(No Model.) 2 Sheets—Sheet 1.

F. CHASE.

TACK MAKING MACHINE.

No. 356,619. Patented Jan. 25, 1887.

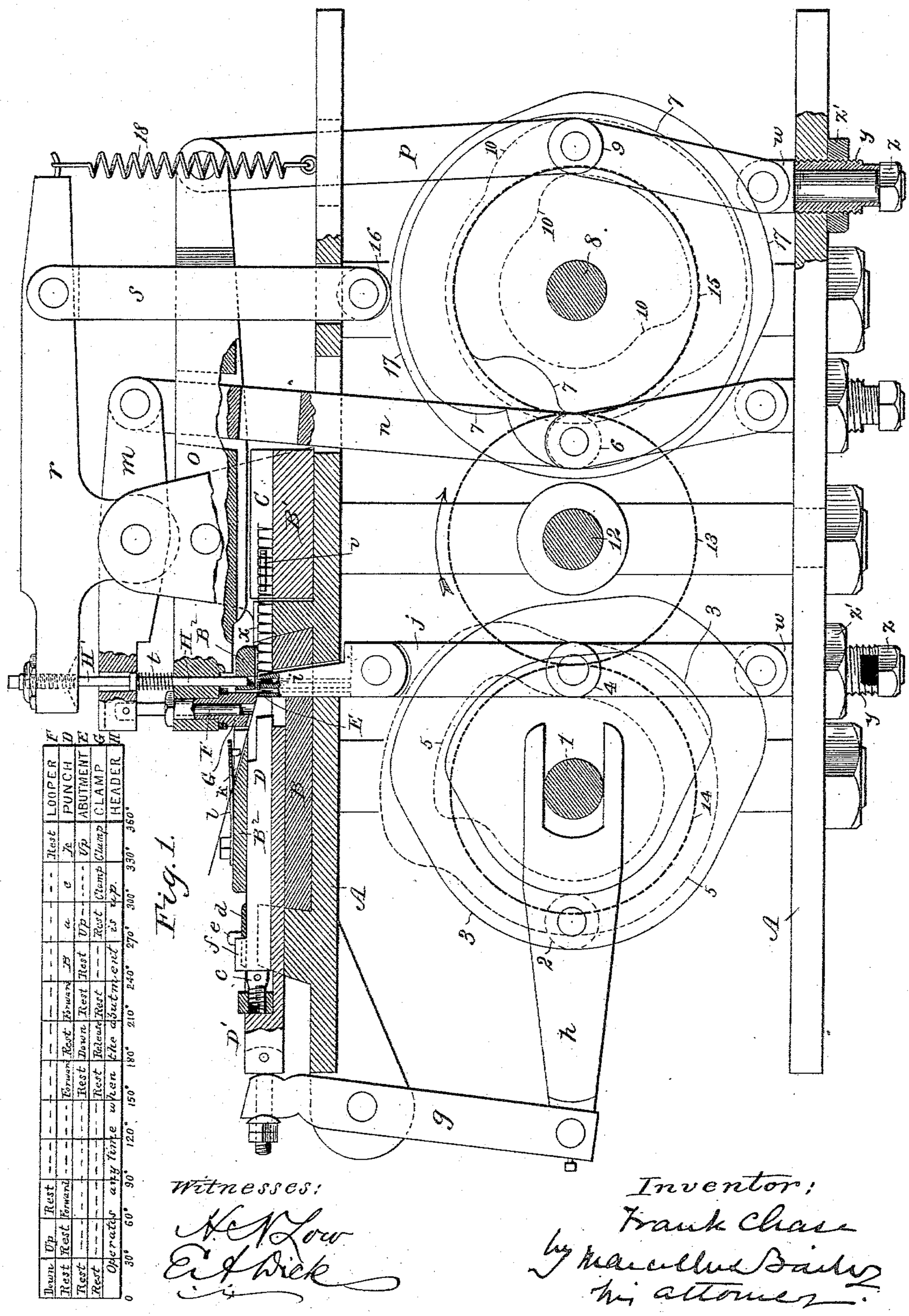

Fig. 1.

