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Description

This invention concerns can openers of the kind designed to cut through the outer seam wall of a double end seam by which a can end is secured to a can body.

An early proposal for a can opener of this kind was set forth in a patent to Smith (US-A-3094776). Smith's proposal was for a hand-operated can opener having a traction wheel, engaging the chuck wall of the can top seam and the upper surface of that seam, and a cutter wheel having a tapered cutting surface to cut in a generally radial direction through the outer wall of the can seam as the opener was moved around the can. This was achieved by rotating the cutter wheel by means of a thumbscrew coupled directly with it so that the traction wheel, by friction, drove the opener around the can. The axes of the cutter wheel and traction wheel were both forwardly inclined with respect to the diametral plane containing the point of contact of the cutter wheel with the can, by an "angle of dive" of 6 to 8 degrees; whilst the can opener was also tilted outwardly and downwardly so that, in the same diametral plane, the axes of the traction and cutter wheels were inclined to the vertical by 15 degrees. These inclinations were obtained by providing a flange or foot to the can opener body, such as to ride upon the can seam. In formal terms, the Smith can opener comprised a body, a cutter roll having a curved peripheral surface terminating in a circumferential cutting edge for engaging a circumferential outer wall of the double end seam of a can, an abutment projecting from the body to engage on the top of the can seam, a traction roll having a peripheral surface for engaging on the top of the can seam, and means for rotating one of said rolls about its own axis, the abutment and said peripheral surface of the traction roll being tangent to a common first plane, the traction roll further having a chuck wall engaging surface for engaging a chuck wall of the said seam, the curved peripheral surface of the cutter roll being such that a generator thereof was inclined, in the region where the cutting edge contacted the outer wall of the seam, from the cutting edge towards said first plane.

The concept of a can opener operating on the outside of the top seam of the can was also embodied in patents GB-A-1175575 and GB-A-1301592. This opener comprises:

- (a) a cutter wheel;
- (b) a traction roll having a chuck wall engaging surface and having a peripheral surface disposed parallel to the roll axis for engaging a curved portion connecting the outer seam and chuck walls of the can end seam, the axes of the cutter wheel and the traction roll lying in the same plane either at right angles or at an acute angle relative to one another;
- (c) a housing carrying the cutter wheel and traction roll, the cutter wheel being contained within a recess in the housing;
- (d) means for rotating either the cutter wheel

and/or the traction roll;

(e) an abutment arranged to engage the top of the can end seam so as to determine the positioning of the cutter wheel relative to the traction roll in a can opening operation whereby to achieve a given cutting angle (which can be defined as the angle between a first plane containing the top of the can end seam and a second plane parallel to the traction roll axis and containing a tangent to the cutting edge of the cutter at the leading point of contact between the cutting edge and the can end seam); and

(f) means, such as a cam, for moving the roll axially to facilitate initial location of the opener on the can end seam.

Can openers of the kinds set forth above suffer from a number of disadvantages. Thus in the form described in the Smith patent, initial engagement of the can opener with the can is difficult, and there is no provision for enabling cans having different thicknesses of the top seam to be readily dealt with. The two United Kingdom patents overcome this disadvantage by providing a ratchet-type device, co-operating with a heavy spring, to enable the opener to be engaged with the can whilst the traction roll and cutter roll are separated by a generous gap into which the can seam is introduced. Upon commencing to rotate the appropriate roll, the ratchet device causes the spring to urge the traction roll outwardly so that the seam is gripped tightly between the two rolls.

In each of the above-cited arrangements, the cutter operates by penetrating the can seam outer wall in a direction whose major component is radial; in other words, in order to provide sufficient force for opening to take place, a substantial radial force-applying facility (for example the above-mentioned heavy spring) must be provided, so that in moving the can opener relative to the can, a high frictional force must be continuously overcome.

Accordingly, can openers of the kinds set forth above require substantial applied force in order to operate them. This is a major disadvantage.

In the can opener of the present invention, the cutter roll does not cut in a direction such that there is a substantial radial component of force. Instead, it is so orientated as to peel the metal away, the major component of force being longitudinal of the can, so that the frictional forces that require to be overcome can be reduced to the minimum needed to enable the traction roll and cutter roll to rotate.

