

(No Model.)

2 Sheets—Sheet 1.

G. DOOLITTLE.  
STAPLE MACHINE.

No. 351,628.

Patented Oct. 26, 1886.

Fig. 1<sup>a</sup>

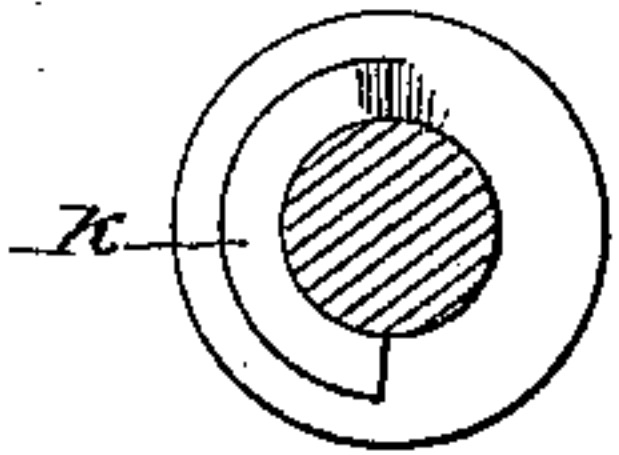
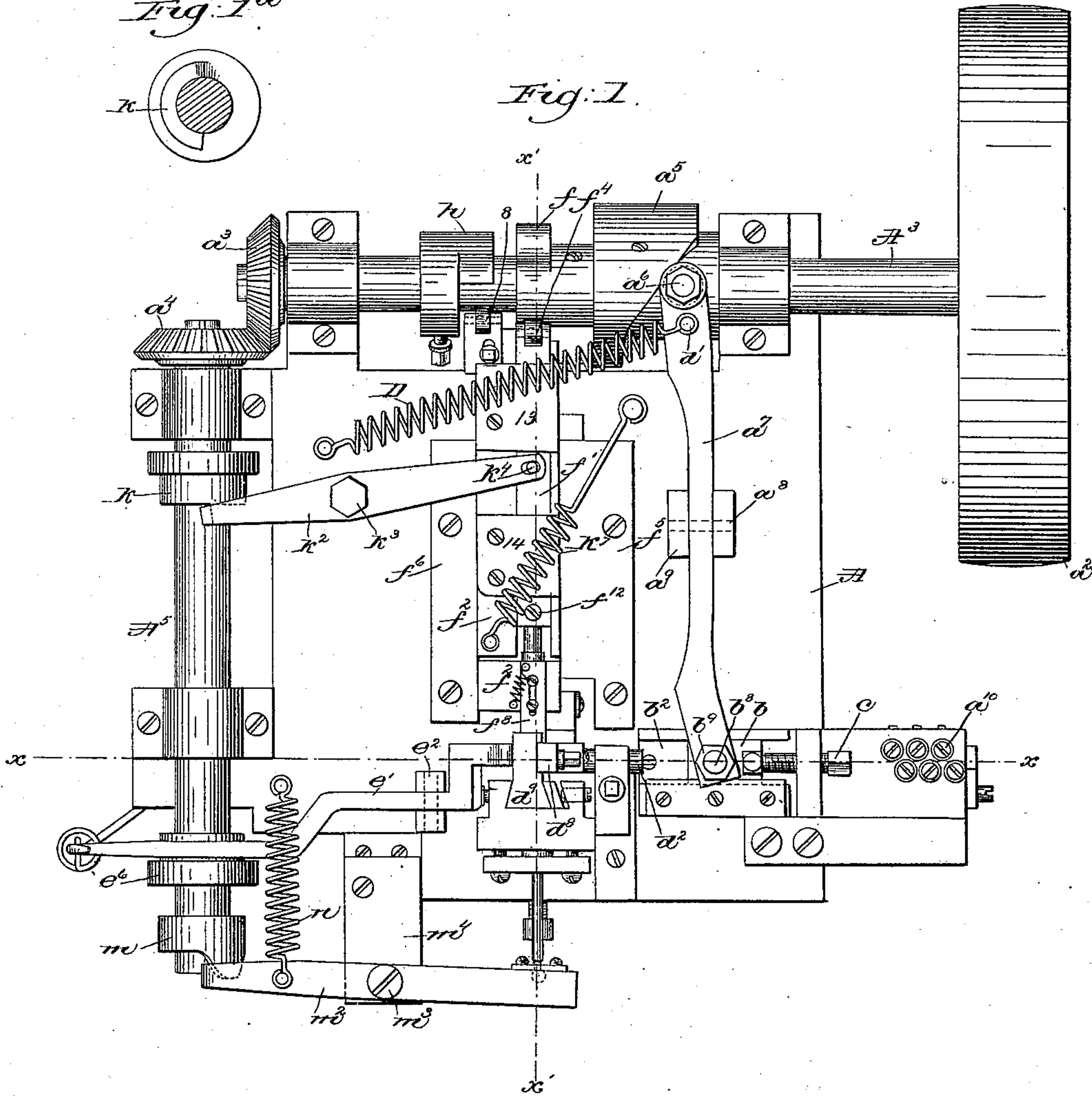


