Feb. 7, 1950 I. NEWMAN 2,496,672

DEVICE FOR REMOVING SEALING CLOSURES

Filed April 16, 1945 2 Sheets-Sheet 1

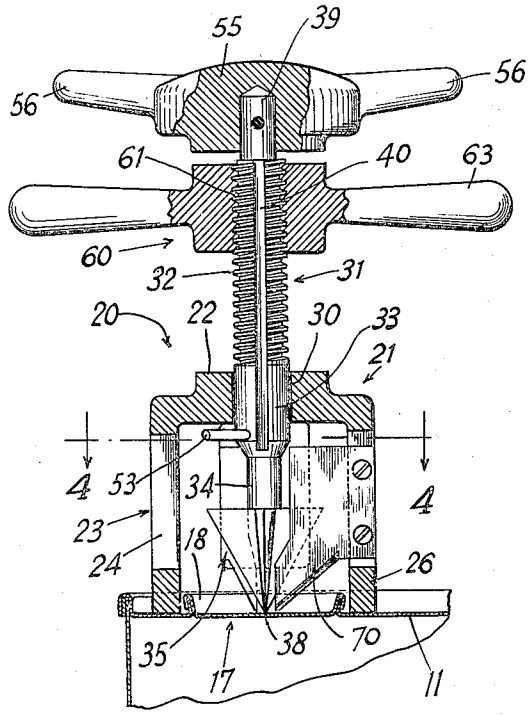


Fig. 1

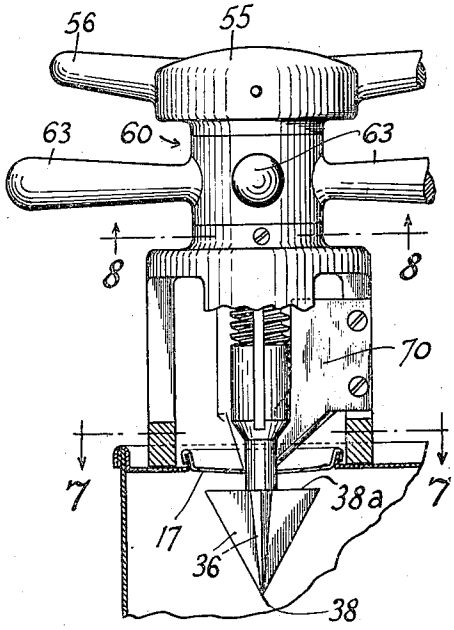


Fig. 2

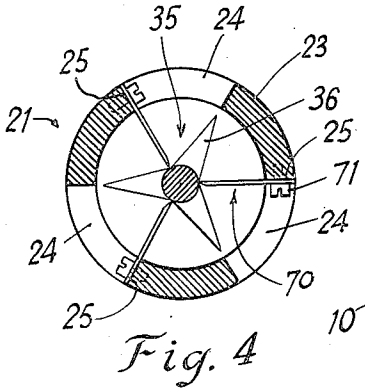


Fig. 4

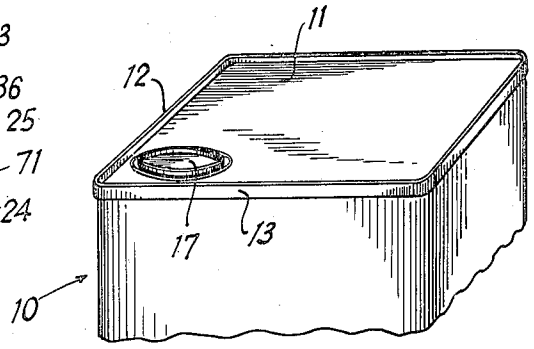


Fig. 3

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DEVICE FOR REMOVING SEALING CLOSURES

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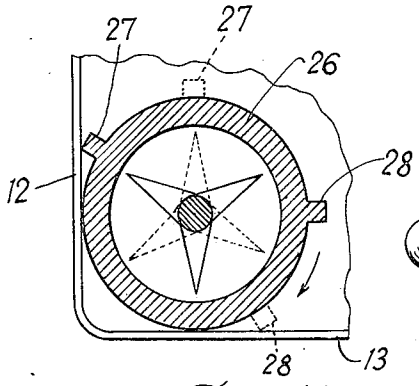


