(Model.)

4 Sheets—Sheet 1.

C. L. LASCH.

WIRE STAPLING MACHINE.

No. 421,939. Patented Feb. 25, 1890.

FIG. 7.

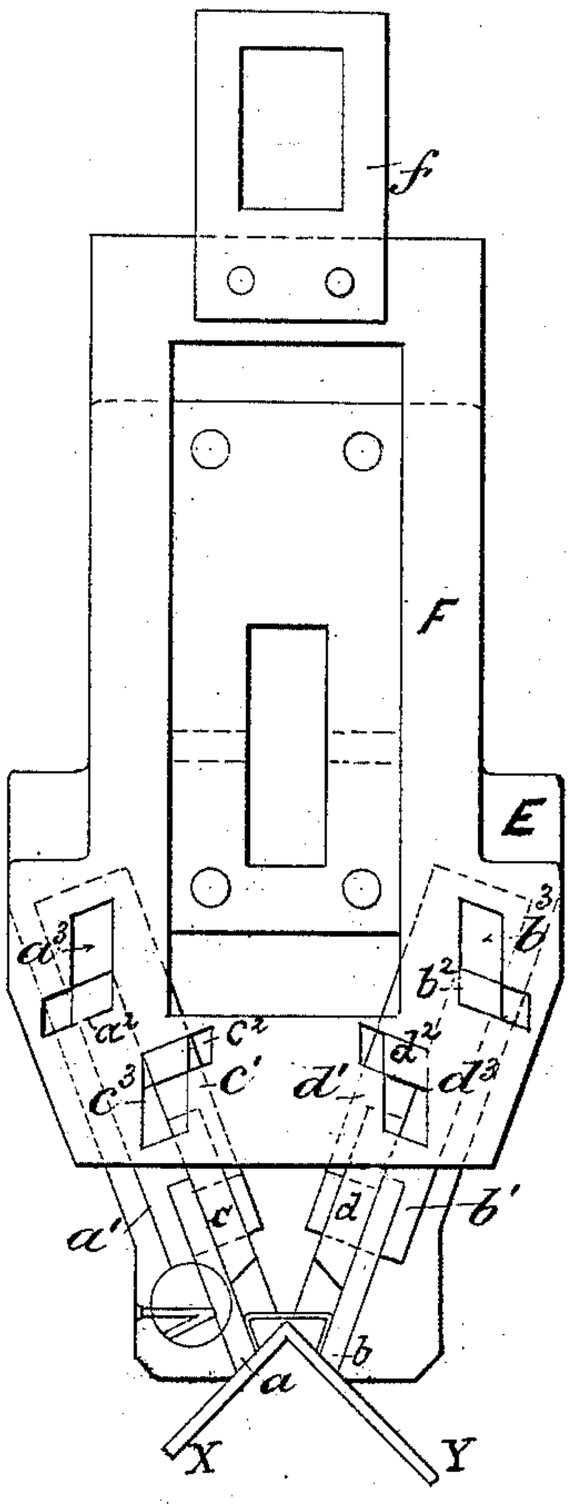


FIG. 1.

