

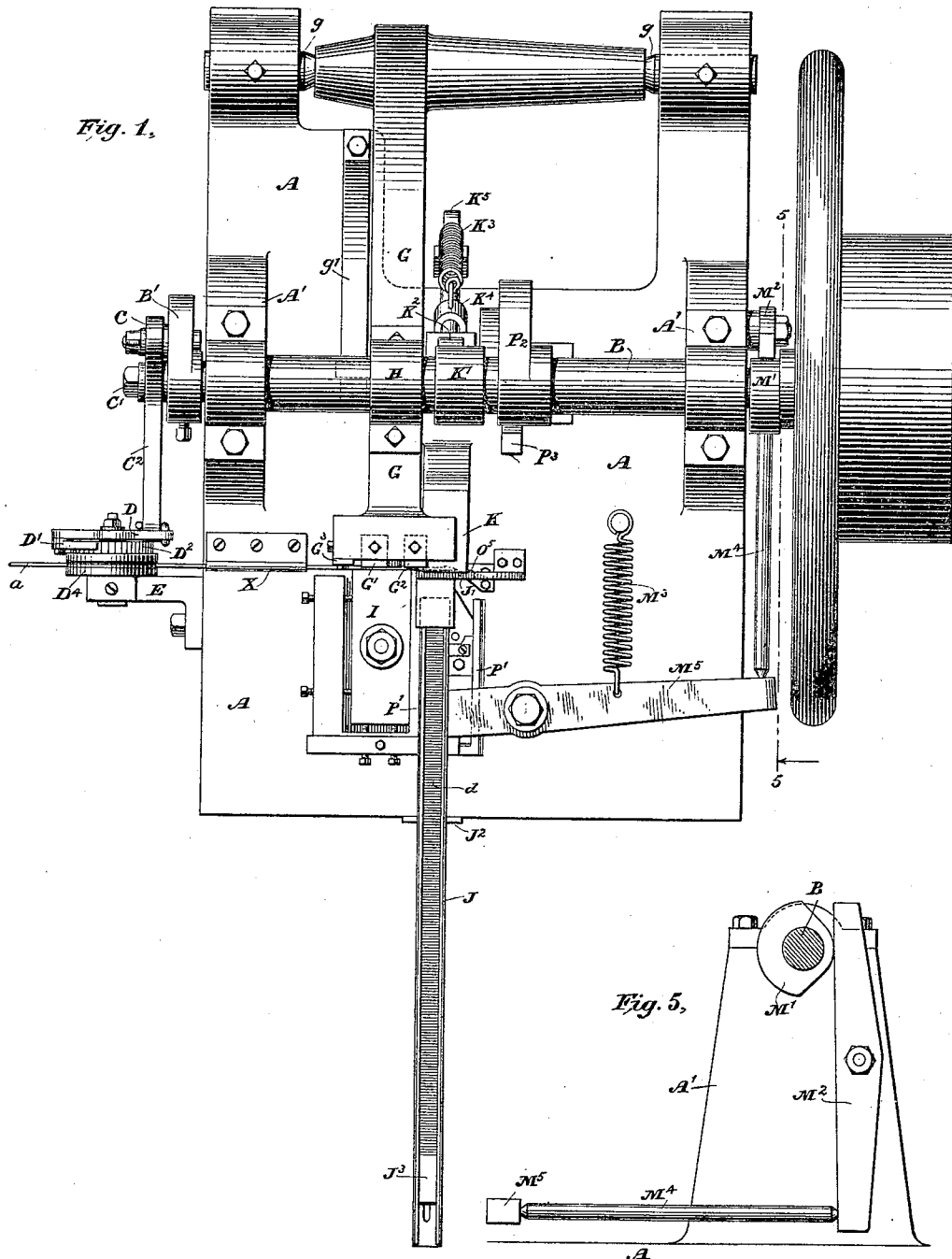
(No Model.)

5 Sheets—Sheet 1.

J. D. WARDEN.  
STAPLE MACHINE.

No. 461,654.

