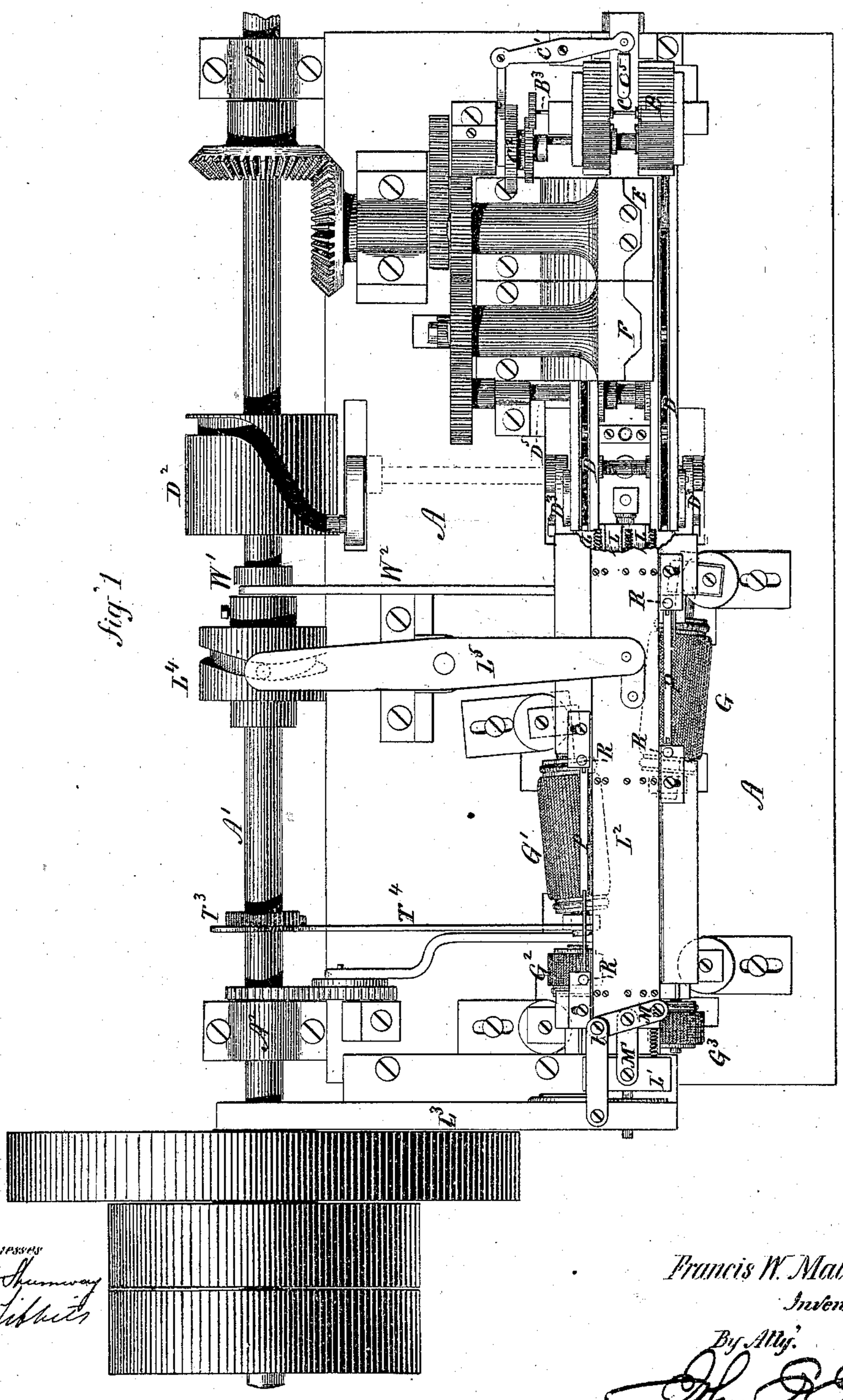
6 Sheets--Sheet 1.

F. W. MALLETT.

Machines for Making Needles.

No. 138,419. Patented April 29, 1873.



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F. W. MALLETT.

