2 Sheets—Sheet 1.

T. R. MORGAN.

PUNCHING PRESS.

No. 184,413. Patented Nov. 14, 1876.

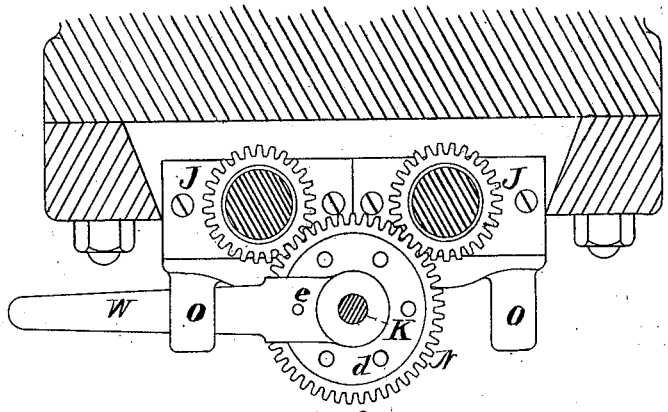

Fig. 2.

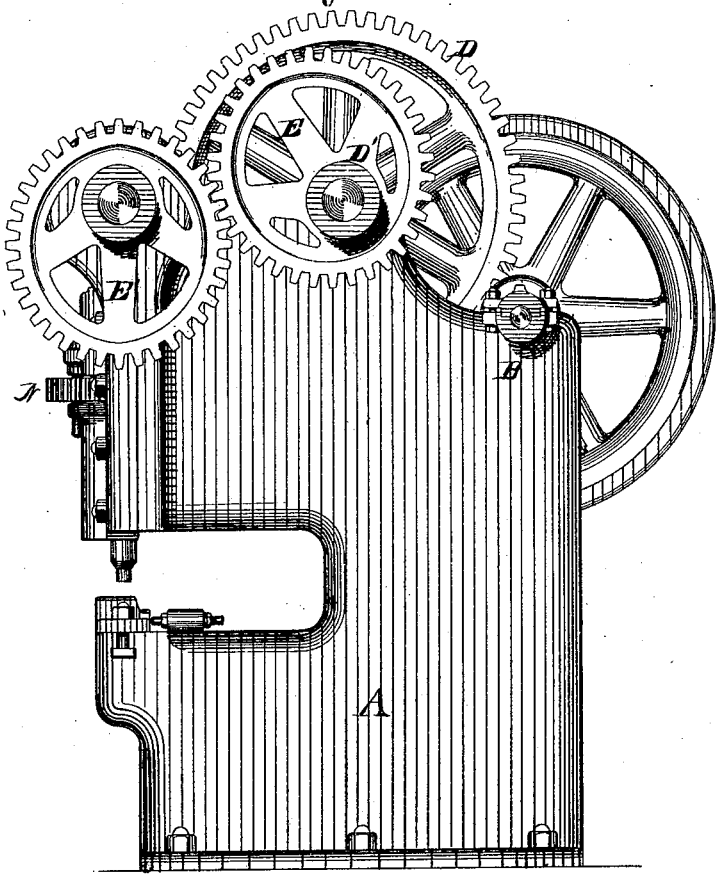

Fig. 1.

Witnesses { F. O. McCleary, A. W. Bugbee } Inventor Thomas R. Morgan

By Leggett and Leggett, attys.

2 Sheets—Sheet 2.

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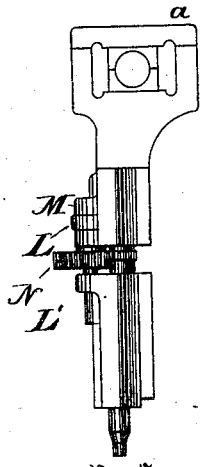

Fig. 5.

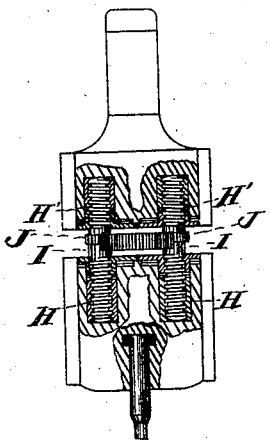

Fig. 4.

