De W. C. CARROLL, D. ROGERS & A. W. FOSTER, Jr.

Machine for Punching Boiler-Plates.

No. 164,673. Patented June 22, 1875.

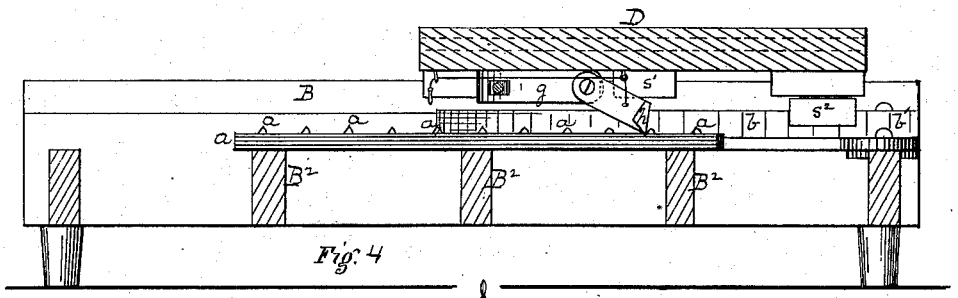

Fig. 4

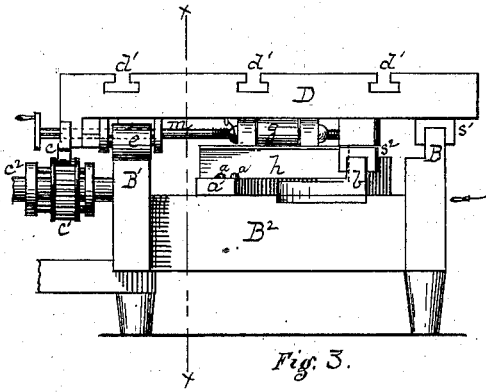

Fig. 3.

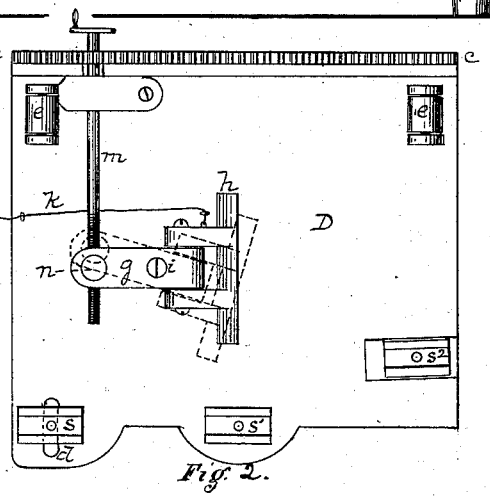

Fig. 2.

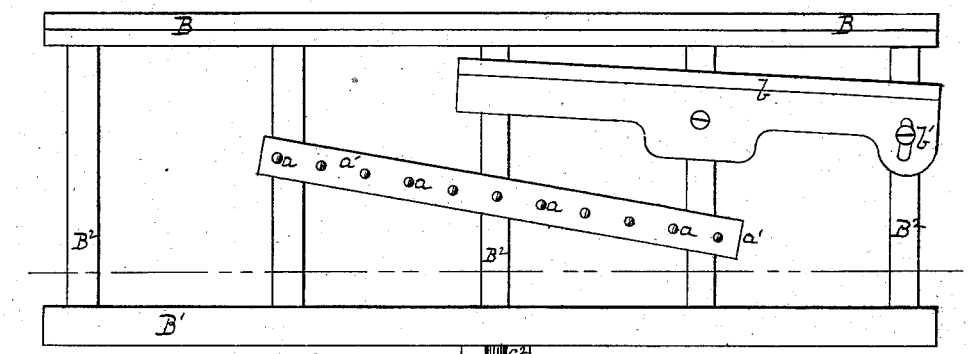

Fig. 1.