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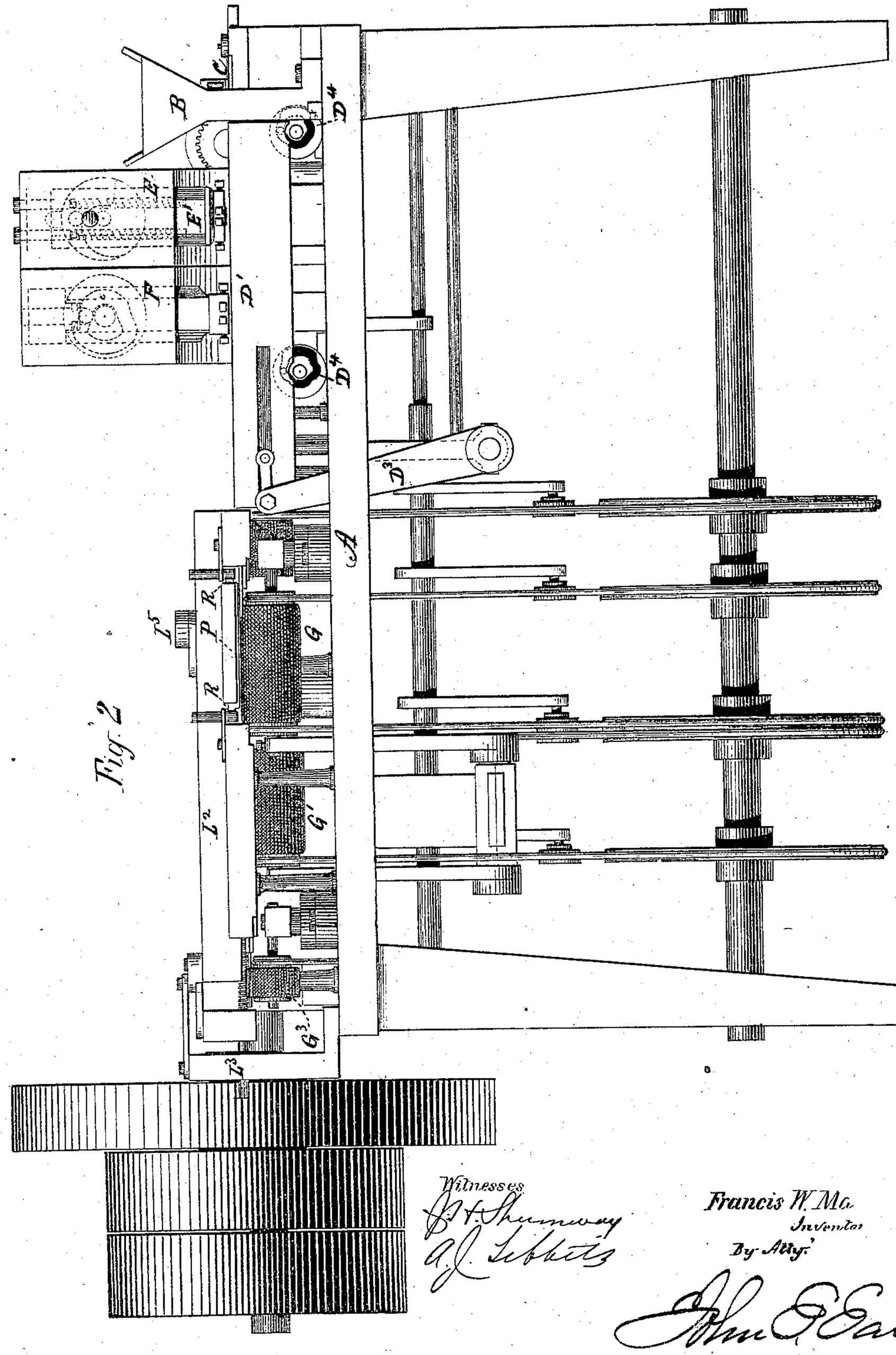

Fig. 2

Witnesses
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Machines for Making Needles.

