

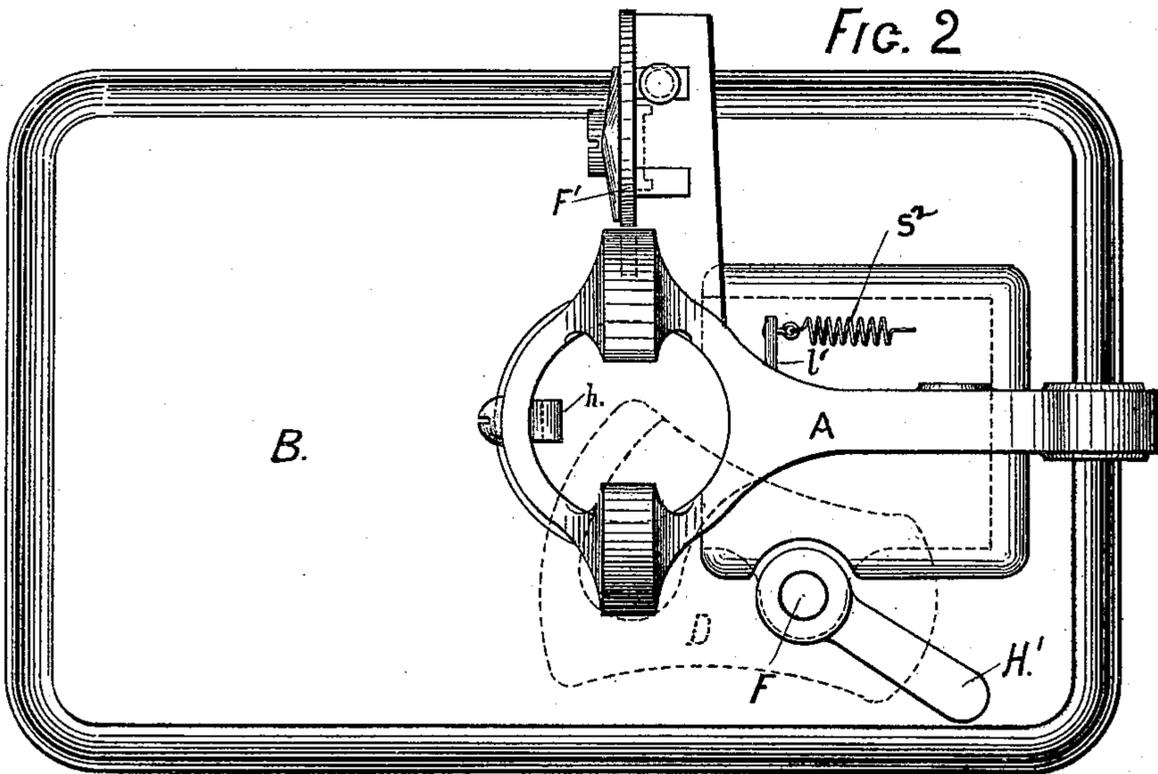
