Aug. 4, 1964 J. W. TONE ETAL 3,142,902

ENGAGING AND OPENING MECHANISM FOR A CAN OPENER

Filed March 21, 1962 3 Sheets-Sheet 1

Fig. 1.

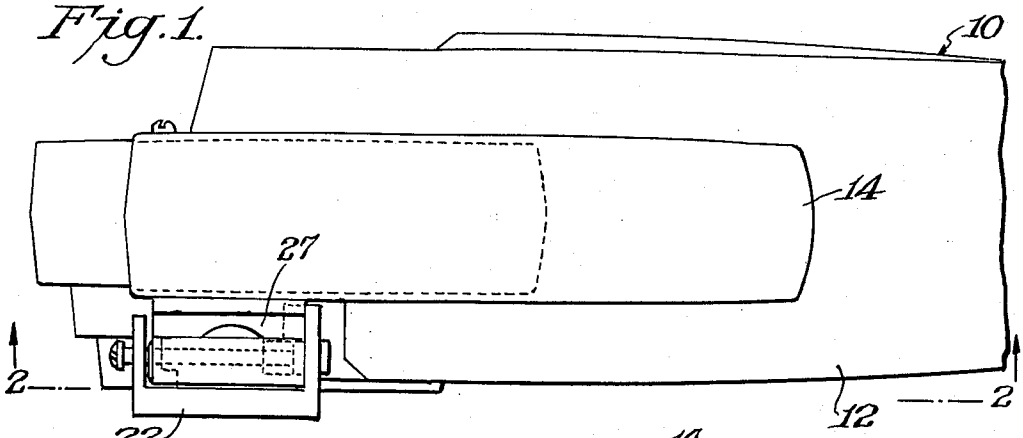

Fig. 2.

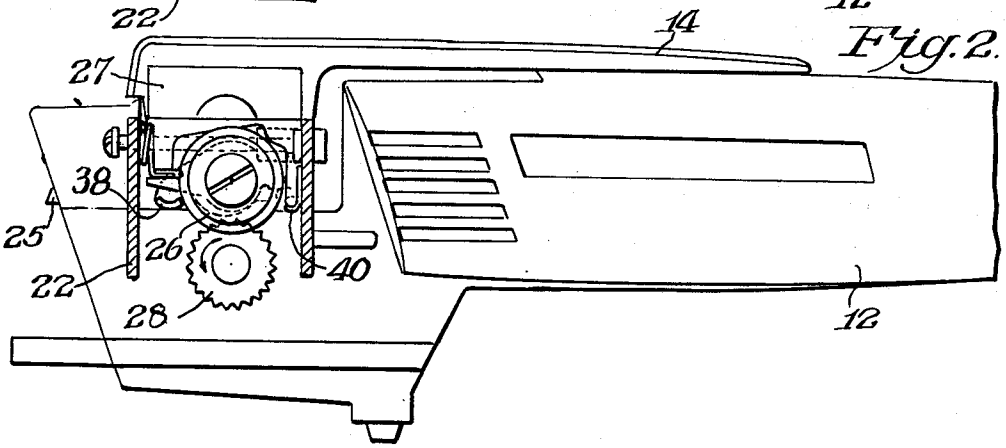

Fig. 3.

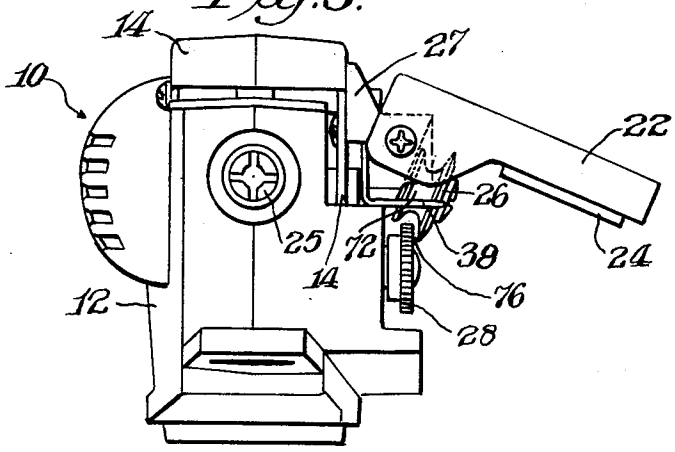

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Fig. 4.

