Oct. 28, 1952 J. R. LAWRENCE 2,615,241

CAN OPENER

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Fig. 1

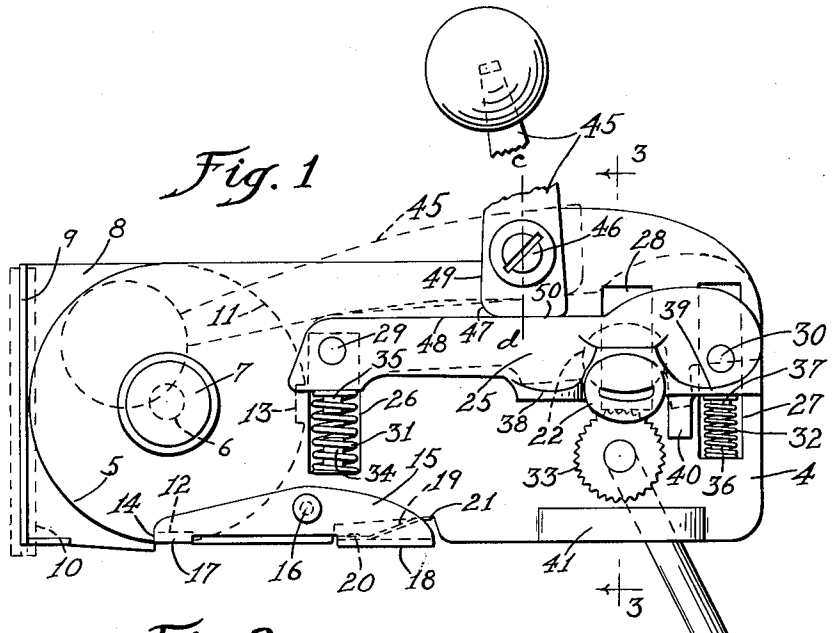


Fig. 2

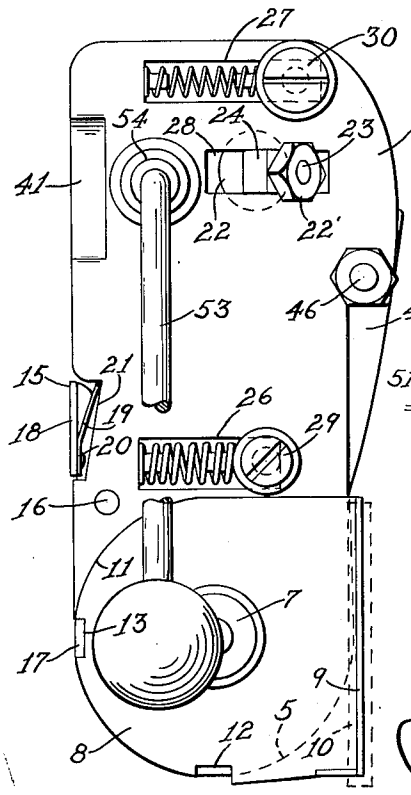
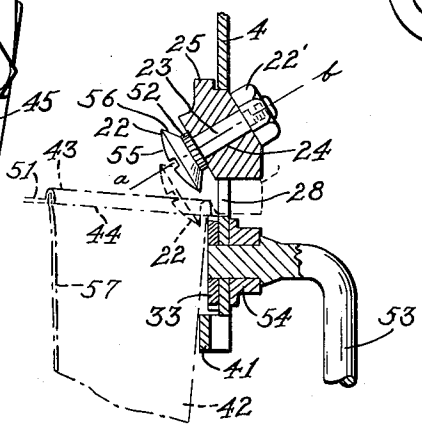


Fig. 3



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CAN OPENER

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5 Claims. (Cl. 30—9)

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This invention relates to can openers of the crank operated type and more specifically, one designated to be pivotally attached to a wall bracket so that it may be swung upwardly to an out of the way position when not in use.

