(No Model.)

3 Sheets—Sheet 1.

P. M. BEERS.

MACHINE FOR POINTING NEEDLES.

No. 575,870. Patented Jan. 26, 1897.

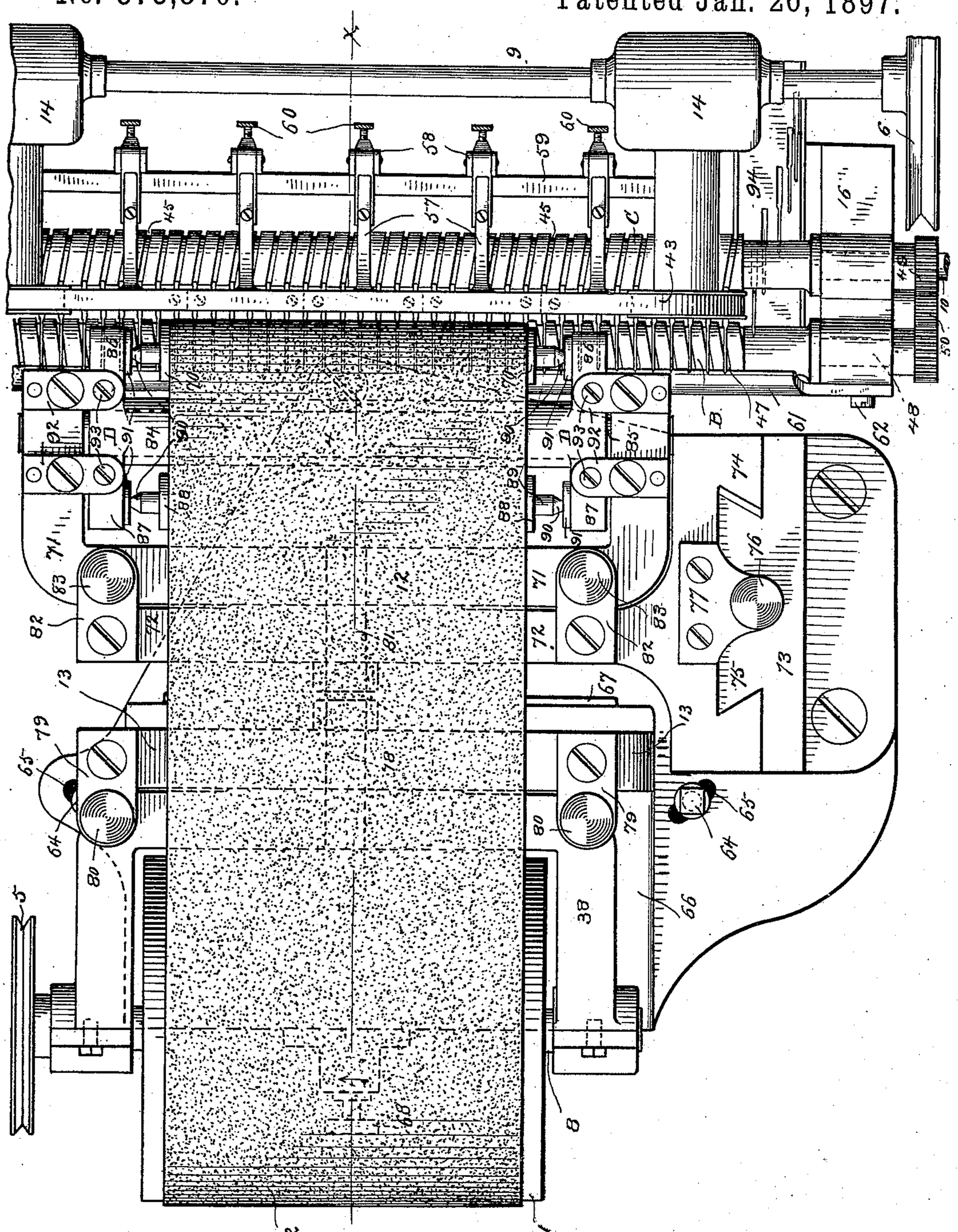

Fig. 1.

