Sheet 1, 3 Sheets.

C. O. Crosby.

Sewing Needle.

No. 104,278. Patented Jun. 14, 1870.

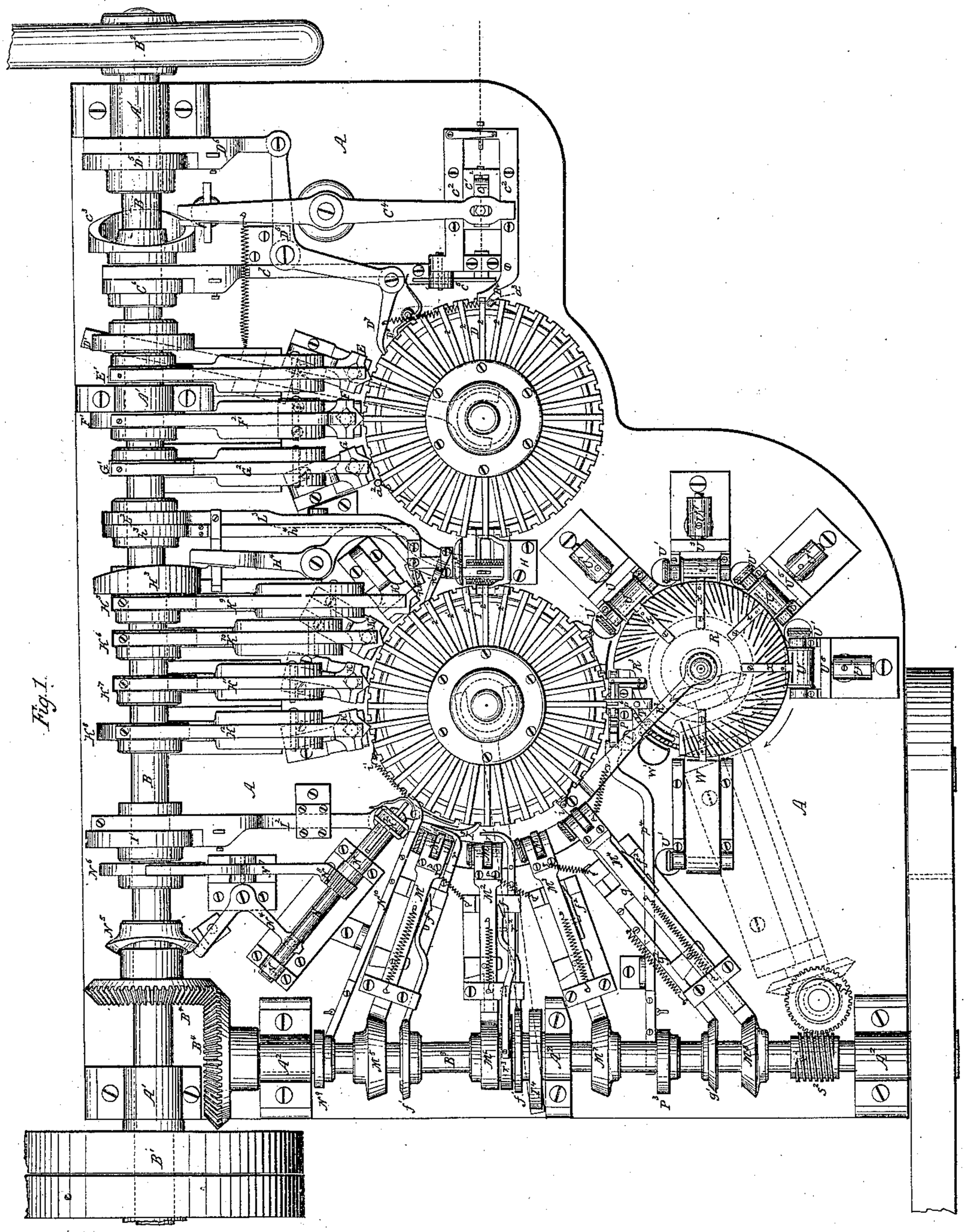

Fig. 1.

