2 Sheets—Sheet 1.

T. J. HALLIGAN.

SEWING MACHINE.

No. 49,262. Patented Aug. 8, 1865.

Fig. 1.

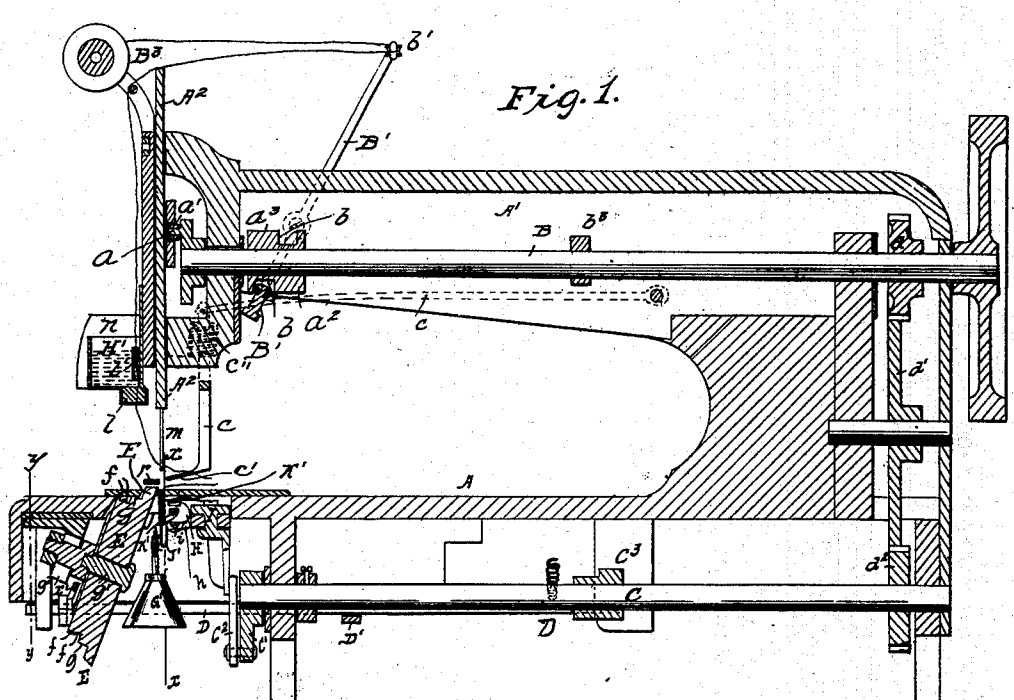
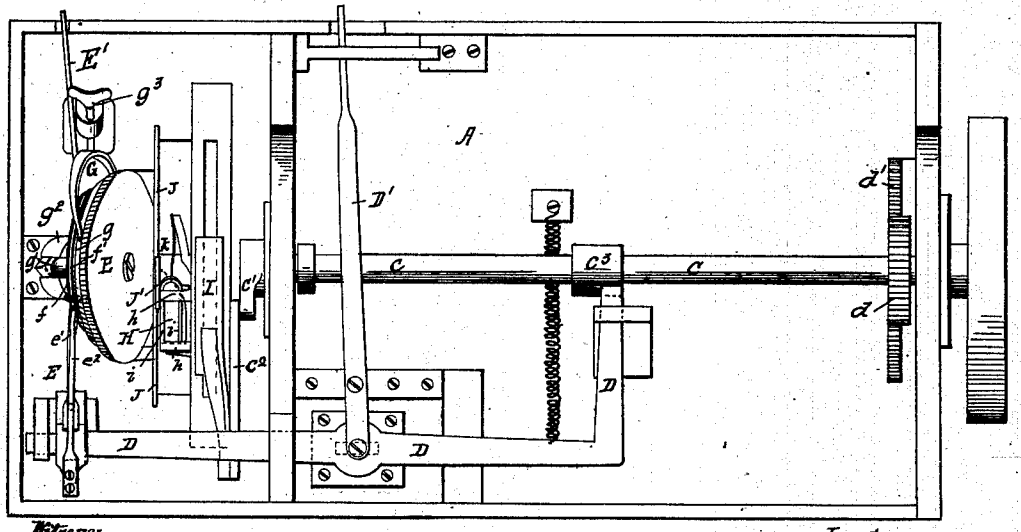


Fig. 2



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Munn & Co

2 Sheets—Sheet 2.

T. J. HALLIGAN.

SEWING MACHINE.

