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PLIER AND WRENCH TOOL

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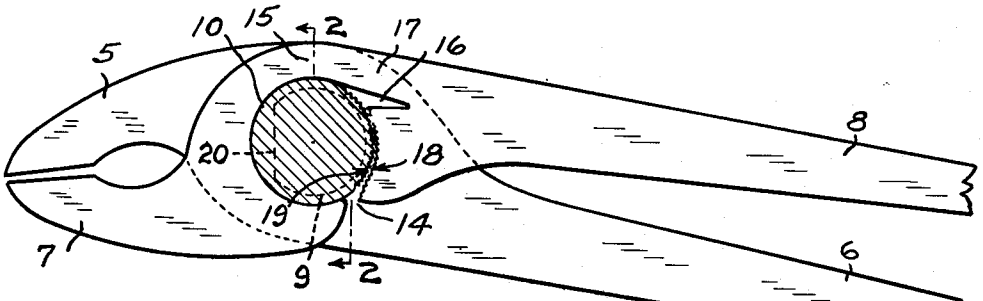


Fig. 1

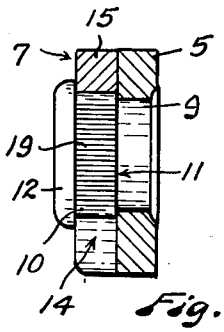


Fig. 2

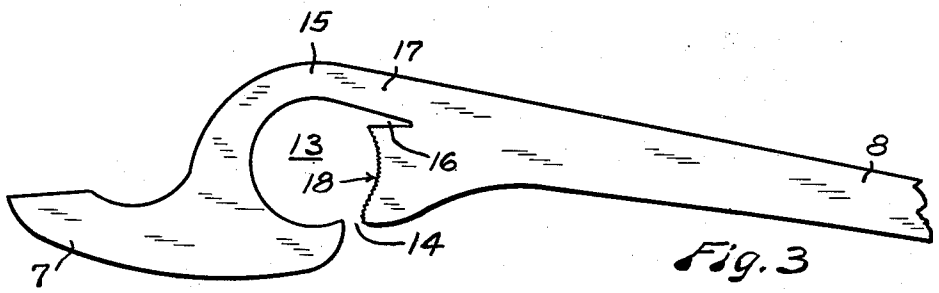


Fig. 3

INVENTOR.
Louis E. Peterson
BY Fred C. Matheny
ATTORNEY

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PLIER AND WRENCH TOOL

Louis E. Peterson, Seattle, Wash.

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4 Claims. (Cl. 81—49)

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This invention relates to a plier and wrench tool and an object of this invention is to provide a plier type tool which is well adapted for use as a wrench.

Another object is to provide a plier type tool constructed so that the application to the handle portions of the tool of a force tending to tighten the jaws of the tool on a nut will produce a binding or clamping action in the fulcrum of the tool tending to lock together the two parts of the tool so that the jaws will not spread apart when torque is applied to turn the nut.

Another object of this invention is to provide a plier type tool in which a fulcrum member of relatively large diameter is rigid with one jaw and handle part of the tool and pivotally supports a second jaw and handle part and in which a ring shaped portion of the second jaw and handle part fits over and extends around the fulcrum member and is split by a slot which is positioned so as to cause said ring shaped member to tighten upon and frictionally engage and grip the fulcrum member when the jaw parts of the tool are applied to a nut and a squeezing force is exerted on the two handle parts of the tool.

Another object is to provide a pliers type tool of this type in which two cooperating parts of a fulcrum member and a jaw and handle member which grips the same are serrated or notched to cause them to more firmly lock together when subjected to pressure.

Other objects of this invention will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a fragmentary view in side elevation, with a fulcrum member shown in section, of a plier type tool constructed in accordance with this invention.

Fig. 2 is a view partly in cross section and partly in elevation taken substantially on broken line 2—2 of Fig. 1 and showing the pivot structure or fulcrum means of the pliers.

Fig. 3 is a detached fragmentary view in elevation of one jaw and handle part of this tool.

Like reference numerals indicate like parts throughout the several views:

In the drawings 5 and 6 indicate the jaw member and the handle member respectively of one part of a pliers type tool and 7 and 8 indicate the jaw member and the handle member respectively of another or second part of said tool.

A pivot member consisting of a shank 9 and a fulcrum portion 10 of larger diameter than the shank 9 is rigidly secured to the jaw and handle

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part 5—6 of the tool. The shank 9 is preferably non-circular in cross sectional shape and is seated in a correspondingly shaped hole in the part 5—6 of the pliers. For instance, this shank 9 may have one flat side as indicated by 20 in Fig. 1 or it may be square in cross section or otherwise shaped to prevent it from rotating in the pliers part 5—6. A shoulder 11 is provided at the junction of the shank 9 and fulcrum member 10 and a head 12 is provided on the end of the fulcrum portion 10.