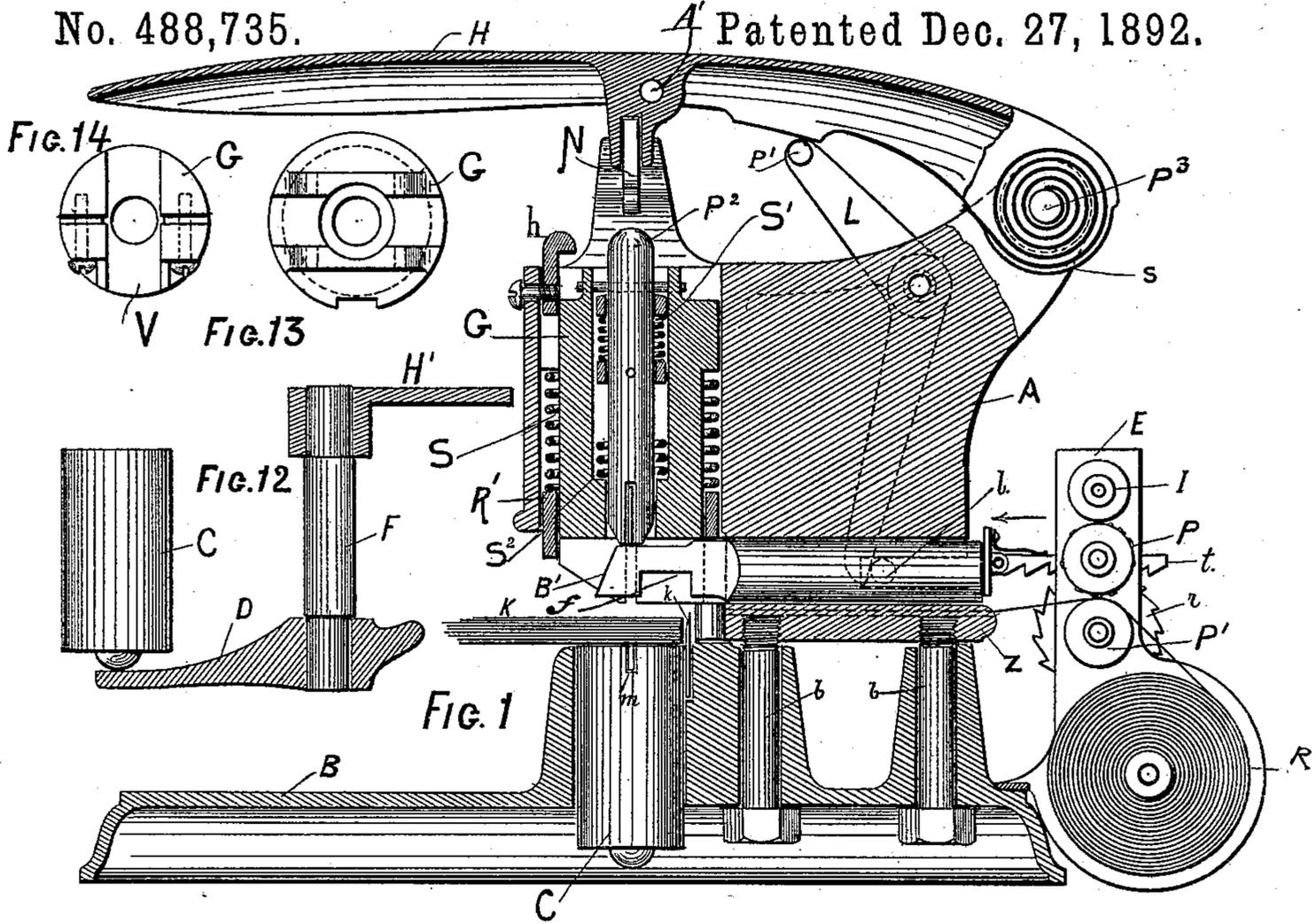
(No Model.)