Patented Oct. 20, 1891.



Witnesses  
Geo. W. Breech.  
Edward Thorpe.

Inventor  
John D. Warden.  
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Dym & Seely

(No Model.)

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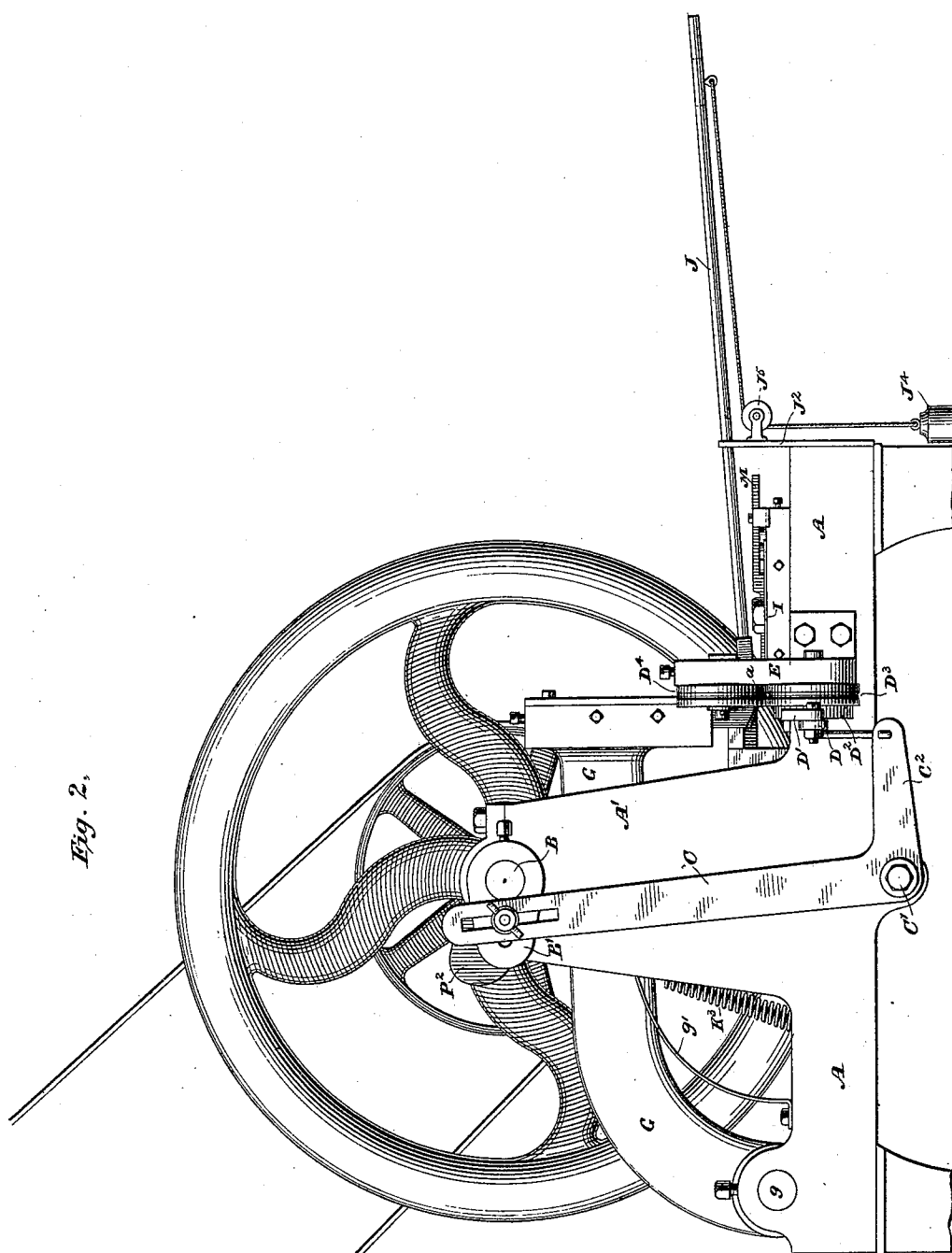


Fig. 2.

