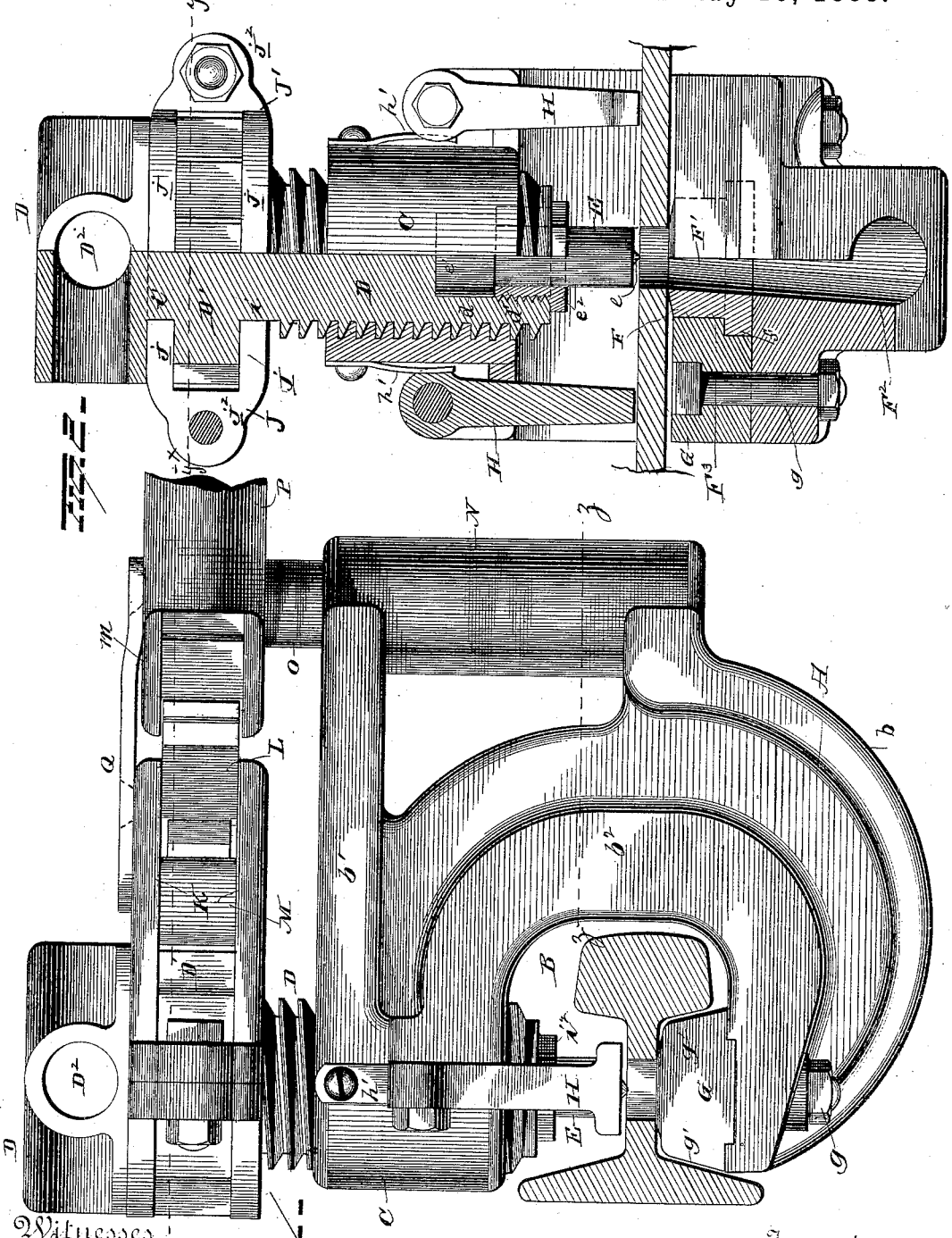
(No Model.)

2 Sheets—Sheet 1.

C. M. BROWN.

COMPOUND LEVER PUNCH.

No. 382,947. Patented May 15, 1888.



Witnesses:
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(No Model.) 2 Sheets—Sheet 2.

