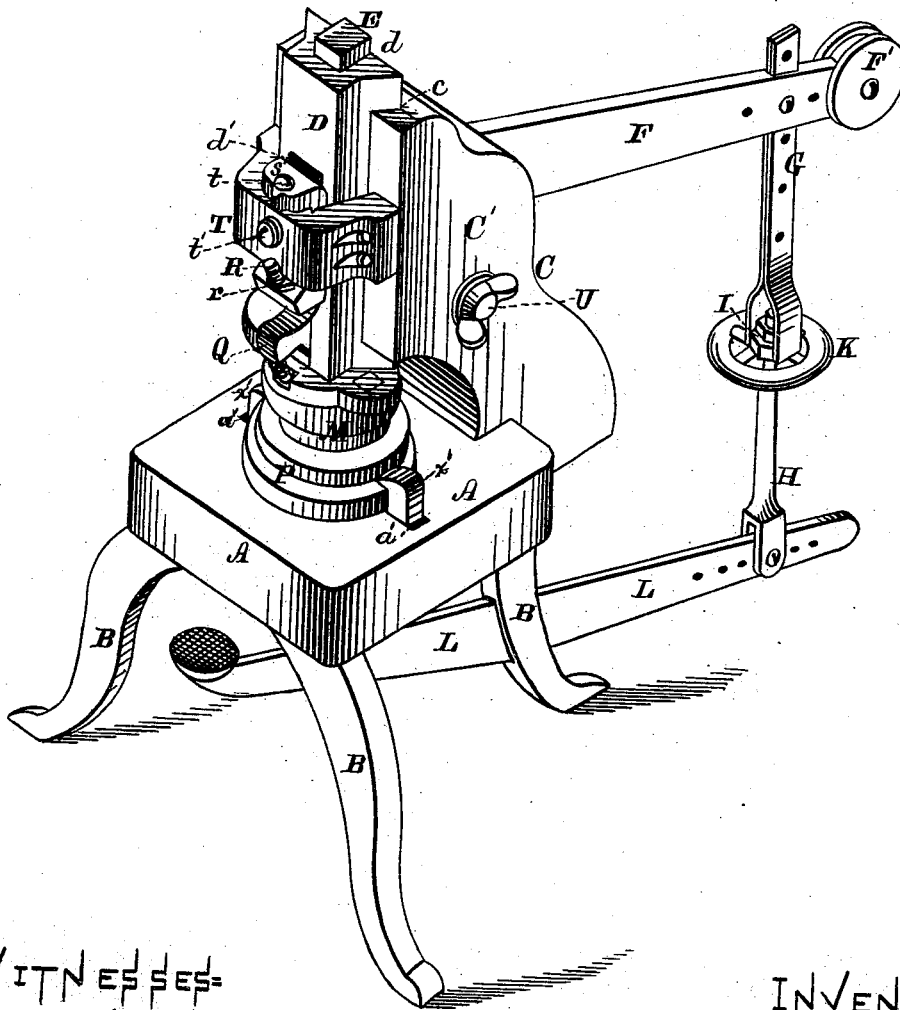


O. SMITH.
METAL DRAWING PRESS.

No. 189,277.

Patented April 3, 1877.

Fig. 1.