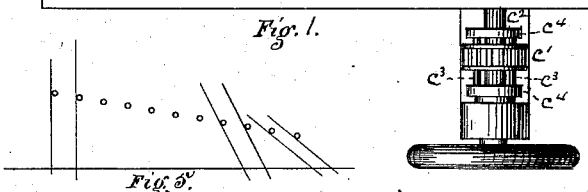

Fig. 5.

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UNITED STATES PATENT OFFICE.

DE WITT C. CARROLL AND DAVID ROGERS, OF PITTSBURG, AND ALEXANDER W. FOSTER, JR., OF TEMPERANCEVILLE, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR PUNCHING BOILER-PLATES.

Specification forming part of Letters Patent No. **164,673**, dated June 22, 1875; application filed April 16, 1875.

To all whom it may concern:

Be it known that we, DE WITT C. CARROLL and DAVID ROGERS, of Pittsburg, and ALEXANDER W. FOSTER, Jr., of Temperanceville, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Feeding-Machine for Punching Boiler-Plate; and we 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 indicating like parts—

Figure 1 is a top or plan view of the machine without the feed table or carriage and its attachments. Fig. 2 is an inverted or bottom view of such feed table or carriage and its attachments. Fig. 3 is an end view of the machine. Fig. 4 is a sectional view in the line *x x*, Fig. 3; and Fig. 5 illustrates by diagram the relationship of the adjustable pawl to the rack-teeth.

In the punching of sheet-metal plates for boilers, tanks, and similar uses the line of rivet-holes along the edge of the sheet is sometimes required to be straight, sometimes curved, and curved to different radiuses. Also great exactness is required, not only in the alignment of the holes, whether straight or curved, but also in the distances between holes.

Our machine is chiefly designed to facilitate the attainment of these two ends—viz., a ready and correct alignment of the rivet-holes, whether straight or curved, and with any desired radius of curvature, and also exactness in the distances between holes, with any desired variation in such distances.

The frame-work of the machine may be of any desired construction, with longitudinal track or guide rails B B^1 suitably connected by cross-bars B^2. The punching apparatus, as it does not form any part of our present invention, is not shown in the drawing; but such apparatus, of any suitable form or construction, is to be attached to, or arranged in connection with, our improved machine, with reference to punching the rivet-holes as the plate is fed into place, such construction or arrangement in similar machines being already well known in the art.

At D we have shown the traveling feed table or carriage. An inclined adjustable guide-rail is shown at *b* resting upon, and, when the machine is in operation, firmly attached to, the cross-bars B^2, and fixedly attached to such cross-bars B^2, is a rack-bar, *a'*, having therein a series of ratchet-teeth, *a*, at any desired distances apart, but preferably a distance equal, or about equal, to the most usual distance desired between rivet-holes, such distance on the bar being measured in the line of feed or travel. This rack-bar *a'* is arranged on, and attached to, the cross-bars B^2 in the general direction of the line of feed, and somewhat oblique or inclined thereto, say, at an angle of about forty-five degrees, more or less. A feeding motion is given to the carriage or table D by means of a rack, *c*, and pinion *c'*.

Either of the rails B B^1 may be employed as a main guide-rail; but, as shown in the drawing, the rail B is so employed, the rollers *e e* on the other rail, B^1, being simply bearing-rollers.

For the purpose of regulating the line of feed, and consequently the alignment of the rivet-holes, we attach to the under side of the feed-table D three inverted U-shaped guides, *s* s^1 s^2, of which *s* s^1 play on the main guide-rail B, and one, s^2, on the adjustable rail *b*. The middle guide s^1 is attached in such manner that the table or carriage D may turn thereon in a horizontal plane, as on a pivot. The stem, by which the forward guide *s* is attached, plays in a transverse slot, *d*, so that while the table is guided, supported, and steadied thereby in its forward travel, its forward end will be free to turn laterally on the stem of the guide s^1 as a pivot. The rear guide s^2 plays on the oblique guide-rail *b*, and, as a consequence thereof, the rear end of the table will with the feed be thrown laterally to or from the rail B, and hence, thus giving a new direction to the feed between each two rivet-holes, will cause the sheet-metal plate, which is fastened on top of the table D, to present a curved line for punching to the punch, and thereby secure a curved arrangement or alignment of rivet-holes; and the radius of curvature in such alignment may be varied at pleasure by increasing or lessening