No. 49,262. Patented Aug. 8, 1865.

Fig. 3.

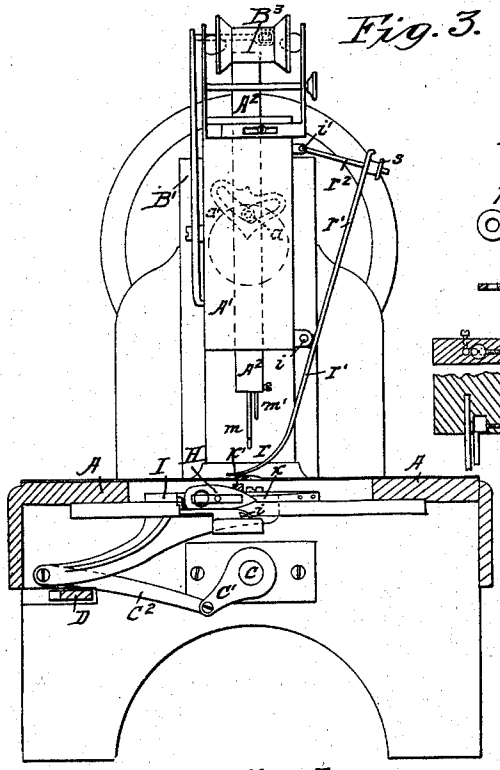


Fig. 4.

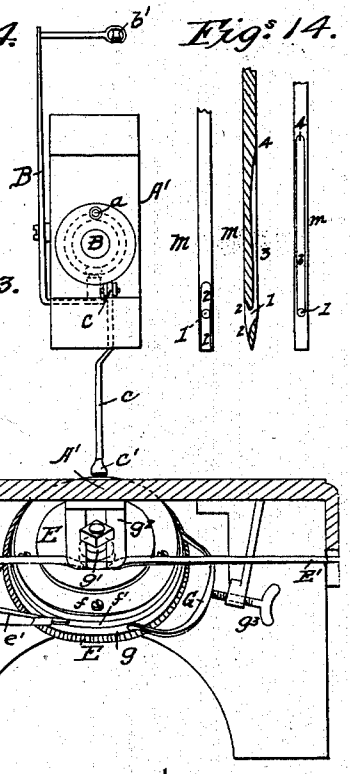


Fig. 14.

Fig. 12.

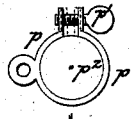


Fig. 13.

Fig. 15.

Fig. 5.

Fig. 6.

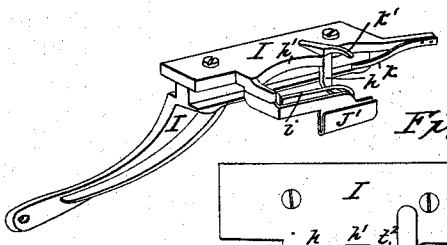


Fig. 11.

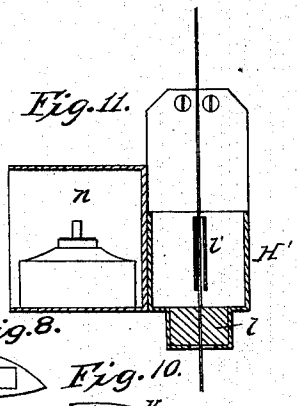


Fig. 7.