One of the principal objects of my invention is to provide a can opener in which the cutter wheel is floatingly mounted relative to the frame of the can opener by means of an elongated plate that is slidably guided at its opposite ends on the frame plate for vertical movement against the resistance of coiled compression springs so as to permit the two horizontal projections provided on the movable plate to be brought to rest squarely on top of the flange on the can in front of and behind the cutter wheel, whereby to insure the desired depth of penetration of the cutter wheel and at the same time positive engagement of its drive roller with the top of the flange and also positive engagement of the crank operated feed roller with the bottom edge of the flange for most efficient operation of the can opener.

Another object is to provide quickly and easily operable lever means for imparting movement to the movable plate, the same comprising a cam lever pivotally mounted on the frame plate at a point above and intermediate the ends of the movable plate. The lever when swung to a vertical dead-center position at right angles to the movable plate, holds the plate positively in its operative position, and when swung downwardly toward parallelism with the movable plate to a retracted position, allows return of the movable plate to retracted position under pressure of its associated springs which also serve indirectly to assist in moving the lever to retracted position.

Another object is to provide the one spring at the forward end of the movable plate appreciably lighter than the other spring at the rear end, so that the plate has mainly pivotal movement about the rear end thereof, whereby to afford greater clearance between the cutter wheel and the feed roller in the retracted position of the movable plate, for easy entry of the flanged top of a can to be opened, the rear end of the plate yielding only a little at the end of the movement of the plate toward operative position, after the lighter spring at the front end is loaded sufficiently to cause some compression of the heavier spring at the rear end to balance the spring loading at opposite ends of said plate. The manually operable cam lever is located close enough to the cutter wheel so that the downward pressure is applied almost directly to the cutter wheel in piercing the metal of the top of the can, and the lever affords so much leverage that the operator can perform the can piercing operation with fairly light pressure applied to the operating lever.

The cutter wheel, in accordance with my invention, is of circular form and substantially spherical shaped on the inner face and of truncated conical shape on the outer face and is disposed with its axis of rotation inclined sufficiently from a horizontal plane so that an element of the lower portion of the conical outer face lies substantially parallel to the side wall of the can, and in closely spaced substantially parallel relation to the feed roller, leaving just enough room between the cutter wheel and feed roller for a double wall thickness of the can whereby to iron out the cut edge of the top wall flatly against the inside of the side wall in the operation of the can opener, and accordingly reduce likelihood of the operator getting his or her fingers cut in the subsequent handling of the can.

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The invention is illustrated in the accompanying drawing, in which

Fig. 1 is a side view of a can opener made in accordance with my invention and shown in the lowered operative position;

Fig. 2 is a view of the can opener from the opposite side and showing it in its raised or folded inoperative position, and

Fig. 3 is a cross-section taken on the line 3—3 of Fig. 1.

The same reference numerals are applied to corresponding parts throughout the views.

Referring to the drawing, the reference numeral 4 designates the generally rectangular frame plate of the can opener, one end 5 of which is cut to semi-circular form in concentric relation to a hole 6 that is on the longitudinal centerline of the plate and which receives the cylindrical shank of a pivot pin 7 pivotally connecting the plate with a sheet metal supporting bracket 8. The latter has a keystone-shaped attaching plate 9 welded thereto in a plane at right angles to the bracket adapted to have a wedging fit in a flanged retainer plate 10 that is fastened to the wall or kitchen cabinet at any convenient location, the present can opener being designed to be swung from the horizontal operative position shown in Fig. 1 upwardly to the vertical retracted or inoperative position shown in Fig. 2. The bracket 8 has a semi-circular outer edge 11 in concentric relation to the pivot pin 7, and two notches 12 and 13 are provided in this edge portion spaced circumferentially 90° apart. A notch 14 is provided in the edge portion 5 of the plate 4 arranged to register with either of the notches 12 and 13. An elongated latch 15 is pivoted intermediate its ends on a rivet 16 on the lower edge portion of the plate 4 and has a lug 17 bent at right angles thereto and arranged to engage in the notch 14 and in whichever of the notches 12 and 13 happens to be in register with the notch 14, the lug 17 being shown engaged in notch 12 in Fig. 1 and in notch 13 in Fig. 2. The other end of the latch 15 has a wider and longer lug 18 bent at right angles thereto which serves as a thumb-piece

