

May 12, 1970

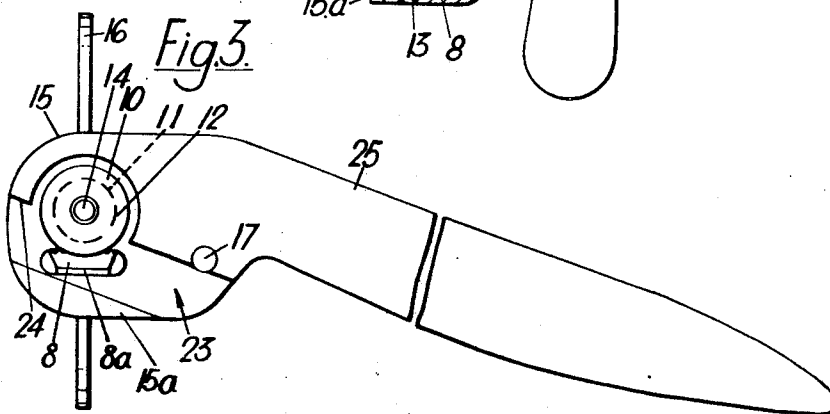
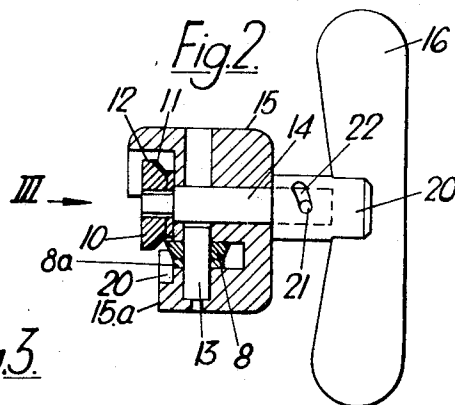
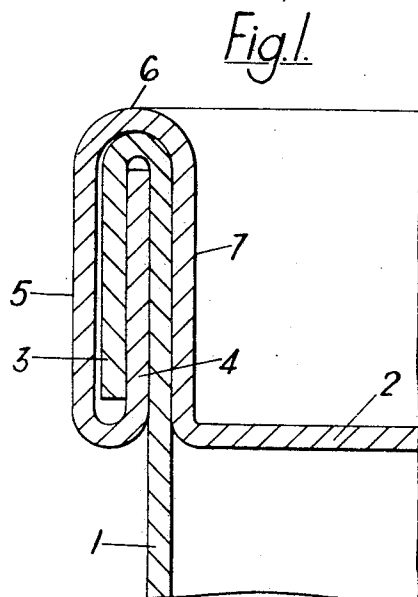
D. R. FYFE