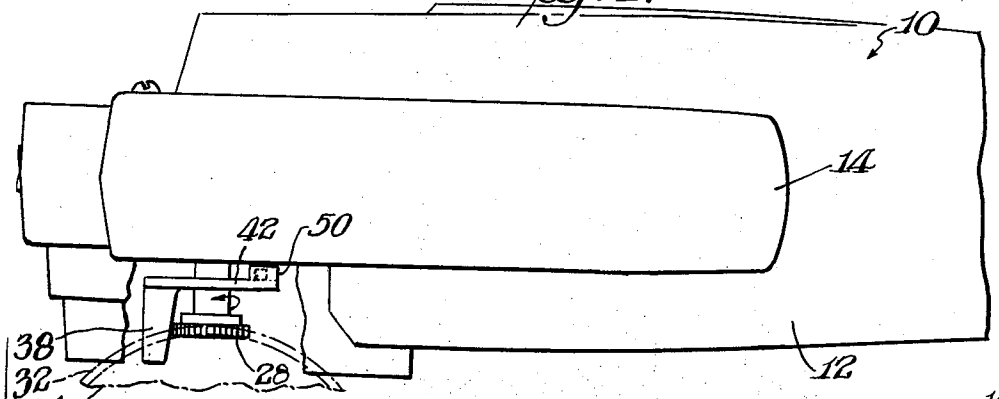

Fig. 5.

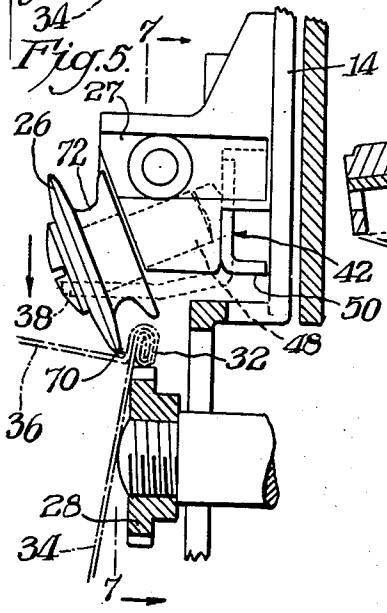

Fig. 6.

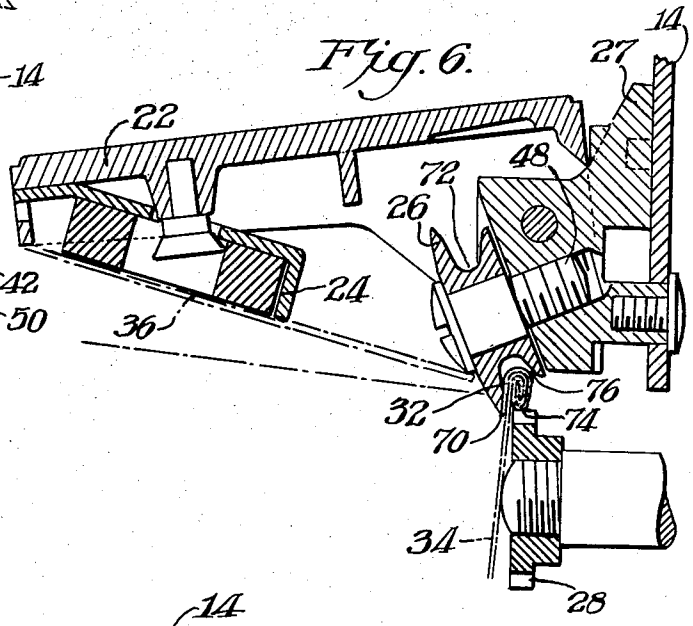

Fig. 7.

