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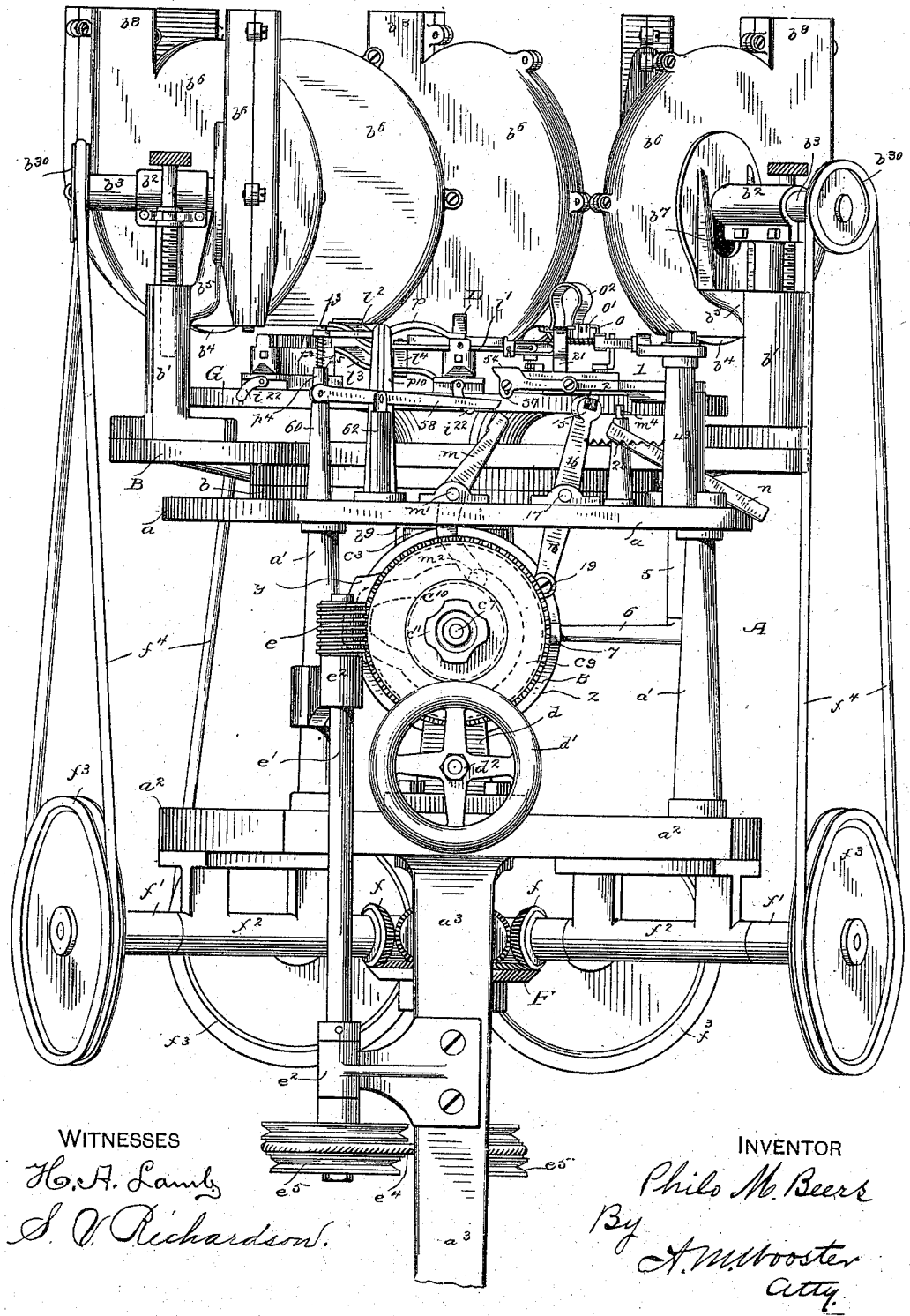
MACHINE FOR SLABBING NEEDLES.

No. 570,367. Patented Oct. 27, 1896.

Fig. 1.



WITNESSES

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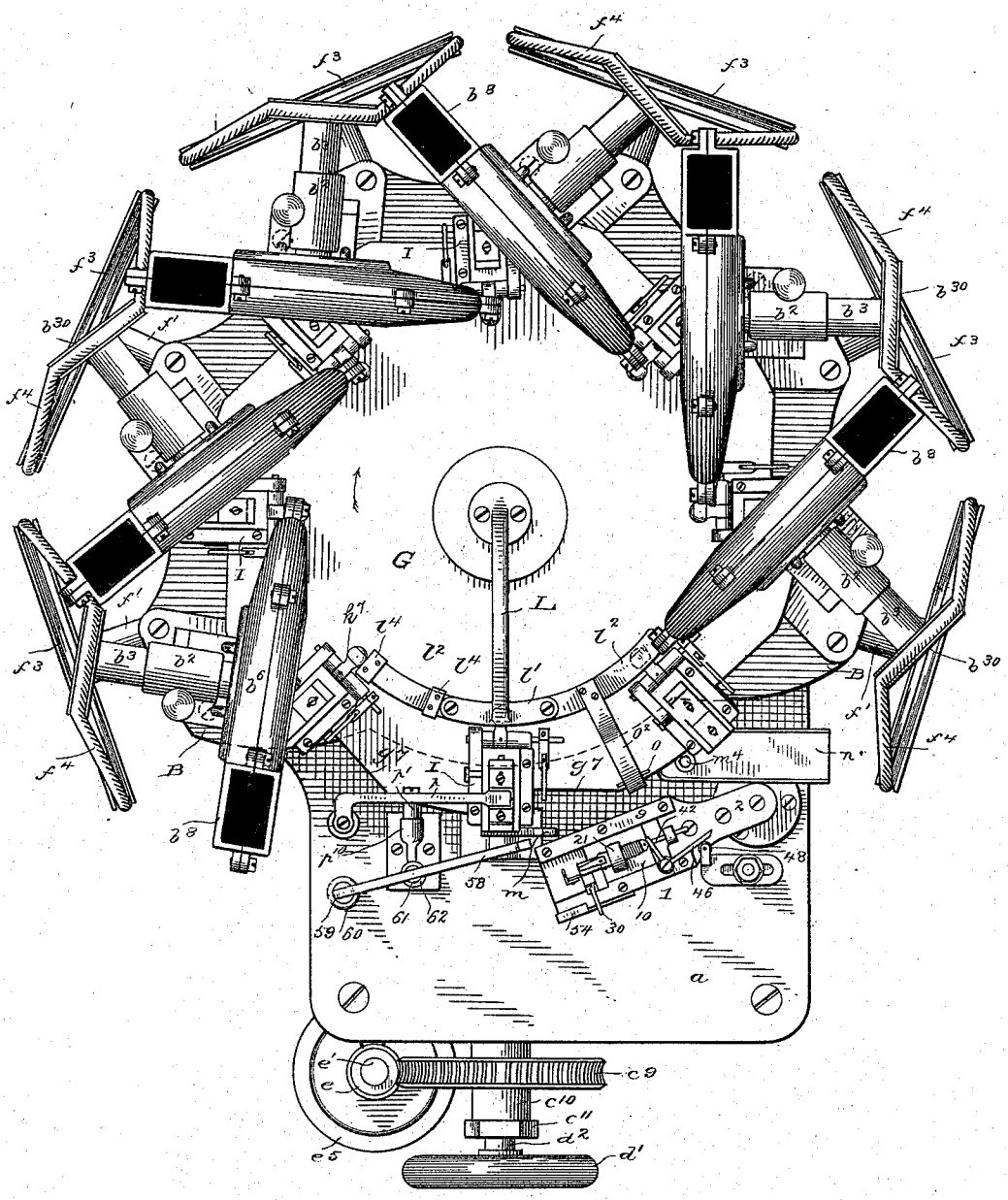
Fig. 2.