3,510,941

CAN OPENERS

Filed March 8, 1968

5 Sheets-Sheet 1



Inventor  
DONALD R. FYFE  
By *Wm. A. Smiley*  
Attorney

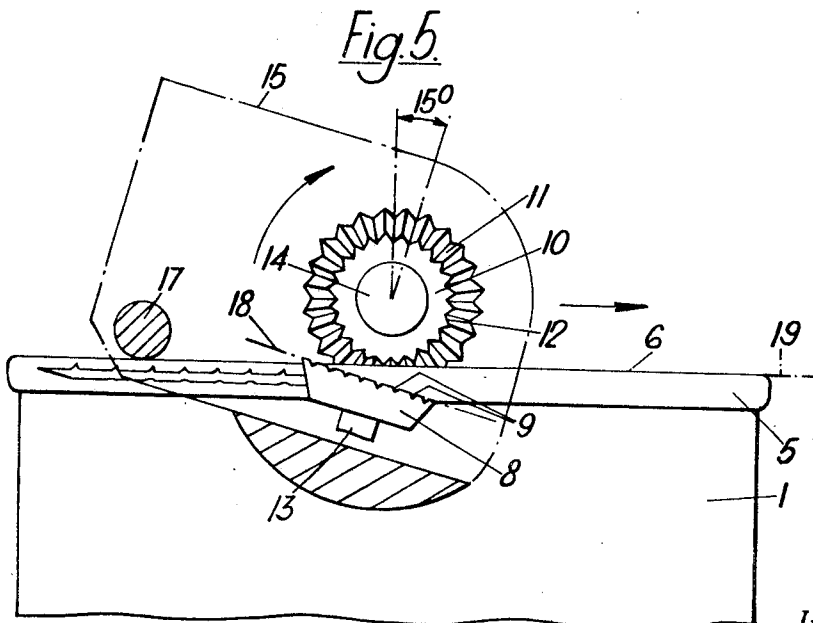
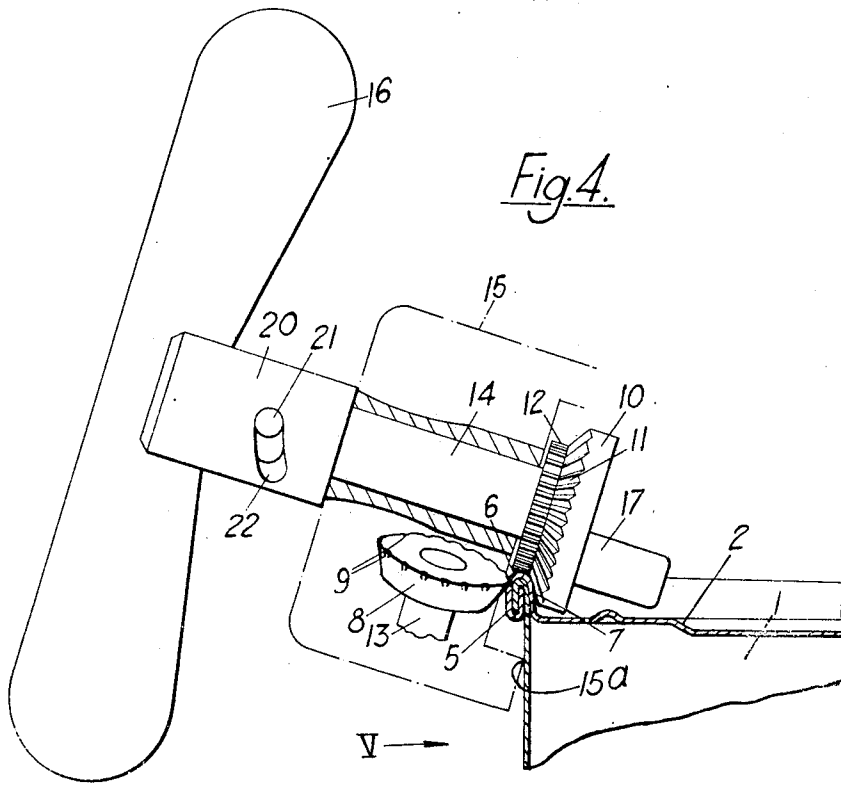
May 12, 1970

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Inventor  
DONALD R. FYFE  
By *Wm. A. Miller*  
Attorney

