

(No Model.)

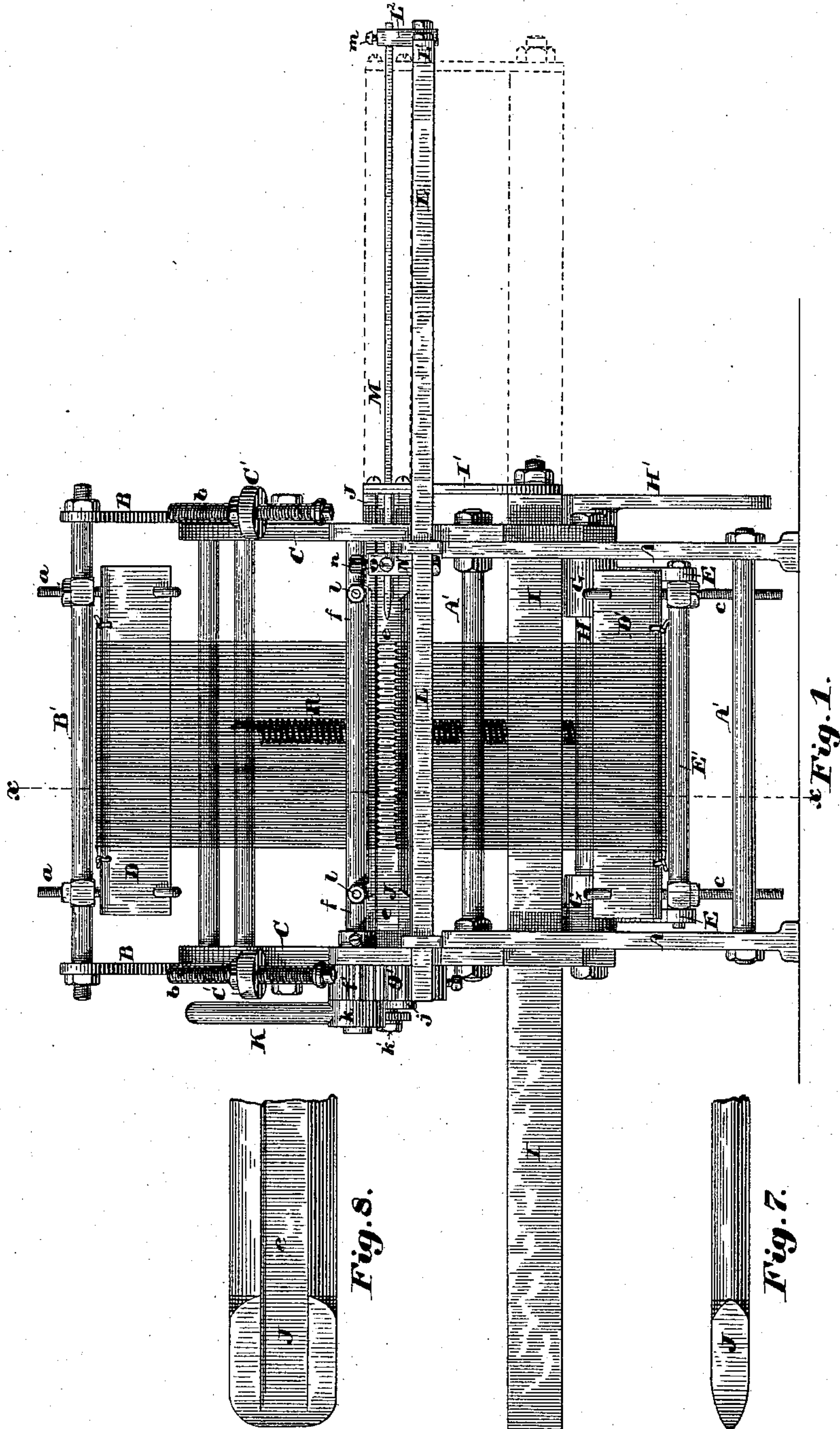
3 Sheets—Sheet 1.

