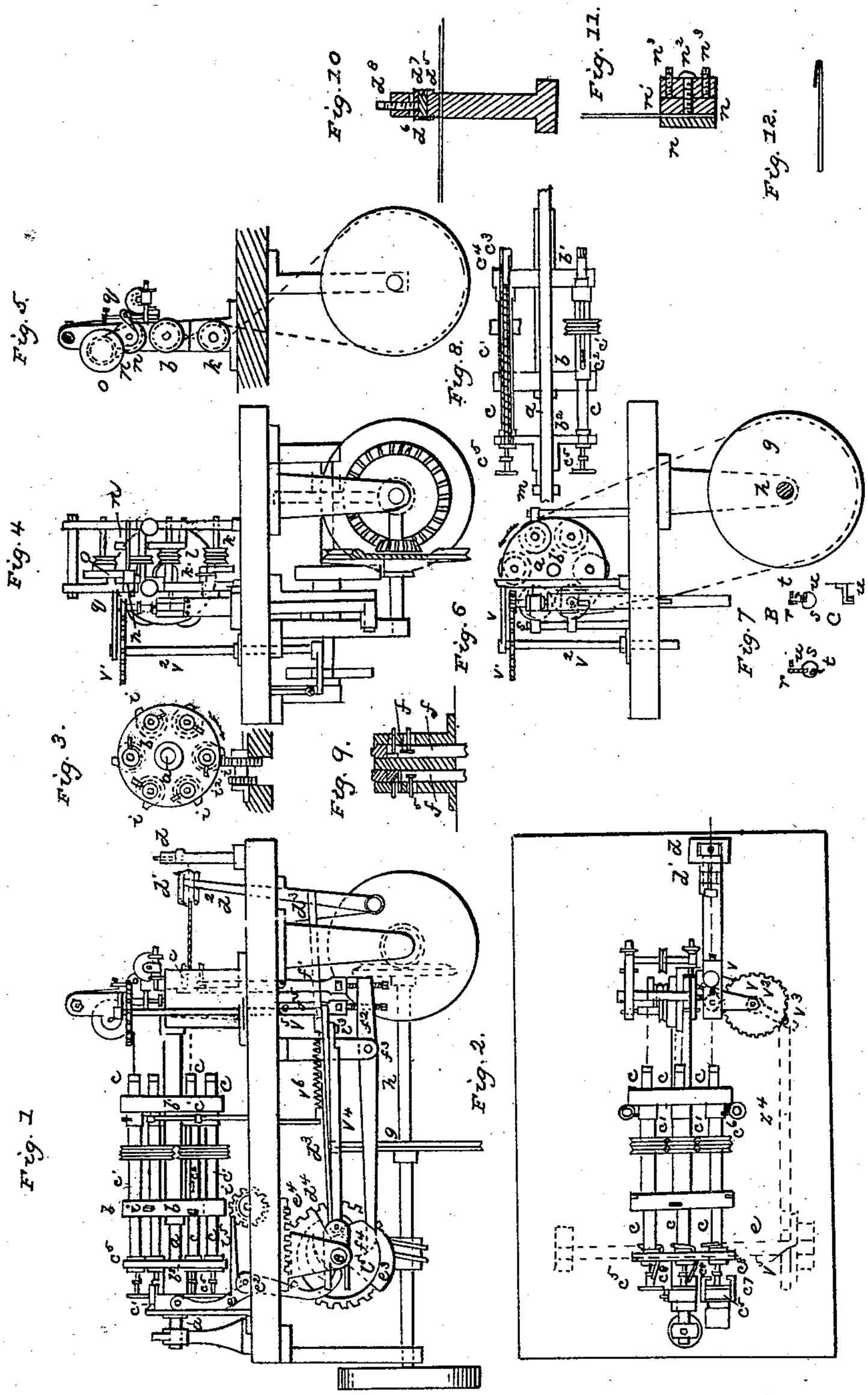
F. PLANT.

Needle Machine.

No. 28,772. Patented June 19, 1860.



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FREDERIC PLANT, OF NEW YORK, N. Y.

MACHINE FOR MAKING NEEDLES.

Specification forming part of Letters Patent No. 28,772, dated June 19, 1860; Reissued October 15, 1867, No. 2,779.

To all whom it may concern:

Be it known that I, FREDERIC PLANT, of the city, county, and State of New York, have invented a new and useful Improvement in Machinery for the Manufacture of Barbed and other Needles for Knitting and Sewing; and I do hereby declare and ascertain said invention and the manner of constructing and using the same, referring to the accompanying drawing, in which I have given the same letters of reference to the different parts of the machine in all the figures.

Figure 1 is a side elevation of the machine, Fig. 2, is a plan. Fig. 3, is a cross section of the needle holding tubes and their connecting disk *b* which governs their position when in operation. Fig. 4, is an end view of the grinding apparatus. Fig. 5, is a side elevation of the parts in Fig. 4. Fig. 6, is view of the bending apparatus; Fig. 7, details of the bending apparatus; Fig. 8, section showing the details of the needle holding tubes and their appendages. Fig. 9, is the cutting off apparatus and grooving die, sectional figure.