Furthermore, whilst the traction and cutter rolls are mounted so that, for the purpose of initial engagement with the can, the distance between them may be varied by a limited amount, in a can opener according to the present invention, the cutter roll is allowed to effect automatic engagement with the can seam by virtue of its peeling action whereby the cutter roll approaches the can seam with its cutting edge in a plane which is nearly tangential with the can seam. the axes of the traction roll and cutter roll are skew (i.e. two infinite straight lines including the two respective

axes do not intersect each other).

More specifically, in a can opener comprising: a body, a cutter roll having a curved peripheral surface terminating in a circumferential cutting edge for engaging and severing a circumferential outer wall of the double end seam of a can, and for lifting and peeling radially inwardly the severed edge of the seam an abutment projecting from the body to engage on the top of the can seam, a traction roll having a peripheral surface for engaging on the top of the can seam, and means for rotating one of said rolls about its own axis, the abutment and said peripheral surface of the traction roll being tangent to a common first plane, the traction roll further having a chuck wall engaging surface for engaging a chuck wall of the said seam, the curved peripheral surface of the cutter roll being such that a generator thereof is inclined, in the region where the cutting edge contacts the outer wall of the seam, from the cutting edge towards said first plane, the abutment projects from one side of the body, the cutter roll being on the opposite side of said first plane from the traction roll, the axis of the traction roll defining the intersection between a second plane parallel to said first plane and a third plane perpendicular to said first plane and radial with respect to the can, the axis of the cutter roll defining the intersection between a fourth plane and a fifth plane, said fourth plane being perpendicular to said third plane and divergent from said second plane outwardly from said side of the body, a cutter incline angle in the range 10 to 30 degrees being defined between said second and fourth planes, said fifth plane being perpendicular to said first plane and convergent towards said third plane outwardly from said side of the body, and a cutter offset angle greater than zero being defined between said third and fifth planes, whereby when the abutment and traction roll are engaged on the top of said can seam and the cutting edge with said outer wall thereof, and a said roll is rotated to effect relative circumferential movement between the opener and the can such that the centre of the cutter roll is behind the centre of the traction roll in the direction of relative movement of the opener, the cutting edge engages the can seam outer wall at an angle thereto substantially equal to the cutter incline angle to sever the outer wall with a cutting force having a substantially minor radial component.

An additional advantage given by this arrangement is that the ratchet device of the prior opener may be omitted whereby a simplified construction is possible. This is because the can opener is capable of automatically locating itself on the can end seam at the commencement of a can opening operation: as a result of the skew arrangement of the two roll axes, when the chuck wall engaging surfaces of the traction roll and the cutting edge of the cutter roll are pressed downward into initial contact with the can end seam and one roll is rotated in opening operation is relatively small so that a low spring force acting on the traction roll to bias it towards the cutting edge of the cutting

roll would be sufficient to enable the opener to accommodate varying thicknesses of can end seam.

One embodiment of the invention features a cutter roll mounted externally of an exposed face of a housing carrying the two rolls. This has the advantage of facilitating cleaning of the cutter roll and is rendered possible by the relative arrangement of the two rolls.

The cutter roll may have serrated cutting edge to improve the cutting action of the opener. This enhances the frictional engagement between the cutter roll and the outer seam wall so that the cutter roll is urged to rotate as the can opener moves about the can end seam. Alternatively or in addition, the cutter roll may be coupled with the traction roll by a gear arrangement to ensure that both rolls are positively driven during cutting, and thus to improve the cutting action by inhibiting skidding of either roll.

The invention is described further, by way of example, with reference to the accompanying drawings, wherein:—

Fig. 1 is a side view of a can opener embodying the invention;

Fig. 2 is a partial section through the opener along the line I—I in Fig. 1;

Fig. 3 is a diagrammatic view of a traction roll of the opener and a cutting edge of a cutter roll of the opener looking in the direction of the arrow X in Fig. 2 during a can opening operation;

Fig. 4 is a diagrammatic view of the two rolls looking in the direction of the arrow Y in Fig. 1 during a can opening operation;

Fig. 5 is a diagrammatic view of the cutter roll looking in the direction of the arrow Z in Fig. 1 during a can opening operation, the traction roll being shown in dashed lines;

Fig. 6 is an enlarged plan view of a washer of the can opener; and

Fig. 7 is an enlarged section, corresponding with Fig. 2, of a modification of the can opener.

