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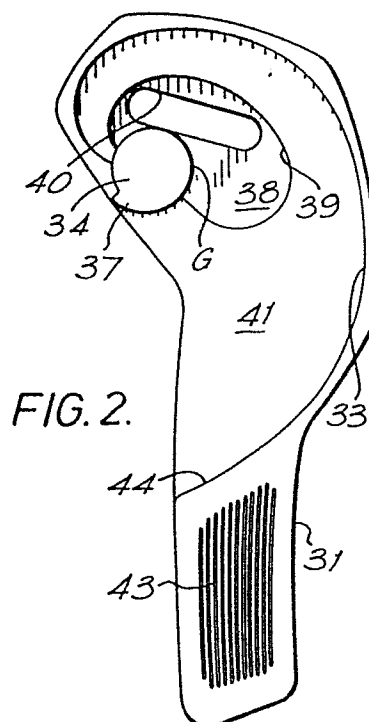
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54 **Device for releasing closures.**

57 A device for releasing the closure (L) from a sealed container comprises a sliding surface (33) which extends in a curve of gradually increasing radius from a gripping surface (G), which surfaces (33, G) between them receive the lid to be released. The gripping surface (G) is part of a deformable body (34) mounted on the device in a way so as to resist high removal forces.



William Levens LimitedAgents Ref :- 2461ADEVICE FOR RELEASING CLOSURES

The invention relates to a device for releasing or removing closures. In particular, the invention relates to such a device for releasing screw tops or caps from sealed containers such as bottles, jars and the like.

Devices for this purpose are known, but none is wholly satisfactory. Some known devices cannot withstand a high release force. Some known devices are assembled from many components which increases costs in manufacture and the risk of damage. Some known devices must be adjusted by hand for each size of closure to be released.

It is one object of this invention to provide a device for the purpose specified which is easy to assemble, can accept a wide range of sizes of closures to be released without adjustment and which can withstand a high release force.

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According to this invention there is provided a device for releasing a closure (L), the device comprising a sliding surface (33, 39) which extends in a curve of gradually increasing radius away from a gripping surface (G), the opposed surfaces (33, 39: G) defining a space to receive in wedging manner the closure (L) to be released characterised in that a deformable body (34, 34A) is present behind the gripping surface (G), the body 34, 34A) being arranged to be deformed upon engagement of the device with the closure (L), limiting means (36, 55) being present to limit the extent of deformation of the body (34, 34A).

Preferably, the gripping member body is located mounted on an anchor having ribs or spokes received within the body, the effect of which is to define compartments to contain material under deformation. Most preferably the ribs do not reach the periphery of the body, so that the peripheral portion is more free to move circularly under load, and will tend to be urged circularly and away from the anchor when a rotational load is applied to the body.

The body may be formed of any suitable deformable or resiliently deformable material having or provided with a surface to define the gripping surface. The body may be made of a natural or synthetic rubber, optionally loaded with a filler or provided with a high friction coating. Suitable synthetic rubbers include 1, 3- butadiene rubber, styrene butadiene rubber, neoprene rubber, butyl rubber, nitrile rubber, polybutadiene rubber, polyisoprene rubber, and the like.

The device of the invention can be incorporated in a tool such as a wall mounted tool or a handtool. Preferably the device is incorporated in a handtool intended for domestic use, especially in the kitchen, and made of materials which are non-toxic (for the release of lidded containers having foodstuffs) and which are temperature resistant (so that the handtool can be cleaned in an automatic dishwasher).

Although the invention is primarily for the release of lids from containers, especially screw threaded lids, it can of course be used to release nuts from threaded bolts and for similar purposes.

The invention further includes in another aspect, a device for releasing closures of a range of different diameters, the device comprising a body having two sliding surfaces extending in a curve of increasing radius from a gripping surface, one sliding surface being closer to the gripping surface than the other, each sliding surface defining with the gripping surface a space to receive in wedging manner the closure to be released.

