N. C. STILES.

Metal Punch.

No. 84,313. Patented Nov. 24, 1868.

Fig. 1.

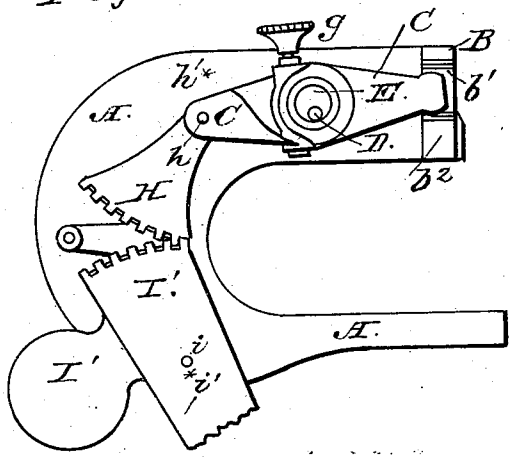


Fig. 2

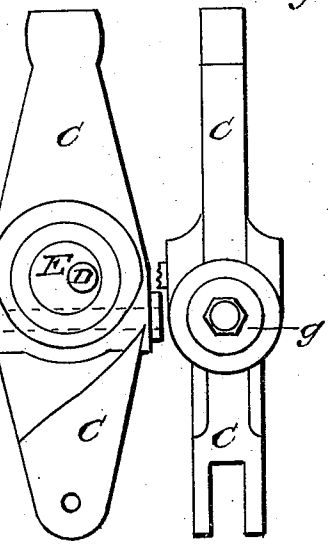


Fig. 3

Fig. 5

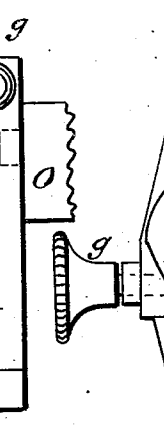
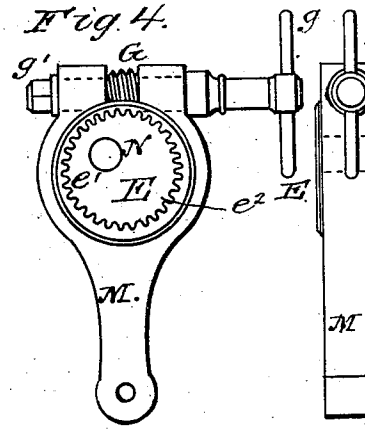


Fig. 4.



Witnesses

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NORMAN C. STILES, OF MIDDLETOWN, CONNECTICUT.

Letters Patent No. 84,313, *dated November* 24, 1868.

IMPROVEMENT IN ADJUSTABLE PRESSES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, NORMAN C. STILES, of Middletown, in the county of Middlesex, and State of Connecticut, have invented certain new and useful Improvements in Adjustable Presses, punches, and the like; and I do hereby declare that the following is a full and exact description thereof.

My invention relates to that form of adjustment in which an eccentric is employed, turned by the aid of a worm, so that as the eccentric is turned, the punch is caused to work higher or lower. The previous devices for this purpose have involved a complication and friction which my invention avoids.

I will first describe what I consider the best means for carrying out my invention, and will afterwards designate the points which I believe to be new. The accompanying drawings form a part of this specification.

They represent two forms in which the invention may be carried out. In the one form a lever is introduced as a means for communicating the force to the punching-die, and the centre or fulcrum of the lever is mounted in the eccentric. In the other form no lever is employed, and the eccentric is mounted in a link, which communicates motion from a crank-shaft to the die or punch.

Figure 1 is a side elevation, representing the lever-form of the invention.

Figures 2 and 3 represent enlarged views of the lever; fig. 2 being a side view, and fig. 3, a top view of the lever.

Figure 4 is a side view of the other form of the invention, and

Figure 5 is an edge view of the same.

The figures represent the novel points, with so much of the other parts as seems necessary in order to convey a clear understanding of the invention.

The parts not represented are made in the ordinary form, and will be readily constructed by mechanics.

Similar letters of reference indicate corresponding parts in all the figures.

Tints are employed merely to aid in distinguishing the parts, and do not necessarily indicate materials. The materials of the whole may be iron and steel.

Referring to figs. 1, 2, and 3, A is the fixed frame-work of the machine, and B is a part to which a punch or die is connected. C is a stout lever, fitting between cheeks b^1 b^2, in the punch-carrier or die-carrier B. This lever C turns on a fixed axis or centre, D, which may be made of steel, or other strong material, supported in the frame-work A, in any convenient manner. This axis D supports the lever C, not directly, but through the intervention of a stout wheel or eccentric, E, the axis or shaft D passing, not through the centre of the wheel E, but through a point out of the centre, as indicated in the drawing. The wheel E is fitted so as to be easily turned around in a corresponding hole in the lever C, and has a line of diagonal screw-threads on its exterior to receive the thread of an endless screw or worm, G. This worm is provided with a head, *g*, by means of which it may be turned, either by hand or by any suitable arrangement otherwise.