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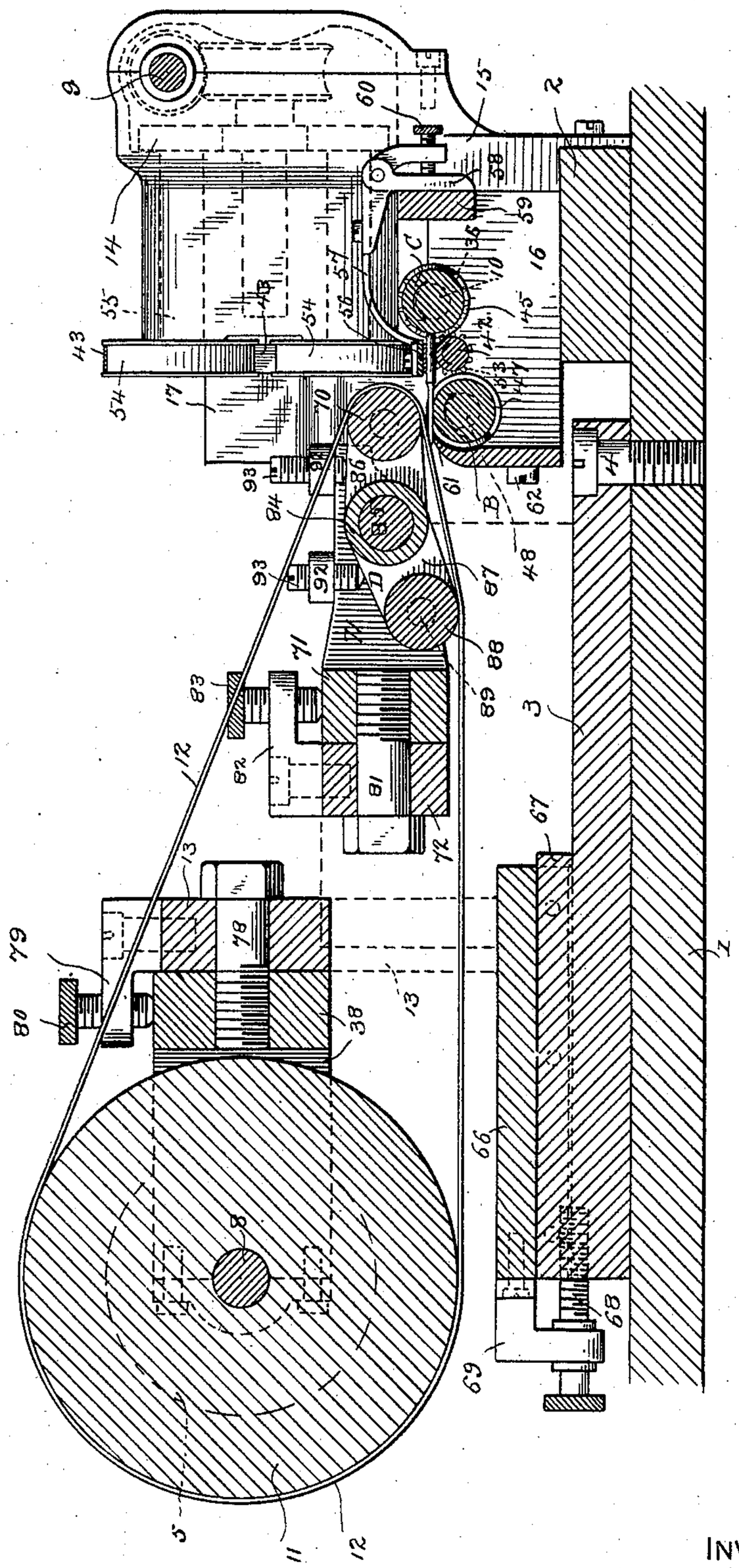
Fig. 2.