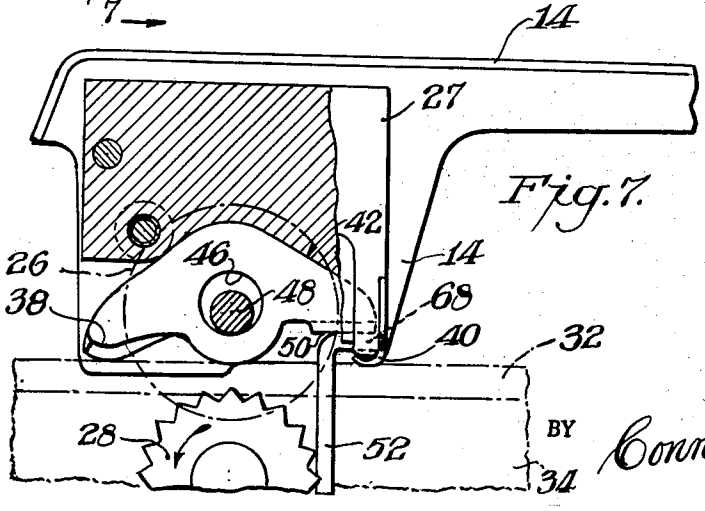

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Fig. 8

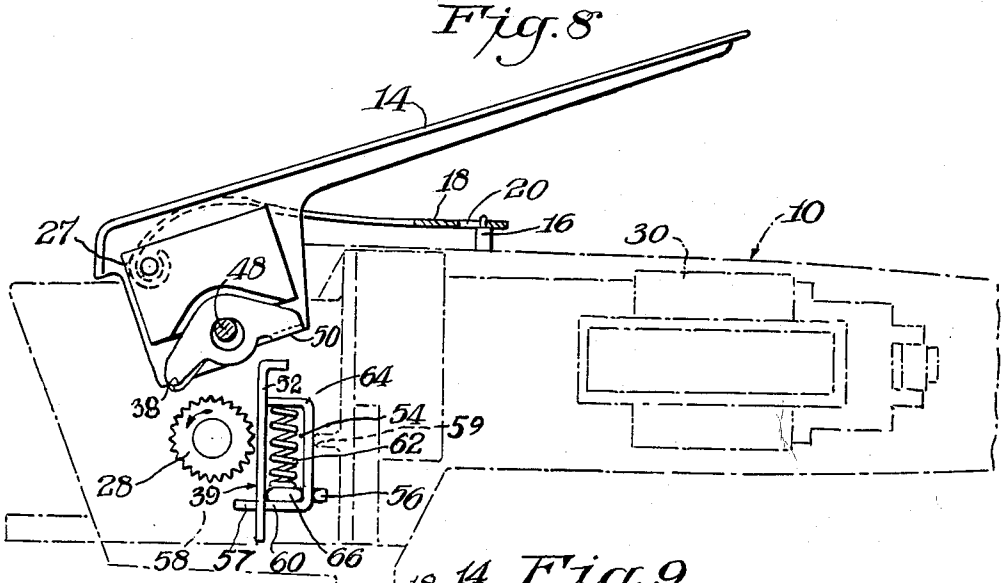


Fig. 9.