adapted to be depressed in releasing the latch against the resistance of an elongated leaf spring 19, that is fastened at one end 20 to the back of the thumb-piece 18 and has slidable engagement at its free end in a notch 21 provided in the lower edge portion of the plate 4. In that way the frame plate 4 can be unlocked quickly and moved from one position to the other and back again. The lug 17 rides on the arcuate periphery 11 of the bracket 8 in the movement of the plate 4 from one position to the other and automatically snaps into place in the notch 12 or 13, as the case may be, at the end of the pivotal movement, positively locking the can opener in a desired position.

A cutter wheel 22 has a stem portion 23 integral therewith that is rotatably mounted in a bearing 24 provided on an axis *a*—*b* inclined at an acute angle with respect to the vertical plane of the plate 4 in an elongated cast plate 25. This plate 25 is floatingly mounted on the frame plate 4 and slidably guided at its opposite ends in vertical slots 26 and 27. The bearing portion 24 of the plate 25 projects through and is movable in a vertical slot 28. A nut 22' is threaded on the reduced end of the stem 23 protruding from the bearing 24, whereby to hold the cutter wheel in place and yet permit easy removal and replacement. Screws 29 and 30, the shanks of which extend through the slots 26 and 27, respectively, serve to hold the movable plate 25 in assembled relation to the frame plate 4. Coiled compression springs 31 and 32 disposed in the slots 26 and 27 normally urge the plate 25 upwardly to the dotted position shown in Fig. 1, in which the cutter wheel 22 is in retracted position relative to the feed roller 33 to permit placing the flanged top of a can in position therebetween for opening. The spring 31 is appreciably heavier than the spring 32 and encircles a lug 34 provided on the plate 4 in one end of the slot 26, the other end of the spring encircling another lug 35 provided on the movable plate 25. The spring 32 in a similar manner has one end encircling a lug 36 provided on the plate 4 in one end of the slot 27, the other end encircling a lug 37 provided on the plate 25. There are two horizontal projections 38 and 39 provided on the plate 25 on opposite sides of the cutter wheel 22 arranged to rest on top of the flange of the can in front of and behind the cutter wheel in the can opening operation to guide the can slidably in its rotary movement during this operation and thus assure maintaining the correct relationship of the cutter wheel 22 and feed roller 33 relative to the can throughout the operation. A lug 40 projecting downwardly from the plate 25 under the projection 39 bears against the outer side of the flanged top of the can to keep it in spaced relation to the spring 32, without, however, interfering with the proper engagement of the feed roller with the bottom edge of the flange on the can, as required for most efficient operation of the can opener. A further guide for the can is provided by a protruding elongated strap portion 41 struck from the lower edge portion of the frame plate 4 in parallel relation to the plate below the feed roller 33, which strap engages the side of the can, as shown in Fig. 3. In this figure, 42 designates the can, shown in dot and dash lines, 43 the flange on top of the can, and 44 the bottom edge of the flange that is engaged by the toothed periphery of the crank operated feed roller 33 to cause the can to be turned in the can opening operation. The floating mounting of the plate 25 is of advantage not only from