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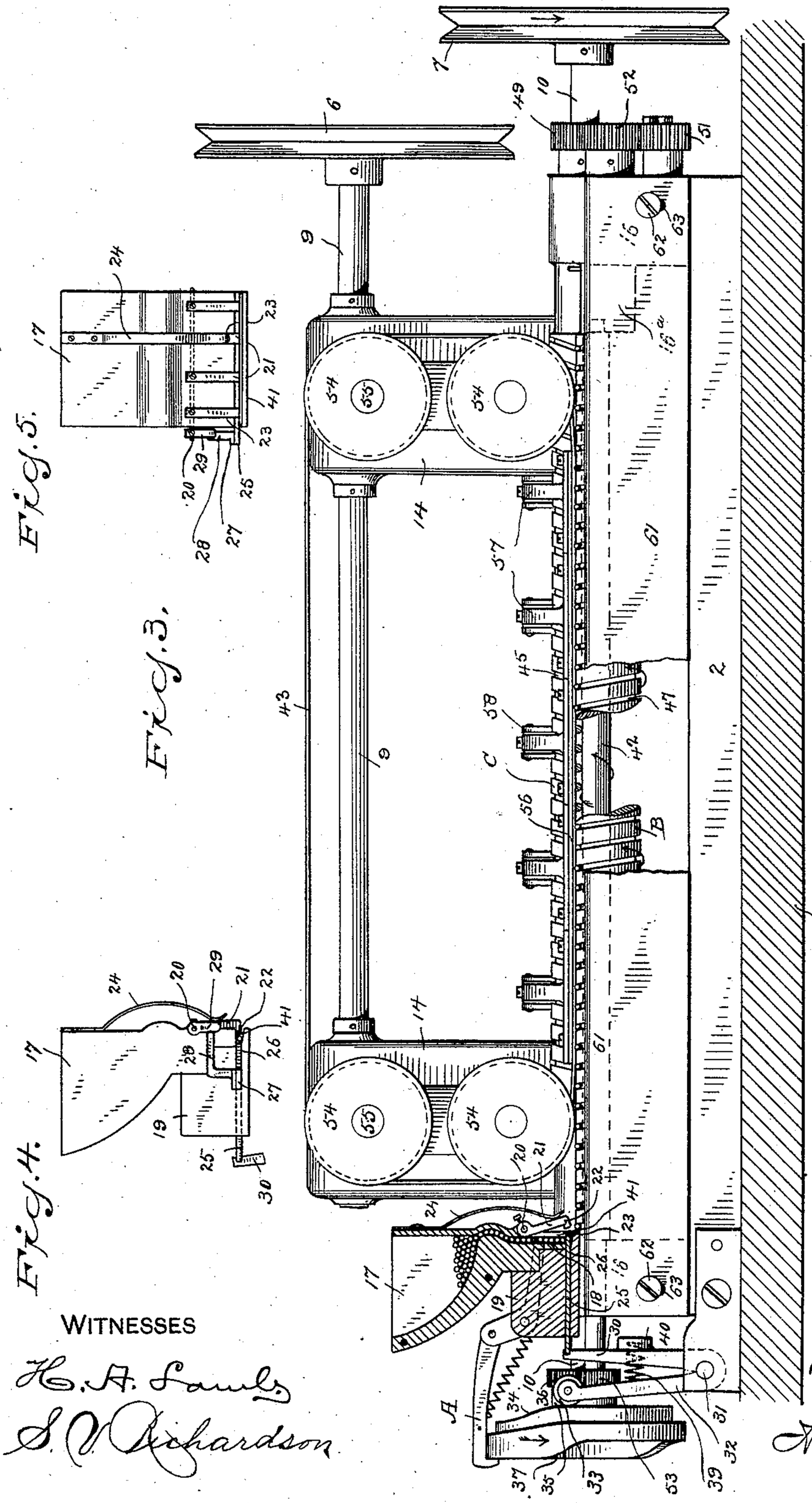

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UNITED STATES PATENT OFFICE.

PHILO M. BEERS, OF BRIDGEPORT, CONNECTICUT.

MACHINE FOR POINTING NEEDLES.

SPECIFICATION forming part of Letters Patent No. 575,870, dated January 26, 1897.

Application filed December 21, 1895. Serial No. 572,880. (No model.)

To all whom it may concern:

Be it known that I, PHILO M. BEERS, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Machines for Pointing Needles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to machines for pointing needles, and has for its objects to simplify the construction of the machine, to greatly increase the production, and to generally improve the mode of operation.

With these ends in view I have devised the novel improvements in needle-pointing machines which I will now proceed to describe and then specifically point out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of my improved needle-pointing machine with the exception of the feeding mechanism, which is clearly shown at the right in Fig. 3; Fig. 2, a section on the line *x x* in Fig. 1, the relative position of the upright portions of the brackets which carry the grinding mechanism being indicated by dotted lines, as these portions themselves do not appear in the view; Fig. 3, an elevation as seen from the left in Fig. 1 with all the grinding mechanism removed, the bed appearing in transverse section and the needle-hopper in section; and Figs. 4 and 5 are respectively end and side views of the hopper detached.

