

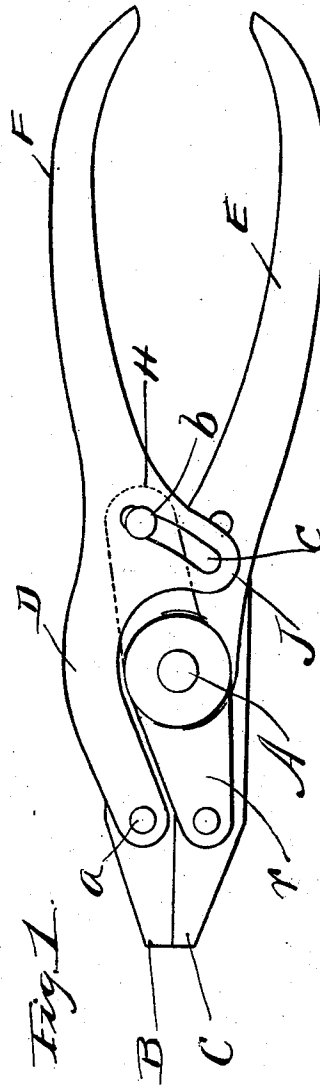
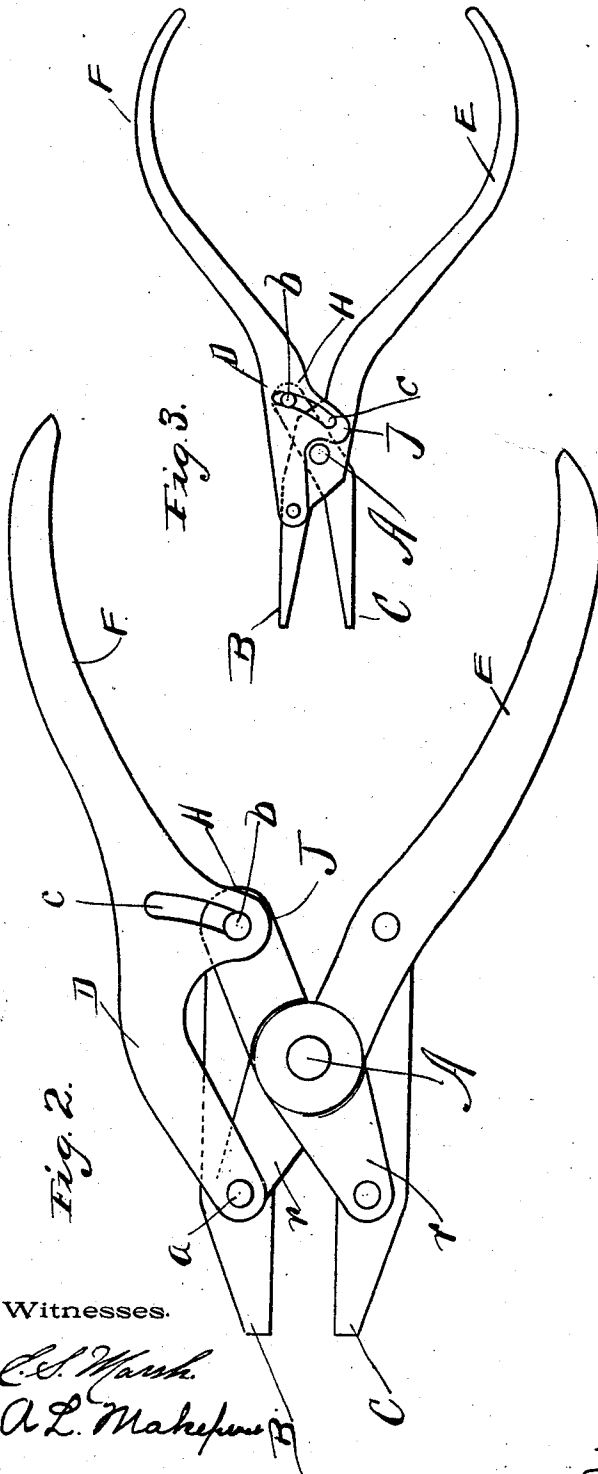
No. 682,701.

Patented Sept. 17, 1901.

M. M. HOWLAND.
LOCKING PLIERS.

(Application filed Feb. 1, 1901.)

(No Model.)



Witnesses.

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MATTHEW M. HOWLAND, OF PROVIDENCE, RHODE ISLAND.

LOCKING-PLIERS.

SPECIFICATION forming part of Letters Patent No. 682,701, dated September 17, 1901.

Application filed February 1, 1901. Serial No. 45,571. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW M. HOWLAND, a resident of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Locking-Pliers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in self-locking pliers, its object being to make them capable of resisting the tendency to open and release the object grasped when under great strain, as in case of twisting and bending of wire or in turning screw-nuts and the like, so that when the pliers have been closed on the object to be held it will not be necessary to further increase the pressure of the hand on the pliers to maintain their hold against being opened by the increased strain of the work.

