I. HULTMAN.

SHEARS FOR CUTTING SHEET METAL AND THE LIKE.

APPLICATION FILED NOV. 20, 1916.

1,284,688.

Patented Nov. 12, 1918.

2 SHEETS—SHEET 1.

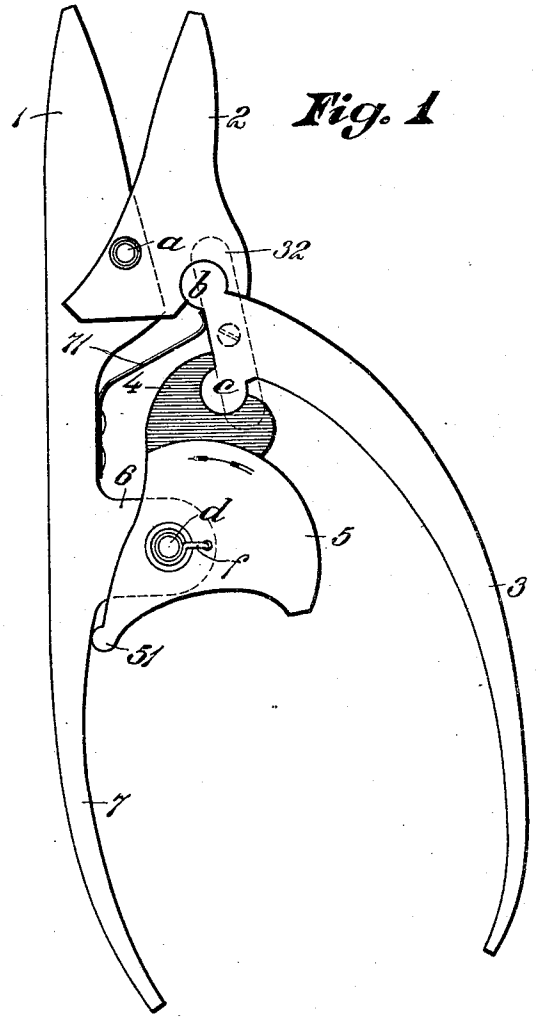


Fig. 1

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2 SHEETS—SHEET 2.

Fig. 3

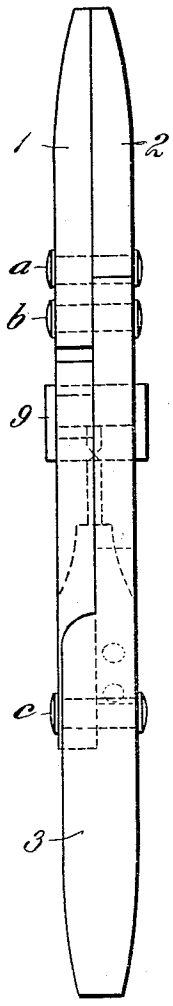


Fig. 2

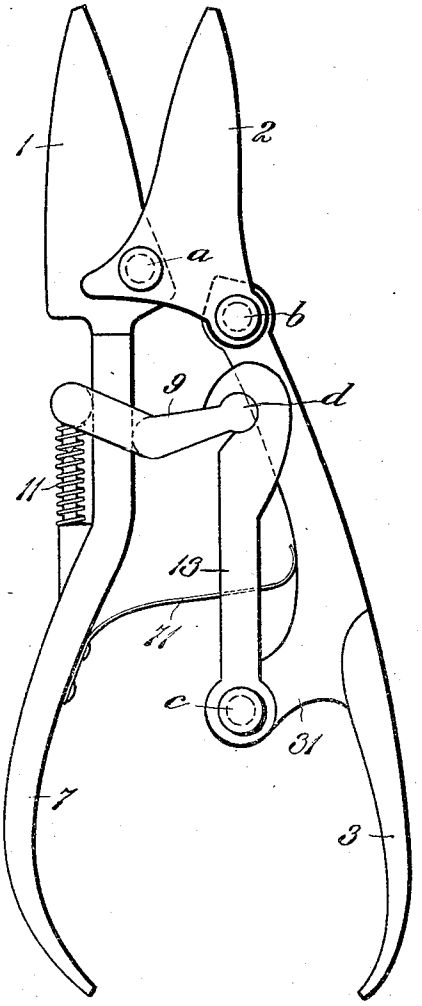
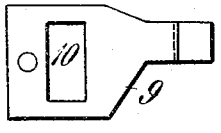


Fig. 4



Inventor:
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UNITED STATES PATENT OFFICE.

IVAR HULTMAN, OF NEGLINGE SALTSJÖBADEN, NEAR STOCKHOLM, SWEDEN.

SHEARS FOR CUTTING SHEET METAL AND THE LIKE.

1,284,688. Specification of Letters Patent. Patented Nov. 12, 1918.

Application filed November 20, 1916. Serial No. 132,418.

To all whom it may concern:

Be it known that I, IVAR HULTMAN, a subject of the King of Sweden, residing at Neglinge Saltsjöbaden, near Stockholm, in the Kingdom of Sweden, have invented a new and useful Shears for Cutting Sheet Metal and the like, of which the following is a specification.

This invention has for its object to essentially increase the cutting power of shears so as to enable one to cut even thicker sheet-metal by means of hand-shears.

For this purpose one of the jaws is pivoted to its handle and between the two handles is inserted a mechanism which strongly increases the leverage.

On the drawing which shows two embodiments intended to serve as examples—

Figure 1 is a side view of one form and Figs. 2 and 3 side view and plan view of the other form.

Fig. 4 shows a detail.

The jaws 1 and 2 are pivoted together at *a*.

The lower jaw 1 is integral with its handle 7. The upper jaw 2 is pivoted to its handle 3 at *b* and is also pivoted to the lever mechanism at *c*.

