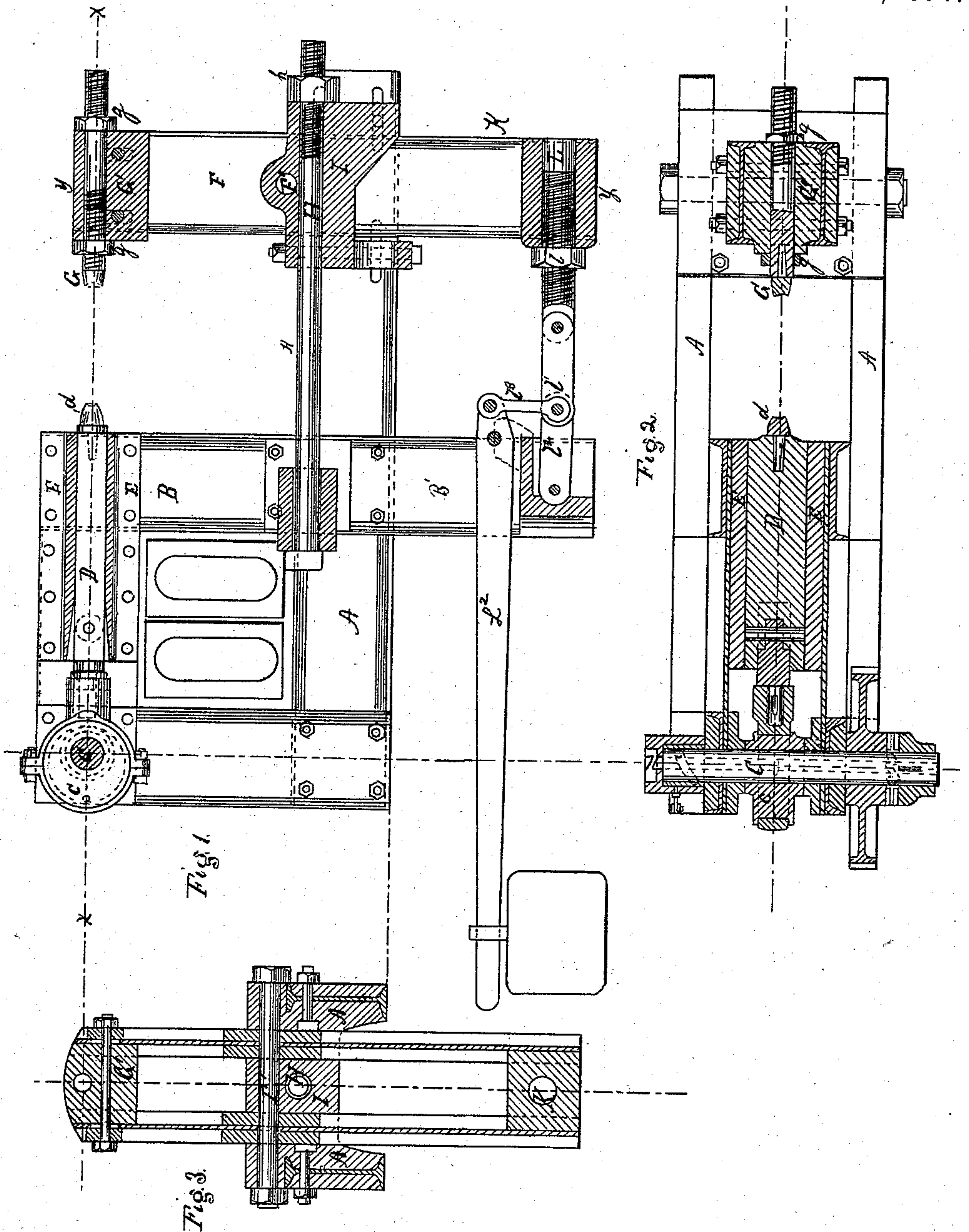


J. L. PIPER & J. A. NICHOLS.

Metal-Riveting Machines.

No. 157,695.