J. SLADDIN.

MACHINE FOR OPENING THE EYES OF LOOM HARNESS.

No. 324,420.

Patented Aug. 18, 1885.



**Witnesses:**  
Walter E. Lombard.  
William H. Parry.

**Inventor:**  
Joseph Sladdin.  
by N. P. Lombard  
Attorney.

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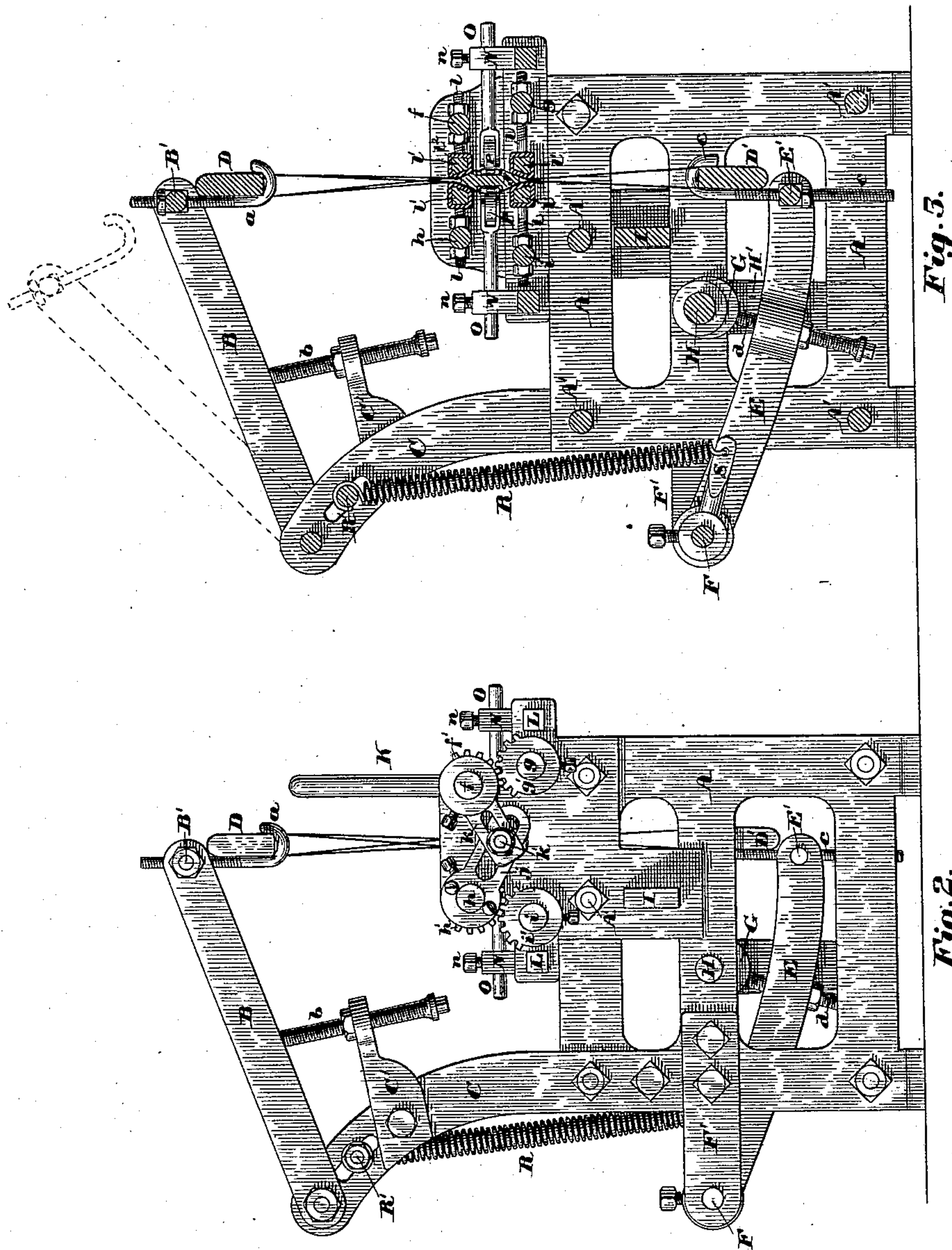


Fig. 3.