May 12, 1970

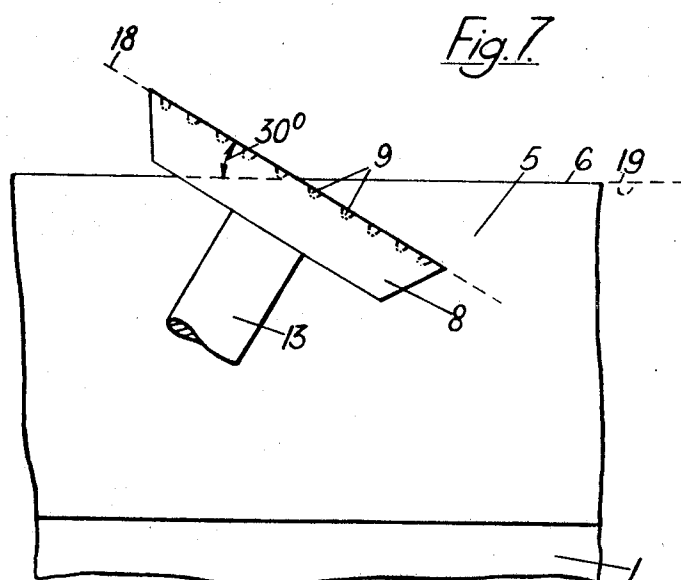
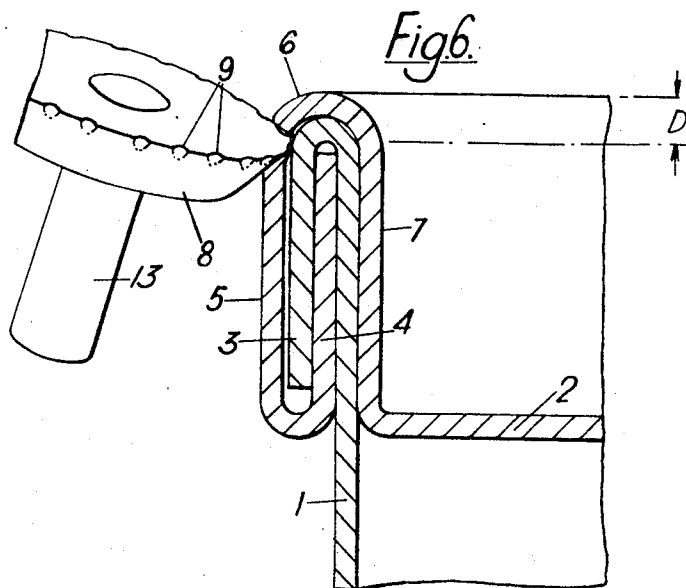
D. R. FYFE

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CAN OPENERS

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5 Sheets-Sheet 3



Inventor  
DONALD R. FYFE  
By *Wm. H. Wiley*  
Attorney

May 12, 1970

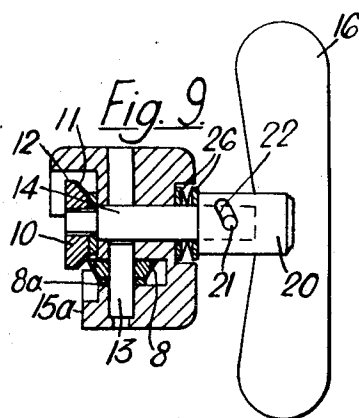
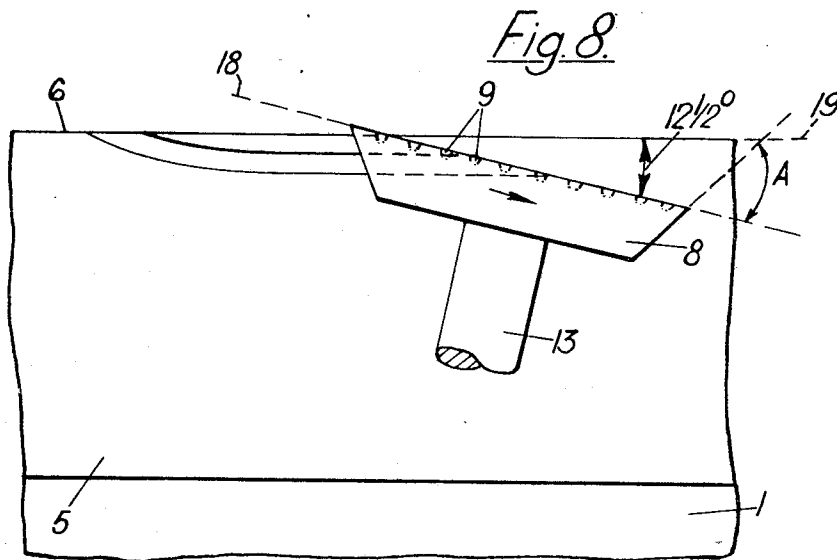
D. R. FYFE

