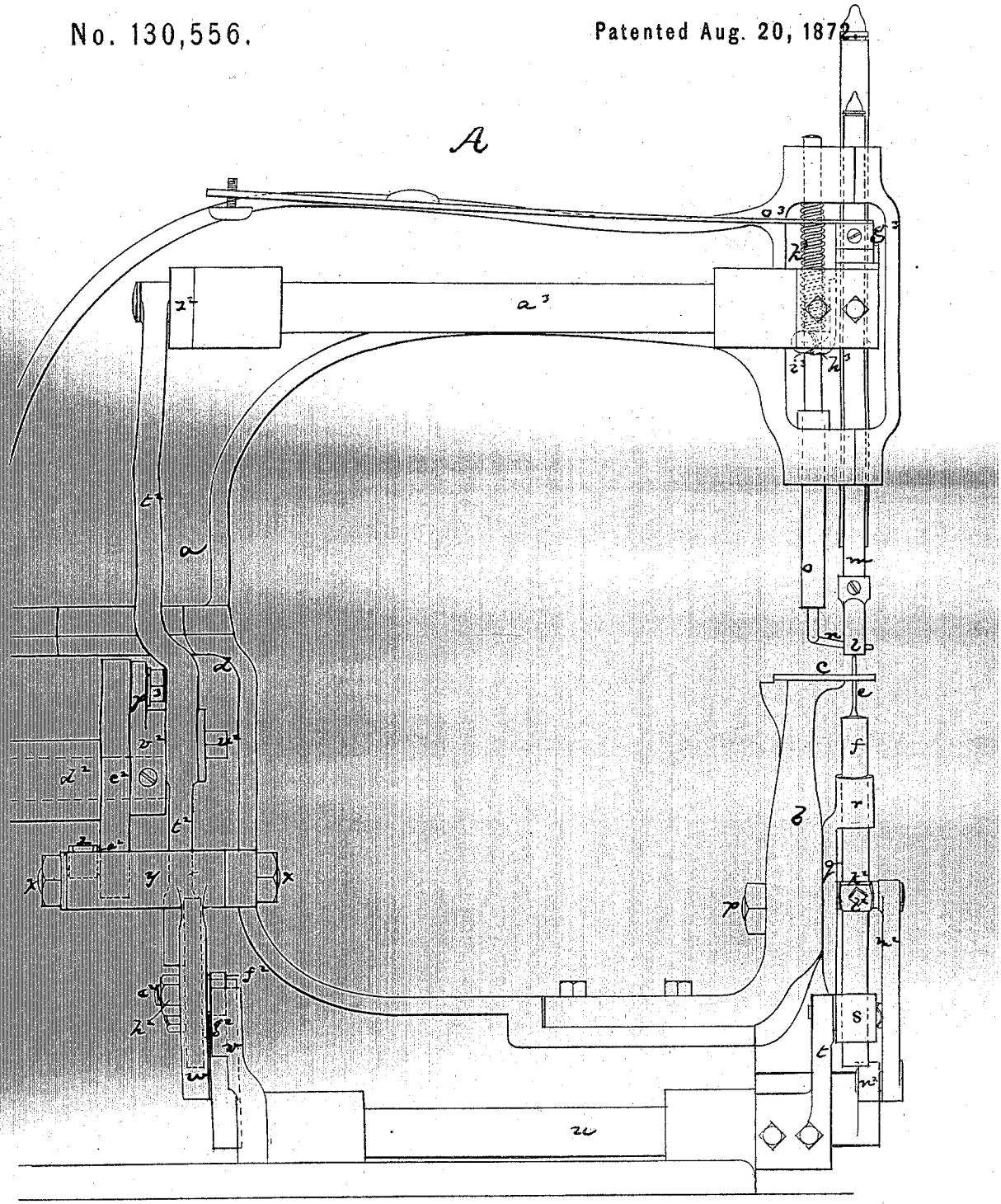
2 Sheets--Sheet 1.

R. ASHE.

Wax-Thread Sewing-Machine.

No. 130,556. Patented Aug. 20, 1872.



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UNITED STATES PATENT OFFICE.

ROBERT ASHE, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO AMOS L. WOOD, TRUSTEE, OF SAME PLACE.

IMPROVEMENT IN WAX-THREAD SEWING-MACHINES.

Specification forming part of Letters Patent No. **130,556**, dated August 20, 1872.

