May 21, 1968 W. R. VONDRACHEK 3,383,963

PIVOTED GRIPPING TOOL HAVING REMOVABLE SWIVELLY MOUNTED JAWS

Filed March 3, 1967

Fig. 1.

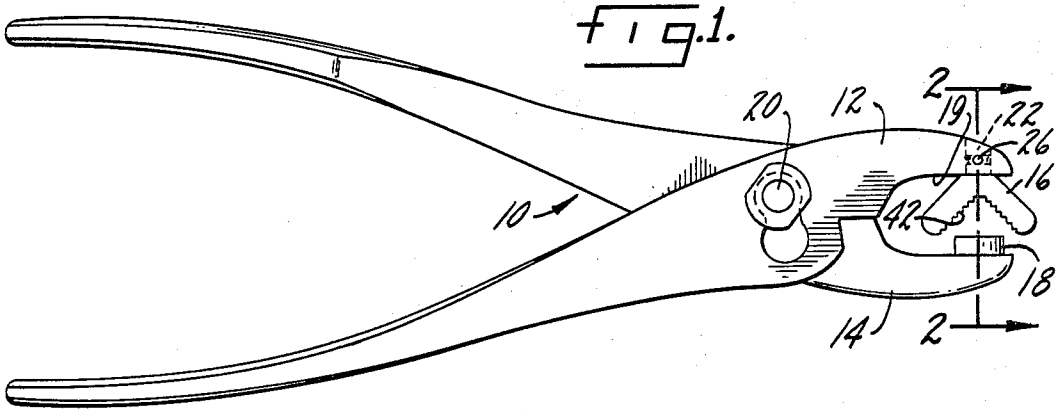


Fig. 2.

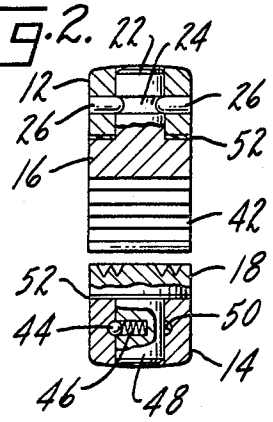


Fig. 3.

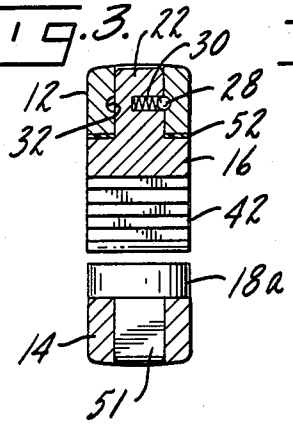


Fig. 5.

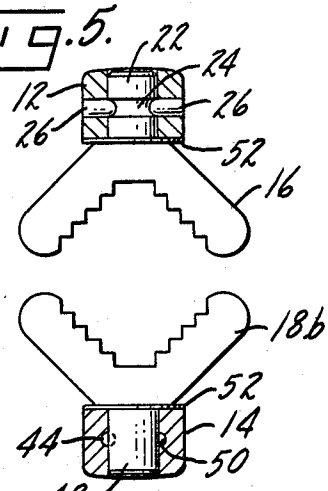


Fig. 4.