Referring to the drawings, a can opener has a stock 12 through which passes an opening 14. Into the opening 14 is fitted a cartridge 16 carrying a traction roll spindle 18. A traction roll 20 is fixed to an end of the spindle 18 at one side of the stock 12 and at an opposite side of the stock 12 an extension 22 of the spindle 18 is joined to a butterfly handle 24 by a pin 26. The spindle 18 is slidable within the cartridge 16 to permit axial movement of the traction roll 20 and is resiliently urged to the right in Fig. 2 by the action of a spring 28, housed in an annular space 30 in the butterfly handle 24, on a thrust washer 32. The washer 32 has a plurality of recesses 34 within which engage tongues 36 protruding axially from the hub of the handle 24 so that the washer is enabled to move axially relative to the handle 24 but rotates with the handle when this is turned. This washer 32 bears against the cartridge 16 and stock 12.

As shown in Fig. 2, the cartridge 16 also carries a cutter roll spindle 38 whose axis is skew relative to the axis of the traction roll spindle 18. At one end of the spindle 38 there is fixed a cutter roll 40

so as to lie externally of an exposed face 42 of the cartridge 16.

With particular reference now to both Figures 2 and 3, the traction roll 20 has a ribbed frusto-conical surface 44 for engaging a chuck wall 39 of a double end seam 41 securing a can end 43 to a can body 45 and also has a ribbed axially extending peripheral surface 46 for engaging the top 47 of the end seam, i.e. a curved portion connecting the outer seam wall 49 and the chuck wall of the end seam. The cutter roll 40 has a generally cylindrical curved surface 48 which is serrated and which terminates at its end remote from the spindle 38 in a cutting edge 50. A portion of the cutting edge 50 extends behind the surface 44 of the roll 20 as shown in Fig. 1 and this prevents the spindle 38 from sliding out of its bore in the cartridge 16.

Two abutments 52, 54 are provided on the stock 12 to ensure that during a can opening operation the two rolls take up a predetermined position relative to the can. The abutment 52 comprises a fin projecting from the stock 12 parallel to the axis of the roll 20 to engage the top 47 of the can end seam 41 so as to ensure that the centre O_c of the cutter roll is behind the centre O_T of the traction roll in the direction of movement of the opener about the can. The fin 52 is wide enough to engage both cans of larger and cans of smaller diameter. And the abutment 54 is arranged to engage the side wall of the can body.

The relative positioning of the two rolls which characterises the invention is best understood by considering the can opener in the course of a can opening operation. Fig. 3 shows how the centre of the cutter roll trails the centre of the traction roll when the fin 52 travels along the top of the can end seam. The trail angle α thus formed between a plane P1, through the traction roll axis and the centre of the cutter roll, and a plane P2 through the traction roll axis and the axis of the can is in the present instance approximately 16° . In the drawings these planes extend perpendicular to the plane of the page, as do also the planes mentioned below.

Turning to Fig. 4 it is seen that during cutting the axis of the cutter roll is inclined relative to a plane P3 through the traction roll axis parallel to the top of the can end seam. The cutter incline angle β between this plane P3 and plane P4 through the cutter roll axis parallel to a radius of the traction roll lying in the plane P3 is 15° . This is not essential, however, and the cutter incline angle may vary, preferably within the range 10° to 30° . The effect of inclining the cutter roll axis in this manner is that an upper region of the cutting edge cuts into the outer seam wall of the end seam 41; and that a generator 51 of the curved peripheral surface 48 of the cutter roll is upwardly inclined from the cutting edge 50 towards a plane P5 containing the top of the can end seam, at least in the region where the cutter roll contacts the outer seam wall (shown as the region marked A in Fig. 3). Furthermore, the positioning of the cutter roll relative to the frusto-conical surface 44 of the

traction roll is such that its cutting edge cuts into the outer seam wall in advance of the plane P1 defined by the axis of the traction roll and the centre of the cutter roll (see region B in Fig. 3).