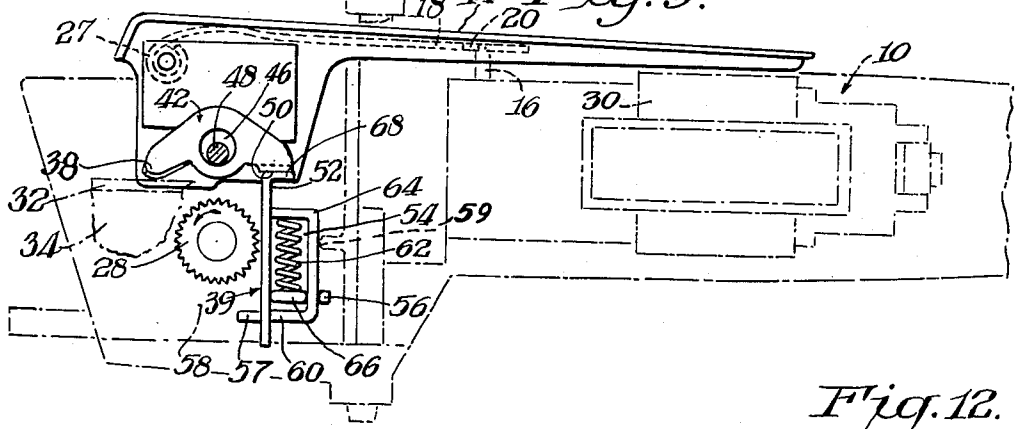


Fig. 10.

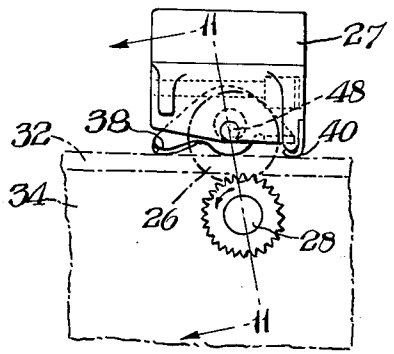


Fig. 11.

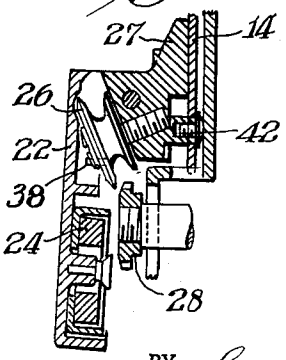
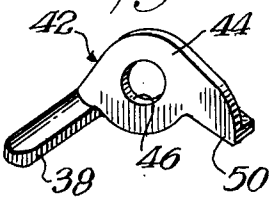


Fig. 12.



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ENGAGING AND OPENING MECHANISM FOR A CAN OPENER

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10 Claims. (Cl. 30—4)

This invention relates to a can-engaging arrangement for a can opener, and it more particularly relates to such an arrangement for a power-driven can opener.

Most power-driven can openers rotate the cans past the cutting blade that severs their lids by engaging a toothed can-driving wheel with the lower edge of the bead between the can and the lid. The bead is usually maintained engaged with the toothed driving wheel by pressing portions of the cutting blade body against the bead; and the changing position of the cutting blade relative to the can as the blade cuts through the lid interferes with obtaining optimum effectiveness from its can-engaging and severing portions.

An object of this invention is to provide a can-engaging arrangement for a can opener that provides optimum can-rotating and lid severing action.

Another object is to provide such arrangement which smooths any jagged edges remaining within the can from the lid severing operations.

In accordance with this invention pressure elements for engaging the bead of the can and maintaining it forceably engaged with the toothed can driving wheel are mounted ahead and in back of the cutting blade on the handle that carries that blade. At least one of the pressure elements resiliently forces the bead of the can into forceful engagement with the toothed can driving wheel. This positively rotates the can past the cutting blade at all times regardless of the changing position of the blade as it cuts through the lid of the can. The body of the cutting blade may accordingly be disposed to lie free of contact with the bead as it is severing the lid which permits it to most efficiently perform its cutting action. When such a cutting blade is a freely rotatably mounted cutting disc, its tip may be arranged to contact the severed edge of the lid which remains connected to the can and to deform it against the inside of the can thereby smoothing out any jagged edges that might result from severing the lid. A peripheral groove may be provided in the cutting disc for reacting against the bead during the final smoothing phase of blade penetration to facilitate smoothing of the jagged edges within the inside of the can.