To all whom it may concern:

Be it known that I, ROBERT ASHE, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Wax-Thread Sewing-Machines; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The invention relates to that class of sewing-machines particularly designed for sewing with waxed thread, and in which each machine employs a hook-needle, working up through a plate at the top of a post, and an awl and a presser-foot working down from above the plate, the stock being fed by a lateral movement of the needle when the needle is in the work. In my invention, the post is stationary, and the needle-bar slides in an arm or bearing which extends up from a rocker-plate hung upon a stud-pin projecting from the front of the post, and in another arm or bearing extending down from the rocker-plate, the lower arm being connected to an arm on the end of a rocker-shaft, the reciprocating rotative movement of the shaft imparting the vibratory movement to the rocker-plate to effect the forward feed movement of the needle when in the work, and its back movement when its point is below the work. This specific method of effecting the feed constitutes one feature of my invention. An arm at the opposite end of the rocker-shaft is connected to a vertical arm extending down from a horizontal rocker-sleeve or quill, at whose other end is a horizontal arm, from which a pin extends into a cam on the fly-wheel shaft. The connection of the arms is effected by an adjustable slide-block, by movement of which the throw of the rocker-shaft is varied to vary the feed. At the end of the cam-wheel shaft is a crank, the pin from which extends into a vertically-reciprocating bar, which is connected at its foot to an arm extending from a horizontal rocker-shaft, at whose other end is an arm jointed by a link to a clamp fixed to the needle-bar, the connection of the bar to the rocker-arm being effected by a slide that permits the bar to oscillate, the needle-bar remaining at rest during the lateral movements of the crank-operated bar, and being raised and depressed by the vertical movements of the bar effected by the crank-pin. Said bar extends above the cam-wheel, and is jointed at top to an arm on one end of another rocker-shaft, at whose opposite end is an arm, which is jointed to and actuates the awl-bar, the awl being actuated by such connection, and in its rise effecting the forward movement of the thread-guide, the back movement of which is effected by a spring, and the upward movement of the presser-foot, the downward movement of which is effected by a spring. The cast-off bar is provided with stops or projections, which are alternately operated by the needle-bar clamp in its rise and fall to impart the proper movements to the cast-off. This is the general organization of the machine, and the invention consists not only in the method of hanging the rocker-plate that carries the bearings in which the needle-bar slides, but in the construction or arrangement of the mechanism that actuates the said rocker-plate, and permits its throw to be adjusted, and the mechanism that actuates the needle-bar and the awl-bar.

The drawing represents a machine embodying my invention.

A shows the machine in side elevation. B is a front elevation of it; C, a rear elevation.

a denotes the frame, composed of the base, upright, and goose-neck arm. At the front end of the base is the stationary post *b*, having at its top the needle-throat plate or work-supporting plate *c*, provision being made for the support of a table to surround this plate and extend to the upright *d*, as in other machines of this kind. *e* denotes the hook-needle; *f*, the needle-bar; *g*, the cast-off; *h*, the cast-off bar; *i*, the awl; *k*, the awl-bar; *l*, the presser-foot; *m*, the presser-foot bar; *n*, the thread-guide; *o*, the thread-guide bar; all these parts, except as to their means of actuation, being the same as in other machines of this class. Upon the front of the post is a pin, *p*, upon which is pivoted the rocker-plate *q*, having two bearings, *r s*, in which slide the needle-bar *f* and the cast-off bar *h*. To the lower bearing *s* is jointed (by a sliding or flexible connection) an arm, *t*, extending from the end of a long rocker-shaft, *u*, mounted in sta-

tionary bearings. At the opposite end of this shaft is a vertical arm, v, which is jointed to an arm, w, extending from a rocker-sleeve, y, (that turns on a pin, x,) there being at the opposite end of this sleeve a horizontal arm, z, from which a pin, a^2, extends into a cam-groove, b^2, of a cam-wheel, c^2, fixed on a rotary fly-wheel and driving-shaft, d^2. The arm v is jointed or connected to the arm w by a bolt, e^2, that has a head, f^2, which enters a slot or groove, g^2, in the arm v, the bolt being confined in place to the arm w by a nut, h^2. The bolt passes through a slot, i^2, cut through the arm w, and, by means of this slot and the groove g^2, the bolt may be moved, and the throw of the arm thereby variably adjusted. The connection of the rocker-shaft to the bearing-plate q effects the oscillation of said plate and the consequent feed or forward movement and the back movement of the needle; and, by the provision for adjustment of the connection between the arms v w, the extent of feed movement of the needle may be varied as occasion may require. The lateral or feed movement of the needle being thus produced, its vertical movements are effected as follows: The needle-bar passes through a clamp, k^2, which is fastened to the bar by a screw, l^2, and this clamp is connected, by a link, m^2, to an arm, n^2, extending from one end of a horizontal rocker-shaft, o^2, (mounted and turning in stationary bearings,) from whose other end an arm, p^2, extends. This arm p^2 has a slot, q^2, in which plays a slide, r^2, at the end of a bolt, s^2, fixed to and extending from a bar, t^2. This bar is hung upon a pin, u^2, extending from a crank, v^2, at the end of the cam-wheel and driving-shaft d^2. As the crank-pin, in the rotation of the shaft, raises the bar the arm p^2 is raised, the rocker-shaft is turned, and the needle is thrown up for its point to enter and pass through the work and the thread to be laid in its hook, and the continued movement of the shaft causes the needle to be drawn down with the thread, the upward movement of the needle, its feed movement, and its downward movement taking place together and without intermission; but when the needle is down, or nearly down, there is a short pause or "slowing" of its movement during the time the slide is passing from the outer end of the slot q^2 to the inner end thereof, there being, of course, a rapid vertical movement of the bar when the crank-pin is moving vertically, and but a slight vertical movement when the pin is in or near a vertical plane. The vertical throw of the needle may be adjustably regulated by changing the position of the connecting-bolt s^2 with reference to a slot, y^2, in the bar t^2. At the top of the bar t^2 it is jointed to an arm, z^2, extending from one end of a rocker-shaft, a^3, at whose other end is an arm, b^3, that is jointed to the awl-bar k, and the reciprocating vertical movements of the awl-bar are thus effected by the action of the crank-pin u^2 upon the bar t^2. The connection of the arm z^2 to the bar is slightly adjustable by means of a bolt, d^3, nut e^3, and slot f^3; but when the machine is in operation there is no sliding movement of the connection, all the lateral movement of the crank-operated bar being effected through the provision for sliding movement of the connection of the foot of the bar t^2 to the arm p^2, by means of the slide r^2 and slot q^2, and through this provision the timing of the respective movements of the needle and awl are effected.