The purposes of my improved machinery are to form a needle complete from a wire; grinding, polishing, flattening and bending the same without removing it, or handling it until it is finished.

In the drawing I have shown the machinery necessary to form a barbed needle such as is used in knitting machinery, and in some kinds of sewing machines; to make other styles some modification is necessary, and it is obvious that in many parts of the machine other obvious and well known mechanical devices, may be substituted for the specific ones described without changing the character of my improvements.

The construction is as follows: In a suitable frame work, which needs no particular description or form, I sustain a permanent horizontal shaft *a*, on which there is a collar or tube put, to which two disks *b b′* are permanently affixed; a third disk b^2 is also placed upon said shaft *a* in rear of the others and revolves on it in unison with them, and also slides lengthwise upon it, as will hereafter be explained. The disks above named have a series of six, more or less, holes through them at equal distances apart, and from the center, so as all to revolve in precisely the same circle; the number of these holes should be determined by the number of distinct operations to be performed upon each needle, and they form the bearings of a series of parallel tubes *c* of the following construction. Each tube *c* is hollow from end to end, and passes through a hole in each of the disks. Between the disks *b b′*, this tube *c* is surrounded by an exterior tube *c′* as most clearly indicated in Fig. 8. This exterior tube *c′* is furnished with a pulley upon it, by which it is rotated; in this exterior tube there is a slot c^2, into which the pin on the tube *c* projects, so as to be driven by it, while said tube *c* is free to move endwise, collars on the rear end of the tube *c* so confine it to disk b^2 that it must move endwise with the said disk as it slides on the permanent shaft *a;* the front end of each of the tubes *c* is contracted on the interior, as clearly indicated in the section Fig. 8 by a trumpet mouth piece, so as to have a hole just large enough to admit the wire freely; in one side of this piece there is a recess, into which is fitted a piece of metal c^3 that on its inner surface conforms to the outline of the trumpet shaped piece, but at its rear end is wedge shaped exteriorly. A wedge c^4 fits over this and when forced forward drives it inward and causes it to grip the wire after it is fed, as hereinafter explained; the wedge c^4 is connected by a stem passing through the needle holding tube *c* to a button c^5 at the rear end thereof; a spring forces forward the wedge and it is drawn back by the button c^5 as hereinafter described.

The first operation to be performed is to feed the wire into the machine. This is done by passing it through stationary holders, of any convenient construction at *d*, thence it passes through the feed apparatus *d′* consisting of a grip that slides forward and back at proper intervals a sufficient distance to feed in the wire for one needle. When this grip is forced forward it holds the wire and carries it into the machine; in returning it slides over the wire which is then held by the stationary holder *d*; the feed is made by means of a lever d^2, that has its fulcrum at its lower end, its upper end being jointed to the feed grip *d′;* just above the fulcrum there is a connecting rod d^3 that connects it with an eccentric d^4 on the cam shaft *e*, by the revolution of which it receives its motion.

The next operation in the progress of the manufacture is to cut off the wire the right

length and stamp the groove or recess therein, which operations may be performed at the same time; the cut off is affected by a movable shear, f, operating against a stationary one, clearly illustrated in the sectional drawing, Fig. 9. This shear is on the upper end of a piston or rod, f', which is forced upward by a lever f^2. The fulcrum of which is at f^3 (see Fig. 1) and it is actuated by a cam f^4 on cam shaft e so as to cut off the wire at the proper time. The grooving die f^5 and its rods are connected with the same lever f^2, and are at the same time actuated by it. Simultaneously with this operation the rotating needles tubes c are made to advance and one of them having its center exactly opposite the projecting end of the wire slips over it. At this time this particular tube is held so as not to revolve by catch c^6 affixed to the frame against which a projecting pin on the tube c' is brought into contact. At this time the wedge c^4 is drawn back as hereafter explained and held by a trigger or catch c^8 affixed to the disk b^2 so as to allow the wire a free entrance; when the tube c has passed onto the wire sufficiently far the tail of the trigger strikes the disk b and trips it, allowing the wedge to be driven forward by the spring that surrounds its stem, and thus secure the wire firmly in the jaws of the tube.