One or more check-nuts, or other devices not represented, may be employed to hold the screw, and thus to hold the eccentric very firmly in any desired position to which it may be adjusted.

The end of the lever C, opposite to the punch-carrier B, receives an eccentric-segment, H, as represented, which gears into another, I. This latter is oscillated by a steam-engine, or other suitable mechanism, turning on the centre, *i*.

The segments H and I have teeth, as represented, which interlock and insure their coincidence of position, and have also rolling surfaces partially in sight, beyond the teeth, which take the main strain in operating the punch.

The segments being struck, not from the centres *i* and *h*, but from the other centres, *i'* and *h'*, it follows that as the segments oscillate, this end of the lever C is pressed forcibly upward, and allowed to return, thus giving a corresponding motion to the punch.

When, by turning the screw G, the eccentric, E, is fixed in the position represented in figs. 1 and 2, the punch is carried at its highest position.

When, by turning the screw G, the eccentric E is partially rotated so as to bring the arbor or axis D in a higher position relatively to the eccentric, it follows, necessarily, that the centre of motion of the lever C, which is of course the centre of the eccentric E, is lower, and consequently the punch operates at a lower level.

The back motion of the lever C and its connections may be effected by any convenient means. I have shown a weight, I', cast on the lever I, in such position that its gravity performs this function.

Referring to figs. 4 and 5, M is a stout link, which carries the punch or die, and suitable guides, not represented, at its lower extremity.

E is an eccentric, which receives in the hole represented the crank-pin N, of a stout crank-shaft, O.

This shaft is revolved by any suitable power, not represented, and gives an amount of motion to the punch or die connected to the lower end of the link M, corresponding to the throw of the crank N, but the elevation to which the reciprocations of the die are effected depends on the position of the eccentric E.

This eccentric is provided with oblique teeth, or a toothed groove around its periphery, which receives the threads of the worm or endless screw G, turned by a handle or head, *g*.

In this construction of the device the nut *g'* serves to fix the screw G very firmly in any position desired.

When it is required to operate the die or punch at a lower level, the screw G is turned in such direction as to rotate the eccentric E to the right, which carries the crank-pin higher in the link, and consequently

compels the link to descend lower at each rotation of the crank-pin.

If it is desired to operate the die or punch at a higher level, the reverse movement is effected. In either case, the jam-nut g' is first slackened, then the screw G is turned as many times as may be required, and the eccentric E is turned a corresponding portion of a revolution; then the parts are allowed to rest, and the jam-nut g' is again tightened.

It will be of course understood that the bearings for the screw G, in the link M, are not threaded, but are cylindrical, as indicated by the dotted lines.

My invention may be worked out with many modifications in the form of the details here represented, and with many modifications in the relations of these parts, in the construction of the other parts of the machine.

The device may be worked with some success without the jam-nuts g', or any equivalent to hold the worm G in place. This is particularly practicable if the worm G is made with a fine thread, a corresponding thread being of course cut on the surface of the eccentric E, and the parts are made to work stiffly, or with a large amount of friction; but I prefer to make the parts work as easily as is practicable without inducing a serious looseness or loss of motion in the parts, and to employ the jam-nut g', or its equivalent, to all the forms of my invention, to hold the adjustment firmly in position, until it is desired to readjust the press or punch.

It may be, for some purposes, preferred to extend the teeth to receive the worm quite around the eccentric E, as represented, but it is sufficient in most cases to extend such teeth only a little more than half way around.

It will be readily understood that the provisions for being acted on by the threads of the endless screw G, which I here term "teeth," are merely recesses in the periphery of the part E. By omitting them where they are not required, I obtain a broader bearing on the periphery to communicate the force to the link or strap M.

I have marked the points where the recesses in the periphery may terminate by the letters e^1 e^2, and the recesses, teeth, or, in short, the threaded surface of the exterior of E, may extend quite around, as shown, or may extend from e^1 around the upper half of the eccentric, terminating at e^2.

The patent to M. G. Wilder, dated May 28, 1867, describes an eccentric adjustment, but mine is substantially different therefrom. In Wilder's machine, after the machine has been properly adjusted, the supporting-pin is immovable, and the eccentric keyed to said pin, and thus made, as it were, in one piece with it, is equally immovable. This immovable eccentric is the true fulcrum of the lever, its periphery constituting the bearing or support around which the lever vibrates. In my machine, the eccentric is virtually integral with the lever. The lever, therefore, instead of vibrating on and around the eccentric, as in Wilder's machine, vibrates on and around the supporting-pin.

Having now fully described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

The method herein described, or its equivalent, of adjusting and fastening the eccentric to the lever or working-part, and allowing to the supporting or crank-pin freedom to rotate in the body of the eccentric, or in its own bearings, substantially as described.

N. C. STILES.

Witnesses:

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