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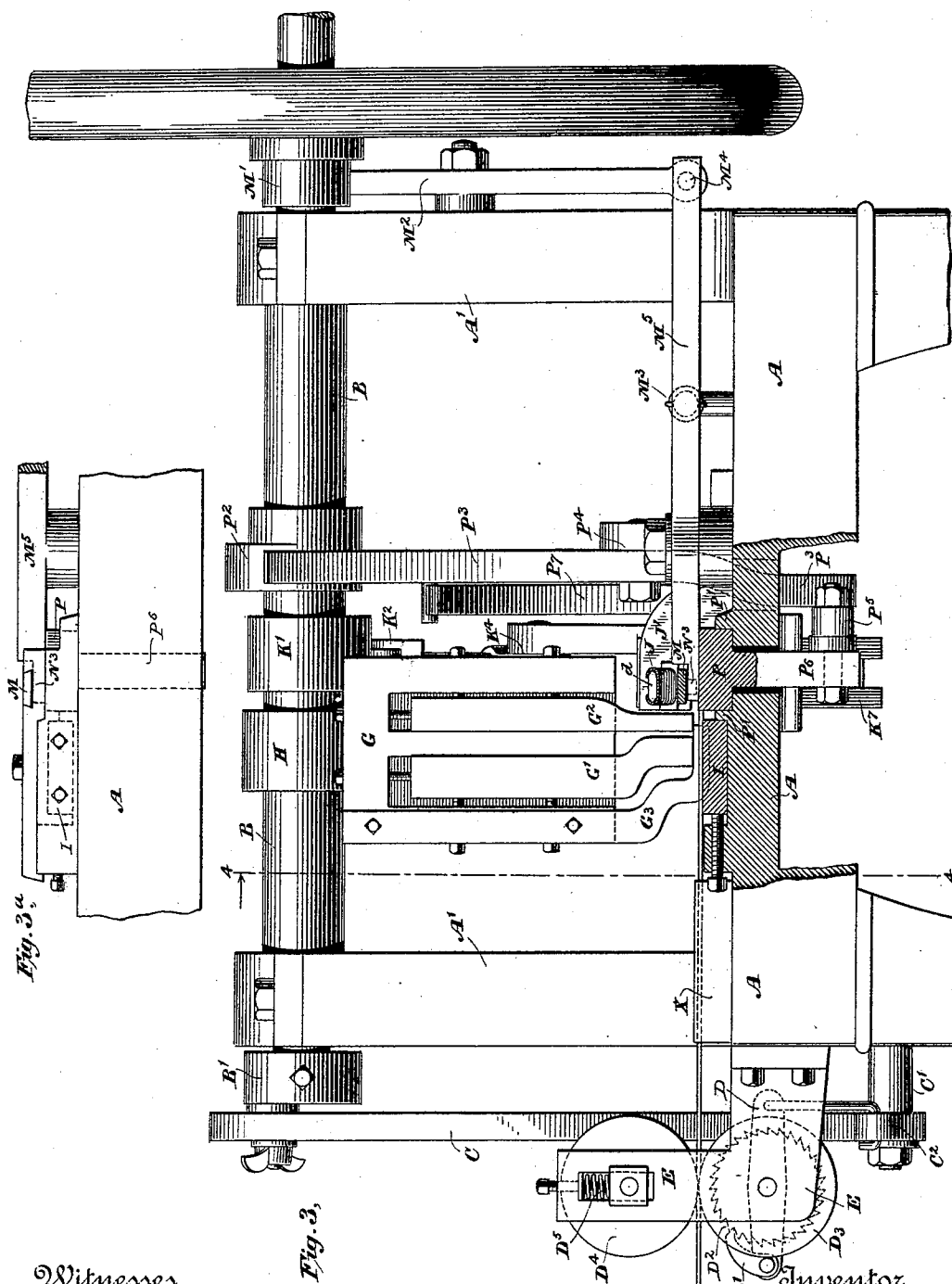
