

(No Model.)

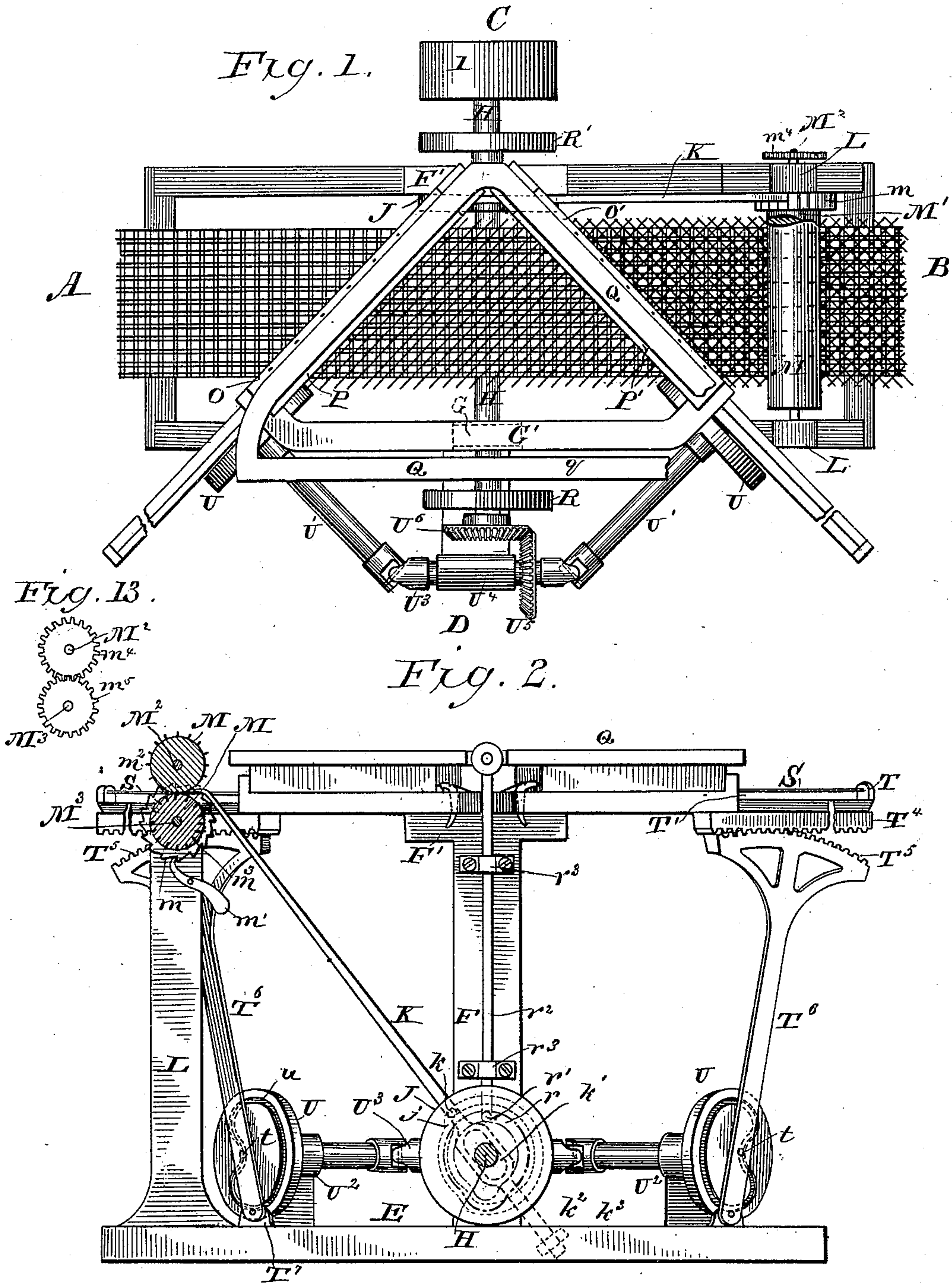
2 Sheets—Sheet 1.

H. B. MORRIS.

MACHINE FOR INSERTING DIAGONAL STRIPS IN WOVEN CANE WORK, &c.

No. 401,050.

Patented Apr. 9, 1889.



WITNESSES

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By his Attorneys

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

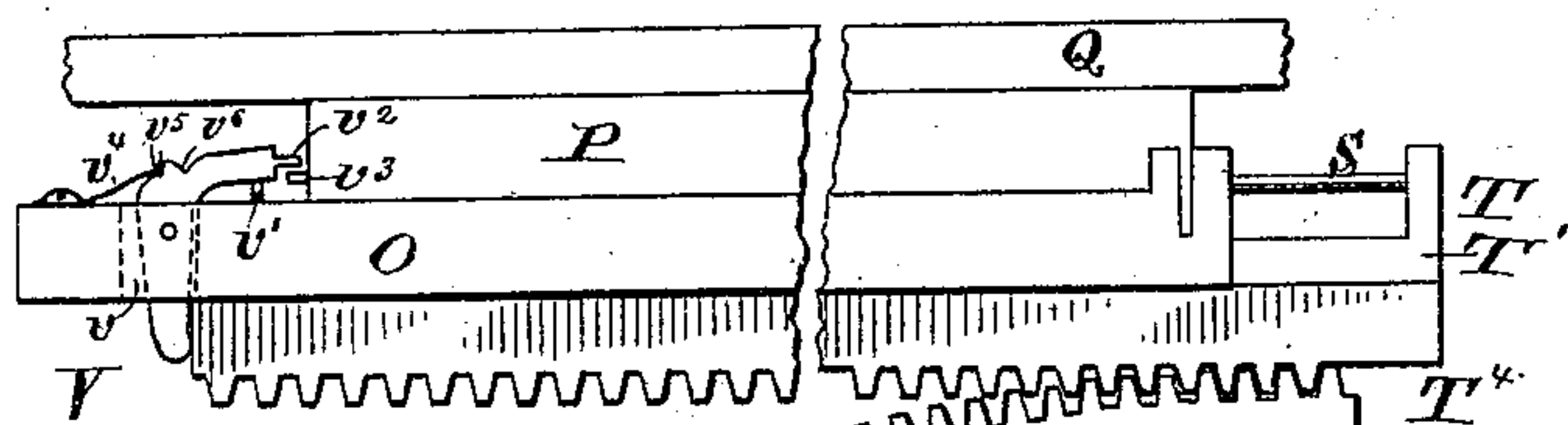


Fig. 5.