In the embodiment illustrated, the axis of the cutter roll is also offset (Fig. 5) relative to the plane P2 through the traction roll axis and the axis of the can. The offset angle γ thus formed between the plane P2 and a plane P6 through the cutter roll axis parallel to the axis of the can is 6° . Again, however, the offset angle may vary, preferably within the range 0° to 10° . With the offset angle in this range, the axis of the cutter roll does not intersect the axis of the can, for most standard sizes of can, but rather intersects the plane P2 on the side of the can's axis remote from the traction roll.

By arranging the two rolls as described, the cutting edge of the cutter roll cuts into the outer seam wall of the can end seam at the region B in Fig. 3 ahead of the narrowest region between the two rolls. The narrowing of the gap between the two rolls then causes the upper portion of the cut seam wall to be crimped. The slope provided by the generator of the curved peripheral surface of the cutter roll, and hence by the region A of the curved peripheral surface in the direction of the cutter roll's axis, relative to the plane P5 containing the top of the can end seam causes this portion to be curled inwardly during crimping to conceal any jagged edges produced by cutting. In addition, the curled edge is lifted as it passes over the topmost region of the cutter roll.

In order to commence a can opening operation, the frusto-conical surface of the traction roll is pressed down into engagement with the chuck wall of the can end seam and say a point C of the cutting edge of the cutter roll is pressed into contact with the outer seam wall. The frusto-conical surface, being ribbed, and the cutting edge, being serrated, frictionally engage the chuck and outer seam walls and this, coupled with the skew arrangement of the two rolls, ensures that rotation of the traction roll as for forward movement of the can opener causes the centre of the cutter roll to rotate about the point C. As a result, the centre of the cutter roll moves downwardly away from the can end forcing the traction roll downwardly until its peripheral surface engages the top of the can end seam, and the cutting edge bites into the outer seam wall.

Returning to Fig. 2 it may be seen that the resultant direction of the cutting force of the cutter roll is that indicated by the arrow F so that this force has only a relatively small component parallel to the axis of the traction roll 20. As a result the tendency of the two rolls to separate during a can opening operation is not great and the force of the spring 28 can be selected accordingly. The spring 28 may thus be weaker than was possible with the prior opener mentioned previously and the present opener is therefore more easily adaptable for use with cans of different seam thickness. Wear of the two rolls may also be lessened in that cutting of a can end seam is pos-

sible with a less tight grip on the can seam and for the same reason the torque which must be applied to the handle 24 during a can opening operation may be reduced.

A modification of the can opener is shown in Fig. 7, which is a view similar to that of Fig. 2. Like parts are indicated by the same reference numerals. In this version of the opener, the ribbed surface 46 of the traction roll 20 is adapted to provide teeth 70 for engaging not only the top 47 of the end seam but also teeth 72 formed on the cutter roll 40. The teeth 72 have a frusto-conical pitch surface to enable them to mesh with the teeth 70 and are cut away adjacent the free end of the cutter roll 40 to provide the cutting edge 50.

As a result of this gear arrangement coupling the cutter roll 40 with the traction roll 20, the cutter roll 40 is positively driven during a cutting operation and skidding of either roll is inhibited which improves the cutting action.

Claims

1. A can opener comprising: a body (12), a cutter roll (40) having a curved peripheral surface (48) terminating in a circumferential cutting edge (50) for engaging and severing a circumferential outer wall (49) of the double end seam (41) of a can, and for lifting and peeling radially inwardly the severed edge of the seam, an abutment (52) projecting from the body to engage on the top of the can seam, a traction roll (20) having a peripheral surface (46) for engaging on the top of the can seam, and means (24) for rotating one of said rolls about its own axis, the abutment and said peripheral surface of the traction roll being tangent to a common first plane (P_1), the traction roll further having a chuck wall engaging surface (44) for engaging a chuck wall (39) of the said seam, the curved peripheral surface (48) of the cutter roll being such that a generator thereof is inclined, in the region where the cutting edge contacts the outer wall of the seam, from the cutting edge towards said first plane, characterised in that the abutment (52) projects from one side of the body, the cutter roll (40) being on the opposite side of said first plane (P_1) from the traction roll (20), the axis of the traction roll defining the intersection between a second plane (P_2) parallel to said first plane and a third plane (P_3) perpendicular to said first plane and radial with respect to the can, the axis of the cutter roll (40) defining the intersection between a fourth plane (P_4) and a fifth plane (P_5), said fourth plane (P_4) being perpendicular to said third plane and divergent from said second plane outwardly from said side of the body, a cutter incline angle (β) in the range 10 to 30 degrees being defined between said second and fourth planes, said fifth plane being perpendicular to said first plane and convergent towards said third plane outwardly from said side of the body, and a cutter offset angle (γ) greater than zero being defined between said third and fifth planes, whereby when the abutment and traction roll are engaged on the top of said can seam and the