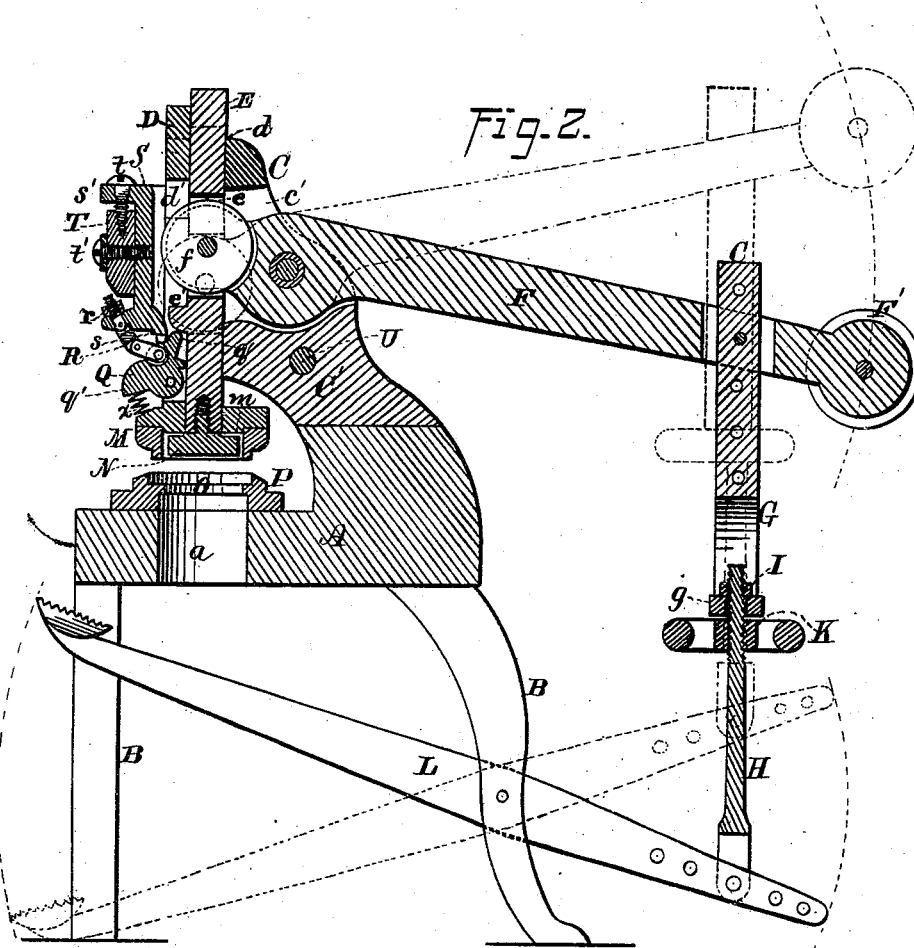
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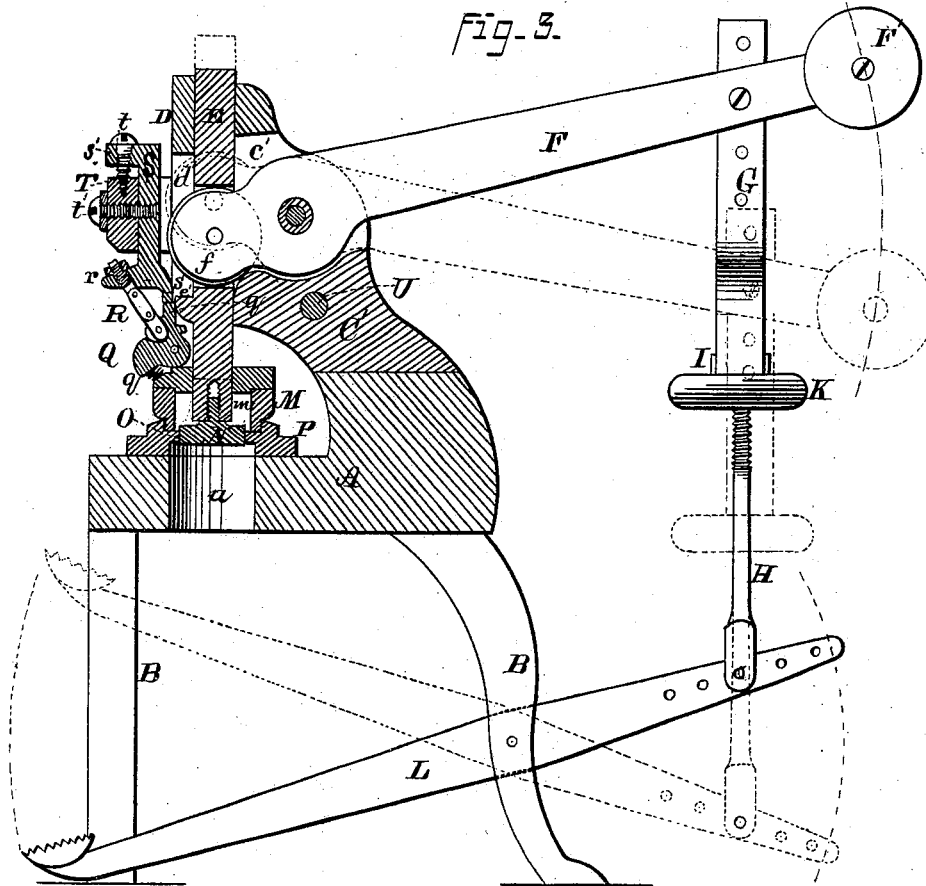
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Fig. 4.