For convenience in description I will divide the operative parts of the machine into three divisions, which I shall refer to as the "feeding" mechanism, the "carrying" mechanism, and the "grinding" mechanism.

1 denotes the bed of the machine, 2 a block rigidly fixed to the bed by which the feeding and carrying mechanisms are supported, and 3 a plate pivoted to the bed, as at 4, by which the grinding mechanism is carried, as will be more fully explained.

Power is applied to drive the machine by means of belts (not shown) passing over pulleys 5, 6, and 7, which are respectively fixed to shafts 8, 9, and 10. Shaft 8 carries a drum 11, which in turn carries one end of the grinding-belt 12. Shaft 8 is journaled in a yoke 38, carried by a bracket 13 upon plate 3. The entire structure of this bracket is not shown in the drawings, its complete illustration not being deemed necessary, as it appears in plan in Fig. 1 and in section in Fig. 2, the relative position of the upright portion of the bracket being indicated by dotted lines in Fig. 2, and, moreover, the bracket itself may be of any ordinary or preferred construction. Shaft 9 extends across the machine and is journaled in housings 14, carried by brackets 15, extending upward from block 2. Shaft 10 is journaled in brackets 16, one being clearly shown in Fig. 2, which likewise extend upward from block 2.

The feeding mechanism.—This mechanism will be found clearly illustrated in Figs. 3, 4, and 5, Fig. 3 showing the cut-off slide at its extreme forward position and Fig. 4 showing said slide at its retracted position.

17 denotes the hopper which receives the needle-blanks and which is provided with a passage 18, down which the blanks pass singly. The hopper is shown as supported by a block 19, which in turn rests upon one of the brackets 16.

20 denotes a rock-shaft which is journaled in the hopper and carries a series of fingers 21, in the present instance four, all or part of which may be provided at their lower ends with inwardly-turned ends 22. These fingers lie in slots 23, which extend into passage 18 in the hopper. (See Fig. 4.)

24 denotes a spring which bears against one of the fingers, and as they are all rigidly attached to the rock-shaft acts to hold the series of fingers at their normal position, which corresponds with the retracted position of cut-off slide 25, that is, as in Fig. 4. This cut-off slide lies in a slot 26, which passes through block 19 and through the lower portion of the hopper, intersecting with passage 18, as is clearly shown in Fig. 3. A portion of slot 26 is closed at the sides, but the forward end thereof is open at one side, as clearly shown in Fig. 4. A lug 27 extends outward from one side of the cut-off slide and through the open forward end of slot 26, as clearly shown in Fig. 4. 28 denotes an arm extending upward

and forward from this lug which engages an arm 29, which is rigidly secured to the rock-shaft.

The forward movements of the cut-off slide are produced as follows: 30 denotes an arm which bears against the rear end of the cut-off slide and is pivoted on a stud 31, and 32 denotes an arm facing arm 30 and pivoted on the same stud. Arm 32 carries at its front end a roller 33, which bears upon a face-cam 34, carried by shaft 10. This cam is provided with a hub 35, by means of which it is secured to the shaft, said hub also carrying a pinion 36, the function of which will presently be explained, and a cam 37, which actuates mechanism for agitating the needle-blanks in the hopper. This agitating mechanism as a whole I designate by A, but will not describe in detail, as it forms no portion of my present invention.

39 denotes a spring lying between arms 30 and 32, the action of which is to hold arm 30 in contact with the cut-off slide and to hold the roller on arm 32 in contact with face-cam 34 and also by yielding to prevent breakage of any of the parts should the needle-blanks become clogged, as will be again referred to.

40 denotes a socket on arm 30, in which one end of the spring is seated and by which it is held in place.