Fig. 1.



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2 Sheets—Sheet 2.

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Fig. 2.

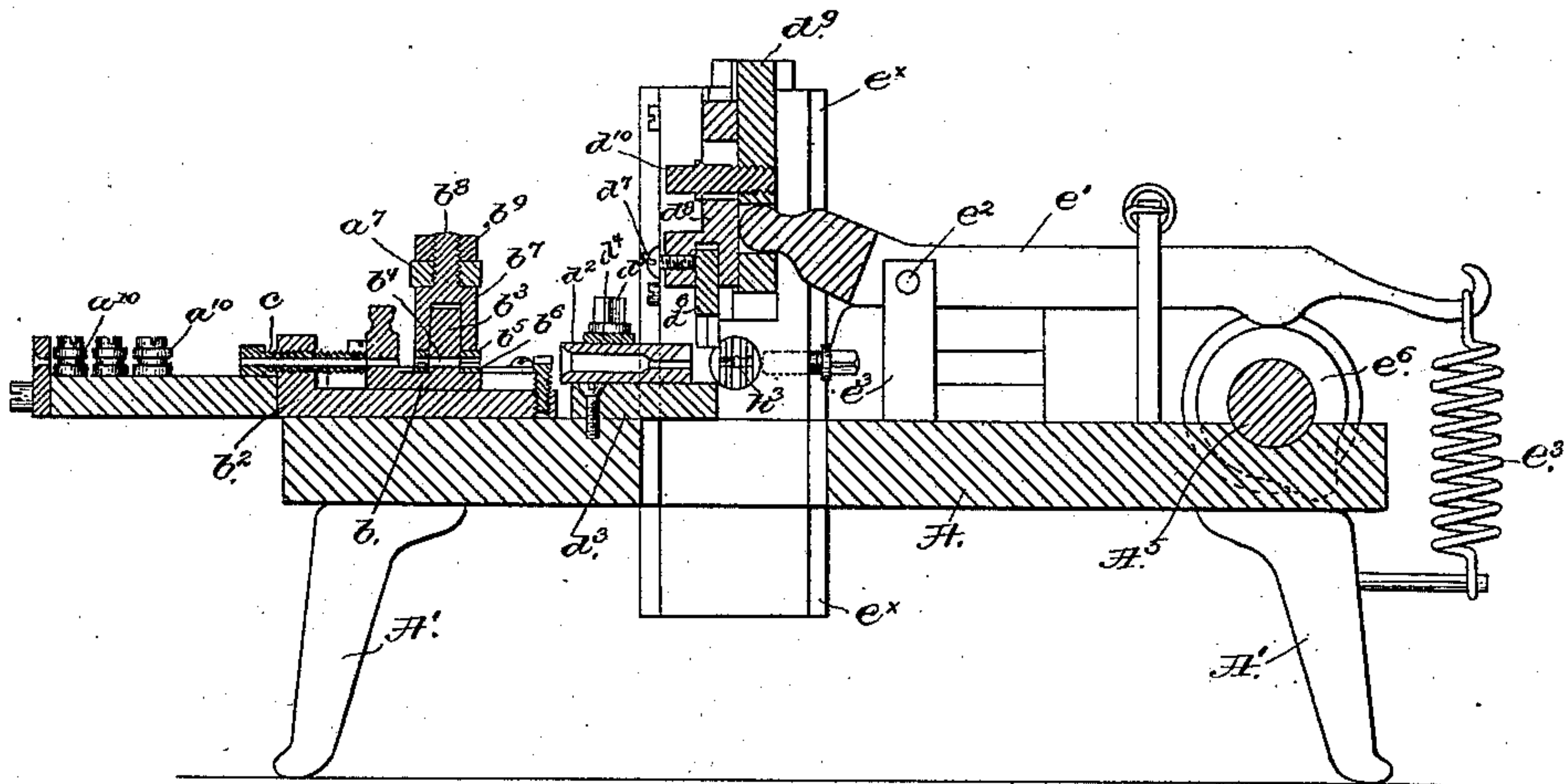


Fig. 3.