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CAN OPENERS

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5 Sheets-Sheet 4



Inventor  
DONALD R. FYFE  
By: *James E. Smith*  
Attorney

May 12, 1970

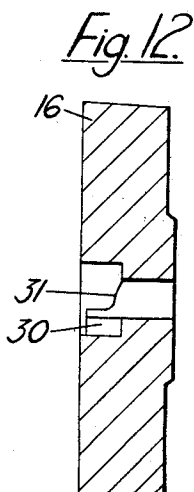
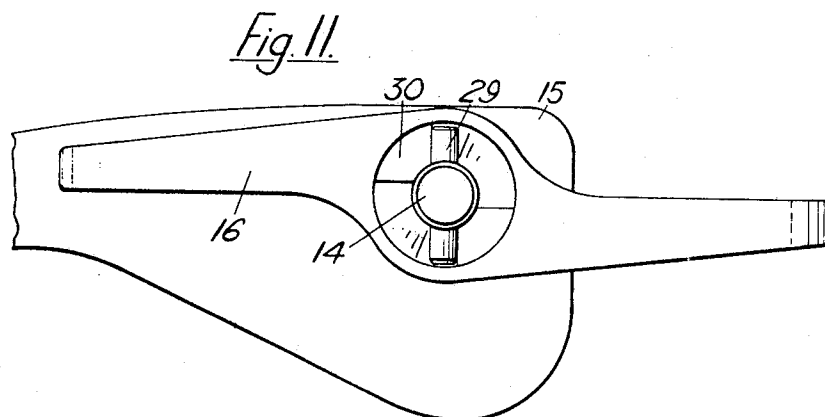
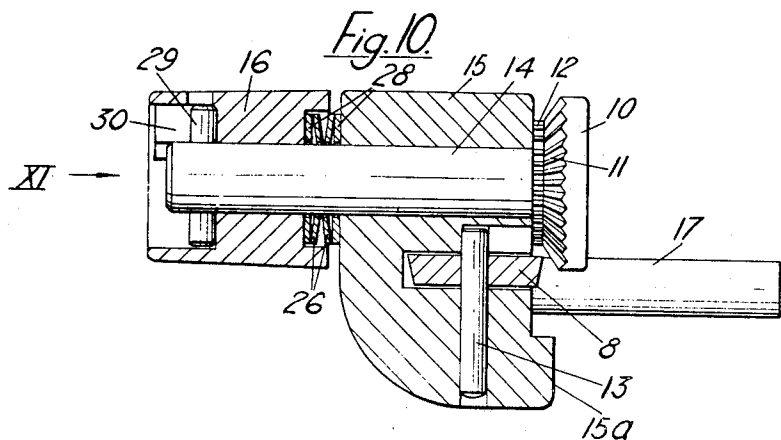
D. R. FYFE

3,510,941

CAN OPENERS

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5 Sheets-Sheet 5



Inventor  
DONALD R. FYFE  
By *James A. Smiley*  
Attorney

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3,510,941

CAN OPENERS

Donald Ross Fyfe, Wembley Park, England, assignor to  
The Metal Box Company Limited, London, England,  
a British company

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12 Claims

## ABSTRACT OF THE DISCLOSURE

In a can opener of the kind in which a rotatable cutter is arranged to cut through the seaming wall of a double seam by which a can end is secured to a can body, the cutter and a wheel having a chuck wall engaging surface and which is arranged to engage the top of the seaming wall radius of the can are rotatable with spindles appropriate thereto and which are mounted substantially at right angles one to the other in a housing common thereto. An abutment parallel with the wheel spindle extends from the housing at the trailing end thereof to engage the top of the seaming wall radius of the can and a second abutment provided on the housing engages the side of the can during a cutting operation.