The operation of the feeding mechanism will be clearly understood from Figs. 3 and 4. When the cut-off slide is in the retracted position, as in Fig. 4, just one needle-blank will drop down from passage 18 in front of said slide, the needle-blank being received between the forward end of the cut-off slide and fingers 21. When the forward movement of the cut-off slide takes place, the passage of the blanks is cut off and the rock-shaft is oscillated through the engagement of arm 28, which extends from the cut-off slide with arm 29, which extends from the rock-shaft. It will be noted that the point of engagement of arm 28 with arm 29 is near the center of oscillation of the latter arm, which is the rock-shaft, so that through the oscillation of the rock-shaft fingers 21 are caused to move faster than the cut-off slide itself moves, thus permitting the expelled needle-blank to pass freely down a ledge 41, which is formed upon block 19, and drop into the grooves in the feed-screws, as will presently be more fully explained. The instant roller 33 rides down the incline of face-cam 34, said roller being held in contact with the cam by spring 39, spring 24, by its engagement with one of the fingers, will oscillate the rock-shaft backward, and arm 29 on the rock-shaft, through its engagement with arm 28, which extends from the cut-off slide, will force the cut-off slide backward from the position shown in Fig. 3 to the position shown in Fig. 4. The instant the cut-off slide has reached the retracted position, as in Fig. 4, another needle-blank will drop down from passage 18 between the forward end of the cut-off slide and the fingers. An instant later another forward movement of the cut-off slide and fingers takes place and another needle-blank is carried forward into position to drop into the grooves in the feed-screws, each forward movement cutting off the passage of blanks from the hopper. Spring 39, in addition to its functions of holding arm 32 in engagement with cam 34 and arm 30 in engagement with the rear end of the cut-off slide, also serves as a cushion to prevent breakage to any part of the machine should there be resistance to the forward movement of the cut-off slide, as, for example, clogging of the needle-blanks at the lower end of passage 18 or between the cut-off slide and the fingers.

The carrying mechanism.—This mechanism comprises the front and back feed-screws, which are designated, respectively, as B and C and which carry the needles forward in substantially a horizontal position, a friction-roller, designated by 42, and a belt, designated by 43, which I term the "rolling-belt," for the reason that it rolls the needle-blanks as they are carried forward by the feed-screws and while they are being acted upon by the grinding-belt, the operation of which will presently be fully explained. The back feed-screw, which I have indicated by C, consists of a spiral peripheral groove 45 in shaft 10, (this portion of said shaft being of greater diameter than the portion which carries pulley 7,) in which the butts of the needle-blanks rest, as is clearly shown in the drawings. The front feed-screw, which I have indicated by B, consists of a spiral peripheral groove 47 in a shaft 48, which is journaled in brackets 16, one of said brackets appearing clearly in Fig. 2. Friction-roller 42 lies between the front and back feed-screws, as is clearly shown in Figs. 2 and 3. One end of this roller, the left as seen in Fig. 3, is journaled in the left bracket 16, and the other end in an extension 16[a]. (See dotted lines in Fig. 3.) It will be noticed that this end of the friction-roller corresponds with the ends of the grooves of the feed-screws, so that as soon as the sharpened blanks pass out from the grooves they will drop into a chute 94, presently to be described, (see Fig. 1,) and pass out of the machine.

In use the shanks of the needle-blanks rest upon the friction-roller, which retains the butts in the groove of the back feed-screw and prevents them from being dragged forward by the grinding-belt, as will be again referred to. Shaft 48 and feed-screw B receive motion from shaft 10, which is transmitted by means of a pinion 49 on shaft 10, which meshes with an idler-pinion 50, (see Fig. 1,) which in turn meshes with another idler-pinion 51, (see Fig. 3,) which in turn meshes with a pinion 52 on shaft 48, the direction of rotation of feed-screw C being from back to front, as seen in Fig. 3, the direction of rotation of feed-screw B being from front to back, as seen in Fig. 3, and the direction of rotation of friction-roller 42 being likewise from front to back, as seen in Fig. 3. Fric-

tion-roller 42 receives motion from shaft 10 by means of a pinion 53 on said roller, which meshes with pinion 36 upon hub 35, carried by shaft 10. The rolling-belt is carried by four rollers 54, themselves carried by four shafts 55, an upper and a lower shaft 55 being journaled in each of the housings 14. These shafts and rollers receive movement from shaft 9 by means of worm-gearing within the housings. This gearing is indicated by dotted lines in Fig. 2, but is not illustrated or described in detail for the reason that specifically it forms no portion of my present invention. Any required pressure of the carrying-belt upon the needle-blanks is maintained by means of a pressure-plate 56, carried by arms 57, which are journaled in brackets 58 upon a cross-piece 59, each end of which is secured to the brackets 15 and 16 on each side of the machine. A set-screw 60 in each of the arms bears upon the corresponding bracket. The pressure of plate 56 upon the belt is regulated by turning these set-screws in or out, as may be required.