Fig. 7

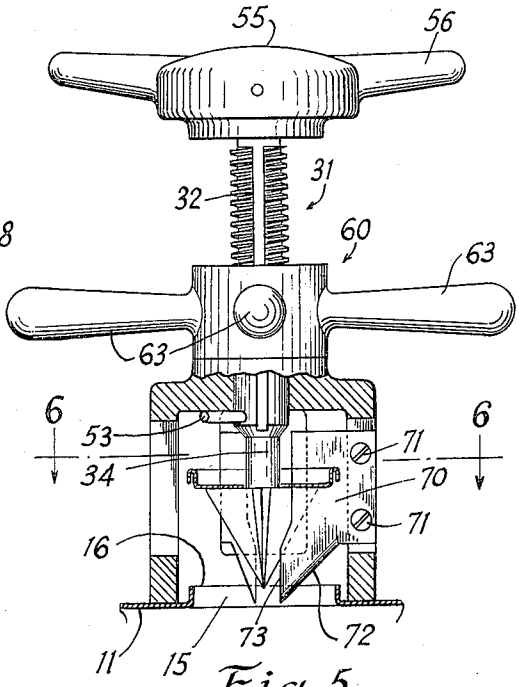


Fig. 5

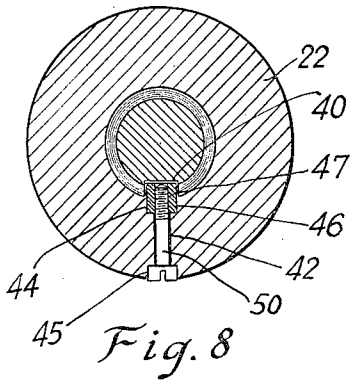


Fig. 8

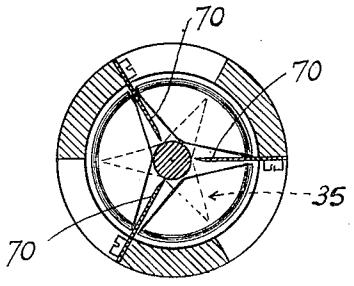


Fig. 6

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DEVICE FOR REMOVING SEALING CLOSURES

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Application April 16, 1945, Serial No. 588,549

11 Claims. (Cl. 7—14.25)

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This invention relates to devices for removing sealing closures. It is particularly directed to a tool for removing the cap from a filling hole of a can.

One object of this invention is to provide an improvement in the tool disclosed in my Patent No. 2,060,888, issued November 17, 1936. The tool shown in said Patent No. 2,060,888 is provided with means for piercing the cap and for pulling the cap upwardly from the rim edge to which the cap is sealed, without destroying said rim edge.

One difficulty that has been found with my prior tool is that when the cap was pulled up and removed from the can, it was difficult to remove the cap from the tool. The cap had to be sheared or cut with nippers into pieces before it could be removed from the tool. It is therefore an object of this invention to provide a tool of the character described provided with means for cutting the cap into segmental pieces as it is being removed from the can, so that the pieces may easily be removed or will drop out of the tool, thereby obviating the necessity for shearing or cutting the removed cap with nippers to remove it from the tool.

A further object of this invention is to provide a tool of the character described comprising a member adapted to be placed on the can over the cap, a shaft thereon carrying a piercing element adapted to be pushed through the cap to pierce the same, means to pull the pierced cap off the can, and means to cut the cap, as it is being pulled off the can into two or more pieces which may easily be removed from the tool.

Yet a further object of this invention is to provide a strong, rugged and durable device of the character described, which shall be smooth and positive in operation, which shall be easy to manipulate, and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is a longitudinal vertical sectional view of the tool embodying the invention in position for piercing a can cap;

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Fig. 2 is a view similar to Fig. 1 and showing the piercing head pierced through the cap;

Fig. 3 is a perspective view of the upper end of a can showing the cap to be removed;

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1;

Fig. 5 is a view similar to Fig. 2 but showing the cap pulled off the rim edge on the top of the can;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 5;

Fig. 7 is a cross-sectional view taken on line 7—7 of Fig. 2 and showing the position of the piercing head and lugs on the tool in the position before the head is drawn up, in dotted lines; and

Fig. 8 is a cross-sectional view taken on an enlarged scale on line 8—8 of Fig. 2.