The jaw and handle part 7—8 has a cylindrical opening 13 therein which fits over and extends around the fulcrum member 10. The ring shaped band of metal surrounding the opening 13 and which fits over the fulcrum member 10 is split by providing therein a notch 14 which extends from the opening 13 to the outer wall of the said ring shaped metal band. This makes possible a limited amount of expansion and contraction of said ring shaped metal band so that it may be caused to grip or to release the fulcrum member 10. The notch 14 is positioned relative to the fulcrum member 10 at a point opposite to the side of said fulcrum member against which pressure will be exerted by tool part 7—8 when a squeezing force is applied to the handles of the tool. Thus the position of the notch 14 relative to the fulcrum member 10 is such that said notch will tend to close when the tool is applied to a nut and the handle member 8 is pressed toward the handle member 6. The metal band which extends around the fulcrum member 10 has a section 15 of maximum resilience positioned approximately diametrically opposite to the notch 14. A major portion of the flexing or spring action occurs in this section 15. Preferably this metal band or ring part which extends around the fulcrum member 10 has another notch 16 provided therein with its inner end registering with the opening 13 and its general longitudinal direction approximately parallel to the handle member 8. The notch 16 is positioned approximately tangent to the inner wall of the resilient part 15 and cooperates to form, in prolongation of the resilient metal part 15, a second resilient part or section 17 which is of somewhat greater cross sectional area and slightly less resiliency than the section 15. The section 17 will not flex much until after the section 15 has been brought into firm contact with the fulcrum member 10 but after section 15 has firmly contacted fulcrum 10 some flexing may occur in the section 17.

A portion of the wall of the circular opening 13 which lies between the notches 16 and 14 prefer-

ably, but not essentially, has transverse serrations or teeth 18 formed therein and the opposed peripheral portion of the fulcrum member 19 has similar serrations or teeth 19 for cooperation with the teeth 18.

In the operation of this tool, when the jaws of the same are applied to an object such as a nut and a squeezing pressure is exerted on the handle parts 6 and 8, the portion 15 of the jaw and handle member 7—8 will first flex and the smooth or non-serrated ring like part thereof will tighten on and firmly grip the fulcrum member 19. After this clamping action has taken place further application of a squeezing force will tend to flex the resilient section 17 and bring the serrated part 18 into firm engagement with the serrated part 19 thus substantially locking the two parts of the tool against relative angular movement. The clamping or locking action initially produced by squeezing together the handle members 8 and 6 will be increased by the application to said handle members of a torque force tending to turn the nut and the clamping or locking action will vary directly with the amount of torque force applied. This clamping action in the fulcrum of the tool resists the tendency of the jaw parts to spread apart and greatly increases the utility of the pliers for use as a wrench. Thus a person who is using this tool on a nut can exert sufficient squeezing force to bring the two serrated surfaces 18 and 19 firmly together and after this has been done can apply torque to the nut without substantially increasing his squeezing force on the handle members and without danger of the jaws spreading apart and slipping on the nut. When the plier member 7, 8 is clamped on the fulcrum 19 the forces tending to spread the jaw 7 away from the jaw 5 will be borne as a tension by the resilient parts 15 and 17 and as these parts 15 and 17 do not appreciably yield under tension there will not be any objectionable spreading movement of the jaw member 7 away from the jaw member 5. The provision, in this tool, of the fulcrum clamping or locking means makes the tool more efficient than ordinary pliers for use as a wrench and further makes it easier to use as it requires less strain on the hand and wrist of the user.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of this invention but it will be understood that changes in this tool may be made within the scope and spirit of the following claims.

I claim:

1. In a plier type tool, a one piece jaw and handle member; a fulcrum member rigid with said jaw and handle member and extending sidewise therefrom; and another jaw and handle member having a cylindrical opening forming a ring shaped bearing portion fitting over and pivotally mounted on said fulcrum member, said ring shaped bearing portion being split to provide for expansion and contraction of the same, whereby said ring shaped bearing portion is adapted to grip said fulcrum member in response to the exertion of squeezing pressure on the handle portions of said two jaw and handle members.

2. In a plier type tool, a one piece jaw and handle member; a fulcrum member of relatively large diameter rigid with said jaw and handle member and extending sidewise therefrom; and another one piece jaw and handle member having therein a cylindrical opening forming a resilient ring shaped bearing portion which extends around and is pivotally mounted on said fulcrum member, said ring shaped bearing portion having a notch extending through its wall from inside to outside thereof providing for expansion and contraction of said ring shaped bearing portion, said notch being positioned at one side of the general longitudinal axis of said jaw and handle member, whereby exertion of squeezing force on said two handle portions tightens said ring shaped bearing portion on said fulcrum member.

3. The apparatus as claimed in claim 2 in which serrations are provided in the internal annular wall of said ring shaped bearing portion on the side thereof toward the handle part of the jaw and handle member and in which cooperating serrations are provided in the opposed circumferential wall portion of said fulcrum member.

4. In a plier type tool, a one piece jaw and handle member; a fulcrum member of relatively large diameter rigid with said jaw and handle member and extending sidewise therefrom; and another one piece jaw and handle member having a cylindrical opening forming a resilient ring shaped bearing portion which extends around and is pivotally mounted on said fulcrum member and having a notch extending through the wall of said ring shaped bearing portion; from inside to outside thereof providing expansion and contraction of said ring shaped bearing portion, said notch being positioned at one side of the general longitudinal axis of said last mentioned jaw and handle member whereby maximum flexing of said ring shaped bearing portion will occur in a section of the same substantially diametrically opposite to said notch and said last mentioned jaw and handle member having a second notch in said ring shaped bearing portion extending from said circular opening toward the handle portion and substantially tangent to the inner wall of the part of said ring shaped bearing portion where maximum flexing occurs, said second notch forming in said ring shaped bearing portion a second resilient portion of greater stiffness than said first mentioned resilient portion, said ring shaped bearing portion having between said two notches a fulcrum engaging portion which presses against said fulcrum member by flexing of said resilient portions.

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