(Model.)

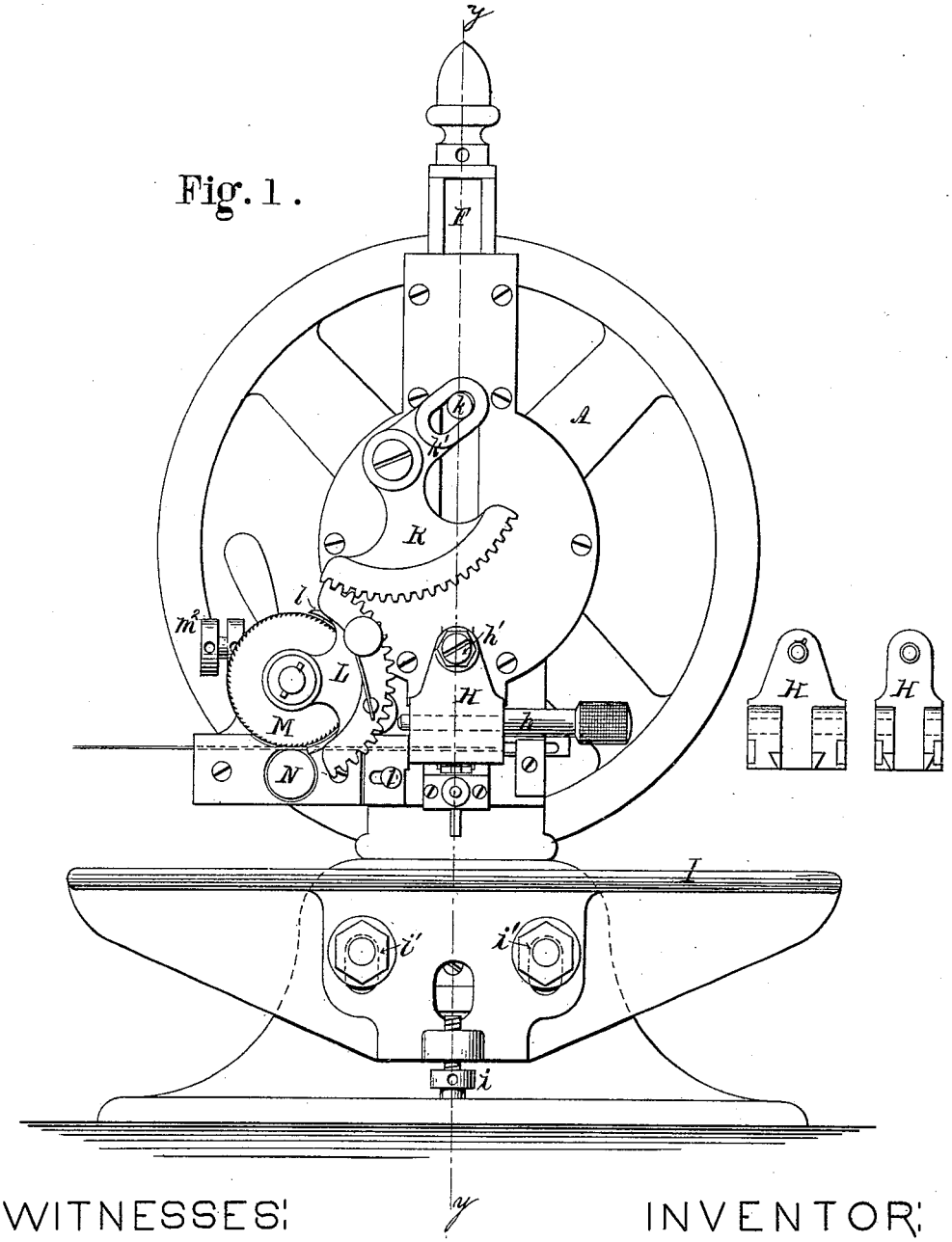
5 Sheets—Sheet 1.

S. E. MOWER.

BOOK STAPLING MACHINE.

No. 263,561. Patented Aug. 29, 1882.

Fig. 1.



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(Model.) 5 Sheets—Sheet 2.

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BOOK STAPLING MACHINE.

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Fig. 2.

