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SWIVEL JAW PLIERS

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FIG. 1

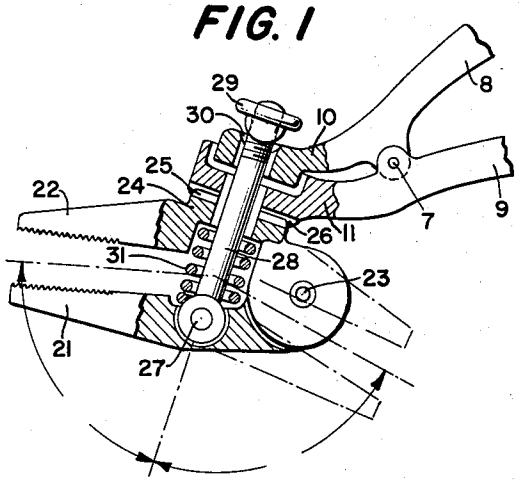


FIG. 2

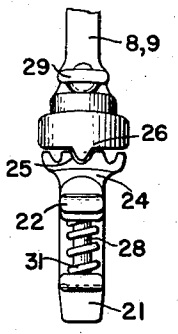
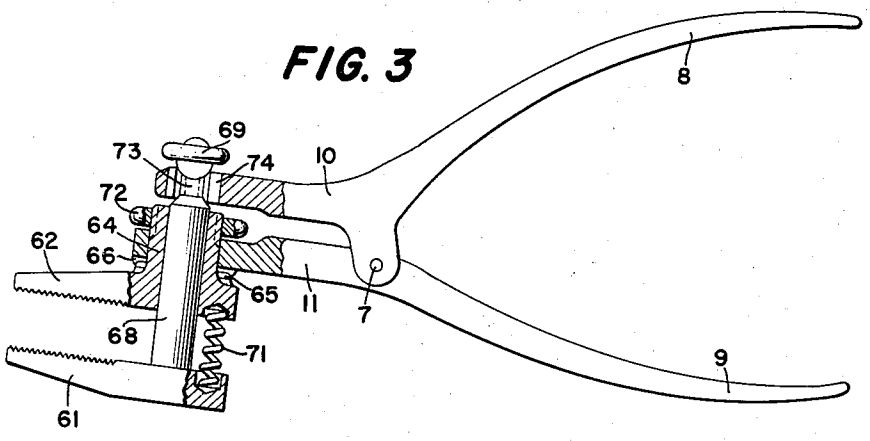


FIG. 3



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SWIVEL JAW PLIERS

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5 Claims. (Cl. 81—356)

The invention relates to swivel pliers, shears or the like, in which the gripping part of the pliers is attached to a pair of lever arms in such a way as to allow the gripping part to be swiveled around an axis lying in the plane of the pair of handles and lever arms, and that the gripping mouth of the pliers can be set in any direction with respect to that plane. The advantage gained by this device is that the operator using these swivel pliers can reach with them such points and spots of the workpiece which cannot be reached with pliers the gripping mouth of which is lying in the plane of gripping, or which are of difficult access or require an awkward or inconvenient position of the arms and hands of the operator.

In a preferred form of construction of these swivel pliers, the one gripping jaw, together with its bored (hollow) neck, is pivoted upon one lever arm of the pliers, and attached, by means of a movable joint, to the other lever arm is a draw rod which passes right through the bored neck, and which is coupled with the other lever arm in such a way that it can be turned and can be moved spatially. The opening spring, that is the spring that keeps the gripping mouth open when no tightening force is applied to the handles of the pliers, in this type of swivel pliers is suitably located between the two gripping jaws. As is usual in pliers, the gripping jaws may be linked together by a movable joint. In this form of construction, the draw rod, attached to one gripping jaw, passes, with play (tolerance), right through the bored neck of the other gripping jaw and also through holes in the two lever arms and is held fast on the outer side of the upper lever arm, by a movable spherical head.

However, the two gripping jaws may also be so constructed that they are parallel to each other—a form of construction which in many cases is of advantage. In this form of construction, the draw rod, attached to one gripping jaw, is slidable along its axis and passes through a slot in the upper lever arm, on the outer side of which it is held fast by means of a movable spherical head.

The invention is explained and specified below, with the aid of forms of construction shown by way of examples in the accompanying drawings, in which: Fig. 1 represents a side elevation showing one embodiment of this invention, Fig. 2 is a front elevation of the embodiment shown in Fig. 1, and Fig. 3 is a side elevation of another embodiment of the invention.