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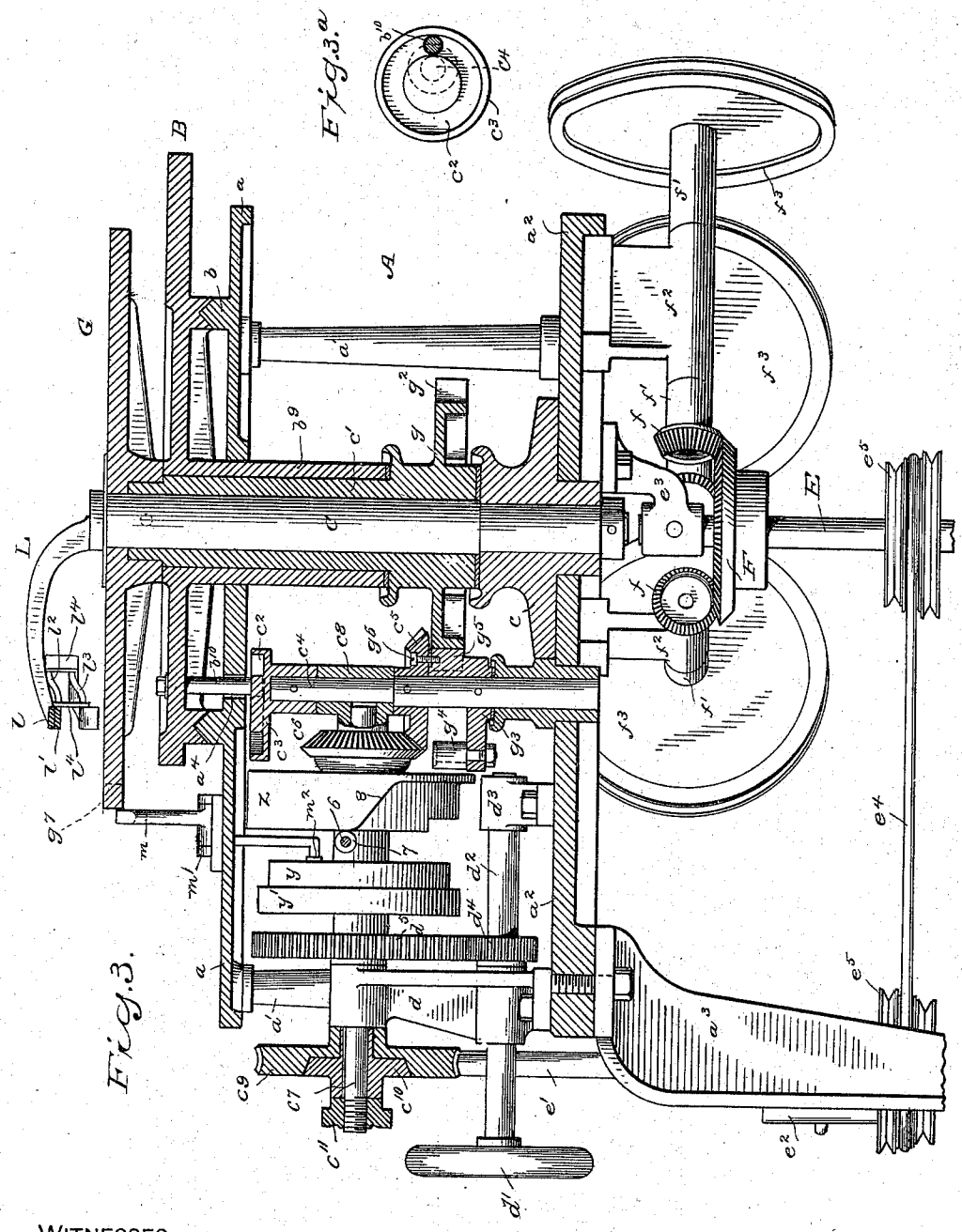

Fig. 3.

Fig. 3a.

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Fig. 4.

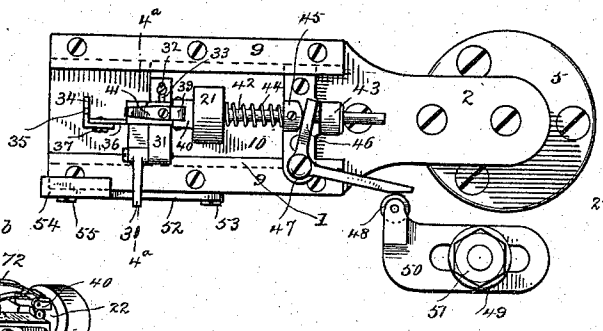

Fig. 4.a

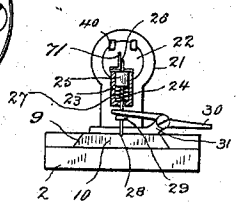

Fig. 5.b

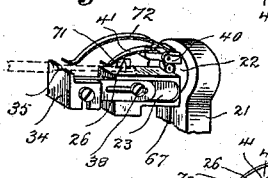

Fig. 5.

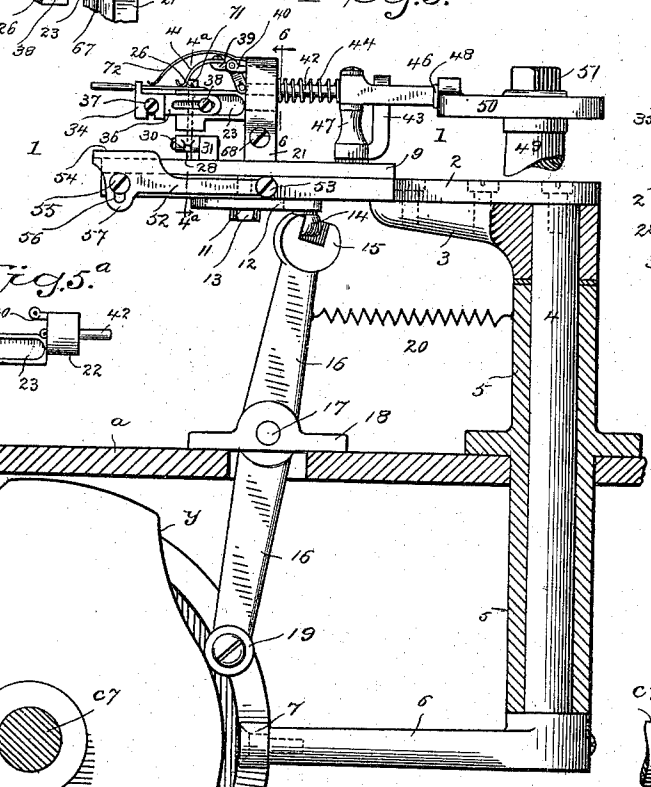

Fig. 7.

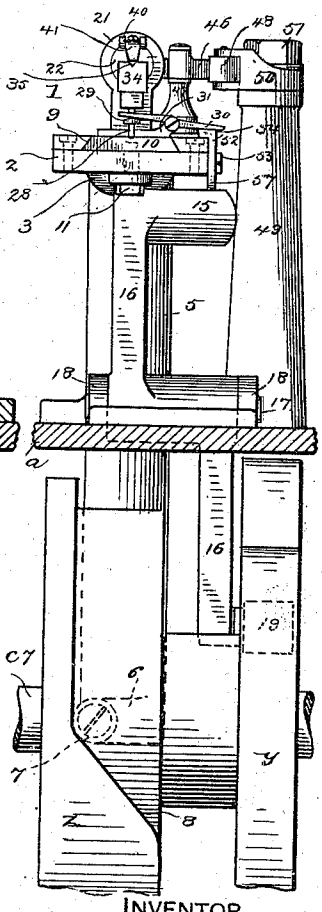

Fig. 5.a

Fig. 6.

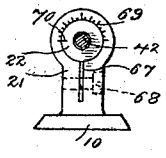

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Fig. 8.

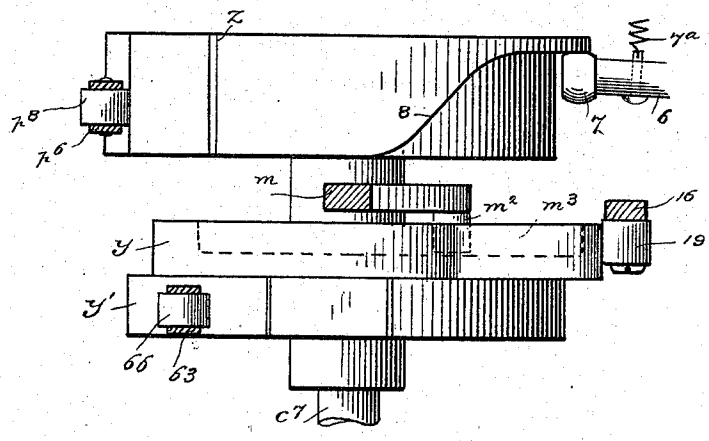

Fig. 9.