Witnesses.
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Sheet 2, 3 Sheets.

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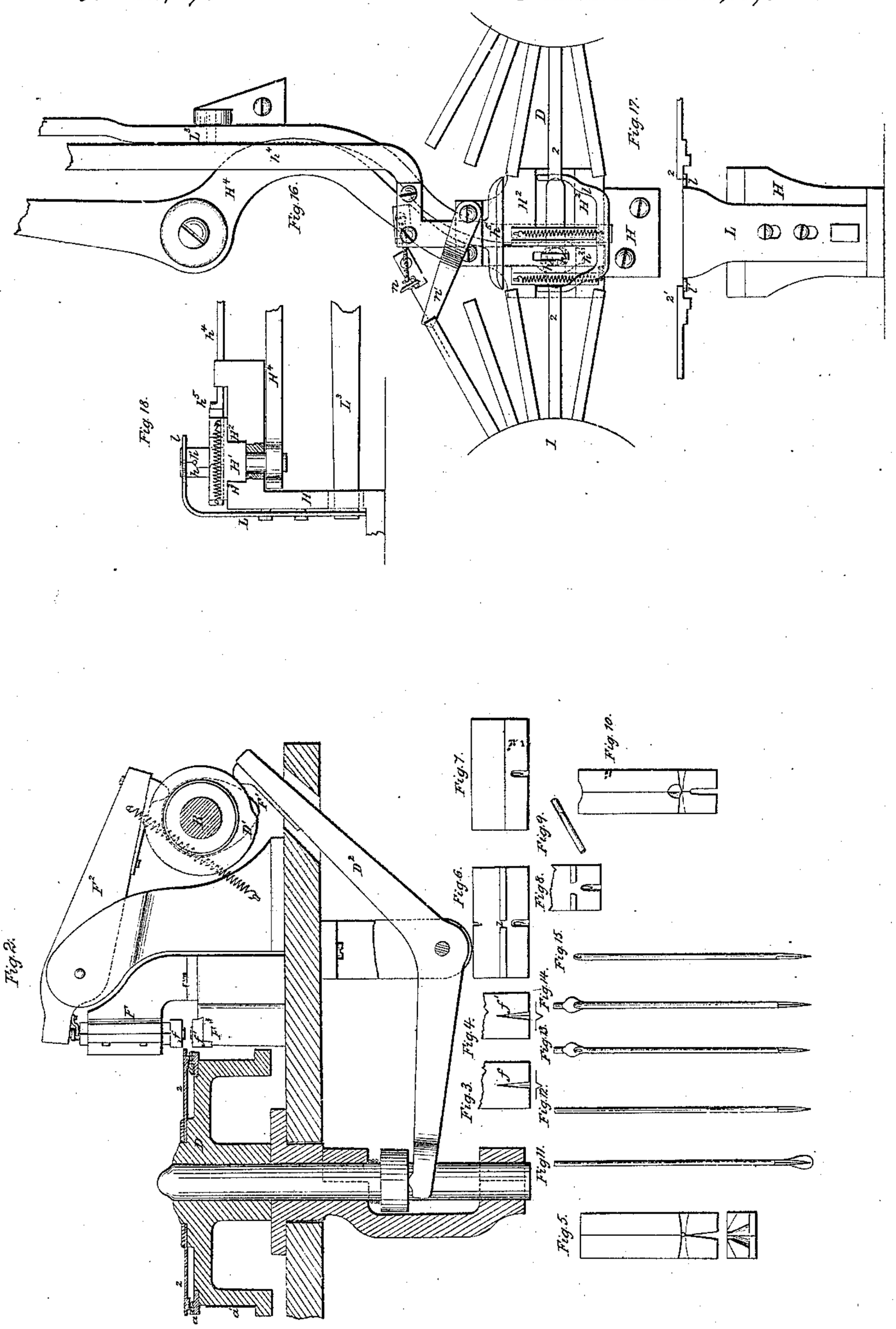

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Fig. 27.