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fig 3a

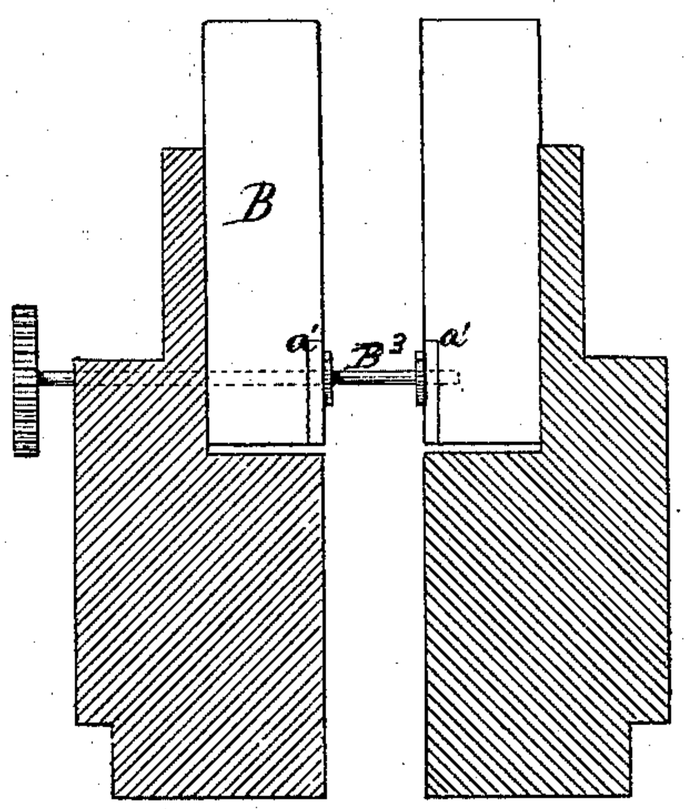


fig 4a

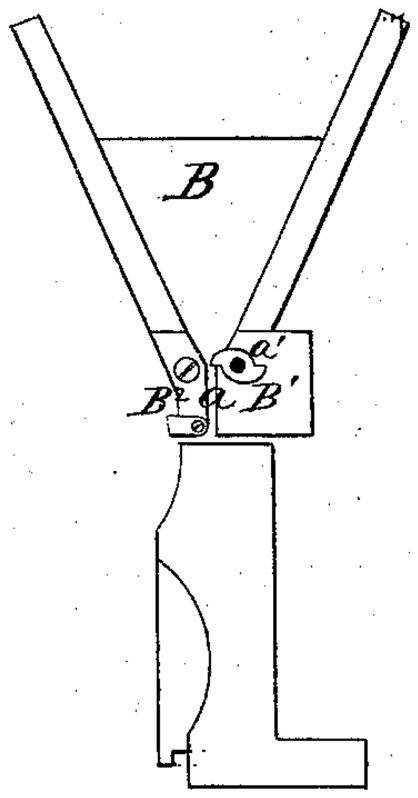


fig 5a

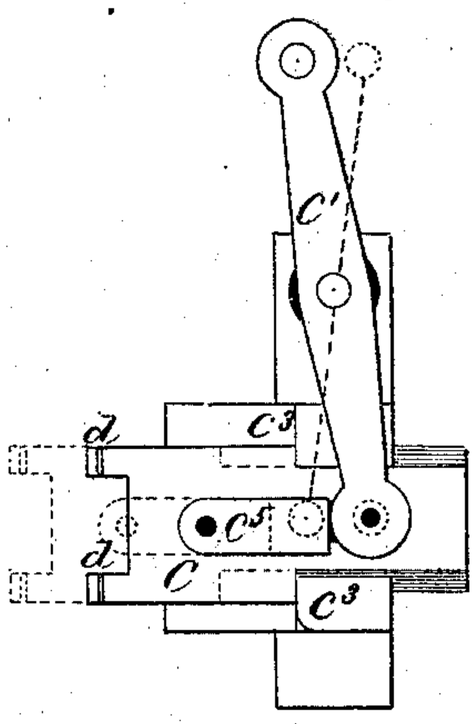
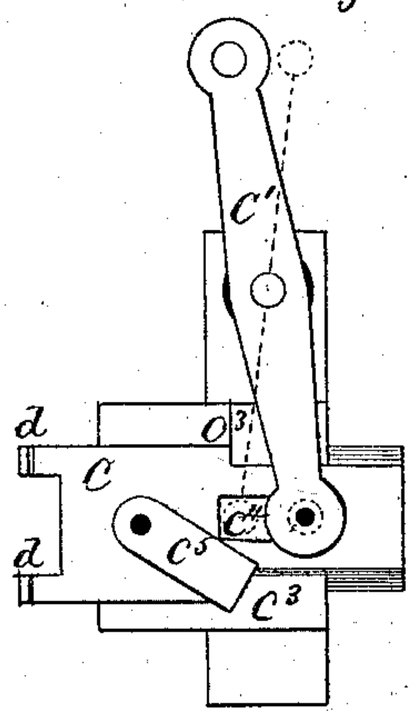


fig 6a



Witnesses

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Machines for Making Needles.

No. 138,419. Patented April 29, 1873.

