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June 4, 1935. A. F. THENER 2,003,983

WRENCH

Filed Sept. 28, 1932

Fig. 2.



Fig. 1.

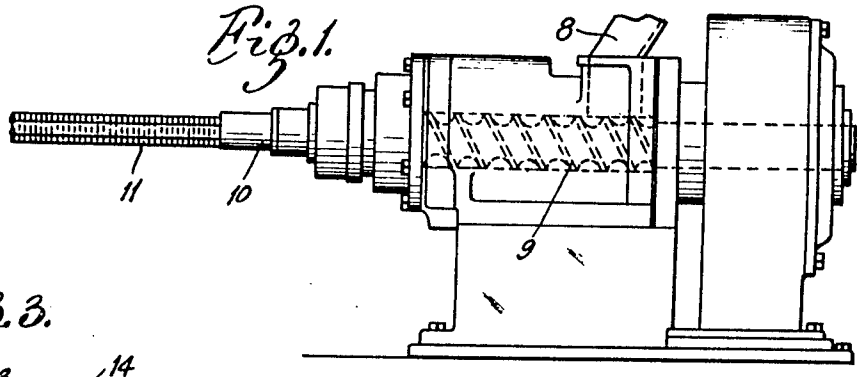


Fig. 3.

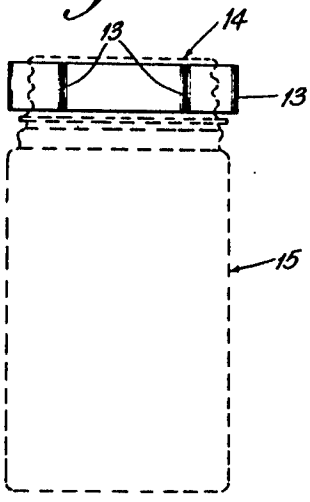


Fig. 4.

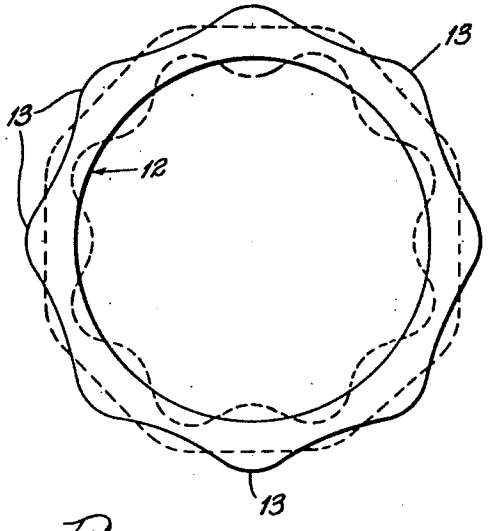


Fig. 5.

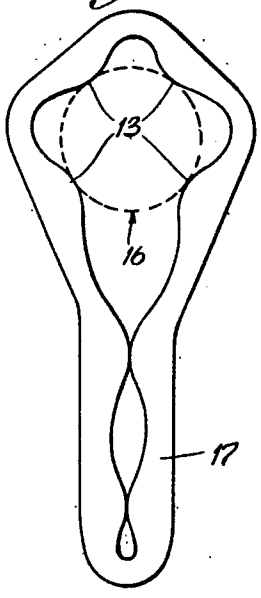


Fig. 6.

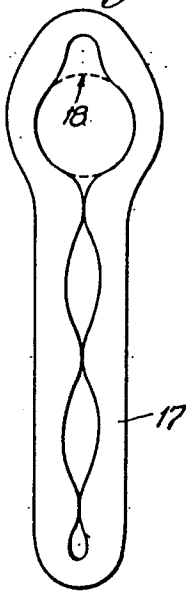
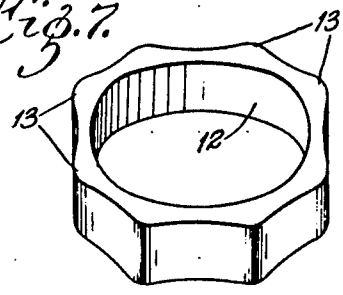


Fig. 7.