Fig. 2.

**Witnesses:**

Walter E. Lombard  
William H. Parry

**Inventor:**  
Joseph Sladdin,  
by N. C. Lombard  
Attorney.



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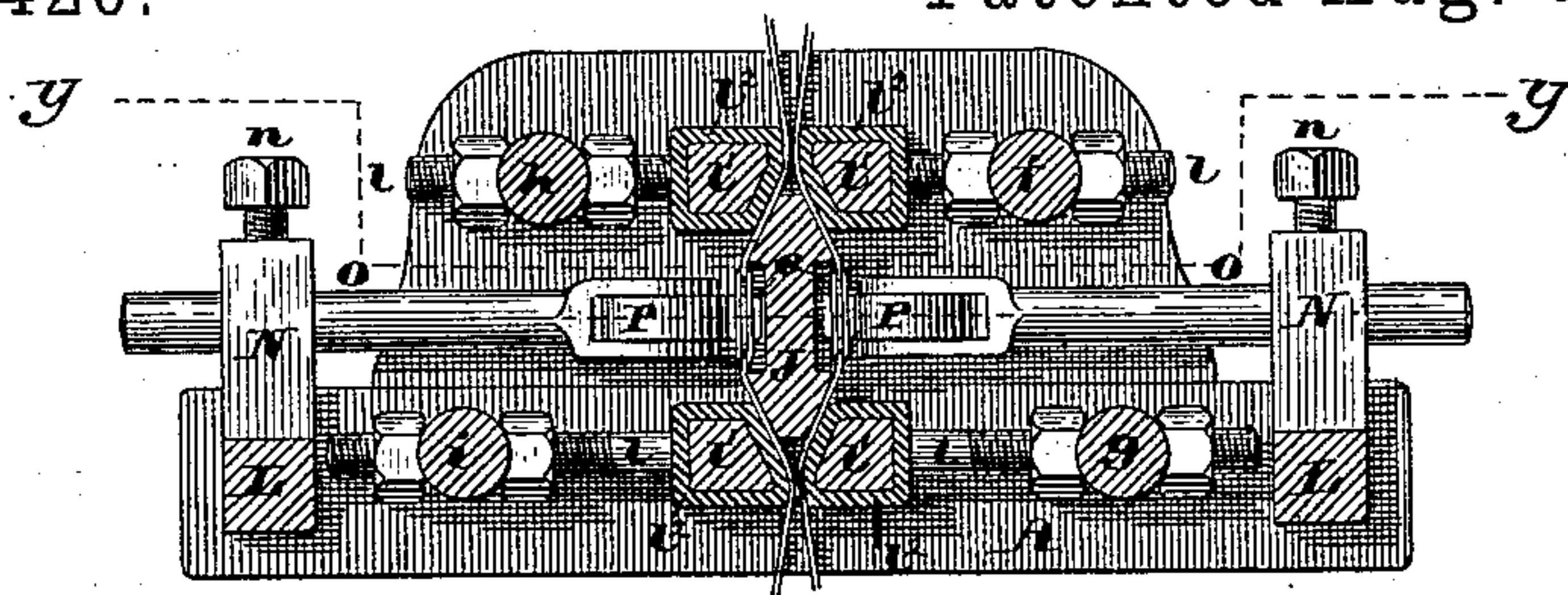


Fig. 4.