Figs. 1 and 2 show, in a side view (partly in section) and in a front view respectively, the gripping jaws (21 and 22) which are linked by a swing bolt or hinge pin (23). The upper gripping jaw (22) has a short bored (hollow) neck (24), the front end of which is provided with a toothed rim 25, by means of which the gripping jaw 22 is in mesh with a toothed rim 26 provided on the outer side of the lower lever arm 11. In place of the toothed rim 26 there can be a single cog or a pair of cogs only. Joined to the lower gripping jaw (21),

by means of a swing bolt or hinge pin 27, is a draw rod 28, the free end of which passes, with clearance (tolerance), through a hole in the lever arm 10, and is retained by a movable spherical head 29 on the outer side of the lever arm 10 which is provided with a ball cup 30. The movable head 29 is, like a nut, screwed on a thread of the draw rod 28. In the bored (hollow) short neck 24 of the gripping jaw 22, the draw rod 28 has considerable diametrical clearance. A spring opens the gripping mouth between the two jaws 21 and 22, and is made in the form of a coil spring (31) surrounding the draw bar 28.

This arrangement permits the gripping tool, 21, 22 to be easily detached from the handles and lever arms 8, 9, 10, 11. For detaching the gripping tool 21, 22, simply the movable spherical head 29 need be unscrewed from the draw rod 28. When the movable head 29 has been unscrewed, the draw rod 28 can be drawn out of the hole in the lever arm 10, and now the gear and toothed rims 25, 26 are separated. The toothed rims 25, 26 make it possible for the gripping tool 21, 22 to be set at any angle in respect of the plane of the lever arms and handles of the pliers.

As the gripping tool is being tightened, it is brought up firmly and tightly towards the lever arm 11. Hence, the coupling force increases as the force exerted on the handles 8, 9 is increasing, that is, the more the pliers are tightened the firmer become the junction between the gripping tool 21, 22 and lever arms 10, 11.

In the form of construction shown in Fig. 3, which represents a pair of parallel jaw pliers, the upper gripping jaw (62) has a comparatively long bored (hollow) neck 64, which is received in a hole in the lower lever arm 11, and has a toothed rim 65 which is in mesh with a toothed rim 66 on the outer side of lever arm 11. By means of a nut 72 screwed on the threaded end jutting out beyond the inner side of the lever arm 11, the bored long neck 64 may be fixed in the direction of its axis.

I claim:

1. Swivel type pliers comprising a pair of pivotally attached upper and lower lever arms rotatably attached to a gripping portion including a pair of upper and lower gripping jaws, pivot means including a pair of opposed toothed rims on said lower lever arm and said gripping portion to permit the gripping portion to be set to act in any desired direction with respect to the plane of lever arm gripping action, and means for moving said gripping jaws in response to relative movement of said lever arms and comprising a draw rod attached to the lower gripping jaw and passing through openings in the upper gripping jaw and lower lever arm, respectively, said draw rod being attached to the upper lever arm.

2. Swivel type pliers comprising a pair of pivotally attached upper and lower lever arms rotatably attached to a gripping portion including a pair of upper and lower gripping jaws, pivot means including a pair of opposed toothed rims on said lower lever arm and said gripping portion to permit the gripping portion to be set to act in any desired direction with respect to the plane of lever arm action, means for moving said gripping jaws in response to the relative movement of said lever arms and comprising a draw rod attached to the lower gripping jaw and passing through openings in the upper gripping jaw and lower lever arm, respectively, said draw rod being attached to the upper lever arm, and spring means biasing said gripping jaws away from each other.

3. Swivel type pliers comprising a pair of pivotally attached upper and lower lever arms rotatably attached to a gripping portion including a pair of upper and lower gripping jaws, pivot means including a pair of opposed toothed rims on said lower lever arm and said gripping

portion to permit the gripping portion to be set to act in any desired direction with respect to the plane of lever arm action, means for moving said gripping jaws in response to the relative movement of said lever arms and comprising a draw rod pivotally attached to the lower gripping jaw and passing through openings in the upper gripping jaw and lower lever arm, respectively, said draw rod being movably attached to the upper lever arm, and spring means biasing said gripping jaws away from each other.

4. Swivel type pliers comprising a pair of pivotally attached upper and lower lever arms rotatably attached to a gripping portion including a pair of pivotally attached upper and lower gripping jaws, pivot means including a pair of opposed toothed rims on said lower lever arm and said gripping portion to permit said gripping portion to be set to act in any desired direction with respect to the plane of lever arm action, means for moving said gripping jaws in response to relative movement of said lever arms and comprising a draw rod pivotally attached to the lower gripping jaw and passing through openings in the upper gripping jaw and lower lever arm, respectively, said draw rod being movably attached to the upper lever arm, and spring means biasing said gripping jaws away from each other, said spring means surrounding said draw rod.

5. Swivel type pliers comprising a pair of pivotally attached upper and lower lever arms rotatably attached to a gripping portion through pivot means including a

pair of opposed toothed rims on said lower lever arm and said gripping portion to permit said gripping portion to be set to act in any desired direction with respect to the plane of lever arm action, said gripping portion comprising upper and lower gripping jaws, means for moving said gripping jaws in response to relative movement of said lever arms and comprising a draw rod attached to the lower gripping jaw, passing through an opening in the upper gripping jaw and movably attached to the upper lever arm, the upper gripping jaw having a neck portion extending through an opening in the lower lever arm, and spring means biasing the gripping jaws away from each other, said spring means extending between said gripping jaws and in spaced relationship to said draw rod.

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