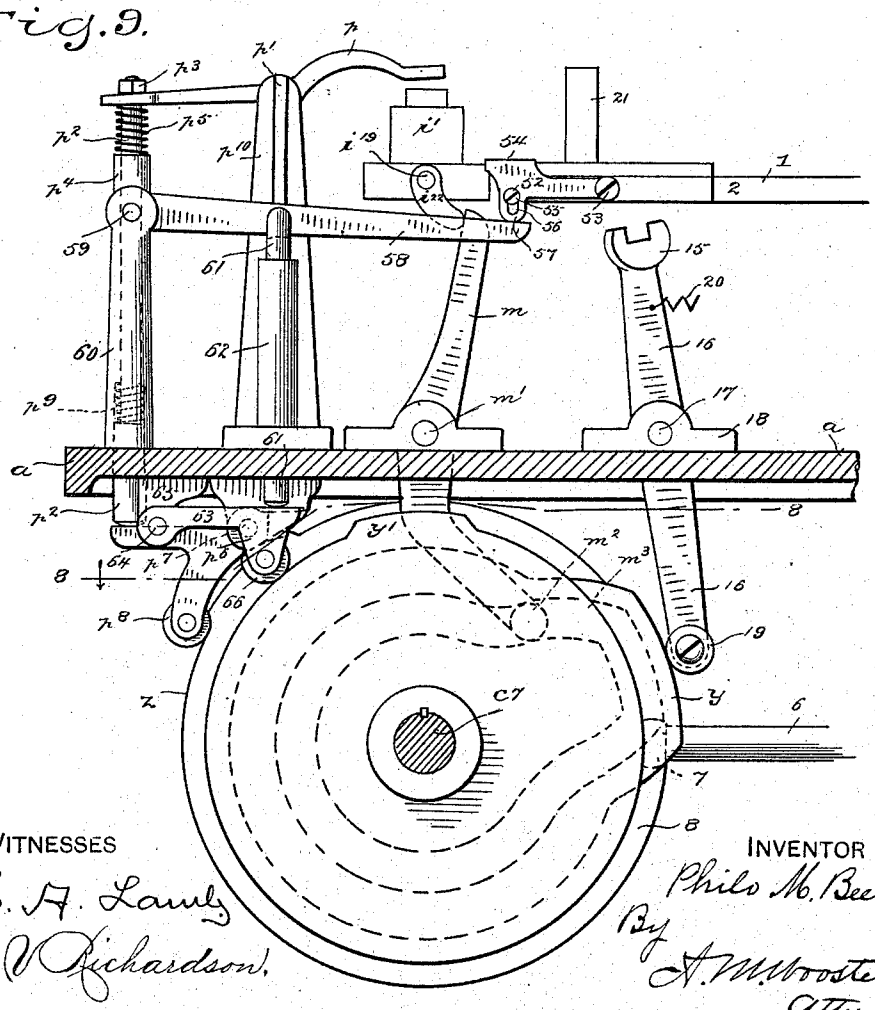

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Fig. 11.

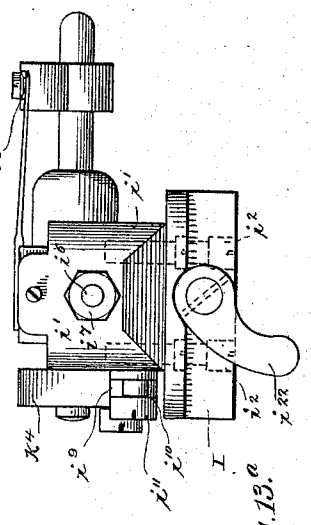


Fig. 13.

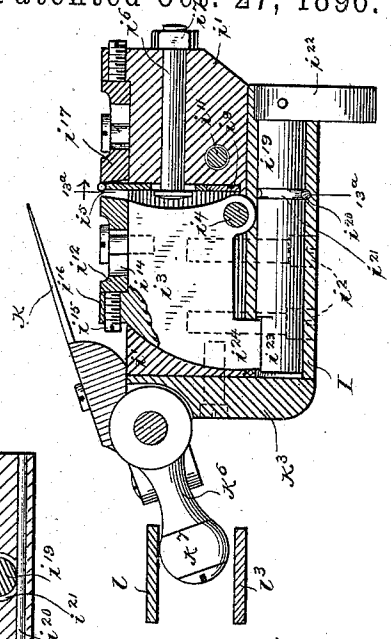


Fig. 13a.

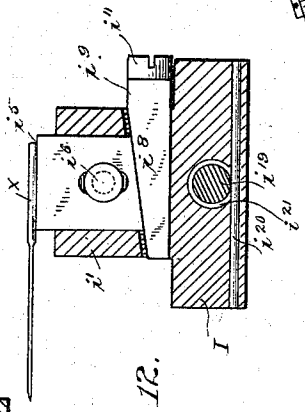


Fig. 10.

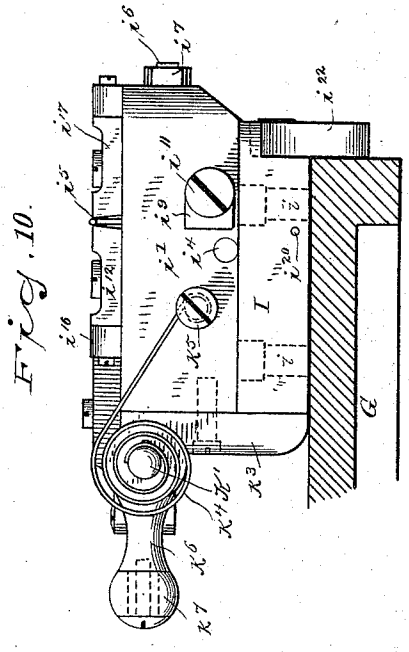
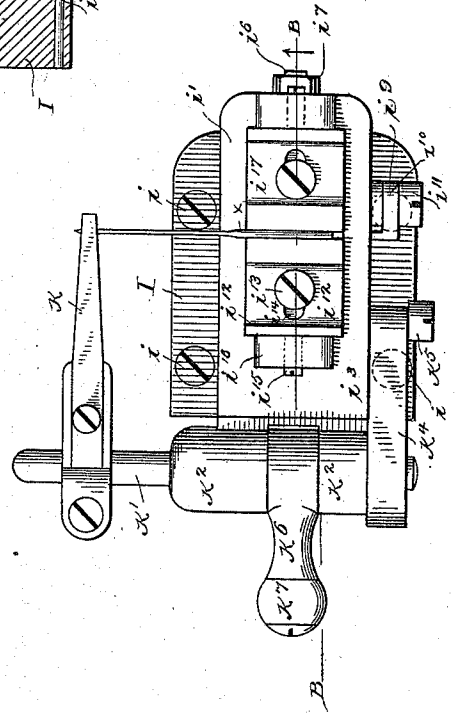


Fig. 12.



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MACHINE FOR SLABBING NEEDLES.

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Fig. 14.

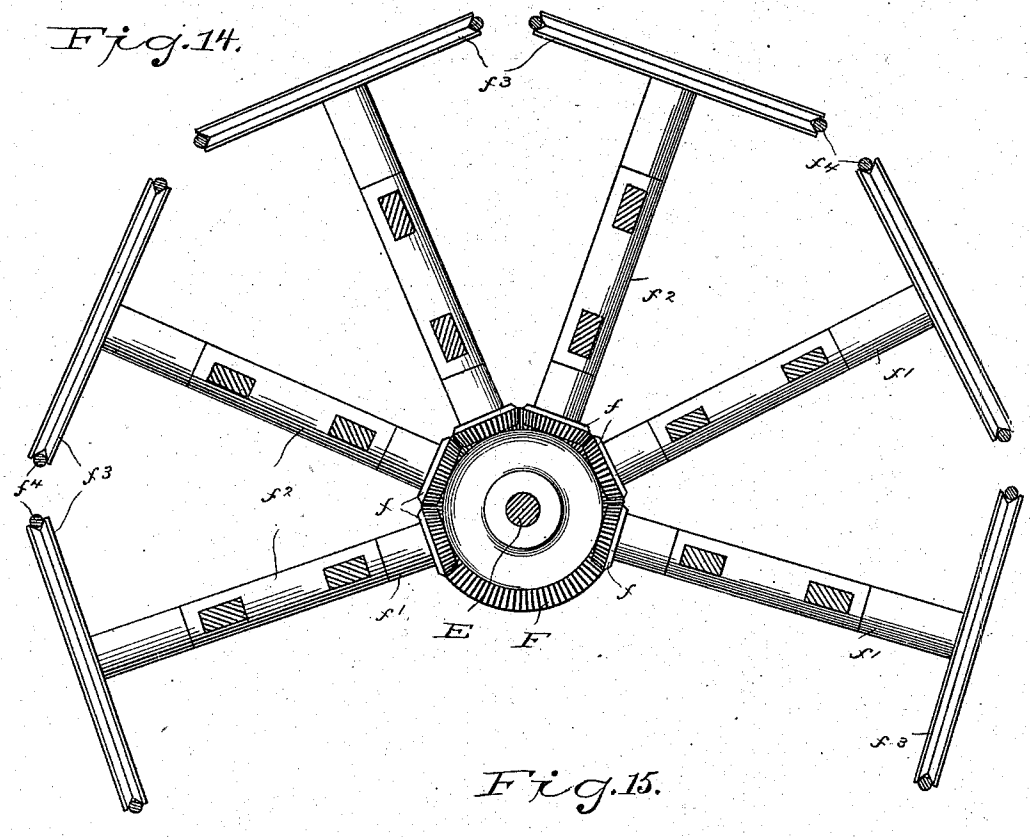
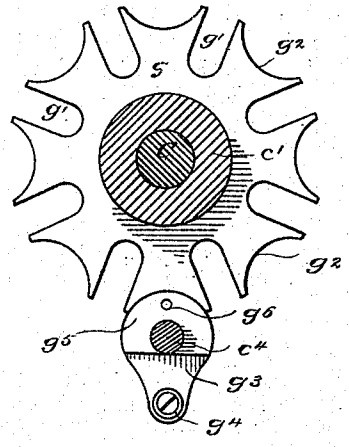


Fig. 15.