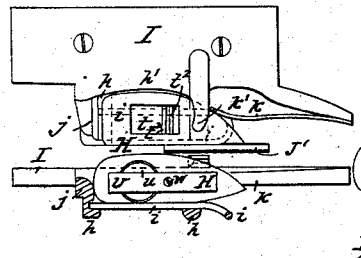


Fig. 8.

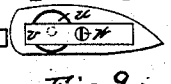
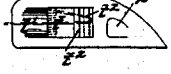


Fig. 10.

Fig. 9.



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UNITED STATES PATENT OFFICE.

THOS. J. HALLIGAN, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **49,262**, dated August 8, 1865; antedated February 8, 1865.

To all whom it may concern:

Be it known that I, THOMAS J. HALLIGAN, of New York city, county and State of New York, have invented a new and Improved Sewing-Machine for using Waxed Thread; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section through the center of my improved machine. The red dotted lines show the rod and spring of the pressure-foot *c*. Fig. 2 is a bottom view of the machine. Fig. 3, Sheet 2, is a vertical transverse section through Fig. 1, taken in the plane indicated by red line *x x*. Fig. 4 is a transverse section taken in the vertical plane indicated by the course of red line *y y* in Fig. 1. Fig. 5 is a perspective view of the open shuttle-carrier. Fig. 6 is a top view of the same with the shuttle in its place. Fig. 7 is a vertical sectional view of the shuttle-carrier. Fig. 8 is a view of the face of the shuttle. Fig. 9 is a top view of the shuttle. Fig. 10 is a top view of the bobbin-frame of the shuttle. Fig. 11 is a vertical section through the wax-cup and lamp-chamber. Fig. 12 is a top view of a device for smoothing the waxed thread. Fig. 13 is a vertical section through Fig. 12. Figs. 14 show the form and construction of the needle which is used in my machine.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates particularly to improvements in adapting sewing machinery for using waxed thread, and also for waxing the thread on its way from the bobbin to the needle, as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation.

The frame for containing and supporting the mechanism for making the stitches and waxing the thread consists of a table, A, and an overhanging bracket, A′, which parts may be cast in one piece, or they may be cast separately and then bolted together.

The needle and awl carrying bar A^2 works in vertical guides in the forward part of the bracket A′, as shown in Fig. 1, and receives a reciprocating motion from the horizontal shaft B through the medium of a pin, *a*, working in a heart-shaped slot, *a′*, (shown in Figs. 1 and 3.)

If desirable, other contrivances may be applied to the needle-bar for giving it the required movements. In rear of this needle-bar A^2, and inclosed within the hollow bracket A′, is a drum, a^2, which is keyed on shaft B, and which has formed around it an oblique groove, *b*, that receives a friction-roller on the lower end of an oscillating arm, B′, which is pivoted to the outside of bracket A′, and, projecting some distance above the same, carries a grooved roller, *b′*, on its upper horizontal portion. The object of this oscillating arm is to take up the slack thread and keep the thread from the upper spool, B^3, always under tension, as will be hereinafter further described. Still further in rear of the needle-bar A^2, and also keyed to the shaft B, is a cam, b^3, which gives an intermittent motion to a spring-rod that carries on its forward end a pressure-foot, *c′*, the object of which is to hold the work down upon the table A during the upward movement of the needle-bar, and thus preventing the needle from carrying up the work when it rises. This pressure-foot is formed on or applied to the jointed vertical portion of the spring-rod *c*, as represented in Figs. 1 and 4, and as the shaft B rotates the cam b^3 forces the foot down, allowing it to rise again at the proper time for feeding the work forward on the table by the recoil of the spring portion of said rod, or of a spiral spring, C″. Near the rear end of the shaft B a pinion spur-wheel, *d*, is keyed, which engages with the teeth of a larger spur-wheel, *d′*, that gives motion to a spur-wheel, d^2, on the longitudinal shaft C, which is arranged beneath the bed-plate of the table, as shown in Figs. 1, 2, and 3. The shaft C thus receives a rotary motion from the main shaft B through the medium of spur-wheels which are inclosed within the frame of the machine.