the standpoint that the springs 31 and 32 which support the plate for movement serve to return the plate to retracted position, but from the standpoint that there is substantially evenly balanced pressure downwardly on the top of the can in front of and behind the feed roller 33 to keep the bottom edge 44 of the flange on the can properly engaged throughout the can opening operation with the toothed periphery of the feed rollers 33, while the projections 38 and 39, slidably engaging the top of the flange 43, guide the can to maintain the correct positioning of the can relative to the cutter wheel 22 and feed roller 33 throughout the operation. The slot 26 containing the spring 31, it will be noticed, is much shorter than the slot 27 containing the spring 32, because the plate 25 has mainly pivotal movement about the inner or rear end thereof, the spring 31 disposed under this end yielding only a little at the end of the movement of the plate 25 toward operative position after the lighter spring 32 at the front end is loaded sufficiently to cause some compression of the heavier spring 31 to balance the spring loading at opposite ends of the plate 25. This pivotal movement of the plate 25 is of advantage in affording greater clearance between the cutter wheel 22 and feed roller 33 in the retracted position of the plate for easier insertion of the can. A cam lever 45 is pivoted to the upper edge portion of the frame plate 4, as indicated at 46, and has its cam-shaped end portion 47 arranged to slide on the upper edge 48 of the plate 25 to impart downward movement thereto against resistance of springs 31 and 32. One edge 49 of the cam-shaped end 47 is approximately in right angle relation to another edge 50, and the lever 45 is movable from a substantially horizontal position in approximate parallelism with the plate 25, as shown in dotted lines in Fig. 1, to a vertical dead-center position substantially at right angles to the plate 25, as shown in full lines in the same figure, whereby to move the plate 25 downwardly and cause the cutter wheel 22 to pierce the top wall 51 of the can alongside the flange 43. The pivot 46 for the lever 45 is located close enough to the cutter wheel 22 so that the downward pressure is applied almost directly to the cutter wheel, and the lever 45 is long enough in relation to the radial dimension of the cam-shaped end 47 so that there is adequate leverage to enable the operator to pierce the top of the can with rather light pressure on the outer end of the lever 45. When the cutter wheel 22 pierces the top 51 of the can, a feed roller 52 provided on the back of the cutter wheel is pressed at the same time against the top of the flange 43 on the can so as to cause the cutter wheel 22 to be turned as the can is thereafter turned in the can opening operation, whereby to make for easier cutting and avoid concentrating wear and tear on one portion of the cutter wheel. A crank 53 suitably mounted in the bearing 54 provided on the frame plate 4 is drivingly connected with the feed roller 33 to turn the same. Due to the fact that the lever 45 is in a dead-center position, at right angles relative to the plate 25, during the can opening operation, it requires only a little more than 45° movement of the outer end of the lever 45 to make the springs 31 and 32 effective for returning the lever 45 to the fully retracted position shown in dotted lines in Fig. 1, the rounded corner 47 in that amount of movement being moved past a vertical dead-center line *c*—*d* drawn through the pivot 46. The spring 31—32, there-

fore, serve an extra purpose, their main purposes being, of course, to return the plate **25** with the cutter wheel **22** to retracted position after a can has been opened, and to allow the plate **25** to float relative to the frame plate **4** to secure proper engagement of both of the projections **38** and **39** on top of the can with approximately evenly balanced pressure.

In conclusion, it will be seen in Fig. 3, that the cutter wheel **22** is substantially spherical shaped on the inner face **55** and is of truncated conical shape on the outer face **56**, and the axis *a*—*b* is so inclined to make an element of the lower portion of the conical outer face **56** lie substantially parallel to the side wall **57** of the can and in closely spaced substantially parallel relation to the feed roller **33**, leaving just enough room between the cutter wheel **22** and feed roller **33** for a double wall thickness of the can, whereby the cutter wheel **22** serves to iron out the cut edge of the top wall **51** flatly against the inside of the side wall **57** in the operation of the can opener, thereby reducing likelihood of the operator getting his or her fingers cut in the subsequent handling of the can.

It is believed the foregoing description conveys a good understanding of the objects and advantages of my invention. The appended claims have been drawn to cover all legitimate modifications and adaptations.