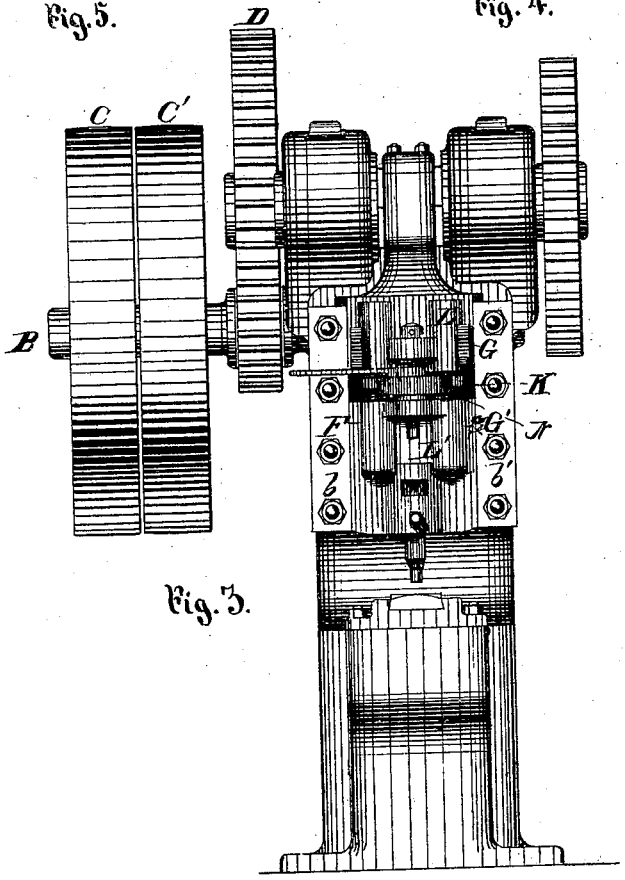

Fig. 3.

Witnesses { F. M. McCleary, A. W. Bright }

Inventor Thomas R. Morgan.
By Leggett & Leggett
Attys.

UNITED STATES PATENT OFFICE.

THOMAS R. MORGAN, OF ALLIANCE, OHIO, ASSIGNOR TO HIMSELF AND CHAS. E. MARCHAND, OF SAME PLACE.

IMPROVEMENT IN PUNCHING-PRESSES.

Specification forming part of Letters Patent No. **184,413**, dated November 14, 1876; application filed October 14, 1876.

To all whom it may concern:

Be it known that I, THOMAS R. MORGAN, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Power-Presses; 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 pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to certain improvements in power-presses for punching metals.

Figure 1 is a side elevation of my improved press. Fig. 2 is an enlarged view of the adjusting mechanism. Fig. 3 represents a front view of the press. Fig. 4 is a front view of the adjusting mechanism, and Fig. 5 shows an edge view of the same.

The prime object of my invention is to provide a power-press with means for adjusting the stock or plunger in any desired position, and to construct and arrange such adjusting mechanism so that the punch may be quickly thrown in or out of engagement with the die, and thereby dispense with the clutch mechanism usually employed for such purpose.

My invention consists, first, in the combination, with a divided or two-part reciprocating stock or plunger, of one or more adjusting screw-rods, constructed with right and left hand screw-threads on opposite ends, and an intermediate gear, and a larger pinion arranged to mesh with the small gear or gears of the adjusting-screws; second, in certain details of construction, hereafter described, and pointed out in the claims.

A is the press-frame, supporting the driving-shaft B, to the outer end of which are secured the tight and loose pulleys C C′. A cog-wheel is secured to driving-shaft B, between the frame and tight pulley C, which meshes with a large gear-wheel, D, the latter secured to a counter-shaft, D′, journaled in bearings on the press-frame, and arranged parallel to driving-shaft B. To the opposite end of shaft D′ is attached an elliptical gear-wheel, E, which is keyed eccentrically to said shaft, and said gear-wheel E meshes with a correspondingly-shaped gear-wheel, E′, eccentrically keyed to the crank-shaft of the press. The reciprocating stock or plunger F is divided into two parts, G and G′, the upper portion, G, being journaled on the crank-shaft shown, and provided with the top plate *a*, whereby the boxes may be removed when worn, and new bearings inserted therefor. The press-frame is provided with the ordinary guides *b b′*, which may be constructed in any known manner, to admit of lateral adjustment to take up for any wear on the stock or guides. The upper and lower portions G G′ of the stock or plunger F are adjustably connected as follows: Nuts H, provided with left-handed threads, one or more in number, are let into the lower end of part G, and removably secured by screws, bolts, or in any desired manner. Similar nuts, H′, provided with right-hand screw-threads, are inserted in the upper end of part G′. The ends of the reversely-screw-threaded bolts I, provided with intermediate gear-wheels J, are inserted in the nuts H H′. A pinion-shaft, K, is journaled in bearings L L′, secured, respectively, to the upper and lower portions G G′ of the plunger, the upper end of the shaft having a collar, M, keyed thereto, which serves to retain the shaft in position. The shaft K is made of sufficient length to insure a perfect bearing in any of the varied adjustments of the plunger.