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UNITED STATES PATENT OFFICE.

PHILO M. BEERS, OF BRIDGEPORT, CONNECTICUT.

MACHINE FOR SLABBING NEEDLES.

SPECIFICATION forming part of Letters Patent No. 570,367, dated October 27, 1896.

Application filed February 10, 1896. Serial No. 578,660. (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 Slabbing 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.

This invention relates to machines for producing or forming the flat sides of the shanks of sewing-machine needles, which operation is termed "slabbing;" and the general features of my invention comprise an oscillating transferrer which transfers a needle from the hand of an attendant to one of a series of carriers, the latter taking the needle by a rotary step-by-step motion to a succession of grinding and polishing wheels, which latter are carried by a table or frame having a rotary reciprocating motion.

The chief objects of my invention are the production of a machine which is adapted to uniformly slab or flatten the shanks of various sizes and styles of sewing-machine needles with varying sizes of eyes, and in the use of which machine no further care on the part of the attendant is required than to insert the needles one by one into the transferrer and engage the eye of each needle with a guide or locating point.

Further objects of my invention, relating to special features of the construction which combine to insure utility and effectiveness, are pointed out in the following description.

To these ends my invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

In the drawings which accompany and form part of this specification, Figure 1 is a side elevation of the machine substantially complete with the exception of the flues, which are attached to the wheel-casings in practice and lead to a suction-fan. Fig. 2 is a plan view of the same. Fig. 3 is a vertical central section of the machine, omitting the upper portion thereof above the rotating tables. Fig. 3^a is a detail plan of the disk-cam for oscillating the table of slabbing-wheels. Fig. 4 is a detail plan view of the transferrer, the holding-spring being omitted. Fig. 4^a is a section on line 4^a 4^a of Fig. 4. Fig. 5 is a side elevation of the same and of the operating devices therefor. Fig. 5^a is a detail hereinafter referred to, showing a portion of the rotatively-adjustable part of the needle-holder in the transferrer. Fig. 5^b is a detail perspective view hereinafter described, showing the same parts as Fig. 5^a with the addition of other coöperating parts. Fig. 6 is a detail section on line 6 6 of Fig. 5. Fig. 7 is an elevation from the right of Fig. 5. Fig. 8 is a detail plan of the cams for operating certain levers hereinafter described and a section of the levers on line 8 8 of Fig. 9. Fig. 9 is a side elevation of said cams and of the levers operated thereby. Fig. 10 is a detail side elevation of one of the carriers. Fig. 11 is an end elevation of the same. Fig. 12 is a plan view of the same. Fig. 13 is a section on line 13 13 of Fig. 12 and showing also the cam track or guides in section. Fig. 13^a is a detail section on line 13^a 13^a of Fig. 13. Fig. 14 is a detail sectional view showing the belt-wheels and their shafts for driving the slabbing-wheels. Fig. 15 is a detail view of the mechanism for imparting an intermittent rotary motion to the table which supports the series of carriers.

Similar reference-characters indicate the same parts in the several views.

A indicates so much of the frame of the machine as is necessary to illustrate a support for the moving parts, said frame including an upper horizontal plate a, supported on posts a', which rise from the lower plate a^2, said lower plate having suitable legs a^3, only one of such legs being shown in the drawings.

To facilitate the understanding of the following description of the details of construction and to render the object of each of said details more clear, I will first give a general description of the course of the needles to be slabbed, referring by reference-characters to some of the parts.

The operator or attendant first inserts the point end of a needle x into the transferrer 1, as shown in Fig. 4, while said transferrer is in the position shown in Fig. 2. As the machine is in operation the transferrer swings toward the table G and pushes the shank of

the needle between the jaws i^{12} and i^{17} of the carrier, (shown in outline in Fig. 2 and more fully in Fig. 12,) the table G being stationary at this time. Then the jaws close on the shank, and the table moves in the direction of the arrow in Fig. 2, and the carrier draws the needle out from the transferrer and carries it under the first grinding-wheel, so that the upper exposed surface of its shank is ground or slabbed. At the same time the transferrer swings back to the position shown in Fig. 2 ready to receive another needle and to deliver it to the next carrier. During the outward movement of the transferrer and its return to the next carrier the table G and its carriers remain stationary, and the table B and its slabbing or grinding wheels slowly oscillate with a rotary reciprocating movement to uniformly reduce the sides of the needle-shanks, said wheels being so mounted that they act on the shanks in a direction inclined to the line or length of the shanks. Each carrier stops under each wheel, and after leaving the last one its jaws are opened, the needle is pushed out into a receiving-chute, and it is ready to receive another needle from the transferrer.

With this preliminary explanation the following description will be more readily understood.

The plate a above mentioned has a circular track b for the table B, which is provided with a circular rib on its under side, said rib having a groove to receive the said track a. The table B is provided with standards b', said standards having vertically-adjustable bearings b^2 for the shafts b^3 of the slabbing or grinding and polishing wheels b^4, said shafts having pulleys b^{30} at their outer ends. These standards also have brackets b^5, supporting casings b^6, which inclose the wheels, each casing being open at the bottom to permit a portion of the periphery of the wheel to project therethrough and having a vertical slot b^7, where the shaft b^3 of the wheel passes through, in order to permit the vertical adjustment of the shaft and wheel, when desired, without affecting the casings. In practice the casings will have their upper openings or flues b^8 connected with a flue (not shown) leading to a suction-fan. In the drawings I show six of these wheels. In practice the first five are of about the same grade of emery, but set at such height that they successively remove different planes of the metal from the side of the shank of the needle, which is carried under them, as presently described. The sixth and last wheel of the series is preferably a polishing-wheel of fine grade.

The table B is mounted and connected so as to be given a rotary reciprocating movement, and this mechanism will now be described.

Referring to Fig. 3, C denotes a center post secured in a step c, fixed on the lower plate a^2. Resting on this step and sleeved on the shaft is a hollow shaft c', which projects above the table B and has secured to its upper end the table G, which supports the carriers hereinafter described. On the shaft c' is the sleeve b^9 of the table B, loosely mounted thereon, so that it and the table may be oscillated rotatively. A pin b^{10}, secured to the table B, projects down through a slot a^4 in the plate a and into a cam-groove c^2, formed in the upper face of a disk c^3, secured on a rotating shaft c^4. (See Figs. 3 and 3^a.) As this shaft revolves it causes a rotary reciprocating motion to be imparted, through the medium of the cam-disk c^3 and pin b^{10}, to the table B and the grinders.

The shaft c^4 is revolved by means of the bevel-pinion c^5, secured thereon, meshing with bevel-pinion c^6 on the inner end of a horizontal shaft c^7, which has an outer bearing in a bracket d, secured to plate a^2, the inner end of the shaft c^7 being stepped in a bearing formed in the side of a sleeve c^8 on the shaft c^4. Sleeved on the outer end of shaft c^7 is a worm-wheel c^9, said worm-wheel, when the machine is being driven by power, having the clutch-disk c^{10} seated against it by the nut c^{11}, the disk c^{10} being splined on the shaft. When the shaft c^7 is to be operated by hand for such purposes as repairing any of the parts, the nut c^{11} is loosened, so as to loosen the clutch, and then the shaft c^7 may be rotated by the hand-wheel d' on a counter-shaft d^2, having bearings at d^3 and in the bracket d, said counter-shaft having a pinion d^4 meshing with a gear d^5 on the shaft c^7.

Meshing with the worm-wheel c^9 is a worm e on the upper end of a vertical shaft e', mounted in suitable bearings e^2, carried by the frame. The shaft e' is driven from the main driving-shaft E, the upper end of which is shown in Fig. 3 as mounted in a bearing in a bracket e^3, secured to the under side of the lower plate a^2, the said shafts E and e' having cone-pulleys e^5, connected by a belt e^4.

On the main shaft E is a bevel-gear F, which meshes with each of a series of bevel-pinions f on the inner ends of the shafts f', of which there are six in this instance. The shafts f' are mounted in radially-arranged bearings f^2, which are secured to the under side of the plate a^2, said shafts having pulleys f^3 at their outer ends, which are connected with the pulleys b^{30} on the grinding-wheel shafts b^3 by the belts f^4. The distance between the pulleys f^3 and b^{30} is such that the proper frictional engagement of the belts therewith is not interfered with by the short rotary reciprocating movement of the said pulleys b^{30}. Furthermore, the belts are sufficiently elastic to permit the shafts b^3 to be vertically adjusted, as above described, without affecting the driving power of the belts.