Whenever the bar is moving up, the awl-bar and needle-bar must, of course, both rise, but while the crank-pin is passing its vertical center the awl-bar will be comparatively stationary, while the lateral movement of the foot of the crank-bar will cause the needle-bar to have a considerable vertical movement.

When the crank-pin, having passed its lower center, begins to rise, the awl is in the work and the point of the needle is brought very near to the point of the awl, so that as the awl rises from the work the needle enters the awl-hole. The points rise nearly together until the needle-point is well through the work. When the crank-pin begins to rise through the upper quarter of its rotation, the lateral movement of the crank-bar begins; but as the upper end of the bar has no lateral movement, the awl-bar moves faster than the needle-bar, the vertical movement of the end of the crank-bar that actuates the needle-bar having to be modified by its lateral movement. The awl, therefore, moves faster than the needle, and increases the space between their points, and the action of the crank-bar upon the arm causes the needle to begin to descend while the awl is completing its ascent. The awl having risen, remains still, or does not begin to descend until the work has been fed, the thread laid in the hook of the needle, and the needle-point is below the work. Then it descends and punctures the work and remains at its lowest position and in the work, until the needle, having been moved back and brought into vertical line with the awl, again starts up, its point nearly reaching the work before the awl begins to rise, and entering the work before the awl leaves the work. The presser-foot bar m is raised by a projection from the arm b^3, which strikes a piece, g^3, fixed on the bar m, and it is thrown down by the stress of a spring, o^3, when the awl-bar descends. The thread-guide bar is thrown forward by the action of a hook, h^3, upon a roll, i^3, when the awl-bar rises, and is thrown back by a spring, k^3, when the awl-bar descends. The cast-off bar is actuated by the action of a projection, l^3, from the needle-bar, alternately, upon two pieces, m^3 n^3, on the cast-off bar.

The cam-wheel c^2 is made adjustable on the crank-shaft and with reference to the crank-arm, for which purpose the crank has an arm, p^3, in which is a slot, q^3, through which slot extends a bolt, r^3, that fastens the arm and cam together. By loosing this bolt the cam-wheel may be adjustably turned with reference to the crank-arm, and by these means

the action of the cam to effect the feed may be adjustably timed with reference to the action of the crank, to effect the vertical movements of the awl and needle.

I claim—

1. In combination with the stationary post, the pivoted and swinging bearing-plate q, carrying a needle-bar and cast-off bar, and connected to a rocking-arm, t, by a sliding connection, substantially as shown and described.

2. The rocker-shaft u and its arms t v, and the rocker-sleeve y and its arms w z, and the cam-wheel c^2, arranged and operating together, substantially as shown and described.

3. The rocker-shaft o^2, slotted arm p^2, arm n^2, crank-bar t^2, crank v^2, rocker-shaft a^3, and arms z^2 b^3, for actuating the needle and awl-bars, substantially as shown and described.

4. The combination with the presser-foot and thread-guide, for the purpose of imparting the upward movement of the presser-foot and the forward movement of the thread-guide, of the arm b^3 that reciprocates the awl-bar, their opposite movements being produced by springs, substantially as shown and described.

5. In combination with the crank, the cam-wheel c^2, made adjustable on the crank-shaft, substantially as and for the purpose described.

6. The arrangement of the slotted arm p^2, rocker-shaft o^2, rocking-bar t^2, operated as described, and slotted at its lower end, and the adjusting-pin s^2, as shown and described.

7. In combination with a needle-bar and an awl-bar, operating in line or from opposite sides of the work-plate, a single crank with intervening mechanism for imparting the respective movements to the respective bars.

Executed June 6, 1872.

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Witnesses:

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