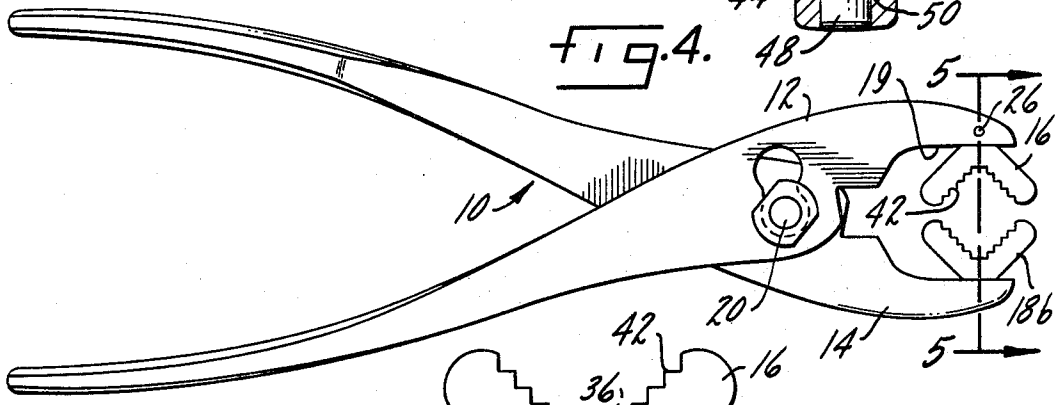


Fig. 7.

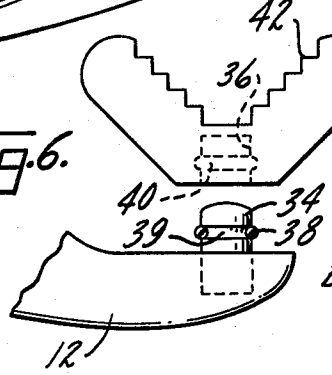
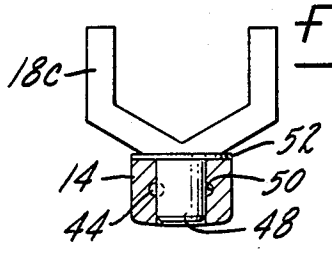


Fig. 6.



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PIVOTED GRIPPING TOOL HAVING REMOVABLE SWIVELLY MOUNTED JAWS

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ABSTRACT OF THE DISCLOSURE

A gripping tool for obtaining a tight purchase on an object from any given angle, said gripping tool having a pair of movable jaw arms with a supplemental jaw swivelly mounted within one of the jaw arms and a bearing surface mounted within the other jaw arm.

This invention relates to improvements in a gripping tool and more particularly, to improvements in a tool or instrument for holding, twisting or turning an object from any accessible angle.

Accordingly, a primary object of this invention is a gripping tool with a swivelly mounted supplemental jaw that is pivotal about an axis at substantially right angles to the gripping face of the jaw arm within which it is mounted.

A further object is a gripping tool that will grasp any given object from any accessible angle and not release or slip off the object during work.

Another object is a versatile gripping apparatus that is not limited in size and is adaptable to a variety of uses in such fields as mechanics, construction or dentistry.

Another object is a gripping tool or instrument with a 3-point contact that provides a tight purchase while holding, twisting or turning an object.

Another object is a gripping tool that is economical and easy to construct with removable parts that may be quickly and easily interchanged.

Other objects will appear from time to time in the ensuing specification and drawings in which:

FIGURE 1 is a top view of a preferred embodiment of this invention;

FIGURE 2 is an enlarged sectional view taken along line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view similar to the cross-section shown in FIGURE 2 showing another modification of this invention;

FIGURE 4 is a top view of another form of the gripping tool;

FIGURE 5 is an enlarged sectional view taken along line 5—5 of FIGURE 4 showing the supplemental jaw and bearing surface in an alternate position;

FIGURE 6 is an enlarged view of another form of the bearing surface; and

FIGURE 7 is an enlarged partial view of another modification of this invention.

The gripping tool **10** consists of three basic parts: a pair of movable jaw arms **12** and **14**, a supplemental jaw **16** swivelly mounted in one of the jaw arms, and a bearing surface **18** mounted in the other jaw arm. The swivelly mounted supplemental jaw **16** is in opposed relationship with the bearing surface **18**, and is pivotal about an axis at substantially right angles to the gripping face **19** of its respective jaw arm.

The jaw arms **12** and **14** are movable so that they may be quickly and easily opened and/or closed about an object, and are shown in the figures as pivotal about a pivot point **20**. However, it is important to note that the jaw arms may be opened and closed by any suitable means such as by use of a worm gear and rack.

