Dec. 10, 1935. W. QUALEY 2,023,975

GRIPPING DEVICE

Filed Sept. 27, 1932

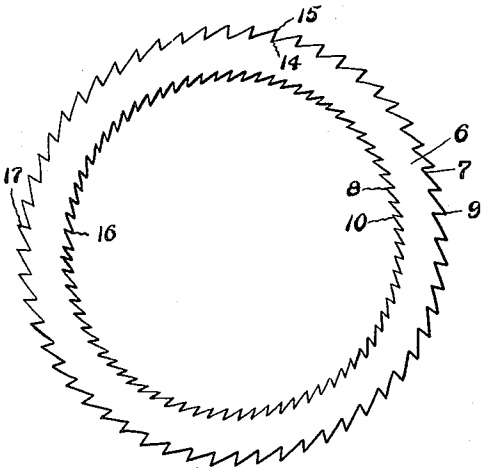


Fig. 1.

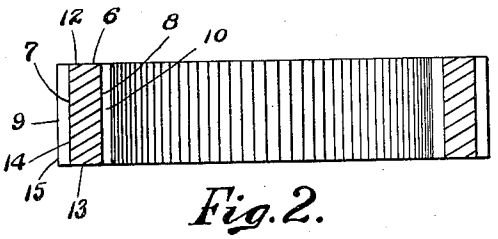


Fig. 2.

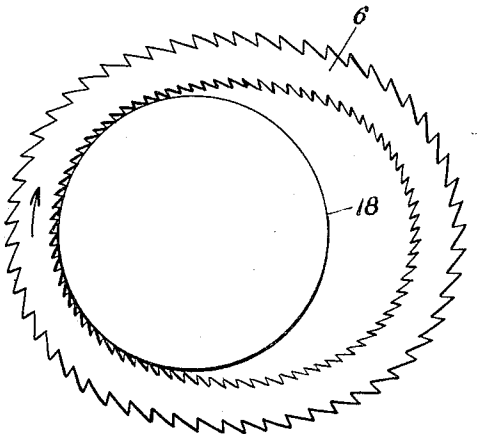


Fig. 4.

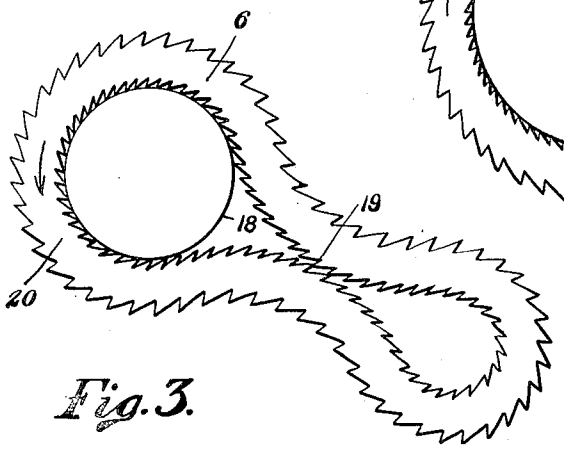


Fig. 3.

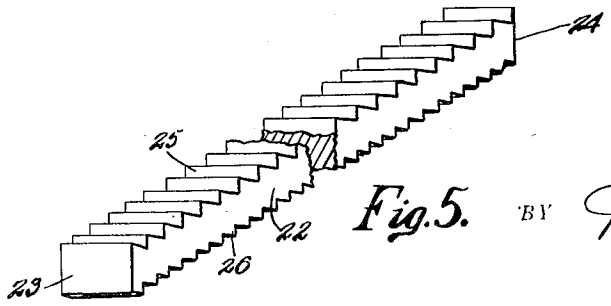


Fig. 5.

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GRIPPING DEVICE

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Application September 27, 1932, Serial No. 635,099

5 Claims. (Cl. 81—3.1)

This invention relates to a gripping device such as may be used in tightening or loosening fruit jar lids and lids of other types of containers, or for rotating relatively any two connected members one or both of which is capable of being accommodated by a gripper, or grippers, such as is set forth herein.