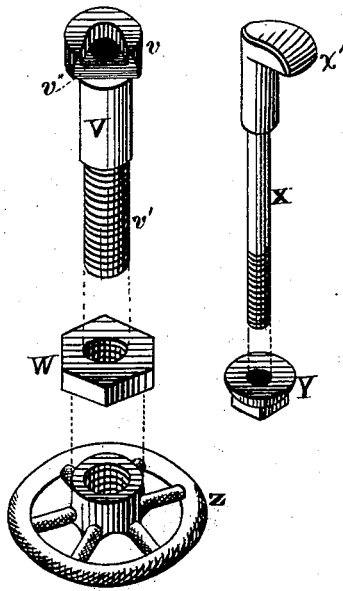


Fig. 5.

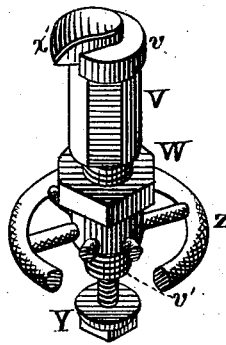


Fig. 6.

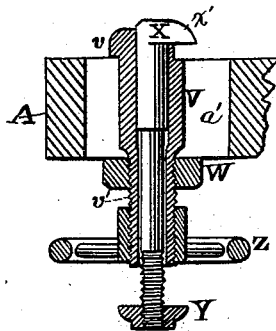
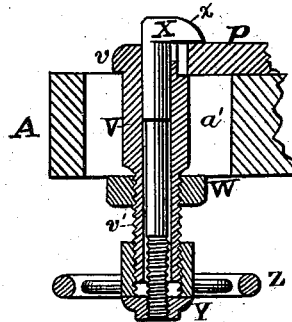


Fig. 7.



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UNITED STATES PATENT OFFICE.

OBERLIN SMITH, OF BRIDGETON, NEW JERSEY.

IMPROVEMENT IN METAL-DRAWING PRESSES.

Specification forming part of Letters Patent No. 189,277, dated April 3, 1877; application filed December 5, 1876.

To all whom it may concern:

Be it known that I, OBERLIN SMITH, of Bridgeton, in the county of Cumberland, and in the State of New Jersey, have invented certain new and useful Improvements in Drawing-Presses; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my improved press as arranged for use; and Fig. 2 is a vertical central section of the same upon a line passing from front to rear; and shows the parts in their normal positions. Fig. 3 is a like view of said press, its operative parts being in the position occupied after the production of a blank and the drawing of the same. Figs. 4 and 5 are perspective views of my die-clamp, the parts being, respectively, separated from and combined with each other; and Figs. 6 and 7 are vertical central sections of said clamp as arranged upon or within the bed-plate of the press.

Letters of like name and kind refer to like parts in each of the figures.

The design of my invention is mainly to combine in a convenient and practicable form a cutting and a drawing press, by means of which the articles to be formed may be cut from a plate and drawn to shape by one movement of the foot-lever; to which end it consists, principally, in a press for cutting and drawing sheet metal, in which the bar that carries the cutting-die is moved positively by the bar which carries the drawing-die, substantially as and for the purpose hereinafter specified.

It consists, further, in the means employed for operating the drawing and cutting dies, whereby said cutting-die moves downward and forms the blank in advance of said drawing-die, substantially as and for the purpose hereinafter shown.

It consists, further, in the means employed for regulating the movement of the cutting-die, substantially as and for the purpose hereinafter set forth.

It consists, further, in the means employed for regulating the downward movement of the

drawing-dies, substantially as and for the purpose hereinafter shown and described.

It consists, finally, in the peculiar construction of the die-clamp, substantially as and for the purpose hereinafter specified.

In the annexed drawings, A represents the bed-plate of my press, which is supported upon or by means of three legs, B, and is provided with a central opening, *a*, for the reception of fixed or female dies.

From the rear side of the bed-plate A a standard, C, extends upward and forward, and within its front side is provided with a vertical dovetail-shaped groove, *c*, which receives and contains a bar, D, the latter being capable of a longitudinal motion within said groove.

Within the rear side of the bar D, at its transverse center, is provided a rectangular groove, *d*, that receives and contains a correspondingly-shaped bar, E, which latter is capable of an independent longitudinal motion within its said groove.