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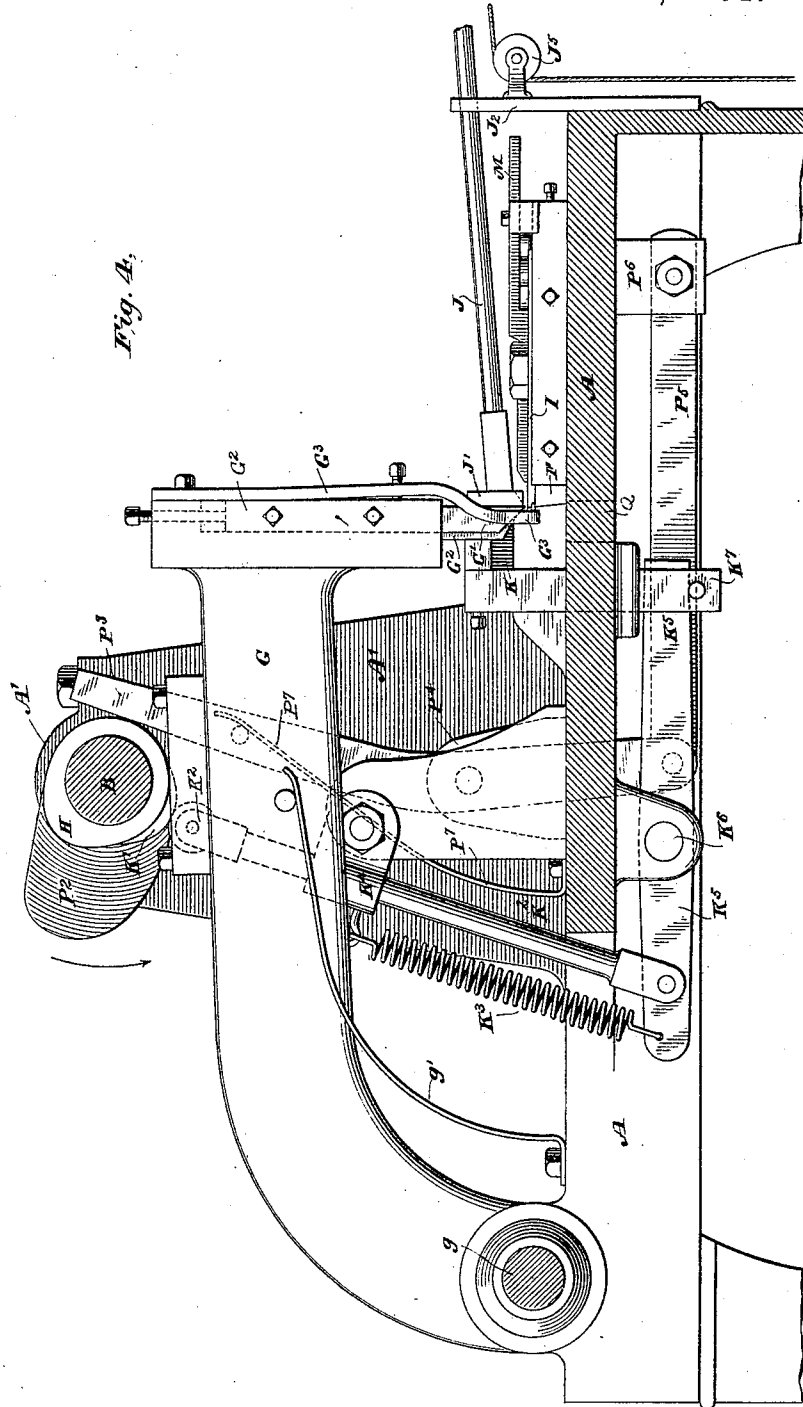
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