61 denotes a rest for the points of the needle-blanks while they are being ground. (See Fig. 2.) This rest is a cross-piece extending the entire width of the machine, the opposite ends thereof being adjustably secured to the brackets 16 by means of screws 62, passing through slots 63 in the rest.

The operation of the carrying mechanism will be readily understood from the drawings. Each needle-blank as it passes from ledge 41 drops into the grooves in the feed-screws, the butts of the blanks resting in the groove in feed-screw C at approximately its mid-height and the reduced portion of the blanks resting in the groove in feed-screw B at the top of the screw, as is clearly shown in Fig. 1. It will be obvious that as the feed-screw C rotates from back to front, as seen in Fig. 3—that is, from right to left, as seen in Fig. 1—and feed-screw B rotates from front to back, as seen in Fig. 3, and from left to right, as seen in Fig. 1, the needle-blanks will be carried along in a horizontal position by the action of these screws, and, furthermore, that as they are carried along by the screws axial rotation will be imparted to each blank by the rolling-belt, which is caused by pressure-plate 56 to rest upon the blanks with just sufficient pressure to roll them freely. The friction-roller rotates in the same direction as feed-screw B, the action of this roller being to retain the butts of the needle-blanks in the spiral groove of the feed-screw C and prevent their being dragged forward by the grinding-belt.

The grinding mechanism.—This mechanism is carried by plate 3, which is pivoted to the bed, as at 4, and is locked in position after lateral adjustment by means of bolts 64, which pass through slots 65 and engage the bed. As already stated, one end of the grinding-belt is carried by drum 11, whose shaft is journaled in yoke 38, carried by bracket 13, extending upward from plate 3. This bracket may be adjusted longitudinally of the machine, if required, for any purpose, as, for example, to tighten the belt. This adjustment is effected as follows: Bracket 13 extends upward from a base 66, which is provided with undercut ways which permit the base and bracket to slide on a block 67 on plate 3. The base, bracket, and parts carried thereby may be adjusted and locked in position after adjustment in any suitable manner, as by means of a screw 68, passing through a bracket 69, secured to the base and engaging plate 3. The operative end of the grinding-belt passes over a roller 70, which is journaled in a frame D, itself pivoted in a yoke 71, carried by a bracket 72, which is itself vertically adjustable on a standard 73. Bracket 72 is provided with a base 74, lying in the vertical plane. This base is provided with undercut ways which engage a block 75 on standard 73, thus permitting the base, brackets, and parts carried thereby to move vertically on the standard. The base, bracket, &c., are adjusted and are locked in position after adjustment by means of a screw 76, passing through a bracket 77, secured to the base and engaging standard 73.

It should be noted that there are six independent adjustments affecting the position of the grinding-belt. The first of these adjustments is a lateral adjustment effected by oscillating plate 3 on its pivot, said plate, as already stated, carrying the entire grinding mechanism. The second adjustment is a longitudinal adjustment of bracket 13 and its base 66 for the purpose of tightening the grinding-belt. The third adjustment is a vertical adjustment of the forward end of the grinding-belt, which is effected by moving bracket 72 and its base 74 vertically on standard 73. The effect of this adjustment is to determine the amount of pressure of the grinding-belt upon the needle-blanks as they are carried along by the feed-screws. The fourth and fifth adjustments, which I will now describe, are for tilting, respectively, the rear and operative ends of the grinding-belt, so as to cause the last portion of the grinding operation to be just as effective as the first portion, or more so, if required. It will of course be understood that before the grinding operation the ends of the needle-blanks are blunt and that as the grinding operation proceeds the ends are gradually reduced to a point. By tilting the belt more or less in the direction of the width, so that the edge of the belt which operates last upon any special blank will be slightly lower than the edge which operates first upon said blank as it is carried along by the feed-screws, it will readily be seen that I can produce the same relative amount of grinding action at the last portion of the operation as at the first, or may produce either more or less grinding action at the last portion of the operation. The rear end of the grinding-belt, as already

stated, is carried by a yoke 38, which is pivoted to bracket 13, as at 78, so as to tilt in a transverse vertical plane.