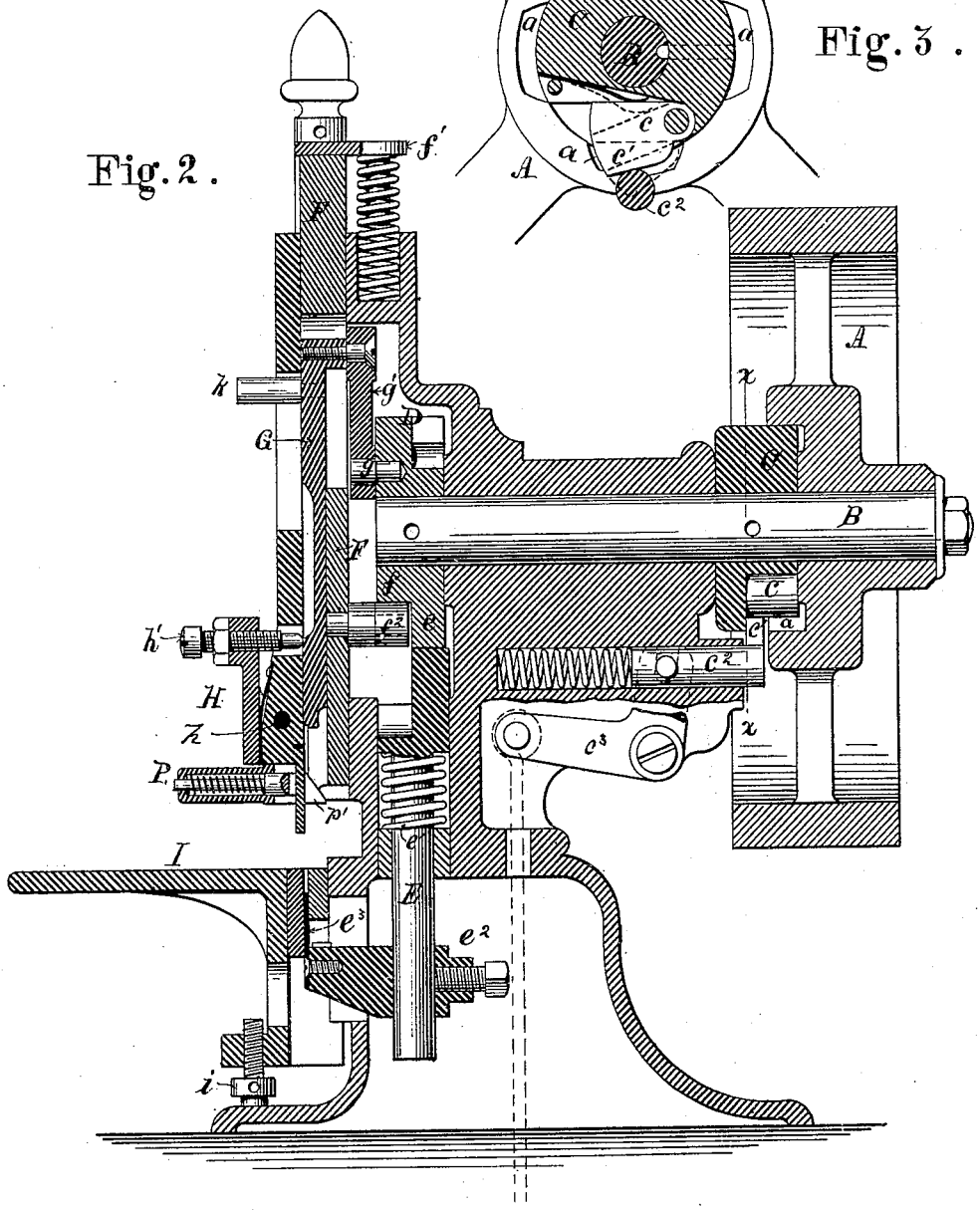

Fig. 3.

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Fig. 4.