In order that the invention may be well understood it will now be described with reference to the accompanying diagrammatic drawings, in which

Figure 1 is a top plan view of one handtool incorporating a release mechanism of the invention;

Figure 2 is an underside plan view of the handtool of Figure 1;

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Figure 3 is a cross section taken on lines III-III on Figure 1 drawn to an enlarged scale;

Figures 4A to 4C show the condition of the gripper member of the handtool of Figures 1 to 3 drawn to a much enlarged scale and under different loads; and

Figure 5 shows an exploded view of part of another device of the invention.

The handtool of Figures 1 to 4 comprises a one piece plastics moulded body 30 having a handle portion 31 and a head portion 32. The head portion 32 includes an engagement member in the form of a smooth wall surface 33 (Figure 2) arranged along a spiral or curve of gradually increasing radius and ending at an edge 44 adjacent the handle portion 31. At the end of the wall 33 remote from the handle portion 31, the top end as seen in Figure 2, there is a gripper member comprising a cylinder like body 34. The body is formed of a resiliently deformable material such as neoprene rubber and presents a gripping surface G. The floor 41 of the body 30 has an upstanding peg 35 (Figure 3) having a number of ribs or spokes 36. The cylindrical body 34 has a socket of complementary form and is press fitted on to the peg 35 to mount the gripper member 34 on the tool at the adjacent end of the engagement member wall 33. The cylinder 34 includes a tail portion 37 which is abutted against the adjacent free end of the wall 33. A portion 38 of the floor 41 of the head portion 32 is depressed to form an inner spiral wall surface 39. The cylinder 34 extends down into the depressed

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portion 38 to lie within the spiral 39. A slot 40 is present in the depressed portion 38 within the spiral 39. The top surface of the head portion 32 incorporates an arrowhead 42 (Figure 1) to show the direction of rotation to release a lid, and the top and bottom surfaces of the handle portion 31 include finger gripping rib portions 43.

In the use, the handtool is held by the gripping portions 43, top side up, and is brought to say a relative large container to be opened and the lid L (say a screw threaded jam jar lid) enters the space between the gripper body tail 37 and the spiral wall end 44. The lid L slides along wall surface 33 until it contacts that one surface on one side and the surface of the gripper body 34 on the other. The user can see the position of the lid L through the slot 40. The user then holds the container steady in one hand and then rotates the handtool in the direction of the arrowhead 42.

The condition of the body 34 in the absence of a lid L to be released is shown in Figure 4A. As the lid L is guided between the wall surface 33 and the body 34 the lid first tends to deform a peripheral portion of the body 34, and to the condition shown in Figure 4B. The rotational force in direction A tends to urge the material of the body in that direction. On continued rotation of the handtool the body tends to act as a pivot and the material of the body is compressed further, and to the condition shown in Figure 4C. The material at the peripheral portion of the body is deformed by the stresses and is caused to flow circularly in the direction of the arrow B1 towards the tail portion 37. Material within the body and closer to the centre is caused to flow in

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the direction of the arrows B but is constrained in the spaces between adjacent ribs 36, so that the total load imposed radially on the peg 35 is less than the force which will break the connection between the body 34 and the floor 41. In this way the body is held secure to the tool no matter how great a force is required to release a lid from its container. The body has all round deformability.

Where the lid to be removed is smaller eg. the top of a bottle of nail varnish, a pillbox or the like the lid L is received in the gap between the gripper member and the wall 39 of the inner spiral. The lid is then released in the way described.

In the embodiment of Figure 5, the deformable body 34A is secured to the moulded body 30A of the device in a different way. The deformable body 34A comprises a cylinder 50 of rubber or the like having a through hole 51. The lower portion 51A of the hole is of D cross sectional shape to complement and receive a boss 52 present in the side wall of the body 30A. The upper portion 51B of the hole is of circular cross sectional shape and has an axial slit 53 in the side wall of the body 34A. A metal strap 54 defines the sliding surface equivalent to sliding surface 33 of Figures 1 to 4 and extends through the slit 53 and ends in a loop 55 which is received in the upper portion 51B. A spigot 56 stands on the boss 52. A plug member 57 having a head 58 and a depending shank 59 including a socket 60 to receive the spigot 56 is received in the top portion of the deformable body 34A so locking the strap 54 to the body 34A and to the body 30A. The exterior of the deformable body 34A includes shoulders 61, 62 to be abutted against complementary shoulders

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63, 64 on the body of the device. In this way the deformable body is locked to the device in a way to resist separation and high removal forces. The loop of the metal strap limits deformation of the cylinder. The remote end of the strap 54 may be anchored to the handle tool handle by means not shown.