A crank-arm, C′, is keyed on the forward end of the shaft C, for the purpose of communicating a reciprocating motion to the shuttle-frame through the medium of the pitman C^2, (shown in Figs. 1, 2, and 3;) and a cam, C^3, is also keyed to said shaft at an intermediate point between the legs of table A, for the purpose of giving a vibrating motion to a horizontal lever, D. This lever is pivoted to a fixed block beneath the bed of the table by means of a pin, *e*, which passes

through a longitudinal slot indicated in dotted lines, Fig. 2. The object of thus pivoting the lever D to the machine is to allow it to be adjusted longitudinally by means of a transverse lever, D.

The forward end of lever D carries a pawl, e', which is acted upon by a spring, e^2, for keeping it in its place upon the ratchet-wheels $f f'$ of the feed-wheel E. When it is desired to change the pawl e' from the ratchet-wheel f to the wheel f', or from f' to f, the operator disengages this pawl by depressing the lever E', (shown clearly in Fig. 4,) and then adjusts the lever D back or forward by means of the lever D'.

The ratchet-teeth of the two wheels $f f'$ differ in length, and hence by changing the pawl e from one of these wheels to the other a difference in the length of the stitches will be produced. These ratchet-wheels may be made to form a part of the feed-wheel E, or they may be made separate and secured to said wheel or to a turning shaft upon which the feed-wheel may be keyed.

In the drawings, Fig. 1, the feed-wheel E, with its friction-drum g, and the ratchet-wheels are made in one piece, and applied so as to turn freely in one direction on a fixed stud, g', which projects from an adjustable block that is supported by a fixed bracket, g^2, (shown in Figs. 1 and 2.) This feed-wheel is prevented from turning backward by means of a friction-clamp, G, which is acted upon by an adjusting-screw, g^3. The clamp is made of spring metal, and prevents, by its pressure upon the drum g, the feed-wheel from being moved backward. By adjusting the screw g^3 the clamp G can be made to act with greater or less friction or pressure upon the periphery of the drum g.

The feed-wheel is inclined, as shown in Figs. 1 and 2, for the purpose of giving greater access to the contrivances for making the stitch, and also for the purpose of introducing a lamp, G, under the table, in such a position that its flame will impinge upon the face-plate of the shuttle-race, as will be hereinafter described. As the feed-wheel is inclined from a vertical plane its roughened edge will have to be beveled, so as to work in a plane parallel with the surface of the table at the point where this feed-wheel is exposed above the surface of this table for the purpose of feeding the work under the needle.

In Figs. 5, 6, and 7, I have represented a shuttle-carrier which I have constructed with the view of facilitating the passage of the shuttle through the loop formed by the needle. The thread which forms the upper loop is waxed on its passage from the spool B^3 to the needle, and at the making of every stitch the shuttle must pass through this waxed thread, or, rather, through a loop which is formed by the needle; hence the importance of devising a means for preventing the waxed thread from adhering to the shuttle and the devices which support it.

To prevent an undue friction on the shuttle in passing through the looped thread, I construct an open or skeleton frame for supporting the shuttle H, as follows:

h h represent two stirrups which project below the overhanging and curved edge h' of the slide I, and, being arranged at the proper distance apart, these stirrups support two very narrow and rounded parallel bars, i' i', the forward ends of which are curved, united together, and depressed, as shown in Figs. 5 and 7. At the rear end of this frame is a convex abutment, j', for preventing the shuttle from being thrust backward. This abutment is so formed that when the butt of the shuttle, which should also be rounded, touches it the point of contact will be very slight, and hence very little friction will be occasioned by the loop of waxed thread at this point; and it will also be seen that the two supporting-bars i i will offer very little resistance to the passage of the shuttle through the loop. There are only three points in my shuttle-frame which offer any resistance to the free movement of the shuttle through the loop, and these points are greatly reduced by forming the open skeleton-frame. Still they serve all the purposes of a support for the shuttle.