An object of the invention is to provide a simple, inexpensive, non-metallic device of the character above referred to which may be formed of a single piece of material.

Another object is to provide a flexible gripping device of the character stated, which may readily be turned inside out, so as to afford two complete gripping surfaces that may be made either identical or varied in character for the accommodation of different objects to be gripped.

Another object is to provide a flexible ring-shaped gripping device which is of great utility, this being due to its ability to grip various objects within a wide range of sizes.

These and other objects are attained by the means described herein and disclosed in the accompanying drawing, in which:

Fig. 1 is a plan view of the device of the invention.

Fig. 2 is a cross sectional view taken diametrally of Fig. 1.

Figs. 3 and 4 are views showing the device applied to objects considerably smaller in diameter than the central opening of the device.

Fig. 5 shows a modified form of the device.

The device of the invention is constituted of a ring 6 of soft, flexible, and preferably resilient material such as soft rubber or other material having the necessary characteristics for proper performance in a manner to be explained. The flexible ring preferably is made rectangular or oblong in cross section, so that the ring readily may be turned inside out in much the same manner as can a flat pulley-driving belt of a machine. The opposed working faces 7 and 8 of the ring are serrated as shown, to provide a series of spaced parallel saw-tooth elements 9 and 10 which extend transversely of the device in the general direction of its axis, or, in other words, from the side face 12 to the opposite side face 13. The saw tooth elements preferably are of greater length than their depth, the length thereof being measured by the distance from face 12 to face 13, and the depth being the distance from the base 14 to the top 15 of each saw tooth element. The tangential or inclined face of each tooth will be considered the back of the tooth.

Although in the preferred construction the serrations are in a form simulating saw teeth, it is by no means to be understood that the invention is to be limited to that type of serration. Serrations formed by transverse cuts or ribs of practically any cross-sectional contour will be found to perform with varying degrees of satisfaction.

When the saw tooth form of serration is employed, it is preferable to have the inner teeth and the outer teeth extended in substantially opposite directions, for example, tooth 16 of Fig. 1 is extended downwardly and inwardly, whereas the oppositely disposed tooth 17 is extended upwardly and outwardly. When the ring of Fig. 1 is turned inside out, the tooth 16 will naturally extend outwardly and downwardly, while the tooth 17 will be extended inwardly and upwardly. The teeth interiorly of the ring may be either the same size as the exterior teeth, or they may be of a different size, i. e., they may be either larger or smaller.

If it be assumed that the device of Fig. 1 is encircling a large container cap having the usual right-hand thread, the inner teeth 16 will tenaciously grip the cap when the device is rotated, by means of the operator's hand, in the counter-clockwise direction of rotation, while at the same time the outward reversed disposition of the outer teeth insure a maximum gripping action upon the operator's hand. To use the device of Fig. 1 for tightening the lid, instead of loosening it as in the foregoing example, the device would be rotated a half rotation about a diameter thereof, i. e., turned upside down, so that the inner teeth extend in the direction (see Fig. 4) corresponding to the direction in which the device is to be rotated for tightening the right-hand threaded screw cap. Fig. 4 illustrates how the device may be applied to an undersized container cap, while Fig. 3 illustrates its application to a greatly under-sized cap or object to be rotated. Pressure of the operator's hand serves to maintain the inner teeth in substantial abutment upon the periphery of the object to be rotated, as is evident. In Figs. 3 and 4, the character 18 indicates a jar lid, container cap, or other object to be forcibly rotated.

From the foregoing it should be evident that either surface 7 or 8 may be used in the tightening or loosening operation, and that upon the wearing out of one of such surfaces the other may be used for gripping the object to be rotated. Furthermore, either surface may be chosen for use at will, because the ring may readily be turned inside out to afford a substantially circular cylinder for reception of a lid, cap, or the like.

By referring to Fig. 3, it will clearly be understood that the inner teeth may be caused to lock or engage at the location 19, when a small diameter object is operated upon, thereby aiding in keeping the loop portion 20 in tight abutment upon said object 18 while rotational force is applied thereto.

