

G. EMIG.

METAL PUNCHING MACHINE.

No. 327,777.

Patented Oct. 6, 1885.

Fig. 1.

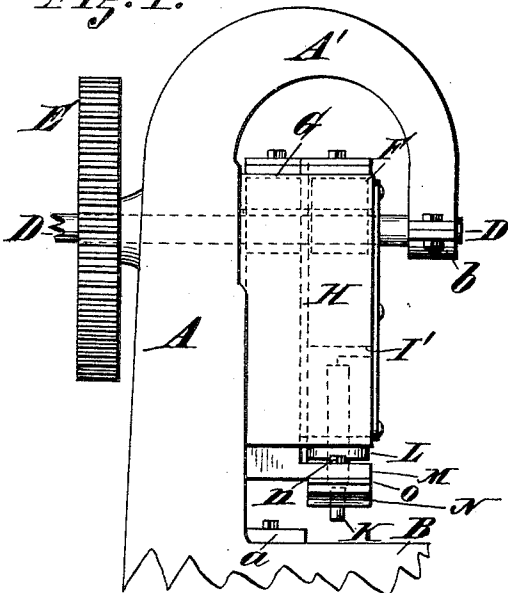


Fig. 2.

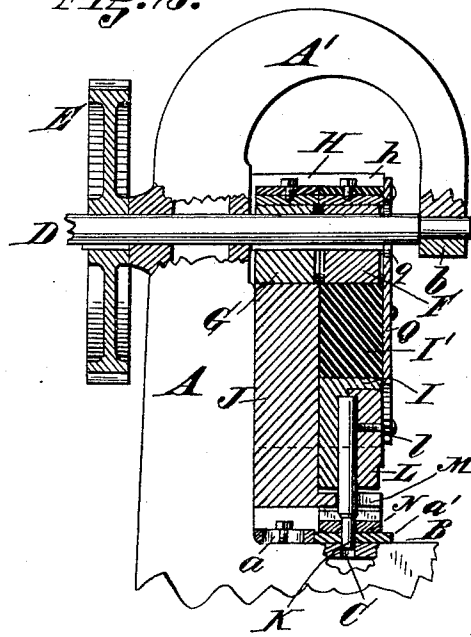


Fig. 3.

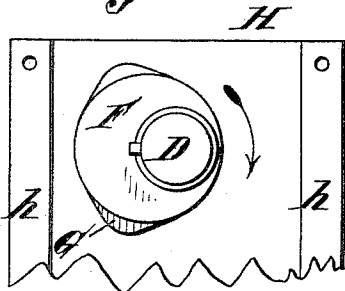


Fig. 4.

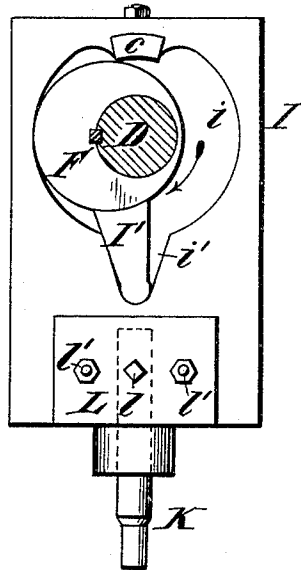


Fig. 5.

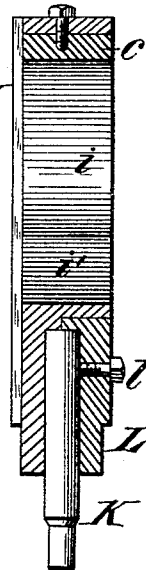
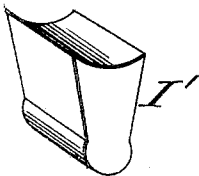


Fig. 6.



ATTEST

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 Williams Reed

INVENTOR

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Fig. 7.

Fig. 10.

