P. M. BEERS.

Machine for Polishing the Eyes of Needles.

No. 165,977. Patented July 27, 1875.

FIG. 1.

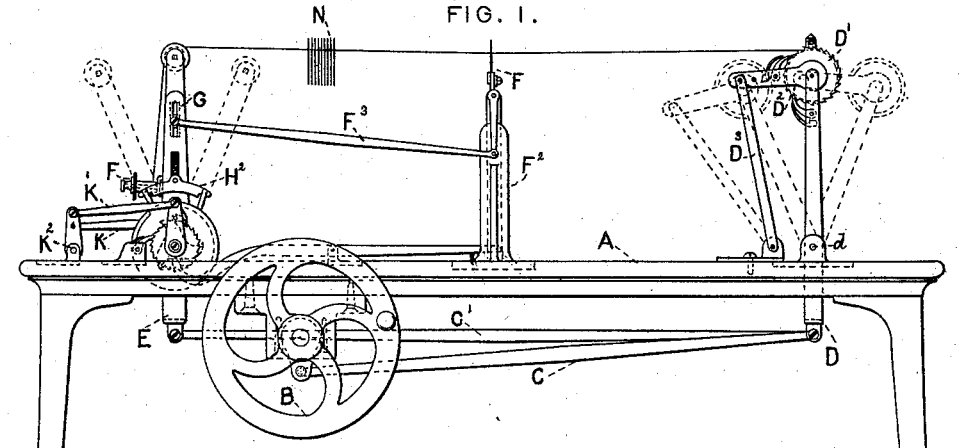

FIG. 3.

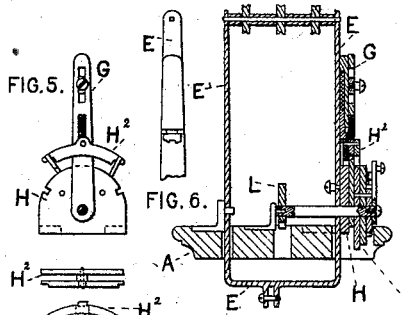

FIG. 4.

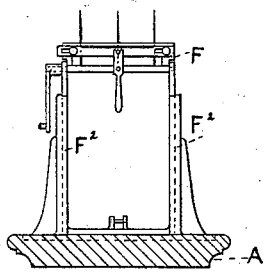

FIG. 5.

FIG. 6.

FIG. 8.

FIG. 7.

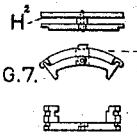

FIG. 9.

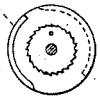

FIG. 10.

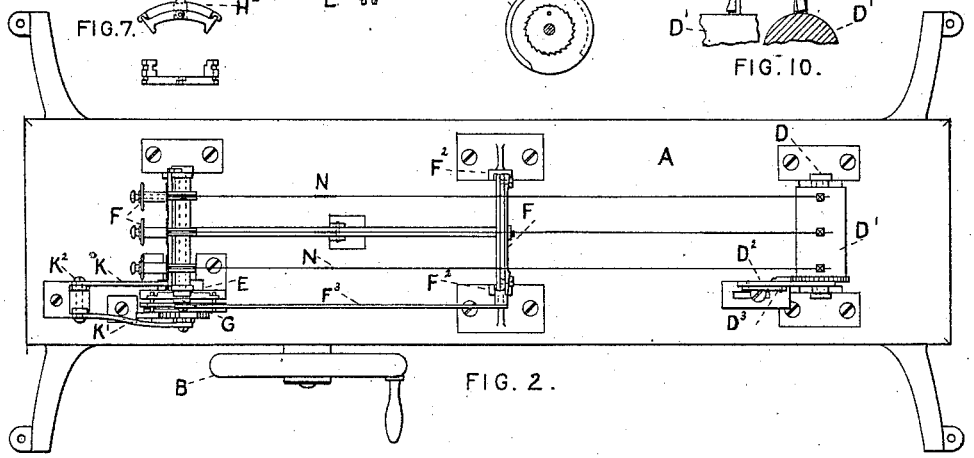

FIG. 2.

WITNESSES

Boyd Eliot

S. Wm. Copley

Phila. M. Beers

INVENTOR

UNITED STATES PATENT OFFICE.

PHILO M. BEERS, OF BRIDGEPORT, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR POLISHING THE EYES OF NEEDLES.

Specification forming part of Letters Patent No. **165,977**, dated July 27, 1875; application filed December 3, 1874.