I claim:

1. A can opener comprising a frame plate disposed in a substantially vertical plane, a can propelling roller carried thereon having a toothed periphery disposed for engagement with the bottom edge of the top flange on a can placed next to the frame plate, means for turning said roller to turn the can, a cutter wheel having a toothed propelling roller in close coaxial relationship therewith arranged for engagement on top of the flange on the can to turn the cutter wheel as the can is turned, an elongated plate disposed in a plane parallel to the frame plate with its lower edge portion substantially horizontal so as to lie substantially parallel to the top of a can being opened, said elongated plate being slidable on the frame plate for movement bodily up and down relative to the frame plate, two resilient means yieldingly supporting the ends of said elongated plate for said up and down movement and tending to urge said elongated plate to a raised retracted position, means rotatably mounting said cutter wheel and its propelling roller on said elongated plate intermediate its ends and above said can propelling roller so that said cutter wheel pierces the top wall of the can alongside the flange and its propelling roller firmly engages the top of the flange for traction when the elongated plate is moved downwardly from retracted raised position to operative position, two horizontal projections on the lower edge of said elongated plate disposed in a substantially vertical plane in longitudinally spaced relation on opposite sides of said cutter wheel disposed for slidable guiding engagement on top of the flange on the top of the can during the can opening operation so as to maintain a predetermined depth of penetration of the cutter wheel in the can top and of the teeth of its propelling roller in the top flange while maintaining a predetermined depth of penetration of the teeth of the can propelling roller in the bottom edge of the flange, and means disposed intermediate the ends of the movable plate and substantially midway between the two resilient means for positively moving the same downwardly a predetermined distance but with freedom to adjust itself in angularity so that both projections ride evenly on said top flange.

2. A can opener comprising a frame plate disposed in a substantially vertical plane, a roller carried thereon and disposed for engagement with the bottom edge of the top flange on a can placed next to the frame plate, a cutter wheel having a toothed propelling roller in close coaxial relationship therewith arranged for engagement with the top edge of the top flange on the can, an elongated plate disposed in a plane parallel to the frame plate with its lower edge portion substantially horizontal so as to lie substantially parallel to the top of a can being opened, said elongated plate being slidable on the frame plate for movement bodily up and down relative to the frame plate, two resilient means yieldingly supporting the ends of said elongated plate for said up and down movement and tending to urge said elongated plate to a raised retracted position, means rotatably mounting said cutter wheel and its propelling roller on said elongated plate intermediate its ends and above the first mentioned roller, so that said cutter wheel pierces the top wall of the can alongside the flange and its propelling roller firmly engages the top of the flange for traction when the elongated plate is moved downwardly from retracted position to operative position manually operable crank means for turning one of said rollers, two horizontal projections on the lower edge portion of said elongated plate in longitudinally spaced relation on opposite sides of said cutter wheel having slidable guiding engagement on top of the flange on the can during the can opening operation so as to maintain a predetermined depth of penetration of the cutter wheel in the can top and of the teeth of its propelling roller in the top flange, and means disposed intermediate the ends of the elongated plate substantially midway between the two resilient means for positively moving said elongated plate downwardly a predetermined distance but with freedom to adjust itself angularly so that both projections ride evenly on said top flange.

3. A can opener comprising a frame plate disposed in a substantially vertical plane, a can propelling roller carried thereon having a toothed periphery disposed for engagement with the bottom edge of the top flange on a can placed next to the frame plate, means for turning said roller to turn the can, an elongated plate disposed in a plane parallel to the frame plate with its lower edge portion substantially horizontal so as to lie substantially parallel to the top of a can being opened, said elongated plate being slidable on the frame plate for movement bodily up and down relative to the frame plate, two springs resiliently supporting the opposite ends of said elongated plate for said up and down movement and normally urging said elongated plate upwardly to a raised retracted position, a cutter for piercing and cutting the top wall of the can carried on said movable plate intermediate the ends thereof above said can propelling roller, two horizontal projections on the lower edge of said elongated plate in longitudinally spaced relation on opposite sides of said cutter disposed for slidable guiding engagement on top of the flange on the top of the can during the can opening operation so as to maintain a predetermined depth of penetration of the cutter in the can top while maintaining a predetermined depth of penetration of the teeth of the can propelling roller in

the bottom edge of the flange, and means disposed intermediate the ends of the movable plate for positively moving the same downwardly a predetermined distance but with freedom to adjust itself in angularity so that both projections ride evenly on said top flange, said two springs comprising a relatively heavy coiled compression spring for supporting that end of said elongated plate most remote from the cutter and arranged to expand only a little in the retracting movement, and a relatively light coiled compression spring for supporting the other end of said elongated plate nearer the cutter and arranged to expand an appreciable amount in the retracting movement, whereby said elongated plate has mainly pivotal movement relative to the heavy spring in its up and down movement so as to provide a maximum clearance between the cutter and the can propelling roller in the raised retracted position of the elongated plate.