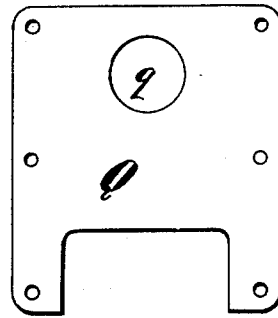
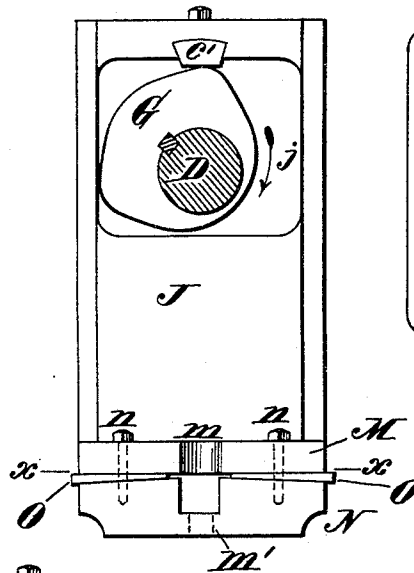


Fig. 8.

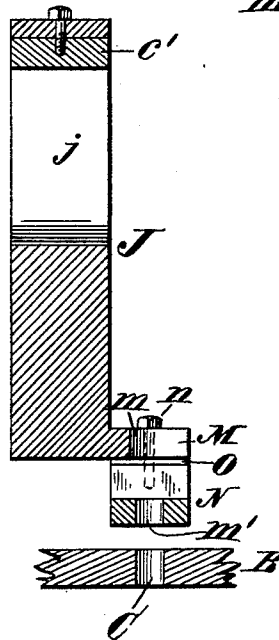
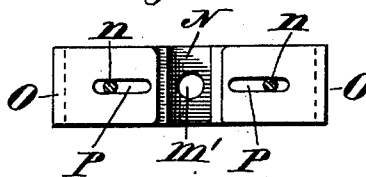


Fig. 9.



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# UNITED STATES PATENT OFFICE.

GEORGE EMIG, OF CINCINNATI, OHIO.

## METAL-PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 327,777, dated October 6, 1885.

Application filed August 18, 1885. Serial No. 174,759. (No model.)

To all whom it may concern:

Be it known that I, GEORGE EMIG, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and the State of Ohio, have invented certain new and useful Improvements in Metal-Punching Machines, of which the following is a specification.

My invention relates to a machine for punching metal; and it consists in the combination, with a main supporting-frame and a rotating main spur-wheel shaft journaled therein, of a cam and an eccentric mounted on said shaft, and two vertically-reciprocating slide-heads actuated within a housing on said frame by said cam and eccentric, respectively, one of said slide-heads being provided with a punch for perforating the metal and the other with a presser-foot, which rests upon the sheet or bar of metal to hold it steady while the punch penetrates and withdraws, and then rises with said punch to allow the metal to be fed or withdrawn, all as fully hereinafter described.

Other features of my invention will be fully set forth in the following description of the accompanying drawings, in which—

Figure 1 is a broken side elevation of the upper portion of a punching-machine embodying my invention, showing the punching devices in their upward position with the punch out of the metal. Fig. 2 is a similar view with the main spur-wheel, the punching devices, and other parts of the machine in section, and showing the punching devices in their downward position, with the punch in the metal. Fig. 3 is a broken front elevation of the housing in which the slide-heads reciprocate, showing the eccentric and cam mounted on the shaft which actuates said heads. Fig. 4 is a front elevation of the punching slide or plunger and its actuating eccentric, showing the actuating-shaft in cross-section. Fig. 5 is a central sectional elevation of the slide shown in Fig. 4. Fig. 6 is a detail perspective view of the pivotal bearing-block upon which the face of the eccentric travels in its revolutions. Fig. 7 is a front elevation of the slide-head having the presser-foot and punch-stripper and its actuating-cam, showing the shaft in cross-section. Fig. 8 is a central sectional elevation of the slide shown in Fig. 7 and a section of the table or die. Fig. 9 is a plan view on line  $x x$ , Fig. 7, showing the bolts in

cross-section. Fig. 10 is a detail front elevation of the covering-plate, which is attached upon the face of the housing.

A represents the upper portion of the main frame or standard of a punching-machine; B, the table thereof, containing the die upon which the metal is placed for punching, and C the opening in the table through which the punchings escape.

$a$  is an adjustable stop or gage plate upon the table, against which the metal  $a'$  is placed for punching, as shown in Fig. 2.

D represents the customary actuating-shaft, suitably journaled in frame A and the box  $b$  at the lower end of the overhanging arm  $A'$  of said frame. This manner of mounting the actuating-shaft, with its outer end bearing in the bracing-arm  $A'$ , in heavy metal-working machinery, is designed to strengthen the machine, and at the same time relieve the shaft of any undue strain caused in the operation of the tools connected directly or indirectly therewith.