The spring k is intended to press the point of the shuttle up gently against the vertical surface of the face-plate J, so that the shuttle will always take the loop of the upper thread as it passes the needle; and the finger k', which projects over the forward part of the shuttle and over an indentation, k^2, in the shell of the shuttle, is intended for preventing the point of the latter from rising too high or working out of its place in the frame.

From the outer bar, i, of the shuttle-frame depends an oblong needle-sheath, J', the upper portion as well as the ends of which are open, as shown in Figs. 1 and 5. This sheath is arranged in such relation to the point of the shuttle that it will always receive the point of the needle and keep the latter in a proper position to allow the point of the shuttle to catch the loop. Sometimes the needle will become slightly bent in sewing heavy work, and the object of the sheath J' is to receive and guide the point of the needle and keep it in its proper position until the needle-bar begins to rise, or until the shuttle takes the loop.

Fig. 11, Sheet 2, is a vertical section through a waxing-box, which is applied to the face of the bracket A', as represented in Fig. 1, Sheet 1. This box is provided with a block of india-rubber, l, in its bottom, and also with a tube, l', which latter is open at its bottom to allow the wax which is put into the cup H' to rise and fill this tube, so that the thread which passes down through it will be exposed to the soft wax. By means of the tube l' a small quantity of wax is subjected to the frictional heating contact of the thread, and it (the thread) is very effectually waxed. The tube also serves as a guide by which to readily pass the thread through the wax to the hole in the rubber at the bottom of

the cup. It is a difficult thing to get the thread down to and through the eye of the rubber if this tube is not provided in the cup. The tube is set free above the bottom of the cup, and hence the ready flow of the wax into the tube. It is also fitted to the metal side of the wax-cup, and, being metal itself, the heat will be conducted all around the wax in the tube, and by this means and the rapid vibration of the thread in the tube the wax immediately in the tube will be kept soft enough for the purpose intended, and under some circumstances softer than the larger quantity of wax in the cup. The thread is passed through a hole made in the rubber bottom l', and thence through the eye of the needle, m, as shown in Fig. 1.

On one side of the wax-cup is a box, n, which is adapted for containing a lamp or gas-burner, and so confining the heat of the flame as to keep the wax in cup H′ always in a liquid state. The wax-cup is secured to the bracket A′ in such relation to the needle m that the take-up lever B′ will draw the thread back and forth through this cup, and thus rewax the thread after every downward stroke of the needle-bar. It has been found that the thread will have its wax scraped off by passing several times through the leather which is being sewed, and hence the importance of rewaxing the thread after it has once passed through the work with the needle. The take-up bar or lever B′ draws the thread up through the waxing-cup as the needle-bar rises, and nearly all that portion of the thread which was between the bottom of the wax cup and the eye of the needle will be drawn back through said cup again and rewaxed.

In Figs. 12 and 13 I have represented a circular metallic clamp, p, containing within it a circular block of india-rubber. By means of the adjusting-screw p', which is applied to the ears of said clamp, the rubber p^2 can be compressed to any desired extent. This rubber block is intended to serve as a means for compressing the wax into the body of the thread which passes through it, and at the same time to smooth the waxed thread, and at the same time clear it of all superfluity of wax, and for this purpose this rubber block p^2 may constitute the bottom of the waxing-cup, or it may be interposed between said cup and the needle m. The advantage of the circular clamp is that it compresses the rubber block uniformly about the thread passing through it.

