edges, a cutter mounted on said plate, means rendered operative by rotation of said rotatable means to move the carrier plate and cutter, guide means on said support having generally parallel portions to engage the parallel edges of said plate and cause the plate to move linearly in a direction to bring the cutter into piercing engagement with the top of a can and the peripheral bead on the can into driving engagement with the traction wheel upon initial rotation of the rotatable means, and complemental offsets in one edge of said plate and the guide means engaged by said edge arranged to allow limited rocking movement of the carrier after the can top has been pierced in response to the thrust exerted on the cutter during severing and conformed to hold said carrier in said rocked position until a reversal in the direction of rotation of the rotatable means reverses the direction of the thrust exerted on the cutter.

6. In a can opener, a support, a shaft rotatably journaled in said support, means for rotating said shaft, a traction wheel rotated by said shaft, a cutter, a carrier for the cutter movably mounted on said support, said carrier having an opening therein defining a cam face, a cam supported by said shaft in the opening in said carrier and having a periphery adapted to cooperate with said cam face to move said carrier relative to said support when the shaft is rotated, and cooperating guide means on the support and carrier to guide the latter for movement in a direction to cause the cutter to be brought into piercing engagement with the top of a can and to force the rim of the can into driving engagement with the traction wheel during initial rotation of the shaft, said guide means including complemental offsets brought adjacent each other when the carrier and cutter are moved to piercing position, said offsets being located on the trailing side of said cutter so that said carrier is freed for rocking movement in a direction to bring said offsets into locking engagement in response to the thrust exerted on the cutter incident to initial severing of the can top.

7. In a can opener, a main support including a pair of body members secured to each other and having spaced walls defining an elongated recess between the body members, a shaft extending through and rotatably journaled in said support, a can feeding traction wheel fixed to one of the projecting ends of said shaft, operating means for rotating said shaft fixed to the other end thereof, a carrier plate movably secured in said recess, a cutter supported upon said plate, cooperating cam means on the carrier plate and shaft to move the plate and cutter when the shaft is rotated, said plate having a pair of generally parallel edges, guide means in said recess including generally parallel portions to engage said edges and cause said plate to move linearly in a direction to bring the cutter into piercing engagement

with the top of a can and the peripheral bead on the can into driving engagement with the traction wheel during initial rotation of the shaft in one direction, and complemental offsets in the guide means and the edge of said plate on the trailing side of said cutter, said plate being rockable in response to the thrust exerted thereon by said cutter during initial severing of the can top to bring said offsets into locking engagement for holding the plate at said position and to move said offsets out of locking engagement when a reversal in the direction of rotation of the shaft causes an oppositely directed thrust to be exerted on the plate.

8. In a can opener, a main support including a pair of body members secured to each other and having spaced walls defining an elongated recess between the body members, a shaft extending through and rotatably journaled in said support, a can feeding traction wheel fixed to one of the projecting ends of said shaft, operating means for rotating said shaft fixed to the other end thereof, a carrier plate movably secured in said recess, a cutter supported upon said plate, cooperating cam means on the carrier plate and shaft to move the carrier plate and cutter when the shaft is rotated, said plate having a pair of generally parallel edges, guide means in said recess including generally parallel portions to engage said edges and cause said plate to move linearly in a direction to bring the cutter into piercing engagement with the top of a can and the peripheral bead on the can into driving engagement with the traction wheel during initial rotation of the shaft in one direction, complemental offsets in the guide means and the edge of said plate on the trailing side of said cutter, said plate being rockable in response to the thrust exerted thereon by said cutter during initial severing of the can top to bring said offsets into locking engagement for holding the plate at said position and to move said offsets out of locking engagement when a reversal in the direction of rotation of the shaft causes an oppositely directed thrust to be exerted on the plate, and yieldable means to separate said cutter and can top when said offsets are released from locking engagement.

9. In a can opener, a support, a shaft rotatably journaled in said support and axially movable relative thereto, a traction wheel fixed to said shaft on one side of said support, an operating handle having a hub nonrotatably fixed upon said shaft upon the side of said support opposite the traction wheel and axially movable relative thereto, means to limit axial movement of the handle and shaft including a tapered groove in the shaft and a screw in the hub of said handle having a tapered point projecting into said groove, resilient means between the traction wheel and support to urge the shaft and handle inwardly of the support, said hub on the handle engaging the support to limit movement of the handle and shaft under the influence of said resilient means, a cutter movably mounted on said support, means rendered operative by rotation of said shaft in one direction to move said cutter into severing engagement with the top of a can and the peripheral bead on said can in feeding engagement with the traction wheel, means forming detent means to hold said parts at the last said position, said detent means being rendered ineffective to hold the parts in said position when the direction of rotation of the shaft is reversed, and means to separate the cutter and can top when said detent means is rendered ineffective, said resilient means between the traction wheel and support yielding to compensate for unevenness in the side wall of the can when the top is being severed.

DAVID J. WALTON.

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