cutting edge with said outer wall thereof, and a said roll is rotated to effect relative circumferential movement between the opener and the can such that the centre of the cutter roll is behind the centre of the traction roll in the direction of relative movement of the opener, the cutting edge engages the can seam outer wall at an angle thereto substantially equal to the cutter incline angle to sever the outer wall with a cutting force having a substantially minor radial component.

2. An opener as claimed in Claim 1, characterised in that the curved peripheral surface (48) of the cutter roll (40) is generally cylindrical.

3. An opener as claimed in Claim 1, characterised in that the cutter incline angle is 15 degrees.

4. An opener as claimed in Claim 1, characterised in that the cutter offset angle is no greater than 10 degrees.

5. An opener as claimed in Claim 1, characterised in that the cutter offset angle is 6 degrees.

6. An opener as claimed in Claim 1, characterised in that the traction roll (20) and the cutter roll (40) are arranged so that in a can opening operation a trail angle of approximately 16° is defined between a sixth plane (P_6), containing the traction roll axis and the centre of the cutter roll, and said third plane (P_3).

7. An opener as claimed in any preceding claim characterised in that the cutter roll (40) has indentations in its cutting edge.

8. An opener as claimed in claim 7, characterised in that the cutting edge (50) is serrated.

9. An opener as claimed in any preceding claim, characterised in that the abutment (52) comprises a fin.

10. An opener as claimed in any preceding claim, characterised in that the cutter roll (40) is coupled to the traction roll (20) by means of a gear arrangement (70, 72).

11. An opener as claimed in claim 10, characterised in that the outer roll (40) is provided with teeth (72) which mesh with teeth (70) on the traction roll (20).

Revendications

1. Ouvre-boîte comprenant un corps (12), une molette coupante (40) ayant une surface périphérique courbe (48) se terminant par un tranchant circulaire (50) conçu pour s'engager et couper une paroi externe périphérique (49) d'une double sertissure de fond (41) d'une boîte et pour soulever et écarter dans le sens radial, vers l'intérieur, le bord coupé de la sertissure, un arrêt (52) faisant saillie hors du corps pour venir en contact avec la partie supérieure de la sertissure de la boîte, une molette de traction (20) ayant une surface périphérique (46) conçue pour venir en contact avec la partie supérieure de la sertissure de la boîte et des moyens (24) permettant de faire tourner l'une desdites molettes autour de son axe propre, l'arrêt et la surface périphérique de la molette de traction (20) étant tangents à une premier plan commun (P_1), la molette de traction

sible with a less tight grip on the can seam and for the same reason the torque which must be applied to the handle 24 during a can opening operation may be reduced.

A modification of the can opener is shown in Fig. 7, which is a view similar to that of Fig. 2. Like parts are indicated by the same reference numerals. In this version of the opener, the ribbed surface 46 of the traction roll 20 is adapted to provide teeth 70 for engaging not only the top 47 of the end seam but also teeth 72 formed on the cutter roll 40. The teeth 72 have a frusto-conical pitch surface to enable them to mesh with the teeth 70 and are cut away adjacent the free end of the cutter roll 40 to provide the cutting edge 50.

As a result of this gear arrangement coupling the cutter roll 40 with the traction roll 20, the cutter roll 40 is positively driven during a cutting operation and skidding of either roll is inhibited which improves the cutting action.