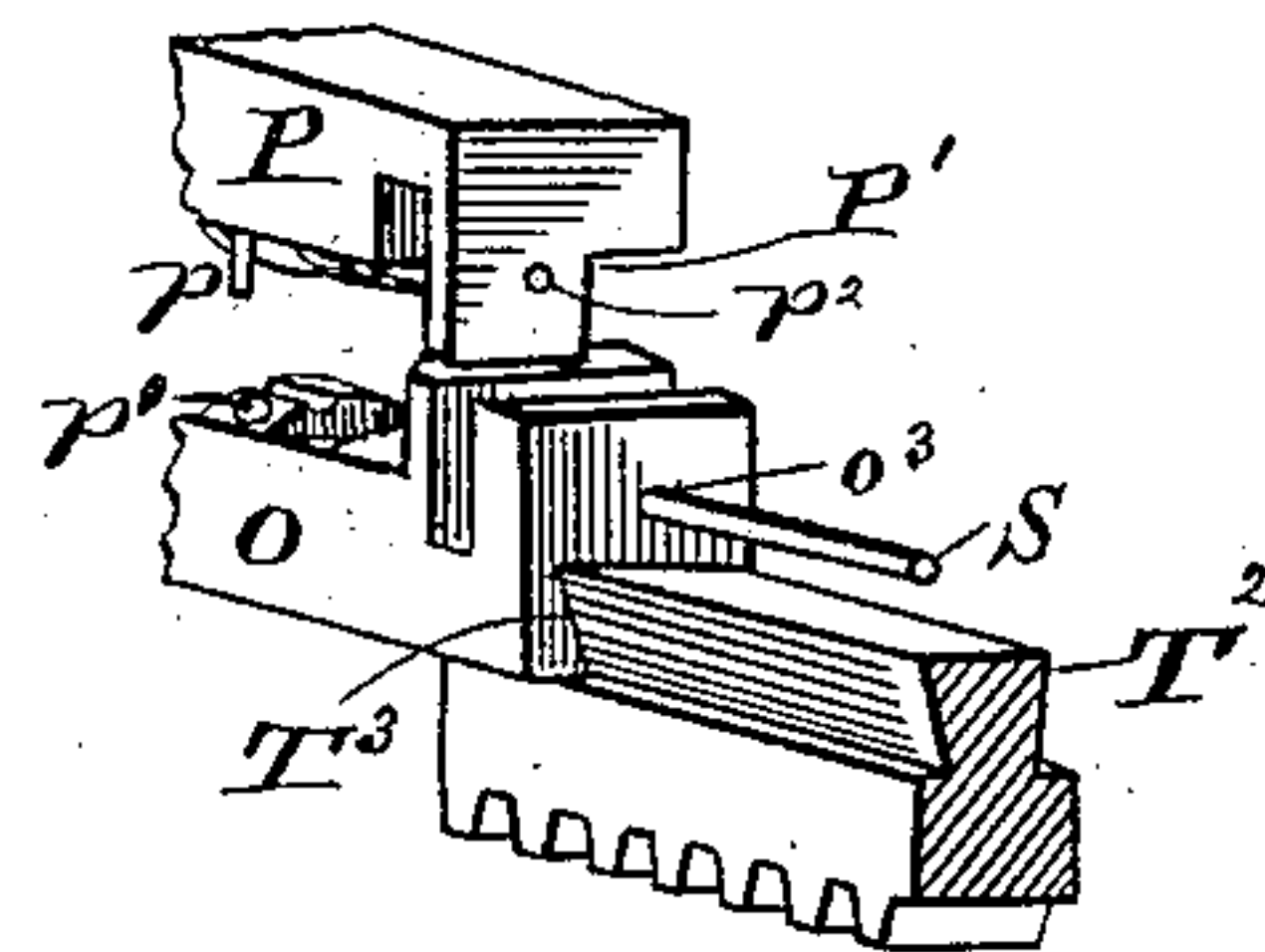


Fig. 6.

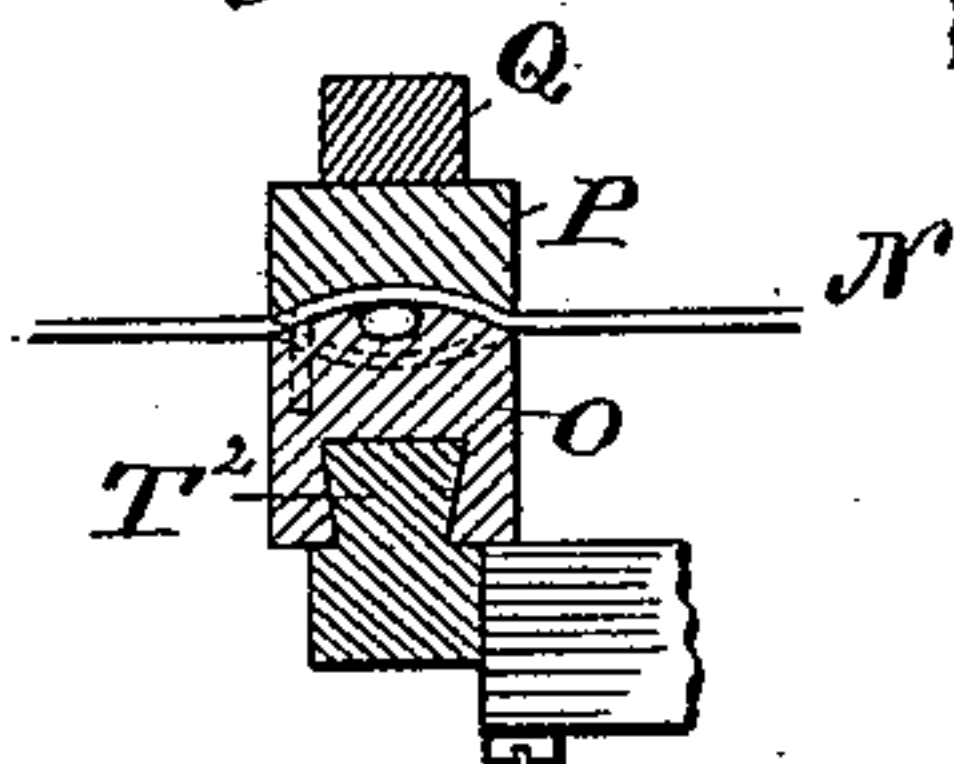


Fig. 4.