Patented Dec. 15, 1874.



WITNESSES.

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J. A. Nichols

INVENTORS.

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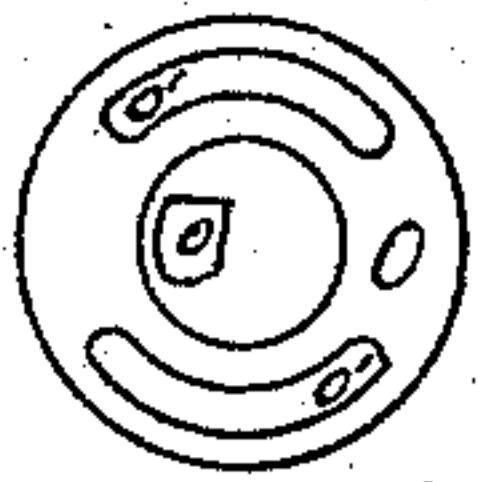
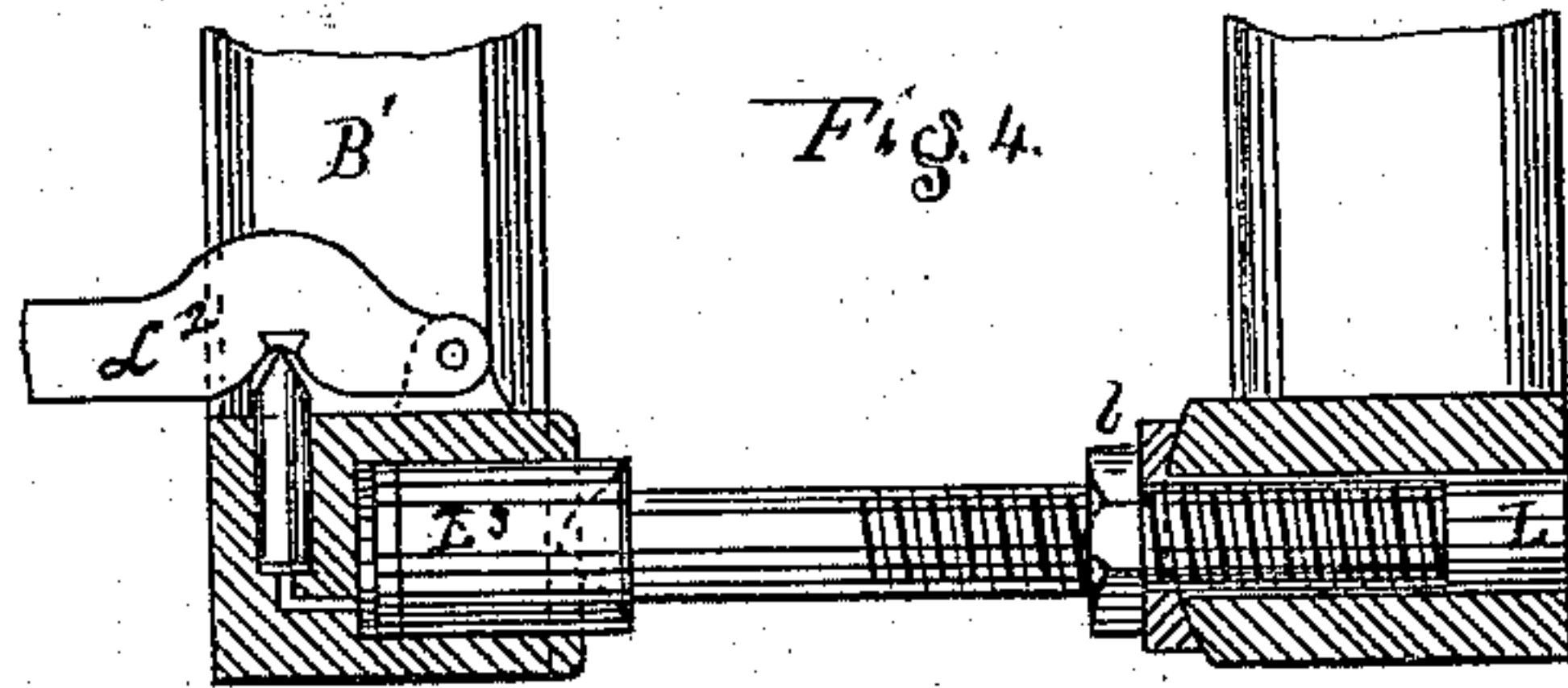
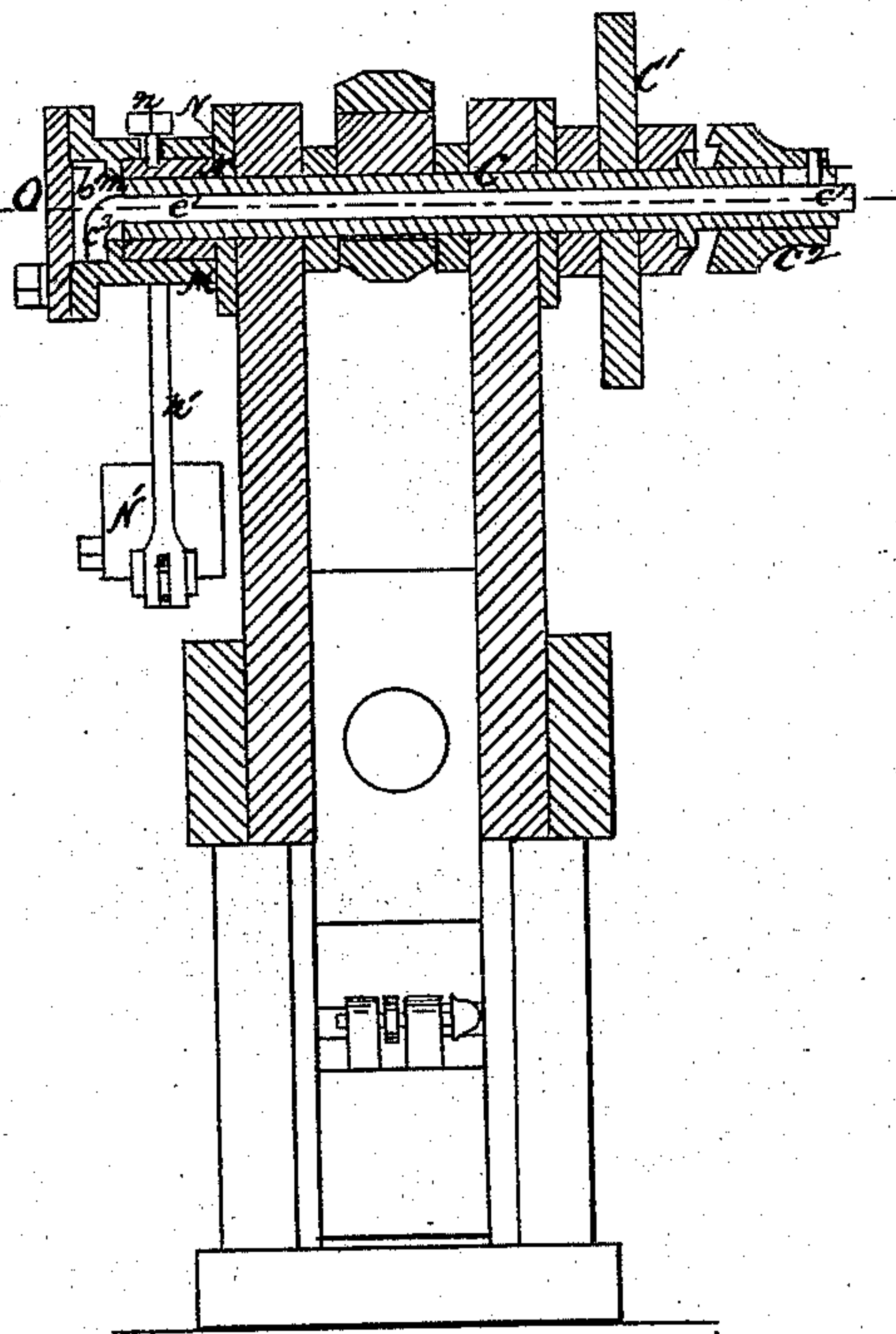
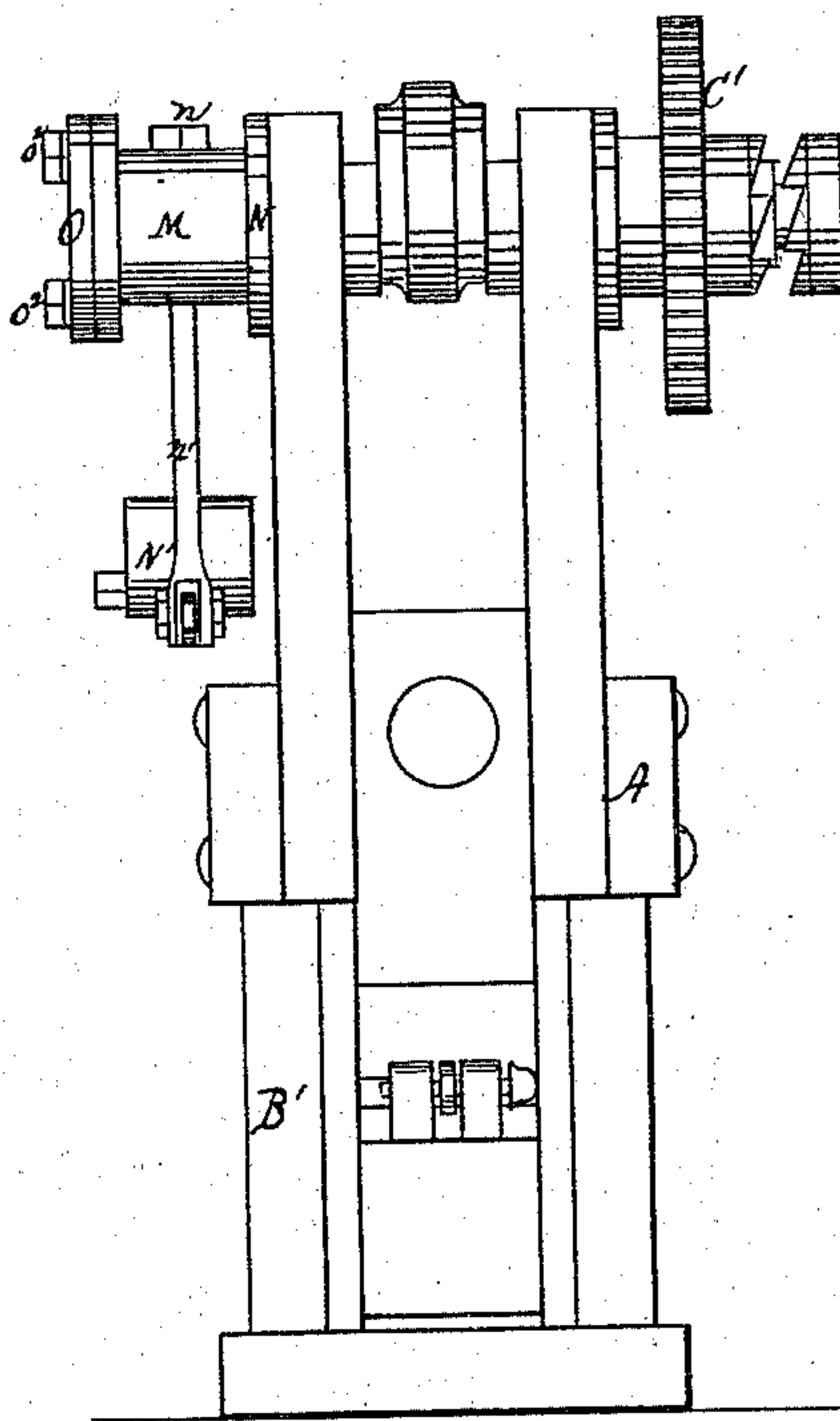