Witnesses:
H. C. Low
E. F. Dick

Inventor:
Frank Chase
by Marcellus Bailey
his attorney.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

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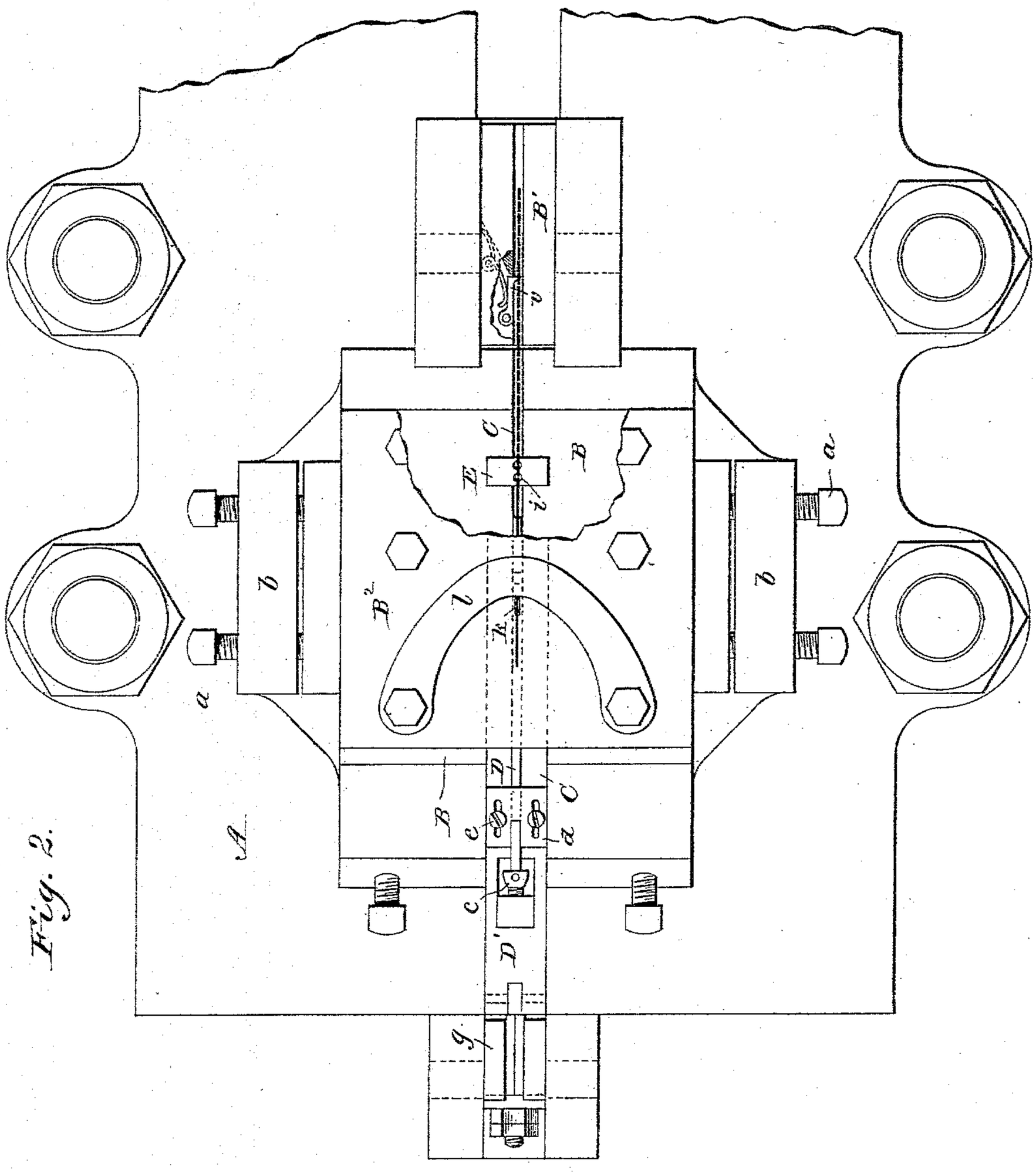

Fig. 2.

Witnesses:
N. N. Low
E. A. Dick

Inventor:
Frank Chase
by Marcellus Bailey
his attorney

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

FRANK CHASE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE CHASE LASTING MACHINE COMPANY, OF SAME PLACE.

TACK-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 356,619, dated January 25, 1887.

Application filed September 21, 1886. Serial No. 214,168. (No model.)

To all whom it may concern:

Be it known that I, FRANK CHASE, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Making Tacks, of which the following is a specification.

The object I have in my invention is to produce a machine for making tack-strips, similar to that shown and described in my Letters Patent No. 337,662, of March 6, 1886—that is to say, a tack-strip consisting of wire bent at intervals into loops pressed into tack form, the legs of the loop forming the shank and point of the tack.