2 Sheets—Sheet 1.

E. T. GREENFIELD.
PAPER BINDING MACHINE.

No. 488,735.

Patented Dec. 27, 1892.



Edwin T. Greenfield
Inventor

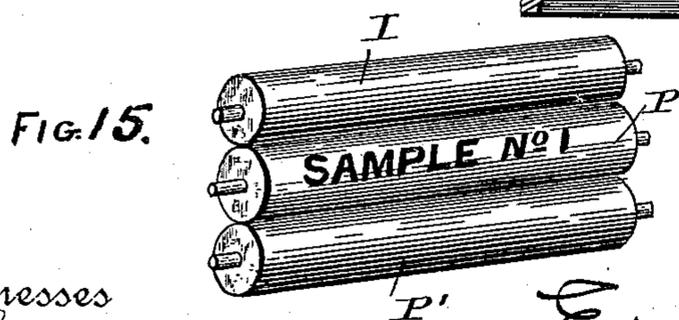
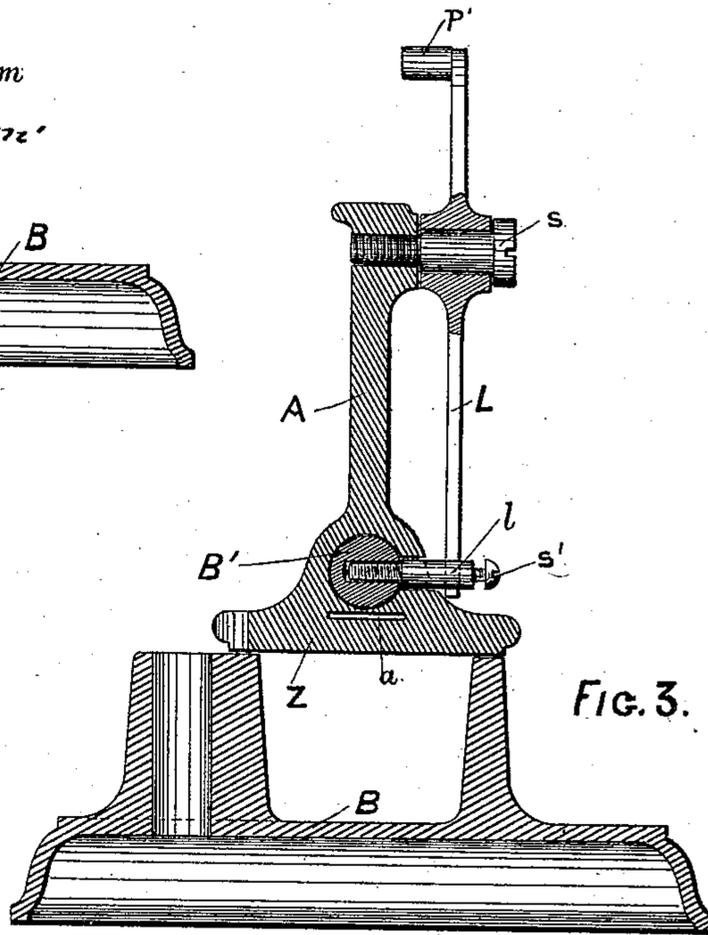
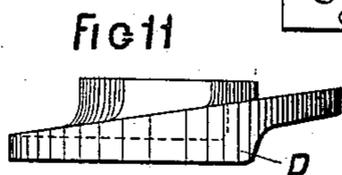
