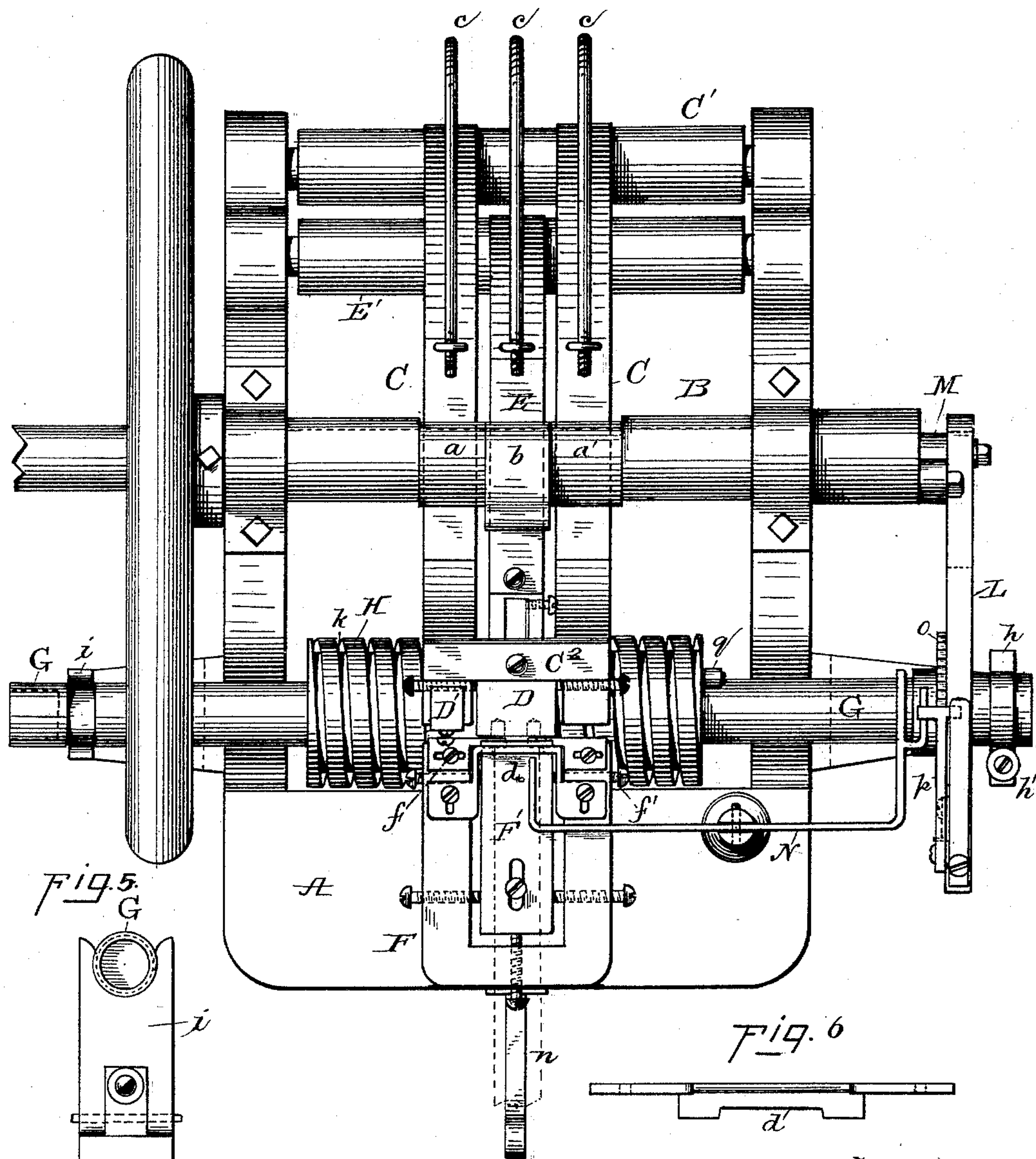


3 Sheets—Sheet 1.

No. 498,040.

Patented May 23, 1893.

FIG. 1.



