

[54] **DEVICE FOR THE OPENING OF FOIL SEALED CONTAINERS**

1,155,267 9/1915 Peacott .....30/11  
 1,542,661 6/1925 Bradshaw .....30/11  
 2,554,628 5/1951 Mesik .....30/6.4

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[22] Filed: **May 7, 1971**

[57] **ABSTRACT**

[21] Appl. No.: **141,312**

Device for opening a sealed container comprising: a knife; means for raising and lowering the knife off the container; rotating means for rotating the knife around the container portion to be cut out; a fixedly positioned jig shaped in the shape of the portion of the container to be cut out; biasing means holding the knife against the jig guide surface to guide the cutting to the desired shape.

[30] **Foreign Application Priority Data**

June 5, 1970 Switzerland .....8431/70

[52] U.S. Cl. ....30/6.4, 30/11

[51] Int. Cl. ....B67b 7/30

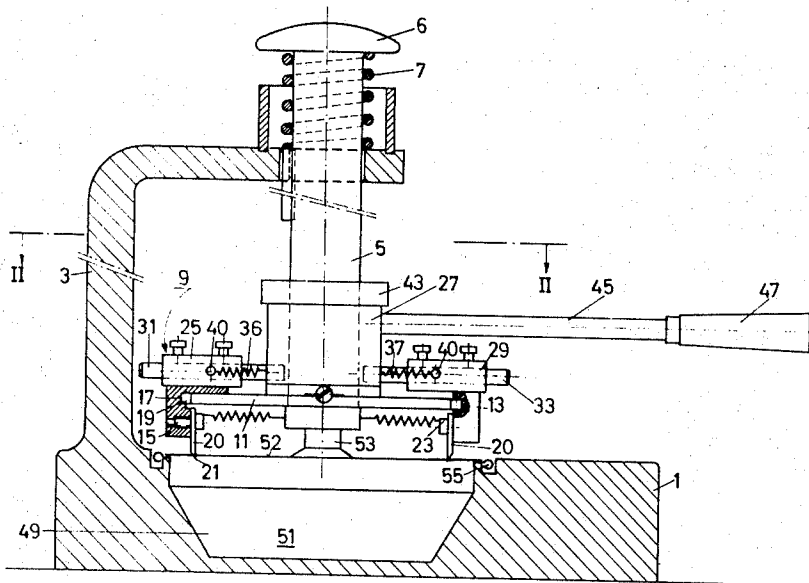
[58] Field of Search .....30/6.4, 11, 17, 310