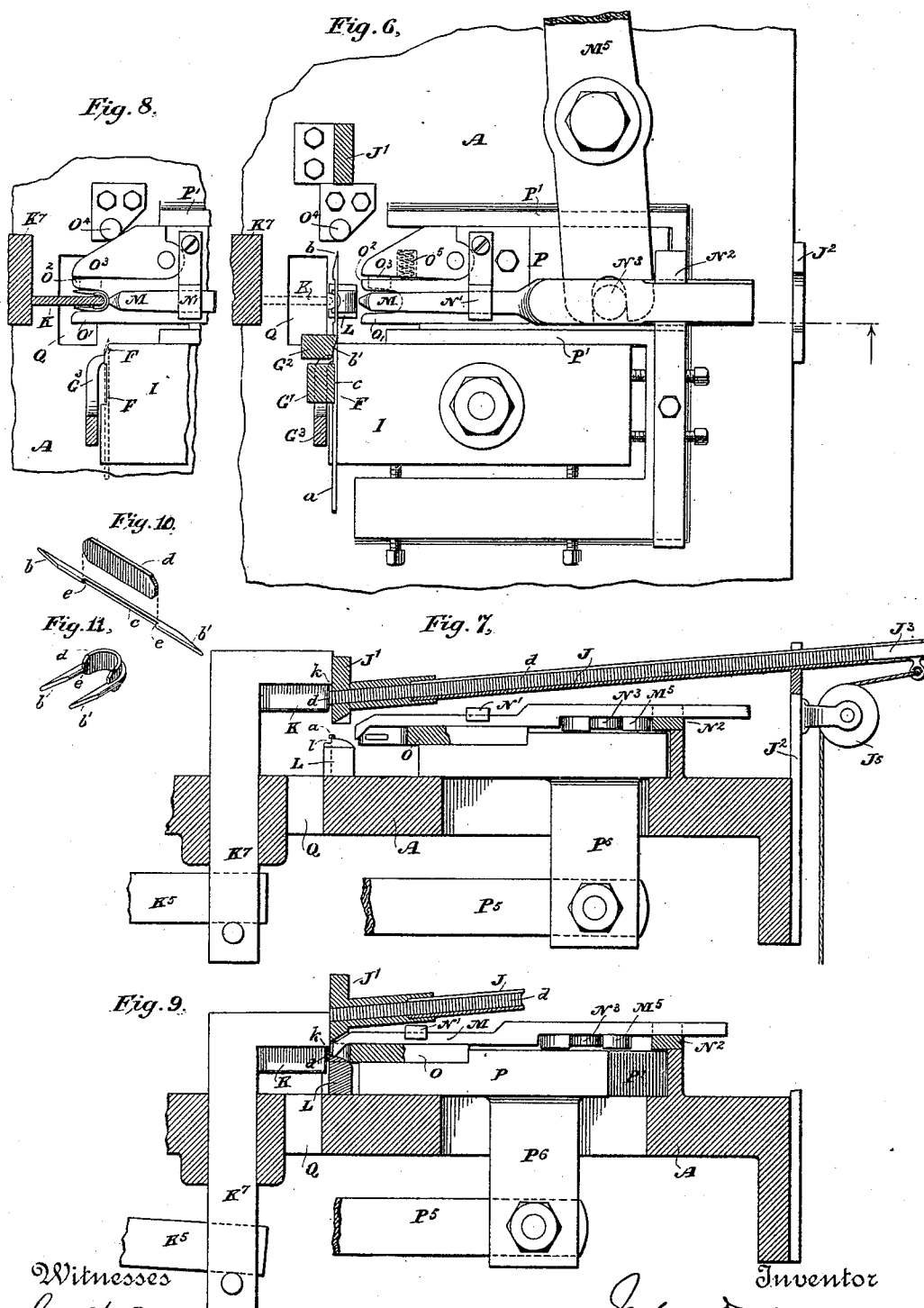
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5 Sheets—Sheet 5.