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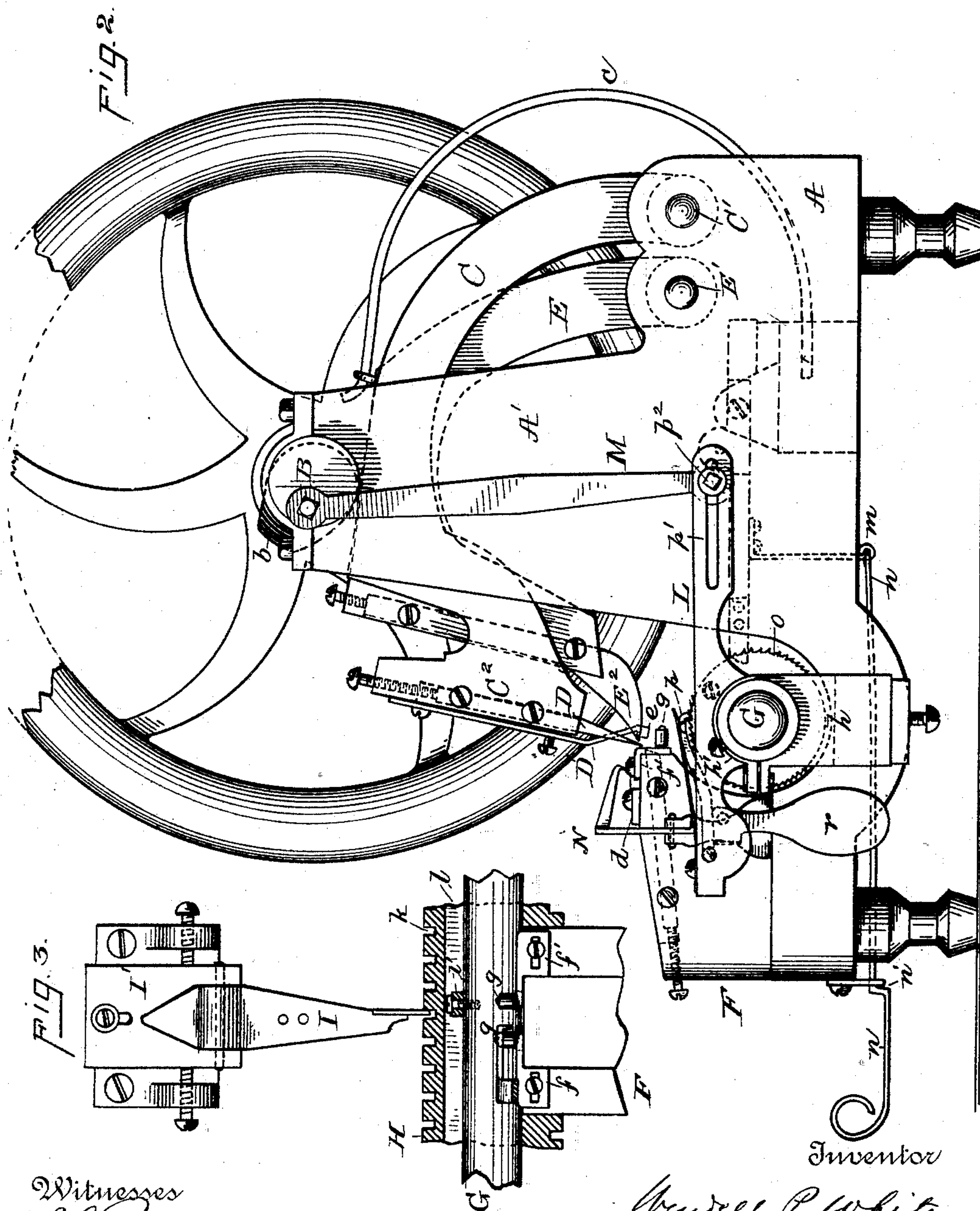
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W. P. WHITE.  
MACHINE FOR MAKING STAPLES.

No. 498,040.

Patented May 23, 1893.