The swivelly mounted supplemental jaw **16** may be attached, mounted or seated within its respective jaw arm **12**, and may include a rounded shank portion **22** as shown in FIGURES 1 through 6. The shank portion **22** may include a circumferential groove **24** as shown in FIGURES 2 and 5. The rounded shank portion **22** may be held in place by one or more press fit pins **26** that will allow the supplemental jaw **16** to freely pivot or rotate about an axis substantially perpendicular to the gripping face **19** of the jaw arm **12**.

Another method of mounting the supplemental jaw **16** is shown in FIGURE 3 wherein it is removably spring loaded within its respective jaw arm **12**. This type of mounting may be accomplished by use of a detent ball **28** and coil spring **30** seated within the rounded shank portion **22**. The detent ball **28** fits into a groove **32** in the jaw arm **12**, and may be depressed into the shank portion **22** when removing the supplemental jaw.

FIGURE 7 shows still another method of swivelly attaching the supplemental jaw **16** to the jaw arm **12**. In this form a rounded shank portion is integral with the jaw arm **12** forming an adapter **34** about which the supplemental jaw **16** may be swivelly mounted. The adapter **34** fits into an aperture **36** in the supplemental jaw allowing free rotation of the supplemental jaw. An O-ring **38** or circular spring may be mounted in a groove **39** around the circumference of the adapter **34**. As shown in FIGURE 7, the O-ring rides in another groove **40** on the inner surface of the aperture **36**.

It is important to note that there are other ways and methods of swivelly mounting or attaching the supplemental jaw **16** to the jaw arm **12**, and it should be understood that the three methods shown and described are not conclusive, but merely illustrate three preferred methods.

In addition, the supplemental jaw **16** preferably includes a gripping face **42** to provide increased leverage during work. The gripping face **42** is best seen in FIGURES 1, 4 and 7, and is preferably V-shaped with a plurality of gripping teeth.

The bearing surface **18** is associated with the other jaw arm **14**, and may be cylindrical or disc shaped as shown in FIGURES 1, 2 and 3. In this embodiment the bearing surface **18** may either rest on or be seated within the jaw arm **14** providing a 3-point contact with an object. In addition, this form of the bearing surface may have a gripping face to facilitate holding an object during work.

The bearing surface may be either removably or permanently mounted or seated within the jaw arm **14**. It is shown in FIGURES 1 and 2 as removably spring loaded in much the same manner as the supplemental jaw shown in FIGURE 3. A detent ball **44** and coil spring **46** are mounted within a rounded shank portion **48** with the detent ball riding in a groove **50** in the jaw arm **14** to allow free pivotal movement during work. When removing the bearing surface **18** from the jaw arm **14**, the pressure on the detent ball **44** will cause it to retract into the shank portion **48** making it easy to remove.

FIGURE 3 shows another suggested method of mounting the bearing surface in the jaw arm **14**. In this form the bearing surface **18a** has a square shank **51**. It is important to note that it is possible for the bearing surface to have a square shank since it is not essential that the bearing surface pivot or rotate.

The bearing surface may also be shaped to conform to the size and shape of the object to be twisted or turned during work. One such modification is shown in FIGURES 4 and 5, wherein the bearing surface **18b** is shaped like the supplemental jaw **16**. In this form the bearing surface **18b** is again removably spring loaded in the jaw arm **14** having a rounded shank portion **48** with a detent ball **44** on the end of a coil spring. During pivotal move-

ment of the bearing surface 18b, the detent ball 44 rides in a groove 50 on the inside surface of the jaw arm 14.

Another modification is shown in FIGURE 6 wherein the bearing surface 18c has a plurality of flat connecting surfaces to snugly fit around a nut, bolt or head of a screw. Here again the bearing surface 18c is shown having a rounded shank portion 48 with a detent ball 44 riding in a groove 50 on the inside surface of the jaw arm 14.