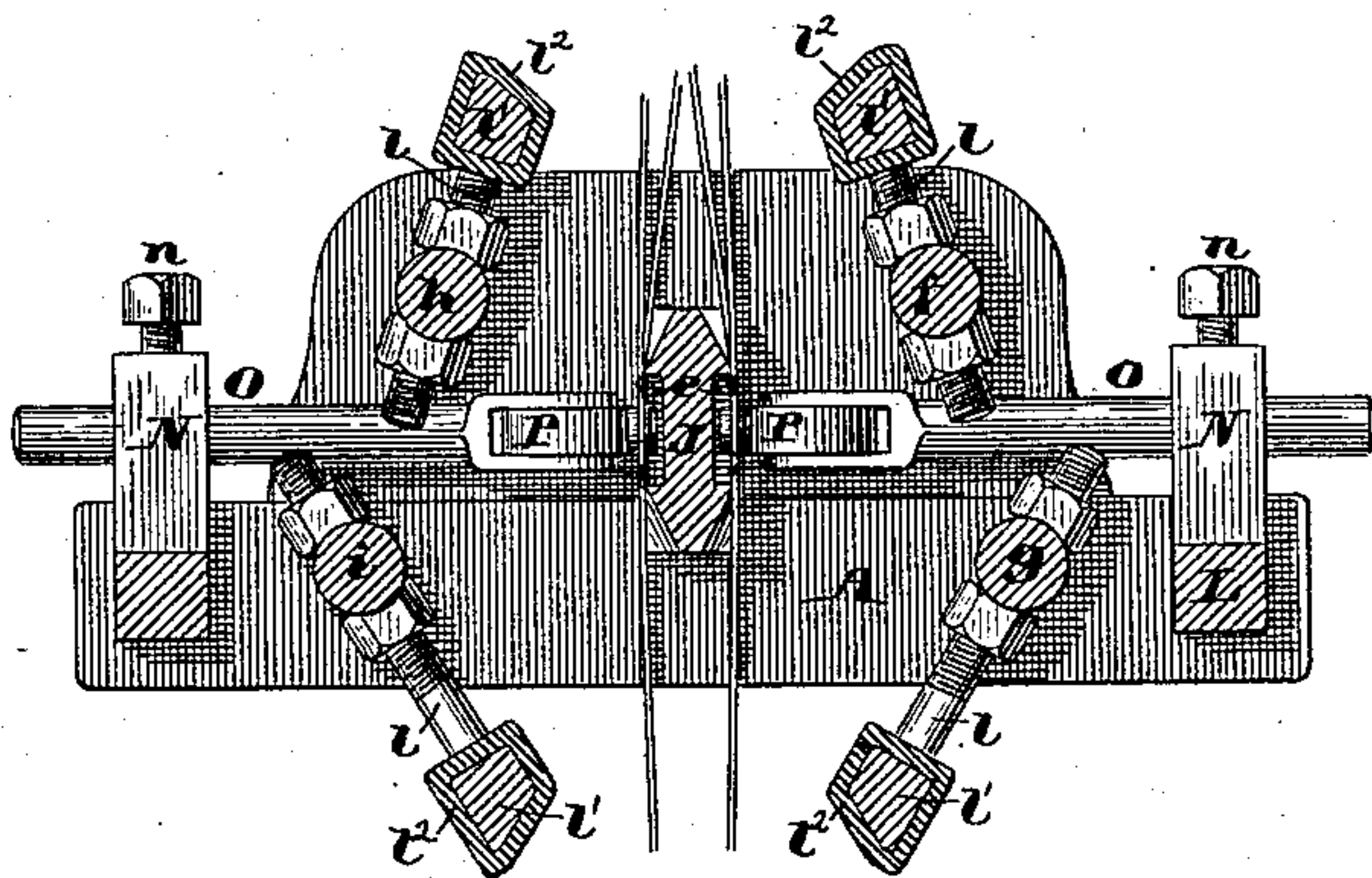


Fig. 5.