fig. 4

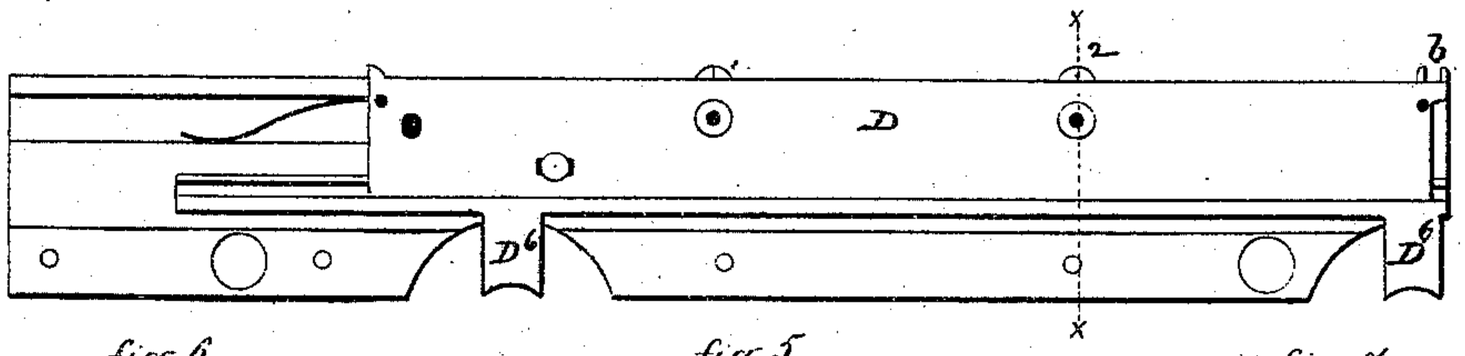


fig. 6

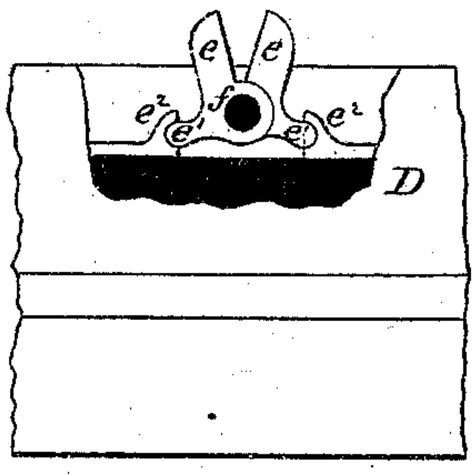


fig. 5

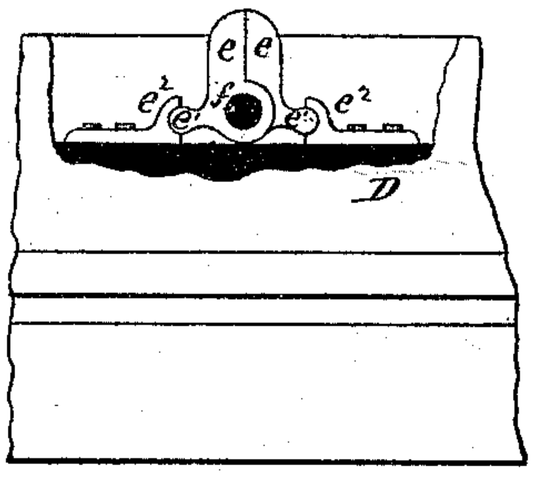


fig. 7

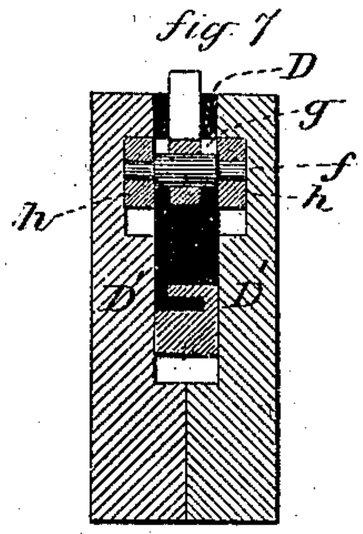


fig. 10

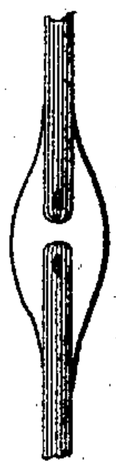
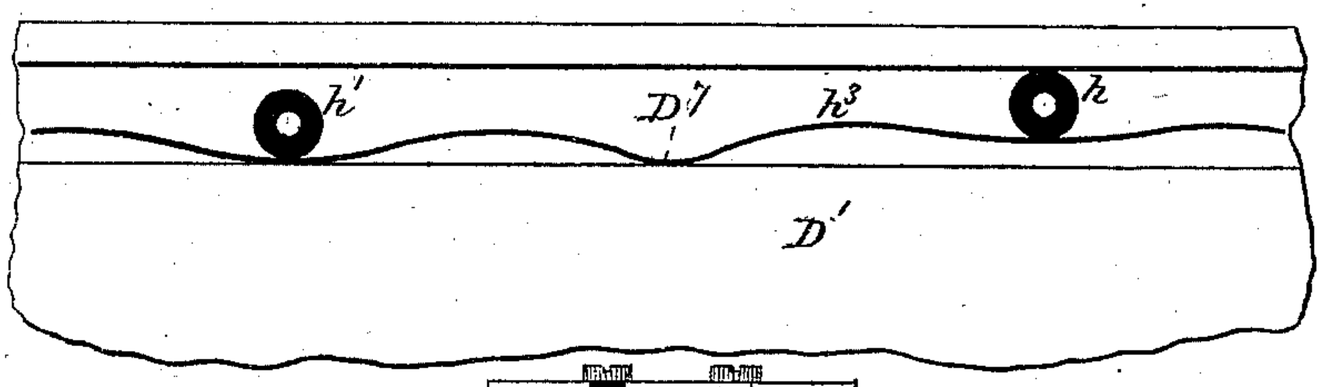


fig. 8



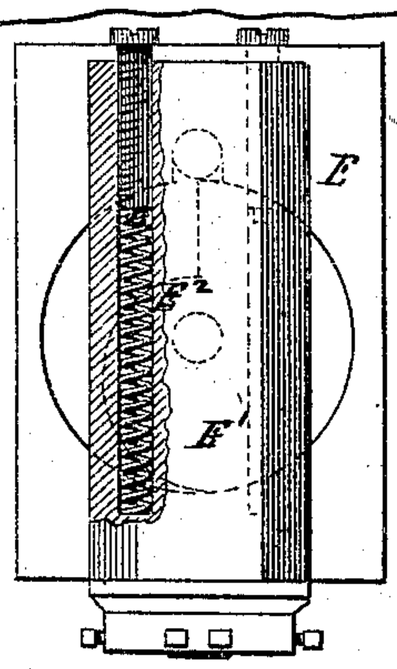


fig. 9

Witnesses.
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F. W. MALLETT.

Machines for Making Needles.