E represents a large spur-wheel keyed to shaft D. This spur-wheel meshes in the usual manner with a pinion on the driving-shaft, which pinion and driving-shaft are not shown, as they and the usual fly-wheel and other actuating mechanism can be made and mounted in the customary or any suitable manner.

F represents an eccentric keyed to shaft D, and G is a cam also keyed to said shaft adjacent said eccentric.

H represents a housing cast upon frame A. Between the walls or ways  $h h$  of housing H two slide-heads, I and J, reciprocate. Slide-head or plunger I is provided with a circular opening,  $i$ , in which the eccentric F rotates to actuate it, as shown in Fig. 4.

$I'$  is a block, pivoted in the V-shape cavity  $i'$  in the opening  $i$  of slide-head I, and providing a continuous bearing for the eccentric F, as customary.

K represents an ordinary punch, adjustably and detachably secured in place upon the slide-head or plunger I by means of the cap or plate L, set-screw or tap  $l$ , and bolts or screws  $l'$ .

Slide-head J is provided with an angular opening,  $j$ , in which the cam G rotates to actuate it, as shown in Fig. 7.

$c c'$  are frictional bearing-blocks, suitably secured in place in the tops of openings  $i$  and  $j$ ,

for receiving the rotations of the eccentric and cam, respectively, in their upward movements while lifting or raising the two slide-heads. Both slide-heads are fitted so that the face of the slide J lies closely against the back of slide I, and they freely slide one upon the other.

At the lower end of slide J is an angular foot-piece, M, having a central notch or opening, *m*, in which the punch moves vertically. N is a stripper and presser plate, secured by screws *n* upon the bottom of foot-piece M, and also provided with a central opening, *m'*, for the passage of the punch. In order to level or squarely set said presser and stripper plate N upon the bottom of said foot-piece I use thin wedge-shaped plates O, having slots P for longitudinal adjustment to raise or lower either end of said plate N, as desired. This adjustment of the plate N permits it to be set so that it will press uniformly upon the sheet or bar of metal while being punched.

Q is a covering-plate secured to the face of the housing-walls *h h*, so as to inclose the slide-heads I and J.

*q* is an opening in the cover Q, through which the shaft D passes to its outer bearing, *b*.

In the operation of the two slide-heads, the eccentric and cam on shaft D both rotate so as to start both heads simultaneously, bringing the presser-foot of head J to bear upon the metal at the time the punch reaches it. The relative arrangement of said eccentric and cam on said shaft is such that the punch then continues its descent till it penetrates the sheet or bar of metal, and withdraws while the presser-foot remains at rest thereon, thus holding the metal firmly in place to avoid buckling or curling during the entire punching operation, from the time the point of the punch enters it until it has entirely withdrawn from it. The presser-foot thus acts as a clean and ready stripper for the punch after it has left the

metal in its ascent, when said metal can be withdrawn and another sheet fed.

I claim—

1. In a punching-machine, the combination, with a punching-plunger or slide, I K, of a slide-head, J, provided with a presser and stripper foot, both slides being mounted within a suitable frame and actuated by suitable driving mechanism, so as to punch the metal and hold and strip it, substantially as herein set forth.

2. In a punching-machine, the combination, with the main frame or standard A, having the overhanging brace-arm A' and shaft-bearing *b*, housing H *h h*, actuating-shaft D, upon which is rigidly mounted the eccentric E and cam G, and the spur-wheel E, of the slide-head I, provided with a punch, K, for perforating the sheet or bar of metal, and a slide-head, J, provided with a presser and stripper foot, N M *m m'*, for exerting a pressure upon said metal during the descent and ascent of the punch through it and to serve as a stripper, substantially as herein set forth.

3. In a punching-machine, the combination, with a slide-head J, having foot-piece M and presser and stripper plate N, of the adjustable intermediate wedge-shape plates O P and screws *n*, substantially as and for the purpose specified.

4. In a punching-machine, the combination, with slide-head I and punch K, of a plate, L, bolts *l*, and set-screw *l*, for adjustably and detachably securing said punch in place, substantially as herein set forth.

In testimony of which invention I have hereunto set my hand.

GEORGE EMIG.

Witnesses:

JOHN E. JONES,  
JOSEPH LITTELL.