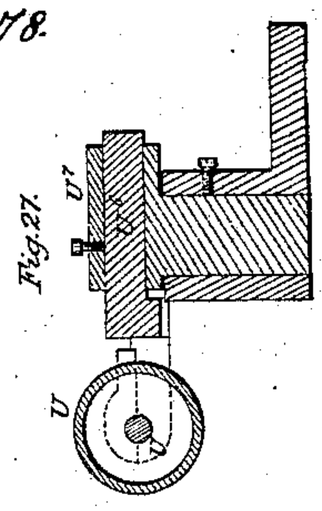


Fig. 28.

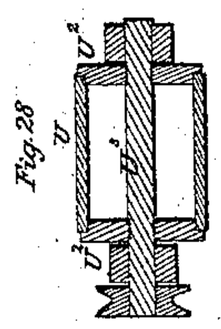


Fig. 26.

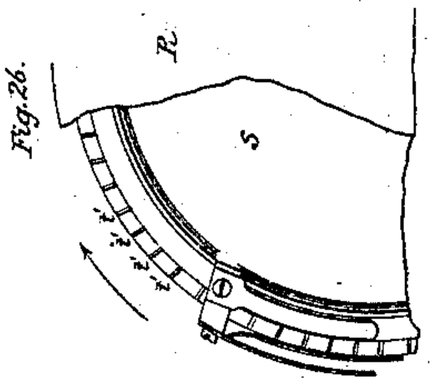


Fig. 25.

Fig. 21.

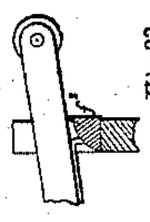


Fig. 22.

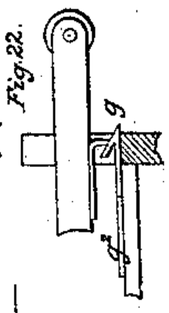


Fig. 24.

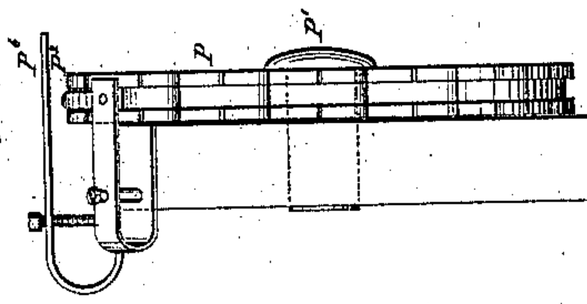


Fig. 19.

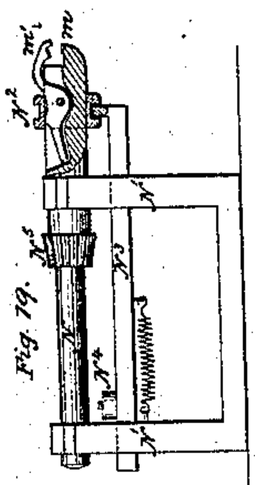


Fig. 20.