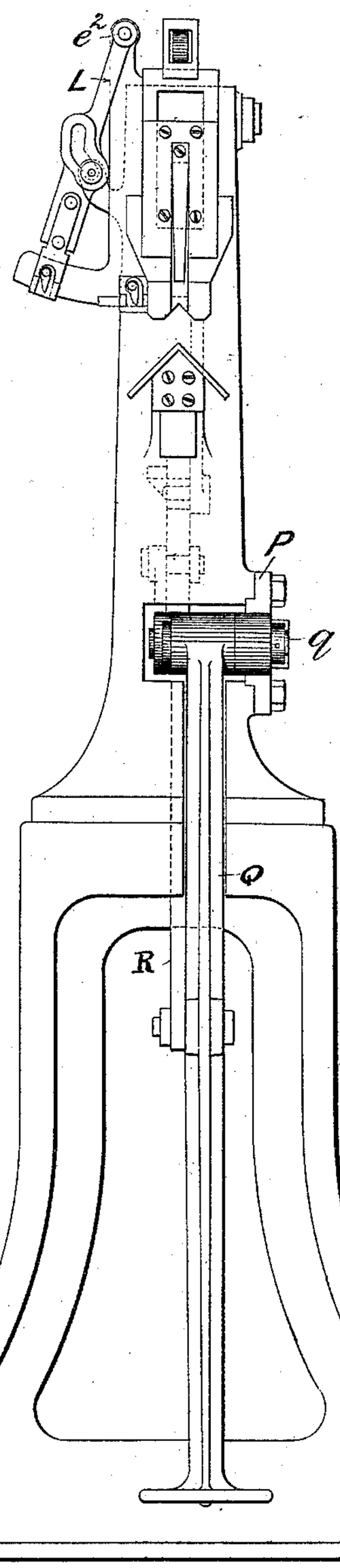
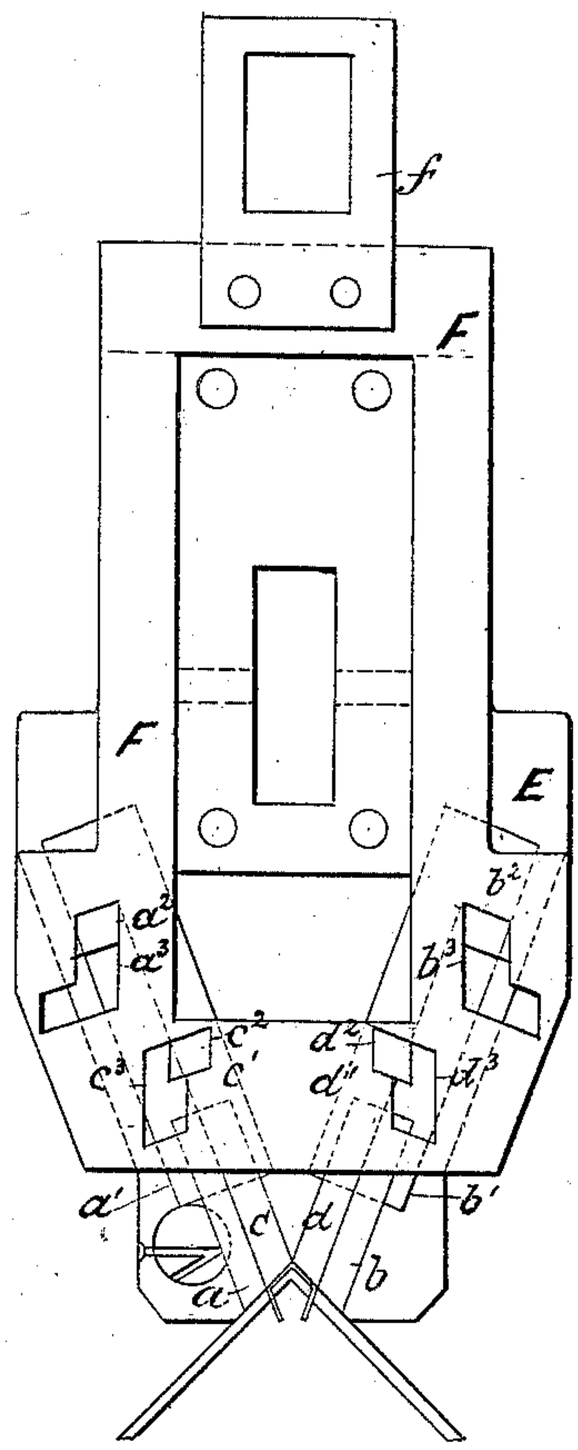


FIG. 8.



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(Model.)

4 Sheets—Sheet 2.

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FIG. 2.