Upon the shaft K is keyed a thick pinion, N, which meshes with gears J of the threaded bolts or rods I. As the gears J are raised and lowered according as the plunger is raised or lowered, the pinion N with which they engage, and by which they are actuated, is of self-sufficient thickness to always insure a positive mesh or engagement of the smaller gears J, the latter sliding up and down on the teeth of the thick pinion. The upper face or side of thick pinion N is provided with any number of holes, *d*. A hand-lever, W, is loosely secured at one end to the shaft K, and may be locked to the pinion N in any desired position by means of a pin, *e*, secured to the lower side of the lever, the pin constructed to fit within the holes *d* formed in the pinion. In order to retain the plunger in a fixed position, the upper portion G of the plunger is provided

with stops or flanged catches O, which serve to retain the hand-lever securely in place.

Heretofore power-presses have ordinarily been provided with a clutch to throw the working parts of the press in and out of gear with the driving shaft or pulley. This construction is objectionable, as the wear and breakage of the clutch mechanism renders it a matter of considerable unnecessary expense to keep such presses in working order. In a press constructed in accordance with my invention, the clutch ordinarily employed is dispensed with, and a loose pulley is only used when the press is unemployed.

The stock or plunger to which the punch or cutter is secured may be adjusted with the greatest accuracy by simply turning the hand-lever either to the right or left, and securing the end of the lever in the spring-catch. When it is desired to raise the punch from contact with the die—or, in other words, to throw the press out of gear—it is only necessary to give a half-turn to the large pinion, and the latter will impart sufficient movement to the screw-threaded bolts to raise the plunger clear of the die or material placed thereon. The screw-threads formed on the adjusting-bolts are made with as little pitch as possible, in order to sustain the pressure of the plunger when in operation, and thus overcome in a great degree the tendency of the bolts to turn in the nuts. By constructing these bolts with right and left hand screw-threads on opposite ends, the same movement is secured as would be obtained from a bolt provided with a single thread of steep pitch, and ample movement is imparted to these bolts by the auxiliary or actuating pinion, which is, preferably, of twice the size of the gears on the threaded bolts, so that a half-revolution of the large pinion will give a complete revolution to the bolts.

I do not confine myself to the exact construction of parts shown and described for adjusting the stock or plunger, as it is evident that instead of employing the hand-lever provided with a pin to engage in holes formed in the face of the pinion, the latter may be provided with lugs, and the handle with a spring-pressed catch to engage therewith; or the pinion may have cogs formed on its upper face, and the hand-lever constructed with a single tooth to engage therewith. Again, the handle may be hinged to a collar loosely fitted to shaft K, in order that the handle may be easily raised and lowered to be disconnected or connected with the pinion. Instead of securing stops or catches to the edges of the stock or plunger, a sector-rack may be arranged just above the pinion, and the ends of the rack secured to the edges of the plunger.

The elliptical eccentric gearing employed in this press is particularly adapted for use in the manner shown, and for the purpose required, as it constitutes a positive connection between the crank-shaft and its driving-shaft. When the punch is passing through the metal, a slow movement of the punch, and increased power, is required, and this desideratum is obtained by means of this peculiarly-shaped cog-gearing.

As the gear-wheels exert their greatest working leverage when the punch is passing through the die, and as the leverage increases the distance through which the plunger travels in a given time gradually decreases, thus two valuable and important results are secured by means of the elliptical gear-wheels.

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

1. In a power-press, the combination, with the two parts of the divided plunger, adjustably connected by means of one or more bolts provided with right-and-left handed screws and gears for operating the same, of a large pinion keyed to a shaft, journaled in bearings secured to the upper and lower parts of the plunger or stock, the pinion arranged to mesh with the gears of the adjusting-bolts, substantially as set forth.

2. In a power-press, the two parts of the divided plunger, adjustably connected by screw-threaded bolts, the latter provided with gears for actuating the same, in combination with a large pinion, and a hand-lever constructed to be adjustably secured to the large pinion, substantially as set forth.

3. In a power-press, the plunger F, constructed as described, in combination with pinion N, provided with holes *d* and hand-lever W, having a pin, *e*, secured thereto, substantially as and for the purpose described.

4. In a power-press, the plunger F, constructed in two parts, and adjustably secured, as described, in combination with the pinion N, hand-lever W, and catches or stops O, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of October, 1876.

THOS. R. MORGAN.

Witnesses:
A. L. JONES,
J. R. MORGAN.