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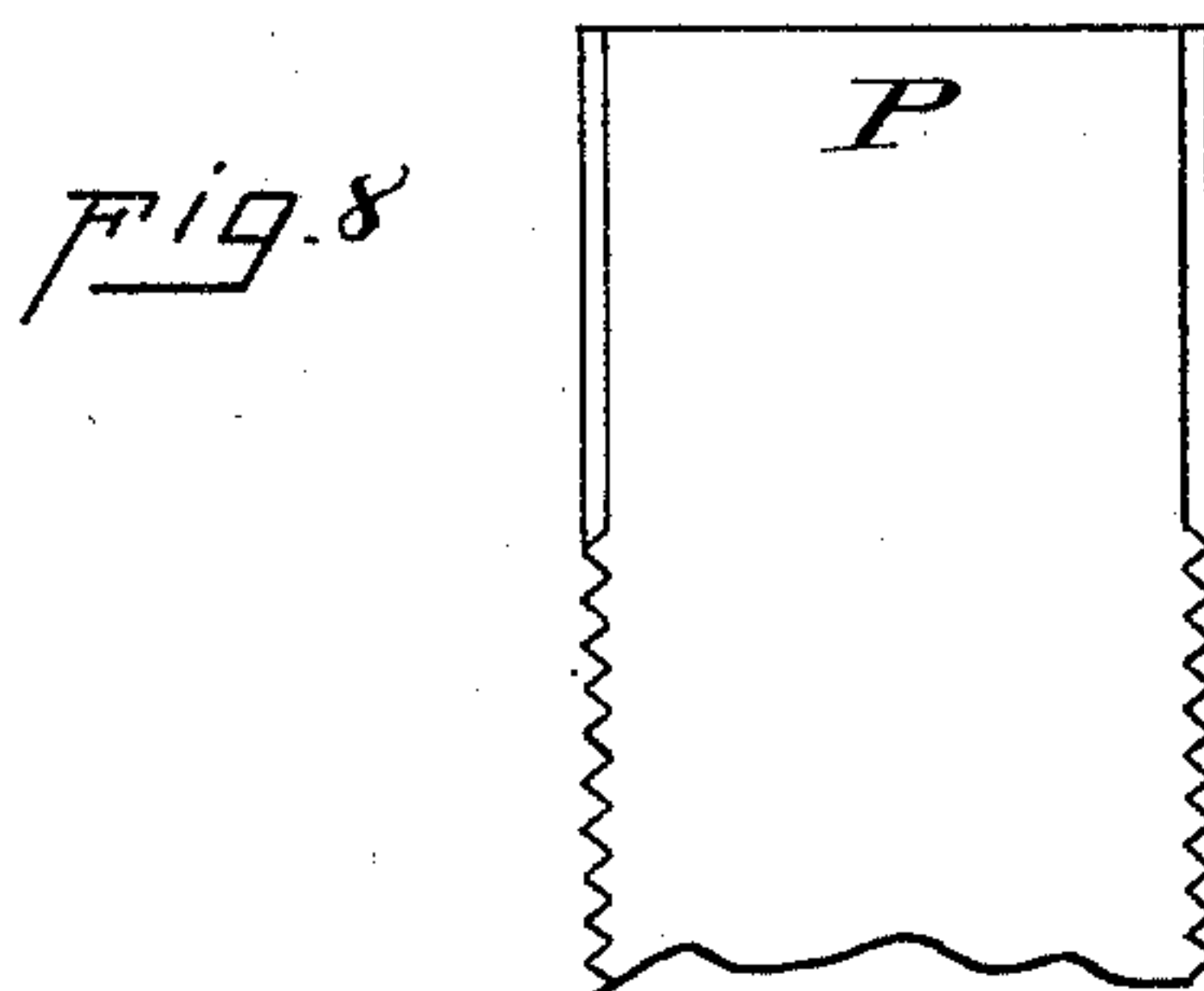
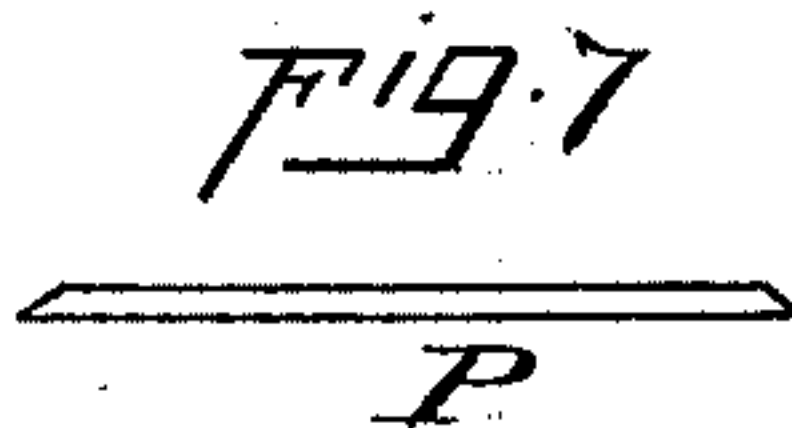