In order to attain the object I have in view I employ a reciprocating punch, a reciprocating device which I term an "abutment," inasmuch as it forms a block against which the punch acts, and a feeding mechanism whereby the wire is fed intermittently and at the proper intervals in loop form into the runway or space between the punch and the abutment. The punch reciprocates lengthwise of the runway. The abutment reciprocates across the runway, its movements being so timed that it first shall be a block across the runway, between which and the reciprocating punch the loop or length of wire fed into the space between the two shall be pressed into tack form, and then shall withdraw, so as to permit the newly-formed tack, as well as the others of the tack-strip, to pass forward through the runway the requisite distance for the production of another tack. The feeding mechanism of course operates during the intervals between the successive tack-forming operations and while the punch is withdrawn. It is in this combination of the punch, the abutment, and mechanism for intermittently feeding from a continuous wire into the space between the two the loop of wire needed to form the tack that my invention, mainly, is comprised. Various forms of feeding mechanism can be made use of. The feeding mechanism which I prefer consists of a device termed by me a "looper," which has reciprocatory movement into and out of the space between the punch and abutment, and intermittently and at the proper intervals moves against the wire, which extends lengthwise and above the bottom of the space or runway, bending or pushing down into loop form that portion of the wire included in said space, and drawing from the reel the wire necessary to permit this operation. In this way the wire is fed in loop form into the space between the punch and the abutment. The wire is held at its forward end between the abutment and an opposite clamping-surface, and the supply of wire needed to form the loop is therefore drawn from the other end. This clamping-surface, or "clamp," as I term it, I prefer to make movable, giving it reciprocatory movement, so that its clamping action will take place intermittently and at the proper intervals only. With the punch, abutment, and feeding mechanism I also prefer to combine an intermittently-acting header, or device for flattening the head of the tack, or that end opposite to the point, which latter is formed by the bight of the squeezed loop.

With this general explanation of the nature of my invention, I now proceed to a description of the accompanying drawings, which represent a machine embodying the several features of my invention in their preferred form.

Figure 1 is a sectional side elevation of the machine, the line of section, wherever there are sectional parts shown, being centrally and longitudinally of the machine—that is to say, in the line of the runway. Fig. 2 is a plan of the machine, with the top levers, the looper, the clamp, and the header removed, and the central top plate partly broken away to show the abutment and the forward end of the punch.

Only so much of the machine is shown as is needed for purposes of explanation. The legs and part of the frame-work are omitted, and the cams are shown diagrammatically.

The table on which the various working parts are placed is shown at A, and below it is the shelf A′, to which are connected the system of levers for giving motion to the various parts. The shelf and table are connected together by suitable rods or bolts, and form part of the frame-work of the machine, as will be understood without further explanation.

For the purpose of securing greater mechanical accuracy the table is recessed to receive steel plates or beds B B′, in the top of which, and of intervening portions of the table, is formed longitudinally and centrally of the machine the runway or groove C, in which the

wire and formed tack-strip are fed along and the punch D and upper part of the abutment E reciprocate. The bed B, for the purpose of securing nicety of adjustment, is held in dove-tailed or undercut grooves in the table, so that it may slide crosswise of the latter, and is held in adjusted position by side set-screws, *a*, which pass through side brackets, *b*, on the table, and press at their inner ends upon the side edges of the bed.

Over the central portion of the bed and table is a covering-plate, B^2, through which play the looper F, the clamp G, and the header H.

The punch D reciprocates horizontally back and forth in the runway. It is mounted on a carrier, D′, and is secured thereto so as to be longitudinally adjustable by a jack-screw, *c*, screwing into flange on the carrier and bearing at its head against the end of the punch, and by a slotted plate, *d*, held to the carrier by screws *e*, passing through said slots, and bearing at its rear edge against a lug, *f*, on the punch. The punch is thus held between the jack-screw and the slotted adjustable plate, and manifestly can be adjusted longitudinally so as to meet the abutment E, sooner or later, during its forward movement.

The reciprocatory movement of the punch is derived from the lever *g*, pivoted to the table and jointed at one end to the carrier and at the other to the cam-arm *h*, which has a forked end to straddle the shaft 1, and is provided with a cam-roll, 2, to enter a groove in the face-cam 3 on said shaft.

In advance of the punch is the abutment E, which reciprocates vertically in proper guides, so that its upper end shall alternately project into and be drawn down out of the runway. The space in the runway (shown in Fig. 1) between the punch and the abutment is that into which the wire is fed and in which the loop is formed. The wire loop is squeezed between the contiguous faces of the punch and the abutment, and these faces are so formed as to give the proper taper to the shank of the tack.

