J. MORGAN.

Machine for Punching Boiler-Plates.

No. 167,461. Patented Sept. 7, 1875.

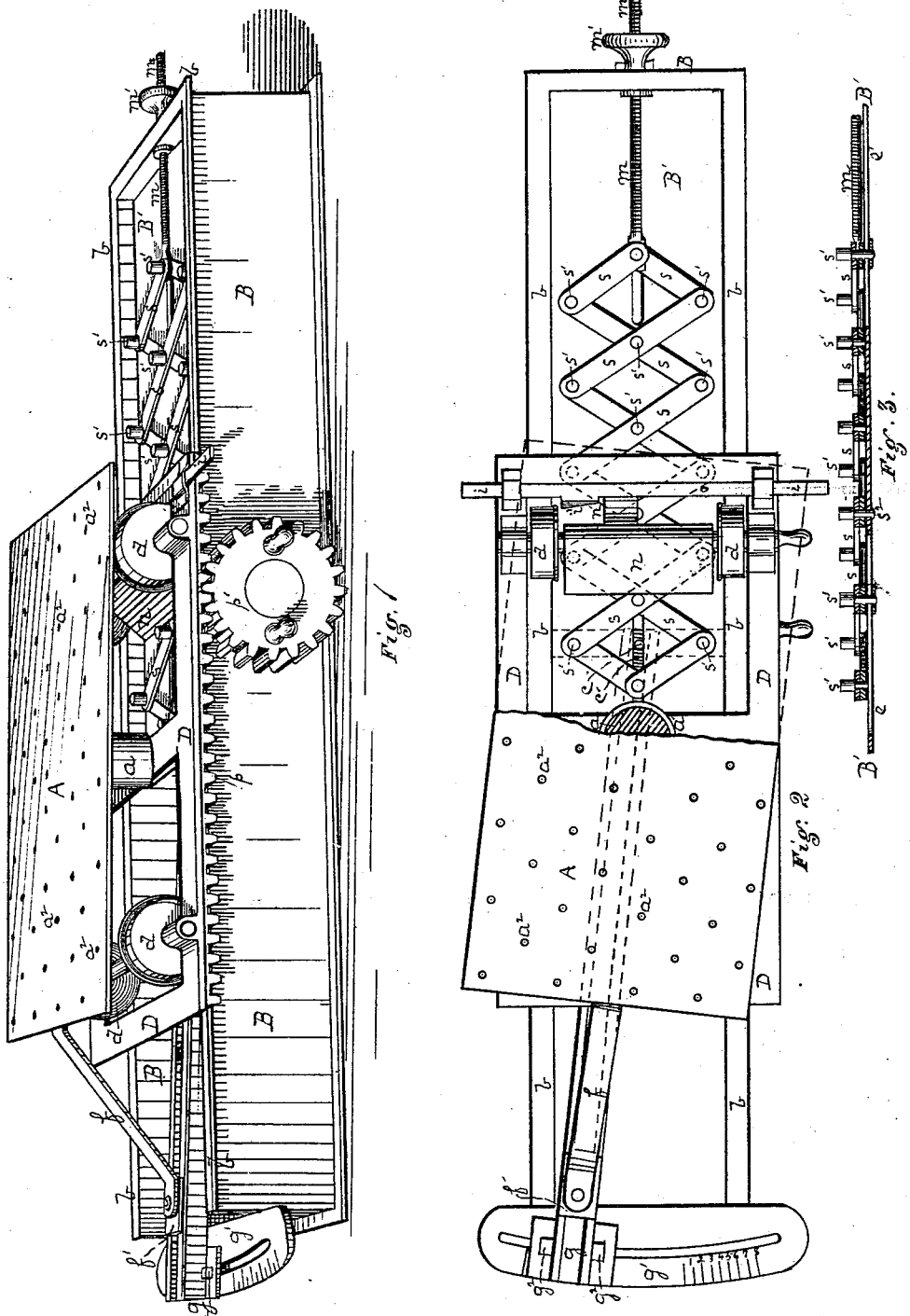

Fig. 1

Fig. 2

Fig. 3.

Witnesses: Claudius L. Parker, J. E. Boggs.

Inventor: James Morgan, by George H. Christy - his Att'y.

UNITED STATES PATENT OFFICE.

JAMES MORGAN, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR PUNCHING BOILER-PLATES.

Specification forming part of Letters Patent No. **167,461**, dated September 7, 1875; application filed August 19, 1875.

To all whom it may concern:

Be it known that I, JAMES MORGAN, of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Boiler-Plate-Punching Machine; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which like letters indicate like parts.

Figure 1 is a perspective view of my improved machine. Fig. 2 is a top or plan view thereof, but with a portion of the pivoted table broken away; and Fig. 3 is a longitudinal sectional view of the adjustable feed-rack.