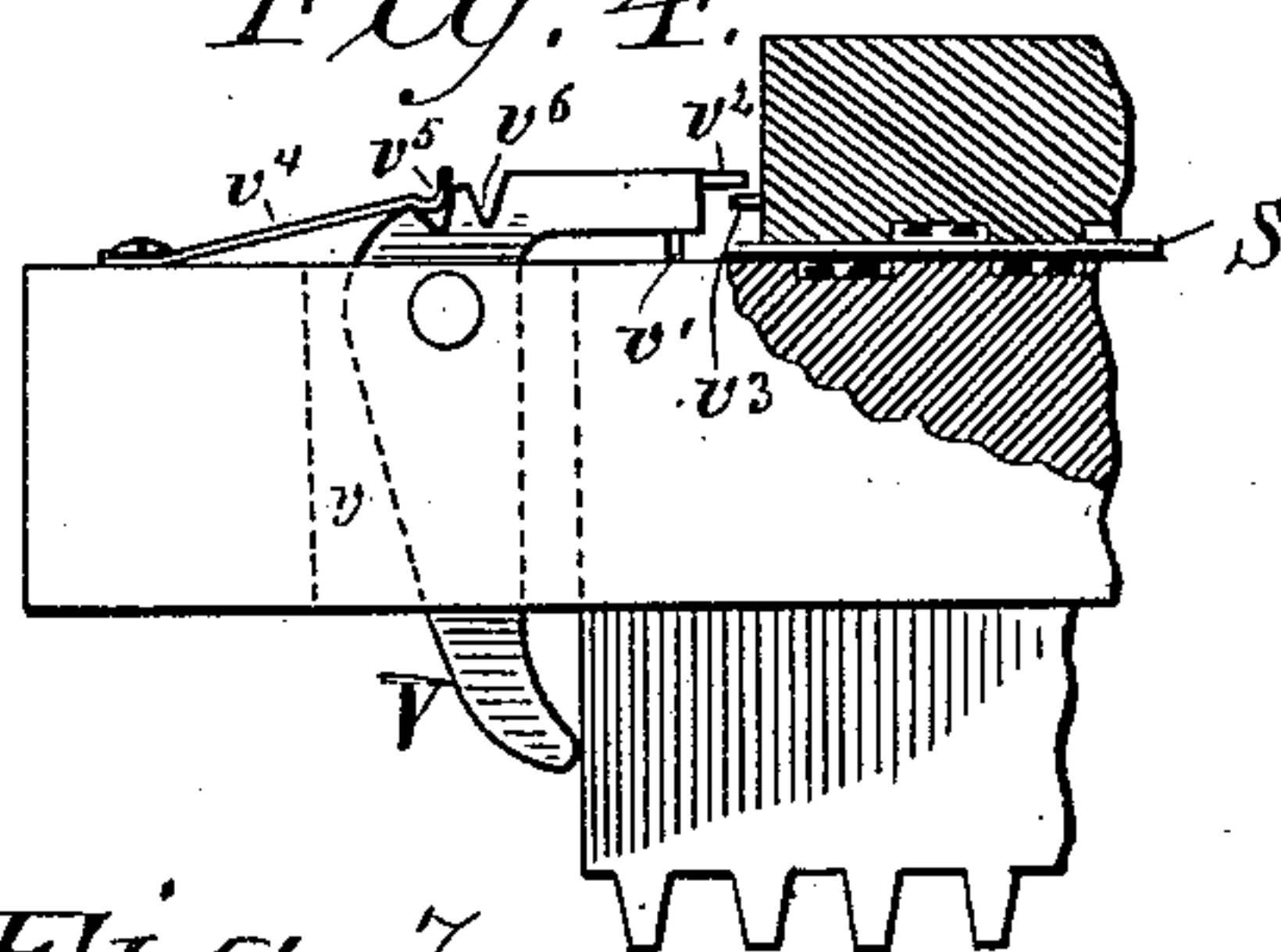


Fig. 7.