Claims

1. A can opener comprising: a body (12), a cutter roll (40) having a curved peripheral surface (48) terminating in a circumferential cutting edge (50) for engaging and severing a circumferential outer wall (49) of the double end seam (41) of a can, and for lifting and peeling radially inwardly the severed edge of the seam, an abutment (52) projecting from the body to engage on the top of the can seam, a traction roll (20) having a peripheral surface (46) for engaging on the top of the can seam, and means (24) for rotating one of said rolls about its own axis, the abutment and said peripheral surface of the traction roll being tangent to a common first plane (P_1), the traction roll further having a chuck wall engaging surface (44) for engaging a chuck wall (39) of the said seam, the curved peripheral surface (48) of the cutter roll being such that a generator thereof is inclined, in the region where the cutting edge contacts the outer wall of the seam, from the cutting edge towards said first plane, characterised in that the abutment (52) projects from one side of the body, the cutter roll (40) being on the opposite side of said first plane (P_1) from the traction roll (20), the axis of the traction roll defining the intersection between a second plane (P_2) parallel to said first plane and a third plane (P_3) perpendicular to said first plane and radial with respect to the can, the axis of the cutter roll (40) defining the intersection between a fourth plane (P_4) and a fifth plane (P_5), said fourth plane (P_4) being perpendicular to said third plane and divergent from said second plane outwardly from said side of the body, a cutter incline angle (β) in the range 10 to 30 degrees being defined between said second and fourth planes, said fifth plane being perpendicular to said first plane and convergent towards said third plane outwardly from said side of the body, and a cutter offset angle (γ) greater than zero being defined between said third and fifth planes, whereby when the abutment and traction roll are engaged on the top of said can seam and the

cutting edge with said outer wall thereof, and a said roll is rotated to effect relative circumferential movement between the opener and the can such that the centre of the cutter roll is behind the centre of the traction roll in the direction of relative movement of the opener, the cutting edge engages the can seam outer wall at an angle thereto substantially equal to the cutter incline angle to sever the outer wall with a cutting force having a substantially minor radial component.

2. An opener as claimed in Claim 1, characterised in that the curved peripheral surface (48) of the cutter roll (40) is generally cylindrical.

3. An opener as claimed in Claim 1, characterised in that the cutter incline angle is 15 degrees.

4. An opener as claimed in Claim 1, characterised in that the cutter offset angle is no greater than 10 degrees.

5. An opener as claimed in Claim 1, characterised in that the cutter offset angle is 6 degrees.

6. An opener as claimed in Claim 1, characterised in that the traction roll (20) and the cutter roll (40) are arranged so that in a can opening operation a trail angle of approximately 16° is defined between a sixth plane (P_6), containing the traction roll axis and the centre of the cutter roll, and said third plane (P_3).

7. An opener as claimed in any preceding claim characterised in that the cutter roll (40) has indentations in its cutting edge.

8. An opener as claimed in claim 7, characterised in that the cutting edge (50) is serrated.

9. An opener as claimed in any preceding claim, characterised in that the abutment (52) comprises a fin.

10. An opener as claimed in any preceding claim, characterised in that the cutter roll (40) is coupled to the traction roll (20) by means of a gear arrangement (70, 72).

11. An opener as claimed in claim 10, characterised in that the outer roll (40) is provided with teeth (72) which mesh with teeth (70) on the traction roll (20).

Revendications

1. Ouvre-boîte comprenant un corps (12), une molette coupante (40) ayant une surface périphérique courbe (48) se terminant par un tranchant circulaire (50) conçu pour s'engager et couper une paroi externe périphérique (49) d'une double sertissure de fond (41) d'une boîte et pour soulever et écarter dans le sens radial, vers l'intérieur, le bord coupé de la sertissure, un arrêt (52) faisant saillie hors du corps pour venir en contact avec la partie supérieure de la sertissure de la boîte, une molette de traction (20) ayant une surface périphérique (46) conçue pour venir en contact avec la partie supérieure de la sertissure de la boîte et des moyens (24) permettant de faire tourner l'une desdites molettes autour de son axe propre, l'arrêt et la surface périphérique de la molette de traction (20) étant tangents à une premier plan commun (P_1), la molette de traction