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# UNITED STATES PATENT OFFICE.

JOHN D. WARDEN, OF FALL RIVER, MASSACHUSETTS.

## STAPLE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,654, dated October 20, 1891.

Application filed December 23, 1890. Serial No. 375,563. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN D. WARDEN, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented a certain new and useful Improvement in Staple-Machines, of which the following is a specification.

The object of this invention is to produce a machine for making insulating saddle-staples; and the invention consists in the several novel features and combinations, as fully hereinafter explained, and pointed out by the claims.

In the accompanying drawings, Figure 1 is a plan view of a machine embodying my invention; Fig. 2, a side elevation; Fig. 3, a front elevation with a portion broken away. Fig. 3<sup>a</sup> is that portion of the front of the base of machine broken away in Fig. 3. Fig. 4 is a side sectional elevation on line 4 4 of Fig. 3. Fig. 5 is a sectional elevation on line 5 5 of Fig. 1. Figs. 6 and 7 are enlarged plan and sectional views, respectively, showing the wire and staple blank in position to be acted upon by the various tools. Figs. 8 and 9 are views of the same parts, showing the position of the parts after the operation is completed. Fig. 10 shows a blank staple and the insulating-strip before bending, and Fig. 11 shows the complete saddle-staple ready for use.

In general terms my machine performs its functions in the following manner: Ordinary wire of any desired size previously flattened is fed into the machine by means of suitable feeding mechanism between cutting-jaws. It is then cut at one end, and also in the middle of the proposed staple a portion is cut away, forming shoulders, between which is to be inserted a strip of insulating material. The wire is still further fed forward into alignment with the supply of insulating-strips, one of which is dropped into place where the wire has been cut away. Thereupon a finger moves forward and securely holds the wire and insulating-strips against a die or shaping-block, immediately following which a compressor-tool advances upon the staple-blank and gradually forces it to assume the required shape, thus completing the operation of forming the staple. A base-plate or table A supports the mechanism, and at the sides of the table rise bearings A', which

carry the shaft B. Through this shaft B, which is driven by any suitable power, the various functions of the mechanism are accomplished. Fastened to one end of the shaft is the crank B', to which is adjustably secured the long arm of the rocking lever C, pivoted at C'. The short arm C<sup>2</sup> is linked to the tilting lever D, carrying driving-pawl D', which on its upward stroke engages with the ratchet-teeth D<sup>2</sup> of lower feed-wheel D<sup>3</sup>. Thus during one half of the revolution of the shaft B the pawl rotates the feed-wheel and during the other half it slides back over the teeth D<sup>2</sup>. The lower feed-wheel revolves on a stud secured to bracket E. The upper feed-wheel D<sup>4</sup> revolves in a box, which slides in a slot in a bracket and is strongly pressed toward the lower wheel by the stiff spring D<sup>5</sup>. The wire *a* is led from a reel to and between the wheels of the feeding mechanism, which tightly grasp said wire by reason of the pressure exerted by the spring D<sup>5</sup> and feed it forward as they (the feed-wheels) are partially revolved through the action of the above-described pawl, lever, and crank. To insure the correct placing of the wire with relation to cutting-jaws, a guide-piece X is mounted on base-plate between the feed-wheels and the cutting-jaws. During the first half-revolution of the main shaft B sufficient wire is fed into the machine to form a staple. Now, supposing the wire to be in position to be acted upon by the cutting-jaws—that is, resting on stationary jaw F—the cam H, advancing upon the upper jaw G, which carries the cutting-tools G' G<sup>2</sup>, forces these tools down through the wire *a*, thus cutting one end *b* of the staple and also cutting a piece *c* out of the middle of the proposed staple. The next half-revolution of the main shaft advances the wire into position for the insertion of the insulating-strip *d*, and immediately following this movement the shaping of the blank into staple form occurs. Simultaneously with this operation the cutting-jaws are preparing the next blank. Of course during this period the wire is held fast by the feed-wheels D<sup>3</sup> D<sup>4</sup>, being advanced only when the tools are up out of the way. The cutting-jaw G is pivoted on adjustable bearings *g*, secured to the base-plate. Applied to the jaw G is a stiff spring *g'* to act against cam H. In the head of the