I will next describe the means for imparting the intermittent or step-by-step rotary movement to the table G, which supports the series of needle-carriers, eight in this instance. This table G is secured on the upper end of

the hollow shaft c', before mentioned, which is sleeved on the post C and rests on the step c. A star-wheel g (see Figs. 3 and 15) is secured to or formed integral with the lower end of the shaft c', said star-wheel having a series of radial slots g', (in this instance eight,) between which slots the edge of the wheel is concaved, as at g^2. This star-wheel, and consequently the carrier-table, is alternately moved quickly for one-eighth of a circle and then held stationary by means of a crank-arm g^3, secured to and rotating with the shaft c^4. At the longer end of this crank-arm is a crank-pin g^4, adapted to enter one of the slots g' and partially rotate the star-wheel, and on the opposite side of the shaft c^4 from the pin g^4 is a stop g^5, the surface of which is concentric with the center of shaft c^4 and fits the concavities of the wheel g. It will be understood that as the pin g^4 leaves one of the radial slots g' it has brought the next concavity g^2 behind the stop, resulting in preventing further movement of the table G until the pin g^4 enters the next radial slot and the stop g^5 has been turned out of the path of movement of the points of the star-wheel.

Since the crank-arm g^3 and the bevel-pinion c^5, above it, are both secured to rotate with the shaft c^4, I have shown a screw g^6 uniting the said pinion and crank-arm. (See Fig. 3.)

The edge of the table G is provided with a series of recesses g^7, into which the transferrer 1, hereinafter described, is successively swung from the position shown in Fig. 2.

I will next describe one of the eight carriers on the table G, referring particularly to Figs. 1, 2, 10, 11, 12, and 13. It is to be understood that all of the carriers are identical in detail, and while six of them are temporarily stationary under the slabbing-wheels b^4, and the latter are being slowly oscillated over the shanks of the needles carried thereby, the other two are in front of the operator, one of said two being ready for the discharge of a finished needle and the other receiving a needle from the transferrer, hereinafter described.

The base-plate I of the carrier is secured to the table G by screws i, and the block i' of the carrier is secured to the base-plate by screws i^2, passing upward through the base-plate into the side portions of the block, said screws i^2 being indicated by dotted lines in Figs. 11 and 13. At one end the block i' is recessed for the jaw-block i^3, pivoted at i^4, and the front vertical wall of the recess has a plate i^5 clamped against it by the head of a bolt i^6, the outer end of which, in front of the block i', is provided with a nut i^7.

The plate i^5 is slotted for the passage of the bolt i^6, and its upper edge forms a rest or centerer for the needle x, as hereinafter explained, and in order that it may be vertically adjusted with accuracy when the clamp-bolt i^6 is loosened its under edge is inclined and rests on the inclined upper edge of a wedge-plate i^8, one end of which projects outside the block and is provided with a bifurcated angle end i^9, which engages an annular groove i^{10} in a screw i^{11}, the latter being fitted to a threaded hole in the block i'. By operating the screw i^{11} the height of the needle-rest i^5 may be adjusted to a nicety, and the rest is then clamped in position by the bolt i^6.

The top of the jaw-block i^3 is provided with an adjustable jaw i^{12}, said jaw i^{12} being secured to the block i^3 by a screw i^{13}, passing through a slot i^{14}. When the screw i^{13} is loosened, the jaw i^{12} may be accurately adjusted to take up wear or to be set according to different sizes of needles by means of a screw i^{15}, passing through a lug i^{16} of the block i^3 and bearing against the jaw i^{12}.

On the other side of the needle-rest from the movable jaw is a stationary jaw i^{17}, which, however, is also adjustable on the top of the block i' in the same way as the jaw i^{12} is adjustable on the movable block i^3.

The movable jaw is operated to clamp a needle x between it and the stationary jaw by means of the shaft i^{19}, mounted to rock in a bearing in the base of the carrier and held in place by a pin i^{20}, engaging an annular groove i^{21} in the shaft. The front end of the shaft is provided with a cam-shaped crank-arm i^{22}, and the other end is reduced or cam-shaped at i^{23} to engage the heel i^{24} of the pivoted jaw i^3. Therefore, as is obvious, a movement of the crank-arm i^{22} in one direction or the other as the carrier travels around the machine will cause the needle on the rest i^5 to be clamped or released automatically. The mechanism for controlling such movements will presently be described.

In order to avoid possible contact of the slender body of the needle with the grinding-wheels when passing under the latter, I provide a finger k for bending the points downward and keeping them in the position indicated in Fig. 11 while being carried around by the table G. This finger or depressor k is secured to one end of a rock-shaft k', mounted in bearings k^2 on a plate k^3, secured to the back of the block i'. At the other end of the rock-shaft is secured one end of a spring k^4, the other end of which is connected to a screw or pin k^5, projecting from the block i'. The tension of this spring is such as to press the finger k down with force enough to hold the point of the needle as indicated in Fig. 11. To positively lift the finger k against the tension of the spring k^4 when the carrier is at the front of the machine, I secure to the rock-shaft k', between the bearings k^2, a crank-arm k^6, having an antifriction-roll k^7, which is adapted to roll on the under side of a cam-track l. This cam-track consists of a plate having its edges concentric with the center of motion of the rolls k^7 and having its central portion l' horizontal and bent upward at each end l^2. The arm or bracket L, fixed to the upper end of the stationary cen-

ter post C, (see Figs. 2 and 3,) has the said cam-track secured to its outer end, said cam-track being therefore held in fixed position.

At the left hand of the track, where the rolls k^7 leave it, there is a short section of track l^3, curved parallel with that end l^2 and connected therewith at l^4. (See Fig. 3.) This section l^3 is for the purpose of insuring the rise of the roll k^7 if a spring k^4 should break or become detached; otherwise the finger k would remain elevated and might come in contact with the first casing b^6 and be broken off before the machine could be stopped.

I will next describe the mechanism for operating the movable jaw $i^3 i^{12}$ to grip the shank of the needle which has been placed therein by the transferrer. It has already been described how the jaw is moved by the movement of the crank i^{22} of the rock-shaft i^{19}. This crank i^{22} is struck at the proper moment after the placing of the needle by the upper end of a lever m, Figs. 1, 2, 3, 8, and 9, pivoted at m' to the plate a and having its lower end provided with a roll m^2, which enters a cam-groove m^3, formed in the side of a cam y on shaft c^7, and which will hereinafter be further described. This lever acts quickly to rock the shaft i^{19} and clamp the needle and then returns out of the way of the next crank i^{22} as the next carrier comes to position to receive a needle.

When a carrier has passed the sixth wheel b^4, its crank i^{22} comes in contact with and passes over a fixed stop m^4, (see Figs. 1 and 2,) projecting up from the plate a, and thus said crank is thrown over to rock the shaft i^{19} in the opposite direction and release the needle. As the carrier continues to move to position in front of the operator the needle is pushed out from the now open jaws and drops into the chute n, Fig. 1, from which it drops into any suitable receptacle. To effect this pushing out of the needle, I fix a pin o in the path of movement of the needle, as indicated in Figs. 1 and 2. This pin is an angular one, having its horizontal portion secured in a block o', carried at the end of an arched bracket o^2, supported by the cam-track l. Preferably the bracket o^2 is of spring metal.

Before the jaws have been closed by the lever m, as above described, the needle-shank is pressed firmly onto the rest i^5 and is held there during the operation of said lever. This is effected by a tapping-lever p, (see Figs. 1, 2, and 9,) pivoted at p' to a standard p^{10} on plate a and having its outer end provided with a hole through which a rod p^2 is passed, the lever being held thereon by a nut p^3. The rod p^2 is fitted to slide in a tubular standard p^4, and a spring p^5 is interposed between the top of the standard and the under side of the lever. The lower end of the rod p^2 rests on one arm of a bell-crank lever p^6, pivoted at p^7 to a bracket on the under side of the plate a, and having a roll p^8, which is acted on by the cam z on shaft c^7 with the proper timing to elevate the rod p^3 and permit spring p^5 to depress the tapping end of the lever on the shank of the needle just prior to and during the clamping of the latter between the jaws. The weight of the rod p^2 tends to hold these parts in the position shown in Fig. 9 when the raised part of cam z is away from the roll p^8. To aid the downward movement of the rod p^2, a coil-spring p^9 (indicated by dotted lines in Fig. 9) is inserted between a shoulder of the rod and a shoulder in the standard p^4.

It now remains to describe the device which transfers the needles, one by one, from the hand of the attendant to the carriers. This is a most important feature of my invention, as it enables the needles to be so presented to and grasped by the carrier-jaws that they will be slabbed or ground with absolute accuracy, and adjustments may be so made that the planes of the slabbed sides may bear different relations to the eye and grooves, as desired. In other words, the slabbing may be performed on different peripheral portions of the shanks of the needles, and when the parts of the transferrer are once adjusted all needles handled by it will be slabbed with absolute uniformity.