The resiliently-biased pressure element may include a finger extending from a rocker element which is rotatably mounted about the axis of rotation of the cutting blade. A reaction surface upon the plate on the opposite side of its axis of rotation from the finger reacts against a spring-biased piston extending from the body of the can opener to resiliently force the finger into contact with the bead of the can which in turn is engaged with the toothed driving wheel. This mounting of the spring within the body avoids any necessity of mounting it upon the handle where space is limited. The other pressure element may be a stationary projection extending from the handle in back of the cutting blade which counter-reacts against the force applied to the bead by the resilient pressure finger to maintain it squarely and firmly engaged with the toothed can-driving wheel. The spring-biased piston may conveniently be an elongated strip inserted within a well in the body of the can opener in line with the reaction surface of the pressure plate. An

elongated loop upon the strip encloses a compression spring which reacts between the top of the loop and a projection within the body of the can opener, which may conveniently extend from a transmission gear casing, to resiliently force the strip in an upward direction toward the reaction surface upon the pressure element plate.

Novel features and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a top plan view of a can opener incorporating one embodiment of this invention;

FIG. 2 is a cross-sectional view taken through FIG. 1 along the line 2—2;

FIG. 3 is a front view in elevation of the embodiment shown in FIG. 1 with its wing folded upwardly;

FIG. 4 is a plan view of part of the embodiment shown in FIG. 1 engaging a can with various parts cut away for clarity of description;

FIG. 5 is an enlarged cross-sectional view in elevation partially broken away of can-engaging portions with the cutting blade just contacting the lid of a can;

FIG. 6 is a view similar to FIG. 5 after the cutting blade has severed the lid;

FIG. 7 is an enlarged side view in elevation broken away in cross section of portions of the embodiment shown in FIG. 2;

FIGS. 8 and 9 are side views in elevation of the can-engaging mechanism in various phases of operation;

FIG. 10 is another side view in elevation showing can-engaging portions;

FIG. 11 is a cross-sectional view taken through FIG. 10 along the line 11—11;

FIG. 12 is a three-dimensional view of a can-engaging element of the embodiment shown in FIGS. 1–11.

In FIGS. 1–3 is shown a can opener **10** which is generally similar to that described in copending application S.N. 181,383 filed March 21, 1962, except where specifically described herein in detail. Can opener **10** is accordingly a manually-supported portable power-operated unit which is operated by holding a can in the hand or resting it upon a surface and engaging the opener with it in a manner later described. Opener **10** accordingly includes a body **12** and an operating handle **14** which actuates both engagement with the can and actuation of motor-opening switch **16** shown in FIGS. 8 and 9 by its downward movement. Handle **14** is resiliently biased upwardly by a spring **18** shown in FIGS. 8 and 9, which is loosely secured to switch **16** by pin and slot **20**. A rotatable wing **22**, which is described in detail in the aforementioned copending application, carries a lid-grasping magnet **24** and shields the operative elements when unit **10** is used for driving other attachments connected to it through front socket **25**.

A cutting blade **26** which is for example of the freely rotatably-mounted disc type is mounted upon boss **27** attached to the side of operating handle **14**. Toothed cam-driving wheel **28** is rotated by electric motor **30** shown in FIGS. 8 and 9, and wheel **28** is mounted upon body **12** substantially opposite cutting blade **26** for engagement under the bead **32** of a can **34** whose lid **36** is being severed by blade **26**. Pressure elements **38** and **40** are mounted upon handle **14** for engaging the top of bead **32** inserted between blade **26** and toothed can-driving wheel **28** ahead and in back of blade **26**. A resilient piston **39** shown in FIGS. 8 and 9 reacts between can opener **10** and an extension of pressure element **38** in a direction which maintains bead **32** firmly engaged with can-driving wheel **28** which acts as a can supporting

means to cause it to positively rotate can 34 past blade 26 to cleanly sever the lid from the can.