## BACKGROUND OF THE INVENTION

### (1) Field of the invention

This invention relates to can openers and in particular to a can opener of the kind having a rotatable cutter arranged to cut through the seaming wall of a double seam by which a can end is secured to a can body. Such a can opener will be referred to herein and in the appended claims as a can opener of the kind described.

### (2) Description of the prior art

There have been a number of prior proposals for can openers of the kind described but many of such proposals have involved making a can seam of special shape to accommodate the characteristics of the opener while in other instances considerable skill was needed to operate the opener. Further, the cutters employed usually tend to produce undesirable metal slivers which slivers are produced by the action of the cutter as it severs the metal and also by scraping of the cutter against the can seam.

It is a main object of the present invention to provide a simple economical form of opener of the kind described which will cut through the seaming wall of a can seam, preferably in the region of the seaming wall radius, which can be used in opening cans of the full range of diameters now used by the canning industry, and which can be employed by users having varying degrees of dexterity. A further object of the invention is to provide an opener which during operation does not create metal slivers.

## SUMMARY

According to the invention there is provided a can opener of the kind described comprising a rotatable cutter, a wheel having a chuck wall engaging face and a peripheral surface parallel to the axis of the wheel and arranged to engage the top of the seaming wall radius of a can, said cutter and wheel being rotatable with spindles appropriate thereto and mounted substantially at right angles one to the other in a housing common thereto, means associated with one of said spindles to effect rotation thereof, a first abutment substantially parallel with the wheel spindle and extending from a face of the housing at the trailing end thereof, considered in the direction of movement of the housing during a cutting operation,

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and arranged to engage the top of the seaming wall radius to tilt the housing about the wheel spindle when said peripheral surface of the wheel is engaged with the top of the seaming wall radius thereby to determine the angle between the plane of cutting edge of the cutter and the horizontal plane of the top of the seaming wall radius, and a second abutment provided on the housing and arranged to engage the side of the can during a cutting operation.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a section of a part of a can to be opened by a can opener of the kind described,

FIG. 2 is an end view, partly in section, of a can opener according to the invention,

FIG. 3 is a view looking in the direction of arrow III, FIG. 2,

FIG. 4 illustrates the mode of operation of the can opener,

FIG. 5 is a view looking in the direction of arrow V, FIG. 4,

FIG. 6 is part of FIG. 4 drawn to an enlarged scale,

FIG. 7 diagrammatically illustrates the location of the cutter relative to the seam on first application of the can opener to the can,

FIG. 8 illustrates diagrammatically the position of the cutter relative to the seam during cutting of the seam,

FIG. 9 is a view similar to that of FIG. 2 and illustrates a modification thereto.

FIG. 10 is a section through a modified form of the can opener,

FIG. 11 is an elevation looking in the direction of arrow XI, FIG. 10, and

FIG. 12 is a section through a handle fitted to the opener of FIGS. 10 and 11.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a can to be opened by a can opener according to the invention comprises a can body 1 having a can end 2 double-seamed thereto in the normal manner. The double seam consists of a can hook 3 bent over from the top of body 1 and located between the cover hook 4 and the seaming wall 5 of the can end. It will be understood that the wall 5 is engaged against the hook 3 and that in the drawings it is shown spaced from hook 3 solely for clarity of illustrating the mode of operation of the can opener. The seaming wall 5 is connected by a seaming wall radius 6 with a chuck wall 7 which engages the inner surface of the can body 1.