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fig. 14

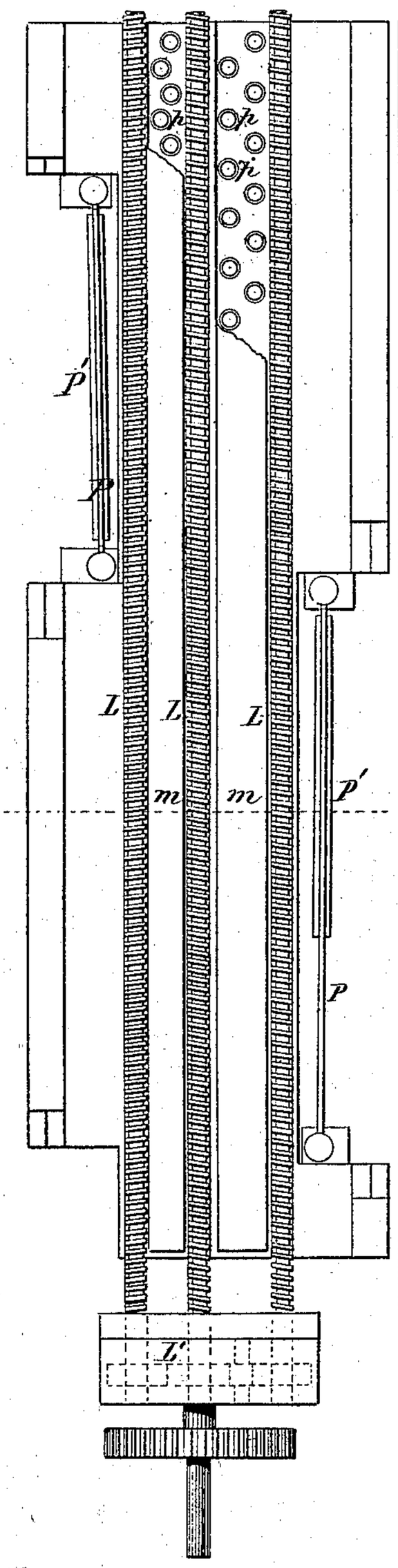


fig. 13

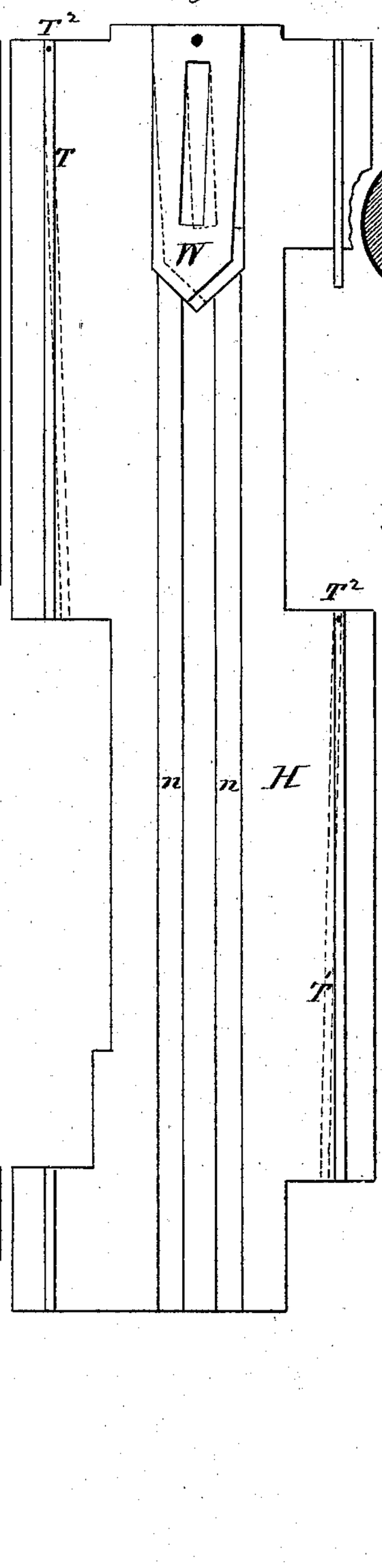


fig. 11

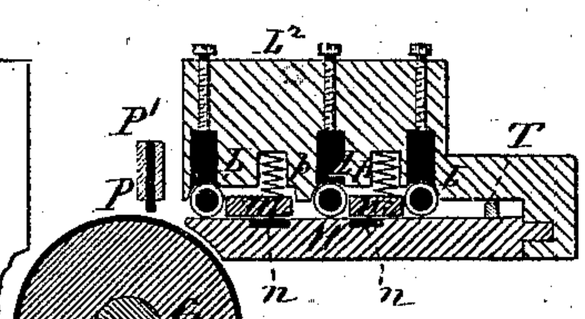
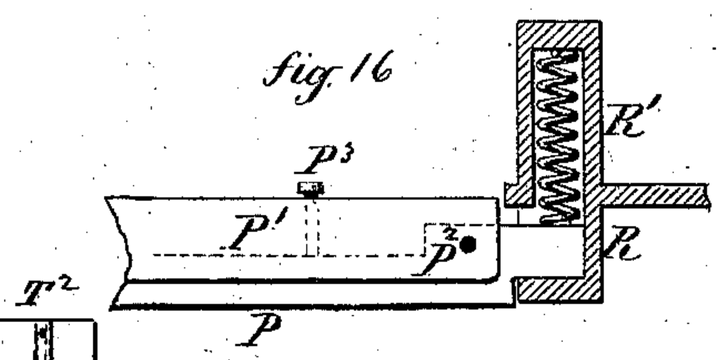


fig. 16



Witnesses.
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6 Sheets--Sheet 6.

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Machines for Making Needles.

No. 138,419. Patented April 29, 1873.

fig. 15.

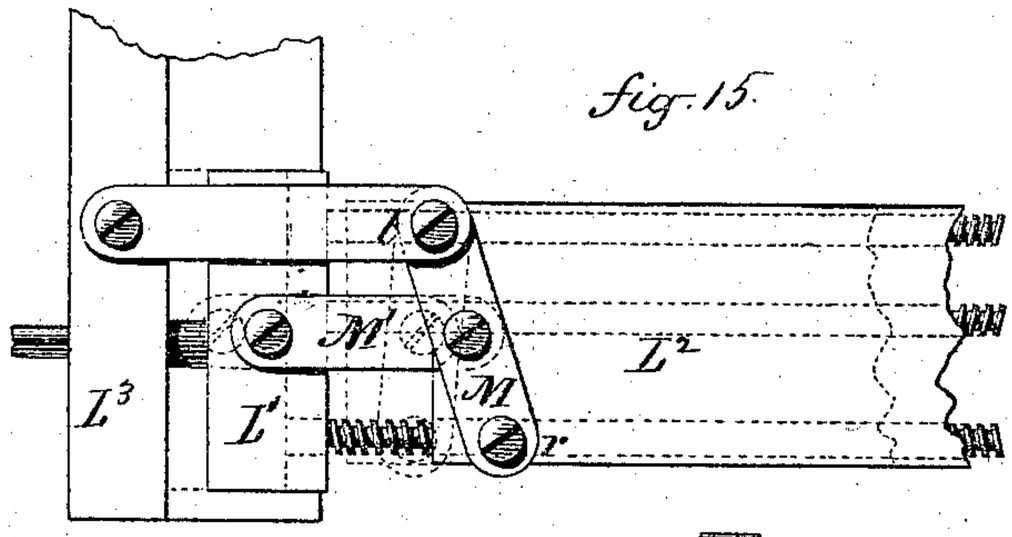
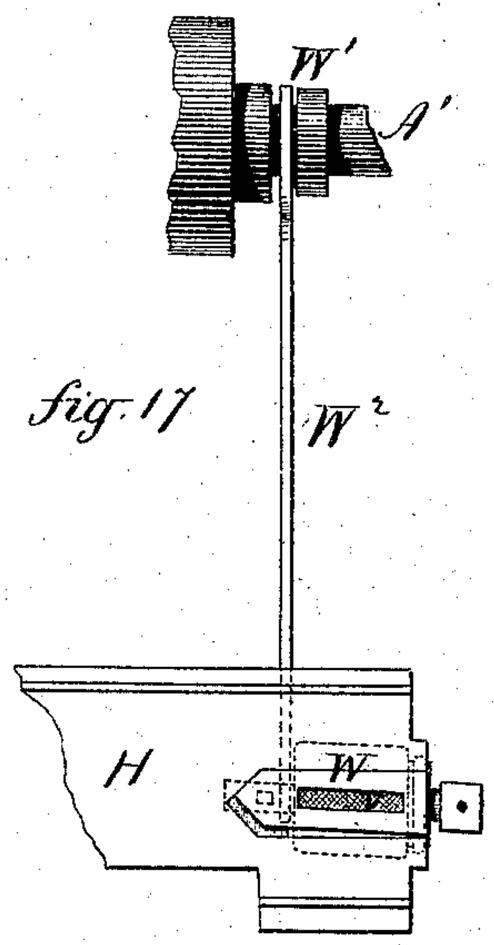


fig. 12

fig. 17



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UNITED STATES PATENT OFFICE.