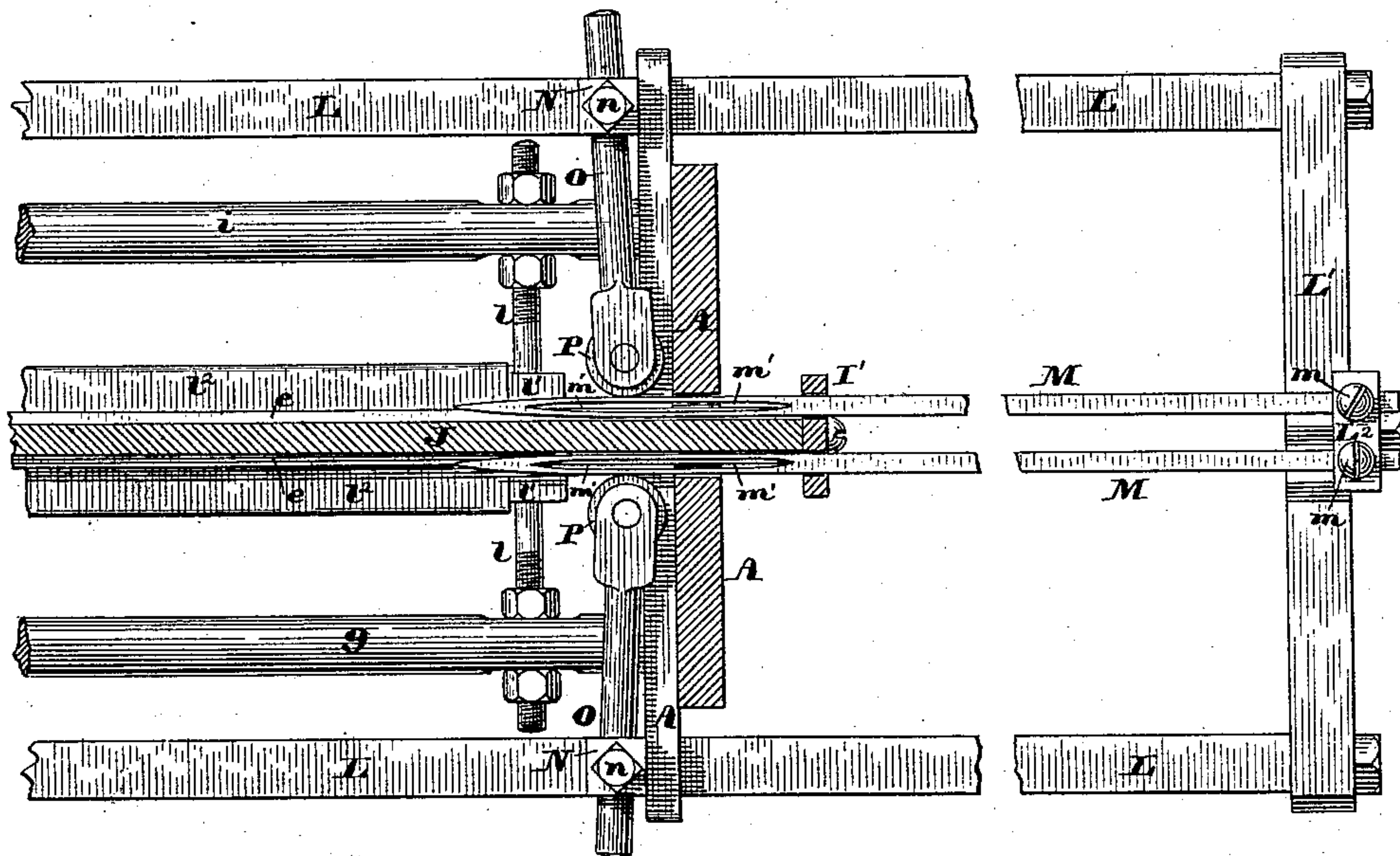


Fig. 6.

Witnesses:

Walter E. Lombard,  
William H. Parry.

Inventor:

Joseph Sladdin,  
by N. C. Lombard  
Attorney.



# UNITED STATES PATENT OFFICE.

JOSEPH SLADDIN, OF LAWRENCE, MASSACHUSETTS.

## MACHINE FOR OPENING THE EYES OF LOOM-HARNESS.

SPECIFICATION forming part of Letters Patent No. 324,420, dated August 18, 1885.

Application filed November 20, 1884. (No model.) Patented in England December 15, 1884, No. 16,483.