jaw are adjustably secured the cutting-tools  $G' G^2$  and also a gage  $G^3$ . These cutting-tools work in conjunction with the edge of a fixed plate I, secured to the table A. Supposing, now, the wire to have been cut at one end and at the middle, as described, we pass on to the next feature of operation, the insertion of the insulating-strip. A reservoir or slide J, supported above the base-plate by the standard  $J'$  and leg  $J^2$ , contains a supply of insulating-strips  $d$ , made of vulcanized fiber or other non-conducting material. These strips are fed forward by a weight  $J^4$  and a cord attached to a block  $J^3$ , the cord passing over a pulley  $J^5$ , as shown in Figs. 2 and 7. These strips are pushed one at a time against the block or die K, and as this block descends the shoulder  $k$ , catching on the upper edge of the strip, pushes the strip down into the cut formed in the staple-blank, as clearly shown in Figs. 7 and 9. The downward movement of the block K is so regulated as to carry the strip well into the seat  $l$  in the block L. The staple-blank also rests at this moment on the top of the block L. This movement of the block K is effected by means of a cam  $K'$  on the main shaft acting upon a push-rod  $K^2$  and against a spring  $K^3$ . This rod  $K^2$  slides in a pivoted bearing  $K^4$  and is connected to the rear end of the lever  $K^5$ , pivoted at  $K^6$ , the front end of which lever is coupled to a vertical slide-block  $K^7$ , carrying the block K. Simultaneously with the insertion of the insulating-strip a finger M begins to move forward horizontally and brings up against the exact middle of the staple-blank just after the insulating-strip is in place, thus securely pinioning them to the die-block K. This movement is accomplished through the medium of a cam  $M'$  on the main shaft, acting upon the upper end of a pivoted lever  $M^2$  against the tension of spring  $M^3$ . The lower end of this lever presses against a horizontal lever  $M^5$ , which is pivoted to base-plate A, the connection between the parts  $M^2$  and  $M^5$  being through a coupling-rod  $M^4$ . The finger M slides on top of the compressor-carriage P and is held in place by means of a strap  $N'$ , the rear end of the finger-piece M sliding in way  $N^2$ . On the under side of the finger-piece M is a pin  $N^3$ , which is grasped by the forked end of the lever  $M^5$ . As soon as the staple-blank and strip are securely held by the finger M against the block K the compressor O advances upon them. The compressor O is bolted to a carriage P, which slides on the table A between ways  $P' P'$ . This carriage receives its motion through the cam  $P^2$  pressing against the upper end of lever  $P^3$ , pivoted at  $P^4$ , the lower end of this lever being connected by a link  $P^5$  to a lug  $P^6$  on the carriage P. A spring  $P^7$  serves to return the carriage. The compressor O consists of two jaws  $O' O^2$ , the intervening space or mouth partaking of the desired shape of the staple. As the compressor advances, the points of the jaws simultaneously strike the straight blank

and gradually bend it back upon the die K, as plainly shown in Figs. 8 and 9. The insulating-strip  $d$  is of such a size as to be tightly grasped by the shoulders  $ee$  of the blank after bending, and thus retained within its embrace. As an additional means of compressing the points of the staple, an extra jaw  $O^3$ , pivoted to compressor O, is provided. Just before the carriage reaches the forward limit of its movement the jaw  $O^3$  strikes a stop  $O^4$  and is thereby thrust laterally toward the die, thus giving the staple an extra pinch, thereby giving it a permanent set. A retractile spring  $O^5$  opens the jaw  $O^3$  as it is released from the stop  $O^4$  by the receding movement of the carriage P. The operation now being completed, the finger and compressor return to their starting positions and the die moves up, thus releasing the finished staple, which falls down through a hole Q into any suitable receptacle.