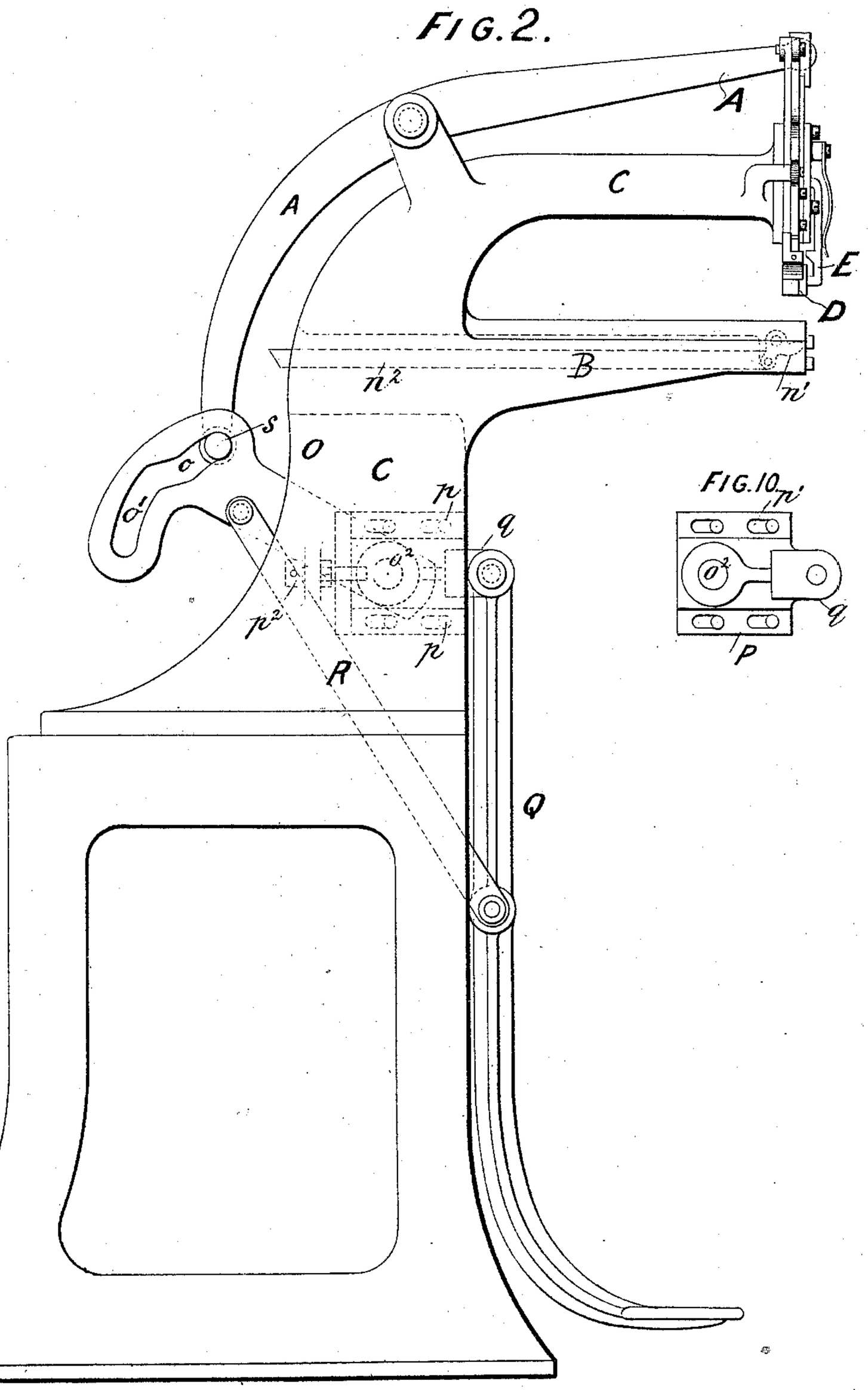

FIG. 10.

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FIG. 4.

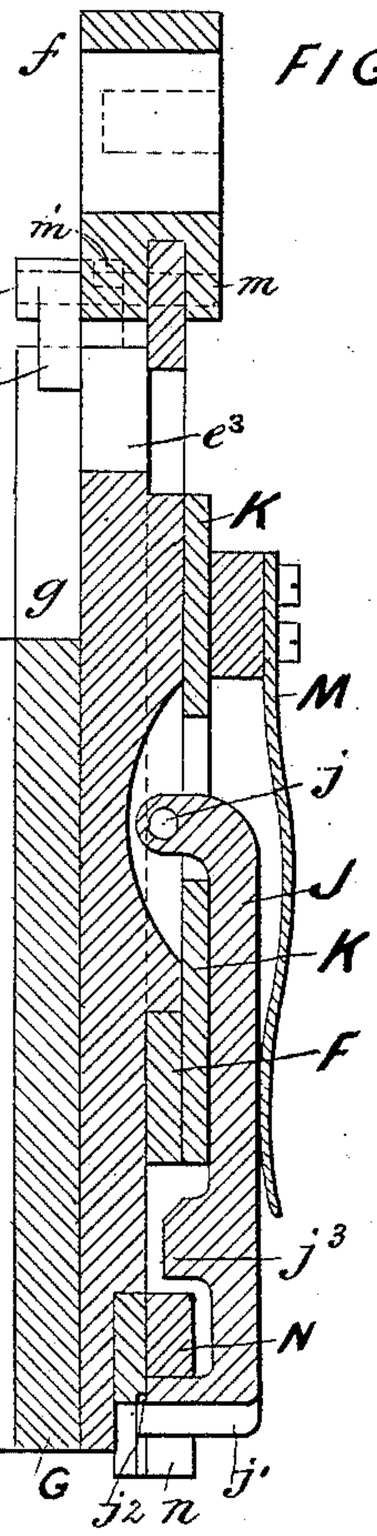


FIG. 9.

