

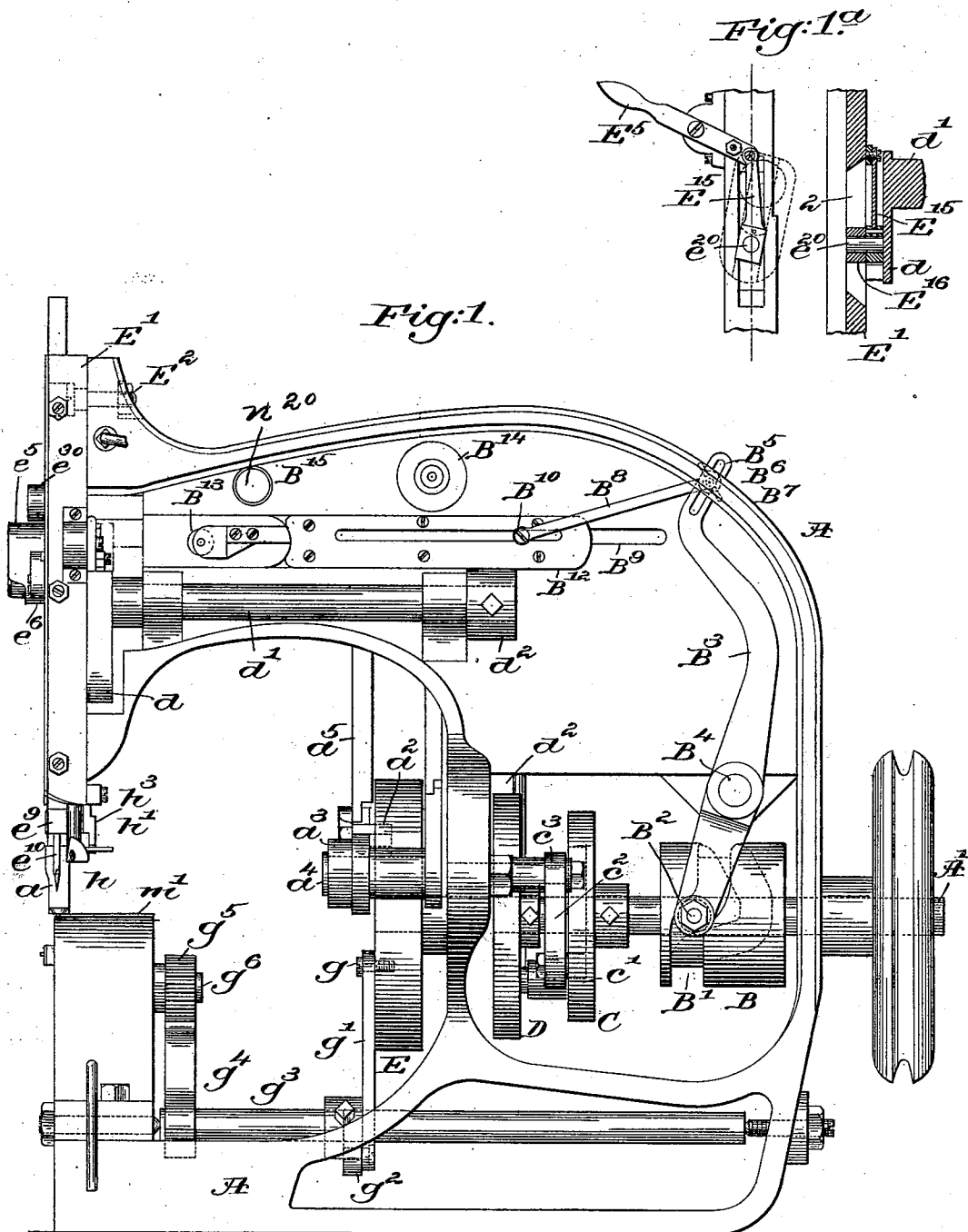
(No Model.)

3 Sheets—Sheet 1.

H. F. NASON.
SEWING MACHINE.

No. 513,717.

Patented Jan. 30, 1894.



Witnesses.

Fred S. Greenleaf
Louis M. Howell

Inventor

Horace F. Nason
by Crosby & Gregory Attys.

(No Model.)