(20) ayant une surface (44) de contact avec une paroi mandrinée destinée à venir en contact avec une paroi mandrinée (39) de ladite sertissure (41), la surface périphérique courbe (48) de la molette coupante (40) étant telle qu'une de ses génératrices soit inclinée, dans la zone où le tranchant est en contact avec le bord extérieur de la sertissure, du tranchant vers le dit premier plan, caractérisée en ce que l'arrêt (52) fait saillie d'un côté du corps, la molette coupante (40) étant du côté opposé au premier plan (P5) par rapport à la molette de traction (20), l'axe de la molette de traction (20) déterminant l'intersection entre un deuxième plan (P3) parallèle au premier plan et un troisième plan (P2) perpendiculaire au premier plan et orienté dans le sens radial par rapport à la boîte, l'axe de la molette coupante (40) définissant l'intersection entre un quatrième plan (P4) et un cinquième plan (P6), le quatrième plan (P4) étant perpendiculaire au troisième plan et divergeant du deuxième plan vers l'extérieur du côté précité du corps, un angle (β) d'inclinaison du tranchant de l'ordre de 10 à 30 degrés étant délimité entre les deuxième et quatrième plans, le cinquième plan étant perpendiculaire au premier plan et convergeant vers le troisième plan à l'extérieur du côté précité du corps et un angle (γ) de décalage du tranchant supérieur à zéro étant délimité entre les troisième et cinquième plans, de telle sorte que, lorsque l'arrêt et la molette de traction (20) sont engagés sur la partie supérieure de ladite sertissure de boîte, que le tranchant est en contact avec la paroi extérieure de cette partie supérieure et que ladite molette tourne de manière à réaliser un mouvement de rotation relatif entre l'ouvre-boîte et la boîte de sorte que le centre de la molette coupante (40) soit derrière le centre de la molette de traction (20) dans le sens du mouvement relatif de l'ouvre-boîte, le tranchant s'engage dans la paroi extérieure de la sertissure de la boîte suivant un angle sensiblement égal à l'angle d'inclinaison du tranchant, pour couper la paroi extérieure avec une force de coupe comportant une composante radiale nettement moindre.

2. Ouvre-boîte suivant la revendication 1 caractérisé en ce que la surface périphérique courbe (48) de la molette coupante (40) a la forme générale d'un cylindre.

3. Ouvre-boîte suivant la revendication 1 caractérisé en ce que l'angle d'inclinaison du tranchant est de 15 degrés.

4. Ouvre-boîte suivant la revendication 1 caractérisé en ce que l'angle de décalage du tranchant ne dépasse pas 10 degrés.

5. Ouvre-boîte suivant la revendication 1 caractérisé en ce que l'angle de décalage du tranchant est de 6 degrés.

6. Ouvre-boîte suivant la revendication 1 caractérisé en ce que la molette de traction (20) et la molette coupante (40) sont disposées de telle manière que dans une opération d'ouverture d'une boîte un angle de traîne d'environ 16° est délimité entre un sixième plan (P1), contenant l'axe de la molette de traction (20) et le centre de

la molette coupante (40), et le troisième plan (P2).

7. Ouvre-boîte suivant l'une quelconque des revendications précédentes caractérisé en ce que la molette coupante (40) comporte un tranchant denté.

8. Ouvre-boîte suivant la revendication 7 caractérisé en ce que le tranchant (50) est strié.

9. Ouvre-boîte suivant l'une quelconque des revendications précédentes caractérisé en ce que l'arrêt (52) comprend une ailette.

10. Ouvre-boîte suivant l'une quelconque des revendications précédentes caractérisé en ce que la molette coupante (40) est accouplée avec la molette de traction (20) au moyen d'un engrenage (70, 72).

11. Ouvre-boîte suivant la revendication 10 caractérisé en ce que la molette coupante (40) comporte des dents (72) qui engrènent avec des dents (70) ménagées sur la molette de traction (20).