It will thus be seen that the invention provides an effective handtool which is versatile in being able to release a wide range of lids and having a securely mounted gripper member which is able to withstand high loads by virtue of the way in which the body thereof is anchored and deforming loads are dissipated; the user can see the location of the lid in the handtool; and the handtool is safe for use with foodstuffs.

The invention is not limited to the embodiment shown. The device mechanism may be used in a manual or power tool to release nuts from bolts, or in a wall mounted support. More than two spirals may be present and each may have an individual gripper member. The gripper member need not be circular and the mounting means may be different from that shown.

CLAIMS

1. A device for releasing a closure (L), the device comprising a sliding surface (33, 39) which extends in a curve of gradually increasing radius away from a gripping surface (G), the opposed surfaces (33, 39: G) defining a space to receive in wedging manner the closure (L) to be released characterised in that a deformable body (34, 34A) is present behind the gripping surface (G), the body (34, 34A) being arranged to be deformed upon engagement of the device with the closure (L), limiting means (36, 55) being present to limit the extent of deformation of the body (34, 34A).
2. A device according to Claim 1 characterised in that the gripping surface (G) is defined by a surface of the deformable body (34, 34A).
3. A device according to Claim 2 characterised in that the body (34, 34A) is formed of a rubber.
4. A device according to Claim 1, 2 or 3 characterised in that the body (34) is mounted on an anchor (35) defining limiting means (36) to confine the deformation of the body (34) under a deforming load.