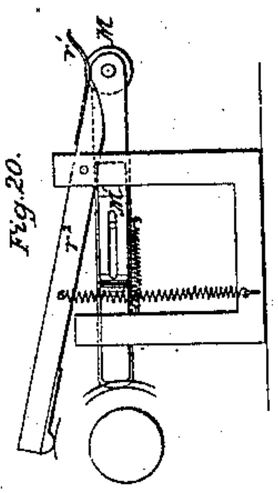
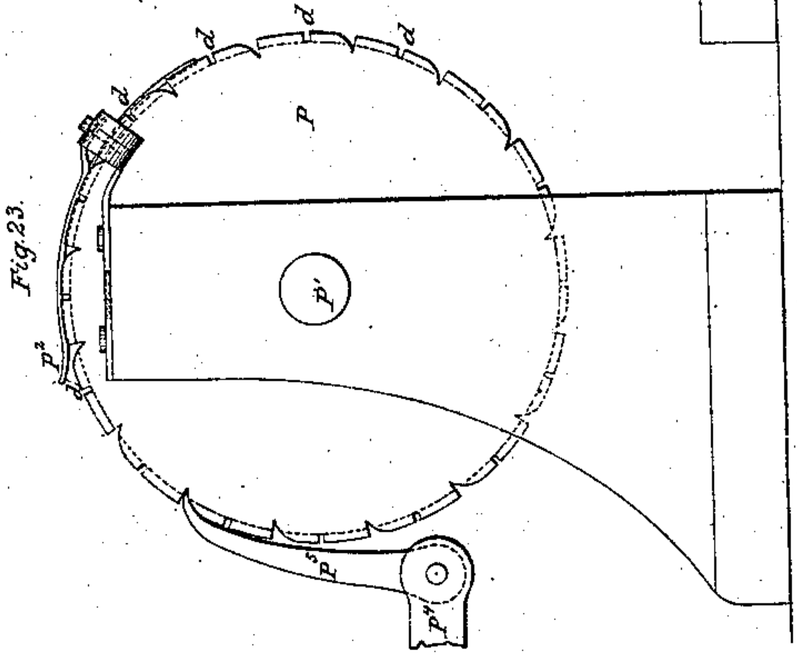


Fig. 23.



Witnesses.
John W. Shumway
A. J. Tibbits

Inventor:
C. O. Crosby
By his Attorney
John E. Earle

UNITED STATES PATENT OFFICE.

CHAUNCY O. CROSBY, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR MAKING NEEDLES.

Specification forming part of Letters Patent No. **104,278**, dated June 14, 1870.

To all whom it may concern:

Be it known that I, CHAUNCY O. CROSBY, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machine for Making Sewing-Needles; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top or plan view; Fig. 2, a sectional view, showing the arrangement of the carrier and dies; Figs. 3 and 4, the upper and lower die for compressing the point, enlarged; Fig. 5, the die for trimming the point; Figs. 6 and 7, the upper and lower die for grooving the head; Fig. 8, the die, and Fig. 9 the punch for forming the eye; Fig. 10, the trimming-die for the head; Figs. 11 and 12, the formation of the point; Figs. 13, 14, and 15, formation of the eye; Fig. 16, a top view, enlarged, of the transferring device from the first carrier to the second; Fig. 17, an end view of the transferring device; Fig. 18, a side view of the same; Fig. 19, a side view of the device for turning the needle preparatory to milling the head; Fig. 20, a side view of the mills; Figs. 21 and 22, the device for operating the mills around the head of the needle; Fig. 23, a front view, and Fig. 24 a side view, of the device for transferring the needles from the carrier to the grinding-plates; Fig. 25, a sectional view of the pointing apparatus; Fig. 26, a partial top view of Fig. 25; Fig. 27, a vertical, and Fig. 28 a longitudinal, section of the grinding-mills.

This invention relates to an improvement in automatic machinery for the manufacture of sewing-needles, the original patent for which was granted to me November 28, 1865. While, in many respects, this machine is identical with my original machine, for the better understanding of my improvements I have shown the whole machine complete, and so describe it, repeating, to a certain extent, the description in my former patent, commencing with the introduction of the wire, and following it through its different stages until discharged from the machine ready for the tempering process.

A is the bed-plate, supporting in bearings A^1 the driving-shaft B, the said shaft caused to revolve by the application of power thereto through a pulley, B^1, and provided with a fly-wheel, B^2, to equalize the power.