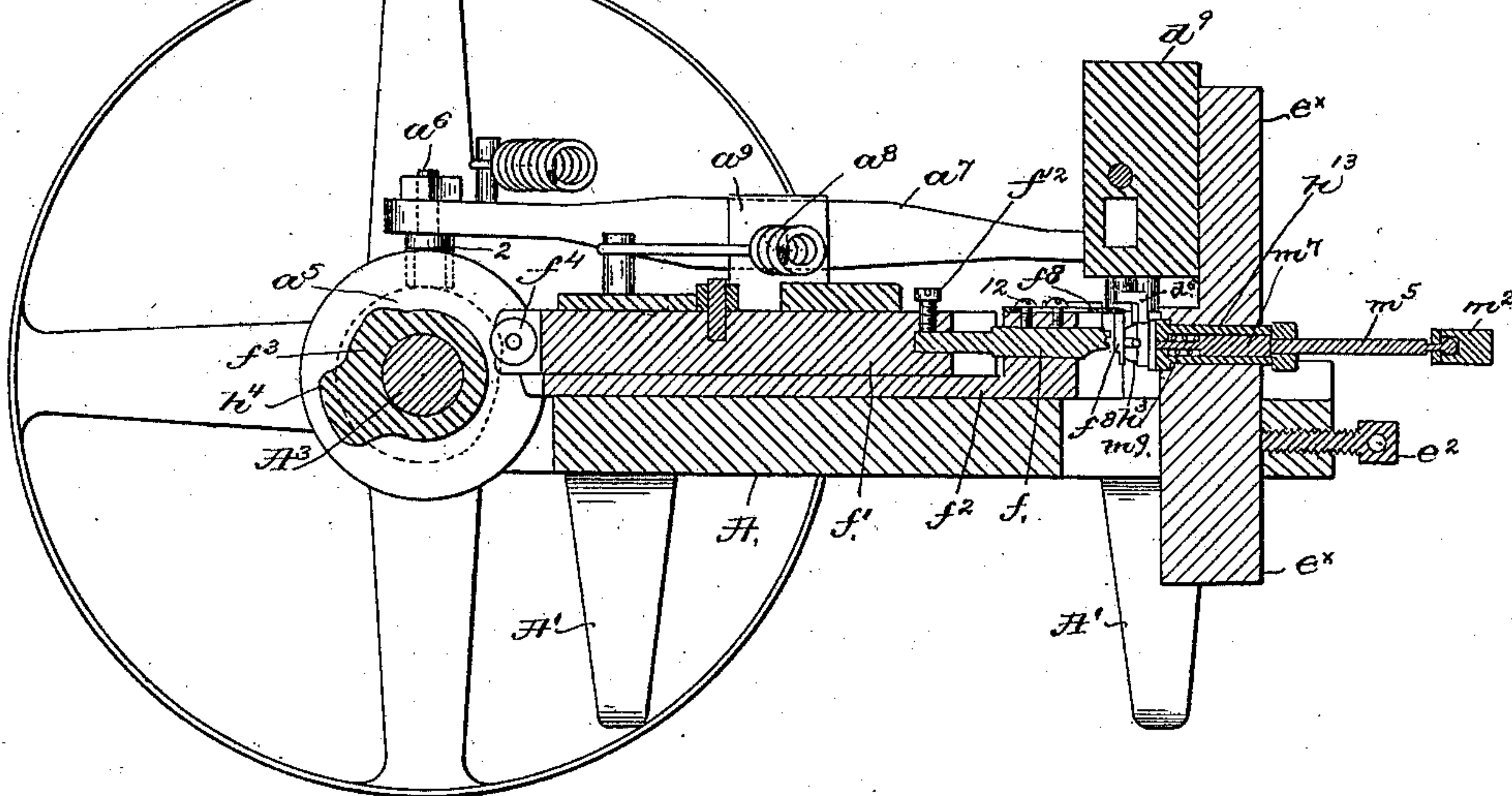


Fig. 5.