To recapitulate, the machine consists, essentially, of a feeding mechanism, cutting-jaws, an apparatus for supplying and inserting insulating-strips, and a holder and compressor or shaping-tool, all operated through the agency of the above-described cams and levers and their connections.

What I claim as my invention is—

1. In a staple-making machine, the combination of feeding mechanism for staple-blanks, knives for making shoulders upon the inner side of said blanks, and bending devices acting on the blanks after the knives have operated thereon, substantially as described.

2. In staple-machines, the combination of knives for cutting the wire into staple-lengths, knives for cutting shoulders upon the inner side of the staple-blanks, and bending devices acting upon the blanks after the knives have acted thereon, substantially as set forth.

3. In staple-machines wherein the staple is bent from a length of wire, the combination, with the forming-block over which the staple is bent, of a finger holding the wire at its center against the forming-block while the wire is being bent, substantially as set forth.

4. In staple-machines, the combination, with a forming-block, of a finger which advances and holds the wire centrally against the forming-block and compressor-jaws which advance and bend the wire over the staple-block, substantially as set forth.

5. In staple-machines, the combination, with a forming-block over which the wire is bent, and compressor-jaws which bend the wire over the forming-block, of an additional setting-jaw acting after the compressor-jaws and giving a final set to the staples, substantially as set forth.

6. In staple-machines, the combination, with a forming-block, of a finger which holds the staple centrally upon the forming-block, compressor-jaws which bend the staple over the forming-block, and an additional setting-jaw which acts to give the final set to the staples, substantially as set forth.

7. In staple-machines, the combination, with the forming-block and compressor-jaws bending the staple over the forming-block, of a setting-jaw carried by the compressor-jaws and acting through the side of the same when the compressor-jaws reach the final limit of their movement, substantially as set forth.

8. In staple-machines, the combination, with the staple-bending devices, of a carrier delivering strips of insulating material to the inner sides of the staple-blanks, substantially as set forth.

9. In staple-machines, the combination, with the staple-bending devices, of the carrier delivering an insulating-strip to the inner side of the staple-blank before it is bent, and means for operating the bending devices after the insulating-strip is in place, whereby the staple and strip are bent together, substantially as set forth.

10. In staple-machines, the combination, with knives acting to cut shoulders upon the inner sides of the staple-blanks, of a carrier which pushes strips of insulating material between the shoulders upon the staple-blanks, substantially as set forth.

11. In staple-machines, the combination, with knives which cut shoulders upon the inner sides of the staple-blanks and the staple-bending devices, of a carrier pushing strips of insulating material between the shoulders before the staple-blanks are bent, and means for operating the bending devices after the insulating-strips are in place, whereby the blanks and insulating-strips are bent together and the strips are compressed and held be-

tween the shoulders, substantially as set forth.

12. In staple-machines, the combination, with the staple-bending block and jaws, of a carrier acting at right angles to the movement of the bending-jaws and delivering insulating-strips upon the inner side of the staple-blanks before the bending-jaws act, substantially as set forth.

13. In staple-forming machines, the combination, with the staple-bending devices, of a reservoir filled with insulating-strips and presenting such strips edgewise in the machine, and a carrier pushing said insulating-strips edgewise upon the inner sides of the staples, substantially as set forth.

14. In staple-machines, the combination, with suitable feeding devices, of knives cutting the staple-wire into lengths, other knives cutting shoulders upon the inner sides of the staples, a forming-block, a finger holding the staples centrally against the block and compressor-jaws bending the staple over the forming-block, a reservoir delivering insulating-strips edgewise to the machine, and a carrier pushing such insulating-strips singly edgewise into position between the shoulders on the inner sides of the staples and before the staples are bent, substantially as set forth.

This specification signed and witnessed this 20th day of November, 1890.

JOHN D. WARDEN.

Witnesses:

CHARLES E. MILLS,  
FRANK A. PEASE.