The transferrer 1 is represented in Figs. 1, 2, and 9, and is shown more in detail in Figs. 4, 4^a, 5, 5^a, 5^b, 6, and 7, and the operating mechanism therefor is shown in detail in Figs. 5, 7, 8, and 9.

The horizontally-swinging arm 2 of the transferrer is secured to a bracket 3, which is fixed on the upper end of a vertical rock-shaft 4, mounted in an elongated bearing 5, supported by the plate a. To the lower end of the rock-shaft 4 is secured a crank-arm 6, having a roll 7, engaged by a cam 8, formed on one side of the periphery of cam z and held in engagement therewith by a spring 7^a, one end of which is shown in Fig. 8, the other end being attached to a suitable part of the frame. The shape of this cam 8 and the timing of its operation are such that the transferrer is swung from the position shown in Fig. 2 inward into a recess g^7 of the table G and to a position so that the needle which has been placed in the transferrer by the attendant will be in line with the space between the open jaws of the adjacent carrier, the carrier-table being stationary at this time.

The arm 2 is provided with ways 9 for a slide 10, which carries the needle locating and holding devices, said slide having a pin 11 (see dotted lines in Figs. 5 and 7) projecting from its under side through the arm 2, and having a plate 12 secured to its lower end under the arm 2 by a nut 13.

Of course it will be understood that the opening in the arm 2 through which the pin 11 passes is elongated in order to permit the slide to move in its ways. In practice the plate 12 is secured to the pin 11, so that it may be longitudinally adjusted thereon. In

Fig. 5 the length of the slot in plate 12 to permit this adjustment is indicated by dotted lines.

One end of the plate 12 is provided with a pin having an antifriction-roll 14, which is received in the bifurcated end or yoke 15 at the upper end of a lever 16, pivoted at 17 on a pin mounted in two ears 18, secured to the plate *a* of the frame. The yoke 15 is elongated, as shown in Fig. 7, and the slot which receives the roll 14 is preferably curved to be concentric with the center of shaft 4. The object of this elongation of the yoke is to keep the roll 14 in engagement therewith whether the transferrer is swung in or out on the shaft 4; and the object of the elongation of the pivotal point of the lever 16, as shown in Fig. 7, is to afford a more steady bearing for the lever, since the lever acts to advance the slide when the roll 14 is at the inner end of the yoke—the right-hand end in Fig. 7.

The lever 16 is provided with a roll 19 at its lower end, which is kept in engagement with its operating-cam *y* by a spring 20, one end of which is shown in Fig. 9 as attached to the lever 16, the other end being attached to a suitable part of the frame. The shape of the cam *y* and the timing of its operation are such as to advance the slide 10 (through the connections described) toward the carrier just after the arm 2 has been swung into the recess of the table G, as before mentioned.

Rising from the slide 10 is a standard 21, having a circular opening in its upper end (see Fig. 6) to receive a head 22, the front face of which is provided with a block 23, (see Figs. 5 and 5ª,) which extends somewhat below the periphery of the head 22. This block, being integral with or rigidly secured to the head 22, may be rotated and adjusted as hereinafter described. Near the outer end the block is provided with a vertical socket 24, (see Fig. 4ª,) which receives and guides a piston or plunger 25, having a tapered point 26, which is to enter the eye of the needle placed thereover by the attendant. The block 25 is yieldingly supported by a spring 27 and is provided with a piston-rod 28, extending down through the spring 27 and through the bottom of the socket 24, said rod 28 having a nut or stop 29 secured on its lower end.

A small lever 30 is pivoted to an ear 31, adjustably secured on the forward end of the slide 10 by a screw 32, passing through a slot 33 in the base of said ear, and said lever has one end bifurcated and embracing the rod 28 and resting on the stop 29, the opposite or outer end of the lever 30 being lifted at the proper time to carry the tip of the eye-locating point 26 below the plane of the needle by mechanism presently described.

A plate 34, having a notch 35 to support the body of the needle near the shank thereof, is adjustably secured to the block 23, so that said notch may be set in such vertical position as that the longitudinal center of the needle to be slabbed will be in line with the axis of the head 22. Said plate 34 is vertically adjustable on another plate 36 by means of a screw 37, passing through a vertical slot in the plate 34 and into the plate 36. The plate 36 is fitted to a longitudinal recess in the side of the block 23 and is longitudinally adjusted therein and secured by a screw 38, passing through a slot in the plate 36 and into the side of block 23. This latter adjustment permits the notched plate 34 to be set at the proper distance from the eye-locating point 26 to support the needle close to the shank thereof.

It is to be understood that when a needle has had its eye placed over the point 26 the point of the needle extends beyond the margin of the socket 24, so as to rest on a firm or rigid portion of the block 23. The said point 26 is tapered, so as to snugly fit the eye of any needle, and it is desirable that when the needle has been placed as described it shall be pressed down, so that its point rests on said rigid part of the block 23 and its body near the shank rests in the notch 35. The point 26 is yieldingly supported, as before mentioned, in order that when a small-eyed needle is operated on and consequently does not slip very far down on the point 26 the said point 26 will yield to permit the firm seating of the needle just mentioned.

The mechanism to so press the needle down will now be described.

A small bell-crank lever 39 is pivoted to an ear 40, projecting from the upper portion of the head 22, and the front end of said lever is provided with an extension or arm 41, having a bent or rounded tip. The other and lower end of the bell-crank lever 39 extends down and is pivotally connected with the end of a push-rod 42, extending through an axial opening in the head 22 and having its outer end supported in a bearing in a bracket 43, rising from the slide 10. A spring 44 on the rod 42 is confined between the head 22 and a collar 45, secured to the rod, and has a tendency to hold the rod 42, lever 39, and arm 41 in the position shown in Fig. 5. To reverse this position and elevate the arm 41, a bell-crank lever 46 is adapted to operate against the back of the collar 45 on the rod 42. This lever 46 is pivoted to a bracket or post 47, rising from a portion of the bracket 43 which overlies the adjacent way 9, and the outer end of the said lever is adapted to make contact with a roll 48, adjustably secured to a standard 49 by means of a slotted bracket 50 and a screw or bolt 51.

When the transferrer is in the position indicated in Fig. 2, the outer end of lever 46 has been relatively moved inward by the roll 48 and the rod 42 operated so as to lift the arm or depresser 41 and permit the insertion of a needle under it by the attendant. Then as the transferrer swings into the recess g^7 of the table G the lever 46 moves away from the roll 48 and permits the spring 44 to act on

the collar 45 and move the rod 42 and the depressor 41 to the position shown in Figs. 4 and 5, thus holding the needle firmly and transferring it into position opposite and adjacent to a carrier.

After the transferrer has been swung by the arm 6 and cam 8 the cam *y* acts on the lever 16 to advance the slide 10 and carry the needle-shank between the open jaws of the carrier on the table G, which jaws are then closed on the shank. As shown in Fig. 13, the jaws i^{12} and i^{17} are inclined apart or have their faces undercut. This causes the clamping action thereof to firmly seat the needle-shank on the needle-rest i^{5} and insures the proper level for the slabbing operation; but before the table G is moved, so that the carrier which has just clamped the needle-shank will draw the body of the needle out from the transferrer, it is necessary that the eye-locating point 26 be lowered out of the eye. This is effected by the following mechanism:

An arm 52, pivoted at 53 on the side of the transferrer, is provided with a substantially horizontal upper surface or edge 54, over which the outer end of the lever 30 moves when the slide 10 is advanced, as above described. Since the other end of this lever 30 engages the stop 29 on the rod 28, it follows that an upward movement of the surface 54 at a time when the lever 30 is above it will depress the rod 28 and the block 25 and draw the point 26 out of the needle-eye and leave the needle free to be taken to the slabbing-wheels by the carrier. The vertical movements of the arm 52 are limited by a pin or screw 55, passing through a slot 56, formed in an ear or lug 57 of the arm, said screw projecting from the side of the main swinging arm 2.

The required upward movement of the arm 52 is imparted thereto at the proper time by a lifting-arm or tappet-lever 58, which is pivoted at 59 to a standard 60, rising from the plate *a*. (See Figs. 1 and 2, and particularly Fig. 9.) Between the ends of this lever it has pivotally connected therewith a rod 61, fitted to slide in a vertical bearing or guide 62, rising from the plate *a*. Said rod 61 extends through and below the said plate and rests on the end of a lever 63, pivoted at 64 to an ear 65 on the under side of plate *a*. The pressure of this rod 61 on the lever 63 is in practice increased by a suitable spring in the guide 62, arranged and acting in a manner similar to the spring p^{9} for the rod p^{2}. The lever 63 has a somewhat angular shape, as shown in Fig. 9, and at its free end is provided with an anti-friction-roll 66, which is acted on by the cam y', secured on the shaft c^{7}. The shape of the cam y' and the timing of its operation is such as to lift the tappet-lever 58 and depress the eye-locating point 26 just after the cam *y* has advanced the slide 10 and after the jaws of the carrier have closed on the needle-shank and to hold said point 26 depressed for a short time while the carrier moves away from the transferrer and draws out the body and point of the needle from the latter.