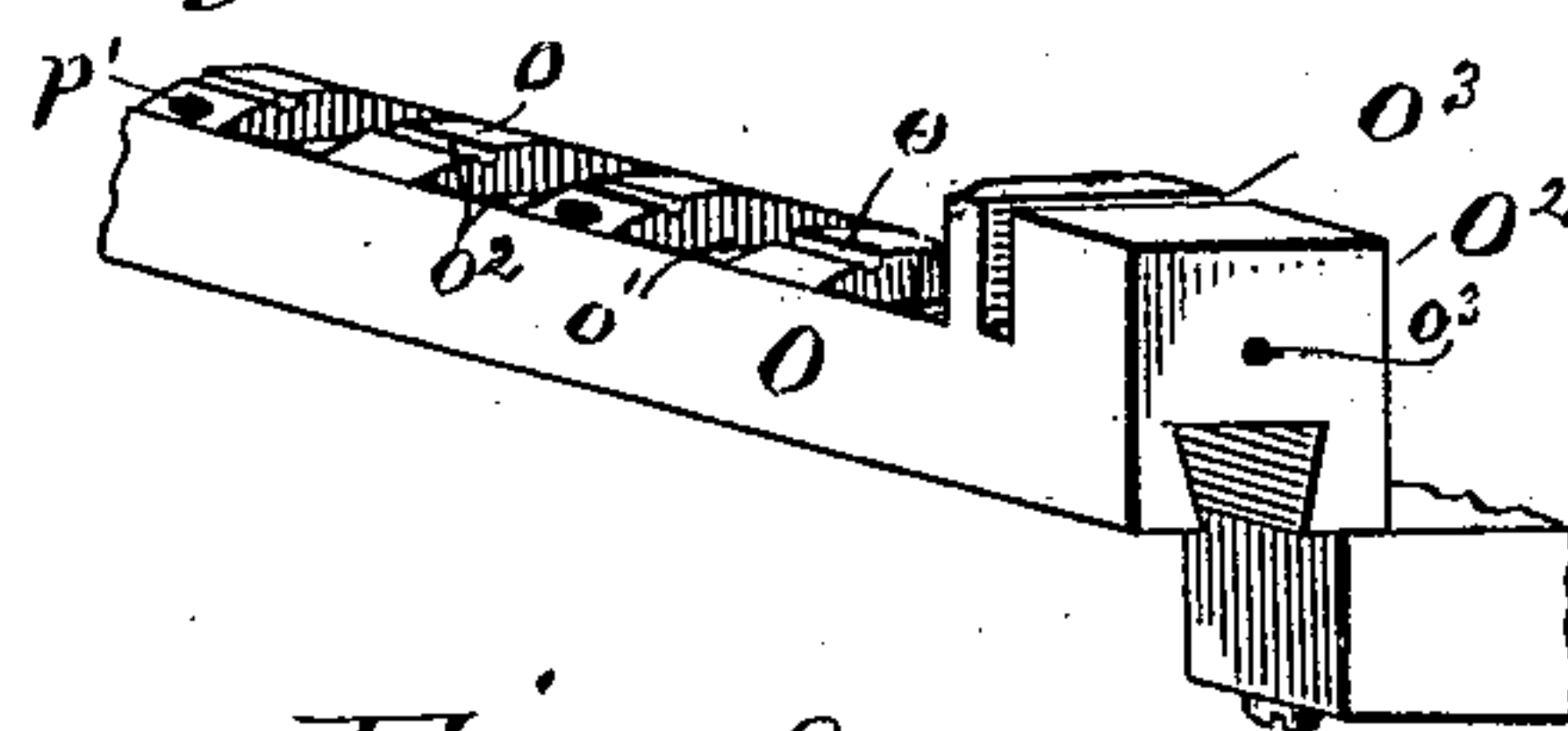


Fig. 9.

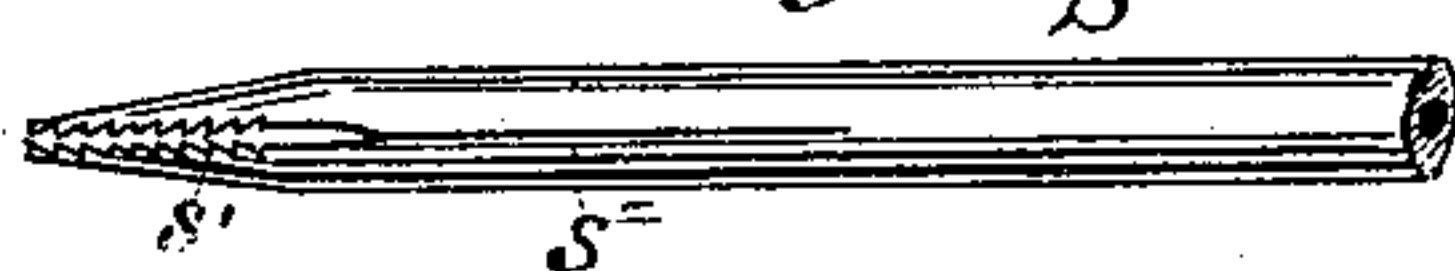


Fig. 10.

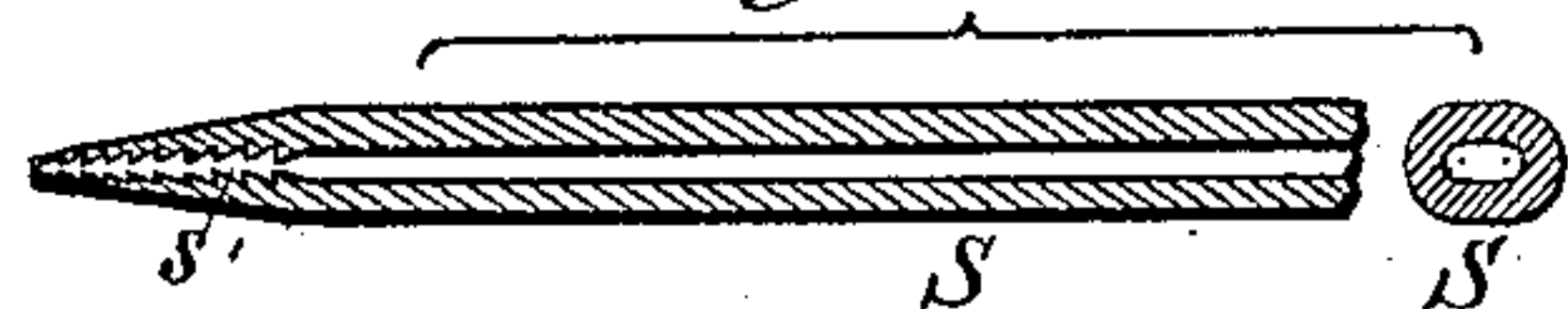


Fig. 8.

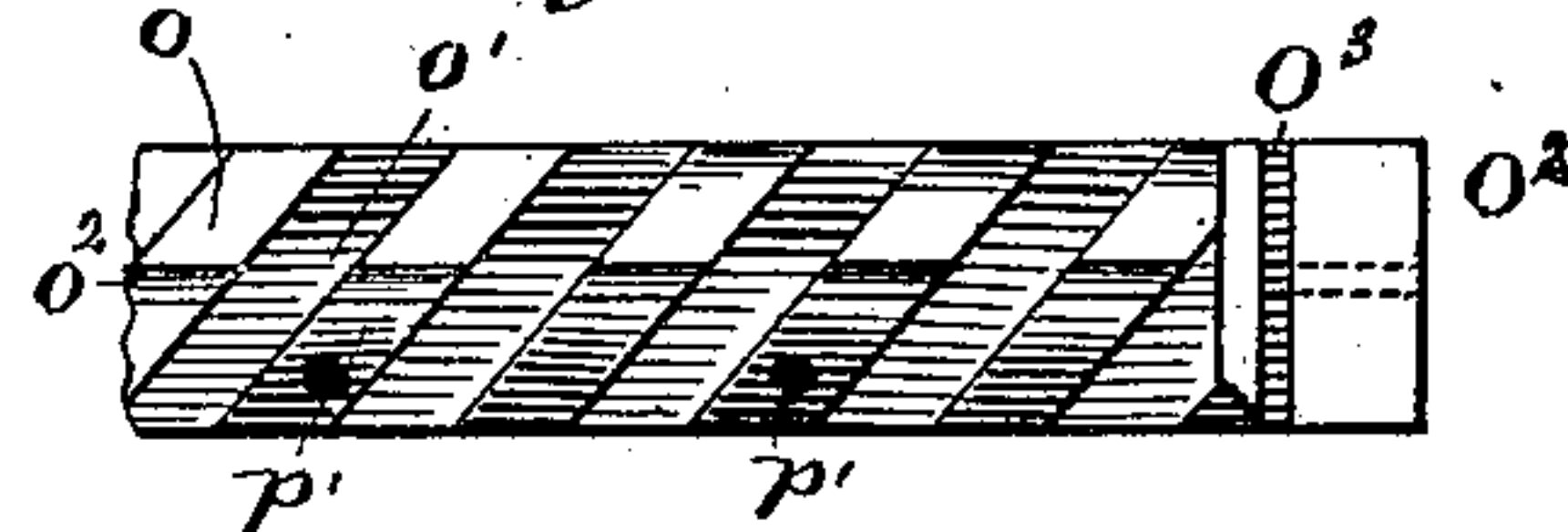


Fig. 11.