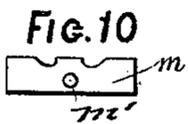
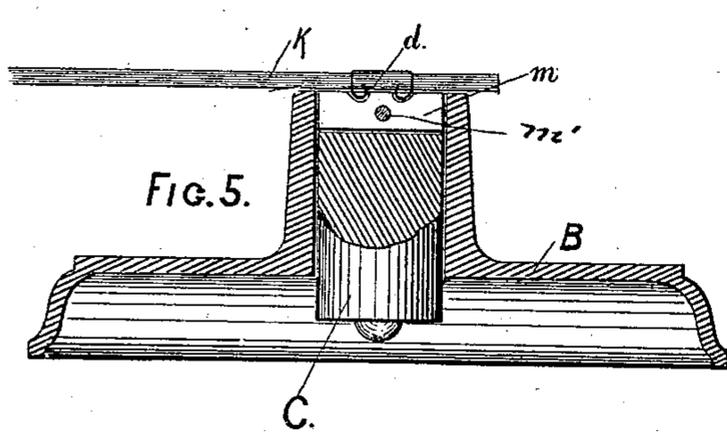
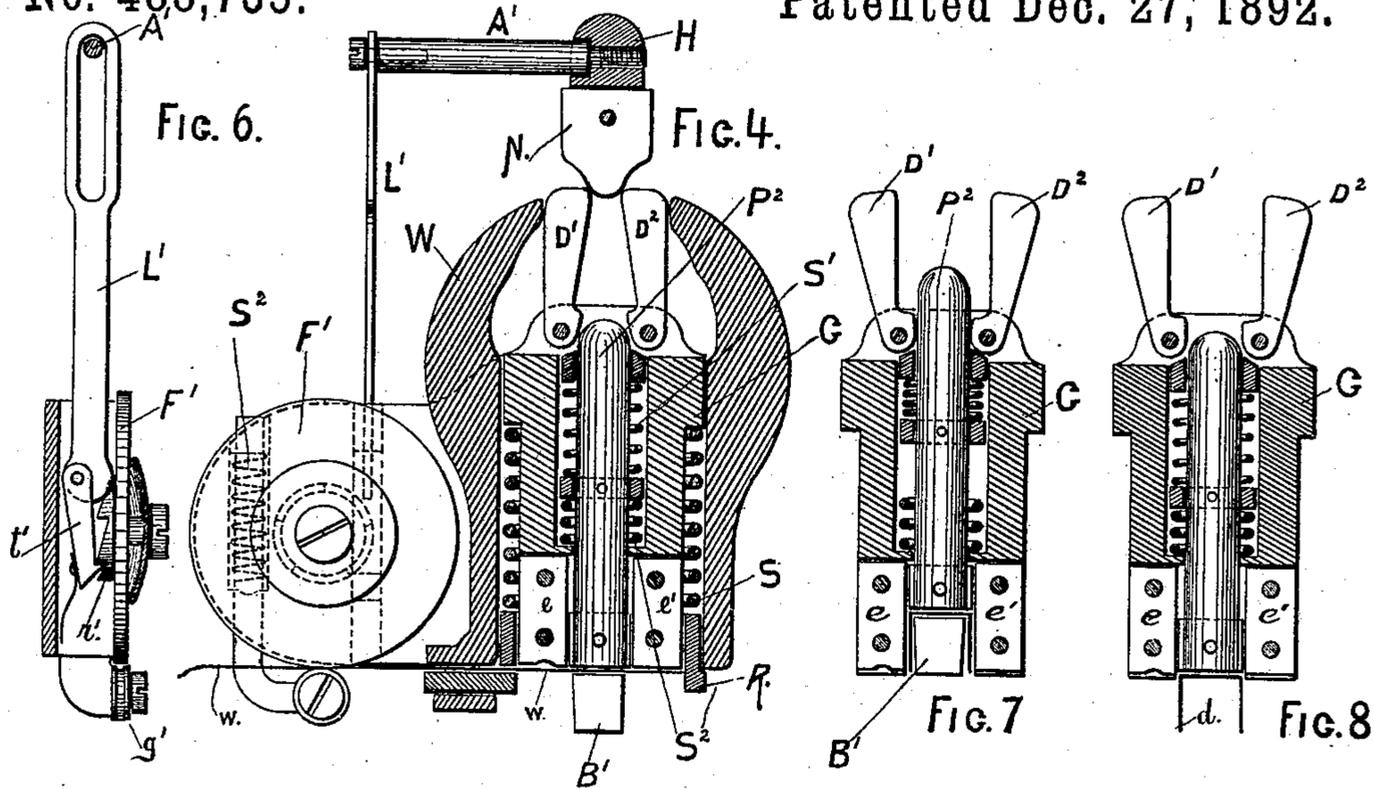
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PAPER-BINDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 488,735, dated December 27, 1892.