CASE C.

To all whom it may concern:

Be it known that I, PHILO M. BEERS, of Bridgeport, in the State of Connecticut, have invented certain Improvements in Machines for Finishing the Eyes of Needles, &c., of which the following is a specification:

This invention consists in the combination of certain devices for vibrating a polishing thread or wire through the eyes of needles after they have been punched or drilled, for the purpose of finishing them, as will hereinafter appear.

Figure 1 is a side elevation of the machine. Fig. 2 is a plan view from above. Fig. 3 is a cross-section through the cam-shaft. Fig. 4 is a cross-section through the machine where the needles are supported. Figs. 5, 6, 7, 8, 9, and 10 are details of various parts in the mechanism.

The bed or table of the machine is shown at A, and suspended underneath it in suitable bearings or hangers is the main shaft and driving wheel or pulley, as at B, to which power is applied, either by hand or from a belt. Upon said main shaft is a crank that gives a reciprocating motion through the connecting-rod, at C, to an upright frame at D, suspended on pivots at *d*, and by which said frame is mounted upon the table A, or rather suspended through it, as a portion of said frame D is below the table, as shown. Said frame consists simply of two upright arms to serve as levers for carrying a large winding spool or cylinder, as at D^1, at their upper ends, while their lower ends are connected together by a cross-bar to hold them parallel to each other. From said cross-bar, to which the connecting-rod C is pivoted, a second connecting-rod, as at C′, leads to another frame, as at E, at the opposite end of the table, and it is suspended in the same manner and vibrates with the frame D in the same time and to the same distance, and has at the upper ends of its bars an axis and sheaves for carrying the polishing thread or wires that are to operate in the eyes of the needles, as will hereafter appear.

Upon the front or left-hand face of the frame E or the vibrating levers at E, as that is their chief motion, there is mounted a cross-bar for carrying the spool or spools upon which the polishing-thread is wound, as best seen at F, Fig. 2, where these spools are shown mounted upon the said bar. This bar has one end held in a socket on one side of the frame E, and the other end drops into a hasp with a spring-catch over it to hold it firmly in place on the frame, but at the same time easily raised by simply relieving the spring and lifting out the spool-bar.

The spools are for the purpose of holding the polishing-thread, which may be simply a sewing-thread of cotton, about the size of the eye to be treated, and said thread, previous to being wound upon a spool, is drawn through a mixture of flour of emery and oil, or some other suitable compound for polishing metals, and is then wound upon the spools, and said spools are placed on pins projecting from the side of the spool-bar, and upon the outer ends of the spools a screw-nut is brought to bear, to give suitable tension on them, so as to keep the thread taut in being worked back and forth through the eyes. Each thread is carried up from each spool so mounted over the sheaves at the top of the frame E and through the eyes of a set of needles, and thence onto the winding-cylinder D^1 at the other end of the machine, and which vibrates back and forth upon the top of the frame D, and to said cylinder the end of each thread is attached in any convenient manner, but preferably by a little pawl, two views of which are shown at Fig. 10. Said winding-cylinder is provided with a ratchet wheel and pawl on an arm, as at D^2, which is supported at its outer end by a pivoted bar, as at D^3, so that at each vibration of the frame D the cylinder is rotated from the teeth of the ratchet to draw the threads always through the eyes, so that an unworn or fresh spot of the polishing material may be brought into operation.

It is evident from this much of the description that if the needle or needles be held in a fixed position with their eyes in the line of the threads, and motion be given to the crank on the main shaft, the thread will be drawn back and forth, and the arms or frames

D and E will vibrate to the point shown by the dotted lines in Fig. 1, and would thereby carry the threads up and down in the eyes to the distance that the winding-cylinder D^1 and the sheaves at E would rise and fall; but as the eyes of most needles, and specially sewing-machine needles, are considerably longer than their diameter, and as the corners of the ends of the eyes must be polished, certain devices are introduced to raise and lower the needles, and also to tilt them to the right and left upon the threads, so that the operation may be completed. For this purpose the needes, after their eyes are punched, which is done after the shanks are milled and provided with a groove for setting them in the machine, are fastened in a clamping device, as at F, mounted in an upright frame upon the center of the table A; but the clamping-bar itself is pivoted in its supports, and they are arranged in vertical guides, as at F^2, like a saw-gate, to rise and fall when desired, and the bar can also partially rotate on its pivots, and thereby vibrate the needles when desired.