As shown in FIGS. 2 and 7, another pressure element 40 counter reacts against the force applied by resilient element 38 to bead 32 to maintain bead 32 squarely and firmly engaged with toothed can-driving wheel 28 as shown most clearly in FIG. 7. Pressure element 40 is a shoe mounted upon a lower surface of boss 27 in a position to contact it with the top of bead 32 when a can 34 is engaged for severing.

Pressure element or finger 38 is more clearly shown in FIG. 12 which describes entire pressure rocker 42 including a mounting plate 44 having an oversize hole 46 through which is inserted the pivot axis 48 of cutting blade 26, as shown in FIGS. 8 and 9. Oversize hole 46 permits pressure rocker 42 freely to adjust to its optimum operating alignment with the can. A reaction surface 50 is provided on the side of rocker 42 opposite from pressure finger 38, and it is substantially aligned with the end of resiliently biased piston 39 as shown in FIGS. 8 and 9.

Resiliently biased piston 39 includes for example an elongated strip 52 inserted within a well 54 in body 12 of can opener 10. The movement up and down of piston 39 is guided within well 54 by protuberances 56 and 59 which conveniently extend, for example, from gear casing 58 which provides the drive to toothed can-driving wheel 28 from electric motor 30. An elongated loop 60 is connected to the side of strip 52 with an extension 57 past it, and it encloses a compression spring 62 which reacts between the top 64 and a reaction projection 66 also extending from transmission gear casing 58 to force the upper bent end 68 of strip 52 into contact with reaction surface 50 of pressure rocker 42. Reaction projection 66 also operates with protuberances 56 and 59 in guiding the movement of piston 39. This provides a convenient resilient reaction against pressure finger 38 without the necessity of incorporating spring elements within handle 14 where available space is highly limited.

Operation

FIGS. 5 and 8 show the condition of the can-engaging elements as the tip 70 of cutting blade 26 is brought into contact with lid 36 of can 34. Bead 32 is lightly yet firmly held in contact with toothed can-driving wheel 28 by the pressure of blade 26 before it penetrates lid 36. Motor 30 is started by contact of handle 14 with switch 16, and the rotation thereby imparted to wheel 28 and bead 32 rotates lid 36 relative to blade 26 to cause blade 26 to roll across and pierce lid 36 as handle is continued to be depressed to the position shown in FIGS. 6–7. Before blade 26 pierces lid 36, rocker 42 does not forcefully engage either bead 32 or piston 39.

After piercing, blade 26 moves downwardly through lid 36 into the position shown in FIG. 6, and it is then in a position to smooth remaining lid edge 74 against the inside of can 34 as lid 36 is completely severed about its entire circumference. This smooths out any jagged edges that might remain extending within the open top of can 34. This avoids any danger of cutting the fingers on the can or obstruction to complete removal of contents. During this lid severing operation, the condition in FIG. 9 exists in which reaction surface 50 of rocker 42 is engaged with end 68 of piston 39 to urge pressure finger 38 into contact with bead 32. Bead 32 is thereby rocked into contact with stationary pressure element 40 on handle 14 as shown in FIG. 7 to engage bead 32 squarely and firmly with toothed driving wheel 28. This allows wheel 28 to positively rotate the entire circumference of lid 36 through blade 26 for rapidly, efficiently and completely severing it from can 34.

Peripheral groove 72 in cutting blade 26 is large enough to completely receive bead 32 without interference with the cutting action of blade 26. Clearance 76, exists during the severing operation as shown in FIG. 6, and it permits blade 26 to be arranged to operate most efficiently through its lid severing and edge smoothing phase in contrast to pre-existing arrangements in which the cutting blade is utilized both for can driving and cutting and accordingly cannot perform these functions as efficiently as that described herein or begin to accomplish the edge smoothing function described.