As before mentioned, the needle is held in the transferrer with its longitudinal center in line with the center of the head 22. This head is rotatable in the circular opening of the standard 21, and below said opening the standard is provided with a vertical slot 67 (see Fig. 6) communicating with said opening, the two sides of the slit being connected by a screw 68. After loosening the screw 68 the head 22 and all its attached parts, including the rod 42 and the block 23 with its devices for centering the needle, can be rotatively adjusted and then clamped again in the standard by the said screw 68. This enables the parts of the transferrer to be so adjusted as to present the shanks of a certain lot of needles so that all will be taken by the carriers and slabbed on a certain side of their peripheries relatively to their eyes and grooves. To exactly determine the angle of adjustment, a scale is marked on the standard 21 around the opening, as indicated at 69 in Fig. 6, and a pointer or line 70 is placed on the head 22.

Referring to Fig. 4^{a}, 71 designates a vertical gage-plate secured to the block 23, the said gage being located adjacent to the eye-locating point 26. When the attendant inserts a needle in the transferrer the side of the point end is placed against said gage, which thus enables the eye to be more quickly placed on the point 26.

Since the arm 41 rises when the transferrer swings outward to receive another needle, owing to the outer end of lever 46 having the before-described contact with the roll 48, it is desirable that some means be provided for holding the needle in the notch 35 as soon as it is placed there. For this purpose I employ a light spring 72, (see Figs. 5 and 5^{b},) which is attached to the upper side of the ear 40 and extends out over the arm 41 nearly to the plate 34. The free end of this spring is curved or bent substantially as shown to facilitate the insertion under it of the needle as the latter is placed by the attendant, as heretofore described. This spring 72 is shown only in the figures mentioned for the reason that in the other figures its presence would interfere with proper illustration of the arm 41.

The construction of the parts and the timing of the operation is preferably such that the table B on which the grinding-wheels are mounted is given one substantially complete oscillation or rotary reciprocating motion, while the table G and its carriers are stationary. Furthermore, the bearings of the grinding-wheels are carried by the table at such an angle that the periphery of each wheel operates on the shank of the needle at an acute angle while traveling from one end to the other of the shank of said needle. Therefore the periphery of each wheel does not act simultaneously upon all portions that are to be ground, but travels thereover slowly and avoids undue heating of the shank.

Having now described my invention, what I claim is—

1. In a machine of the character described, the combination with a carrier having needle-holding jaws and mounted on a rotary table, of a transferrer having means for temporarily holding a needle and delivering it to said carrier, said transferrer having a point for engaging the eye of the needle.

2. A machine for slabbing needles, comprising in its construction a series of carriers and mechanism for imparting thereto a step-by-step rotary motion, a series of grinders past which the carriers move, and a pivoted oscillatory transferrer for delivering a needle to each carrier.

3. A machine for slabbing needles, comprising in its construction a series of carriers and mechanism for imparting thereto a step-by-step rotary motion, a series of grinding-wheels mounted on a table, mechanism for imparting a rotary reciprocating motion to said table, and a pivoted oscillatory transferrer for delivering a needle to each carrier.

4. The combination with the table G having a series of needle-carriers, of the table B having standards b, the vertically-adjustable bearings b^2 in said standards, the grinding-wheels having their shafts mounted in said bearings, and the wheel-casings b^6 provided with outlet-flues b^8, said casings having the vertical slots b^7 for the passage of the shafts off the grinding-wheels.

5. The combination with the table G having a series of needle-carriers and provided with a series of recesses g^7 in its edge, of a needle-transferring device adapted to swing into said recesses g^7.

6. The combination with the table G, of a series of carriers for the needles, each of said carriers having a pivoted jaw and a fixed jaw, and a needle-rest plate between said jaws.

7. The combination with the table G, of a series of carriers for the needles, each of said carriers having a pivoted jaw and a fixed jaw, each of said jaws being composed of a block having a jaw-plate adjustable thereon.

8. The combination with the table G, of a series of carriers for the needles each of said carriers having a pivoted jaw and a fixed jaw, and a needle-rest plate between said jaws, said jaws having portions adjustable, toward and from each other.

9. The combination with the table G, of a series of carriers for the needles each of said carriers having a pivoted jaw and a fixed jaw, having adjustable clamping portions and a needle-rest plate between said jaws, said needle-rest plate being vertically adjustable between said jaws.

10. The combination with the carrier-base I, of the stationary jaw i^{17}, the pivoted jaw i^3 i^{12}, the needle-rest i^5 provided with a vertical slot, and the bolt i^6 passing through said slot and through the jaw i^{17}.

11. The combination with the carrier-base I, of the stationary jaw i^{17}, the pivoted jaw i^3 i^{12}, the needle-rest i^5 provided with a vertical slot, the bolt i^6 passing through said slot and through the jaw i^{17}, and means for vertically adjusting said plate i^5.

12. The combination with the carrier-base I, of the stationary jaw i^{17}, the pivoted jaw i^3 i^{12}, the needle-rest plate i^5 provided with a vertical slot, the bolt i^6 passing through said slot and through the jaw i^{17} the lower edge of the plate i^5 being inclined, and the wedge-plate i^8 on which the plate i^5 rests and means for adjusting said plate i^8 longitudinally.

13. The combination with the carrier-base I, of the stationary jaw i^{17}, the pivoted jaw i^3 i^{12}, the needle-rest plate i^5 provided with a vertical slot, the bolt i^6 passing through said slot and through the jaw i^{17} the lower edge of the plate i^5 being inclined, the wedge-plate i^8 on which the plate i^5 rests, and having the angle end i^9, and the adjusting-screw i^{11} having a groove i^{10} receiving said end i^9.

14. The combination with the pivoted jaw of the carrier having the heel i^{24}, of the shaft i^{19} provided with the cam i^{23} and having the crank i^{22}.

15. The combination with the pivoted jaw of the carrier having the heel i^{24}, of the shaft i^{19} provided with the cam i^{23} and having the crank i^{22}, the said shaft having a groove i^{21}, and a fixed pin i^{20} engaging said groove.

16. In a machine of the character specified, the combination with a grinding-wheel, of a needle-carrier movable past said grinding-wheel and having a finger to press the point of the needle out of the plane of the periphery of the grinder.

17. The combination with a carrier having needle-clamping jaws, of the shaft k' provided with a depressor-finger k and a spring k^4 for normally pressing said finger against the needle held by said jaws.

18. The combination with a carrier having needle-clamping jaws, of the shaft k' provided with a depressor-finger k and a spring k^4 for normally pressing said finger against the needle held by said jaws, and means for automatically elevating said finger k.

19. The combination with the table G having carriers, each of which is provided with needle-clamping jaws and with the depressor-finger k having the arm k^6, of the fixed cam-track l supported above said table.

20. The combination with the table G having carriers each of which is provided with needle-clamping jaws and with the spring-operated depressor k having the arm k^6, of the fixed cam-track supported above said table.

21. The combination with the table G having carriers each of which is provided with needle-clamping jaws and with the spring-operated depressor k having the arm k^6, of the fixed cam-track l supported above said table, and the cam-track section l^3 below the track l.

22. The combination with the table G having a series of needle-carriers, each of said carriers having a spring-actuated depressor provided with an arm k^6, of the center post

C, the arm L supported by said post, and the cam-track l^3 supported by said arm L.

23. The combination of the table G having a series of needle-carriers, of the center post C, the arm L supported by said center post, and the cam-track supported by said arm, each of said carriers having a rock-shaft k' provided with a finger k and with the arm k^6 provided with a roll k^7 adapted to engage said cam-track, and the spring k^4.

24. The combination with the table G having a series of needle-carriers, each of said carriers having a spring-actuated depressor provided with an arm k^6, of the center post C, the arm L supported by said center post, and the cam-track supported by said arm L, said cam-track having a horizontal central portion l', the inclined ends l^2, and the inclined lower section l^3 connected to one of the end portions l^2.

25. The combination with the intermittently-rotary table having a series of carriers, each of said carriers being provided with needle-clamping jaws and with a jaw-operating crank i^{22}, of the lever m for operating said crank, and the cam y having a cam-groove m^3 for operating said lever.

26. The combination with the intermittently-rotary table having a series of carriers, each of said carriers being provided with needle-clamping jaws and with a jaw-operating crank i^{22}, of the lever m, for operating said crank, the cam y having a cam-groove m^3 for operating said lever, and the fixed stop m^4 against and over which the crank i^{22} is adapted to pass to open the jaws.