My improved machine is designed for use in the punching of boiler-plates or other sheet metal where the line of punching is a curved line, or the distances between holes are, in the same or different sheets, other than uniform.

The frame-work B is of any suitable construction, but it is provided with track-rails *b*, running parallel with each other in the general direction of feed. On these track-rails the truck-wheels *d* operate so as to carry along forward and back a carriage, D, on which, preferably at or near its center, by a pin-and-socket or other suitable joint, *a a'*, I pivot a feed-table, A, so that the latter, while being moved forward and back by the carriage, may be free to turn on its pivoting-point like the forward bolster of a wagon within the desired limits. The plate to be punched is clamped thereon by L or T bolts passing through the holes a^2, or in other desired way, but with the edge to be punched projecting over the edge of the table, so as to be brought under the punch, which is arranged in suitable position for the purposes. If, now, as the carriage D advances in the line of the rails *b*, the table A be caused to advance in a line forming an acute angle therewith, it is obvious that any fixed point on the table outside of the center of rotary motion, or any point attached thereto, will describe a curved line, and that the radius of curvature will be shorter, as the angle referred to becomes less acute. To secure this curved line of feed along the edge of the plate to be punched I attach rigidly to one end of the table A a guide-arm, *f*, the outer end of which, by a block or shoe, *f'*, enters a U-shaped guide-bar, *g*, which at one end is pivoted, as at *c*, to a cross-bar, *c'*, or other fixed part of the frame B, and at the opposite end is adjustable in a horizontal plane. And to secure accuracy of adjustment I connect by a sliding connection this movable end of the guide-bar *g* with a graduated plate, g^1, whereby I am enabled to give the desired angle to the bar *g*, and by tightening-nuts g^2, or other locking device, fix it in place.

It is obvious that the form of the shoe *f'* and of the bar *g* may be changed, and also the pivoting-point *c*, it only being essential in these respects that the bar *g* be adjustable in the line of its length with reference to the line of motion of the carriage, and that it act as a guide to an arm rigidly attached to the pivoted table.

In order, now, to vary the distances between the holes as punched, I use an extensible rack, *s*, made with bars crossing each other like lattice-work, riveted to each other at their crossing-points with such degree of looseness that the bars may turn on the rivets, but without any or with a minimum of play. The rivets s^1 are extended up so as to form ratchet-teeth. Any desired one of the inner line of rivets (preferably one at or near the middle, as shown in Fig. 3 at s^2) is secured to the bed-plate B' or other fixed part of the frame of the machine, so as to constitute a fixed point of motion to the extensible rack *s*, and one or more of the rivets at or near each end are caused to extend down into a slot, *e* or *e'*, so that, as the extensible rack *s* is lengthened or shortened, it will be caused to lengthen or shorten in a direct line. It is obvious, now, that by increasing or shortening the length of the extensible rack *s* the distance between transverse lines passing through the teeth s^1 at right angles to the line of feed will be correspondingly increased or lessened. And this longitudinal extension of the rack *s* I effect by a threaded stem, *m*, secured to the rack, and an adjusting screw-nut, *m'*, thereon, the latter being set in the end of the frame B. To one of the axles, or to a transverse bar on the carriage, I affix a vertically-swinging pawl, *n*, so that, swinging freely, it will pass and engage the teeth s^1, and thus, according

to the adjustment of the extensible rack *s*, fix the length of each successive feed or forward motion, and, consequently, the distance between punch-holes. The feed is effected by a toothed rack and pinion, *p p'*, in the usual way. When it is desired to run the carriage back the pawl *n* may be raised and held up in any known way, one suitable for the purpose consisting of a slide, *i*, moving endwise with an inclined projection, *i'*, which, when drawn forward, engages an arm, *n'*, on the pawl *n*, and by depressing said arm raises the pawl clear of the teeth.

I claim as my invention—

1. The combination of traveling carriage, a table pivoted thereon, a rigid bar extending from the table and engaging an adjustable guide-bar, substantially as and for the purposes set forth.

2. An extensible rack, *s*, in combination with a feed-carriage and pawl, substantially as and for the purposes described.

3. An extensible rack, *s*, fastened to the frame at one point of its length, as at s^2, and guided in its extensible movement by one or more projections and slots, substantially as and for the purpose set forth.

4. In combination with the adjustable guide-bar *g*, a graduated fastening-plate, g^1, substantially as set forth.

5. The slide *i*, having an inclined or wedge-shaped projection, *i'*, in combination with the pawl *n*, having an arm, *n'*, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES MORGAN.

Witnesses:

JAMES M. CHRISTY,

GEO. H. CHRISTY.