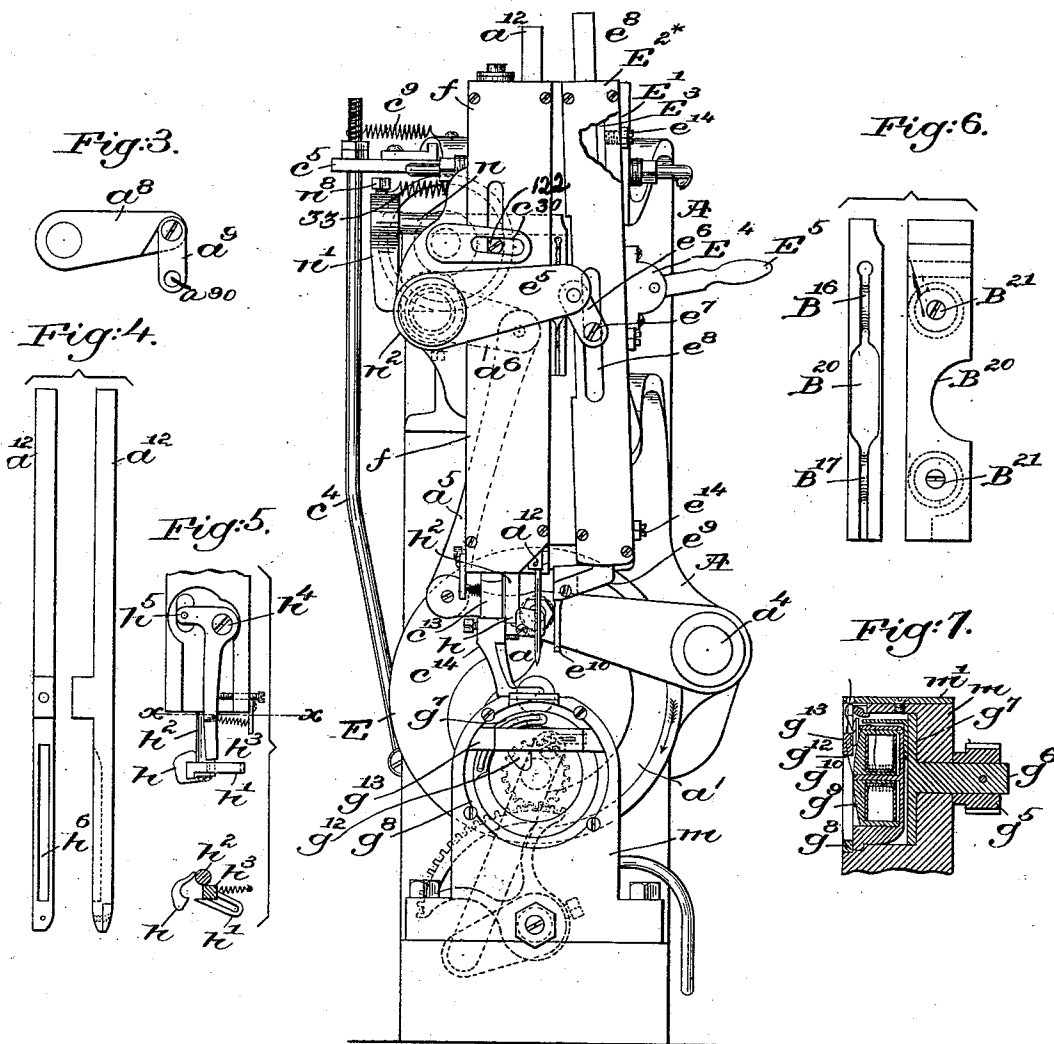
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Fig. 2.