79 denotes brackets at the opposite ends of the bracket 13, which carry set-screws 80, adapted to bear upon the opposite sides of yoke 38, whereby any required tilt may be given to the yoke and the drum which carries the rear end of the grinding-belt.

It will of course be obvious that both ends of the belt should be similarly adjusted to prevent twisting of the belt. For this reason yoke 71, which carries the frame, which in turn carries roller 70, over which the operative end of the grinding-belt passes, is pivoted to bracket 72, as at 81.

82 denotes brackets at the opposite ends of bracket 72, which carry set-screws 83, adapted to bear upon the opposite sides of yoke 71, whereby any required tilt may be given to yoke 71 and the frame to cause it to lie in the same plane with yoke 38 and prevent twisting of the grinding-belt.

The sixth adjustment of the grinding-belt determines the angle at which the grinding-belt acts upon the points of the needle-blanks, and therefore determines the relative sharpness or bluntness of the points. This adjustment is effected in the manner which I will now describe. As already stated, roller 70, which carries the operative end of the grinding-belt, is journaled in a frame D, itself pivoted in yoke 71. This frame consists of a sleeve 84, which is journaled on a cross-rod 85 in the yoke. Roller 70 is journaled in arms 86, which extend from this sleeve. 87 denotes other arms which extend from sleeve 84 at a more or less oblique angle to arms 86, and 88 denotes a roller journaled in these arms and adapted to bear upon the inner side of the grinding-belt. The hubs 89 of rollers 70 and 88 are shown as provided with cone-bearings 90, which engage hardened blocks 91 in arms 86 and 87. The frame is adjusted and locked in position after adjustment by means of set-screws 93 in brackets 92, which are rigidly secured to the opposite sides of the yoke, as clearly shown in Fig. 1. The operation of this adjustment will be readily understood from Fig. 1 in connection with Fig. 2. Should it be required to grind relatively blunt points upon the needle-blanks, the set-screws 93 at the right in Figs. 1 and 2 would be turned outward and the set-screws at the left in Figs. 1 and 2 would be turned inward, and should it be required to grind longer and sharper points the set-screws 93 at the left in Figs. 1 and 2 should be turned outward and the set-screws at the right in Figs. 1 and 2 would be turned inward, thereby causing the grinding-belt to engage the needle-blanks farther from the tips and causing it to pass the tips at a more acute angle.

94 denotes a chute into which the sharpened blanks drop and which conducts them out of the machine. As already stated, the end of the friction-roller over which the blanks pass after leaving the grinding-belt corresponds with the ends of the grooves of the feed-screws. It is obvious, therefore, that as soon as the sharpened blanks pass beyond the grooves of the feed-screws they will drop into the chute, which is of course properly placed to receive them butts first, and will slide down the chute and into a suitable receptacle. (Not shown in the drawings.)

The operation of the machine as a whole will be clearly understood from the description already given. The needle-blanks pass singly from the hopper into the grooves of the feed-screws and are carried along toward the opposite side of the machine. During the time that the needle-blanks are passing across the machine they are being continually rotated axially by the rolling-belt and are subjected to the abrading action of the grinding-belt, which may be adjusted in the several ways described, so as to produce any style of round point that may be required. As they are being carried across the machine the needle-blanks are held in place in the grooves in the feed-screws, that is to say, they are prevented from being dragged forward by the grinding-belt by frictional contact with roller 42, which as it rotates in the opposite direction from that in which the grinding-belt is moving acts to retain the butts of the blanks in the groove in the back feed-screw C. It will be noticed in Fig. 1 that the feed-screws are longer than the width of the grinding-belt. This is in order that the operator may see that the feeding and carrying mechanisms are working perfectly before the needle-blanks pass to the grinding mechanism, and also to carry the sharpened blanks entirely away from the grinding-belt before they drop into the chute.

Having thus described my invention, I claim—

1. The combination with the hopper having a passage 18 leading therefrom, slots 23 extending into the passage and a slot 26 intersecting the passage, of a rock-shaft carrying fingers which normally lie in slots 23 and an arm 29 and a cut-off slide in slot 26 carrying an arm which engages arm 29 near its center of oscillation so that when the forward movement takes place the fingers will be moved faster than the cut-off slide and permit a blank to be expelled by the cut-off slide.