[56] **References Cited**

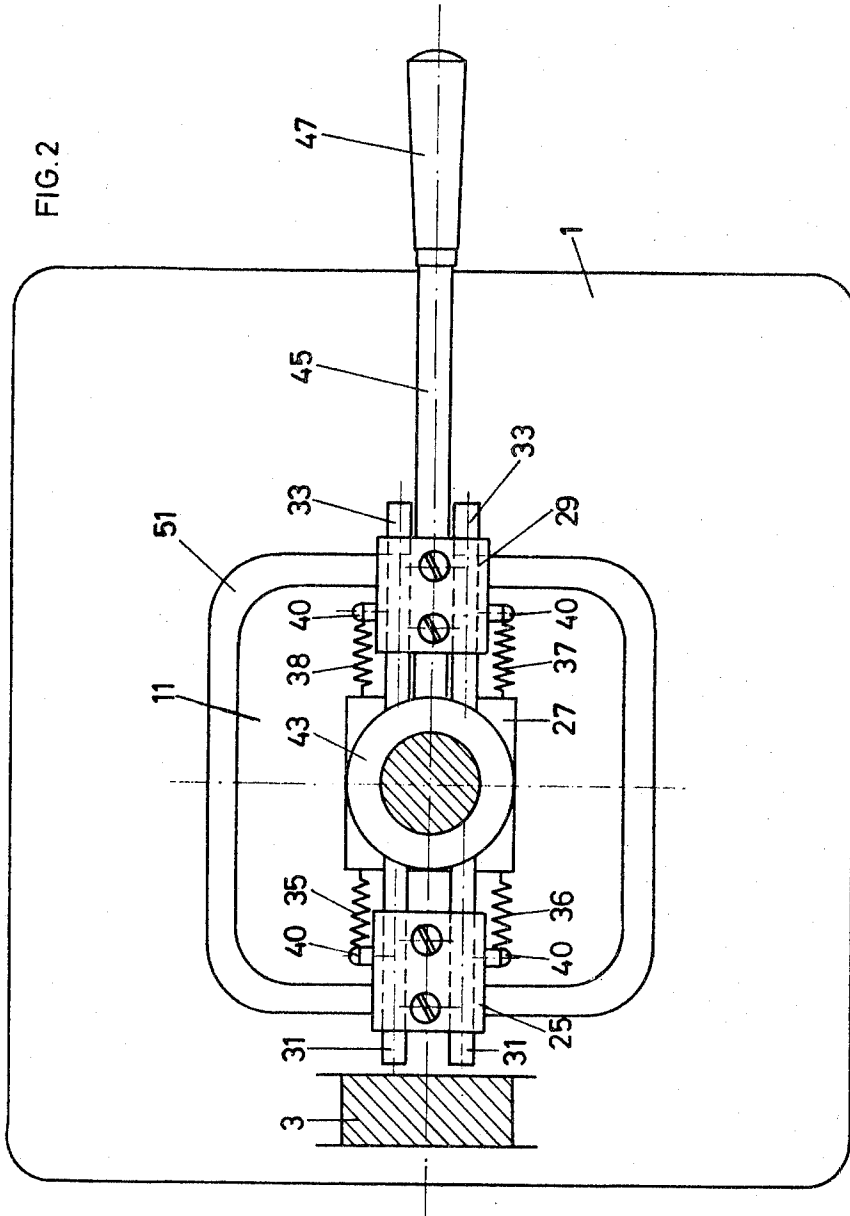
**16 Claims, 3 Drawing Figures**

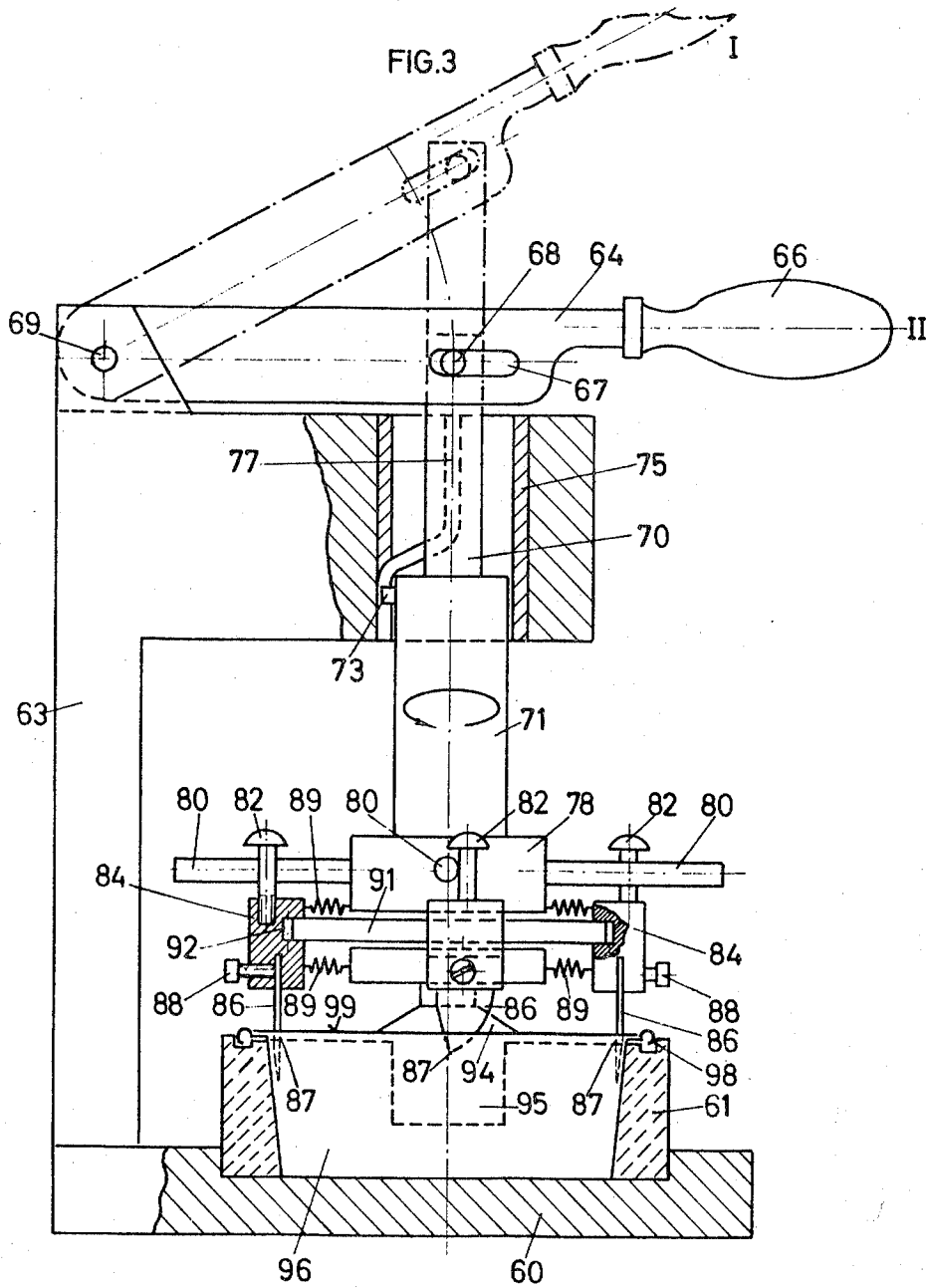
**UNITED STATES PATENTS**

1,110,334 9/1914 Moran .....30/11









## DEVICE FOR THE OPENING OF FOIL SEALED CONTAINERS

Known semi-automatic openers for tin cans, in particular for use in canteens, hotels, etc., are not suitable for the opening of foil-sealed lightweight containers, because they unduly deform these and tear them. Such containers, known as lightweight containers, are mainly used in the food industry. They consist of a bottom section of plastic sheet or aluminum foil or a foil combined from both, the aluminum foil being up to 0.20 mm thick, and of a lid of the same material. The lid foil is joined to a rim flange of the bottom section by heat sealing. The object of the present invention is to provide a device for the opening of foil-sealed containers. The device of the invention includes a knife support capable of being lowered on to the container, means for moving the knife support into its cutting position for cutting the foil along the container rim, a suction device which both holds the foil as it is being cut and, when the knife support is lifted after cutting, raises the foil detached from the container.

The present invention is now to be described by way of example with reference to the accompanying drawings, in which:

FIG. 1 shows a side view partly in longitudinal section, of a device for opening foil-sealed containers of non-round shape;