In Fig. 3, Sheet 2, I have represented a contrivance for keeping the work down on the feed-wheel and allowing the work to be moved under the needle by said wheel. This pressure-plate consists of a curved foot, r, which is formed on the lower end of a narrow spring-strip, r', which is pivoted at i to the bracket A′, and projects upward nearly to the top of said bracket. The upper end of this spring r' is forked, and receives between the prongs of the fork a screw-rod, r^2, which is pivoted at i' to the bracket A′, and receives on its outer end a screw-nut, s. By means of this nut s the upper end of the spring r' can be set up nearer to the bracket A′, which adjustment will depress the curved foot r and cause it to act with a spring-pressure upon the work. This elastic pressure is derived from the foot r, as well as its lever-strip r', and consequently the foot r will be allowed to yield and accommodate itself to the varying thickness of the work passed under it without greatly augmenting the pressure thereupon. By simply raising the outer end of the screw-rod r^2 out of the fork in the upper end of the spring-lever r' and drawing this end backward the foot r on its lower end will be thrown up out of the way.

In Figs. 8, 9, and 10 I have represented the shuttle which I use for carrying the lower bobbin. The shuttle-case H may be made of any desirable form adapted to the skeleton shuttle-carrier which I have above described. Through the top of this shuttle-case H is an oblong opening, t, terminating at its rear end in a concave depression, t', in the case, as shown in Fig. 9. Two bars, t^2 t^2, extend transversely across the forward part of the opening t, over and under which bars the thread from the bobbin u is passed.

The use of two bars instead of one, as in my patent August 18, 1863, is to obviate the difficulty from the thread overriding or interfering at one point with another point thereof, which, when it does, causes extra tension and removal of the wax from the thread before it reaches the cloth. When only one bar is used the thread requires to have a complete hitch or coil around it, and consequently overriding cannot well be prevented. The use of the second bar near the bobbin is equivalent in effect to the complete hitch or coil on the single bar, as will be evident when it is considered that the bobbin is below the plane of the bars and the thread moves in an oblique direction. The space t and depression t' are equal in width to the length of the bars, and therefore the thread from the bobbin has a chance to traverse back and forth the full length of the bobbin or of the bars.

The bobbin u is pivoted by means of conical pins between the open ends of a metal frame, v, the opposite ends of which are united, as shown in Fig. 10. This forms a spring-frame for the bobbin and enables me to use an adjusting-screw, w, for contracting its open ends and increasing the friction on the bearings of the bobbin at pleasure. The tendency of this frame v is to open and release the bobbin; but by means of the transverse screw w this frame is contracted so as to keep the bobbin between its open ends and to allow the latter to turn with more or less freedom. The part v of my bobbin holder serves as a means for closing the opening of the shuttle designed for the introduction of the bobbin and its frame, the said part, when in the opening, being just flush with the face of the shuttle. Thus an extra cap is dispensed with and a very ready withdrawal

of the bobbin can be effected, it only being necessary to move it with the part *v* out of the shuttle in a sidewise direction.

I use an awl, *m'*, and a needle, *m*, the former punching, or, rather, perforating, the work to allow the needle to pass freely through it. The awl may be formed and applied to the needle-bar in the usual manner; but the needle *m* is constructed as represented in the enlarged views, Fig. 14. This needle is wedge-pointed, and on one side of the beveled point it is grooved both above and below the eye 1, as shown at 2, the lower portion, 5, being so cut away upward toward the groove 3 as that the eye shall, as far as practicable, incline in a direction approaching the axis of the needle, instead of transversely of the same, as usually. On the opposite beveled surface th groove 3 should not extend down below the eye, and this groove 3 gradually increases in depth as it extends above the eye, 1, and then terminates at 4, about an inch and a half or two inches from the eye. By thus constructing the needle it will be seen that I leave a sufficient body of metal below the eye 1 to insure strength and at the same time give a nearly direct line to the thread through the eye—*i. e.*, the thread passes through the eye 1 nearly in a line with the axis of the needle—and hence there will be very little resistance offered by the thread as the needle enters the work.