In so far as concerns its co-operation with the punch, the upper end of the abutment need be of a thickness from front to rear equal to or a very little less than the interval separating two successive tacks; but it is made of greater thickness in order to co-operate also with the header H, and consequently has formed in it at appropriate intervals vertical sockets or holes *i*, for receiving such of the formed tacks as may not have passed beyond it, as indicated in Fig. 1.

The abutment E derives its movement from a toggle-lever, *j*, at the elbow of which is a cam-roll, 4, which enters a cam-groove on the face-cam 5, which is carried by and revolves with shaft 1.

The looper F has vertical reciprocatory movement. It plays through the clamp G and down into the runway in the space between the punch and the abutment.

The wire from which the tack-strip is made passes from any suitable reel down through an inclined feed-opening, *k*, in the top plate, B^2, into the runway, extending beneath the looper and above the abutment, a spring-presser, *l*, being used to prevent too free delivery of the wire, while during the operation of the looper the wire is held at the front between the abutment and the clamp G, as will be presently and more fully described. The looper descends upon the wire, and, drawing it in from under the presser *l*, bends it down in loop form into the space between the punch and the abutment. After the looper rises the punch moves forward and squeezes the loop between it and the abutment, thus pressing the loop of wire into tack form. As soon as this has been accomplished the abutment descends, so as to get out of the way of the newly-formed tack, and the punch then moves farther forward, and in so doing pushes along the whole tack-strip a distance just equal to that which separates successive tacks, and then at once recedes to its original position. This will bring the newly-formed tack over the first hole in the abutment, into which it will enter, when the abutment again rises, as indicated in Fig. 1, where the wire partly made into a tack-strip is shown at *x*.

The looper is actuated by a pivoted arm, *m*, jointed at one end to the looper and at the other to a toggle-lever, *n*, and the latter is moved and controlled by a cam-roll, 6, at its elbow, which enters a cam-groove in face-cam 7 on shaft 8.

The clamp G acts, as before said, to clamp the wire upon the abutment E, so as to prevent it from being drawn back by the action of the looper. It has for this purpose reciprocatory movement imparted to it at proper intervals, said movement being imparted from a pivoted arm, *o*, jointed to the clamp at one end and at the other end to toggle-lever *p*, provided at its elbow with cam-roll 9, entering cam-groove 10 of face-cam on shaft 8.

The two shafts 8 and 1 derive their rotary movement from driving-shaft 12 through gearing 13 14 15, and they revolve synchronously.

The header H is intended to press upon and flatten that portion of the strip which is designed to form the head of the tack. The abutment forms what may be termed the "anvil," against which it strikes or presses, and it can thus act at any time during the period when the abutment is up. Its reciprocatory movement is obtained from a pivoted lever, *r*, jointed at one end to the header and at the other end to vertical arm *s*, provided at its lower end with a cam-roll, 16, which bears upon the peripheral cam 17 on shaft 8, the cam-roll being held in contact with the cam by spring 18, which tends to pull down the end of lever *r*, to which arm *s* is jointed.

As a matter of mechanical construction in the arrangement shown in the drawings, it is preferred to make the header H in two parts, the lower part or header proper, H, playing through the plate B^2 and arm *o*, and upheld by an encircling-spring, *t*, interposed between the

arm *o* and the flanged top of the header, and the upper part, H′, arranged to bear upon the top of the header and made vertically adjustable in the lever *r*, as seen in Fig. 1, so that it may meet the part H, sooner or later, in its downward stroke.

The operation of the several parts will now be described. Their actuating-cams are of course shaped to impart appropriate movement to them, and in order to enable the skilled mechanic to more readily construct such cams, as well as to a better understanding of the mode of operation of the machine, I have placed upon the drawings adjoining Fig. 1 a table indicating the position and movements of the several parts during one complete revolution of the cams, the three hundred and sixty degrees, constituting one complete revolution, being subdivided into divisions of thirty degrees each. In the several lines, reading from left to right, are indicated the movements and positions assumed by the looper F, punch D, abutment E, clamp G, and header H, respectively.