Application filed May 13, 1892. Serial No. 432,941. (No model.)

To all whom it may concern:

Be it known that I, EDWIN T. GREENFIELD, a citizen of the United States, residing at New York, in the county and State of New York, have made a new and useful invention in apparatus for binding or fastening layers, strips, or sheets of paper or other analogous material together, of which the following is a specification.

My invention is directed particularly to a novel device for binding or uniting sheets of paper such as legal or analogous documents; samples of goods; leather belting, &c., and its objects are. First. To produce a binding machine of the type indicated having staple-forming and staple-driving devices and a sliding or moving anvil provided with a wiper or lifting cam and an operating handle whereby the article or articles to be bound may be firmly held in place and quickly and readily inserted. Second. To produce a machine of this type which shall also automatically print or otherwise mark upon the material thus bound or united a characteristic mark or indication of the nature or class of the goods or material thus joined. I accomplish these objects with the apparatus hereinafter described the essentially novel features of which are fully pointed out in the claims at the end of this specification.

In order that my invention may be fully understood by those skilled in the art to which it is most nearly related reference is had to the following description and accompanying drawings in all of which like letters of reference represents like parts whenever used.

Figure 1 is a longitudinal vertical sectional view of my machine illustrating parts in elevation. Fig. 2 is a plan view of the same, the operating handle, the printing or marking apparatus, staple-former and staple-driver, and mandrel being removed. Fig. 3 is a cross sectional view taken through Fig. 2 near the right hand end of that figure; the wire feeding mechanism not being shown. Fig. 4 is a cross sectional view taken through the upper part only of Fig. 1 and as seen looking from left to right. Fig. 5 is a sectional view illustrating the moving clamping anvil in the base of the machine and showing also how the staple is clinched through the ma-

terial to be bound or fastened together. Fig. 6 is a detail side elevational view of the wire feeding attachment as seen looking toward Fig. 4 from left to right. Figs. 7 and 8 are sectional views of the staple-former, staple-driver and attachments illustrating said parts in different positions and the staple as completed preparatory to clinching. Fig. 9 is a plan view of the top of the clamping anvil and clinching plate and Fig. 10 is a detail view of the notched clinching plate or block carried in the top of this anvil. Fig. 11 is a side view of the wiper cam which lifts and lowers the anvil while Fig. 12 is a side elevational view of the anvil itself illustrating also the wiper-cam and its operating lever in section. Figs. 13 and 14 are top and bottom plan views of the staple-former, plunger and staple-driver and operative parts being detached. Fig. 15 is a detail perspective view of the inking, printing and feed rolls for the printing attachment.

Referring now to the details of the drawings, B is the base of the machine made preferably of cast metal and having upwardly extended parts to which the major portion of the operation parts are attached by bolts *b b* extending from below into the paper guide Z (see Figs. 1 and 3).

C is a cylindrical shaped anvil having vertical movement through the base B and provided with a clinching plate *m* notched or curved at two places in its upper edge, said plate being secured by a pin *m'* as shown in Fig. 5.

D is a wiper-cam journaled by an upright shaft F in the base B and in such manner that when the handle H' carried by the shaft F is rotated, the anvil C will be raised or lowered at will.

k is a chisel or cutter carried at the upper end of anvil C, see Fig. 1.

H is the operating handle pivoted at P³ to the body A and provided with a strong restoring spring *s* for causing it to assume the position shown in Fig. 1 after each operation.

G is a cylindrical staple-former plunger having vertical movement through the body A and in alignment with the anvil C which has similar movement in the base B as already described.

h is a detachable hook or stop for preventing the staple-former and driver from being withdrawn from the body A.

R' is a metal ring having an internal diameter equal to that of the staple-former plunger G at its lower end and an external diameter equal to that of the upper end of the same staple-former plunger; the arrangement being such that this ring acts as a seat for a strong spiral spring S which in turn sustains the staple-former plunger, see Figs. 1 and 4. One edge of this ring is lower than the other as shown, for the purpose of acting as a stop for the binding wire *w*, as it is fed forward into position. The ring is secured to the inner face of the guide way W the upper end of which is hollowed as shown to receive the free ends of two arms D' D² pivoted to the upper end of the plunger G.