The advancing of the tubes is effected by a lever e' that is connected by a fork and collar with the rotating disk b^2; the fulcrum of this lever is at e^2 and its lower end is brought into contact with a cam e^3 on shaft e. The tubes are drawn back by a spring c^4 affixed to said lever, or otherwise placed. When the tube c has received the piece of wire cut to the proper length, and has receded, the disks turn so as to bring the next succeeding tube to the point for receiving a wire as just described. This process of turning is made as follows: all the tubes are rotated by a single band running in the direction of the arrow in Fig. 6, which passes over a pulley g on the driving shaft h; the tendency of this band is to continuously revolve the disks, if not checked by some interposing device; on the exterior circumference of the disk b are projections i' (see Figs. 6 and 1). These come into contact with projections or cogs on a small wheel i' placed just below it and at right angles thereto. This wheel i' is on a short shaft on which is a second cog, or ratchet-wheel i^2; this latter wheel is actuated by a catch or pawl i^5 connected with the lever e'; thus when the projections i' are in contact with a cog on wheel i' the disks are at rest but when the cog passes the said projection the disks revolve until the next one strikes a cog. The cut wire having passed on to the second position, and its tube free from the catch c^6, it commences to revolve, and as the tubes c, c, c, again advance the end of the wire comes into contact with the first grinding operation. This grinding or pointing of the wire is effected by the face of a steel revolving cutter disk or emery wheel k (see Figs. 4 and 5); the needle is pressed against the surface of said wheel k, by a block or gage k', which is adjusted into exact position by set screws, so as to properly bring the wire into contact with the grinding surface. The tubes then again retreat, and the disks b and c revolve one more step, bringing a new piece of wire to the grinder k, and carrying that just acted upon up to a second grinding surface l similar in all essentials to k, but finer, where the point is made more perfect and the needle is properly reduced. At the next step in the circuit the needle is stopped in its revolution by a catch, similar to that described in c^6 (this is seen at m, see Fig. 6,) the partly finished needle is then thrust forward with out revolving and is ground flat at n' on the same side as the groove formed by the first operation. At the next step it is smoothed and polished by a polishing wheel o while revolving; this wheel o acts at its periphery on the needle, against which the needle is borne by a spring rest p; the spring upon which is adjusted by the set screw at q. The needle is now shaped and ready for bending into form which is done by the next step in the circuit.

The grinding apparatus is all put in motion by a band running from pulley K^2 which is driven by bevel gear from the main driving shaft; when the smooth incomplete needle arrives opposite to the bending apparatus its point is thrust forward through a stationary guide at the point r (see the detached parts in Fig. 7,) in which A shows the bending apparatus open ready to receive the straight unbent needle and B, the same parts closed at the time the needle barb is bent into form and the needle finished, except the last polish ordinarily given to such articles by "tumbling" the point of the needle after passing the guide at r passes along beside the straight die of which the guide forms a part and projects beyond this stationary guide just far enough for the bend, at this point in a perpendicular line is fixed a vertical shaft E, two sides of which have been cut away down to the center so as to be present when the point of the needle is inserted as in the position A a straight surface continuous with the straight stationary part r and on a line therewith there is an arm t affixed to the shaft against which the point of the needles come. Affixed to the stationary die or surface r there is a thin steel piece u, (see C Fig. 7) between which and the stationary die r the needle

passes and around which the barb is bent by revolving the shaft s a half turn more or less into the position shown at B, Fig. 7. This movement bends the barb short around the steel piece u and the arm t crimps the necessary bend in the end of the barb for entering the groove of the needle in advancing the tubes, the one which presents the needles for this last operation the button C^5 is brought within the influence of a stationary piece c^7 on the frame work, (see Figs. 1 and 2) by which when the tubes are advanced the button c^5 is caught and the grip upon the shank of the needle released by drawing back the wedge c^4 as hereinbefore fully explained when the tubes are receded and the revolving shaft s is rotated back to its first position as at A, Fig. 7, the needle is free to drop from the machine.

To turn the shaft s as before described I put upon it a pinion v clearly shown in Figs. 2, 4 and 6. Into this pinion v a spur wheel v' gears this latter being affixed on a shaft v^2 that extends down to a level with the cam shaft at which point it has an arm extending out radially at v^3 a sliding bar v^4 is connected at its front end with the arm v^3 and at the rear end it comes in contact with a cam v^5, by which it is thrust forward, into the position shown in Fig. 7, A. The spring v^6 turns it back to close it, and bend the barb as at B. The cam shaft e is revolved by a worm w on the driving shafts working into a wheel x on said cam shaft e, into the position shown in Fig. 7, A the spring v^6 turns it back to close it, and bend the barb as at B. The cam shaft e is revolved by a worm w on the driving shaft working into a wheel x, on said cam shaft e.

It is obvious that many mechanical changes, may be made in parts of this such as substituting rotating machine and cutters for the cutter f, and die f^5. In making needles that are not barbed the bending apparatus is omitted, bearing in whole, or in part, may be substituted for the bands, and the tubes to be stopped may be thrown out of gear by the usual mechanical devices.

Having thus fully described my invention what I claim therein as new and for which I desire to secure Letters Patent,

1. The combination of the feeding and groove stamping apparatus with the needle holding tubes, substantially as and for the purposes specified.

2. I also claim the revolving needle tubes for holding the wire and releasing the same as herein described.

3. I also claim the combination of a series of grinding apparatus with their adjustable blocks for pointing the needles and polishing the same with a series of needle tubes or holders as above specified.

4. I also claim the apparatus for bending the barbs of the needle as herein set forth.

5. I also claim the combination of a series of needle holders, feed apparatus, grinding and bending apparatus by which a perfect needle can be formed without manipulation in a single machine.

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