The axis of the clamping-bar is best seen at Fig. 4, and on one end is fixed a crank, to which a connecting-rod, as at F^3, gives motion from the frame E through a vibrating arm, as at G, that at certain intervals is connected with the frame E, and vibrates with it. This periodic motion is produced by the combined action of certain cams and pawls and ratchets co-operating with the frame E as follows: Upon the table is a fixed plate, as at H, the upper part of which is the segment of a circle, as shown at Fig. 5, and the center of said segment is the axis of the frame E, and upon said center the arm G is mounted, and upon said arm G is pivoted a double-ended pawl, H^2, pivoted at its center to a spring-bolt in the arm G, which allows the pawl to be raised at times at both ends and in the middle. The toes of said pawl, when in the position shown at Fig. 5, both rest upon the arc of the plate H, and will slide thereon back and forth with the vibrating frame E; but in front of said plate, and connected with its axis, is mounted a cam-wheel, (seen at Fig. 9,) with alternate arcs and depressing grooves in its perimeter, as indicated by the circles and dotted lines therein, and it is caused to revolve by a ratchet on its side and a pawl that receives motion from the vibrating frame E through the connecting-rods K and K^1 and the rock-shaft K^2.

As the cam, Fig. 9, revolves, it lifts the pawl H^2 to the position shown at Fig. 5, or lifts only one end thereof, which depresses the other into a notch in the plate H, and thereby holds it either on the right or left hand side thereof, according to whichever notch it may catch.

When, however, the pawl is in the position shown at Fig. 5, a projection at the center of said pawl is raised far enough to engage with a spring-bolt on the side of the arm E, (shown at Fig. 6,) and when so connected the arm G is firmly connected with the frame E, and vibrates with it, and thereby vibrates the crank that partially rotates the clamp in which the needles are held, and this action continues until the cam at Fig. 9 rotates, so as to let one end of the pawl H^2 drop to a point to free it from the spring-bolt on the arm E, and at the same time catch in a notch in the plate H, either on the right or left hand side, and there hold the crank to control the needle-bar tilted either to the right or left on the polishing-thread, and by which the corners of the eyes or that portion at the ends of the punched or drilled holes for the eyes will be smoothed; but as the eyes are much longer than their cross-diameter, the needle-bar or clasp is raised and lowered by a cam or tappet wheel on the cam-shaft, as at L, Fig. 3, and at Fig. 8. Said wheel being on the same shaft with the cams that control the arm G, is also so placed that at proper intervals it raises the needle-clamp, and lets it down gradually, so that the sides of eyes are smoothed as well as the ends and corners.

The method of operating such a machine as now practised is, to have ten polishing-threads mounted on the machine at a time, and on each thread ten needles, making a hundred in all, ready for finishing, and suspended as shown at N, Fig. 1.

One needle on each thread is moved to the clamping-bar, and then fastened with its groove on a projection in the side of the clamp, so that the eye will always be in proper position with the thread, and then the machine is set in motion until the cam at Fig. 9 has made one revolution, which, as already explained, will polish the sides, ends, and corners of the eyes, when those ten are released, moved over, and allowed to hang on the threads until the rest are finished by repeating the same operation, when all are removed from the machine by simply lifting the spool-bar from off the frame E, and releasing the ends of the threads at D^1 on the winding-cylinder. During the time those were being finished another set are threaded on another set of spools on another spool-bar, so that little time is lost in changing from one set to the other.

I therefore claim—

1. In combination with the needle-bar and automatic vibrating mechanism for holding the polishing thread or wire, automatic mechanism consisting of the connecting-rod F^3, reciprocating lever G, pawl H^2, vibrating arm E′, and ratchet-plate H, for controlling the motions of the needle-bar, substantially as described.

2. In combination with the automatic vibrating frames or arms D and E, the winding-cylinder D^1 and its pawls, whereby the polishing-thread is shifted at every vibration, substantially as described.

3. In combination with the frame E, ratchet-

plate H, and arm G, the double cam-wheel, and double-ended pawl H^2, for controlling the vibratory movements of the needle-bar, substantially as described.

4. The combination of the vertical frame for carrying the needle-bar with the tappet-wheel on the cam-shaft, so that the bar will be raised and let down at regular intervals and gradually, as and for the purposes set forth.

PHILO M. BEERS.

Witnesses:
BOYD ELIOT,
J. WM. RIPLEY.