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UNITED STATES PATENT OFFICE

2,003,983

WRENCH

Arthur F. Thener, St. Louis, Mo., assignor to Cupples Company, Manufacturers, St. Louis, Mo., a corporation of Missouri

Application September 28, 1932, Serial No. 635,134

4 Claims. (Cl. 81—3.1)

This invention relates to wrenches. One of the objects is to produce a very simple and extremely inexpensive wrench having a high degree of efficiency in gripping and turning the articles to which it is applied.

Another object is to produce a simple wrench of this kind consisting of a single piece of material that can be easily and quickly contracted, reversed and otherwise deformed to grip and turn articles having various shapes and dimensions.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawing, wherein is shown the preferred embodiment of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claims hereunto appended.

To illustrate one form of the invention, I have shown a simple wrench in the form of a loop, made of rubber and having an inner gripping face to engage the article to be turned, and an outer hand-receiving face to be grasped in turning the wrench. This elastic wrench can be reversed to transpose its inner and outer faces, and such reversal reduces the internal diameter of the wrench.

Furthermore, the wrench can be quickly adjusted to firmly grip relatively small articles and the excess material then serves as a handle for the wrench.

The flexible rubber is strong and durable; it can be used for years in tightening jar and bottle caps to provide the desired hermetic seal, and thereafter employed to unscrew the tightened caps. The rubber wrench will not in any way injure the thin metal caps, and it can be adjusted in a manner hereafter described to tighten or loosen the caps of jars and bottles of any shape or size.

In addition to its use in opening and closing bottle and jar caps, the new wrench serves as a household tool for general use in turning other threaded articles varying from the size of a fruit jar cap to that of an ordinary lead pencil, and it can be used in opening plain tin caps, such as the caps of jelly glasses and baking powder cans. When applied to relatively small articles, the handle forms a lever which aids in turning, or prying, the article grasped by the inner face of the rubber tool.

Furthermore, the wrenches can be easily and quickly manufactured at a very low cost by merely forming a continuous rubber tube having the desired internal and external shapes and diameters, and then slicing the tube to produce a continuous series of complete wrenches, ready for service, and having all of the advantages herein set forth.

Fig. 1 is a side elevation of a mill adapted for use in making the wrenches.

Fig. 2 is an end view of the tube formed by the mill.

Fig. 3 is a side view of one of the wrenches applied to a fruit jar cap.

Fig. 4 is a top view on a larger scale showing how the simple wrench can be reversed to transpose its inner and outer faces and thereby reduce its internal diameter.

Fig. 5 shows how the wrench can be contracted to grip a relatively small article.

Fig. 6 is a similar view showing a still further contraction of the wrench and the elongated handle which is produced in deforming the wrench.

Fig. 7 is a perspective view of one of the wrenches in its free, or normal condition, as it appears when sliced from the rubber tube.

To illustrate one form of the invention I have shown a tube mill having a chute 8 for the delivery of plastic rubber compound to a rotary feed screw 9 which forces the plastic material through a tube-forming die 10 to produce a continuous tube 11.

After the plastic tube 11 is formed as shown in Figures 1 and 2, the rubber compound is vulcanized in any suitable manner (not shown) and the tube is sliced, as suggested by dotted lines in Fig. 1 to produce a continuous series of wrenches, each appearing as shown in Fig. 7. The vulcanizing operation may be performed either before or after the tube is sliced, but an advantage is gained by slicing the tube after vulcanization, as this tends to insure the desired accuracy and uniformity in the shape and dimensions of the wrenches.

When the flexible wrench is in its normal condition, shown by Fig. 7 and by full lines in Fig. 4, it has a smooth circular inner face 12 to grip the article to be turned, and a hand-receiving outer face provided with abutments 13 to be grasped in turning the wrench. Fig. 3 shows the wrench in this condition applied to the cap 14 of a fruit jar 15.

When the rubber wrench is in its normal condition, i. e. the condition in which it is manufactured, the rubber is free of tension, and the internal diameter of the wrench preferably con-

forms approximately to the external diameter of the standard size fruit jar cap.

However, the wrench herein shown can be very easily and quickly adjusted to receive articles of various shapes and dimensions. For example, to obtain a relatively slight reduction in the internal diameter of the rubber wrench, it is reversed to transpose its inner and outer faces, and it then appears as shown by dotted lines in Fig. 4. The rubber at the outer face of the wrench is thus placed under tension while the inner portion is subjected to compressive stresses which results in a reduction of the internal diameter. The wrench, while retaining a circular shape, is thus reduced to receive the caps of another popular size.