Referring now in detail to the drawing, 10 designates a can having a top wall 11 and provided with a pair of opposite upstanding rim edge portions 12, and with a pair of opposite upstanding rim edge portions 13. The top wall 11 of the can is provided with a filling hole or opening 15 and has an annular upstanding rim 16 at said opening. On the rim 16 is a cap 17. The cap 17 is provided with a peripheral channel flange 18 gripping the upstanding rim 16.

In accordance with the present invention, there is provided a tool 20 for removing the cap 17 while leaving the rim 16 in such condition that the can can be resealed with a new cap. Tool 20 embodying the invention comprises a dome or inverted cup-shaped member 21 having a top wall 22 and a cylindrical wall 23. Cylindrical wall 23 is formed with three openings 24 equiangularly spaced. At each opening 24 is a vertical edge 25. Although any suitable number of openings may be provided, three such openings are shown for the purpose of illustration. The edges 25 are thus 120° apart. At the lower end of wall 23 is an annular rim edge portion 26 formed with a pair of radially projecting spaced lugs 27 and 28. When the tool is placed on the top wall 11 of the can over the cap 17, lug 27 will contact rim 12. After the cap is pierced, in the manner hereinafter explained, the entire tool is rotated through an angle of substantially 60° so that lug 28 will contact rim 13.

The top wall 22 of member 21 is formed with a through opening 30. Slidably extending through the opening 30 is a shank 31 having a screw threaded portion 32, of preferably steep pitched, multiple lead threads. At the lower end of the screw threaded portion 32 is a smooth portion 33. Below said portion 33 is a reduced stem 34.

At the lower end of stem 34 is an arrow head shaped piercing element 35. Element 35 may be provided with a plurality of cutting fins 36, three such fins being shown for the purpose of illustration. There are as many fins as there are openings 24 in member 21. The fins or cutting knives 36 converge to a point 38 at the bottom, and have flat upper surfaces 38a.

At the upper end of shank 31 is a reduced stem 39. The shank is formed with a longitudinal key slot or groove 40. Wall 22 is formed with a through opening 42 countersunk at its inner and outer ends as at 44 and 45, respectively (see Fig. 8). Within the countersunk opening 44 is a collar or pin 46 projecting into key slot 40. The pin 46 is formed with a screw threaded opening 47. Extending through opening 42 is a screw 50 one end of which is screwed into the threaded opening 47. The head of the screw is received in countersunk opening 45. Pin 46 thus serves to prevent rotation of shank 31 relative to member 21. Fixed to the lower end of portion 33 of the shank is a radial pin 53 adapted to contact the underside of wall 22 to limit upwardly longitudinal movement of the shank relative to member 21. When pin 53 strikes wall 22, the piercing head or element 35 will be wholly within member 21. Fixed to stem 39 at the upper end of shank 31 is a handle 55. The handle may be formed with a pair of radial arms 56.

Screwed onto the threaded portion 32 of the shank is a nut 60. The nut 60 is formed with an internal screw threaded portion 61 receiving the threads of the shank portion 32. The nut 60 is formed with a plurality of radial extending handles 63.

The operation of the tool will now be explained. The nut 60 is rotated to the position shown in Fig. 1 where it is at the upper end of the screw threaded portion 32 of the shank. The shank is then pulled upwardly until pin 53 strikes wall 22. The tool is then placed on top of the can so as to surround or overlie the cap. The entire tool is rotated so that lug 27 contacts rim 12 of the can. Pressure is then exerted on the handle 55 downwardly so that the piercing element 35 will pierce the cap 11. The entire tool is then rotated about its axis until lug 28 contacts rim 13. The fins 36 will then become misaligned with respect to the openings cut through the cap. Said fins will then lie in the dotted line position of Fig. 7 between the openings which were cut in the cap 11 when the piercing element passes therethrough. The tool is then in the position shown in Fig. 2 of the drawing. The nut 60 is then rotated in a direction for causing the shank 31 to move upwardly. The piercing element will then engage beneath the cap and pull the cap upwardly. The nut is rotated until pin 53 again strikes wall 22. During this operation the cap is pulled off the rim edge 16.