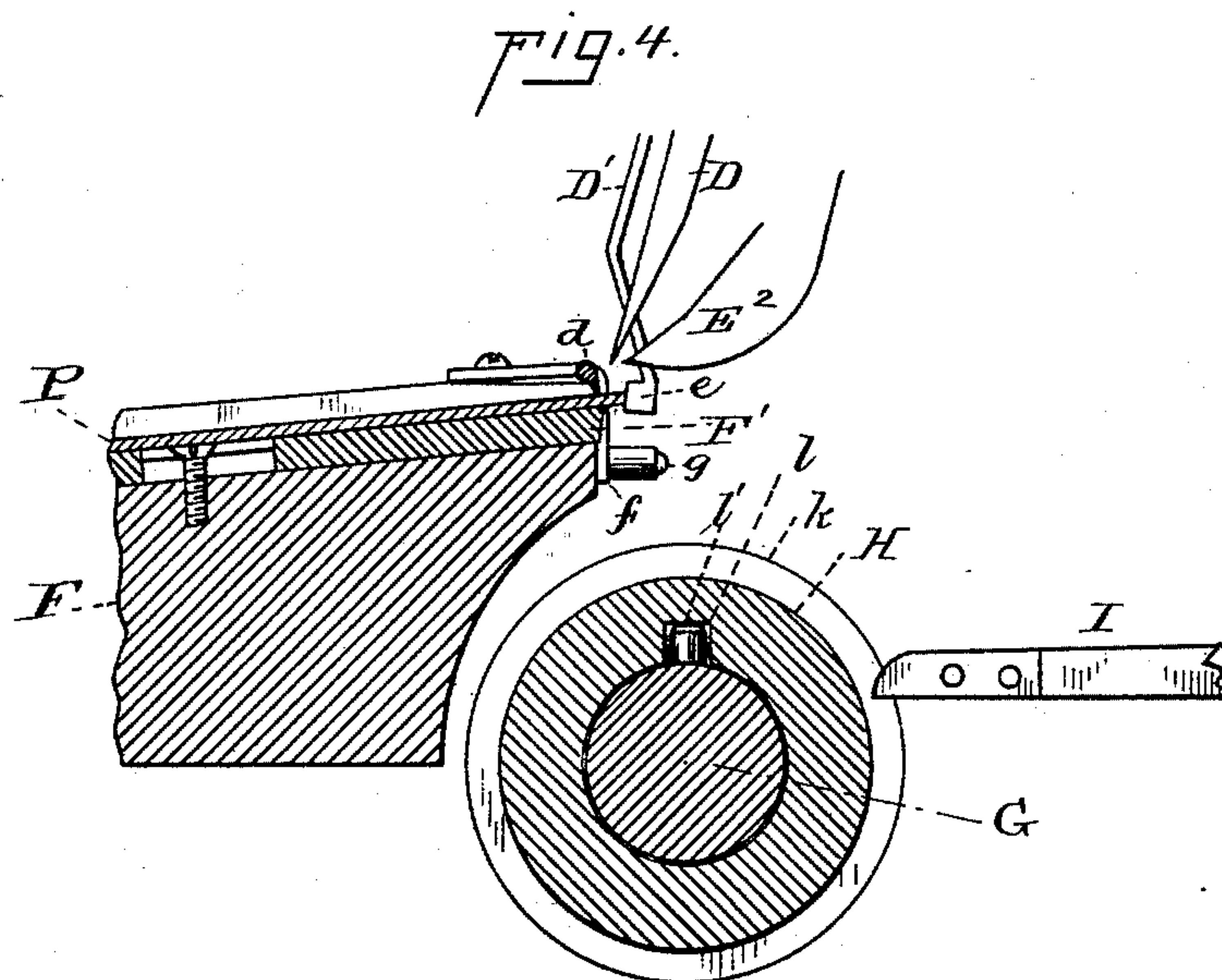
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3 Sheets—Sheet 3.