the obliquity of the rail *b*, and this is effected by means of a screw-bolt and slot, *b'*, or by other known suitable means. To provide, however, for the change of position which is thus effected in the toothed rack *c*, we combine therewith a shrouded pinion, c^1, which is free to slide back and forth on its driving-shaft c^2, and which has a flange on each end flush with the exterior of its teeth, so that the ends of the teeth on the rack *c* shall, by bearing against such flanges, cause it to shift position either way, as may be necessary.

The pinion c^1 should be secured to its shaft c^2 by a key or feather, or like means; or may play on pins c^3 passing through it, the ends of the pins being secured to collars c^4, which are fixed on the shaft c^2 far enough apart to allow the desired range of motion in the pinion c^1; or, as a mechanical equivalent of this arrangement, a long pinion may be employed.

In order now to vary at pleasure the distance between the rivet-holes, or, what is the same thing in effect, to vary the length of feed or motion in the table D, we pivot to the under side of the table a block, or arm, *g*, so that the same may swing or turn freely in a horizontal plane. To one end of this block we pivot loosely a vertically-swinging pawl, *h*, which, by passing or being carried over a tooth, *a*, when the table is moving one way, shall permit of a forward feed, but by dropping from, or by in any way engaging a tooth, shall either arrest the feed or indicate the point at which it is to be arrested preliminary to punching another rivet-hole; and this pawl should be made as long as, or longer than, the transverse side of a rectangle, of which the line of teeth *a* is the diagonal. In the opposite end of the block *g* we insert vertically a rocking shaft, *n*, through a tapped eye in which we pass a screw-stem, *m*, which, passing through the side bar of the table D, shall be held as against a longitudinal motion, and, hence, on being turned, will cause the block *g* to turn on its pivot *i*. By this means the pawl *h* is shifted in position so as to stand directly transverse, or at right angles, to the line of teeth *a*, or at any desired acute angle to such line. In the former case the distance between the teeth in the line of feed will give the distance between the rivet-holes, and such distance between the rivet-holes will be lessened accordingly as the engaging edge of the pawl is brought to an angle more and more acute to the line of the teeth. Thus the distance between rivet-holes may be regulated at pleasure.

This variable length of feed, with the varying angle of the pawl, will, perhaps, be more readily understood on reference to Fig. 5, where the distances between parallel lines indicate the length of feed where the pawl stands at the angles indicated by such lines.

Instead of the inverted U-shaped guides *s* s^1 s^2 grooved rollers, or other equivalent device, may be employed.

The sheet or plate to be punched is fastened on the table D by T-head bolts entering the grooves *d'*, or by other equivalent means, the edge of the sheet, however, projecting over the edge of the table far enough to pass under the punch. To run the table back after a line of punching is complete, it is only necessary to carry the pawl clear of the teeth, which may be done by a cord, *k*, or other suitable means.

We claim as our invention—

1. The feed-table D and the driving mechanism for imparting to the table a forward motion on the main guide-rail, in combination with a guide attached to said table, and playing on an inclined guide-rail for giving the table a swinging motion in its forward travel, substantially as set forth.

2. A pinion, moving laterally on its driving-shaft, in combination with a toothed rack and horizontally-swinging feed-table, substantially as set forth.

3. A toothed rack-bar, fixedly secured in place, in combination with a pivoted pawl, whereby the angle of the engaging edge of the pawl with the line of the rack-teeth may, by the adjustment of the pawl, be varied at pleasure, substantially as set forth.

4. The vertically-swinging pawl *h*, attached to, and in combination with, a horizontally-swinging block, *g*, and with suitable devices for setting the latter at any desired point of adjustment, substantially as set forth.

In testimony whereof we have hereunto set our hands.

DE WITT C. CARROLL.
DAVID ROGERS.
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Witnesses:
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