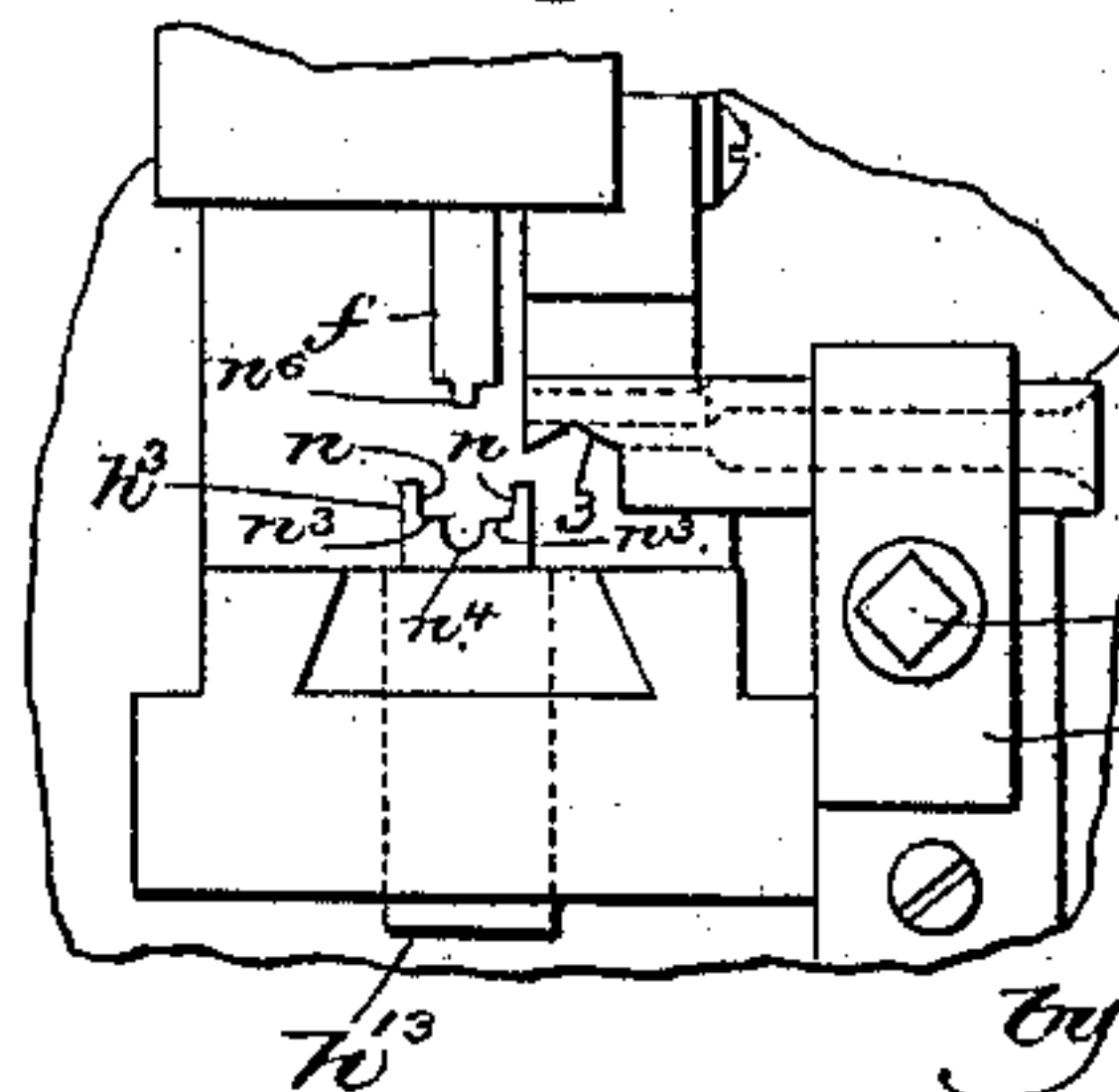


Fig. 7.