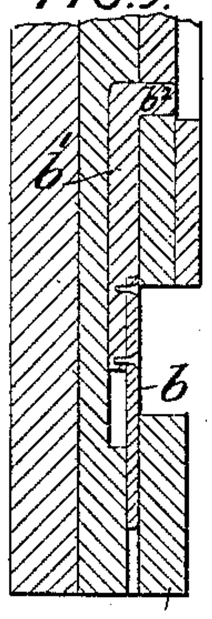
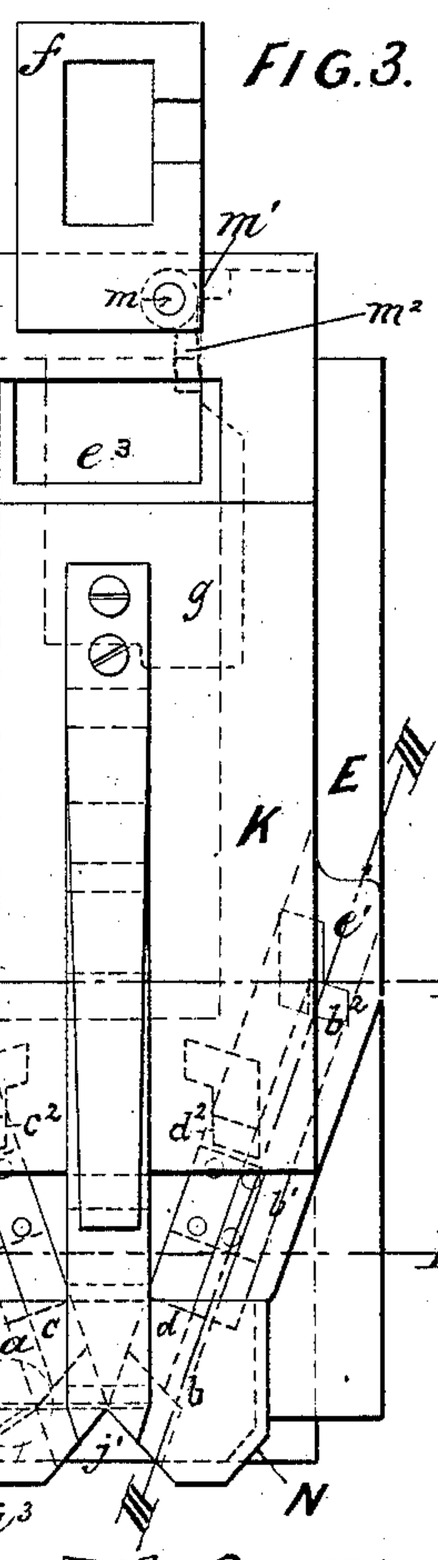


FIG. 3.