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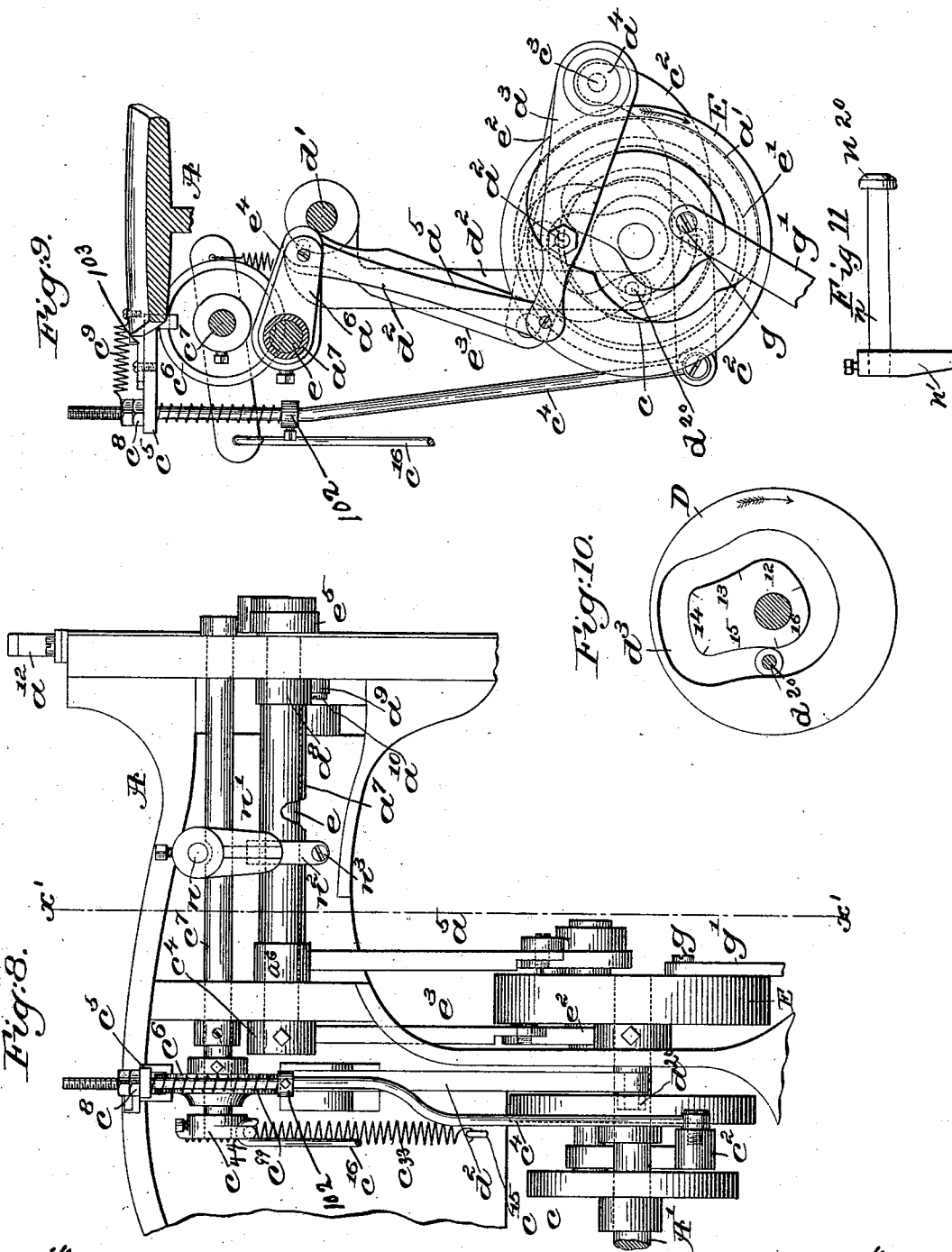
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UNITED STATES PATENT OFFICE.

HORACE F. NASON, OF NATICK, ASSIGNOR OF TWO-THIRDS TO JOHN Q. A. WHITTEMORE AND CHARLES WHITTEMORE, OF BOSTON, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 513,717, dated January 30, 1894.

Application filed February 17, 1893. Serial No. 462,685. (No model.)

To all whom it may concern:

Be it known that I, HORACE F. NASON, of Natick, county of Middlesex, State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve and simplify the construction of that class of machine devised more especially for stitching leather, in harness, boot and shoe, and other work, my improvements making it practicable to sew together a thick pile of leather. Most machines employed for stitching leather have an awl to perforate the leather, and a needle to enter the awl hole and take the thread, but in these machines the awl is usually located above the material and the needle below the material, but this arrangement has been reversed, and in either case either the awl or needle is depended upon as the feeding instrument. So also in the state of the art a hooked needle and an awl have been used at the same side of the material, and been moved laterally together in the same direction during the feeding operation, and so also, an eye-pointed needle and an awl have been used at the same side of the material, but the needle to get out of the way of the awl, has had to have imparted to it an oscillating motion over and beyond its usual reciprocating motion.