To operate upon the other parts of the machine, a second shaft, B^3, is arranged in bearings A^2, to which power is communicated from the principal shaft B through bevel-gears B^4, so as to impart to the said shaft B^3 a revolution corresponding to that of the main shaft. C is a clamp, arranged in a block, C^1, the said block arranged in guides C^2, so as to be moved longitudinally by the action of a cam, C^3, through a lever, C^4. Through this clamp the wire is passed, as denoted in broken lines, the clamp acting to grasp the wire and draw or feed it in the required length for a needle-blank at each revolution of the shaft B, and when so fed in it is cut off by a cutter, C^5, actuated by a cam, C^6, through a lever, C^7; but previous to being cut off it is inserted beneath one of the holding devices, 2, on the carrier D, the said carrier D being constructed as seen in Fig. 2, the holding device consisting of a spring bearing upon a die, *a*, fixed on the said carrier, the said holding devices being arranged around the periphery of the wheel equidistant, and so that the wire blanks, when placed in the said holding device, are clamped and firmly held.

To insert the wire blank into the holding device, it is advisable to raise the clamps or springs at the time of the insertion of the blank; and to thus raise the spring I take advantage of a subsequent necessity, and before each insertion the carrier D is raised by the action of a cam, D^1, through a lever, D^2, as seen in Fig. 2, and then immediately before the insertion the carrier is dropped; but while it is raised the spring 2, which is to receive the blank, passes onto an arm, D^4, which is of sufficient height that when the carrier drops the spring is held up and the holding device opened.

To the carrier D an intermittent rotary motion is imparted from the cam D^5 through levers D^6, operating a pawl, D^7, and, by preference, each of the said intermittent movements is made equal to the distance between each of the holding devices. Therefore, after the blank has been introduced into the holding

device on the carrier D, as before described, the said intermittent movement is given to the carrier, which causes the spring on the arm D^4 to fall off onto and secure the blank, and at the same time a second spring passes onto the arm D^4 to receive a second blank, and so on, a new blank being supplied to each of the holding devices on the carrier. I prefer to thus introduce the blanks by automatically feeding and cutting off the wire, as by so doing I am enabled to straighten the wire at the same time it is drawn into the machine; yet for some classes of needles it may be advisable to cut the blanks independent of the machine and supply them singly to each of the holding devices. If the carrier D be moved with any great velocity, the tendency is to move beyond the desired point, or, at best, to be irregular in its movement. To avoid this I arrange a band, a^1, around the said carrier, one end fixed to the bed at a^2, the other end, a^3, attached by a spring to the pawl D^7. Therefore, as the pawl is thrown forward to move the carrier, it tightens the said band and produces a friction on the carrier sufficient to prevent any over motion. To hold the carrier when it has been turned to the desired position, I arrange a dog, D^8, to drop into one of the notches on the carrier.

The blanks having been thus fed into the machine, one end projecting beyond the holding device a sufficient distance to be operated upon, are each in turn presented first to the die E, then to the die F, then to the die G, each of these dies being operated, respectively, by cams E^1, F^1, and G^1, through levers E^2, F^2, and G^2, the construction of the operative mechanism of the said dies being shown in Fig. 2, which consists of a vertical slide in connection with the said lever, the slide carrying the upper part, *f*, of the die, the lower part, f^1, of the die resting upon an anvil, F^3. The first of these dies forms the point, and they are constructed as seen in Figs. 3 and 4. They are of V shape, of the diameter of the wire at the outer end, and running to a point, as clearly seen in Figs. 3 and 4, which form the point, as seen in Fig. 11, the transverse section of which is square, and with a fin upon the two angles, as seen in the sectional view, Fig. 11.

To set the blank into the die the carrier is raised by the action of the cam D^1, as before described, before it commences its intermittent movement, and is held up until the movement is completed, so that the blank passes in over the die and is properly laid thereon. The first die having performed its duty, the blank is carried forward to the second or trimming die, which is constructed as seen in Fig. 5, representing the upper die or shear corresponding to the V shape of the first die. The lower die is of the shape of the slot in the upper die, so that the point rests thereon while the upper die passes down and trims or cuts off the fin, leaving it in the condition denoted in Fig. 12, when the blank is translated to the third die, G, which I make of the same form as the first die, and as shown in Figs. 3 and 4. The third die is used for the purpose of straightening the point. The blank is translated from die, to die by the intermittent movement of the carrier D, as before described. This preparation of the point, which leaves it square, as shown in the transverse section, Fig. 12, I find by practical operation to be the best for the subsequent process of grinding, and a better effect and more solid point is attained by swaging the metal into this square form.