What is claimed is:

1. A can opener having a body with can supporting means and can engaging means on said body pivotably mounted upon said body, said can opener comprising a cutting blade included in said can engaging means, a toothed can driving wheel rotatably mounted upon said can supporting means substantially opposite said cutting blade for engagement under the bead of a can whose lid is being severed by said blade, pressure elements secured to one of said body and said can engaging means for engaging the bead of a can inserted between said blade and said can driving wheel ahead and in back of said blade, and at least one resilient reacting element secured to the other one of the said body and said engaging means substantially opposite said pressure elements biasing said bead in a direction in which it is firmly maintained in engagement with said can driving wheel whereby said can is positively driven while said blade is inserted through said lid to sever it from said can.

2. A can-engaging and opening arrangement for a can opener having a body and a can-engaging handle rotatably mounted upon said body comprising a cutting blade mounted on said handle, a toothed can-driving wheel rotatably mounted upon said body substantially opposite said blade for engagement under the bead of a can whose lid is being severed by said blade, pressure elements upon said handle for engaging the bead of a can inserted between said blade and said can-driving wheel ahead and in back of said blade, resilient means reacting between a portion of said body and at least one of said pressure elements in a direction which maintains said bead firmly engaged with said can-driving wheel whereby said can is positively driven after said blade is inserted through said lid, electric motor means connected to said toothed wheel for rotating it, switch means electrically connected to said motor for running and stopping it, actuating means reacting between said handle and said switch for causing said motor to run when said handle is moved in a can-engaging direction, said pressure elements and said resilient means and said cutting blade being arranged to first cause said cutting wheel to contact said lid with said pressure elements free of said bead, said actuating means being arranged to cause said motor to run and drive said toothed wheel when said cutting wheel contacts said lid thereby causing said lid to move in engagement between said cutting wheel and said toothed wheel to facilitate the piercing of said cutting wheel through said lid, and said pressure elements and said toothed wheel being arranged to engage said bead between them after said piercing for driving said can between them for causing said cutting wheel to complete severing said lid from said can.

3. A can-engaging arrangement for a can opener having a body and a can-engaging handle rotatably mounted upon said body comprising a cutting blade mounted upon said handle, a toothed can-driving wheel rotatably mounted upon said body substantially opposite said blade for engagement under the bead of a can whose lid is being severed by said blade, pressure elements upon said handle for engaging the bead of a can inserted between said blade and said can driving wheel ahead and in back of said blade, resilient means reacting between said can opener and at least one of said pressure elements in a direction which maintains said bead firmly engaged with said can-driving wheel whereby said can is positively driven while said blade is inserted through said lid, and said pressure element against which said resilient means reacts being incorporated in a rocker element which is rotatably mounted upon said handle.

4. An arrangement as set forth in claim 3 wherein said

cutting blade is a cutting disc rotatably mounted upon an axle shaft, and the resiliently-biased rocker element is also rotatably mounted about said axle shaft.

5. An arrangement as set forth in claim 4 wherein said axle shaft is inserted through an oversize hole in said resiliently-biased rocker element.

6. An arrangement as set forth in claim 5 wherein said resiliently-biased rocker element is a plate including said hole, a pressure finger extending from said plate on one side of said hole for contact with said bead, a reaction surface upon said plate on the other side of said hole, a well in said body substantially in line with said reaction surface, a piston in said well, and a spring in said well reacting between said piston and said body in direction to urge said piston toward said reaction surface.

7. An arrangement as set forth in claim 6 wherein said pressure finger is curved in cross section for minimizing frictional resistance between it and said bead.

8. An arrangement as set forth in claim 7 wherein said body is hollow, and said well is formed by projections mounted within said hollow body.

9. An arrangement as set forth in claim 8 wherein an electric motor and a geared transmission casing are mounted within said body, and said well is formed by projections from said geared transmission casing.

10. An arrangement as set forth in claim 8 wherein said piston is an elongated strip having an elongated loop attached to it, a reaction projection from said geared transmission casing being disposed inside said loop, and said spring being a compression spring mounted within said loop for reacting between said recation projection and the top of said loop for resiliently biasing said loop to move in an upward direction.

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