In tightening or loosening relatively small bottle caps, or other articles smaller than the diameters suggested by Fig. 4, the flexible wrench can be deformed as suggested by Figures 5 and 6.

In Fig. 5, the selected abutments 13, which normally lie at the exterior of the wrench, are frictionally engaged with a circular article 16, and the excess material provides a handle 17 which is grasped by the user to firmly force these abutments onto the article 16. At this time, if the wrench is subjected to severe stresses, the relatively thin rubber between said abutments 13 will be tensioned and slightly stretched, but this action will naturally lead the user to tighten the wrench, and the resultant tension will maintain the frictional contact at the gripping abutments 13. The extended handle 17 cooperates with the gripping elements to form a lever which aids in turning, prying, or otherwise manipulating the article 16.

Fig. 6 illustrates a further deformation to receive a smaller circular article 18, and it will be understood that this flexible wrench can be very readily deformed to grasp and turn other articles of varying shapes and dimensions. The deformed conditions suggested by Fig. 5 and Fig. 6 exist only while the wrench is grasped by the user. When released, the elastic tool will return to the condition shown by dotted lines in Fig. 4, and when restored to the normal condition shown by full lines in the same view, the rubber will be entirely free of tension.

To obtain all of these numerous adjustments, the wrench is preferably uniform in cross-section and devoid of reinforcing elements, or the like, that would impair the flexibility which is required to most effectively provide the desired variations. For example, the wrench herein shown has flat top and bottom faces duplicates of, and parallel with, each other; and these flat faces conform to the cross-section of the wrench at all planes between and parallel with said flat faces. It is true that the flat top and bottom faces include the ends of the projecting abutments 13, but these abutments extend entirely across the wrench, so the cross-section is substantially uniform throughout the entire width of the wrench. Such uniformity exists when the wrench is reversed as shown by dotted lines in Fig. 4, and also when it is deformed and contracted as suggested in Fig. 5 and Fig. 6.

A further advantage of this uniformity lies in manufacturing the wrenches, as all of the conditions herein described can be obtained by forming a continuous rubber tube having the required internal and external shapes and dimensions, and thereafter slicing the tube. The complete wrenches, ready for service, are thus produced very easily and at a very low cost.

I claim:

1. An adjustable wrench in the form of a ring made of elastic material having an inner face to engage the article to be turned and an outer face provided with abutments, said ring being reversible to transpose the locations of said inner and outer faces and at the same time reduce the internal diameter of the wrench, and said wrench being freely contractible when reversed, so as to force said abutments into gripping engagement with the article to be turned.

2. An adjustable wrench comprising a slice of rubber tubing in the form of a ring having an inner face to engage the article to be turned and an outer face provided with abutments extending from the top to the bottom of the wrench, said wrench having flat top and bottom faces including the ends of said abutments, said flat top and bottom faces being duplicates of each other and substantially uniform with the cross-section of the wrench in all planes between and parallel with said faces, said wrench being reversible to transpose said inner and outer faces and at the same time reduce the internal diameter of the wrench, and said wrench when reversed being freely contractible to force selected portions of said abutments onto the article to be turned and provide an extended handle for the wrench.

3. An adjustable wrench comprising a slice of elastic rubber tubing in the form of a ring having an inner face to engage the article to be turned and an outer face, one of said faces being provided with projecting portions extending from the top to the bottom of the wrench, said wrench having substantially flat top and bottom faces including the ends of said projecting portions, said top and bottom faces being approximately duplicates of each other and substantially uniform with the cross-section of the wrench in all planes between and parallel with said faces, said wrench being reversible to transpose said inner and outer faces, and said wrench being freely contractible to force one of said faces onto the article to be turned and provide an extended handle for the wrench.

4. A reversible elastic wrench in the form of an endless ring made of rubber having inner and outer faces adapted to engage the article to be turned, said ring being reversible to transpose the locations of said inner and outer faces, so that either of said faces may be selectively employed as a gripping face to engage the article to be turned, one of said faces being provided with gripping abutments adapted to engage the article to be turned, and said wrench being freely contractible to force selected portions of said abutments onto the article to be turned and at the same time provide an extended handle for the wrench.

ARTHUR F. THENER.