Staple forming devices *e* and *e'* are secured to the lower end of the plunger G and located directly over the wire or strip of metal *w*; the one on the left *e* being notched or grooved so as to permit it to shear off the wire from which the staple is made when in the position shown in Fig. 4.

P² is a staple-driver having a vertical movement within the staple-former plunger G and provided with a spiral restoring spring S' connected at the top end to a collar secured to the inner wall of the staple former plunger G and at the other to a second collar carried by the staple driver.

S² is a cushion spring located between the collar carried by the male plunger and an inwardly projecting ledge at the bottom of the staple-former plunger G.

The upper end of the staple-driver plunger rests normally between the lower inner faces of the two upper ends of the pivoted arms D' and D² their free ends in turn resting against the inner wall of the guideway W. A lug or extension N carried by the handle H bears on the upper ends of the pivoted arms D' D² and gives them downward motion as will be more fully described in connection with the description of the mode of operation.

B' is a block or mandrel of rectangular cross section at its free end and having longitudinal sliding motion into and out of the path of the staple-former and driver G and P². It is beveled at its free end and notched on the under side; the bevel corresponding to a similar bevel on the lower end of the staple-driver P² and the notch *f* lying in the path of the chisel or cutter K. This mandrel is given positive longitudinal motion by a pin *l* secured through a screw *s'* to one end of a lever L pivoted to the part A, the other end thereof carrying a pin *p'* lying below and in the path of the operating handle H. This mandrel is returned by a retractile spring *s*² connected to the arm *l* and a second arm *l'* secured to the body of the machine. See Fig. 2.

To the outer end of the mandrel B' is attached a pivoted rack *t* the teeth of which are

adapted when the rack moves inward in the direction of the arrow to give forward motion to a ratchet wheel *r* carried by a shaft journaled in side supports; said shaft carrying also a feed roll P' adapted to feed forward a strip of stiff paper from a roll R carried on a parallel shaft.

P is a printing roll having any characteristic mark on its face as for instance the number and grade of the sample of goods to be bound and I is an inking roll said rolls being supported in journal bearings by the side supports which sustain the ratchet wheel *r* and feed roll P'.

a is a guide groove through which the tag paper passes before it is cut off by the knife *k*.

F' is a feed wheel for the staple forming wire *w*. It is journaled at one side of the machine and is provided with impelling mechanism consisting of a pawl *t'*, ratchet wheel *r'*, operating link or arm L' slotted at its upper end and operatively connected to a rigid arm A' secured directly to the operating handle H.

g' is a grooved guide wheel for the wire *w* pivotally secured beneath the feed wheel F' and provided with an adjustable spring S² for varying the pressure on the wire or metal strip, between said wheels.

d, Figs. 5, 7, and 8 represents a staple as produced during the various steps of the operation of the machine which operation will now be described.

The steel wire or thin metal strip *w* of which the binding staples are to be made is first fed forward by hand from a roll of the material not seen and passed between the feed wheel F and pressure wheel *g'* to the position shown in Fig. 4 its free end resting against the tip or projection of the ring R' seen on the right. In like manner the marking paper from roll R is drawn forward by hand between the feed roll P' and printing roll P, each complete revolution of the roll P making one impression, the character appearing on the upper surface of the strip as it is fed forward. The inner end of this marking strip at starting will therefore be allowed to rest near and beneath the free end of the bolt B'. The material K to be bound or fastened (say for illustration several sheets of a legal document) are now inserted with the top of the sheets resting on the clamping anvil C, (see Figs. 1 and 5) against the lateral face of the chisel or cutter *k*. The handle H' on the shaft F carrying the cam D is now rotated so as to cause the cam to lift the anvil and firmly clamp the sheets between it and the free rectangular end of the sliding mandrel B'. The chisel or cutter *k* therefore severs the marking tag and the latter is held securely between the upper sheet and the bolt. The operating handle H is now forced suddenly downward. The first movement imparted to this handle causes the staple-former plunger G to be forced forward through the action of the lug N and arms D' and D². This causes the former *e* to shear or