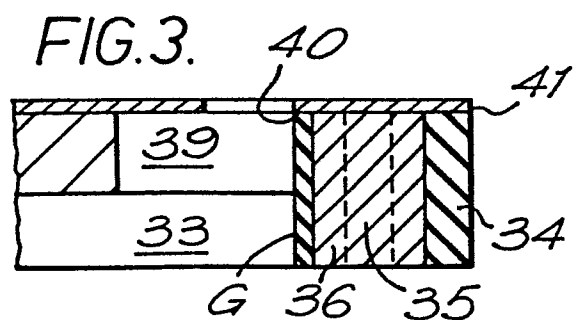
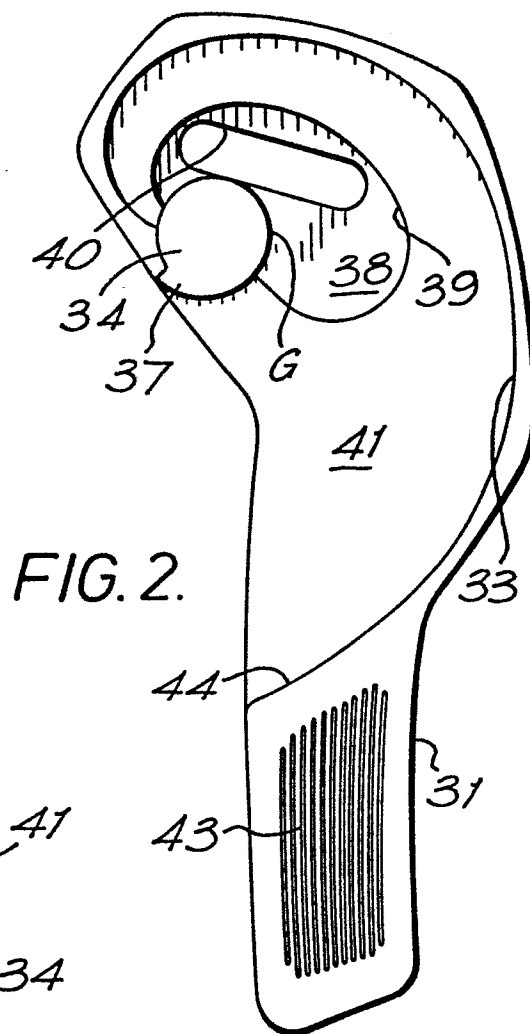
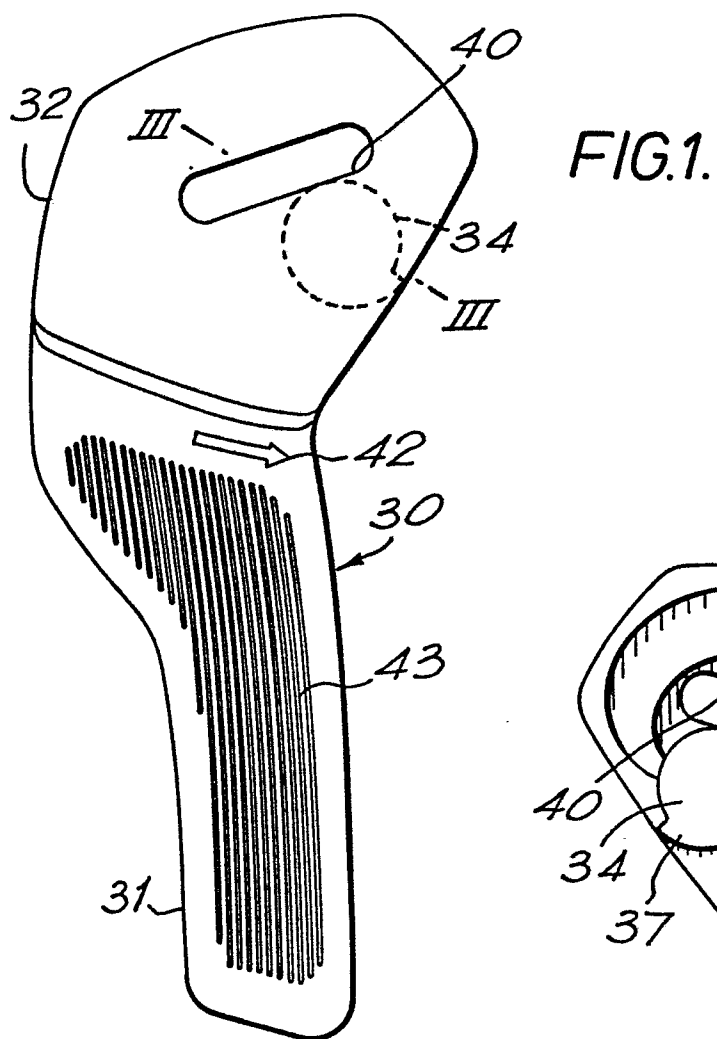
5. A device according to Claim 4 characterised in that the anchor (35) has radial ribs (36) which define internal barriers to deformation of the body (34).
6. A device according to any of Claims 1 to 3 characterised in that the body (34A, Figure 5) contains an end portion (55) of a metal strap (54) defining the sliding surface (33).
7. A device according to any preceding Claim characterised in that the device is a one piece moulding (30) arranged to receive and engage the deformable body (34, 34A).
8. A device according to any preceding Claim characterised in that the sliding surface (33, 39, 54) is smooth.
9. A device according to any preceding Claim characterised in that two walls (33,39) each having a curve of gradually increasing radius extends from the body (34), one curve being closer to the body (34) than the other.
10. A handtool for use in releasing a lid (L) from a sealed container, the handtool comprising a handle portion (31) and a head portion (32), the head portion (32) including a sliding surface (33) and a gripping surface (G), the opposed surfaces defining a space to receive in wedging manner the lid to be released characterised in that the gripping surface (G) is present on a deformable body (34) mounted in the head portion

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(32) of the handtool (30), the body (34) being located at or adjacent one end of two sliding surfaces (33, 39) which extend along a curve of gradually increasing radius, one curve (39) being closer to the body (34) than the other (33), the body (34) being engaged with an anchor (35) present on the head portion (32), the anchor including radial ribs (36) extending into the body (34).

11. A handtool according to Claim 10, characterised in that a slot (40) is present in the floor (41) of the handtool (30) so that a user may see that a lid (L) is present between the gripper body (34) and a facing wall surface (33, 39).
12. A handtool according to Claim 10 or 11 characterised in that it is formed of non-toxic and temperature resistant materials.
13. A device for releasing closures of a range of different diameters, the device comprising a body (30) having a sliding surface (33) which extends in a curve of increasing radius from a gripping surface (G), the opposed surfaces (33, G) defining a space to receive in wedging manner a closure (L) to be released characterised in that a second sliding surface (39) extends in a curve away from the gripping surface (G).
14. A device according to Claim 13 characterised in that the second curve (39) is closer to the gripping surface (G) than the first one (33).