FIG. 2 shows a top view of the said device, partly in section, along line II—II in FIG. 1;

FIG. 3 shows another embodiment of a device for opening foil-sealed containers, in side view analogous to FIG. 1.

FIGS. 1 and 2 show a device with a baseplate 1 and a lateral support 3 for receiving a rod 5. This is provided at its upper end with a knob 6 which concurrently serves as an abutment for a spring 7. Rotatably seated on the rod 5 is a knife support 9, inside which is a jig 11 rigidly joined to the rod 5. The edge of jig 11 provides a guide surface oriented to face in a direction transverse to the container surface to be opened. The knife support 9 presents two knife holders 13 and 15. These present guide grooves 17 in which there are two rolls 19. These rolls support the knife holders 13 and 15 on the edge of the jig 11. Fitted to the knife holders 13 and 15 by bolts 23 are knife blades 20 presenting knife-edges 21. The knife holders 13 and 15 are connected to slides 25 and 29. The slides slide on guide bars 31 and 33, while the middle section 27 remains fixed. Guide bars 31 and 33 extend generally parallel to the container surface to be opened. The slides are connected to the middle section 27 by tension springs 35, 36, 37 and 38 and holder 40. A collar 43 rigidly joined to the knife support 9 holds a lever 45 with a grip 47.

The baseplate 1 presents a recess 49 for receiving a container 51. Fitted to the lower end of the rod 5 and rigidly joined thereto is a suction cup 53 which, consisting of soft rubber, sits fast when pressed on to a surface.