*To all whom it may concern:*

Be it known that I, JOSEPH SLADDIN, of Lawrence, in the county of Essex and State of Massachusetts, have invented a new and useful Machine for Opening the Eyes of Loom-Harnesses, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of my invention is the production of a machine which will open the heddle-eyes of loom-harnesses, after sizing or varnishing, with great rapidity and accuracy, and without injury to the twines from which the heddles are formed, which operation has heretofore been done by hand by taking each heddle separately and picking open the eye with a sharp-pointed instrument, and as this operation has to be performed two or three times upon each harness—i. e., after each coat of varnish or size is applied thereto—it is quite a heavy item of expense, and therefore it is very desirable that some more expeditious and cheaper way of performing this labor should be devised.

My invention consists in certain novel features of construction, arrangement, and combinations of devices which will be readily understood by reference to the description of the drawings, and to the claims, to be hereinafter given.

Figure 1 of the drawings is a front elevation of a machine embodying my invention. Fig. 2 is an end elevation of same. Fig. 3 is a vertical transverse section on line *xx* on Fig. 1. Fig. 4 is a partial section on the same line as Fig. 3, drawn to an enlarged scale. Fig. 5 is a similar view, with the heddle-clamping bars removed from contact with the heddles. Fig. 6 is a partial horizontal section on line *yy* on Fig. 4; and Figs. 7 and 8 are respectively a plan and side elevation of a portion of the lease-opening bar.

A A are the two side frames of the machine connected together by the tie-rods or girts A' A'.

B B are two levers, pivoted at their rear ends to the upper ends of the curved arms C C, which are secured to or formed upon and project upward from the frames A A, said levers B B being connected at their front or movable ends by the rod B', in which are adjustably secured the two pendent hooks *a a*,

by being screwed into threaded bearings in said rod B' and clamped thereto by check-nuts, as shown, said hooks *a a* serving to receive and support the upper harness-shaft, D, as shown in Figs. 1, 2, and 3. The front ends of the levers B B and the hooks *a a* may be adjusted to the desired height to adapt them to the width of the harness to be operated upon by means of the screws *b b*, which work in the stands C' C', which may be bolted to the arms C C, as shown, or cast in one piece therewith, if desired.

E E are two levers mounted upon a rocker-shaft, F, having bearings in the stands F' F', bolted to or forming a part of the frames A A. The front or movable ends of the levers E E are connected together by the rod E' in threaded bearings, in which are fitted the two upwardly-projecting hooks *c c*, which engage with the upper edge of the lower harness-shaft D', said hooks being adapted to be adjusted to or from the rod E' by screwing them in or out of their threaded bearings in said rod, and are clamped in the desired position relative to said rod by check-nuts, as shown. The levers E E are each provided with a set-screw, *d*, by means of which the front or movable ends of said levers and the hooks *c c* may be adjusted to adapt them to harnesses of different widths, and upon the points or upper ends of which the cams G G, mounted upon the shaft H, act to depress said levers, and the hooks *c c* to strain the heddles of the harness taut when placed in position in the machine preparatory to opening the eyes after the twine-heddles have been varnished or sized.

I is a guide-bar, made rectangular in cross-section, and fitted to slide endwise in bearings formed in the frames A A, and having firmly secured to one end thereof the upwardly-projecting plate I', to the upper end of which is firmly secured the lease-opening bar J of sufficient length to extend through both frames A A when in the position shown in Fig. 1, and adapted to be moved to the right with the bar I till its disconnected end is drawn back nearly to the inner face of the right-hand frame A, or into the position indicated in dotted lines in Fig. 1. The bar J is guided in its reciprocations by the bar I and its own bearings in the frames A A, and has formed in each side thereof a broad shallow



groove, *e*, and has the greater part of the length of its upper and lower edges made V-shaped or beveled, the purpose of which will presently appear. Four shafts, *f*, *g*, *h*, and *i*, are mounted in suitable bearings in the frames A A, two in front and two in the rear of the lease-bar J, as shown in Fig. 3, and have firmly secured thereon the segmental gears *f'*, *g'*, *h'*, and *i'*, by which they are connected together in pairs, the shafts *f* and *g* being connected together by the gears *f'* and *g'* and the shafts *h* and *i* by the gears *h'* and *i'*, and the shafts *f* and *h* are connected together by the slotted levers *j* and *k* and the crank-pin *k'* firmly clamped to the lever *k*, all as shown in Fig. 2.