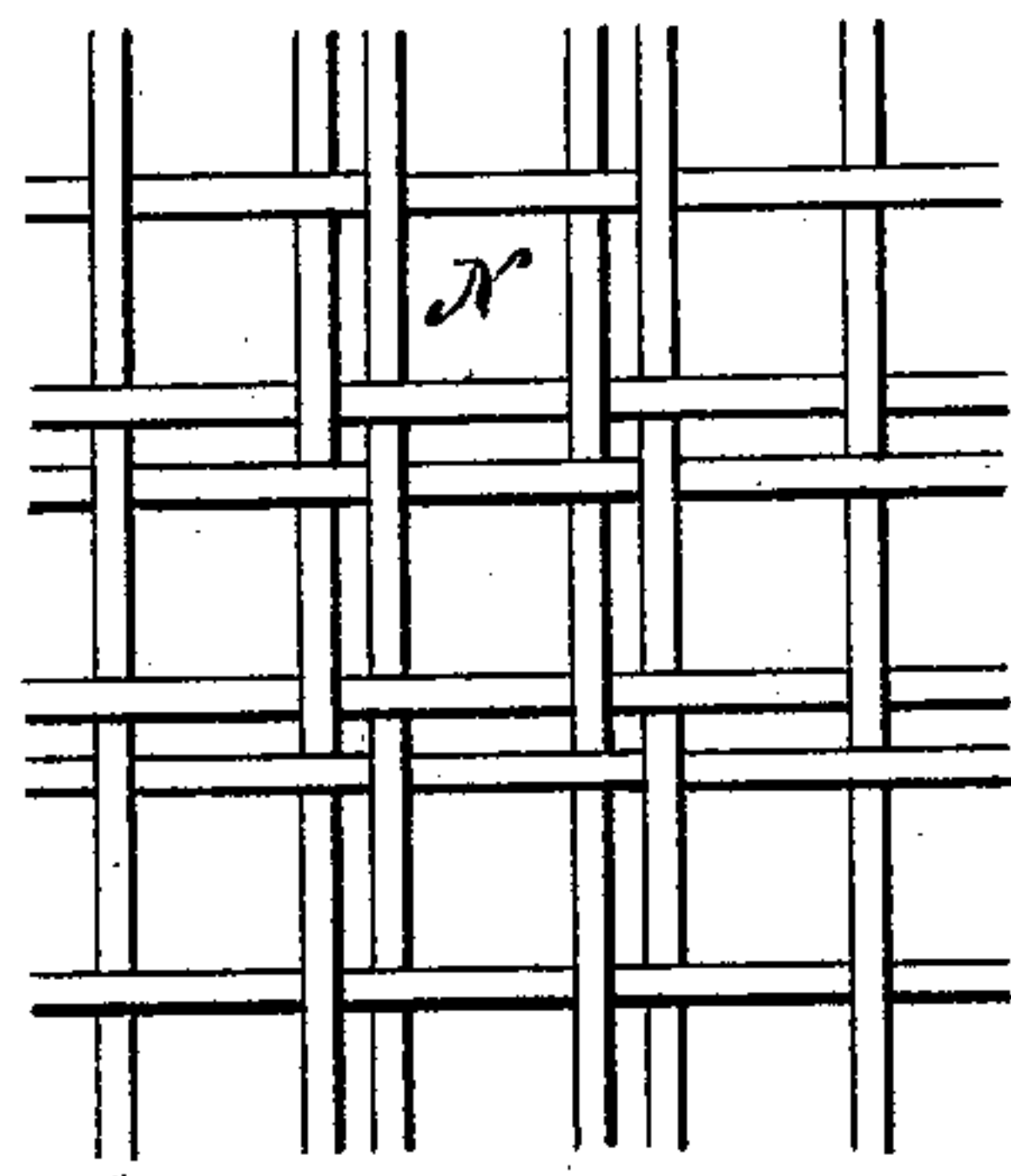
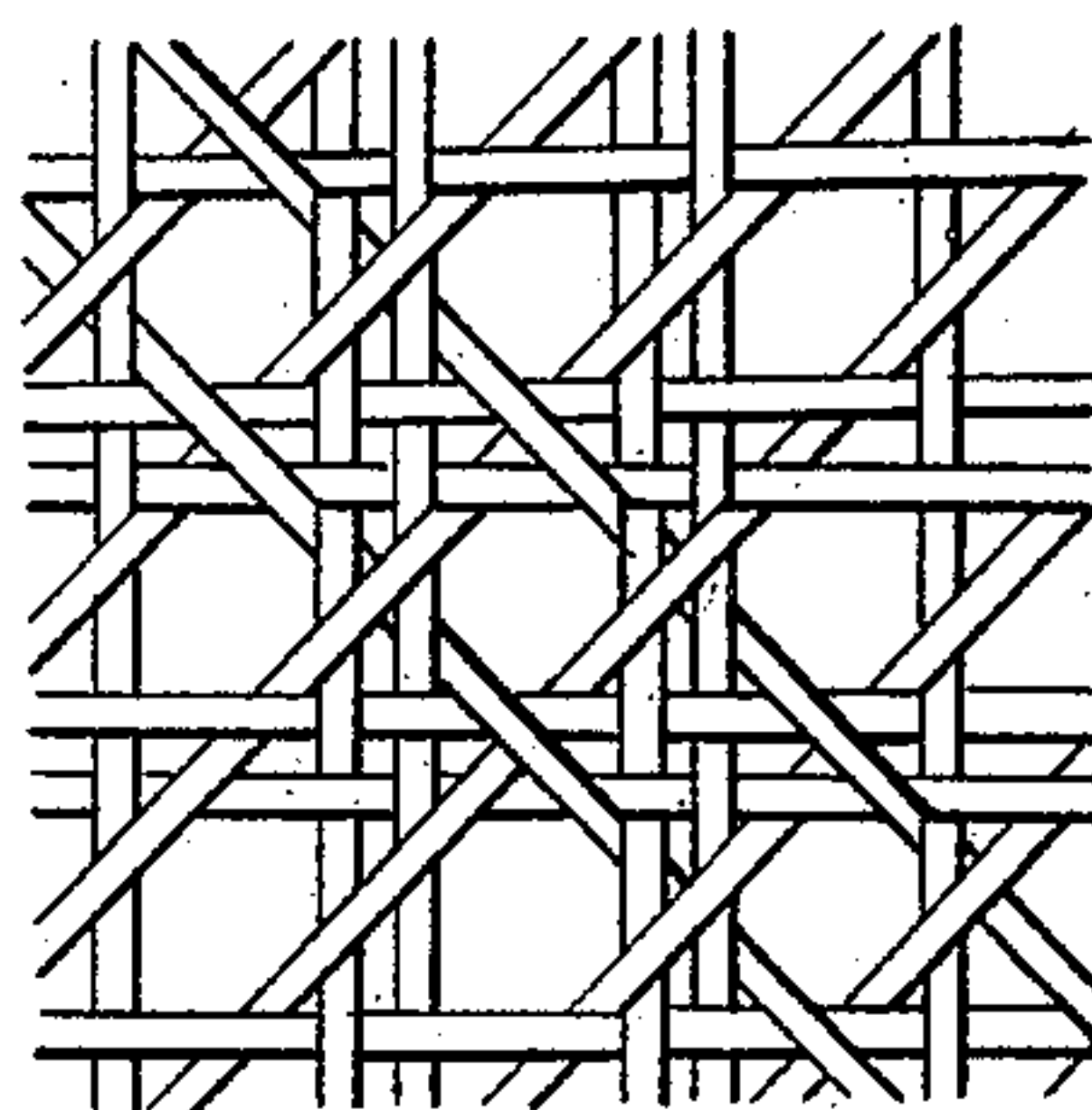