The device operates as follows:

In the initial position, owing to the pressure of the spring 7, the rod 5 together with the knife support 9, the grip 47 and the suction cup 53 is in the raised position, so that the container 51 can be easily slipped into the recess 49 of the baseplate 1. Then, against the action of the spring 7, pressure is applied to the knob 6 to lower the rod 5, with the result that the knife-edges 21 penetrate into lid foil 52 of the sealed container 51,

and the suction cup 53 is caused to suck itself fast on the foil. Next, the grip 47 is gripped and swung in a plane parallel to the lid foil 52, so that the knife-edges 21 cut through the foil along the container rim 55. Where there are two knife blades 20 fitted to knife holders 13 and 15 relatively displaced by 180°, a swing through slightly more than 180°, such as 185°, is sufficient to part the foil 52 reliably from the container 51 while preventing any further portions from being cut by the knife-edges 21. When the cut is complete, the grip 47 can be moved back slightly, as through a few degrees, and then the knob 6 can be released. The entire cutting assembly comprising the knife support 9 and the suction cup 53 with the detached lid returns upwards to its initial position under the action of the spring 7. The opened container 51 can be easily removed from the recess 49, as sideways, for instance.

The jig 11 is formed according to the contour of the container rim 55, which may be rectangular with rounded corners, oval, etc. The slides 25 and 29 are slidably arranged on the guide bars 31, 33. They are subject to the action of the springs 35-38, ensuring that the knife holders 13 and 15 rest against the edge of the jig 11. For smooth action, the knife holders 13 and 15 are provided with suitable rolls 19 which substitute a largely rolling friction for a sliding friction between jig edge and holders 13 and 15. Balls may be used instead of rolls.

FIG. 3 shows a device analogous to that in FIGS. 1 and 2 for opening foil-sealed containers. In this embodiment, a base-plate 60 presents a die 61. A support 63 holds an operating lever 64 with a grip 66 and a slot 67 by which the lever 64 is action-connected to a guide pin 68 of a rod 70. The lever 64 pivots on a pin 69 of the support 63. Continuing the rod 70 downwards is a piston, shaped component 71 with a dog 73 guided in the guide groove 77 of a sleeve 75. The groove of the sleeve 75 fitted in the support 63 is formed in such a manner that its upper portion extends parallel to the axis of the rod 70 or the piston 71, while its lower portion is bent in the manner shown, so that the dog 73 and, with it, the piston 71, which is free to rotate on the rod 70, first performs an axial movement and thereafter, following the bend of the groove 77, a combined axial and rotary movement.

Fitted to the piston 71 is a carrier 78 with carrier bars 80. These serve to carry along the bolts 82 in the knife holders 84, which carry knife blades 86 with knife-edges 87. The blades are held by bolts 88. In this case again, the knife holders 84 are interconnected by springs 89 and the carrier 78. The knife holders 84 rest against a jig 91, and the grooves of the knife holders 84 have rolls 92 or balls intended to guide the knife holders 84 smoothly along the circumference of the jig 91. A suction cup 94 is provided as a terminating element. Also shown in FIG. 3 is a container 96 to be opened, with a rim 98 and a lid foil 99.

Once the container 96 has been placed in position, with the operating lever 64 lifted (dash-dotted in FIG. 3), this lever is gripped by its grip 66 and moved downwards, with the result that the rod 70 performs a straightline movement, so that the piston 71, being rotatable but axially fixed in respect thereof, at first also performs an axial movement, corresponding to the form of the groove 77. During that movement, the knife-edges 87 meet the foil 99 and pierce it, whereupon, with the lever 64 continuing its downward move-

ment, the piston 71 performs a rotary movement corresponding to the form of the groove 77, so that the knife-edges 87 move parallel to, or along, the container rim 98 and part the foil 99 from the rim. According to the number of knife-edges 87, the rotary movement performed by the piston 71 is limited to about 95° or about 185°. The suction cup 94, which is pressed against the foil 99 and which may be connected to a vacuum device, not shown, for instance, entrains the detached foil 99 when the lever 64 is lifted, so that, with the lever 64 back in its initial position, the opened container 96 is cleared and can be removed from the die 61. Removal may be effected sideways through a lateral cut-out 95 of the die 61, for instance.

Where the groove 77 has a fully continuous form, the knife support, after the cutting of the foil 99 has been completed, is first lifted and then swung back into its initial position.