K is a handle projecting from the segmental gear *f*, by which all of the shafts may be simultaneously moved about their axes. Each of the shafts *f*, *g*, *h*, and *i* has adjustably mounted in suitable bearings formed therein two screw-rods, *ll*, to the inner ends of which are secured the bars *l'*, each inclosed in an envelope of rubber, *l''*, and beveled on its inner side to correspond with the beveled surface on the lease-bar J, with which it is to co-operate to clamp the twine-heddles, as shown in Figs. 3 and 4. The threaded ends of the rods *ll* pass through smooth bearings in the shafts *f*, *g*, *h*, and *i*, in which they are adjusted endwise by means of two nuts upon each rod, one upon each side of the shaft, as clearly shown in Figs. 4, 5, and 6.

L L are two rectangular bars fitted to bearings in the frames A A, and connected together at one end by the bar *L'*, as shown in Fig. 6, said bars being of a length somewhat greater than twice the distance between the outside of the frames A A, so that they may be moved endwise in their bearings a distance about equal to the distance between said frames. The bar *L'* has secured to the middle of its length the upwardly-projecting ear or lug *L''* in bearings, in which are adjustably secured by the set-screws *m m* the two long needles M M, which have additional bearings in the plate *I'*, one upon each side of the bar J, said needles being so located that they lie about one-half their thickness, as viewed in plan, within the grooves *e e*, formed in the sides of the bar J, and about midway vertically of said grooves, as shown in Figs. 1, 3, 4, 5, and 6. Each of the needles M M has formed therein, near its point, a long slot, *m'*, extending vertically through the same, thereby rendering said needles at those points elastic or yielding. The bars L L are each provided with a stud, N, in a bearing, in which is adjustably secured, by the set-screw *n*, the rod O, the inner end of which is forked, and has mounted therein upon a vertical axis the truck P, arranged to press against the spring side of the needles, as clearly shown in Fig. 6.

R is a spring connected at one end to the tie-rod R' and at the other end to the short lever S, secured to the middle of the rocker-shaft F, and serves the purpose of raising the levers E E, rod E', and hooks *c c* when the shaft H is rotated, by means of the lever H', mounted upon one end thereof, to release the

strain on the harness-heddles. The forward end of the lease-bar J is rounded and tapered, as shown in Figs. 7 and 8, to facilitate its entrance between the twines of the two sides of the harness, as shown in Fig. 5.

The operation of my machine is as follows: The several parts being in the positions shown in Fig. 1, except that the bars I and J are moved to the position indicated by dotted lines, the operator raises the levers B B, rod B', and hooks *a a* into the position shown in dotted lines in Fig. 3, and rotates the shaft H by means of the lever H' to the extent of a quarter of a revolution to allow the levers E E, rod E', and hooks *c c* to be raised a short distance above the positions shown in the drawings. The operator now moves the lever K toward the front of the machine to move the bars *l'* into the positions shown in Fig. 5. He then takes a harness the twine-heddles of which have been sized or varnished, and drops the lower harness-shaft, D', between the bars *l'*, and engages it with the hooks *c c*, then moves the levers B B downward into contact with the set-screws *b b*, and places the upper harness-shaft, D, upon the hooks *a a*, as shown in Figs. 2 and 3. He then rotates the shaft H and cams G G by means of the lever H' to depress the hooks *c c* and strain the heddle-twines taut, as shown in Fig. 5, in which position the heddle eyes hang with their broad sides parallel with a vertical plane extending longitudinally through the centers of both harness-shafts, as indicated in said Fig. 5. The lease-bar J is next moved endwise between the two rows of heddle-twines to separate them, as shown in Figs. 1 and 5, and the lever K is then moved backward to move the bars *l'* into the positions shown in Figs. 3 and 4, and deflect the twines of the heddles and clamp them between the inner edges of said bars *l'* and the beveled surfaces on the lease-bar J, as shown in Figs. 3 and 4. This clamping of the heddle-twines imparts an extra strain thereto, which, being transmitted to the knots by which the heddle-eyes are formed, causes said eyes to be turned one-quarter of a revolution, so that their edges are toward the front and rear of the machine, and the openings between the two parts of the eyes in each row of heddles are all in a line parallel with the sides of the lease-bar J and their inner edges in contact, or nearly so, with the bottom of the groove *e* in said bar. The next thing to be done is to open the eyes by moving the bars L L and the needles M M endwise until the needles have pierced every eye in the harness and opened it to the extent of the thickness of the needle. The trucks P P move with the bars L L and needles M M and insure the proper guiding of said needles, so that their points shall enter between the two twines which make up the eye and separate them, instead of being deflected, so as to strike and pierce one of the threads and thus spoil the eye. When the trucks P P reach the heddle-twines, the spring