Although the device, in practice, preferably is made in a size such as will snugly receive therein the lid of an ordinary fruit jar cap, it may be made in other sizes as well. The device has the advantage that it may satisfactorily be used on caps or rotatable objects much smaller than the fruit jar lid, and may in fact be used to loosen tightly corroded fountain pen parts and the like. The device is sufficiently pliable to permit free distortion for forming a very narrow elongated oval, as will be evident from the illustration of Fig. 3. Inasmuch as the device of the invention is merely a short section of a longitudinal tube having the proper interior and exterior wall formation, its manufacture is seen to require only the simplest of molding and severing operations.

In accordance with the disclosure of Fig. 5, the gripping device is constituted of a length of pliable rubbery material which is not made into ring formation. In this modification, the length of material 22 is merely looped about an object to be gripped, in the manner of Fig. 3, with the opposite free end portions 23 and 24 held in the user's hand. The gripping surfaces or teeth 25 and 26 correspond to the teeth or projections 9 and 10, respectively, of the device of Fig. 1. It is to be noted that the teeth are in the form of rip saw teeth, and they project in opposite directions, that is, the teeth 25 project outwardly and in the general direction of the end 23, while the teeth 26 project outwardly and toward the opposite end 24.

Although it is preferable to have the distance 12—13 greater than the distance 7—8, (Fig. 2) it is to be understood that these distances may be equal, or that distance 7—8 may exceed to some extent the distance 12—13, provided that the rubber of the device is soft enough to permit the ring to readily be turned inside out as above explained. It is to be noted that the ability of the ring to be readily turned inside out, and to maintain itself in such a condition, as a short cylinder, is made possible by fabricating the ring in such a manner that the large central opening thereof is perfectly cylindrical in shape and of a uniform diameter throughout its length.

What is claimed is:

1. A gripping device for rotating an object to be gripped, comprising an endless ring of soft rubbery material, said ring being oblong in cross-section rather than L or U shaped, so that it may readily be turned inside out, and serrations located inside and outside of the ring, the inner serrations being disposable outside of the ring when the ring is turned inside out, with the outer serrations disposable within the ring, whereby either the inner or outer serrations may be employed selectively to grip the object to be rotated.

2. A gripping device for rotating an object to be gripped, comprising a length of soft rubbery tubular material, said length of material being oblong in cross-section rather than L or U shaped so as to provide a central opening which is substantially cylindrical throughout its length, saw toothed projections extending from both the inner and outer faces of the tubular length of material, said saw toothed projections being long as compared with their depth, the projections on one face of the length of material being extended in a direction substantially opposite to that in which the other projections extend from the opposite face.

3. A gripping device for rotating an object to be gripped, comprising a cylindrical tube of soft and pliable rubber material, said tube being greater in width than in thickness and of oblong cross-sectional shape with the central opening thereof substantially uniform in diameter at all portions of its length, so that it may readily be turned inside out with the outer wide face thereof disposed to the inside while the inner wide face is disposed exteriorly of the tube, and saw toothed projections located both inside and outside of the tube, the projections inside the tube being extended in one general direction of tube rotation while the projections exteriorly of the tube are extended in substantially the opposite direction of tube rotation.

4. A gripping device for rotating an object to be gripped, comprising a serrated length of soft pliable material in which the serrations are in the form of saw teeth having their top edges projecting in a common direction toward one end of the length of material, to definitely interlock with each other when the length of material is doubled upon itself in contact.

5. A gripping device for rotating an object to be gripped, comprising a cylindrical shaped tube of soft pliable rubbery material, said tube being of a cross-section such that it may be readily turned inside out and remain in the turned condition with the outer face thereof disposed to the inside while the inner face is disposed exteriorly thereof, and saw-toothed projections located both inside and outside of the tube upon the inner and outer faces, the projections inside the tube being extended in one general direction of tube rotation while the projections exteriorly of the tube are extended in substantially the opposite direction of tube rotation.

WALTER QUALEY.