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# UNITED STATES PATENT OFFICE.

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## MACHINE FOR MAKING STAPLES.

SPECIFICATION forming part of Letters Patent No. 498,040, dated May 23, 1893.

Application filed November 27, 1888. Serial No. 291,992. (No model.)

*To all whom it may concern:*

Be it known that I, WENDELL P. WHITE, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented a certain new and useful Improvement in Machines for Making Staples, of which the following is a specification.

The object I have in view is the production of a machine for making staples of insulating material, such as are described in Letters Patent No. 317,879, and which have heretofore been made by hand. These staples are made from strips of any suitable insulating material, vulcanized fiber or wood being a good material for the purpose. The strips have a width equal to the entire length of the staple and the staples are first cut transversely from the strip and are then bent in the center to give them the staple form. Before bending, the strip of vulcanized fiber or wood must be softened and the staples must be held in shape while the material is hardening. I have found it desirable to soften the strip with alum water, or with steam, before it is presented to the machine.

My machine is designed to form the staple complete from the strip, it first cutting the staples from the strip, then bending them, and then delivering them to a suitable mandrel or holder attached to the machine, which has a capacity for a great number of staples and which is adapted to be removed from the machine and to be placed in a suitable oven for the drying and hardening of the staples.

My machine is provided with various adjustments for enabling staples of different lengths and widths and having different distances between the legs or sides of the staple to be made upon the same machine, and it also has various features of construction to meet the requirements of work of this character, as will be hereinafter pointed out in detail.

My invention consists in various novel devices and combinations of parts, all as more fully hereinafter explained and pointed out by the claims.

In the accompanying drawings forming a part hereof, Figure 1 is a top view of the ma-

chine. Fig. 2 is a side view; Fig. 3 a sectional view of a part of the mandrel or carrier and showing some of the adjacent parts. Fig. 4 is a vertical section through the table of the machine and the mandrel showing adjoining parts in elevation. Fig. 5, is an end view of the mandrel carrying shaft showing the pivoted bearing block; Fig. 6, an elevation of the gate through which the strip is fed; and Figs. 7, and 8, are respectively end and top views of the strip.

A is the frame of the machine from which rise standards A', in which is journaled the driving shaft B. On the center of this shaft between the standards are two small cams or eccentrics *a a'*, and between these two is a third cam or eccentric *b*, the eccentric *b* having a greater throw than the eccentrics *a, a'*, but acting at the same point in the revolution of the shaft.

C is a bifurcated rocking arm mounted upon a shaft C' at the rear of the frame and projecting forward under the shaft B, where it is provided with a head C<sup>2</sup>, carrying a cutting knife D and a guide arm D'. Working between the two sides of the bifurcated rocking arm C is a rocking arm E, which is mounted at the rear of the frame upon the shaft E' and likewise projects forward under the driving shaft B, where it carries a bending knife E<sup>2</sup> working in the rear of the cutting knife D. The two eccentrics *a a'* bear upon the rocking arm C, while the central eccentric *b* bears upon the rocking arm E. These rocking arms are thrown upwardly by springs *c* and are depressed by the eccentrics *a, a' b*, the effect of the movement being to first depress both rocking arms together until the highest point of the eccentrics *a a'* is reached, when a continuation of the movement depresses alone the bending rocking arm E to a further extent. The cutting knife D and the bending knife E<sup>2</sup> are held by suitable set screws for permitting proper adjustment in all directions to set these knives to the exact adjustment required.