Means is provided to cut the removed cap into several pieces while the cap is being removed so that the pieces may be easily withdrawn from the tool. To this end there is fixed to each of the edges 25 of the cylindrical wall 23, a cutting knife 70. The cutting knives 70 bisect the angles between the fins 36. Said cutting knives may be attached to the edges 25 by means of screws 71 or any other suitable means. Screws 71 pass through openings in the blades of the knives 70 and screw into appropriate threaded openings in edges 25 of the cylindrical wall. Each knife 70 has a downwardly and inwardly extending cutting edge 72 at its lower end. Each knife or blade is furthermore formed with an inner vertical edge 73 almost touching the stem 34. As the cap 17 is pulled upwardly, it will be cut by the blades 70 into a plurality of segments which will either fall out or which may easily be shaken out of the tool. There is thus provided means for removing the cap and cutting it into pieces at the same time.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A tool of the character described comprising an annular member having an end wall formed with an opening, a shank movably mounted on said end wall and passing through said opening and disposed axially of said member, a piercing element at one end of said shank, and a plurality of knives on said member projecting into said member, said piercing element having a plurality of fins, and said knives projecting between said fins.

2. A tool of the character described comprising an annular member having an end wall formed with an opening, a shank movably mounted on said end wall and passing through said opening and disposed axially of said member, a piercing element at one end of said shank, a plurality of knives on said member projecting into said member, said piercing element having a plurality of fins, said knives projecting between said fins, and screw threaded means to move said shank relative to said member.

3. A tool of the character described comprising an annular member having an end wall formed with an opening, a shank movably mounted on said end wall and passing through said opening and disposed axially of said member, a piercing element at one end of said shank, a plurality of knives on said member projecting into said member, said piercing element having a plurality of fins, said knives projecting between said fins, screw threaded means to move said shank relative to said member, and means on said shank to limit movement thereof relative to said member.

4. A tool of the character described comprising a member having a tubular wall, and an end wall, said end wall being formed with an axial opening, a shank slidably and non-rotatably mounted on said member, and passing through the opening in said end wall, said shank having a screw threaded portion, a nut on said screw threaded portion, a handle at one end of said shank, and a piercing element at the other end of said shank and disposed within said member, said piercing element having a plurality of triangular fins extending upwardly and outwardly, said fins having blunt horizontal upper edges and sharpened outer edges, in combination with a plurality of upright blades secured to said tubular member, said blades extending radially inward into close proximity of said shank and respectively between said fins, said blades having outwardly and upwardly inclined cutting edges, said nut being located between said handle and said member whereby said shank and its fins may be forcibly

elevated relative to said member and its blades.

5. A tool of the character described comprising a member having a tubular wall, and an end wall, said end wall being formed with an axial opening, a shank slidably and non-rotatably mounted on said member, and passing through the opening in said end wall, said shank having a screw threaded portion, a nut on said screw threaded portion, a handle at one end of said shank, a piercing element at the other end of said shank and disposed within said member, said piercing element having a plurality of triangular fins extending upwardly and outwardly, said fins having blunt horizontal upper edges and sharpened outer edges, in combination with a plurality of upright blades secured to said tubular member, said blades extending radially inward into close proximity of said shank and respectively between said fins, said blades having outwardly and upwardly inclined cutting edges, said nut being located between said handle and said member whereby said shank and its fins may be forcibly elevated relative to said member and its blades, a pin on said shank adapted to contact said end wall to limit movement of said shank relative to said member in one direction, and a pair of spaced lugs on said tubular member extending outwardly therefrom at the open end thereof.