The point having now been prepared for the subsequent process of grinding, the next operation upon the blank is to form the eye. To do this the blank needs to be reversed, so as to present the other end. For this purpose I arrange a second carrier, I, having a like intermittent movement imparted to it by a cam, I^1, acting through a lever, I^2, and pawl I^3, and provided in like manner with a frictional band, *i*, extending around the carrier and fixed to the pawl by a spring, i^1, the vertical movement being imparted to the carrier by the cam I^4 on the shaft B^3 through a lever corresponding to the lever D^5 in Fig. 2; and the said carrier is also provided with holding dies and springs 2′, in like manner as the carrier D, the two carriers arranged so that the holding-die in one, when at rest, lies in line with a corresponding holding-die in the other, between which the transferring apparatus is arranged, as seen in Figs. 16 and 17, the holding-die 2 in the said figures being the die on the first carrier, and the die 2′ the corresponding die on the other carrier, the transfer to be made from the die 2 to the die 2′. For this transfer a base, H, is fixed to the bed of the machine, carrying a slide, H^1, in guides H^2, the said slide being operated by a cam, H^3, through a lever, H^4, to move longitudinally across the said base, and this slide H^1 is provided with a pair of jaws, *h* and h^1, the jaw *h* being fitted to a transverse slide, h^2, arranged in guides on the slide H^1, so that by moving the slide h^2 the jaw *h* is moved back from the jaw h^1, and it is thus moved by a cam, h^3, through a lever, h^4, provided with a head, h^5, so as to bear against the said slide h^2 at any point within the length of the movement of the slide *h*.

When the blank is presented by the holding-die 2 the transferring device lies at that end of the guides H^2, and the carrier as it falls places the blank within the said jaws, which have been opened preparatory to its reception.

To relieve the blank from the pressure of the spring 2, and also to raise the spring 2′, I arrange a vertical slide, L, with arms *l* and l^1, operated by a cam, L^2, through a lever, L^3, as seen in Figs. 17 and 18, so that the raising of the said slide raises both springs and holds them up until the jaws, having closed upon the blank, carry the blank across into the holding-die in the opposite plate. Then the slide L drops and leaves the blank within the grasp of the holding-die beneath the spring

2′. Then, the jaws again opened, the carrier rises, taking the blank from the jaws and advancing the blank by each intermittent movement, new and previously-pointed blanks being presented for each succeeding holding-die.

To insure the equal length and proper position of each of the blanks, I arrange an adjuster, *n*, (see Fig. 16,) actuated by the lever H^4, so as to strike the end of the blank and force it into the holding-die, and so act upon each blank as they are successively presented, thus arranging the blanks projecting uniformly from the carrier I. At the time of this adjustment the spring is relieved by passing over an arm, *n′*, resting thereon until carried off by the movement of the carrier. The movement of the carrier advances the needle until it is presented to the several presses K K^1 K^2 K^3, actuated respectively by cams K^5 K^6 K^7 K^8 through levers K^9 K^{10} K^{11} K^{12}, each constructed in like manner as the presses E F G, and standing in proper relative position to the carrier, as shown in Fig. 2. The first of these presses, K, is provided with dies above and below, constructed as seen in Figs. 6 and 7, so as to form the groove and partially form the eye, squeezing the surplus metal into a fin around the eye, as seen in Fig. 13; and in order to prevent this squeezing process from forcing the blank forward or straining upon the grooving-punch, the blank is of sufficient length to extend to an open offset, *z*, in the die 6, so that a portion of the wire is not compressed, but left projecting beyond the head, as seen in Fig. 13. The second press, K^1, is constructed to punch the eye, and is provided below with a die (shown in Fig. 8) and above with a punch. (Shown in Fig. 9.) The blank transferred to the said second press is set into the die, (seen in Fig. 8,) and the punch brought down pierces the partially-formed eye, leaving the blank as seen in Fig. 14. The blank is then carried to the third press, K^2, which is provided with dies similar to the dies 6 and 7, each provided with a conically-shaped punch, corresponding to the form of the eye, but rounded so as to smooth and countersink the eye, the general appearance of the needle not being changed from that of Fig. 14. The blank is then carried to the last press, K^3, which is the trimming-die, and is seen in Fig. 10. This consists of a shear for the two edges and rounded head of the blank, the needle being supported by a correspondingly-shaped rest on the anvil, so that the said die passes down, trims off, and shapes the head of the blank, as seen in Fig. 15.