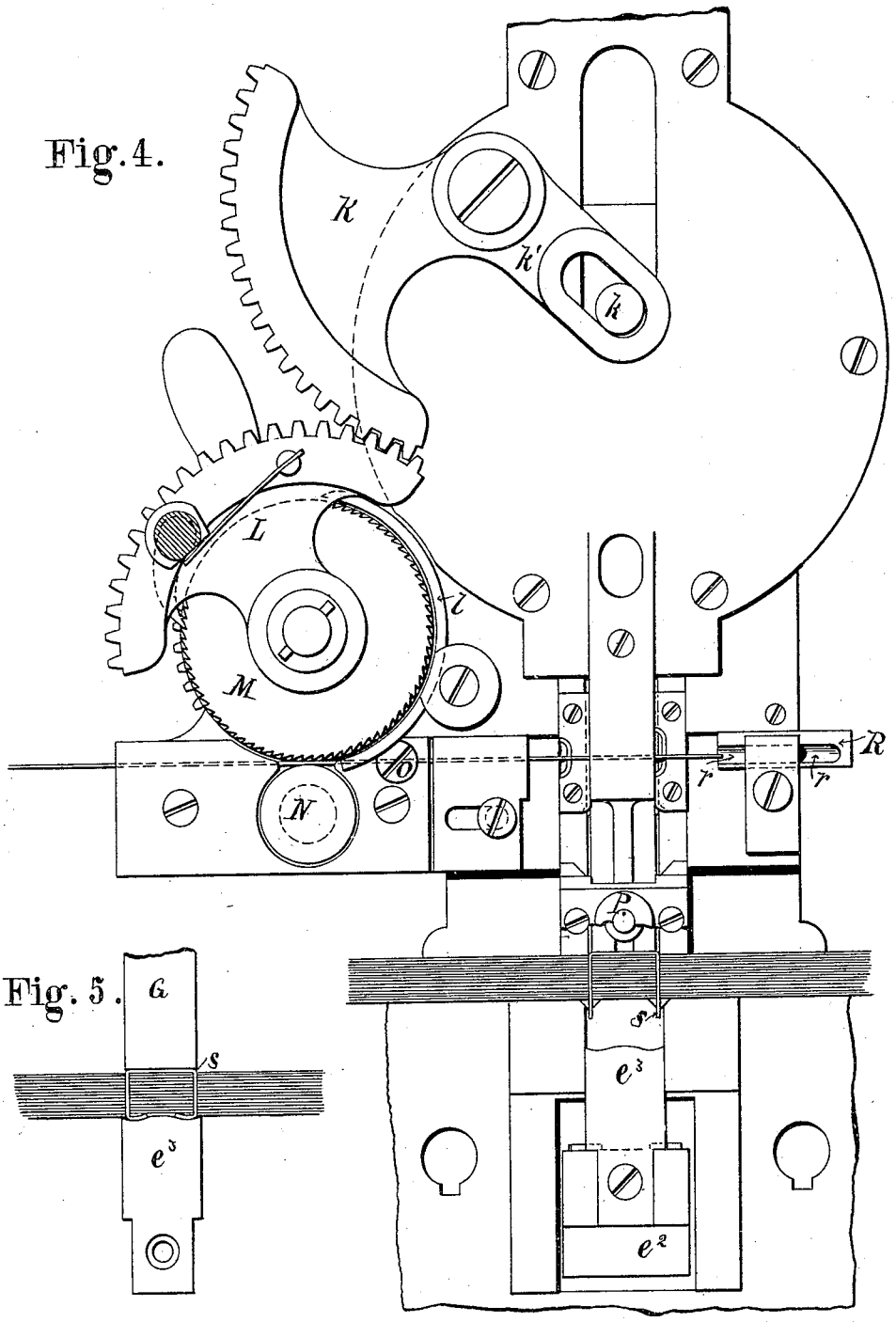

Fig. 5.

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No. 263,561. Patented Aug. 29, 1882.

Fig. 6.