Fig. 12.



WITNESSES

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UNITED STATES PATENT OFFICE.

HENRY B. MORRIS, OF HORNELLSVILLE, ASSIGNOR TO THE MORRIS WEAVING COMPANY, OF GENEVA, NEW YORK.

MACHINE FOR INSERTING DIAGONAL STRIPS IN WEAVING CANE-WORK, &c.

SPECIFICATION forming part of Letters Patent No. 401,050, dated April 9, 1889.

Application filed November 23, 1888. Serial No. 291,655. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. MORRIS, a citizen of the United States, residing at Hornellsville, in the county of Steuben and State of New York, have invented a certain new and useful Machine for Inserting Diagonal Strips in Weaving Cane-Work, &c., of which the following is a specification.

This invention relates to the manufacture of that class of textile fabrics wherein some of the strips or threads are arranged as a warp and weft, perpendicular to each other in direction, and other strips are diagonally disposed with reference to the warp and weft. This mode of weaving is most commonly employed in the manufacture of the "open cane-work" used for the seats and backs of chairs. For this kind of work my invention is especially designed.

The machine embodying my invention involves improved means for inserting diagonal threads into a woven fabric, improved means for feeding the fabric to the mechanism for inserting the diagonal threads, and improved devices for severing the threads at proper lengths.

The object of the first part of my invention is to provide improved means for separating the threads in a woven fabric, so that diagonal threads may be inserted.

To this end my invention consists in providing one or more pairs of separators or dies, adapted to hold the threads of the fabric apart, and open spaces or ways for the insertion of the diagonal threads. In this connection my invention also consists in certain improved organizations of instrumentalities and details of construction, hereinafter set forth.

The object of the next part of my invention is to provide improved means for inserting the diagonal threads in the spaces or ways thus opened in the fabric.

To this end my invention consists in a thread-carrier or needle mounted on a frame or carriage reciprocating in line with the separators and carrying the thread into and through the diagonal open spaces in the woven fabric.

In this connection my invention also consists in providing devices for clamping or

holding the ends of the diagonal threads after their insertion in the fabric, and during the return or backward movement of the needle.

My invention in this connection also consists in improved devices for cutting the diagonal threads to the proper lengths after their insertion in the fabric and after the needle has reached the extremity of its backward movement.

The object of the next part of my invention is to provide improved means for feeding the woven fabric to the separators. To this end my invention consists in providing a roller having series of pins, suitably spaced, to take hold of the fabric between the warp and weft threads, and in arranging a second roller in close proximity to the first roller, and provided with recesses into which the pins of the first roller project.

Certain improved organizations of instrumentalities and details of construction which render the machine simple and effective are also comprehended in my invention, and will be hereinafter fully described.

The subject-matter claimed is hereinafter designated.

In the accompanying drawings, Figure 1 is a plan view of my improved machine with some of the parts removed. Fig. 2 is an elevation of the same from the right-hand side, with some of the parts omitted to better illustrate the working parts. Fig. 3 is an enlarged detailed view, partly broken away, of one pair of dies or separators, showing also the needle for inserting the diagonal threads, the mechanism for reciprocating the needle, and devices for holding the threads after their insertion by the needle. Fig. 4 is an enlarged view, partly in section, of one end of the dies or separators and devices for retaining the threads after their insertion. Fig. 5 is a perspective view, partly broken away, of the dies, the needle, its carrying-frame, and devices for securing the diagonal strip after its insertion. Fig. 6 is a transverse section of the dies or separators, showing how the threads of the fabric are separated, and also showing in section the needle-carrying frame. Fig. 7 is a perspective view of one of the lower dies. Fig. 8 is a plan view of the

same. Fig. 9 is a side view of the needle, the inner end being broken away. Fig. 10 is a longitudinal central section of the outer end of the needle and also a cross-section of the same. Fig. 11 is a plan view of a portion of the woven fabric into which the diagonal threads are inserted. Fig. 12 is a similar view with the diagonal threads in place; and Fig. 13 is a detail view of the gearing for the feed-rollers.

For convenience I will term that end of the machine indicated by the letter A the "front" end, and that end indicated by the letter B the "rear" end.

C indicates the right-hand side, and D the left-hand side.