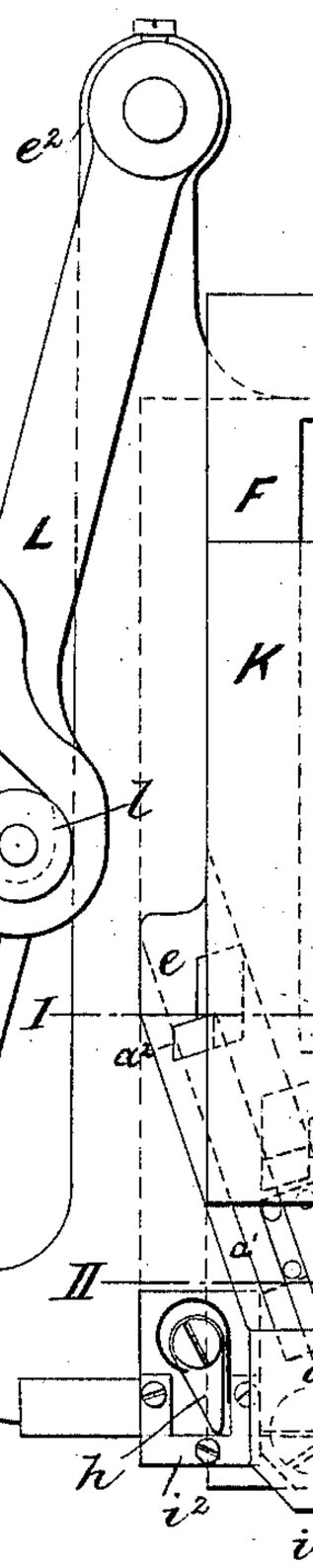


FIG. 4ª.

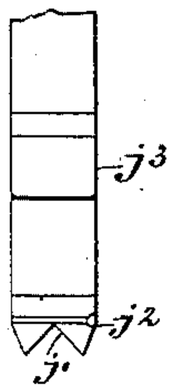


FIG. 5.

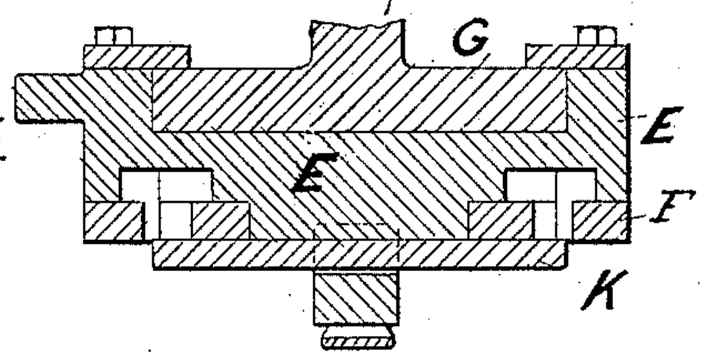


FIG. 6.

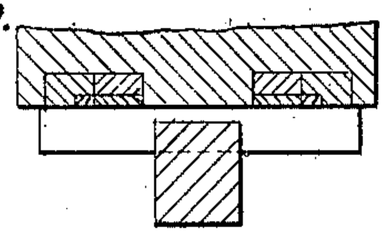


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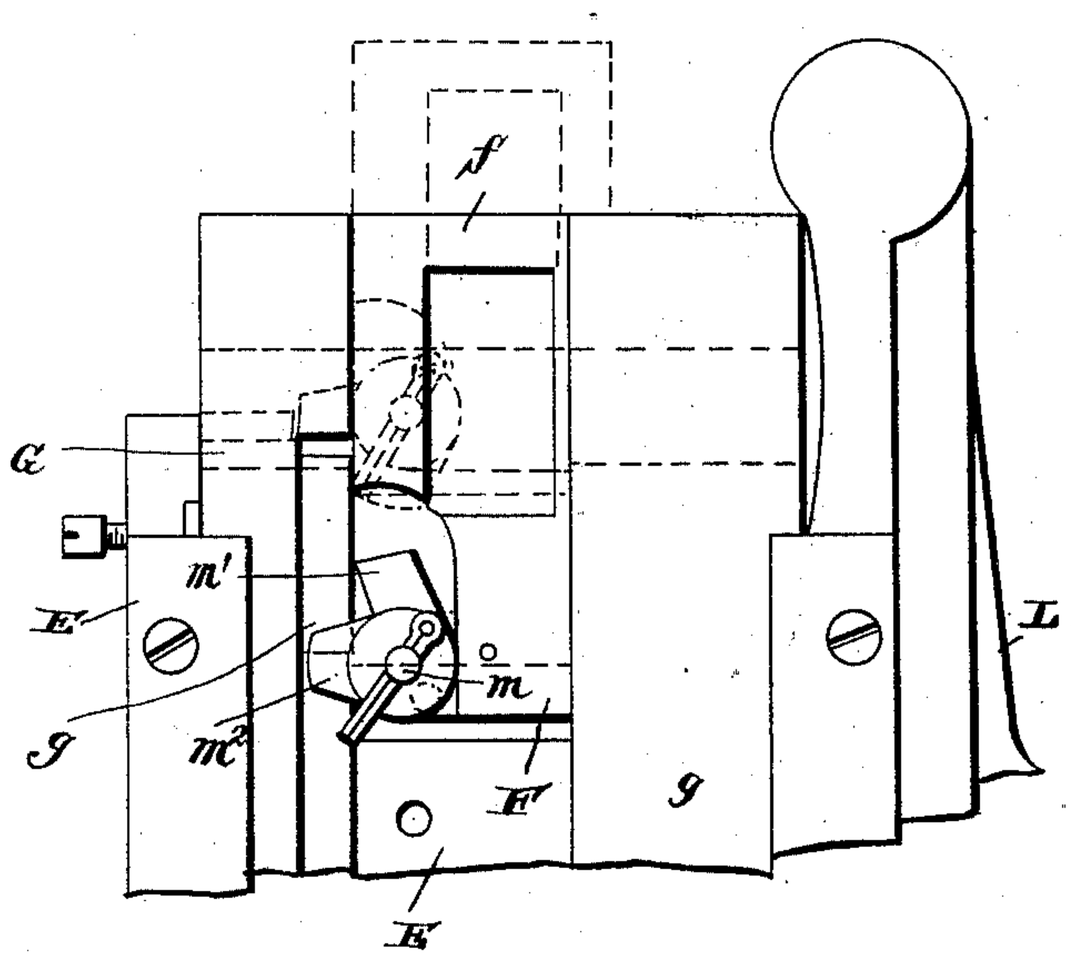
FIG. 11