27. The combination with the intermittently-rotary table having a series of carriers, each of said carriers being provided with needle-clamping jaws and with the cam-shaft i^{19} for operating the jaws, said shaft having a crank i^{22}, of the lever m, for operating said crank, the cam y having a cam-groove m^3 for operating said lever, and the fixed stop m^4 against and over which the crank i^{22} is adapted to pass to open the jaws.

28. The combination with the intermittently-rotary table having a series of carriers, each of said carriers being provided with needle-clamping jaws and with a jaw-operating crank i^{22}, of the lever m for operating said crank, means for operating said lever, a fixed stop m^4 against and over which the crank i^{22} is adapted to pass and open the jaws, and a transferrer located at a suitable point to transfer a needle to the jaws of the carrier after they have released the preceding needle.

29. The combination with a rotary table having a series of carriers, each of said carriers being provided with needle-clamping jaws and a jaw-operating crank i^{22}, of the lever m, for operating said crank, in one direction, a fixed stop for operating the crank in the opposite direction, and the discharger-pin o located in the path of movement of the needles.

30. The combination with a rotary table having a series of carriers, each of said carriers being provided with needle-clamping jaws and a jaw-operating crank i^{22}, of the lever m for operating said crank in one direction, a fixed stop for operating the crank in the opposite direction, and the discharger-pin o, located in the path of movement of the needles, said discharger-pin being carried at the end of the curved bracket o^2.

31. The combination with the table G and its series of carriers having needle-clamping jaws and an adjustable rest-plate between said jaws, of means for pressing the needle to its seat between said jaws.

32. The combination with the table G and its series of carriers having needle-clamping jaws, of means for pressing the needle to its seat between said jaws, said means comprising the lever p and devices for automatically operating said lever at predetermined times.

33. The combination with the table G and its series of carriers having needle-clamping jaws, of the lever p, the tubular standard p^4, the rod p^2 fitting said tubular standard and connected with said lever and means for operating said rod.

34. The combination with the table G and its series of carriers having needle-clamping jaws, of the lever p, the tubular standard p^4, the rod p^2 fitting said tubular standard and connected with said lever, the spring p^5 between the top of the standard and the lever, the spring p^9, the bell-crank lever p^6, and the cam z.

35. In a machine of the character specified, the combination with the intermittently-movable carriers having needle-clamping jaws, of the transferrer mounted on a swinging arm and having a slide provided with means for temporarily holding the needle, means for moving said arm to a position to carry the needle in line with the jaws of the carrier, and means for advancing the slide to pass the needle to said jaws.

36. In a machine of the character specified, the combination with the intermittently-movable carriers having needle-clamping jaws, of the series of grinding-wheels set at varying elevations above the carriers, the transferrer mounted on a swinging arm and having a slide provided with means for temporarily holding the needle, means for moving said arm to a position to carry the needle in line with the jaws of the carrier, and means for advancing the slide to pass the needle to said jaws.

37. In a machine of the character specified, a needle-transferrer comprising a swinging arm, a slide movable on said arm, a tapered eye-locating point carried by said slide, and means for holding a needle with its eye fitting said point.

38. In a machine of the character specified, a needle-transferrer comprising a swinging arm, a slide movable on said arm, a yieldingly-

supported tapered eye-locating point carried by said slide, and means for holding a needle with its eye fitting said point.

39. The combination with the vertical rock-shaft 4 having the arm 2 provided with ways and with the slide 10, of needle-holding devices carried by said slide, the crank-arm 6 at the lower end of the shaft 4, the cam 8 for acting on said crank-arm, the lever 16 for operating said slide, and the operating-cam y.

40. The combination with the swinging arm 2, of the slide 10 having the plate 12 provided with the pin or roll 14 below said arm 2, the lever 16 provided with the elongated yoke 15, and means for operating said lever.

41. The combination with the swinging arm 2, of the slide 10 provided with needle-holding devices and having the plate 12 provided with the pin or roll 14 below said arm 2, adjustable connections between said slide 10 and plate 12, and a lever engaging said pin or roll.

42. The combination with the slide 10 having the standard 21, of the head 22 provided with the block 23, the piston or plunger 25 having the tapered point 26, and means for holding the needle with its eye on said point.

43. The combination with the slide 10 having the standard 21, of the head 22, the block 23 carried by said head and having a socket 24, the plunger 25 provided with the point 26, and a spring 27 located in said socket.

44. The combination with the slide 10 having the standard 21, of the head 22, the block 23 carried by said head and having a socket 24, the plunger 25 provided with the point 26, a spring 27 located in said socket, the rod 28 extending through the bottom of the socket and provided with a stop 29, the lever 30 engaging said stop, and means for operating said lever to depress the plunger and point.

45. The combination with the slide 10 having the standard 21, of the head 22, the block 23 carried by said head and having a socket 24, the plunger 25 provided with the point 26, a spring 27 located in said socket, the rod 28 extending through the bottom of the socket and provided with a stop 29, the lever 30 engaging said stop, the arm 52 pivoted to the arm 2 and having a surface 54 over which the lever 30 is adapted to ride, and means for lifting said arm 52 at predetermined times.

46. The combination with the slide 10 having the standard 21, of the head 22, the block 23 carried by said head and having a socket 24, the plunger 25 provided with the point 26 a spring 27 located in said socket, the rod 28 extending through the bottom of the socket and provided with a stop 29, the lever 30 engaging said stop, the arm 52 pivoted to the arm 2 and having a surface 54 over which the lever 30 is adapted to ride, the tappet-lever 58 adapted to engage the arm 52, the vertically-movable rod 61, the lever 63 adapted to lift said rod 61, and the cam y' for operating said lever 63.

47. The combination with the arm 2, the slide 10, the standard 21, and the head 22 provided with the block 23, of the plate 36 longitudinally adjustable on said block 23 and the plate 34 provided with a notch 35 and adjustable on said plate 36.

48. The combination with the arm 2, the slide 10, the standard 21, and the head 22 provided with the block 23, of the plate 36 longitudinally adjustable on said block 23 and the plate 34 provided with a notch 35 and adjustable on said plate 36, the said head 22 and its attached parts being rotatively adjustable.

49. The combination with the arm 2, of the slide 10, the standard 21, the head 22 provided with the needle-supporting block 23 and with the ear 40, the lever 39 provided with the pressing-arm 41, the rod 42 connected to said lever and having the collar 45, the spring 44 on said rod, the bell-crank lever 46, and means for operating said bell-crank lever to advance the rod against the action of the spring.

50. The combination with the arm 2, of the slide 10, the standard 21, the head 22 provided with the needle-supporting block 23 and with the ear 40, the lever 39 provided with the pressing-arm 41, the rod 42 connected to said lever and having the collar 45, the spring 44 on said rod, the bell-crank lever 46, means for operating said bell-crank lever to advance the rod against the action of the spring, and the standard 49 having the bracket 50 provided with a roll for contact with said bell-crank lever.

51. The combination with the slide 10 having the standard 21, of the head 22 rotatively adjustable in said standard and provided with means for locating and holding the needle.

52. The combination with the slide 10, of the standard 21 provided with a circular opening and with the slit 67, the head 22 fitted to said circular opening and having needle supporting and locating devices, and the screw 68 connecting the sides of the standards for clamping the head 22.

53. The combination with the slide 10 and standard 21, of the block 23, supported by said standard and having the vertically-movable eye-locating point 26, and the side gage 71 adjacent to said point 26.

54. The combination with the slide 10 and standard 21, of the block 23, supported by said standard and having the vertically-movable eye-locating point 26, a movable arm 41 adapted to rest on the needle, and a spring 72 normally resting on said needle.

55. A machine for slabbing needle-shanks, comprising in its construction the frame having the plates a a^2, the radial shafts f' f' supported by the plate f^2 and having pinions f and pulleys f^3, the main shaft E having beveled gear F, means for operating said main shaft, the table B mounted above the frame-plate a, and having means for imparting thereto a rotary reciprocating motion, a series of grinding-wheels having their bearings carried by said table B and having their shafts provided with pulleys b^{80}, the belts f^4 connecting the pulleys b^{80} and f^3, the table G

having a series of needle-carriers and having means for imparting thereto an intermittent rotary motion, means for transferring a needle to each of the carriers and means for discharging each needle from its carrier after passing the grinding-wheels, substantially as described.

56. A needle-shank-slabbing machine, comprising in its construction a carrier or holder for the needle and a grinding-wheel having its shaft at an acute angle relatively to the line of the shank of the needle, and means for oscillating said grinding-wheel while its periphery is acting upon the needle.

57. A needle-shank-slabbing machine comprising in its construction a rotary reciprocating table having a series of grinding-wheels mounted thereon, and an intermittently-rotating table having a series of needle-carriers, the shafts of the grinding-wheels being arranged at an acute angle to the shanks of the needles operated upon by them.

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

PHILO M. BEERS.

Witnesses:
F. HURD,
N. H. HOYT.