In Fig. 1 the lever mechanism consists of a segment 4, the rear concave edge of which rests upon the convex edge of an eccentric 5 pivoted at *d* to the lower handle or to a lug 6 on said handle.

The points *a b c d* should be so disposed that a right line drawn from *a* to *b* will be about perpendicular to a right line drawn from *b* to *d*, while the point *c* will be on or a little above the latter line.

When the shears is open, the point *c* is a little above the right line *b*—*d*. By pressing the handles together so that 3 moves toward 7 the point *c* will approach said line until it reaches the same and by this movement the distance between *b* and *d* will be increased, so as to be equal with the distance *b*—*c* plus *c*—*d*, which is larger than distance *b*—*d* when the points *b*, *c*, *d* are the vertices of a triangle. The points *a* and *d* are however fixed and thus the increase of distance *b*—*d* will mean that point *b* is forced forward so as to swing the jaw 2 on pivot *a* in such a direction, that the shears will close a little.

When slackening the pressure on the handles, a spring 71 will swing the handle 3 upward so as to bring point *c* a distance above line *b*—*d*, whereby the eccentric 5 is allowed to swing a little in direction of the arrow either by means of its weight or by the action of a spring *f* so as to maintain the contact with segment 4. When then again compressing the handles the jaw 2 is closed a little more. This action may be repeated until the shears is fully closed. For opening it the eccentric must be swung in opposite direction which may be done by pressing down its rear end 51 by a finger.

It is obvious that the segment 4 and eccentric 5 act as an integral link between the pivots *c* and *d* when the shears is compressed, and that the segment should not slide upon the eccentric during such action. To prevent such sliding the contact faces between segment 4 and eccentric 5 may be unpolished or rough, if necessary.

As the distance between point *c* and line *b*—*d* is small, the leverage is a suitable one for overcoming high resistances.

In Fig. 2 the upper handle 3 or a lug 31 thereon is pivoted to a link 13 (at *c*), the front end of which is pivotally connected to a support 9 on the lower handle 7.

This support 9 is free to move along the handle 7 in one direction but will be locked in every position when a pull rearward is exerted on its free end *d*.

In the example shown the support 9 has a hole 10 so as to be passed on handle 7 said hole being more wide than the thickness of the handle so that the support can take a rearwardly inclined position and thereby lock itself on the handle. A spring 11 tends to move the support forward.

In the position shown the shears is fully open. The points *b*, *c*, *d* are then on a right line. When pressing down the upper handle the point *c* will move along a bow with radius *c*—*d* on the fixed center *d*, and the point *b* will move along a bow with radius *a*—*b* on the fixed center *a*. The result is that point *b* is forced forward a little with an almost unlimited force so as to close the jaws a certain amount. This effect is due to the fact that the points *b*, *c*, *d* will be the vertices of a triangle instead of lying at a right line, and as any two sides of a triangle taken together are always greater than the third side and as two of the sides viz. *b*—*c* and *c*—*d* are constant, the distance *b*—*d*, which represents the third side, must increase. The point *d* is however stationary and thus the point *b* must move.

When then lifting the handle 3 (which may be done automatically by means of a spring such as 71) the point *b* will keep its position and the point *c* will rise until all three points are again on a right line. This will cause a little movement forward of point *d* (if *b* be stationary) so as to release the support 9 and allow it to be moved forward by means of its spring 11. By now pressing down the handle 3 the jaws will be closed another amount. By such repeated movement of handle 3 up and down the jaws will be successively closed until their tips reach each other; and every time the applied power from the hand will be enormously multiplied.

The possibility of fully closing the jaws is of great advantages for instance when cutting a piece bent into angular shape.

The jaws are opened by pulling the support 9 rearward. The support 9 is automatically locked on handle 7 as soon as the link 13 begins to pull in the direction *d*—*c*.

To prevent the handle 3 of Fig. 1 from sliding sidewise so as to be released from jaw 2 and segment 4 a piece 32 of sheet metal may be fixed on each side of handle 3 as indicated by dotted lines. Or the bearing in segment 4 for the pivot *c* may be closed on both sides. If the segment is made in two symmetrical halves these side walls of the bearing may be integral with the segment, or else one of them may form a separate lid. The segment 4 may have side flanges or lugs which overlap the eccentric 5 or vice versa. Or the segment may have a central flange or rib which engages a groove on the edge of the eccentric or vice versa.

I claim:

1. Shears of the character described, comprising in combination with the two cutting jaws, a handle rigidly secured to its jaw and a handle pivotally secured to the other jaw, and a support adapted to move successively along one of said handles during the opening and closing movements of said handles, a link pivoted to the other of said handles and to said support for successively advancing the pivoted handle by changing the position of its fulcrum support, substantially as described.

2. Shears of the character described comprising in combination, two cutting jaws, a handle rigidly secured to its jaw and a other handle pivotally secured to the other jaw, a support having a hole through which one of said handles is passed and adapted to successively move along this handle, said support being adapted to automatically lock itself by taking up an inclined position to its handle, and a link pivoted to the other handle and to said support for successively advancing the pivoted handle by changing the position of its fulcrum support, substantially as described.

3. Shears of the character described, comprising in combination, two cutting jaws, a handle rigidly secured to its jaw, and a handle pivotally secured to the other jaw, and a support adapted to move successively along one of said handles during the opening and closing movements of said handles, a spring adapted to move said support forward when the handles are opened, and a link pivoted to the other of said handles and to said support for successively advancing the pivoted handle by changing the position of its fulcrum support, substantially as described.

IVAR HULTMAN.

Witnesses:
L. ROWELL,
FRANK LYON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."