The invention is fully described and illustrated in this specification and the annexed drawings.

Figure 1 represents a pair of parallel-jawed pliers with the improvement applied to them. Fig. 2 represents the same pliers partly open to show the relative position of the moving parts. Fig. 3 shows the locking devices applied to a pair of common pliers with solid jaws, which are represented as being partly open.

The following is a description of the construction and operation of the improvement in its application to both solid and parallel jawed pliers.

B and C denote relatively the "upper" and "lower" jaws of the pliers, as, for convenience, they are designated. F E are the handles by which they are operated, and A is the central pivot that holds the jaws together and which serves as a fulcrum in operating them. The lower jaw is cut off a short distance back of the central pivot A and the projecting part marked H both in the solid jaws, Fig. 3, and the parallel jaws in Figs. 1 and 2, as the plates *r r* of the latter figures serve the same purpose as the solid jaws in Fig. 3. An operating bar or handle F has one end attached to the upper jaw by a pivot *a* forward of the

pivot A, on which it has a swinging motion. A portion J of the upper handle F is extended down more or less by the rear portion H of the lower jaw and has a curved slot *c* made in it, and a pin *b*, held in the part H, projects through and slides in the slot *c*. The point from which the curve of the slot *c* is drawn is a short distance above the pivot *a*, and this distance may be varied a little, according to the amount of eccentricity of the slot to the pivot *a* required. The sides of the slot *c* need not be parts of a circle, but may be parts of a parabola or other curve, or even straight; but then the degree of resistance of the opening of the jaws at different points in the slot will not be uniform.

The action of these parts may be explained in this way. When the pliers are opened by the handles E F, the concave side of the slot *c* easily raises the rear end H of the lower jaw by means of the pin *b*; but when it is attempted to open the pliers by the front end of the jaws the pin *b* has to raise the handle F by pressing against the convex or inner side of the slot *c*, and the direction of the pressure being so nearly square to the side of the slot the friction between the pin *b* and the side of the slot will be so great that a very slight pressure on the handle F will prevent it from being raised, and the greater the force used to open the jaws the greater will be the friction produced and the resistance to the opening will be accordingly increased. It will readily be seen that the pivot *a* and the pin *b* move on a circle having its center at A and that as the jaws open the two points *a b* must approach each other; but the convex or inner side of the slot *c* will prevent this if the handle F is not raised, and the slightest pressure on that handle will hold it from rising, and thereby accomplish the locking of the pliers. To find a curve for the slot *c* that will cause sufficient friction, first close the pliers and mark the position of the pin *b* on the extension J. Then open them and again mark the position of the pin *b* on the extension. Then strike a circle from a point almost directly above the pivot *a* that will pass through the two positions of the pin *b* and it will give a proper curve for the slot. It will readily be seen that if the relative positions of the slot *a* and the pin *b* were

changed by putting the pin in the handle and the slot in the extension of the lower jaw the locking effect would be the same, and the connection between the operating bar or handle F and the extension H of the lower jaw may be made on the outside, as shown, or through slots in the jaws or handle.

Having thus described my improvements, I claim as my invention and desire to secure by Letters Patent—

1. In self-locking pliers, the combination of an upper jaw, a lower jaw with an extension or bar rearwardly projecting therefrom, a central pivot to connect said jaws together, an operating bar or handle pivoted to said upper jaw forward of said central pivot and having a slot in it back of said central pivot, a locking-pin held in said extension of the lower jaw and projecting through and moving in said slot in the operating-bar, substantially as described.

2. In self-locking pliers, the combination of an upper jaw, a lower jaw with an extension or bar rearwardly projecting therefrom, a central pivot to hold said jaws together, an operating bar or handle pivoted to said upper jaw forward of said central pivot, a friction locking-pin extending through said

extension and operating bar or handle, a suitable slot or frictional bearing-surface for said pin to work on made in one of said parts, substantially as described.

3. In self-locking pliers, the combination of an upper jaw, a lower jaw with an extension rearwardly projecting therefrom, a central pivot to hold said jaws together, an operating bar or handle pivoted to said upper jaw forward of said central pivot, with means for automatically locking said operating-bar and said lower jaw in any desired position against any force applied to the front ends of the jaws to open them, substantially as described.

4. In self-locking pliers, the combination of a pair of plier-jaws held together by a central pivot, an operating bar or handle pivoted to the upper jaw before said central pivot, a pin-and-slot connection between said operating-bar and the lower jaw back of said central pivot, substantially as described.

In testimony whereof I have hereunto set my hand this 30th day of January, A. D. 1901:

MATTHEW M. HOWLAND.

In presence of—

BENJ. ARNOLD,
EDGAR S. MARSH.