The trimming of the fin naturally leaves more or less roughness around the edge of the head, and this is removed by the revolving mills; but, for convenience in presenting the heads to the mills, the blanks are turned one-fourth over, so as to bring the trimmed surface upon the upper and lower edge, and it is thus turned by a rotating mandrel, N, arranged in suitable bearings N^1. (Shown detached in Fig. 19.)

The mandrel is provided with a fixed jaw, *m*, and a movable jaw, *m′*, and around the jaw end of the mandrel a collar, N^2, is placed, to which a longitudinal movement is given by a forked slide, N^3, operated through a lever, N^4, by a cam, N^5, so that as the ring N^2 is moved in one direction it will close the jaws, and in the other open them.

The jaws are open to receive the needle, and so soon as placed within the grasp of the jaws they close firmly upon the needle, and a quarter-revolution is imparted to the mandrel from a cam, N^6, through the lever N^7 and rack and pinion N^8, turning the needle one-fourth over, thus turning the trimmed edge up and down.

To free the needle from the pressure of the springs on the carrier, the spring, during the process of turning, is raised and held by the action of a cam, N^9, through a lever, N^{10}. Having been thus set, the needle is presented successively to the mills M, arranged respectively in holders M^1 M^2 M^3 M^4, (shown detached in Fig. 20,) so that two of the mills grind upon the lower edge and two upon or around the end, the first mill acting upon the upper side and the second upon the lower.

The mills are caused to revolve rapidly by belts arranged below the bed of the machine, or in other convenient manner; and a movement is given to the mills radially to and from the center of the carrier I by means of cams M^5 M^6 M^7 M^8, acting upon their respective holders, so that the mills are advanced, grinding off the roughness which is left after trimming.

In order to cause the whole surface of the mill to be used, I arrange an inclined slide, *f*, actuated by cams f^1, which are advanced as the mill advances, forcing itself between the mill-holder and the wall of the slot in one of the standards which support said mill-holder, and consequently gives a transverse movement to the mills, causing them to work over an extended surface instead of in a constant line. This transverse movement may be given, as seen on the last two mills, by an incline, f^2, fixed in the mill-holder.

As a support for the needle while being thus operated upon by the two first mills, I arrange upon the first a fixed arm, *r*, so that the needle will rest thereon while the mill is operating upon the upper surface.

For the second mill, which is to operate upon the under surface, I arrange an arm, r^1, upon a lever, r^2, actuated by a cam, r^3, which, when the needle is presented, presses down, so as to hold the needle on the mill.

To mill off or around the head of the needle, it is necessary to give to the mill a vertical swinging movement, the first down around the head and the second up, and the mills M^3 M^4 are thus arranged, the first by a cam, f^3, (see Fig. 21,) fixed to the frame which supports the mill-holder, as seen in said Fig. 21, so that as the mill advances it is raised to pass up around the head, taking the upper part of the needle.

The next mill, to take the lower part of the