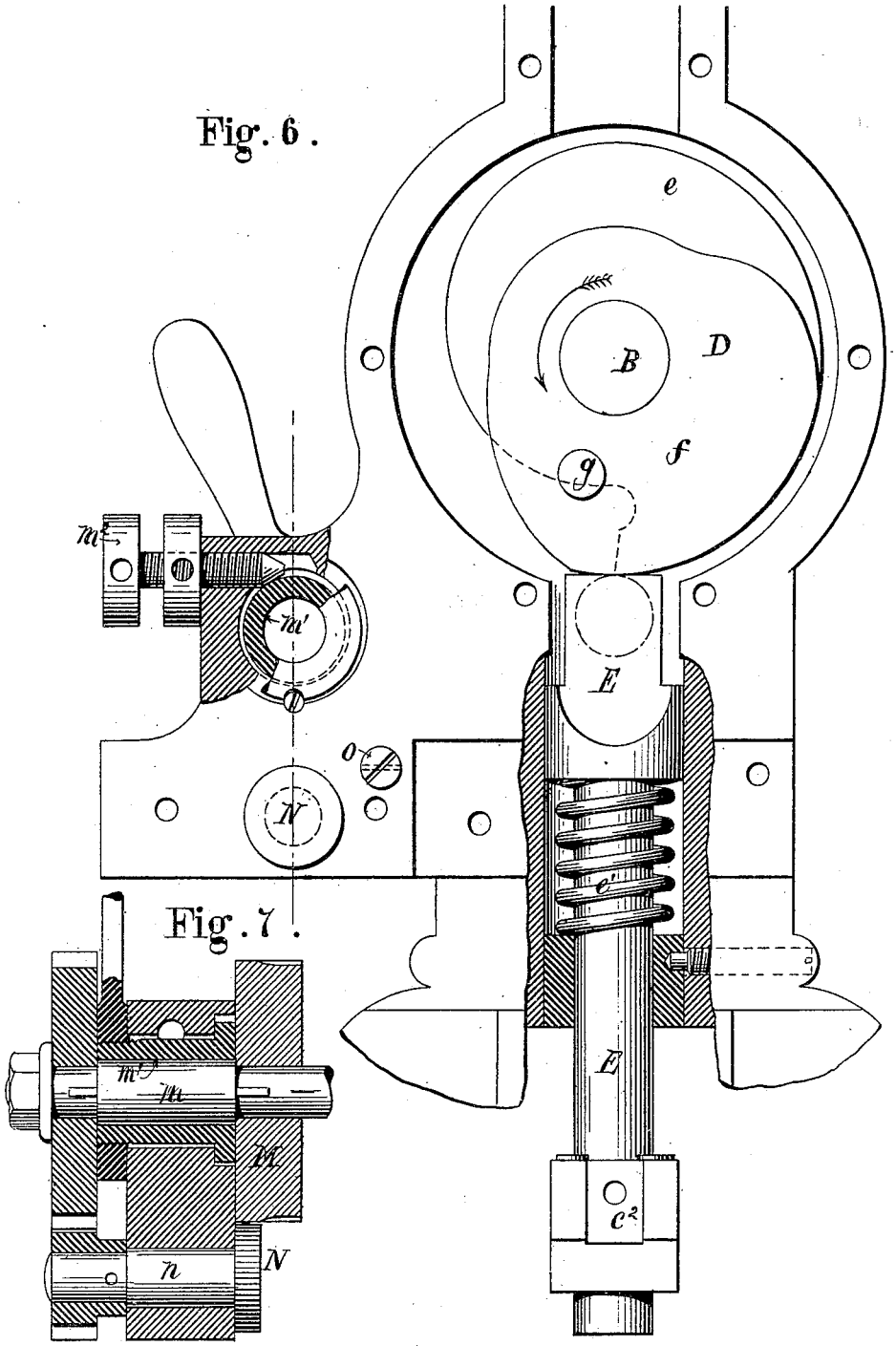

Fig. 7.

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(Model.) 5 Sheets—Sheet 5.

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No. 263,561. Patented Aug. 29, 1882.

Fig. 8.

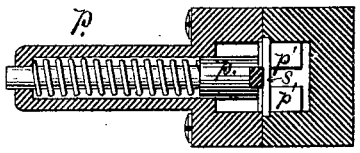


Fig. 9.

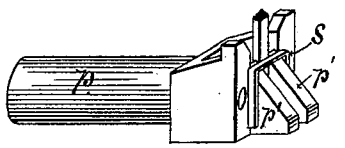
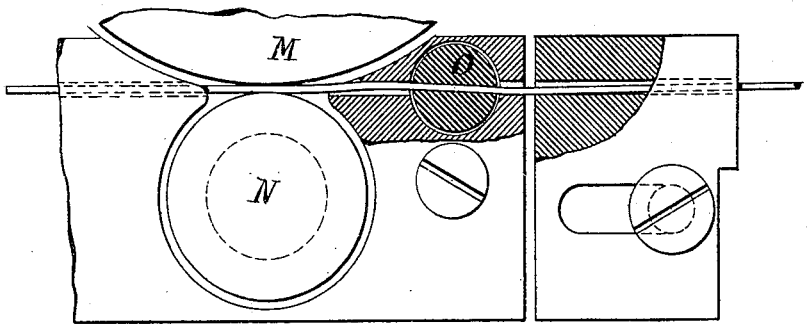


Fig. 10.