In Fig. 1 the parts are represented in the position they occupy upon the completion of one entire revolution—that is to say, in the right-hand column of the table. At this time the looper is up and at rest, the punch has just finished its backward or receding movement, the abutment is up, and the clamp is down, the wire thus being clamped between the parts E G. Starting upon another revolution, during the first thirty degrees, as seen in the left-hand column of the table, the looper descends while the other parts remain at rest. During that portion of the revolution from thirty degrees to sixty degrees all the parts still remain at rest, except the looper, which rises and returns to its first position, having accomplished the bending of the wire into loop form. From ninety degrees to one hundred and eighty degrees all of the parts remain at rest, save the punch, which during this portion of the revolution moves forward and squeezes the loop into tack form. From one hundred and eighty degrees to two hundred and ten degrees all of the parts remain at rest, except the clamp, which rises, and the abutment, which descends, so as to leave the runway clear. From two hundred and ten degrees to two hundred and forty degrees the parts are at rest, excepting the punch, which moves still farther forward a distance equal to that which separates the acting face or side of the abutment from the first hole, *i*, the effect of this being to advance the tack-strip far enough to bring the newly-formed tack just over said hole *i*. From two hundred and forty degrees to two hundred and seventy degrees all the parts are at rest, except the punch, which begins to move back to its original position, and in so doing travels far enough to uncover or clear the abutment. From two hundred and seventy degrees to three hundred degrees the clamp and looper are at rest while the punch is still moving, and the abutment rises again to the position from which it descended. From three hundred degrees to three hundred and thirty degrees the abutment and looper are at rest, while the punch is still receding, and the clamp begins to descend upon the abutment. From three hundred and thirty degrees to three hundred and sixty degrees the clamp concludes its descent, the punch concludes its receding movement, and the looper and abutment are at rest, the parts, when the point indicated by three hundred and sixty degrees has been reached, occupying again the position shown in the drawings.

In the foregoing description I have not deemed it necessary to include the header H. It is sufficient to say that it can operate at any time during the period when the abutment is up and at rest.

In order to prevent any possibility of the tack-strip being drawn back while the punch is receding and the abutment is down, I provide in the side of the runway a light spring-controlled pawl or detent, *v*, provided with a tooth which enters the space between any two successive tacks, and is arranged to yield only in a direction to permit the advance of the tack-strip, the tooth being beveled in a direction to facilitate this advance movement. The successive tacks can thus readily pass beyond the detent, but cannot be drawn back, the strip being thus held in proper position.

With a view to more readily and nicely adjusting the movements of the several parts, I provide for each one of the toggle-levers a vertical adjustment, as shown, for example, in section in connection with the lower end of toggle *p*. The lower arm of this toggle is jointed to the head of a post or support, *w*, the stem of which passes through and swivels in a sleeve, *y*, and is held thereto by a nut, *z*, screwing on the lower end of the stem, the sleeve thus being held between the head of the post and the nut. The sleeve is externally screw-threaded and screws down through the shelf A′. It is manifest that by turning the sleeve in one direction or the other (which can be done without turning the post *w*) the toggle can be lifted or lowered, as the case may be. A check-nut, *z*′, is used to hold the sleeve in its adjusted position.

Having described my invention and the best way now known to me of carrying the same into practical effect, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. The combination of the reciprocatory punch, the reciprocatory abutment, and mechanism for feeding the wire into the space or runway between the punch and the abutment, these parts being timed in their movements relatively to one another and operating together, substantially in the manner and for the purposes hereinbefore set forth.

2. The combination of the punch, the abutment, and the looper, these parts being operated to move at the times and in the manner substantially as hereinbefore set forth.

3. The combination of the reciprocatory punch, the reciprocatory abutment, mechan-

ism for intermittently feeding the wire into the space between the punch and abutment, and the reciprocatory header, these parts being timed in their movements and operating together, substantially in the manner hereinbefore set forth.

4. The combination of the reciprocatory punch, the reciprocatory abutment, intermittently-operating wire-feed mechanism, and the reciprocatory clamp, these parts being timed in their movements and adapted for joint operation, substantially as hereinbefore set forth.

5. The combination of the punch, the looper, the abutment, the clamp, the header, and mechanism for imparting reciprocatory movement to the same at the times and in the manner substantially as hereinbefore set forth.

6. The combination, with the reciprocatory abutment and intermittently-operating wire-feed mechanism, of the punch and punch-operating mechanism, substantially as described, whereby the punch is actuated first to squeeze the wire into tack form against the abutment, and then, upon descent of the abutment, to advance the tack-strip a distance equal to that which separates successive tacks, as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 4th day of September, 1886.

FRANK CHASE.

Witnesses:
EWELL A. DICK,
MARVIN A. CUSTIS.