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Inventor:
Carl Louis Lasch.
By his Attorney
J. R. Littell

UNITED STATES PATENT OFFICE.

CARL LOUIS LASCH, OF LEIPSIC, SAXONY, GERMANY.

WIRE-STAPLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 421,939, dated February 25, 1890.

Application filed August 10, 1887. Serial No. 246,600½. (Model.) Patented in England May 28, 1887, No. 7,836.

To all whom it may concern:

Be it known that I, CARL LOUIS LASCH, a subject of the German Emperor, residing at Leipsic, in the Kingdom of Saxony, Germany, have invented certain new and useful Improvements in Wire-Stapling Machines, (for which I have obtained English Patent No. 7,836, dated May 28, 1887,) of which the following is a full, clear, and exact description.

Machines for stitching together sheets of card-board or other material at an angle to each other by means of steel wire have generally the drawback that the wire staple formed in the machine must be pushed downward and guided in a specially-constructed canal to arrive at the place where it can be driven into the card-board.

My invention has for its object to simplify the process by constructing a machine which will cut off the wire, form the staple, (by bending the shanks,) and drive it into the card-board at the same place where the staple has been formed, thus avoiding a downward motion of the entire staple.

In the following description reference will be made to the annexed drawings, of which—

Figure 1 is a front elevation, and Fig. 2 a side view, of a complete machine, while Figs. 3 to 9 represent details on a larger scale. Fig. 3 is a front view of the staple-forming head. Fig. 4 is a vertical section through the center of Fig. 3. Fig. 5 is a horizontal section along line I I of Fig. 3; Fig. 6, a partial horizontal section along line II II of Fig. 3. Figs. 7 and 8 are front elevations showing the principal parts of the staple-forming head in two different positions. Fig. 9 is a section along line III III of Fig. 3; and Fig. 10, an inside view of the adjustable block P, also shown in Figs. 1 and 2. Fig. 11 is a rear view of the upper part of my machine, being shown in full lines as down and up in dotted lines.

The mechanism for forming and applying the staple chiefly comprises two pairs of sliding bars *a b c d*, situated obliquely right and left of the vertical center line of the machine. Each pair consists of two parallel plates, the outer plate *a* of one of the pairs serving to cut off the wire, while both of the outer plates act to form the shanks, and the inner ones of both pairs serve to drive the staple through the card-board. Each plate is guided longitudinally by screwing it to one of four sliding bars *a′ b′ c′ d′*, situated and adapted to slide in oblique grooves *e e′*, formed in the base-plate E. The latter is adapted to slide up and down on a stationary guiding plate or post G, forming part of the machine-frame, and carries the pivotal bearings e^2 of the oscillating lever L, which serves to feed the wire to the staple-forming mechanism. This plate E carries also the retaining-pawl *h* and the wire-guides *i′*, i^2, and i^3, the latter having the shape of a disk provided with a cutting-edge adapted to operate in conjunction with the cutting-plate *a* for cutting off the wire.

The construction and operation of the wire-feeding mechanism (lever L, guides *i′* i^2 i^3, and pawl *h*) are similar to those described in an earlier patent, No. 378,324.