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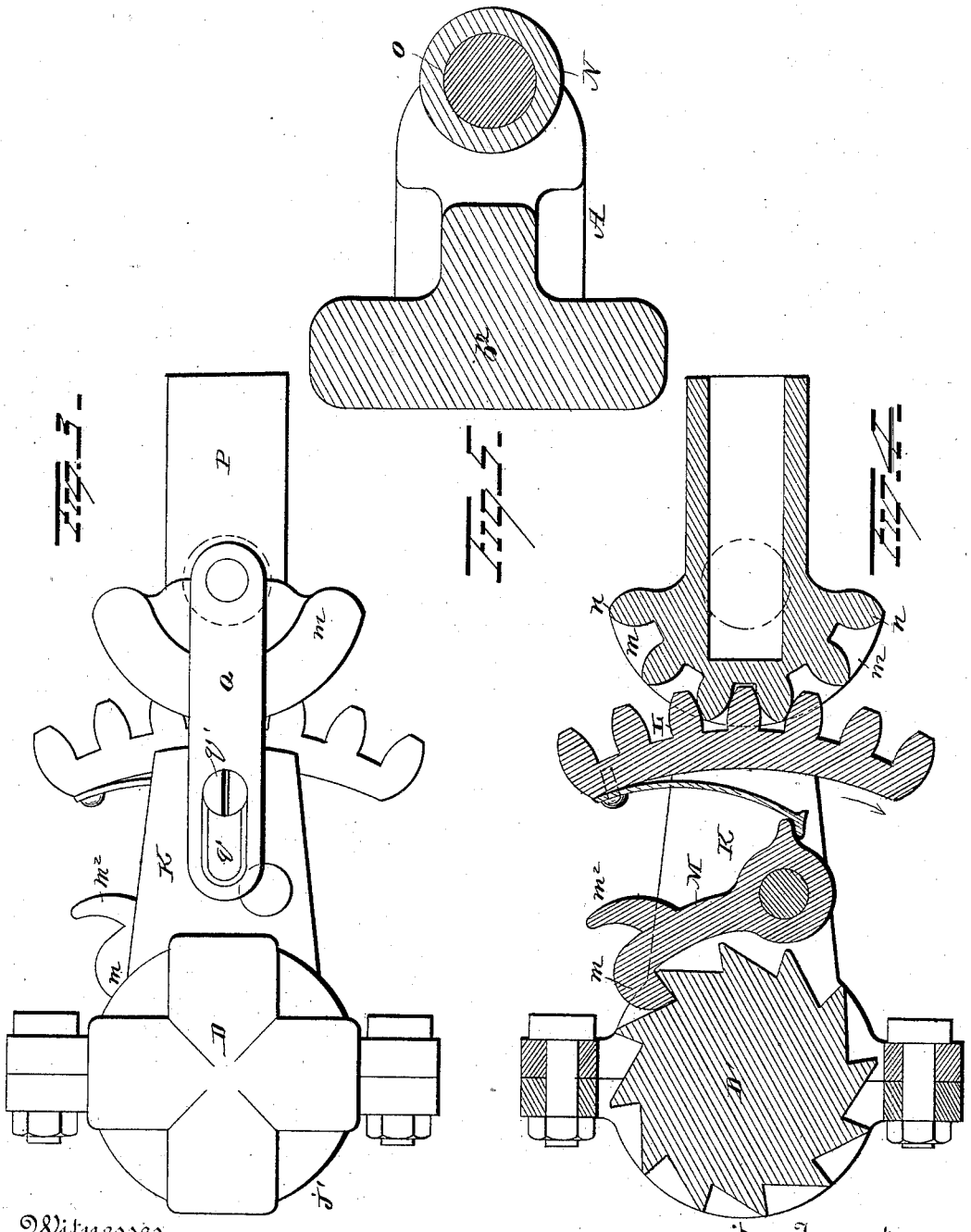

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UNITED STATES PATENT OFFICE.

CHARLES M. BROWN, OF ROCKFORD, ILLINOIS.

COMPOUND-LEVER PUNCH.

SPECIFICATION forming part of Letters Patent No. 382,947, dated May 15, 1888.

Application filed December 9, 1887. Serial No. 257,447. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. BROWN, of Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Compound-Lever Punches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in compound-lever punches, and more especially to punches employed in cutting holes in steel or iron bars or rails or other similar refractory material requiring enormous power and great strength of working parts.

The object is to provide a powerful and compact machine applicable as well to stationary bars of iron or rails as to movable bars or rails; and it practically consists in a screw-punch, connected parts to hold it in a proper relative position to the bar or rail to be punched or operated upon, and both a simple and a compound operating-lever whereby to economize and concentrate power accordingly, as required, the punch being operated by either one or the other of these levers, according to the character of the material to be operated upon.

It further consists in certain features of novel construction and combinations of parts, as will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of the punching-machine with the rail being operated upon in position therein. Fig. 2 is an end elevation, partly in section. Fig. 3 is a top plan view. Fig. 4 is a section on line *x x* of Fig. 1 and line *y y* of Fig. 2, and Fig. 5 is a section on line *z z* of Fig. 1.