The main frame or bed E may be of any suitable construction, but is preferably rectangular, as shown. Upright standards F and G are arranged respectively on opposite sides of the frame E, about midway between its ends. A shaft, H, is mounted in suitable bearings in the lower ends of the uprights F and G, and projects a short distance from each side thereof. The driving-pulley I is secured to the right-hand end of the shaft H, as indicated in Fig. 1. A cam, J, is secured to the shaft H near the inner side of the upright F. The groove j of the cam J is engaged by a friction-roller, k , on the operating-rod K of the feed-rollers. The rod K is bifurcated at k' , as shown, to straddle the main driving-shaft. The lower end, k^2 , of the rod projects through a guide, k^3 , secured to the frame E.

On the rear end of the frame are mounted two uprights, L, in the upper ends of which are mounted the feed-rollers M and M', secured to shafts M^2 and M^3 . On the shafts M^2 M^3 are gear-wheels m^4 m^5 , which are of the same size, and which intermesh with each other, so that the rollers revolve synchronously, and one of the rollers, preferably the lower one, is provided with a ratchet-wheel, m , with which the upper end of the rod K engages. A gravity-pawl, m' , also engages with the ratchet-wheel m and prevents the backward movement of the rollers.

As the cam J on the main driving-shaft revolves, the rod K is reciprocated intermittently—i. e., at each revolution of the driving-shaft—to engage with the teeth of the ratchet-wheel m and turn the rollers which engage with the fabric to feed it through the machine. The fabric passes through the machine in a continuous length.

One of the rollers—preferably the upper one, M—is provided on its surface with a series of radially-projecting pins, m^2 , which enter corresponding recesses, m^3 , in the lower roller, M'. The pins on the roller are suitably spaced to correspond with the opening in the fabric N, so that at each actuation of the rollers a horizontal series of pins will engage with the threads of the fabric and feed it forward a distance corresponding to the distance between the threads.

Fig. 11 illustrates the formation of the fab-

ric, which is of usual construction. On the upper end of the upright F is arranged a cross-bar, F', and on the opposite upright, G, is arranged a cross-bar, G'. The bars F' and G' support the lower dies or separators, which are disposed diagonally relatively to the fabric as it passes over them. The lower die or separator, O, at the front end of the machine extends from the front end of the cross-bar G' to the cross-bar F', and is firmly secured thereto. The lower die, O', at the rear end is disposed diagonally in an opposite direction to that of the die O, and is secured to the cross-bars F' and G' in a similar manner. The inner ends of the dies O and O' are brought close together, as shown, and from these ends diverge at substantially a right-angle, their outer ends being widely separated, as indicated in Fig. 1.

The upper dies, P and P', are arranged to act directly over the dies O and O', and are secured to a triangular frame, Q, the apex of which is directly over the inner ends of the dies, and the sides are connected at their outer ends by the base q . On each end of the driving-shaft H, outside the uprights F and G, are secured cams R R', each provided with a cam-groove, r , with which engage friction-rollers r' on the lower ends of upright rods r^2 , extending through guideways r^3 in the uprights F and G, and secured at their upper ends, respectively, to the apex and base of the triangular frame Q. As the cams R R' on the driving-shaft revolve, the rods r^2 are reciprocated vertically, and consequently raise and lower the triangular frame Q, carrying with it the upper dies, P and P'.

The formation of the upper and lower dies is shown particularly in Figs. 4 to 8, inclusive.

I will describe the details of construction of the dies O and P at the front end of the machine. The dies O' and P' at the rear end are similar in construction and operation, the only difference being the direction in which they are disposed, as above explained. The lower die, O, is formed on its upper face with a series of projections, o , which alternate with a series of recesses, o' . These projections and recesses extend diagonally across the dies to conform to the direction of the longitudinal threads of the fabric, which extend through and over them. The upper die, P, is likewise formed with a series of projections and recesses arranged so that the projections on the upper die shall enter the recesses in the lower die, and the projections on the lower die are arranged to enter the recesses in the upper die. Guide-pins p , preferably secured to the upper die and projecting downwardly, are arranged to enter corresponding recesses p' in the lower die. These pins, by entering the interstices of the fabric, serve to prevent lateral or longitudinal movement while the dies are together. The outer end of the lower die, O, which is prolonged a short distance beyond the upper die, is provided with an upwardly-

projecting block, O^2 , having a recess, O^3 , for the reception of a plate or blade, P' , on the outer end of the upper die, P . The projections o on the upper and lower dies are provided with grooves o^2 , which are all in line with each other and form a passage or race between the dies when they are together. The projection O^2 and plate P' are perforated at o^3 and p^2 , so that when the dies are together the openings o^3 , p^2 , and the grooves o^2 are in line with each other. When the upper die is depressed against the lower die, it separates the threads of the fabric which is between them, and opens a passage or way through which a diagonal thread may be passed. The warp threads or strips are elevated and the weft-strips are depressed.

The diagonal strips which are inserted into the fabric are taken from a continuous strip of material, which, when cane is used, may be formed by gluing or otherwise securing short strips of the material together. The end of the strip is carried by a needle, S , preferably formed as shown in Figs. 9 and 10. In this instance the needle is hollow, its outer end being slightly tapered and split at s , as shown, and provided with forwardly-projecting teeth s' , which firmly clamp the end of the strip and carry it forward. The needle is preferably made of steel, or of some other metal having sufficient resiliency to cause the teeth s' to firmly clamp the threads. One end of the needle, which I term the "heel," is secured to a bracket, T , mounted on the end of a frame, T' , which is provided with a dovetailed tongue, T^2 , fitting in a dovetailed recess, T^3 , in the under side of the frame T' .

The needle S is somewhat longer than the dies O and P , and is adapted to pass through the openings o^3 and p^2 and through the grooves o^2 in the projections of the dies. At the extremity of its backward movement the point of the needle rests in the opening o^3 of the block O^2 .

The under side of the frame T' is provided with a toothed bar, T^4 , which engages a segmental rack, T^5 , on the upper end of a rocking bar, T^6 . The lower end of the bar is hinged to a bracket, T^7 , on the main frame E . A friction-roller, t , near the lower end of the bar T^6 , engages with a cam-groove, u , in the cam U , which is mounted on the end of a shaft, U' , having its bearings in a bracket, U^2 , and flexibly connected at its inner end to a short shaft, U^3 , journaled in bearings in a bracket, U^2 , projecting from the main frame. The shaft U^4 carries a gear-wheel, U^5 , which engages with a cog, U^6 , secured to the main driving-shaft H . The cam U is thus revolved simultaneously with the driving-shaft, and causes the rocking-bar T^6 to oscillate, thus moving the needle-carrier T' back and forth parallel with the dies and causing the needle S to pass through the race or passage-way between the dies and between the threads of the fabric when the dies are together. The needle carries the strip diagonally through

the fabric, a short portion of the strip extending beyond the point of the needle at each forward movement. When the needle has reached the extremity of its inward movement, the end of the strip is clamped and held fast during the return or backward movement of the needle.