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN L. PIPER AND JOHN A. NICHOLS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN METAL-RIVETING MACHINES.

Specification forming part of Letters Patent No. **157,695**, dated December 15, 1874; application filed October 28, 1874.

To all whom it may concern:

Be it known that we, JOHN L. PIPER and JOHN A. NICHOLS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Power Riveting Machinery; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making part of this specification, in which—

Figure 1 is a side view, partly in section, of a machine embodying our invention. Fig. 2 is a horizontal section on the line *x x*, Fig. 1. Fig. 3 is a vertical section of the die-post on the line *y y*, Fig. 1. Fig. 4 is a modification of the device used for balancing the compensating die-post. Fig. 5 is a rear view, and Fig. 6 is a sectional view of Fig. 5.

Like letters refer to like parts in the several figures.

Our invention relates to that class of riveting-machines in which the riveting-punch is driven by pulleys or gearing through the medium of an eccentric or similar device, and in which the stroke of the ram is uniform, and not capable of graduation, as in the steam riveting-machine. As heretofore constructed, riveting machinery of this class has been provided with a rigid die-post, to which the die was adjustably secured, so that the distance could be increased or decreased, according to the nature of the work to be accomplished, the thickness of the material, and length of the rivet operated upon; but, when once graduated, no provision existed for occasions where the rivet was longer than usual, or the material between the ram and die was more than that to which the machine was graduated. When, from the rigidity of the post, and the nature of the power by which the ram was driven, an extra length of rivet or surplus of material intervened, it caused the jamming of the machine, which usually resulted in the destruction of the riveting ram and die, and was only relieved when the driving-cam on the power-shaft passed its greatest eccentricity.

For the above reasons and objections, power riveting machinery of this class has been almost entirely superseded by steam riveting machinery, wherein the distance and force of

the travel of the riveting-ram can be controlled.

For general purposes, the power riveting machinery of the class to which this invention relates is preferable to the steam riveting machinery, if the objections above cited are removed, which is the object of the present invention.

Our invention consists, first, in combining, with the riveting-ram, a die-post pivoted to a block movable on the bed of the machine, said die-post being weighted through the medium of toggle-levers, or similar mechanism, so as to yield when undue strain is put on the machine; second, in operating the clutch of the driving-gear by means of a rod or similar device passing through the driving-shaft, and terminating in a cam-box, which slides on a stationary bearing, and is controlled by a treadle or similar suitable device, whereby the clutch may be caused to slide into gear, and the ram to advance and make the rivet-head, after which the clutch will be thrown out of gear until the operator again moves the treadle.

We will now proceed to describe the apparatus embodying our invention with reference to the accompanying drawing, in which—

A represents the bed; B, the ram-post; C, the driving-shaft, provided with the cam *c* for operating the piston D, which works through the sleeve or guide E, and is provided with the riveting-ram *d*. The bed, ram-post, and supporting-frame, together with the punch and driving-power above enumerated, may be of the ordinary or any approved construction, with the exception that the ram-post B is provided with an extension, B', for purposes hereinafter specified. F represents the die-post, pivoted at F' to a block sliding on the bed A, and provided at its top with the riveting-die G, supported in a movable head, G', and adjustably constructed, so as to be lengthened or shortened by means of the nuts *g*, according to the distance required between the die and the riveting-ram. The die-post is pivoted to the block I, through which the rod H passes, said rod H connecting the die-post with the ram-post, and permitting the adjustment of the compensating-post F to or from the ram-post by means of the nut *h* on the end of the

rod H and slots in the bed A, so that the compensating-post, while pivoted to the block I, so as to oscillate, is at the same time supported on ways movable on the bed A. Within the bottom of the post F is an opening, K, through which passes the screw L, provided with the nut *l*, and jointed through the toggle-levers L^1 L^2 L^3 with the extension B' of the ram-post, and with the weighted lever L^2 .