4. A can opener comprising a frame plate disposed in a substantially vertical plane, a roller carried thereon and disposed for engagement with the bottom edge of the top flange on a can placed next to the frame plate, a cutter wheel having a toothed propelling roller in close coaxial relationship therewith arranged for engagement with the top edge of the top flange on the can, an elongated plate disposed in a plane parallel to the frame plate with its lower edge portion substantially horizontal so as to lie substantially parallel to the top of a can being opened, said elongated plate being slidable on the frame plate for movement bodily up and down relative to the frame plate, two springs yieldingly supporting the opposite ends of said elongated plate for said up and down movement and tending to urge said elongated plate to a raised retracted position, means rotatably mounting said cutter wheel and its propelling roller on said elongated plate intermediate its ends and above the first mentioned roller, so that said cutter wheel pierces the top wall of the can alongside the flange and its propelling roller firmly engages the top of the flange for traction when the elongated plate is moved downwardly from retracted position to operative position, manually operable crank means for turning one of said rollers, two horizontal projections on the lower edge portion of said elongated plate in longitudinally spaced relation on opposite sides of said cutter wheel having slidable guiding engagement on top of the flange on the can during the can opening operation, so as to maintain a predetermined depth of penetration of the cutter wheel in the can top and of the teeth of its propelling roller in the top flange, and means disposed intermediate the ends of the elongated plate substantially midway between the two resilient means for positively moving said elongated plate downwardly a predetermined distance but with freedom to adjust itself angularly so that both projections ride evenly on said top flange, a relatively heavy coiled compression spring for supporting that end of said elongated plate most remote from the cutter wheel and arranged to expand only a little in the retracting movement, and a relatively light coiled compression spring for supporting the other end of said elongated plate nearer the cutter wheel and arranged to expand an appreciable amount in the retracting movement, whereby said elongated plate has mainly pivotal movement relative to the heavy spring in its up and down movement so as to provide a maximum clearance between the cutter wheel and the can propelling roller in the raised retracted position of the elongated plate.

5. A can opener comprising a frame plate disposed in a substantially vertical plane, a can propelling roller carried thereon having a toothed periphery disposed for engagement with the bottom edge of the top flange on a can placed next to the frame plate, means for turning said roller to turn a can, an elongated plate disposed in a plane parallel to the frame plate with its lower edge portion substantially horizontal so as to lie substantially parallel to the top of a can being opened, said elongated plate being slidable on the frame plate for movement bodily up and down relative to the frame plate, two resilient means yieldingly supporting the opposite ends of said elongated plate for said up and down movement and tending to urge said elongated plate to a raised position, a cutter carried on said elongated plate intermediate its ends and above said can propelling roller so that said cutter pierces the top wall of the can alongside the flange when the elongated plate is moved downwardly from retracted raised position to operative position, two horizontal projections on the lower edge of said elongated plate in longitudinally spaced relation on opposite sides of said cutter disposed for slidable guiding engagement on top of the flange on the top of the can during the can opening operation so as to maintain a predetermined depth of penetration of the cutter in the can top while maintaining a predetermined depth of penetration of the teeth of the can propelling roller in the bottom edge of the flange, and a cam lever disposed in coplanar relation with said elongated plate and pivoted by its cam end on said frame plate intermediate the ends of said elongated plate and substantially midway between two resilient means for positively moving the latter downwardly a predetermined distance, the pivoted cam end of said lever having two edge portions in substantially right angle relationship for abutment selectively with said elongated plate in either of two limit positions of the lever, said lever moving through about 90° from one limit position to another and being held yieldingly in either limit position by the action of said resilient means on said elongated plate.

J. RICHARD LAWRENCE.

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