2. The combination with the hopper having a passage leading therefrom, slots 23 extending into the passage and a slot 26 through the lower portion of the hopper intersecting with the passage, of a rock-shaft carrying fingers which normally lie in slots 23, a spring 24 bearing upon one of the fingers to hold them at their normal position, a cut-off slide in slot 26 and mechanism for reciprocating the cut-off slide and for oscillating the rock-shaft.

3. The combination with the hopper having a passage 18, slots 23 and a slot 26, of a rock-shaft carrying fingers which normally lie in slots 23 and an arm 29, a cut-off slide in slot

26 which carries an arm engaging arm 29 to actuate the rock-shaft, lever 30 which engages the cut-off slide, a cam 34, lever 32 carrying a roller engaging said cam and a spring 39 acting to hold the roller in engagement with the cam and lever 30 in engagement with the cut-off slide whereby forward movement is imparted to the cross-slide, said spring serving as a cushion to prevent breakage should the blanks become clogged.

4. The combination with a back feed-screw which turns forward and a front feed-screw which turns backward of a friction-roller which also turns backward whereby the needle-blanks are retained in the screws.

5. The combination with a back feed-screw in which the butts of the needle-blanks lie, and a front feed-screw in which the reduced portions of the blanks lie, of friction-roller 42 on which the shanks of the needle-blanks rest and mechanism for rotating the back feed-screw toward the front and for rotating the front feed-screw and the friction-roller toward the back.

6. The combination with a back feed-screw which turns forward and a front feed-screw and friction-roller which turn backward, of feeding mechanism which delivers needle-blanks to the screws singly.

7. The combination with the feed-screws and the friction-roller, of the rolling-belt which rotates the needle-blanks axially as they are carried along by the screws.

8. The combination with feeding mechanism for delivering one needle-blank at each actuation, of the back and front feed-screws, the friction-roller and rolling-belt 43.

9. The combination with the back and front feed-screws and the friction-roller, of the rolling-belt, pressure-plate 56 and means for adjusting said plate to determine the pressure of the belt on the needle-blanks as they are carried along by the screws.

10. The combination with the back and front feed-screws, of the grinding-belt and means substantially as described and shown for oscillating said belt laterally relatively to the feed-screw.

11. The combination with the back and front feed-screws, of the grinding-belt and means substantially as described and shown for tilting said grinding-belt relatively to the feed-screws in a transverse vertical plane whereby either the first or the last portion of the grinding operation may be made more or less effective.

12. The combination with the back and front feed-screws, of the grinding-belt and a friction-roller by which the needle-blanks are held in position in the feed-screws while being acted upon by the grinding-belt.

13. The combination with the back and front feed-screws, of rest 61, the grinding-belt and the friction-roller.

14. The combination with the back and front feed-screws and the rolling-belt, of the grinding-belt and the friction-roller.

15. The combination with the feed-screws and the grinding-belt, of drum 11 over which one end of said belt passes, a yoke 38 in which said drum is journaled, a bracket 13 by which the yoke is carried, means for tilting said yoke relatively to the bracket and for locking it in position and means for adjusting the bracket, yoke and drum relatively to the feed-screws.

16. The combination with the feed-screws, and the grinding-belt, of roller 70 over which the operative end of said belt passes, yoke 71 by which said roller is carried, bracket 72 by which the yoke is carried and means for tilting said yoke and the grinding-belt in a transverse vertical plane relatively to the bracket and for locking said parts in position after adjustment.

17. The combination with the bed, the feed-screws and the grinding-belt, of plate 3 pivoted so as to oscillate in the horizontal plane and means for locking said plate to the bed after adjustment.

18. The combination with the feed-screws and the grinding-belt, of roller 70 over which the operative end of the grinding-belt passes, frame D in which the roller is journaled, roller 88 also journaled in said frame and bearing on the grinding-belt, yoke 71 in which the frame is journaled, bracket 72 by which said parts are carried, means for tilting the frame relatively to the yoke and means for tilting the yoke and frame relatively to the bracket.

19. The combination with the back feed-screw which turns forward and the front feed-screw which turns backward, of the grinding-belt, the friction-roller which turns backward and a chute 94 into which the blanks drop butts foremost as they pass off the friction-roller.

In testimony whereof I affix my signature in presence of two witnesses.

PHILO M. BEERS.

Witnesses:

A. M. WOOSTER,

S. V. RICHARDSON.