Upon the base-plate E is placed a slide F, provided with a head *f*, adapted to receive the extremity of the operating-lever, which imparts to the slide F an up-and-down motion. This slide serves to set in motion the cutting and bending plates *a b* and driving-places *c d*, as well as the base-plate E.

For guiding the slide F vertically the base-plate E has in the center a projection in the shape of a rectangular plate riveted to the face of the plate E, (see Figs. 4, 7, and 8,) and the slide F is cut out rectangularly to fit over the said projection.

For imparting to the bars *a′ b′ c′ d′* (and thereby to the plates *a b c d*) the required intermittent motion independent of the base-plate E the upper end of each bar is bent forward, as shown in Fig. 9 for the bar *b′*, and the slide F has two pairs of angular slots a^3 b^3 c^3 d^3, adapted to receive the heads or projections a^2 b^2 c^2 d^2 of the sliding bars. Each of these slots is composed of two parts which form an obtuse angle to each other—namely, a vertical part and a slightly-inclined part, the latter forming a right angle to the sliding bar. If the head is at the bottom of the vertical part, the down motion of the slide F while the base-plate E remains stationary will have no effect on the sliding bar, the head of the latter being allowed to slide along the upright part of the slot; but if the slide F descends while the head of the slid-

ing bar is at the top of the slot the motion of the slide F will be transmitted to the sliding bar.

The bending-saddle is formed at the lower end of an upright lever J, pivoted at the upper end j to the projecting part of the base-plate E, for which purpose the face of the said plate is hollowed out, as shown by Fig. 4. The lower end of the lever J is bent inward and provided in the middle with an angular recess j' to fit over the edge of the card-board box which is placed underneath the staple-forming head, as illustrated by Fig. 4^a, which is an inside or under-side view of the lower part of lever J. j^2 is a groove for the wire placed on the bending-saddle.

At a convenient distance below the lower edge of the slide F the lever J has an inward projection j^3, which is provided with an oblique face adapted to come in contact with the lower edge of the slide F during the descent of the latter, thereby causing the lever J and the bending-saddle to recede. A plate K is screwed to the projecting face of the base-plate E, and serves to cover and guide the slide F. A spring M, secured at the top to the cover K and pressing at the bottom on the back of the lever J, serves to hold the bending-anvil in place during the formation of the staple. At the lower end the face of the base-plate E is covered by a plate N, which has in the center an angular recess adapted to receive the bending-saddle and the upper edge of the card-board box.

For temporarily coupling together the slide F and base-plate E during the down motion of the slide I employ the following contrivance, (illustrated by Figs. 3, 4, and 11:) In the lower part of the head f is secured a horizontal pivot m, which carries a pair of arms m' and m^2, placed in different planes and at an angle to each other. The arm m^2 is adapted to slide along one side of the recess g, formed in the upper part of the stationary plate G, while the horizontal arm m' rests in a notch formed at the top of the base-plate E. The recess g is wider at the lower part than at the top, as shown in Fig. 3 by dotted lines. As long as the arm m' slides along the narrow part of the recess g the arm m^2 is prevented from turning. Consequently the arm m^2 imparts its down motion to the base-plate E; but as soon as the arm m' arrives at the wide part of the recess g it is allowed to turn, and therefore also the arm m^2. Consequently the arm m^2 will get clear of the base-plate E, and the further down motion of the slide F is not shared by the base-plate E, the latter remaining stationary. The plate E has a recess e^3 to make room for the head f. The descent of the base-plate E causes the feed-lever L to turn on its pivot by means of the friction-roller l, which is secured to the stationary machine-frame and fits into the curved slot l' of the lever L.

The clinching mechanism may be constructed as in my earlier machines—for instance, as shown in Patent No. 378,324. It is set in motion by an angle-lever n' and pushing-rod n^2, situated in the interior of the clinching-saddle B.