A means to help reduce friction during pivotal movement of the supplemental jaw 16 or bearing surface 18 may be provided and is positioned between the supplemental jaw or bearing surface and its respective jaw arm. This means may be a washer 52 made from a material with a low co-efficient of friction. Another means for reducing friction during pivotal movement may consist of caged roller bearings seated in the surface of its respective jaw arm to contact the supplemental jaw or bearing surface and allow free pivotal movement.

The use, operation and function of this invention are as follows:

When holding, twisting or turning an object the V-shaped face of the supplemental jaw 16 will cooperate with the bearing surface 18 to provide a tight purchase during work. This feature, along with the important feature that the supplemental jaw 16 will pivot or rotate about an axis substantially perpendicular to the gripping face 19 of its respective jaw arm 12, make this tool the answer to many problems in any exacting trade. In other words, the swivelly mounted supplemental jaw 16 allows the gripping tool 10 to grasp an object from any accessible angle without the worry of slipping off the object during work.

The structure of this invention has been shown and described in connection with a common pliers, but it should be understood that it may be adapted for use with other tools or instruments such as wrenches, dental tools or hoisting apparatus. When this invention is incorporated with a common pliers it should be noted that the supplemental jaw 16 will pivot or rotate about an axis substantially perpendicular to the axis of the jaw arms shown at 20. Again, as mentioned above the swivelly mounted supplemental jaw 16 allows the user to grasp an object from any accessible angle, and turn or twist the object in any convenient plane or arc without the worry of slipping off during work.

The parts of this invention may be made from any suitable material that is strong and durable such as steel. In addition, this invention is not limited in size, and may be used, for instance, to grasp large cylindrical or irregular shaped objects.

It is understood that this invention is not confined to the particular construction or arrangement of parts herein illustrated and described, but embraces all such modified forms thereof as may come within the scope of the following claims.

I claim:

1. A hand gripping tool for holding, twisting or turning an object including:
   - a pair of movable jaw arms working on a pivot,
   - a jaw pivotally attached to one of said jaw arms having a channel-shaped gripping surface for at least partially encircling and grasping said object,
   - said pivotally attached jaw adapted to pivot about an axis in a plane at substantially right angles to the axis of the pivot for said jaw arms allowing the user to grasp and hold, twist or turn said object from any accessible angle, and
   - a bearing surface associated with the other said jaw arm to provide at least one other engaging surface for said object.

2. The structure of claim 1 further characterized in that the gripping surface consists of an opposed pair of gripping faces for partially encircling and grasping said object from any accessible angle.

3. The structure of claim 1 further characterized in that the pivotally attached jaw includes a rounded shank portion mounted within one of said jaw arms allowing free rotation of said jaw.

4. The structure of claim 3 further characterized in that the rounded shank portion includes a circumferential groove and further the pivotally attached jaw is adapted to be held in place by at least one press fit pin fitting into said circumferential groove allowing free pivotal movement of said jaw.

5. The structure of claim 1 further including a rounded shank portion integral with one said jaw arm forming an adaptor about which the pivotally attached jaw may freely rotate.

6. The structure of claim 1 further characterized in that the pivotally attached jaw is removably mounted within one said jaw arm and the bearing surface is rotatably seated in the other said jaw arm in opposed relationship to facilitate gripping an object during work.

7. The structure of claim 1 further characterized in that the bearing surface has a plurality of integrally connected gripping surfaces to partially encircle and grasp an object during work.

References Cited

UNITED STATES PATENTS

120,910	11/1871	Stratton	81—423
519,550	5/1894	Riordan	81—425 X
743,593	11/1903	Thomann et al.	81—424 X
773,259	10/1904	Jackson	81—180
1,294,715	2/1919	Schultz	81—180
2,326,962	8/1943	Meier	81—180
2,851,295	9/1958	Chaffee	81—177

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