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FIG. 4A.

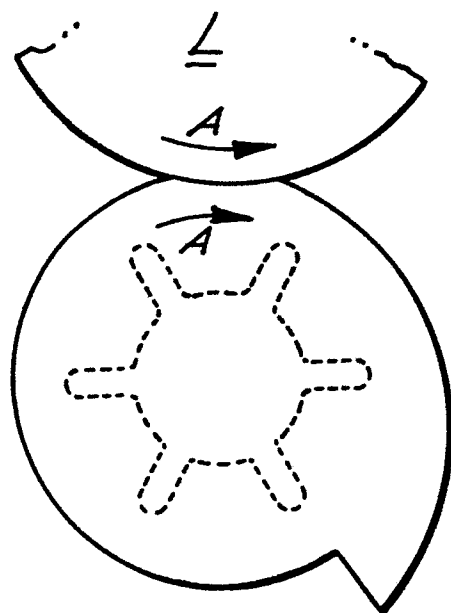
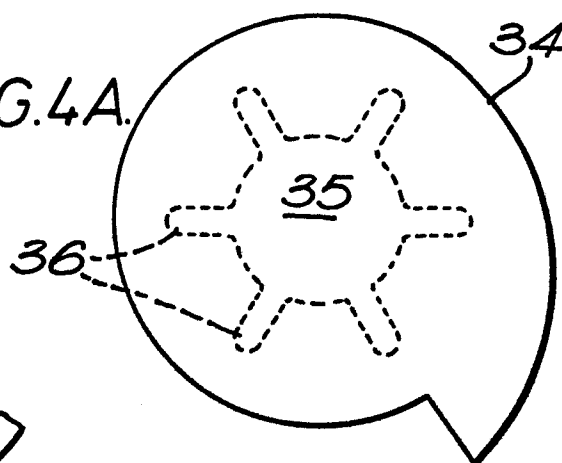
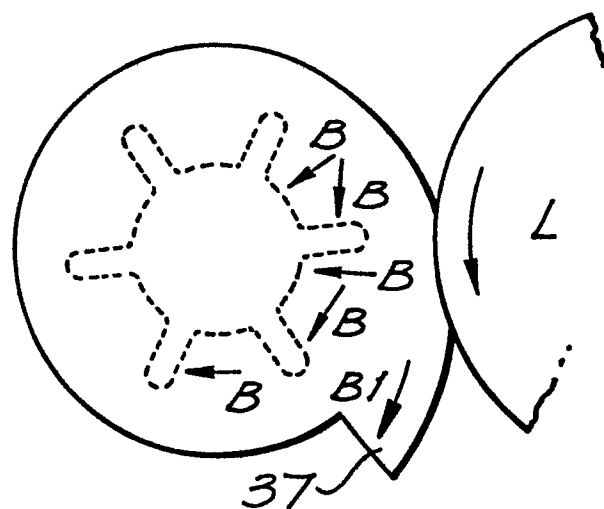


FIG. 4B.

FIG. 4C.





European Patent
Office

EUROPEAN SEARCH REPORT

0246023

Application number

EP 87 30 4030

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
Y	DE-U-7 525 076 (FELLER) * Whole document *	1-4,7-8	B 67 B 7/18
A	---	10-13	
Y	DE-A-2 138 761 (COBARG) * Figure 5; page 6, paragraph 3 *	1-4,7,8	
A	--- US-A-4 262 560 (HOFFBERGER) * Figure 2; column 4, lines 10-25 *	1-3,13	
A	--- US-A-2 761 337 (DANIEL) * Figure 6 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	--- US-A-4 178 732 (PFLEGER) * Figure 13; column 4, line 62 - column 5, line 38 *	1	B 67 B B 25 B
A	--- US-A-1 354 722 (BOWEN)		
A	--- GB-A- 174 844 (HOFFMANN) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 22-07-1987	Examiner CARMICHAEL D.G.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			