sides of the needles opposite said trucks yield sufficiently to permit the passage of the twines between said trucks and the needles without bringing sufficient strain upon the twines to injure them. The needles are now withdrawn, the clamping-bars thrown back, the lease-bar withdrawn, the cam-shaft H rotated to release the strain from the harness, and the harness is removed, another put in its place, and the operation is repeated.

What I claim as new, and desire to secure by Letters Patent of the United States, is--

1. An organized machine for opening the heddle-eyes of loom-harness, containing, essentially, the following elements, viz: supports for the harness-shafts, and devices, substantially as described, for operating the same, for stretching the heddle-twines taut, a lease-bar for separating the two sets of heddle-eyes, pressure-bars, and means, substantially as described, for operating the same to deflect said heddle-twines and clamp them to said lease-bar, and a pair of needles, each arranged to pierce and open all of the eyes in one set by a single endwise movement thereof, as set forth.

2. The levers B B, rod B', and hooks *a a*, in combination with the levers E E, rod E', and hooks *c c*, the set-screws *b b* and *d d*, the shaft H, lever H', and the cams G G, all arranged and adapted to operate substantially as and for the purposes described.

3. The lease-bar J, provided with the two grooves *e e* and beveled upper and lower edges and its front end rounded and beveled, as shown and described, for the purposes specified.

4. The lease bar J, in combination with the bar I, and the frames A, provided with bearings to receive and guide said bar I, substantially as described.

5. The combination of the lease-bar J, provided with beveled surfaces upon its upper and lower edges, the bar I, and plate I' for carrying and guiding said lease-bar, with the four clamping-bars *l'*, the gears *f'*, *g'*, *h'*, and *i'*, the shafts *f*, *g*, *h*, and *i*, the levers *j* and *k*, and pin *k'* for operating said clamping-bars in unison to deflect the heddle-twines and clamp them to said beveled surfaces, substantially as described.

6. The combination, with the lease-bar J, the bar I and plate I', the needle-carrying bars L L L', and lug L<sup>2</sup>, of the needles M M, arranged, as set forth, upon opposite sides of the lease-bar J, and adapted to open all of the eyes of the heddles upon each side of said lease-bar by a single endwise movement, substantially as described.

7. The needle-carrying bars L L L' and the needles M M, provided with the slots *m'*, in combination with the guide-trucks P P, arranged and adapted to operate substantially as and for the purposes described.

8. The combination of the lease-bar J, the bar I, and plate I', the clamping-bars *l'*, the rocker-shafts *f*, *g*, *h*, and *i*, the segmentally-toothed gears *f'*, *g'*, *h'*, and *i'*, and the slotted arms *j* and *k*, and pin *k'*, with the needles M M, the needle-carrying bars L L and L', the studs N N, the arms or rods O O, and the guiding-trucks P P, all arranged and adapted to operate substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 15th day of November, A. D. 1884.

JOSEPH SLADDIN.

Witnesses:

N. C. LOMBARD,

WALTER E. LOMBARD.