Patentansprüche

1. Büchsenöffner mit einem Hauptteil (12), einer Schneidrolle (40) die eine gekrümmte Umfangsfläche (48) aufweist, die in einer umlaufenden Schneidkante (50) ausläuft, die mit einer umlaufenden äußeren Wand (49) des Doppelendfalzes (41) einer der Büchse in Eingriff bringbar ist und diese durchtrennt und die abgetrennte Kante des Falzes radial nach innen an- und abzuheben, wobei eine Anschlag (52) vom Körper vorsteht und mit der Oberseite der Büchse in Eingriff bringbar ist und eine Antriebsrolle (20) mit einer Umfangsfläche (46), die mit der Oberseite des Büchsenfalzes in Eingriff bringbar ist, und Mittel (24) vorgesehen sind, um eine der Rollen um die eigene Achse zu rotieren, und der Anschlag sowie die Umfangsfläche der Antriebsrolle tangential zu einer gemeinsamen ersten Ebene (P_1) angeordnet sind und die Antriebsrolle weiterhin eine mit einer Klemmwand (39) des Falzes in Eingriff bringbare Oberfläche (44) aufweist und die gekrümmte Umfangsfläche (48) der Schneidrolle so ausgebildet und angeordnet ist, daß deren Mantellinie in dem Bereich, in welchem die Schneidkante die äußere Wandung des Falzes berührt, von der Schneidkante in Richtung auf die erste Ebene geneigt verläuft, dadurch gekennzeichnet, daß der Anschlag (52) von einer Seite des Hauptteils vorsteht und die Schneidrolle (40) sich auf der gegenüberliegenden Seite der ersten Ebene (P_1) von der Antriebsrolle (20) befindet und die Achse der Antriebsrolle die Schnittlinie zwischen einer zweiten Ebene (P_2) parallel zur ersten Ebene und einer dritten Ebene (P_3), die senkrecht zur ersten Ebene und radial in Bezug auf die Büchse verläuft, definiert und die Achse der Schneidrolle (40) die Schnittlinie zwischen einer vierten Ebene (P_4) und einer fünften Ebene (P_5) definiert und die vierte Ebene (P_4) senkrecht zur dritten Ebene und gegenüber der zweiten Ebene divergierend nach außen von der erwähnten Seite des Hauptteils verläuft und ein Schneid-Neigungswinkel (β) im Bereich von 10—30° zwischen zweiter und vierter Ebene



definiert wird und die fünfte Ebene senkrecht zur ersten Ebene und in Richtung auf die dritte Ebene konvergierend nach außen von der erwähnten Seite des Hauptteiles verläuft und ein Schneid-Versatzwinkel (γ), der größer als Null ist, zwischen dritter und fünfter Ebene definiert ist, wodurch dann, wenn Anschlag und Antriebsrolle an der Oberseite des Büchsenfalzes und die Schneidkante mit der äußeren Wandung desselben in Eingriff sind und die Rolle rotiert wird, um eine relativ Umfangsbewegung zwischen Öffner und Büchse derart zu bewirken, daß die Mitte der Schneidrolle sich in Richtung der Relativbewegung des Öffners hinter der Mitte der Antriebsrolle befindet, die Schneidkante mit der äußeren Wandung des Büchsenfalzes unter einem Winkel dazu in Eingriff ist, der im wesentlichen gleich dem Schneid-Neigungswinkel ist, um die äußere Wandung mit einer Schneidkraft zu durchtrennen, die eine im wesentlichen unbedeutende radiale Komponente aufweist.

2. Öffner nach Anspruch 1, dadurch gekennzeichnet, daß die gekrümmte Umfangsfläche (48) der Schneidrolle (40) im wesentlichen zylindrisch ist.

3. Öffner nach Anspruch 1, dadurch gekennzeichnet, daß der Schneid-Neigungswinkel 15° beträgt.

4. Öffner nach Anspruch 1, dadurch gekennzeichnet, daß der Schneid-Versatzwinkel nicht

mehr als 10° beträgt.

5. Öffner nach Anspruch 1, dadurch gekennzeichnet, daß der Schneid-Versatzwinkel 6° beträgt.

6. Öffner nach Anspruch 1, dadurch gekennzeichnet, daß die Antriebsrolle (20) und die Schneidrolle (40) so angeordnet sind, daß beim Öffnen einer Büchse ein Spurwinkel von ungefähr 16° zwischen einer sechsten Ebene (P_1), die die Achse der Antriebsrolle und den Mittelpunkt der Schneidrolle enthält, und der dritten Ebene (P_2) definiert ist.

7. Öffner nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Schneidrolle (40) an ihrer Schneidkante mit einer Zahnung versehen ist.

8. Öffner nach Anspruch 7, dadurch gekennzeichnet, daß die Schneidkante (50) geriffelt ausgebildet ist.

9. Öffner nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der Anschlag (52) eine Rippe aufweist.

10. Öffner nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Schneidrolle (40) durch ein Getriebe (70, 72) mit der Antriebsrolle (20) gekuppelt ist.

11. Öffner nach Anspruch 10, dadurch gekennzeichnet, daß die Schneidrolle (40) mit Zähnen (72) versehen ist, die mit Zähnen an der Antriebsrolle (20) kämmen.

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