The operating-lever A and pushing-rod n^2 are actuated by a treadle mechanism constructed as follows, (see Figs. 1, 2, and 10:) To the hollow stand C is secured on one side a plate or block P by means of four screws p, passing through horizontal slots p'. To the inside of this block is pivoted at q the treadle-lever Q, and at o the sector-lever O, which is also connected with the treadle-lever Q by a rod R. The sector-lever has a curved slot $o\,o'$, the part o' being concentric to the pivot o, while the part o is eccentric. The lower end of the operating-lever A carries a friction-roller s, which runs in the slot $o\,o'$. If pressure is applied to the treadle, the lever Q pivots on its fulcrum q and causes the segment-lever O to turn on its pivot o^2 by means of the connecting-rod R. In turning upward (from the position shown by Fig. 2) the lever O drives the lower end of the two-armed lever A outward and its upper end downward, thereby setting in operation the staple-forming head. As soon as the roller s gets into the concentric part o' of the slot the further up motion of the lever O has no effect on the operating-lever, but the segment pushes against the rod n^2, and thereby sets in motion the clinching mechanism. The block P is adapted for horizontal adjustment by means of the slots p' and the set-screw p^2. By shifting the fulcrum of the lever O to and fro the motion of the operating-lever A may be regulated so as to suit varying thicknesses of card-board placed on the clinching-saddle.

The operation of the machine may be described as follows: The two sheets of card-board X and Y which are to be stitched together having been placed on the saddle B, as represented in Fig. 7, and a wire from a reel introduced into the wire-feeding apparatus, as in my previous machines, the operator presses on the treadle, thereby setting in motion the segment-lever O, operating-lever A, and vertical slide F. When the latter begins its down motion, the heads of the oblique sliding bars a' and b' and c' and d' are situated at the bottom of their respective slots a^3 and c^3 and b^3 and d^3, the heads a^2 and b^2 being in the inclined part, while the heads c^2 and d^2 are in the vertical part of their slot. The base-plate E (and therefore the feed-lever L) share the down motion of the slide F, whereby the lever L is caused to turn on its fulcrum and push the wire into the staple-forming head through the disk i^3 and above the bending-anvil until the extremity of the wire abuts against the outer wall of the groove e'. The base-plate E now stops, (because the arm m^2 has arrived at the wide part of the recess g,) while the slide F continues its down motion. The cutting and bending plates a and b now come in contact with the wire. The plate a cuts off the wire

in passing the cutting-edge of the disk i^3 and both plates bend down the ends of the wire over the bending-anvil, after which they occupy the position represented by Fig. 7. During the motion just described (being the second part of the down motion of the slide F) the heads a^2 and b^2 have slid in the vertical part of their respective slots a^3 and b^3 and the heads c^2 d^2 have arrived at the top of the vertical part of their slots c^3 and d^3, as shown by Fig. 7. Consequently the further down motion of the slide F has no effect on the plates a and b, but is shared by the driving-plates c and d, which now bend the staple over the edge of the card-board and drive in the shank, after which the mechanism occupies the position represented by Fig. 8. The lever J, carrying the bending-anvil, has been previously driven outward by the contact of the projection i^3 with the slide F. The slide F now stops, because the friction-roller s has meanwhile passed from the part o into the concentric part o' of the slot in the segment-lever O; but the lever O continues to move, and thereby acts on the rod n^2, which sets in motion the clinching mechanism. After the clinching the treadle is allowed to ascend, the card-board shifted on the clinching-saddle, and a new cycle of operations may commence.

What I claim is—

1. Mechanism for forming and applying metallic staples, comprising in its construction a pair of bending-plates situated obliquely right and left of the center line and adapted to receive a longitudinal motion, a pair of driving-plates situated obliquely right and left of the center line between the bending-plates and adapted to receive a longitudinal motion in unison with the bending-plates, and a bending-anvil adapted to support the staple during the operation of the bending-plates and to recede before the driving-plates begin to act, substantially as described.

2. The combination of a base-plate having a pair of oblique grooves placed symmetrically right and left of the center line, with a pair of longitudinally-movable bending-plates, a pair of longitudinally-movable driving-plates, the said plates being guided by the oblique grooves of the base-plate, a slide adapted to impart to the bending and driving plates an intermittent longitudinal motion in unison with each other, and a bending-anvil adapted to support the staple during the operation of the bending-plates and to recede before the driving-plates begin to act, substantially as described.

3. The combination of base-plates E, having oblique grooves e e', and a guide-piece i^3, with bending plates and bars a a' b b', driving plates and bars c c' d d', slide F, having angular slots a^3 b^3 c^3 d^3, adapted to receive and guide the heads of the bending and driving bars, and anvil-lever J, with spring M, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CARL LOUIS LASCH.

Witnesses:

CHAS. ROCHE,

J. WETTER.