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UNITED STATES PATENT OFFICE.

SAMUEL E. MOWER, OF MILFORD, ASSIGNOR TO HENRY G. THOMPSON & SON, OF NEW HAVEN, CONNECTICUT.

BOOK-STAPLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 263,561, dated August 29, 1882.

Application filed July 22, 1881. (Model.)

To all whom it may concern:

Be it known that I, SAMUEL E. MOWER, of Milford, in the county of New Haven, State of Connecticut, have invented a new and valuable Improvement in Power-Machines for Sewing Books with Wire Staples; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in machines for sewing books with wire staples; and it consists in the peculiar and novel construction of the parts, as will be more fully described hereinafter, and pointed out in the claims.

Figure 1 is a front view of my improved machine, showing the same in elevation with the adjustable table on which the work is supported. Fig. 2 is a vertical section in the plane indicated by the broken line *y y*, Fig. 1. Fig. 3 is a sectional view of the clutch mechanism by which the machine is stopped and started. The section is taken through the line *x x* on Fig. 2. Fig. 4 is an enlarged front view of the machine, the cutters and table being removed so as to show the mechanism more clearly. Fig. 5 is a view of the driver and clincher, showing their operation on the staple. Fig. 6 is an enlarged view, showing the cams on the end of the driving-shaft for operating the clincher and driver, as also the device for regulating the pressure on the wire in feeding the same to the cutters. Fig. 7 is a sectional view, showing the device for regulating the pressure and the disks for feeding the wire. Fig. 8 is an enlarged horizontal sectional view of the base of the presser-foot, showing the spring-pressed guide for holding the staple while it is driven. Fig. 9 is a perspective view of the yielding guide for the staple, placed on the presser-foot to hold and guide the staple while the same is driven by the driver. Fig. 10 is a sectional view, showing the means used to straighten the wire while it is delivered to the cutters.

Similar letters of reference indicate corresponding parts.

In the drawings, A is the driving-pulley, revolving loosely on the driving-shaft B. The hub of the pulley A is provided with ratchets or recesses *a a*, into which a pawl may enter. C is a clutch-disk secured to the shaft B. The clutch-disk C has the pawl *c* hinged to it, and a spring is interposed between the pawl and the clutch-disk, so as to engage the pawl *c* with the hub of the pulley A by entering one of the recesses *a a*, and thus connect the shaft B with the driving-pulley.

Connected with the pawl *c*, and extending outside the hub of the driving-pulley, is the wing *c'*, which, when it comes in contact with the spring-pressed bolt c^2, raises the pawl *c* out of the recess *a*, thus disengaging the clutch and stopping the revolution of the shaft B. As long as the bolt c^2 projects the driving-pulley will revolve without turning the shaft B, and the machine is stopped. To start the machine the bolt c^2 must therefore be withdrawn, and to do this the bell-crank lever c^3 is connected by means of a fork and pin with the bolt c^2, and by means of a rod to a foot-treadle or similar device, so that as long as it is desired to run the machine the bolt c^2 is held back, and as soon as the machine is to be stopped the bolt is pushed out by the coiled spring behind the bolt. The usual operation performed is to place the book or other article into which the staple is to be driven in the proper position on the table, withdraw the bolt c^2 by means of a foot treadle or a lever operated by one hand, thus allowing the pawl *c* to enter one of the recesses *a a* in the hub of the driving-pulley and allow the bolt c^2 to shoot out so as to intercept the wing *c'* of the pawl and disengage the same the instant one revolution has been made, as in this machine at each revolution of the driving-shaft B one staple is cut, driven, and clinched. The book is quickly moved to receive the next staple, the bolt withdrawn, and the operation repeated.

To the front end of the shaft B the double cam D is secured. One of the parts, *e*, of this double cam operates the clinching device by forcing the same down against the force of a coiled spring, and, by suddenly releasing the same, allowing the clincher to rise suddenly and clinch the staple by a blow. The other

part, *f*, of the double cam operates the presser and gives to the same a fixed motion, and to the face of this cam the driver G is connected by means of a crank-pin, *g*, so that positive motion is imparted to the driver.