The can opener according to the invention comprises a cutter 8 of frusto-conical form, the larger end of which forms the cutting edge. It should be understood that the angle A, FIG. 8, of the cutter must be selected according to the depth of cut required and that the angle A must not be too steep if a cut of undue depth is to be avoided. The cutting edge has shallow nicks 9, FIGS. 4, 5 and 6, which are spaced apart around the cutting edge. The opener also includes a wheel 10 which has a conical chuck wall engaging face 11 and a peripheral surface 12 parallel to the axis of the wheel and arranged to engage the top of the seaming wall radius 6. The face 11 and the surface 12 are preferably knurled to facilitate gripping of the can seam during a cutting operation. The cutter 8 which may, if desired, be backed by a thrust washer 8a, and wheel 10 are respectively rotatable with spindles 13, 14 which spindles are mounted at right angles one to the other in a housing 15 common thereto. Any suitable means is associated with one of the spindles 13, 14 to effect rotation thereof and, as shown in the drawings, such means comprises a handle 16 which is

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coupled to the spindle 14, it is, however, to be understood that the opener may be power operated instead of manually operated.

An abutment 17, FIGS. 3 to 5, extends from a face of the housing 15 at the trailing end thereof, considered in the direction of movement of the housing during a cutting operation, see FIG. 5, and the abutment 17 is arranged to engage the top of the seaming wall radius 6 to tilt the housing 15 about the wheel spindle 14 when the peripheral surface 12 of the wheel 10 is engaged with the top of the seaming wall radius 6, thereby to determine the angle between the plane 18, FIGS. 5, 7 and 8, of the cutting edge of the cutter and the horizontal plane 19 of the top of the seaming wall radius. A second abutment 15a, FIGS. 2 to 4, integral with housing 15 is disposed beneath the cutter 8 and slides along the side of the can during a can-opening operation.

When the opener is first applied to the can, the plane 18 of the cutting edge makes with the horizontal plane 19 of the top of the seaming wall radius an angle of about 30° as shown in FIG. 7. When, however, the cutter is caused to bite into the seam at a position approximately at the junction of the seaming wall 5 with the seaming wall radius 6, as shown in FIG. 6, the angle changes to one of about 12½°, as shown in FIG. 8. To obtain the best results the working angle between the planes 18, 19 is between 10° and 15°. When operated in these conditions the cutter 8 tends to effect a slight curling of the metal on either side of the cut, as illustrated in FIG. 6, making the opened can safe to handle. For this reason the distance D, FIG. 6, between the top of the seaming wall radius and the position of cutting is important. The angle of the cutter ensures that the top and side pressure exerted by the faces 12 and 11, FIG. 4, which latter forms an obtuse angle with the axis of the wheel spindle 14, of the wheel 10 is fully maintained. It is not essential that the edge of the cutter be provided with the nicks 9 but when the series of equi-spaced shallow nicks 9 are formed in the cutter edge they ensure that the action of the cutter does not produce metal slivers.

The operation of the can opener is facilitated by providing that the cutter 8 and wheel 10 have a greater relative spacing when the opener is applied to the seam of a can than when the cutter is performing a cutting operation. This may be achieved in a number of ways but, as shown in FIGS. 2 and 4, the handle 16 has a sleeve 20 which is a sliding fit on the spindle 14 and which is connected to the spindle 14 by a pin 21 which is fixed to the spindle 14 and is located in an angled slot 22 formed in the sleeve 20.

The housing 15 is provided with a seam locating slot 23, FIG. 3, which extends across the face of the housing from which the abutment 17 extends. When the opener is applied to a can, this being facilitated by a reverse turning of the handle 16, the seam of the can is located in the slot 23 and the forward edge 24, FIG. 3, of the slot rests on the top of the seaming wall radius 6. As the handle 16 is rotated the pin 21 moves in slot 22 to draw the wheel 10 into contact with the seam and as the cutter 8 bits into the seam the angle between the opener and the can changes until the abutment 17 rests on the top of the seaming wall radius 6. When the opening operation has been completed the handle 16 is turned in a reverse direction to move the pin 21 back in the slot 22 and so slacken the wheel 10 on the seam to enable removal of the can opener.

As shown in FIG. 3, the housing 15 is integral with a handle 25 by which the opener is held during a can opening operation.