The devices for clamping the end of the strip preferably consist of a bell-crank lever, V , pivoted in a slot, v , at the inner end of the lower die, O . The lower end of the lever V projects beneath the die, and the needle-carrying frame T' abuts against it at the extremity of its backward movement. The upper and forward end of the bell-crank lever is provided with a pin or stud, v' , projecting downwardly therefrom and adapted to pierce and hold the end of the strip or thread at the proper time. A lug, v^2 , projects forwardly from the upper end of the bell-crank lever, and engages at times with a lug, v^3 , on the inner end of the upper die, P . A spring, v^4 , secured to the outer end of the lower die, O , engages with recesses v^5 and v^6 at the upper inner end of the lever V . When the needle-carrying frame has reached the extremity of its forward movement, it abuts against the lower end of the lever V and rocks it on its axis, so as to depress its upper end and cause the stud v' to engage with the end of the strip or thread projecting from the needle. The spring v^4 then engages with the notch v^5 in the lever V and holds it positively in place. The lever V remains in this position until the needle-carrying frame has reached the extremity of its backward movement. The upper die is then elevated, and the lug v^3 , engaging with the lug v^2 , swings the lever V , so as to withdraw the stud v' from the end of the strip. The spring v^4 then engages with the notch v^6 and holds the lever V in its elevated position until positively moved back on the return of the needle.

After the strip has been inserted into the fabric and the needle has been withdrawn to the extremity of its backward movement the point of the needle will be located outside the recess O^3 . When in this position, the upper die is elevated and the thread is severed by the separation of the plate P' from the block O^2 .

It will be observed that when the diagonal threads have been inserted their ends project a short distance beyond the sides of the fabric. The block O^2 and the blade or plate P' are therefore slightly beveled or recessed, as shown, to allow the projecting ends of the diagonal threads to pass freely by them when the fabric is fed forward.

As above stated, the dies at the rear end of the machine are similar in all respects to the dies at the front end, the needle and needle-carrying frame with its actuating mechanism are similar, and the clamping devices for the inner ends of the threads and the shearing or severing devices are duplicates.

The feed-rollers are actuated to feed the

fabric forward when the dies are elevated. When the dies are depressed, the feed is stopped until a diagonal thread has been inserted. After the insertion, and while the dies are elevated, the fabric is fed forward into position for the insertion of the next diagonal thread.

The dies O' and P' not only separate the warp and weft threads of the fabric, but also separate the diagonals inserted by the dies O and P.

The machine which I have thus minutely described in construction and operation is simple and efficient; but it is obvious that the details of construction may be varied without departing from my invention. Numerous modifications of some of the parts will be apparent to those skilled in the art, and need not be specified.

I claim as my invention—

1. In a machine for inserting diagonal threads in warp-fabrics, the combination, substantially as hereinbefore set forth, of the separators for opening a diagonal passage in the fabric, means for actuating the separators, the needle which carries the diagonal thread through said passage, and means for actuating the needle.

2. In a machine for inserting diagonal threads in warp fabrics, the combination, substantially as hereinbefore set forth, of the separators for opening a diagonal passage in the fabric between the warp and weft threads, means for actuating the separators, the needle which carries the diagonal thread through said passage, means for actuating the needle, and devices for holding the end of the diagonal thread during the backward movement of the needle.

3. In a machine for inserting diagonal threads in warp fabrics, the combination, substantially as hereinbefore set forth, of the separators for opening a diagonal passage in the fabric between the warp and weft threads, means for actuating the separators, the needle which carries the diagonal thread through said passage, means for actuating the needle, and devices for severing the diagonal thread inserted from the thread carried by the needle.

4. The combination, substantially as hereinbefore set forth, of the separators for opening a diagonal passage in the fabric between the warp and weft threads, means for actuating the separators, the needle which carries the diagonal thread through said passage, means for actuating the needle, the feed-rollers for carrying the fabric through the machine, and means for actuating them.

5. The combination, substantially as hereinbefore set forth, of the upper and lower dies formed with a longitudinal groove or race, means for raising and lowering the upper die relatively to the lower die, the feed-rollers for

carrying the fabric through the dies, the needle, and means for reciprocating the needle in the longitudinal groove or race.

6. The combination, substantially as hereinbefore set forth, of the main frame, the upper and lower feed-rollers geared to revolve synchronously and formed with projecting pins and recesses corresponding with the interstices in the fabric, and means for actuating the feed-rollers.

7. The combination, substantially as hereinbefore set forth, of the main frame, the upper and lower dies, the main driving-shaft, connections between the driving-shaft and the upper dies, whereby they are raised and lowered relatively to the lower dies, the feed-rollers, connections between the main driving-shaft and the feed-rollers for actuating them, the needle, the needle-carrying frame, and connections between the needle-carrying frame and the main driving-shaft.

8. The combination, substantially as hereinbefore set forth, of the main frame, the upper and lower dies, the main driving-shaft, the frame to which the upper dies are secured, the vertical rods secured to the die-supporting frame, the cams on the driving-shaft with which the vertical rods engage, the upper and lower feed-rollers geared to revolve synchronously, the feed-roll-actuating rod, and the cam on the driving-shaft with which said rod engages.

9. The combination, substantially as hereinbefore set forth, of the lower die formed with alternate projections and recesses and longitudinal grooves, the upper die formed with alternate projections and longitudinal grooves, the recessed block on the outer end of the lower die, and the blade or plate on the upper die adapted to enter said recess, said block and plate being perforated for the purpose specified.

10. The combination, substantially as hereinbefore set forth, of the lower die, the upper die, the needle-carrying frame, the needle, the bell-crank lever pivoted to the lower die and projecting beneath it, a clamping device on the lower front portion of the lever, and a lug or projection on the front end of the lever engaging with a lug or projection on the upper die, for the purpose specified.

11. The combination, substantially as hereinbefore set forth, of the separators, the clamping devices, and the needle formed with a horizontal central opening, and tapered, split, and provided with forwardly-projecting teeth at its front end.

In testimony whereof I have hereunto subscribed my name.

HENRY B. MORRIS.

Witnesses:

J. M. WELSH,
C. ADSIT.