F is a supporting block mounted upon the frame in front of the cutting and bending knife. This block carries a horizontal cutting knife F', held and adjusted by proper



screws, which horizontal cutting knife F' presents a cutting edge at right angles to that of the vertical cutting knife D, so that by the shearing action of the two knives the strip will be cut transversely. Secured to the bed F adjustably by screws is a guide block or gate *d*, which rests upon the knife F' near its cutting end and is provided with an opening through which the strip to be cut passes.

This gate is removable so that other gates with openings of different widths can be put upon the machine in its place to accommodate a strip of material of greater or less width. The guide arm D' which is attached to the head C<sup>2</sup> of the rocking arm C is also adjustably held by screws, so that its vertical as well as its lateral position can be varied. This guide arm projects down in the rear of and below the cutting knife D and its point *e* is turned forward and forms a gage to determine the width of the staple which will be cut from the strip. Attached adjustably to the block F on its edge next to the cutting knife D are two plates *ff'*, carrying studs *g*, having preferably anti-friction rolls upon them. These studs are adjusted toward each other beneath the cutting edge of the horizontal knife F' and centrally beneath the vertical cutting knife D. The bending knife E<sup>2</sup> passes between these studs *g*, and by doing so bends the staple which has been cut from the strip. By adjusting the plates *ff'* toward and away from each other the staples will be given a greater or less distance between their sides or legs. These studs *g* are located at a point beneath the lower limit of movement of the vertical cutting knife D.

G is a shaft extending transversely beneath the cutting and bending knives. This shaft is journaled at one end in a bearing *h*, having a friction strap *h'* adjusted to place more or less friction upon the shaft and to prevent any retrograde movement. The other end of the shaft G is journaled in a pivoted bearing *i*, which is adapted to be thrown down when desired, for slipping the mandrel or staple carrier on to or off of the shaft. The shaft G at this end is also made hollow for a short distance, as shown in Figs. 1 and 5, for a purpose which will be presently explained. Upon the shaft G is removably mounted the mandrel or staple carrier H. This is a sleeve provided with a spiral groove *k*, which is the shape and size of the head of the staple. The machine will be provided with different mandrels having grooves of different width, so that when the other parts of the machine are adjusted for a particular size of staple, a proper mandrel having a groove corresponding to that size can be placed upon the machine. This mandrel has a slot *l* which slides over a wheeled stud *l'* on the shaft G, permitting the longitudinal movement of the mandrel on the shaft but preventing it from turning independent of the shaft.

I is a guide arm, having a finger which takes in the groove *k* of the mandrel, so that as

shaft G is turned the mandrel will be advanced by the engagement of the finger of this guide arm I with the spiral groove of the mandrel. The guide arm I is pivoted upon a block I', which is secured to the frame and is adjustable by screws laterally and longitudinally, so as to adjust it to the different mandrels that may be placed upon the machine. A rod *m* projects from the under side of the arm I and this rod is connected with a sliding bar *n* which projects forward beneath the frame, so that by the moving of the sliding bar *n* the guide arm can be thrown up into engagement with the mandrel, or dropped away from it, the former position being maintained by a shoulder *n'* on the sliding bar *n*. It is necessary to drop the guide arm I out of engagement with the mandrel H when it is desired to remove the mandrel from the machine.

To give the shaft G an intermittent feeding movement it is provided with a ratchet wheel *o* which engages a spring pawl *p* attached to an arm L rocking on the shaft. This arm is oscillated by a pitman M from the end of the shaft B to which it is connected eccentrically. This pitman is connected with the arm L by means of a slot *p'* and a set screw or bolt *p*<sup>2</sup>, so that the throw of the arm L can be varied and the pawl can be made to engage every tooth of the ratchet, or to skip one or more teeth at each movement so as to turn the shaft and the mandrel to a greater or less extent for each movement, as may be required, to accommodate the staple.