In Fig. 1 I have represented a lamp, G', applied beneath the shuttle-frame, so that its flame will impinge upon the lower edge of the plate J, against which the flat face of the shuttle works. The heat from this flame will keep the plate J warm, and consequently prevent any wax which may adhere to it from interfering with the free movements of said shuttle. Instead of a lamp, a gas-burner may be arranged so that its flame will operate as stated.

In conjunction with the contrivances for regulating the length of feed according to the length of stitch desired, I have provided for adjusting the awl *m'* nearer to or farther from the needle, so as to adapt its position to the stitch required. This may be done by forming an eccentric enlargement on the upper end of the awl *m'*, as I have represented in Fig. 15, Sheet 2, which exhibits a vertical and also a transverse section of the needle-bar with its needle and awl and eccentric, the small dotted circle in the larger circle of the transverse section representing the awl when turned farthest away from the needle; or the awl may be secured to a slide which is adjusted by means of a set-screw tapped through a portion of the needle-bar. In the former instance two stitches of different lengths can be made by turning the enlargement on the awl half round. In the latter case a variety of stitches of different lengths can be made, provided a number of ratchet-wheels are employed beneath the bed-plate of the machine.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Waxing thread on its way to the needle by passing the thread through a wax-cup which is provided with an elastic bottom, *l*, and also with means for keeping the wax in the cup in a fluid state, substantially as described.

2. The elastic bottom *l* and the guide-tube *l'*, which is attached to the wall of the wax-cup H', applied together in the construction of a sewing-machine, substantially as described.

3. The combination of the take-up B', needle-bar A^2, waxing contrivance H', and shaft B, substantially in the manner described, for the purpose of rewaxing the thread, as set forth.

4. The manner shown of arranging the vibrating take up arm B' in connection with the shaft B, and operating this arm by means of this shaft B, which is arranged at right angles to the line of feed, and which also operates the needle-bar, substantially as described.

5. Holding the work down upon the table during the upward movement of the needle-bar by means of a pressure-foot, c^3, which rises at the proper time to allow the work to be fed under the needle, and which is located to one side of the needle and of the pressure-pad, and is operated by the devices as described.

6. The hinged screw-rod r^2 and adjusting-nut *s*, applied to the open forked end of the pressure-lever *r'*, substantially as described.

7. So applying the awl *m'* to the needle-bar A^2 that this awl can be adjusted and set nearer to or farther from the needle *m*, according to the length of stitch required, substantially as described.

8. The use of the vibrating and longitudinally-adjustable lever D, in combination with the shaft C and pawl *e'*, for giving motion to the feed-wheel E, substantially as described.

9. The combination of levers D', E', and D, for adjusting the pawl *e'*, substantially as described.

10. The use of two or more ratchet-wheels having teeth of different length, in combination with a feed-wheel, E, and adjustable spring-clamp G, substantially as described.

11. In the construction of a skeleton or open shuttle-carrying frame, the combination of the stirrups *h h*, bars *i i*, rear abutment, *j*, and spring *k*, these parts being formed and arranged in the manner and for the purpose described.

12. The use of two or more transverse bars, t^2 t^2, within a space, *t*, of a shuttle, for the purpose of creating tension upon the lower thread of a sewing-machine, combined with the depression t^3, for allowing the thread to traverse laterally back and forth the full length of the bobbin and preventing the thread from overriding, as herein described and set forth.

13. A device for smoothing the wax-thread on its way to the needle, consisting of a metallic clamp, *p p'*, constructed and operating as described, and encircling a rubber block, p^2, through which the thread passes

14. A needle for using wax-thread which is formed with a groove, 2, extending above and below the eye on one side, and a groove, 3, ex-

tending only above the eye on the opposite side, and with its eye inclined as far as practicable in a direction approaching the axis of the needle, and otherwise constructed substantially as and for the purpose set forth.

15. Heating that part of the face of the shuttle-race plate which is in close proximity to the place where the leather is being sewed by means of a lamp or burner, applied substantially as and for the purposes set forth.

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