C^1 represents a pulley or gear wheel moving loosely on the shaft C, with which the clutch C^2 engages when shaft C is to be revolved. The clutch C^2 is keyed to a rod, c^1 , passing centrally of the driving-shaft C, the slot in shaft C, for the passage of the key which connects the central rod and clutch, being elongated to admit of the sliding motion of the clutch upon the shaft. Surrounding the opposite end of shaft C is a sleeve or box, M, capable of sliding and partial revolution upon a stationary bearing, N, but limited in its movement by a set-screw, *n*, and controlled by a weighted treadle, N^1 , to which it is connected by a rod, n' . Upon the inner surface of the sleeve M is a flange, *m*, which, together with the slotted cap O, forms a box surrounding the end of shaft C, within which the bent end c^3 of rod c^1 is confined. The cap O is provided upon its inner face with a projection or cam, *o*, which, under certain relations of the parts, gives an end movement to the rod c^1 , and it is also slotted, as at o^1 , to admit of its adjustment, upon which depends the position of the ram at the end of its movement. The cap is secured to the end of the sleeve M by screws o^2 , or other suitable devices.

The operations of these devices are as follows: The operator placing his foot upon and depressing the treadle, the sleeve or box M slides on its bearing, so that the flange *m*, acting on the bent end c^3 of rod c^1 , causes the clutch C^2 to slide upon shaft C, and take into the driving-gear C^1 , revolving the main shaft, and causing the ram or punch to advance.

If the operator wishes the ram to act continuously, he keeps his foot upon the treadle, retaining the several parts in the position above stated; but if he desires a single stroke of the ram, he withdraws his foot from the treadle, when the weighted arm n' retracts the sleeve M, so that the bent end c^3 of arm c^1 revolves close to the inner face of cap O, and, coming in contact with the projection or cam *o*, receives end motion, causing clutch C^2 to slide out of gear.

The position in which the ram is left will depend upon the position of the projection *o*, which can be regulated by adjusting the cap by means of the slots o^1 .

The length of the rivet to be employed will determine the distance between the compensating-post and ram-post, or between the riveting-die and the ram; and the compensating-post F may be moved forward or backward, as is necessary for adjustment, by means of the rod H and the screw-nut *h*.

The force of the blow having been determined, the lever L^2 is weighted to correspond, so that sufficient power is obtained to keep the compensating-post steady under the usual riveting-blow of the ram.

So long as the material between the riveting punch and die is of the proper thickness, the machinery will operate in the ordinary manner; but if, for any cause—too great thickness of material or length of rivet—the space is not sufficient, the compensating-post will yield under the end thrust of the riveting-ram, oscillating upon the pivot F', and raising the weighted lever L^2 ; but, as soon as the cam by which the riveting-ram is driven passes its greatest eccentricity, the weight upon the lever L^2 will draw down its lever, forcing back the compensating-post F to its first position.

Fig. 4 of the drawing is a modification, wherein, instead of using the weighted lever, connected by toggle-levers to the bottom of the compensating-post, we have caused the screw L to terminate in the piston-head L^3 , working in the cylinder formed in the bottom of the ram-post extension B', and have interposed a water-packing between it and the piston forming the fulcrum of the weighted lever-arm, which is simply an equivalent of the device specified.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The die-post F, pivoted to the block I, movable on the bed A, in combination with the ram-post B and weighted lever L^2 and intermediate mechanism, substantially as and for the purposes described.

2. The die-post F, pivoted to the block I, in combination with the weighted lever L^2 and suitable intermediate mechanism, substantially as and for the purpose specified.

3. In combination with a sliding clutch, C^2 , the rod c^1 , sliding cam-box M, and a suitable weighted treadle or similar device, substantially as and for the purpose specified.

In testimony whereof we, the said JOHN L. PIPER and JOHN A. NICHOLS, have hereunto set our hands.

JOHN L. PIPER.

JOHN A. NICHOLS.

Witnesses:

T. B. KERR,

F. W. RITTER, Jr.