cut off the wire *w* and the continued motion bends the staple in the manner shown in Fig. 7; the staple-driver having during this downward stroke remained at rest on the body of the staple carried by the top face of the mandrel B'; the spring S' being of sufficient strength to maintain the driver in this position and to thrust the completed staple into the position shown in Fig. 8 which occurs as soon as the mandrel B' is withdrawn. This withdrawal of the mandrel B' is brought about as the handle H descends through the agency of a pin *p'* and lever L acting on the arm *l*, secured to the mandrel by a screw *s'*. As the mandrel B' is withdrawn from under the staple the spring S' forces the staple-driver forward into the position shown in Fig. 8. A further advancement of the handle H now brings the lug N into actual mechanical contact with the upper end of the staple-driver the enlarged inner portion of the guide way W allowing the arms to spread into the position shown in Figs. 7 and 8. The legs of the staple are therefore forced through the paper one on each side of the indicating tag and into contact with the curves or notches in the block *m* and are turned up or clinched into the paper K as shown in Fig. 5. The last portion of the downward stroke of the lever or handle H causes the arm A' to strike the lower end of the slot in link or arm L' and to impart to its pawl *t'* one forward step into the next succeeding tooth of ratchet wheel *r'* so that when the handle H is released and allowed to return under the influence of the spring *s* this pawl will impart to the feed wheel F' one step forward and again feed the wire or strip *w* into the position shown in Fig. 4 where it is ready for a repetition of the act described. At the same time the liberation of the handle H allowed the springs S and S' to restore the parts to normal position and the mandrel B' was returned to its normal position under the influence of spring *s*², the marking paper having been fed forward one step and a new tag printed. The cam is now released and the document removed, the same operation being repeated as many times as desired dependent of course upon the number of staples or binders deemed necessary for each article to be bound.

It will be apparent that this device may be used for many purposes such for instance as binding papers; samples of goods; joining leather belting and in fact in any place where it is desired to unite two or more pieces of material whether laid one or more upon another; or, side by side; or, end to end.

Having thus described my invention what I claim and desire to secure by Letters Patent of the United States is.

1. A binding machine having a staple-forming plunger, a staple driver and a single operating handle for moving the plunger and driver in combination with a staple-forming mandrel adapted to slide into the path of the plunger and driver, and a pivoted lever connecting the mandrel with the operating handle, substantially as described.

2. A binding machine having a staple-forming plunger provided with pivoted arms at its upper end and adapted to move vertically in a hollow guide-way, a staple-driver, a movable or sliding staple-forming mandrel and a single operating lever operatively connected thereto and provided with means for forcing the plunger forward to form the staple, separating the pivoted arms and driving the staple into place, substantially as described.

3. A binding machine having a staple-forming plunger, a staple-driver, a single operating handle for moving both, a staple-forming mandrel adapted to slide into and out of the path of the plunger and driver, an anvil located beneath the plunger and driver, a wiper cam on which the anvil rests, a rock-shaft to which the cam is secured, and an operating handle or lever for moving the cam and imparting vertical motion to the anvil, substantially as described.

4. A binding machine having mechanism for forming and securing a binding staple through the material to be bound, additional mechanism for printing a tag or label, and mechanical connections between the binding and the printing mechanism whereby the machine simultaneously binds the material and marks or labels it with a distinguishing mark or character, substantially as described.

5. A binding machine having mechanism for forming and clinching a staple through the material to be bound or united, printing or recording apparatus for printing or recording a definite mark or record on a tag held between each staple and the bound material, a strip of metal from which the staples are formed, a strip of paper on which the record is made, and mechanical connections between the staple-forming and binding mechanism and the printing apparatus whereby the parts all act conjointly to bind the material and label it, substantially as described.

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