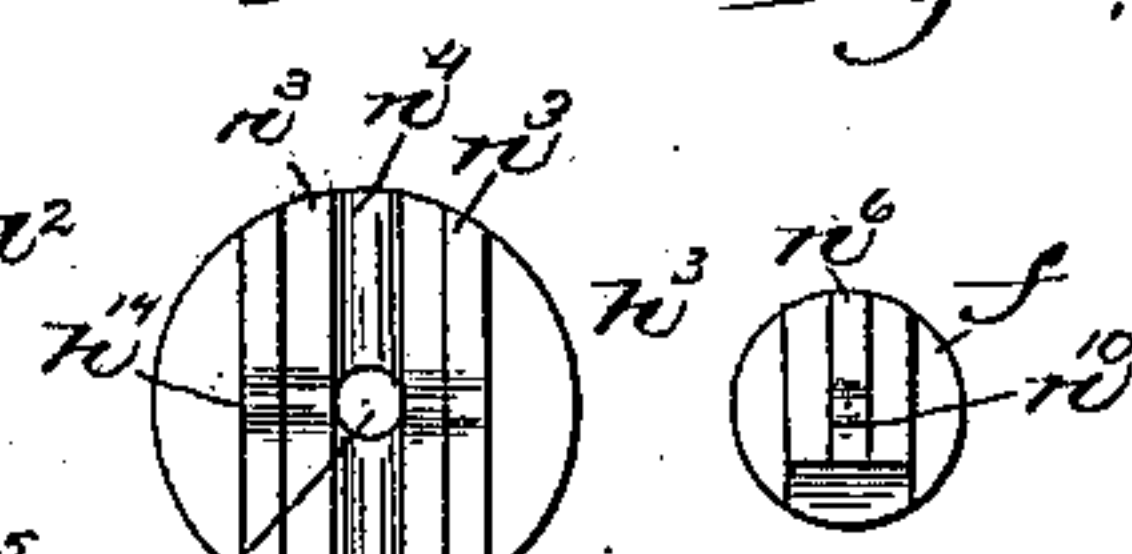
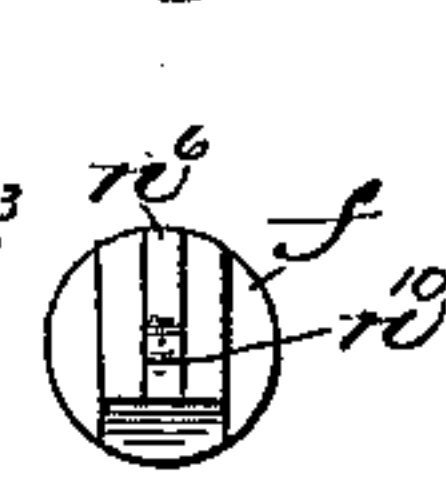


Fig. 8.



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# UNITED STATES PATENT OFFICE.

GEORGE DOOLITTLE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE  
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## STAPLE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 351,628, dated October 26, 1886.

Application filed March 27, 1886. Serial No. 196,782. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE DOOLITTLE, of Bridgeport, county of Fairfield, and State of Connecticut, have invented an Improvement in Staple-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to improve the construction of machines for the manufacture of staples especially useful, among other things, as fasteners for buttons.

My invention in staple-forming machines consists, essentially, in a die having a concaved recess, two shoulders, and side walls leading from said shoulders and provided with a rounded groove, combined with a "former" having a nose and shoulders, and with a "former-carrier," and means to reciprocate or operate said carrier automatically, said nose having a rounded groove, said grooves enabling the outer face of the staple and the inner or under side of the crown thereof to be made curved or oval in cross-section; also, in a die having a concaved recess, two shoulders, and side walls leading from said shoulders, a former having a nose and shoulders, a former-carrier, and means to reciprocate or operate said carrier automatically, combined with a guide for the wire, a cutter to sever the wire in the said guide, and feed mechanism to move the wire intermittently, substantially as will be described.

Other features of my invention will be hereinafter described, and pointed out in the claims.

Figure 1 is a top or plan view of a staple-forming machine constructed in accordance with my invention; Fig. 1<sup>a</sup>, a partial section to show one of the cams on the secondary shaft; Fig. 2, a transverse section on line *x x*, Fig. 1, it showing clearly the cutter and forming-die; Fig. 3, a longitudinal section on line *x' x'* of Fig. 1; Fig. 4, a detail view of the cutter; Fig. 5, a detail to be referred to, it showing in plan view the die, the former, and the notched guide through which the wire passes, the guide being notched to enable the cutter to cut the wire. Fig. 6 shows an elevation and section of a staple made on the machine shown in the drawings; Fig. 7, a face view of the die; and

Fig. 8, a face view of the former, both being enlarged.