6. A tool of the character described comprising a member having an annular wall, and an end wall, said end wall being formed with an axial opening, a shank slidably and non-rotatably mounted on said member, and passing through the opening in said end wall, said shank having a screw threaded portion, a nut on said screw threaded portion, a handle at one end of said shank, a piercing element at the other end of said shank and disposed within said member, a pin on said shank adapted to contact said end wall to limit movement of said shank relative to said member in one direction, a pair of spaced lugs on said cylindrical member extending outwardly therefrom, and a plurality of knives on said cylindrical member projecting radially inwardly therefrom, said knives having downwardly and inwardly inclined cutting edges, said piercing element being formed with a plurality of radial fins, and said knives being disposed between said fins.

7. A tool of the character described, said tool comprising a hollow annular member having an end wall formed with an opening, a shank slidably mounted on said end wall and passing through said opening and disposed axially of said member, a combined piercing and cutting means on one end of said shank and a handle on its other end, said cutting means comprising radially extending triangular fins substantially equally spaced from each other, said fins having blunt horizontal upper portions and outwardly and upwardly extending upper edges, in combination with upright blades secured to the hollow annular member and extending radially inwardly therefrom into close proximity of the shank and respectively between the fins, said blades having outwardly and downwardly inclined cutting edges, cooperating means on both said member and said shank to prevent relative rotation thereof, means supported by the shank and engaged by both said shank and said member whereby said shank its piercing element and fins may be forcibly elevated relative to said hollow annular member and its blades, said handle having radial portions whereby said complete tool may be readily rotated when desired through the distance of a minor arc.

8. A tool of the character described comprising a member having a tubular wall and an end wall, said end wall being formed with an axial opening, a shank slidably mounted on said member and passing through the opening in said end wall, in combination with cooperating means on both said shank and said member to prevent relative rotation thereof, said shank having a screw threaded portion, a nut on said screw threaded portion, a handle on one end of said shank and a piercing element on the other end thereof and disposed within said member, a pin on said shank within said tubular wall and in the path of said end wall to limit longitudinal movement of said shank relative to said member in one direction, a pair of spaced lugs on said tubular wall extending outwardly therefrom at its open end, a plurality of knives on said tubular wall projecting radially inward therefrom into close proximity to said shank, said piercing element being formed with a plurality of fins extending radially outward therefrom and receiving said knives respectively between said fins.

9. A tool of the character described comprising a hollow dome shaped member, a shank slidably mounted to extend through said member, a combined cap piercing and cap removing element on the lower end of said shank, a handle on the upper end of said shank, said element being formed with a plurality of outwardly extending fins located about the central axis of said member and said shank, in combination with a plurality of knives mounted on said member and extending radially inward and having their inner terminals located in a path respectively between said fins, said handle comprising means to actuate the element downwardly through the cap and additional means on said shank to forcibly elevate said element and the removed cap in the path of said knife.

10. A tool of the character described comprising a hollow annular member having an end wall formed with an opening, a shank slidably and non-rotatably mounted on said end wall and passing through said opening and disposed axially of said member, a combined cap piercing and cap removing element on one end of said shank and disposed centrally within said member, said element being formed with a plurality of radial fins extending outwardly therefrom in substantially equally spaced relation, in combination with a plurality of knives on said member projecting radially inwardly and terminating in close proximity to said shank, each knife being located in a path between a pair of fins, said shank having a screw threaded portion and a complemental nut thereon in the path of said member whereby to forcibly elevate said shank and its element and pierced cap upwardly with the cap and in the path of said knives, said shank having a handle on one of its ends opposite to the element whereby said shank and its element may be actuated downwardly.

11. A tool of the character described a hollow dome shaped member adapted to be placed on the top of a can over a cap to be removed, said member having a tubular guide in its top central portion, a shank movably mounted in said guide, a handle on the upper end of said shank and a combined cap piercing and cap removing means on its other end, said piercing means being formed with outwardly projecting radial fins located centrally within said member, said shank having a

screw threaded portion carrying a complemental nut thereon in the path of said member, in combination with means fixed on said member and arranged in the path between the fins for severing the removed cap into a plurality of pieces as said cap is being elevated by said screw threaded portion and its nut.

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