FIG. 9 illustrates a modification to the can opener as described above, which modification consists of the positioning of a spring, or springs, 26 between the sleeve 20 and the housing 15. As shown in FIG. 9 two disc springs

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26, are located in a recess 27 formed in the housing 15. These springs tend to urge the sleeve 20 axially away from the wheel 10 and permit the opener to cater for can seams of varying thickness, for example seams the thickness of which varies between 0.035 inch and 0.090 inch.

FIGS. 10 and 11 illustrate another modified form of the can opener in which the handle 16 is slidable axially on the wheel spindle 14 and washers 28 and disc springs 26 are located between the housing 15 and the handle 16. In this embodiment a pin 29 fast in the wheel spindle 14 co-operates with abutments 30, FIG. 11, in the handle 16 to effect rotation of the spindle 14 and cam faces 31, FIG. 12 urge the handle towards the cutter when the handle is initially rotated in the direction of cutting until the pin 29 is engaged with the abutments 30 to effect rotation of the spindle 14. At the end of the cutting operation reverse rotation of the handle disengages the pin 29 from the abutments 30.

From the foregoing it will be understood that with can openers constructed as herein described it is not necessary to provide a gear link between the wheel 10 and the cutter 8.

I claim:

1. A can opener for opening a can having a seaming wall comprising a rotatable cutter having a cutting edge engageable with one side of the seaming wall of a can, a wheel having a face engageable with the other side of the seaming wall of a can and having a peripheral surface parallel to the axis of the wheel and engageable with the top of the seaming wall of a can, a first spindle rotatably mounting said cutter and a second spindle rotatably mounting said wheel, a housing, said first and second spindles being mounted within said housing at substantially right angles to one another, operating means associated with one of said spindles to effect rotation thereof, first abutment means on said housing and spaced from said wheel in a trailing direction considered with respect to the direction of movement of the housing during a cutting operation and arranged to engage the top of the seaming wall of the can to tilt the housing about said second spindle when said peripheral surface of the wheel is engaged with the top of the seaming wall of a can thereby to determine the angle between the plane of the cutting edge of the cutter and the horizontal plane of the top of the seaming wall of the can, and a second abutment on said housing and arranged to engage the side of a can during a cutting operation.

2. A can opener as defined in claim 1 wherein the cutting edge of cutter is provided with shallow nicks spaced apart around the cutting edge.

3. A can opener as defined in claim 2 wherein the cutter is substantially frusto-conical in configuration, the larger end thereof defining said cutting edge.

4. A can opener as defined in claim 1 wherein said housing includes a seam-locating slot which extends across the face of the housing.

5. A can opener as defined in claim 1 wherein said second spindle is axially movable with respect to said housing and said first spindle.

6. A can opener as defined in claim 5 wherein said operating means is connected with said second spindle so as to cause axial movement of said second spindle with respect to said housing upon rotation of said operating means.

7. A can opener as defined in claim 6 wherein said operating means has a cam connection with said second spindle.

8. A can opener as defined in claim 6 wherein said operating means is connected with said second spindle for axial movement with respect thereto.

9. A can opener as defined in claim 8 wherein said operating means is also connected with said second spindle for rotation with respect thereto to provide a camming effect on said second spindle upon rotation of said operating means whereby said cutter and wheel have a greater

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relative spacing when the opener is applied to the seam of a can than when the cutter is performing cutting operation.

10. A can opener as defined in claim 1 wherein said operating means is connected with said second spindle for axial movement with respect thereto and means resiliently urging said operating means away from said wheel.

11. A can opener as defined in claim 1 wherein said second spindle is axially movable with respect to said housing and said first spindle, said operating means being connected with said second spindle so as to cause axial movement of said second spindle with respect to said housing upon rotation of said operating means, said operating means being connected with said second spindle for axial movement with respect thereto, and means resiliently urging said operating means away from said wheel.

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12. A can opener as defined in claim 1 wherein said housing is mounted on a handle.

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OTHELL M. SIMPSON, Primary Examiner

G. F. GRAFEL, Assistant Examiner