The devices described are designed to open containers of any shape which are closed with foil such as plastic-backed aluminum foil or the like, in cold condition as well as in hot condition, in such a manner that the detached foil lid is raised by the device while the container rim remains undamaged. This is an absolute necessity in view of the container stability required. The die for the container and the jig for the guidance of the knife holders are preferably made as interchangeable parts. The die may consist of plastic or similar material moulded to the shape of the particular type of container.

The suction cup serves not only to lift the detached foil lid, but also to keep the lid in position during the opening movement and thus ensure a reliable and neat opening cut.

Instead of having hand lever operation, it is possible to provide the knife support with pneumatic, hydraulic or electrical drive and thus automate the device yet further.

We claim:

1. Device for opening of sealed containers, comprising:

a knife means;

knife moving means connected with said knife means for moving said knife means into cutting engagement with a container and for raising said knife means off the container, for enabling cutting open of the container;

rotating means connected with said knife means for rotating said knife means around the container after said knife means has been moved into engagement with said container;

holding means for holding a container to be opened fixedly positioned with respect to said knife means; a fixedly positioned jig, nonmovably connected with said holding means; said jig including a guide surface facing in a direction transverse to the surface to be opened of the container;

biasing means for biasing said knife means against said jig guide surface for guiding said knife means as it rotates.

2. The device for opening of claim 1, further comprising an anti-friction bearing interposed between said knife means and said jig guide surface.

3. The device for opening of claim 1, further comprising container cut-out portion engaging means for holding the portion of the container to be cut and for lifting out this portion; said container cutout portion

engaging means being connected with to be movable by said knife moving means.

4. The device of opening of claim 3, wherein said container cutout portion engaging means is a suction cup.

5. The device for opening of claim 1 wherein said jig guide surface is of a shape to conform to the shape of the container surface being opened.

6. The device for opening of claim 5, wherein said jig guide surface is noncircularly shaped.

7. The device for opening of claim 6, wherein said jig is removable and replaceable with a different said jig having a differently shaped said guide surface.

8. The device for opening of claim 1, wherein said biasing means comprises springs joining said knife means and said rotating means.

9. The device for opening of claim 8, further comprising an anti-friction bearing interposed between said knife means and said jig guide surface.

10. The device for opening of claim 9, further including knife guide bars connected with said rotating means, spaced away from the container surface to be cut and extending generally parallel to that surface; said knife means being supported on said guide bars and being shiftable therealong by said jig and said biasing means.

11. The device for opening of claim 10, wherein said knife moving means comprises a shaft which is shifted axially and said rotating means comprises a sleeve which is connected with said shaft.

12. The device for opening of claim 11, wherein said knife moving means shaft extends in the direction of movement of said knife means toward engagement with the container; said rotating means being connected with to be movable with said knife moving means;

a sleeve having an interior through which said rotating means extends; said sleeve being nonmovably secured to said holding means; one of said rotating means and said sleeve interior has an engageable dog projecting therefrom; the other of said rotating means and said sleeve interior has a groove which extends along and which wraps around said sleeve interior; said dog being engaged in said groove, whereby moving of said knife moving means causes rotation of said dog and said rotating means.

13. The device for opening of claim 12, wherein said rotating means includes a shaft extending up from said rotating means extending into said sleeve interior and said dog projects out of the side of said shaft; said sleeve interior comprises a hollow tube and said groove is on the inside of said tube.

14. The device for opening of claim 1, wherein said knife moving means comprises a shaft which is shifted axially and said rotating means comprises a sleeve which is connected with said shaft.

15. The device for opening of claim 14, wherein said knife moving means shaft extends in the direction of movement of said knife means toward engagement with the container; said rotating means being connected with to be movable with said knife;

a sleeve having an interior through which said rotating means extends; said sleeve being nonmovably secured to said holding means; one of said rotating means and said sleeve interior has an engageable dog projecting therefrom; the other of said rotating means and said sleeve interior has a groove which extends along and which wraps around said sleeve

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interior; said dog being engaged in said groove, whereby moving of said knife moving means causes rotation of said dog and said rotating means.

rotating means extending into said sleeve interior and said dog projects out of the side of said shaft; said sleeve interior comprises a hollow tube and said groove is on the inside of said tube.

16. The device for opening of claim 15, wherein said rotating means includes a shaft extending up from said

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