Vertical motion is imparted to the bars D and E by means of a lever, F, which has its front end contained within vertical central openings *d'* and *e*, that are provided in and through said parts, and is pivoted within a similar opening, *c'*, in the standard C, a short distance in rear of its said front end.

From the standard C the lever F extends rearward for some distance, and by means of a forked bar, G, threaded bar H, and nuts I and K, as hereinafter described, is connected to or with the rear end of a foot-lever, L, which lever is pivoted upon or within the rear leg B, and has its front end within convenient reach of the foot of the operator.

As thus arranged, by depressing the forward end of the foot-lever L, the bars D and E will be depressed, while, by releasing said lever, the weight of the rear portion of the lever F, and of the connection between the same and said foot-lever, will return said parts to their normal positions. If necessary, additional weight may be added to the rear end of said lever F by bolting metal plates F' upon opposite sides, as shown in Fig. 1.

The bar D is intended to sustain and operate the male cutting-die M, and the bar E to operate the male forming or drawing die N,

said dies being attached to or upon their lower ends, in consequence of which use it is necessary that said bar D should move in advance of said bar E, so that the blank may be cut from the sheet of metal before said forming-die operates upon it.

The desired result is accomplished by constructing the dies so that the forming-die N is contained within a central recess or opening, *m*, in the cutting-die M, while the female forming-die O is constructed or placed within the bottom of the female cutting-die P, and then arranging the motions of said bars D and E so that said male cutting-die M shall move downward until it has cut a blank, and holds the same firmly against the top of its female die O, after which its motion ceases, and said die N continues and presses said blank into and through said die O.

The relative movements of the bars D and E are effected by the following-described means: The opening *d'* of the bar D is lengthened, so as to prevent the end of the lever F (which end is provided with a friction-roller, *f*) from bearing against the lower end of the same, and a projection, *e'*, which has a forward and an upward curve, is provided upon the front side of said bar E below the lever-opening *e*. Within the lower end of said recess *d'* is pivoted a block, Q, which has the general form of a triangle, and is so arranged as to permit of being turned to the position shown in Fig. 2, with its upper arm *q* in engagement with said projection *e'*, or of being moved to the position seen in Fig. 3, so as to disengage said parts.

When the block Q occupies the position shown in Fig. 2, the downward motion of the bar E will be communicated to the bar D; but when said block is released from engagement with the spur *e'*, said bar E is at liberty to continue its downward motion without moving said bar D.

The arm *q* of the block Q is held in engagement with the spur *e'* by means of a spring, *x*, which is placed below its lower arm *q'*, while said block is tripped, so as to release it from engagement with said spur, by means of a jointed bar, R, which is pivoted at one end to the lower portion of said arm *q*, and from thence extending upward and outward through a suitable opening in a vertically-adjustable support, S, has its outer end threaded and provided with a nut, *r*.

When the bars D and E move downward until the jointed bar R is straightened, further motion of said parts causes said bar R to draw the arm *q* of the tripping-block Q forward until released from engagement with the spur *e'*, while upon reversing the motion of said parts said bar B yields and permits the spring *x* to move said block Q into engagement with said spur once more.

When the bar D has reached the limit of its downward stroke, and is released from engagement with the bar E, it is necessary that

the former should be locked in position for the purpose of confining the blank just cut between the male cutting-die M and the upper end of the female drawing-die O, which result is secured by providing upon the lower end, at the rear side of the block S, a spur, *s*, that extends rearward and engages with the arm *q* as the latter passes from beneath the spur *e'*.

The front side of the spur *e'* bears against the rear side of the arm *q* when the latter is in engagement with the spur *s*, and prevents its disengagement from the latter; but as the bar E moves upward said spur *e'* passes above said arm, and permits the latter to be moved rearward once more by the spring *x*.

In order that the downward limit of motion of the bar D of the cutting-die (which latter also operates as a holding-die) may be varied for the purpose of securing a proper adjustment of parts, the block S is bolted to or upon the rear face of a yoke, T, that spans the front side of said bar D, and at its end is secured rigidly to or upon the standard C.

A lug, *s'*, projects forward from the upper end of said block S over said yoke, and a screw, *t*, passes through said lug into a threaded opening in the latter.