A represents a jaw formed approximately in the shape of a horseshoe, with a mouth or opening, B, therein. This jaw is made of some hard metal—such as malleable iron or cast-steel—and to give it additional strength proportionate to the work which it is to perform the web *a* of this jaw is provided on its edges with strengthening ribs or flanges *b b' b²*, the latter of which, surrounding the mouth or opening B, is preferably considerably broadened, as shown in Fig. 5. Above the mouth of the jaw an internally-screw-threaded boss or socket, C, is formed integral with the jaw, and this boss, besides being large and elongated, is further re-enforced by the flange b^2, which merges into it, and also by the flange *b'*, extending along the top of the jaw.

The screw D, which carries the punch, being fitted to the boss or socket C, is adapted to turn therein and be guided and supported by the internal threads of this boss or socket, thus giving the screw a direct and unyielding up and-down movement. In its lower end this screw is provided with an opening, *d*, the diameter of which is a little greater than the punch which it is designed to receive. A portion of this opening is screw-threaded, as shown at *d'*, and the object of this is quite evident. A punch, E, having a small point or projection, *e*, on one end and an enlarged head, *e'*, on the opposite end, enters this opening, in which it is held by a hollow screw-threaded nut or follower, e^2, the outer end of this follower being flanged and given an angular form, which is readily gripped and operated upon by a wrench.

Immediately below the punch a block or die, F, is seated. This die preferably has a rounded or convex upper end and an annular flange, *f*, at its base, while extending through it from top to bottom there is a slightly-tapering hole, F', which aligns with a similar hole, F^2, through the lower end of the jaw, which holes receive the waste blank and permit it to drop unobstructed out of the machine.

Immediately inside of the mouth B and directly below the boss C the jaw and flange b^2, forming a continuation or extension thereof, are transversely grooved to furnish a seat for a die-clamping block or plate, G, which plate may be made in one or two parts, and is provided with an opening, F^3, of a shape and size to correspond with the outer shape of the die F, so as to receive the latter and hold it in position over the waste blank. This clamping-plate is held rigidly in place by bolts *g*. Fig. 1 illustrates the form of clamping-plate employed when rails are punched, its edges *g'* sloping so as to about occupy the space between the tread and base-flange of the rail, in order to always give the rail a proper relative position to the punch, or vice versa,

and always bring the portion of the web of the rail or bar of metal to be punched in position over the die and beneath the punch. It is obvious that the plate may be changed to suit the work, and its form may always be such as to give a predetermined assurance of the hole being punched in the desired spot as regards the edges of the bar of metal without further care on the part of the operator. Still a further point to be noticed is the fact that the upper face of the clamping-plate is slightly below the upper edge of the die, so that the bar being operated upon rests snugly upon the die, giving it a solid and unyielding seat. Further means is furnished for holding the punch at right angles to the metal being operated upon by way of arms H, pivoted at the sides of the boss C and held normally in a depressed position by the abutment of springs *h* against their flattened faces or edges *h'*. These arms are so arranged that they may be turned up or out of the way when the bar is removed from or placed beneath the punch, or when, on the other hand, the punch is removed from or applied to the bar, or, more properly, the rail; but a still more important function of these arms is for them to act as a "take-off" to keep the machine in its place when the punch is being withdrawn from its work.

Formed integral with or otherwise rigidly secured to the screw D there is a ratchet-toothed wheel, D', the teeth of which project in a direction directly opposite to the direction in which the screw D is turned when the punch is at work. Also affixed to the screw D at its very top there are the sockets D^2, preferably four in number, adapted to receive a removable operating-lever, and the lever thereby formed I designate "simple," in contradistinction to the "compound lever," yet to be described. While the screw D, the ratchet-toothed wheel D', and the sockets D^2, as stated, are desirably constructed in a single piece of metal, yet it should be stated that these parts are slightly separated, as shown at *i* and *i'*, to constitute bearings on the shank of the screw. A box composed of two differently-formed half-sections, J J', each of which half-sections is composed of parallel rings *j j*, held apart a distance to receive the ratchet-toothed wheel D' between them by spacing-blocks or ears j^2. These half-sections are fitted about or made to straddle the ratchet-toothed wheel and held together thereon by means of bolts passing through the ears or spacing-blocks j^2. The rings of the box-sections when thus fitted together have bearings on the portions *i i* of the shank of screw D. The difference between the half-sections of the box consists in an elongation or projection, which together constitutes a bracket, K, carrying in its extreme end a toothed segment, L. Pivoted in this bracket is a pawl, M, provided on its end with a hook, *m*, which engages the teeth of the ratchet-toothed wheel D', thereby locking the bracket thereto when moved in one direction. The pawl is provided near its pivot with a toe, *m'*, which forms a seat or abutment, against which the spring *l*, secured to segment L, bears in holding the pawl M in normal yielding contact with the teeth of wheel D'. A small projection, m^2, is formed on the pawl, whereby the latter may be grasped by the operator if occasion requires it.

