

L175.575

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Can Openers

We, THE METAL BOX COMPANY LIMITED, a Company Incorporated under the laws of Great Britain, of 37, Baker Street, London, W.1. England, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

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 end 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.

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 the end seam of a can seam, preferably in the region of a curved portion which connects the seaming and chuck walls of the end seam, 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.

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

In order that the invention may be clearly understood embodiments thereof will now be described, by way of example, with reference to the accompanying drawings, in which:

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 a 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.

In the drawings like reference numerals indicate like or similar parts.

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 curved portion 6 with a chuck wall 7 which engages the inner surface of the can body 1.

The can opener includes a cutter 8 which in the embodiments of the invention illustrated in the drawings is 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 large 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 curved portion 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 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, which is substantially parallel with the wheel spindle 14, 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 end seam

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 end seam, 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 end seam. 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 seam an angle of about 30° as shown in Fig. 7. When, however, the cutter, by rotation of the handle 16, is caused to bite into the seam at a position approximately at the junction of the seaming wall 5 with the curved portion 6, as shown in Figure 6, the angle changes, by tilting of the housing 15, to a cutting angle of about $12\frac{1}{2}^\circ$, as shown in Fig. 8. To obtain the best results the cutting 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. 5, making the opened can safe to handle. For this reason the distance D, Fig. 6, between the top of the end seam 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 8 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 end seam. 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 bites into the seam the angle between the opener and the can changes until the abutment

17 rests on the top of the end seam. 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.

10 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
15 springs 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
20 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
25 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, adjacent
30 to the abutments 30, urge the wheel 10 towards the cutter 8 when the handle is initially rotated in the direction of cutting until the pin 29 is engaged with the abutments 30 to
35 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.

40 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.

WHAT WE CLAIM IS:—

45 1. 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 a curved portion connecting the seaming and chuck walls of an end seam
50 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
55 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, and arranged to engage the top of the end seam to
60 tilt the housing about the wheel spindle when

said peripheral surface of the wheel is engaged with the top of the end seam thereby to determine the angle between the plane of the cutting edge of the cutter and the horizontal plane of the top of the end seam, and a second abutment provided on the housing and arranged to engage the side of the can during a cutting operation.

2. A can opener according to Claim 1, wherein the cutting edge of the cutter is provided with shallow nicks spaced apart around the cutting edge.

3. A can opener according to Claim 1 or Claim 2, wherein the cutter is frusto-conical and the larger end thereof forms the cutting edge.

4. A can opener according to any one of Claims 1 to 3, wherein the housing is provided with a seam-locating slot which extends across the face of the housing from which said first abutment extends.

5. A can opener according to any one of Claims 1 to 4, wherein said means to effect rotation is associated with the wheel spindle and said spindle and means are connected for relative axial movement to facilitate location of the wheel and cutter relative to the can end seam.

6. A can opener according to any one of Claims 1 to 4, wherein said one spindle is the wheel spindle and is manually rotated by a handle connected with the wheel spindle for rotation therewith and axial movement relative thereto to facilitate location of the wheel and cutter relative to the can end seam.

7. A can opener according to Claim 6, wherein a pin fast in the wheel spindle co-operates with abutments formed in the handle to effect rotation of the wheel spindle and cam faces adjacent to said abutments co-operate with the pin when the handle is initially rotated in the direction of cutting to urge the wheel towards the cutter until the pin is engaged with said abutments.

8. A can opener according to Claim 6 or Claim 7, wherein the handle is resiliently urged away from the wheel.

9. A can opener according to any one of Claims 1 to 6, wherein the housing is mounted on a handle.

10. A can opener according to any one of Claims 1 to 9, wherein said chuck wall engaging surface and said peripheral surface of the wheel are knurled.

11. A can opener of the kind described, constructed and arranged to operate substantially as herein described with reference to Figs. 1 to 8, or modified substantially as described with reference to Fig. 9, or to Figs. 10 and 11 of the accompanying drawings.



17 rests on the top of the end seam. 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.

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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, adjacent to the abutments 30, urge the wheel 10 towards the cutter 8 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.

40 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.

WHAT WE CLAIM IS:—

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said peripheral surface of the wheel is engaged with the top of the end seam thereby to determine the angle between the plane of the cutting edge of the cutter and the horizontal plane of the top of the end seam, and a second abutment provided on the housing and arranged to engage the side of the can during a cutting operation.

2. A can opener according to Claim 1, wherein the cutting edge of the cutter is provided with shallow nicks spaced apart around the cutting edge.

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8. A can opener according to Claim 6 or Claim 7, wherein the handle is resiliently urged away from the wheel.

9. A can opener according to any one of Claims 1 to 6, wherein the housing is mounted on a handle.

10. A can opener according to any one of Claims 1 to 9, wherein said chuck wall engaging surface and said peripheral surface of the wheel are knurled.

11. A can opener of the kind described, constructed and arranged to operate substantially as herein described with reference to Figs. 1 to 8, or modified substantially as described with reference to Fig. 9, or to Figs. 10 and 11 of the accompanying drawings.



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