The bed-plate A of the machine, supported on legs A', has suitable bearings for the main shaft A<sup>3</sup> and the secondary shaft A<sup>5</sup>, the said shafts being geared together by the gears a<sup>3</sup> a<sup>4</sup>. The shaft A<sup>3</sup> has attached to it cam-hubs a<sup>5</sup>, f<sup>3</sup>, and h, and the shaft A<sup>5</sup> has cams k, e<sup>6</sup>, and m.

In the machine herein to be described the wire or strip of metal to be made into staples is taken from a suitable reel or spool (not shown) and led between usual straightening-rolls, a<sup>10</sup>, and passed into and through a guide, c, made (see Fig. 2) as a tube, which is screw-threaded externally, and thus made adjustable horizontally to serve the additional purpose of a stop for the feed-carriage b, adapted to slide in ways in a plate, b<sup>2</sup>, attached to the bed-plate, the said carriage being moved forward and backward by a lever, a<sup>7</sup>, having its fulcrum a<sup>8</sup> in a bearing, a<sup>9</sup>, the stem or foot of which (not shown) is fitted loosely into a hole in the bed-plate A. The lever a<sup>7</sup> has at one end a roll, 2, which is acted upon by the cam a<sup>5</sup>, a spring, D, working antagonistically to the cam, the forward end of the said lever having a socket-piece, b<sup>7</sup>, provided with a screw-threaded shank, b<sup>8</sup>, which, extended through the lever a<sup>7</sup>, has a nut, b<sup>9</sup>, applied to it. The stud b<sup>3</sup> on the feed-carriage b is provided with a hole, b<sup>4</sup>, for the passage of the wire, and about this stud are placed two washers, b<sup>5</sup> b<sup>6</sup>, between which the wire also passes, the said stud above the said washers being surrounded by the socket-piece b<sup>7</sup>, which latter has a straight vertical movement on the said stud by reason of the shape of the cam a<sup>5</sup>, so as to cause the said washers to intermittently clamp the said wire, hold it firmly when the wire is to be fed forward, and release it when the feed-carriage is to be moved backward.

The wire fed by the feeding devices described, or by any other well-known wire-feeding device, is passed through a guide, d<sup>2</sup>, (shown best in Figs. 2 and 5,) the said guide being notched at one side, as at 3, for a depth sufficient to intersect the wire-passage in the guide, said notch permitting the wire-cutter d<sup>6</sup> (see Figs. 2, 3, and 4) to descend into the said notch and sever the wire, the cutting-edge of the wire-cutter being shaped substantially as



shown in Fig. 4, so that when severing the wire a V-shaped portion is cut from the wire, leaving oppositely beveled ends to constitute points for two staples.

5 The wire-cutter is attached to a plate,  $d^8$ , by a screw,  $d^7$ , the plate being adjustably secured by screw  $d^{10}$  to a plunger,  $d^9$ , fitted to slide vertically in a guide-block,  $e^*$ . This plunger  $d^9$  is moved vertically by the lever  $e'$ , pivoted at  
10  $e^2$  on a suitable upright, the said lever being acted upon by the cam  $e^6$ , the spring  $e^3$  keeping the said lever pressed in contact with the said cam.

The die  $h^3$ —a block of steel cut out, as best  
15 shown in Figs. 5 and 7, to form a recess to conform in shape to the shape of the curve of the staple or fastening to be made, (see Fig. 6)—has its shank  $h^{13}$  extended through the guide  $e^*$ .

Referring to Fig 5, it will be seen that this  
20 die has a substantially semicircular recess,  $n^1$ , and next it, at each side, shoulders  $n^2$  and vertical walls  $n$ , the recess  $n^1$  shaping the staple at  $n^{4*}$ , and the shoulders  $n^2$  causing the shaping of the shoulders  $n^{3*}$ , while the vertical walls  
25 determine the shape of the legs  $n^3$ .