E is the clincher-rod, operated by the part *e* of the double cam D. It is surrounded by the coiled spring *e'*, which is compressed by the cam part *e*. The shape of the cam is shown in Fig. 6 partly in broken lines.

To the clincher-rod E the bracket e^2 is secured by means of a clamp-screw, and to the face of the bracket e^2 the clinch-plate e^3. The end of the clincher-plate is curved, so as to bend the ends of the staple.

The presser F, which bends the wire over the anvil to form the staple, as usual in this class of machines, is operated by the cam *f*, being the forward part of the compound cam D, secured to the driving-shaft B. The presser F through the greater portion of its length surrounds the driver G, and in its upper end it is provided with the arm *f'*, which bears on a coiled spring, as shown in Fig. 2. The roller f^2, bearing against the cam *f*, carries the presser down with the rotation of the cam, and the coiled spring, bearing against the arm *f'*, raises the presser.

G is the driver, connected with the crank-pin *g* on the face of the cams D by the link *g'*, so that positive reciprocating motion is imparted to the driver at each rotation of the shaft B.

H is the cutter-plate, hinged on the pin *h*, which extends laterally and is provided near its end with a thumb-piece, so that it can be readily removed and a cutter-plate constructed to cut the wire for any desired length of staple be substituted.

In Fig. 1 two sizes of cutter-plates H are shown on the right side of the figure, the reverse side of the cutters being shown in front. The upper end of the cutter-plate H is provided with the screw *h'*, the end of which enters a groove in the driver when the driver descends and is forced outward at the end of the groove when the driver ascends, or before it completes the ascent, thus forcing the upper end of the hinged cutter-plate outward and the lower end inward to cut the wire.

As the motion of the driver and presser is positive and the downward travel of the reciprocation fixed, it becomes necessary to make the table on which the work is to be secured together adjustable to the thickness of the work. The table I is therefore made so that it can be adjusted vertically by means of the set-screw *i* and be secured in the desired position by the clamp-screws *i' i'*.

It has been shown that the cutter-plate H may be exchanged for a wider or narrower plate, so as to cut longer or shorter wire, to vary the length of the staple. This change only affects the length of the two legs of the staple, so as to adjust it to the varying thickness of the work to be secured together. The width between the legs is not changed, and the staple is bent over the same anvil by the descending presser, as is well known in the art, and shown, as well as described, in several patents for such machines, which devices for bending the staple and delivering the staple under the driver forms no part of my present invention.

By varying the length of the wire for the staple it becomes necessary to adjust the length of wire fed, which is accomplished by the mechanism shown in Fig. 4.

k is a pin projecting from the driver G, and K is a segmental gear provided with the slotted arm *k'*, in which the pin *k* moves. The reciprocation of the driver imparts partial rotation to the segmental gear K. L is another segmental gear, pivotally connected with the shaft of the feed-roll M and geared with the segmental gear K. At each reciprocation of the driver the two segmental gears are turned a fixed distance through a partial revolution. The feed-roll M is provided with a ratchet-gear and the segment L with a pawl, so that at the rising of the driver the pawl will slide over the ratchet-gear; but the moment it descends the pawl engages with the ratchet and turns the feed-roll M so as to deliver a given length of wire. Now, considering that this whole motion will deliver wire just long enough for the widest cutter-plate or staples with the longest legs for which the machine is adapted, it will become necessary to shorten this motion when a narrower plate for shorter staples is to be used, and for this purpose the shield or rider *l* is adjusted so as to allow the pawl to slide over the shield for a part of its oscillation and enter the ratchets at the point where, when it has completed its motion, the proper length of wire shall have been delivered. By thus adjusting the shield *l* any length of wire less than the length of the oscillation of the pawl can be delivered to the cutter-plates.