A step or elongated bearing-socket, N, is supported by the flanges *b b'*, and stepped therein is a shaft, O. Affixed to the upper end of the latter is a lever-socket, P, adapted, like the socket D^2, to receive an operating-lever therein, whereby it may be turned. Teeth *n* on one end of this socket-piece mesh with the teeth of the segment L. Flanges *m* on each side of the teeth prevent the teeth of the socket from being disengaged from the teeth of the segment. On top of the socket P a link, Q, is pivoted, and the other end of this link is provided with an elongated slot, *q*, which latter receives a pin, *q'*, set in the top of bracket K, the function of these parts being to allow the teeth of socket-piece N and segment L to turn freely upon each other, but not too far or away from each other.

In operating upon light work a lever is inserted into one of the sockets D^2 and the screw D turned thereby, and always in removing a punch from the work these sockets are employed, thus having the effect of a simple lever; but in operating upon work of a heavier character the operating-lever is inserted into the socket P, forcing it in the direction indicated by the arrow, the pawl M engaging the teeth of wheel D' until the lever has had one sweep the length of the segment L, or about ninety degrees, when it is returned, the pawl sliding over the teeth to take a new grip.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention; hence I do not wish to limit myself to the particular construction herein set forth; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a punching-machine, the combination, with jaws and a screw-punch, of a die seated in the lower jaw and having a flanged lower end, and a clamping-plate having an opening, and a recess for the reception of the die and its flange, whereby the die is supported on all sides, substantially as set forth.

2. In a punching-machine, the combination, with jaws and a punch, of a hollow die having a flanged lower end and a clamping-plate having a central opening, and a recess to receive the lower end of the die and its flange, whereby the die is firmly clamped at all sides, substantially as set forth.

3. In a punching-machine, the combination, with jaws the lower one of which has an opening through same, and a punch mounted in the upper jaw, of a hollow die having an enlarged lower end and a clamping-plate having an opening conforming in shape to the

enlarged end of the die, whereby when the clamping-plate is locked in position the die is firmly supported on all sides.

4. In a punching-machine, the combination, with jaws the lower one of which has an opening through the same, of a hollow die having a flanged lower end and a slightly-conical upper end, and a clamping-plate having a recess to receive the flanged end of the die and adapted to be secured to the jaw and lock the die over the opening in the jaw, said plate having a form to correspond with the shape of the rail-bar being operated upon, substantially as set forth.

5. In a punching-machine, the combination, with jaws, of a punch in the upper jaw, a die on the lower jaw, a pair of pivoted arms located alongside of the upper jaw, each arm having a flattened portion, and springs adapted to bear against said flattened portions for yieldingly holding the arms in position.

6. In a punching-machine, the combination, with a jaw, a screw therein, and a punch, said screw having a ratchet-toothed wheel thereon, of a bracket mounted on the screw, spring-actuated pawl for engaging the teeth of the wheel, and a pivoted lever for imparting motion to this bracket, substantially as set forth.

7. In a punching-machine, the combination, with a jaw, a shaft, and a screw adapted to turn in the jaw, said screw having ratchet-teeth thereon, of a bracket mounted on the screw and having a spring-actuated pawl held normally in contact with the teeth, a toothed segment attached to said bracket, and a lever affixed to the shaft and provided with teeth which mesh with the teeth on the segment attached to the bracket, substantially as set forth.

8. In a punching-machine, the combination, with a jaw, a screw adapted to turn therein, and a punch in the screw, of a bracket mounted on the screw and adapted to engage with the latter, a toothed segment on the bracket, and a pivoted lever having a toothed segment adapted to mesh with the teeth of the segment on the bracket in operating the screw, substantially as set forth.

9. In a punching-machine, the combination, with a jaw, a screw therein, and a bracket mounted on the screw, said bracket having a toothed segment, of a toothed lever pivoted on the jaw and a link loosely connecting the lever and bracket, substantially as set forth.

10. In a punching-machine, the combination, with a jaw and a screw therein, of a lever pivoted to the jaw-frame and devices connecting the lever with the screw for operating the latter, substantially as set forth.

11. In a punching-machine, the combination, with a jaw and a screw, of a bracket mounted on the screw and devices, substantially as described, connecting the bracket with the screw, whereby it can turn on the screw when moved in one direction and turn the screw when moved in the opposite direction, and a lever pivoted on the jaw-frame and adapted to operate the bracket, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES M. BROWN.

Witnesses:
MARCUS S. PARMELE,
DUNCAN H. FERGUSON.