The face of the die  $h^3$  (see Fig. 7) is grooved horizontally at  $h^{14}$ , the bottom of the said groove being substantially circular, so as to preserve the round shape of the wire used at the top of  
30 the crown of the staple, the inner side of the crown, especially below the portion  $n^{4*}$ , being also kept round by providing the nose  $n^6$  of the former  $f$  with a groove,  $n^{10}$ , (see Fig. 8,) the bottom of the said groove being rounded.  
35 This leaves both the upper and lower side of the part  $n^{4*}$  of the staple rounded, as shown in the section Fig. 6.

The former  $f$  referred to is attached by screw  $f^{12}$  to a carrier,  $f'$ , fitted to slide in a  
40 carriage,  $f^2$ , adapted to slide horizontally between ways  $f^3 f^6$ , screwed to the bed-plate A. The carriage  $f^2$  has at one end a roller, 8, which is normally kept pressed toward or against the cam  $h$  by the spring  $k^1$ , and said carriage supports a bent finger,  $f^8$ , secured to it by screws  
45 12, said finger being slotted to permit the former  $f$  to pass through it.

The carrier  $f'$  is held within the carriage by plates 13 14, the one 13 acting as a back-stop  
50 for the carrier when moved backward by the lever  $k^2$ , having its fulcrum at  $k^3$ , and slotted at one end to embrace a stud,  $k^4$ , on the carrier  $f'$ , the said lever being acted upon by the cam  $k$ .

55 The hollow shank of the die receives within it a clearer,  $m^7$ , shaped as best shown in Fig. 3, its inner end being reduced and surrounded by a spiral spring,  $m^9$ , which normally keeps the clearer retracted from the face of the die,  
60 the latter having a central hole, 15. When a staple is to be discharged from the die, the clearer is pushed forward by the rod  $m^5$ , jointed to a lever,  $m^2$ , pivoted at  $m^3$ , and acted upon by the cam  $m$ , a spring,  $n$ , keeping the said  
65 lever against the said cam.

In operation the wire is fed forward by the feed mechanism into the notched guide  $d^2$ , and when in such position the cutter  $d^6$  is thrown down, so as to enter the notch 3 of the said guide and sever the wire therein. As soon as  
70 the wire is cut the cam  $h$  on the shaft  $A^3$  hits the roller 8 and moves the carriage  $f^2$  forward, so that the bent finger  $f^8$  presses the cut strip of wire against the face of the die at the edges of the side walls,  $n$ , the said bent finger hold-  
75 ing the ends of the wire against the said edges, while the former  $f$ , carried forward by the cam  $f^3$ , acting on the roller  $f^4$  on the carrier  $f'$ , presses the wire into the recess of the said die  $h^3$ , to form the staple shown in Fig. 6, the  
80 groove  $h^{14}$  of the die and the groove  $n^{10}$  in the nose of the former permitting the wire to retain its rounded or oval form, as shown in said figure. After the said staple has been formed the carrier  $f'$  is moved backward by the le-  
85 ver  $k^2$ , acted upon by the cam  $k$ , and as the carrier is thus moved the cam  $m$  on the secondary shaft acts on the lever  $m^2$  to move the clearer  $m^7$  forward to dislodge the staple.

I claim—

1. In a staple-forming machine, the die having a concaved recess, two shoulders, and side walls leading from said shoulders, and provided with a rounded groove, combined with a  
90 former having a nose and shoulders, and with a former-carrier and means to reciprocate or operate said carrier automatically, said nose having a rounded groove, said grooves enabling the outer face of the staple and the inner or under side of the crown thereof to be  
100 made curved or oval in cross-section, substantially as described.

2. In a staple-forming machine, a die having a concaved recess, two shoulders, and side walls leading from said shoulders, a former  
105 having a nose and shoulders, a former-carrier, and means to reciprocate or operate said carrier automatically, combined with a guide for the wire, a cutter to sever the wire in the said guide, and feed mechanism to move the wire  
110 intermittently, substantially as described.

3. In a staple-forming machine, feeding mechanism, substantially as described, to grasp and move the wire intermittently, a wire-guide  
115 notched at its side, and a substantially V-shaped cutter to sever the said wire and oppositely bevel the adjacent ends, combined with a die and a former, substantially as described, to produce from the severed pieces of wire a shape substantially such as shown. 120

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

GEORGE DOOLITTLE.

Witnesses:

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