N is a revolving roll, between which and the feed-roll M the wire passes. It (the roller N) is supported on the fixed bearing *n*, Fig. 7. To secure the positive delivery of fixed lengths of wire, the rolls M and N must press the wire and hold the same firmly. To insure this and regulate the pressure, I support the shaft *m* of the feed-roll M in the sleeve *m'*, which is loosely fitted in a bearing, as shown in Fig. 6, partly in section, and I tap the screw m^2, provided with a conical end, into the frame at right angles to the axis of the sleeve *m'*, the center of the screw m^2 being practically on a line with the upper line of the sleeve *m'*, and with it press the feed-roll M downward against the roll N with great force, and when turned in the opposite direction withdraw the conical end and allow the sleeve *m'* and roll M to be raised. A clamp-nut is provided to secure the screw m^2 in the desired position.

Wire may be taken from a large roll or reel of wire and fed to this machine automatically

by the feed-roll M; but such wire is liable to be bent and must be straightened before the wire is made into staples, and for this purpose I place the grooved disk or perforated cylinder *o* in the path of the wire and adjust the same so that the wire is deflected from the direct path and is held firmly against the side of the groove, which has a similar offect on the wire as drawing the same through such a groove placed at an angle with the line of the wire.

In all machines for sewing books with wire staples, whether by hand or power, it is important to guide the staple until it is driven, so as to prevent the upsetting of the legs of the staple and injury to the book as well as the machine.

In Fig. 2, below the cutter-plate H, the case P containing a bolt surrounded by a coiled spring is shown. The end of this bolt has two beveled guides, which are encountered by the descending driver, and are forced inward against the pressure of the coiled spring as the driver descends. In Figs. 8 and 9 the same device is shown enlarged. *p* is the spring-pressed bolt contained in the case P, and *p' p'* are the beveled guides. A staple is shown resting on the beveled guides.

When it is considered that the legs of the staple *s* in Fig. 9 are guided in grooves (not shown) in the presser, it will be apparent that when the driver descends on the staple the spring-pressed bolt to which the guides *p' p'* are secured, or of which they form the projecting ends, will be forced back as the driver descends and forces the staple into the work, until the staple is driven, the legs will be sustained on all sides and cannot bend under the force of the driver, and thus a staple can be driven through anything softer than the staple without bending the same.

It is of much practical value to make the cutter R (fixed to the frame and forming the cutter, acting in connection with the outer end of the cutter-plate H) concave or channeled, so that the short ends of wire that are fed farther than the width of the cutter-plate, being cut off at this place, will not adhere to the cutter and get under the cutter-plate, but will be pushed forward by the succeeding ends and discharged at the end of the channel.

The machine as constructed will deliver wire to the cutters automatically, will cut the wire, bend the staple, compress the material, drive the staple, and clinch the same, all at one revolution of the driving-shaft B, and can only make one revolution unless the operative shall keep the bolt c^2 withdrawn, when it will continuously perform all these operations at one revolution of the shaft.

An active person can accomplish an immense amount of work on one of these machines with little labor. All the parts are strong, simple in construction, and durable. The adjustable table allows all other parts to move with strong fixed connections, so as to make an easy-running, durable machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the shaft B and the double cam D, secured to said shaft, of the presser operated by one of the parts of said cam, the driver connected with said cam by link and crank-pin, and the clincher operated by the other part of said cam, substantially as described.

2. The combination, with the clinching-rod E, provided with the bracket e^2, and clinch-plate e^3, of the coiled spring e' and the cam *e*, constructed to compress the spring and suddenly release the clincher, so as to clinch the staple with a blow, as described.

3. The combination, with the clinching-rod provided with a spring, and an adjustable bracket provided with a clinching-plate having a curved surface, of a cam constructed to compress the spring and suddenly release the clincher, so as to clinch the staple by a blow and bend the ends, as described.

4. The combination, with the wire-feeding device and the cutters, of the disk *o*, provided with a channel set at an angle with the feed-channel of the wire, and constructed to straighten the wire, as described.

5. In a machine for binding books with wire staples, the cutter R, provided with the groove or channel *r*, constructed to receive the waste ends of the wire, as described.

6. In a machine for sewing books with wire staples, a driving-shaft, a double cam secured upon said shaft, a presser operated by one of the parts of said double cam, a staple-driver sliding in a way formed in said presser and connected by link and crank-pin with the cam, a clincher operated in one direction by the other part of said cam, a spring for operating said clincher in opposition to the cam, and a table adjustable in accordance with the thickness of the book to be sewed, the whole constructed, combined, and operating as and for the purpose set forth.

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Witnesses:
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A. C. WETMORE.