N is a lever pivoted upon the base and having at one end a tooth which normally rests just above the strip that is being fed over the horizontal cutting knife F'. The other end of this lever is forked, one of its fingers being struck by a stud *q* on the end of the mandrel, while its other finger at the same time lifts the pawl *p* out of engagement with the ratchet wheel *o*, so that the farther feed movement of the mandrel will be stopped.

The lever N has no function in the operation of the machine until the mandrel reaches the end of its movement, when it is desirable that it should not be fed any farther and that no more staples should be cut from the strip, although the machine may continue to run from lack of attention. When the mandrel reaches the end of its movement the stud *q* strikes the lever N, causing the tooth on one end of the lever to catch the strip, preventing its farther forward feed, and at the same time the pawl is raised from the ratchet so that it will not feed the mandrel farther. A hand latch *r* is provided for throwing the pawl out of engagement with the ratchet at any time that it may be desired to do so. The strip of material P from which the staples are cut is fed over the horizontal knife F' and through the opening of the gate *d*, by means of a weight or spring which keeps it forward, as will be well understood. The forward end of the strip P strikes the gage *e*; the downward



movement of the cutting knife D cuts off the staple; the bending knife E<sup>2</sup> then depresses this strip upon the studs g and carrying it downwardly between the studs, bends it into the form of a staple and then thrusts it into the spiral groove of the mandrel H. The knives then make a return movement, the mandrel at the same time being fed forward sufficiently to make room for the next staple. Staples are successively cut in this way and thrust into the groove of the mandrel, such groove holding them in their proper shape until the mandrel is entirely filled, when it is removed from the machine and placed in an oven to dry and harden the staples. To give the staples a proper point the edge of the strip P is shaved in one or in both directions, or is notched, as shown in Figs. 7 and 8.

In removing the mandrel from the shaft G a wooden arbor carried by the hand is slipped into the hollow end of the shaft G and the mandrel is slipped off of the shaft G onto this hand arbor by which it is held in the oven. A new mandrel is placed on the shaft G and the operation is repeated. By reason of the great length of the spiral groove of the mandrel, each mandrel is adapted to carry a large number of staples.

What I claim is—

1. In a machine for making staples of vulcanized fiber, wood and similar materials, a turning mandrel or holder having a spiral groove for the reception of the staples and a feed movement for advancing the mandrel so as to present unoccupied portions of the groove for receiving the staples, substantially as set forth.

2. In a machine for making staples of vulcanized fiber, wood and similar materials, a turning mandrel or holder mounted removably upon the machine, having a spiral groove for the reception of the staples and a feed movement for advancing the mandrel so as to

present unoccupied portions of the groove for receiving the staples, substantially as set forth.

3. In a machine for making staples of vulcanized fiber, wood and similar materials, the combination of vertical and horizontal shearing knives for cutting the staples transversely from a strip, with a bending knife for bending the staples and adjustable studs between which the bending knife acts, substantially as set forth.

4. In a machine for making staples of vulcanized fiber, wood and similar materials, the combination with the cutting and bending knives, of the turning mandrel having a spiral groove, the shaft upon which the mandrel is removably carried and the dropping or removable guide arm for advancing the mandrel as the shaft is turned, substantially as set forth.

5. In a machine for making staples of vulcanized fiber, wood and similar materials, the combination with the cutting and bending knives, of the turning mandrel having a spiral groove and an adjustable feed movement for such mandrel whereby it will accommodate staples of different widths, substantially as set forth.

6. In a machine for making staples of vulcanized fiber, wood and similar materials, the combination with the cutting and bending knives, of the turning mandrel, a feed movement for such mandrel, and a stop lever operated by a stud on the mandrel and acting to stop the feed movement and to hold the strip of material when the mandrel is filled, substantially as set forth.

This specification signed and witnessed this 25th day of July, 1888.

WENDELL P. WHITE.

Witnesses:

HERBERT H. CHASE,  
WILLIAM B. CROSS.