FRANCIS W. MALLETT, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR MAKING NEEDLES.

Specification forming part of Letters Patent No. **138,419**, dated April 29, 1873; application filed November 30, 1872.

To all whom it may concern:

Be it known that I, FRANCIS W. MALLETT, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machines for Making Needles; and I do hereby declare the following, when taken in connection with the accompanying drawing and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this specification, and represents, in—

Figure 1, a top view; Fig. 2, a front view; Figs. 3ª and 4ª, detached views of the hopper; Figs. 5ª and 6ª, detached views of the hopper-feed; Figs. 4, 5, 6, 7, and 8, detached views of the mechanism for carrying and presenting the wires to the dies; Fig. 9, a detached view of one of the presses; Fig. 10, a diagram of the blank after the operation of the first press; and in Figs. 11, 12, 13, 14, 15, 16, and 17, detached views of the pointing mechanism.

This invention relates to an improvement in machinery for making hand-sewing needles; and consists in the mechanism more fully hereinafter described, which, receiving the wires in lengths for two needles, transfers the said wires from one device to another, by which the eyes are formed at the center and the two ends pointed. Each wire or two needles are not separated, but run through the machine together, and are discharged in that condition, to be afterward separated and treated as in the usual hand process or by other mechanism. The object of this invention is the construction of a machine which will operate as near like the common hand process as possible.

A is the bed upon which the mechanism is arranged; A^1, the driving-shaft, supported so as to revolve freely in bearings A^2, power being applied to the shaft in the usual manner for driving similar machinery. B is the hopper, in which the wires are arranged. This hopper is constructed as seen in Figs. 3ª and 4ª, enlarged, and is of V-form, and made in two parts, as seen in Fig. 3ª. The hopper may be lengthened or shortened to accommodate different lengths of wire for making different-sized needles. The throat *a* of the hopper (see Fig. 4ª) is made adjustable to wires of different diameters—that is to say, the throat should be only wide enough to permit a single column of wires to stand therein, as the wires are taken singly from the hopper, and this adjustment is accomplished by making one of the cheeks, B^1, adjustable so as to be set further from or nearer to the other cheek, B^2. Into the space between these two cheeks the wires fall from the hopper to supply the place of each wire taken therefrom.

In order that this supply may be constant, and the mass not "choked," I arrange upon a shaft, B^3, two cams, *a'*, substantially of the form seen in Fig. 4ª, the said shaft revolving by the application of power thereto in any convenient manner, so that the cams *a'* constantly raise the mass at the throat of the hopper and allow them to fall, thus keeping them constantly agitated, which prevents the wires from choking or clogging at the throat. To take the wires from the hopper to transfer them singly to the proper carrier a slide, C, is arranged beneath the throat of the hopper, to which a reciprocating movement is imparted through a lever, C^1, actuated by a cam, C^2, on a counter-shaft, as seen in Fig. 1. This slide is shown enlarged in Figs. 5ª and 6ª. The end of the slide C is constructed with a transverse groove, *d*. In the position denoted in Fig. 5ª this groove would be directly beneath the channel or throat of the hopper, and the lower wire would rest in the said groove. The before-described movement being imparted to the said slide will carry it forward to the position denoted in broken lines, Fig. 5ª. The surface of the slide passing close to the lower edge of the throat of the hopper will prevent the escape of other wires therefrom, and carry the wire already in the groove *d* to the position denoted by the grooves in broken lines. This slide works in suitable guides C^3. As at times it is desirable to stop the feed while the other parts of the machine may be working, a slot, C^4, is formed in the slide C, as seen in Fig. 6ª, into which the connection or stud on the lever C^1 extends, and in front of this, upon the slide, is pivoted a bar, C^5, and when this bar is turned away, as in Fig. 6ª, the lever will work in the said slot, as denoted in broken lines, without moving the slide; but when the bar is turned forward