By loosening the bolt *t'*, which confines the block S in place, said block may be adjusted vertically by the movement of the screw *t*, the latter being, preferably, swiveled within the lug, *s'*, so as to move the same in either direction.

In order to compensate for the wear of the bar D within the standard C, the upper portion of the latter is divided vertically upon a line passing centrally from front to rear, and the detachable portion C is held in place by means of a screw, U, which passes horizontally through the latter and into the fixed portion of said standard. By tightening said screw the groove *c* will be lessened in breadth, and less lateral motion allowed to said bar D.

The foot-lever L is intended to move within certain fixed limits, and in order that the motion of the lever F may be varied at will, the lower section H of the connection between said parts is arranged to be attached at a number of points between the rear end and pivotal bearing of said foot-lever; but as such change in the point of attachment will vary the relative position of said lever F, the following-described construction of said connection is employed:

The upper section G has its lower end forked, and the ends of said forks connected by means of a horizontal bar, *g*. Through said bar *g* passes loosely the threaded upper portion of the lower section H, and upon the end of the latter, above said bar *g*, is loosely fitted a nut, I, while below said bar is placed a second nut, K, which is formed within or of the hub of a hand-wheel.

By loosening the nut K with the hand, the upper nut I may be turned with the fingers until the proper length of the connection is

secured, after which said lower nut is turned upward firmly against the bar *g*, and closely confines said parts in relative positions.

The lower or female die *P* is confined in position upon the bed-plate *A* by means of the following-described clamp:

A sleeve, *V*, having a flattened upper portion, which is terminated by a projecting flange, *v*, and a threaded lower portion or body, *v'*, is loosely fitted within a radial vertical slot, *a'*, in the bed-plate *A*, and is held in position therein by means of a nut, *W*, that is fitted over said threaded portion and bears against the lower side of said bed-plate.

Within the sleeve *V* is loosely fitted a bolt, *X*, which, at its upper end, is provided with a head, *x'*, that extends horizontally outward from one side, and fits within a corresponding recess, *v''*, that is provided within the upper end of said sleeve at the side next to the die *P*.

The lower portion of the bolt *X* is threaded, and projects below the sleeve *V*, and upon such portion is loosely fitted a nut, *Y*. A nut, *Z*, constructed in the form of a hand-wheel, is fitted loosely upon the lower portion of said sleeve, below the nut *W*, and completes the device, the operation of which is as follows:

The clamp-bolt *X* being in position, the wheel-nut *Z* is turned downward, and as it impinges against the nut *Y* the friction between their contiguous faces will cause the latter to move in the same direction; but as the screw-thread of the sleeve *V* has a greater pitch than the thread of said bolt, it will be seen that said wheel-nut will move downward more rapidly than said nut *Y*, and, as a consequence of such differential motion, said bolt will be drawn downward with great force.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. A press for cutting and drawing sheet metal, in which the bar that carries the cut-

ting-die is moved positively by the bar which carries the drawing-die, substantially as and for the purpose specified.

2. The means employed for combining the movements of the bars *D* and *E*, consisting of the tripping-block *Q*, pivoted within said bar *D*, and provided with an arm, *q*, which is caused to engage with a spur, *e'*, upon said bar *E* by the pressure of the spring *x*, substantially as and for the purpose shown.

3. The means employed for disengaging the bar *D* from the bar *E*, consisting of the jointed bar *R*, pivoted to or upon the tripping-block *Q*, and connected to or with the block *S*, substantially as and for the purpose set forth.

4. The means employed for locking the bar *D* at its lowest point, consisting of the tripping-block *Q* *q* and spurs *s* and *e'*, substantially as and for the purpose shown and described.

5. In combination with the bar *D*, tripping-block *Q*, and jointed bar *R*, the block *S*, secured to or upon the yoke *T*, and made vertically adjustable by means of the screw *t*, swiveled within the lug *s'*, substantially as and for the purpose specified.

6. In combination with the levers *F* and *L*, the connection formed by the forked bar *G* *g*, threaded bar *H*, and nuts *I* and *K*, substantially as and for the purpose shown.

7. The hereinbefore-described die-clamp, consisting of the threaded sleeves *V* *v* *v'*, the threaded bolt *X* *x'*, and the nuts *W*, *Y*, and *Z*, all combined to operate in the manner and for the purpose substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of December, 1876.

OBERLIN SMITH.

Witnesses:

JAMES J. REEVES,
E. F. BREWSTER.