of the lever, as seen in Fig. 5ª, the connection between the slide and the lever is formed, so that the slide will move with the lever; hence, at any time when it is desirable to arrest the feeding, it is only necessary to turn the bar C^5 away from the lever, and the object is accomplished. To take the wire from the groove *d* in the slide C, as it is presented, a pair of parallel slides, D, are arranged longitudinally on the bed of the machine in suitable guides D^1, one of these being shown enlarged in Fig. 4, and in detail in Figs. 5, 6, 7, and 8. To these slides a longitudinal movement is imparted from a cam, D^2, through levers D^3. To these slides a vertical movement is also given by cams D^4, operated by a counter-shaft, D^5, the said cams working upon arms D^6, which project down from the said slides, by which last-named cams the slides are raised from the position in Fig. 6 to that in Fig. 5, also shown in the raised position in Figs. 4 and 7. At the end of the slides next to the hopper a notch, *b*, is formed, (see Fig. 4,) which corresponds to the position of the groove *d* in the slide C when thrown forward, carrying the wire, and when in that position the slides D are raised, the notches *b* raising the blank from the groove in the slide. Then the longitudinal movement of the slides D takes place and carries the wire in the notch *b* to the position 2, as seen in Fig. 4, which is directly beneath the press E. In this press E are arranged dies for forming the head of the needle preparatory to punching the eye. This is done in the center of the wire, the slides D presenting the wire to the dies in this press in such position. The upper die in this first press E is arranged in a slide, E^1, seen enlarged in Fig. 9, and this slide is raised by a cam in the head of the slide, denoted in broken lines in Figs. 2 and 9. The said cam is so constructed that when the slide is raised to its full height it will permit it to fall and be forced down by the springs E^2, striking the wire beneath with sufficient force to form the heads of two needle-blanks at one time. The operation of this blow brings the wire to the form denoted in Fig. 10, (enlarged,) shaping two heads, and forcing the surplus metal into a thin fin around the two heads. The slides D, after having presented the wire to this die, and, after this operation, drop and return to the first position, that the notch *b* on the slide may take a second wire. On the said slides D, distant from the notch *b* equal to the longitudinal movement of the said slides—that is, at the point where the first operation is performed when the notches *b* are in position to take the second wire, and denoted as position 2, Fig. 4—I arrange a pair of jaws, *e e*. These jaws are hung in the said slides, and have a vertical opening, as seen in Fig. 6, and are made to close by the raising of the slide D, and to open as the slide drops. These jaws are hung upon a shaft, *f*, which passes through a vertical slot, *g*, in the slides, and on the ends of the shaft are arranged anti-friction rolls *h*. See Fig. 7. The guides D^1, within which the slides D are arranged, are grooved longitudinally upon the inside, within which groove D^7 the rolls *h* run as the slide is moved longitudinally. An arm, e^1, extends from each jaw into a seat, e^2. When the slide descends, as in Fig. 6, the roll strikes upon the bottom of the groove D^7, as denoted at *h'*, Fig. 8. Before the slide has completed its descent, and as the roll strikes the bottom of the groove in the descent of the slide the further descent of the shaft *f* is prevented. Hence, as the slide continues down the seats e^2 draw down the arms of the jaws and cause them to open, as seen in Fig. 6; and when the slide D is raised the roll strikes the top of the groove, as denoted in Fig. 7 and at h^1, Fig. 8, and arrests the upward movement of the shaft *f* before the upward movement of the slide is completed. Hence, the continued upward movement of the slide acting upon the arms of the jaws will close the jaws, as denoted in Fig. 5; therefore, when the slides rise to receive the second wire in the notch *b* the first pair of jaws will grasp the blank which was left in the press E and raise it from the dies; then the next forward movement of the slides will take the blank and carry it onto a second press, F, while the notch *b* will carry its wire to the first press E, as before, to be headed. In order that the jaws may rise with the slide and allow the final upward movement of the slide to close the jaws, a flat longitudinal spring, h^3, is arranged in the groove D^7, as seen in Fig. 8, upon which the rolls rest, the tendency of these springs being to bear the rolls against the upper side of the groove and carry the jaws up as the slides rise, the shaft being borne against the upper end of the slot in the slides, and are therefore carried to their highest position open, and closed, as before described, by the completion of the upward movement of the slide. These springs also hold the jaws in their upper position until the slide has descended the extent of the slot in the slide, which movement opens the jaws before they commence their descent. The second press is provided with two punches, which perforate the two eyes in the needle-blanks. These presses are actuated by a chain of gearing from the driving-shaft, as denoted in Fig. 1. This completes the forming of the heads. The slides now drop and return the notch *b* to receive a third wire, the first pair of jaws for the second, and another or third pair of jaws to take the first in like manner, and by the next forward movement the blank with the completed head is carried forward, and the next two blanks for the same operation, and so continuing for each successive blank. The jaws firmly gripe the blanks and prevent them from turning, which enables their proper presentation for the second operation. The dies which are used in these two presses are substantially the same in form as those employed in the making of needles by hand.

Passing from the last process, as described, the blanks are ready for the next operation, which is to remove the fin or surplus metal

from around the heads, and then they are ready for pointing. The surplus metal is removed by means of a revolving mill, V, (see Fig. 2,) and the pointing is performed first on one end by a mill, G, then upon the other end by a mill, G′. These mills are caused to revolve rapidly, so as to grind the points as the blanks are presented. In order to present the blanks and carry them over the surfaces of the mills I arrange three longitudinal screws, L L L, above a bed, H, and in line with the slides D, as seen in Fig. 1, the screws and bed shown in transverse section in Fig. 11. I illustrate as three screws; two, however, will answer the purpose; the third is intended to prevent the liability of breaking the wires between the heads. In case two screws are used they would preferably be made one right and the other left, revolving in opposite directions. These screws run in close contact to the said bed, and extend to the point where the blanks are left by the slides D, the thread at the ends terminating in the form of a hook, *l*, (see Fig. 12.) These screws are supported at their extreme rear ends in a bearing, L^1, and are covered by a slide, L^2, (more fully hereinafter described,) which keeps them in longitudinal line, and they are caused to revolve by a chain of gearing, here represented as inclosed within a casing, L^3, and the threads cut so that the draft of the thread is from the hooked ends. Revolving the hook *l* on the screws takes the blanks from the slides D, and each revolution of the screws carries the blanks along the distance of a single thread. By preference the revolution of these screws is timed corresponding to the movement of the slides D, so that at each revolution of the screws a new blank is taken from the slides D, and will be carried along between the screws and the bed H by the revolution of the screws and pass over the mill V, and also the mills G G′, one end of the blank first coming in contact with one mill, then the other with the other mill; but in order to insure the perfect trimming of the heads and formation of the point, it is necessary that the blanks revolve as they pass over the mills. To do this I arrange in longitudinal grooves on the bed a slightly-flexible material, *n*, as seen in Figs. 11 and 13, as leather or rawhide, and above these in the slide L^2, and corresponding in position to the strips *n*, I arrange similar strips *m*, running longitudinally. (See Figs. 11 and 14.) These are arranged, each pair, between two of the screws. Above the upper strips *m* I arrange numerous spiral springs *p*, to create a pressure upon the strips *m* to bear upon the blanks which lie between them and the strips *n* below. A longitudinal reciprocating movement is imparted to the slide L^2 by means of a cam, L^4, through a lever, L^5, in connection with the said slide, as seen in Fig. 1. This movement of the slide back and forth causes the blanks between it and the bed below to revolve back and forth accordingly, and a full movement of the slide back and forth occurs during each full revolution of the screws, but the longitudinal movement of the slide is several times greater than the pitch of the screw, hence the blanks are rolled a greater number of times than they would be if carried by the screws themselves. In order, therefore, to allow the mills to roll this distance a corresponding longitudinal movement is given to the screws—that is to say, as the blanks will roll one-half the distance that the slide L^2 moves a longitudinal movement equal to one-half the distance traversed by the slide is imparted to the screws. This is done by connecting the bearing L^1, which holds the screws, with the slide L^2 by a lever, M, one end of which, as at *r*, pivoted to the said slide, and the other pivoted at *t*, to a stationary bearing. Midway between these two pivots or fulcrums a connecting-rod, M^1, unites the lever M with the slide L^2, as more clearly seen in Fig. 15, in which the full movement of the slide is shown in broken lines, and also that of the bearing L^1 with the screws, being equal to one-half the distance moved by the slides. The screws, therefore, move longitudinally with the blanks, but adding to the blanks the additional movement of one thread at each revolution; hence, at each full movement of the slides the blank is advanced one thread or pitch of the screws, and in this manner are carried along by a constant movement, but always revolving either backward or forward, their ends passing over the mills G G^1, as before described. The blank first passes over the mill V, as before stated, to remove the fin or surplus metal thrown out by the heading-dies. This mill is hung upon a plate, W, upon the under side of the bed H, (see Figs. 13 and 17,) Fig. 17 showing the upper side. A slot is formed through this plate and the bed, so that the surface of the mill V will run flush with the upper surface of the bed, and to this plate W a vibratory motion is imparted by a cam, W^1, through a rod, W^2, thus giving to the mill a movement longitudinally with the blank, or transversely across the bed, so that the mill will act to cut away the fin thrown out by the heading-dies, as the blank revolves in its passage over the slot in the plate W. The object of the slotted plate W is that, as narrow and open a space as possible may be formed in the bed beneath the blanks, and, as the mill can touch only at a single point, the slot in the plate allows this action of the mill, and, moving longitudinally on the blanks, causes the dressing of the whole length of the fin.

The mills G G′ are, by preference, arranged diagonally, as seen in Fig. 1, so that the grinding may commence first at the point and work back as the blank advances. This grinding reduces the blank all that is required. In order to bear the ends of the blank upon the mills, I arrange over each mill a bar, P. (See Figs. 2, 11, and 16.) This bar is supported at each end in a bearing, R, and above each end of the bar a spiral or other spring, R′, is ar ranged, as seen in Fig. 16, which will yield

slightly, yet bear with sufficient force to press the ends of the blank upon the mills. In order that the pressure of the bar may be increased at any desired point along the mill, I arrange the bar P within a bar, P^1, (see Fig. 16,) which bar P^1 is attached at each end, as at P^2, to the bar P, and at intermediate points I arrange adjusting-screws P^3 to bear upon the bar P, and give it a greater or less depression. As the mills revolve toward the blank, they would naturally force them away from the mills, hence a stop or guide is necessary upon the opposite side, and this is made by a rib, T, for the first mill, and T^1 for the second mill, (see Figs. 11 and 13;) but as the force of the mill would cause the blanks to drag on this stop, I pivot this rib at one end, as at T^2, and impart to the other end a slight transverse reciprocating movement by means of a cam on the driving-shaft, or by other suitable or convenient device, the reciprocating movement being indicated by broken lines in Fig. 13. This reciprocating movement is very rapid, and therefore constantly striking the ends of the blank, forces them onto the mill, and thus keeps them always in the required position.

At the end of the machine, beyond the mills G G^1, I arrange other mills, G^2 G^3, so that after passing from the first grinding the blanks will pass the second pair of mills, which will touch the ends of the revolving blanks, and perfect the pointing. After the blanks have passed the mills G^2 G^3 the operation is complete, and they drop therefrom, having the points and heads formed complete, then taken to another device by which the blanks are divided between the heads.

I claim as my invention—

1. In a hopper, substantially such as described, the two cheeks B^1 B^2, which form the throat *a* of the hopper, one of which cheeks is made adjustable, so that the said throat may be made of greater or less width, substantially as described.

2. In combination with a hopper for supplying the wires, the revolving shaft B^3, with its cams *a'*, arranged in the relative position to the throat *a*, as and for the purpose specified.

3. The parallel slides D, having an up-and-down and longitudinal reciprocating movement, combined with the jaws *e e*, to receive and translate the blanks for successive operations, substantially as set forth.

4. The longitudinal screws L, constructed with the hook *l* at their ends, arranged to receive the blanks within the grasp of the said hooks, and combined with the mills V and G G^1, over which the blank is carried by the said revolving screws, substantially as described.

5. In combination with the revolving longitudinal screws L, the slide L^2 and bed H, the said slide L^2 having a reciprocating movement, substantially as described.

6. The longitudinal revolving screws L, the slide L^2, and the bed H, the said slide L^2 and the revolving screws L having each a longitudinal reciprocating movement independent of the other, substantially in the manner and for the purpose set forth.

7. The arrangement of the springs *p* above the flexible strips *m* in the slide L^2, substantially as and for the purpose set forth.

8. In combination with the mills G G^1, the bars P P^1, and their pressure-spring R^1, substantially as and for the purpose described.

9. In combination with the mills G G^1, bar P, and its spring R^1, the auxiliary bar P^1 and adjusting-screw P^3 to bear upon the said bar, substantially as and for the purpose described.

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