In my invention, the eye-pointed needle and an awl are arranged above the material, and a shuttle below the material, and said awl besides having imparted to it vertical movements for penetrating the material, has also imparted to it lateral movements to carry it toward and from the elevated needle and leave it parallel with and distant from the needle equal to the length of the next stitch to be made, after which the awl and awl-bar descend, the awl penetrates the material and is then again moved laterally in the same direction to effect the feeding of the material, when it is raised from the material and then moved backward to what is to be the next starting point. The awl in its feeding movement is always moved forward to a definite

point, but its backward movement is variable, that depending upon the distance over which the material is to be fed at the next forward movement when the awl is in the material. The backward movement of the awl bar is, however, always enough to carry the awl and that part of the bar to which it is attached laterally out of the vertical path traversed by the needle for a distance a little more than the shortest stitch to be made. In this way the awl is enabled to perforate a vertical hole to easily and readily receive the vertical needle. I have also provided means for lifting the presser-foot a definite distance from the material whatever may be its thickness, said mechanism including a rock-shaft having a flanged clutch wheel acted upon at its periphery by a clutch having a positive movement in one direction to turn the rock-shaft to lift the foot, a spring returning the clutch and moving the same over the wheel as the presser-foot descends under the action of its usual spring, and when the spring carries the clutch back the wheel is left free, so that the rock-shaft on which it is mounted, may be turned by a treadle to lift the presser-foot for the removal and insertion of the work.

Figure 1 is a right-hand side elevation of a sewing machine embodying my invention; Fig. 1^a, a detail showing the devices for altering the feeding stroke of the awl-bar and awl. Fig. 2 is a front end view thereof, the needle being shown as on its downward stroke. Fig. 3 is a detail showing the connection between the needle-bar and its actuating rock shaft; Fig. 4, details showing the needle-bar in two views; Fig. 5, details in two views of the devices for controlling the slack in the needle thread below the point of the needle, one of the views being taken below the dotted line *x* of the other view; Fig. 6, two views of the block or yoke containing the two thread sheaves; Fig. 7, a vertical section taken through the shuttle race and shuttle and its contained parts. Fig. 8 is a partial left-hand side elevation of the machine shown in Fig. 1. Fig. 9 is a sectional detail in the line *x'*, Fig. 8, looking to the left. Fig. 10 is a view showing the face of the cam disk D. Fig. 11 is a detail showing the clamping tension bar and its actuating head.

The frame-work A is and may be of any usual or suitable shape to sustain the working parts. This frame-work contains a main shaft A' adapted to be rotated in any usual manner and by any usual power, said shaft as herein shown, carrying four cams B, C, D, E, the cam E as will be hereinafter described, having two cam grooves, one in one and one in its other side. The cam B has a suitable groove B' for the reception of a roller or other stud B² of a lever B³ pivoted at B⁴ on the frame-work, said lever, forming part of the take-up mechanism, being slotted at its upper end as at B⁵, said slot receiving in it an adjustable stud B⁶ provided with a thumb nut B⁷, said stud being connected with a link B⁸, the adjustment of the stud in the said slot enabling the slide-bar B⁹, to which the link B⁸ is jointed at B¹⁰, to be reciprocated, more or less, in the guide-box B¹². The forward end of the slide-bar B⁹, has a roller B¹³ about which is passed the needle thread, said thread being taken from preferably a suitable wax-pot or device, and led about a suitable friction tension device B¹⁴, thence over a grip or clamping device B¹⁵, and over a roll B¹⁶, shown in the detail Fig. 6, the thread from the said roll passing over roll B¹³, thence over another roll B¹⁷ and down to and through the eye-pointed needle a, said rolls being in a yoke B²⁰, suitably attached to the frame-work by screw studs B²¹. Going now to the cam disk E, it is provided at its front face with a cam groove a', shown in Figs. 2 and 9, in which enters a roller or other stud a² carried by an arm a³ loose on a stud a⁴ supported in the frame-work, the opposite end of said arm having jointed to it a link a⁵ which is attached to an arm a⁶, shown in full lines in Fig. 9 and dotted lines in Fig. 2, said arm being fast to a sleeve-like rock-shaft a⁷ having at its center of motion the rock-shaft e to be described. The sleeve-like rock-shaft a⁷ has a second arm a⁸, see the detail Fig. 3, to which is jointed a link a⁹, said link having a hole a¹⁰ which embraces a stud screw a¹⁰, see Fig. 8, screwed into the inner side of the needle-bar a¹², all as commonly practiced in sewing machines, said needle-bar being provided at its lower end with the eye-pointed needle a.

The cam disk E at its inner end is provided with a cam groove e', the shape of which is best shown by the dotted lines in Fig. 9, said cam-groove receiving a roller or other stud carried by an arm e² also mounted loosely upon the stud a⁴, the outer or free end of said arm having jointed to it a link e³, which at its upper end is jointed to an arm e⁴ fast on the rock shaft e, said rock-shaft at its opposite end having a second arm e⁵ which, by a link e⁶ and stud screw e⁷, is jointed to the awl-bar e⁸, the lower end e⁹ of which is off-set, as best shown in Fig. 2, said off-set portion having secured to it by a suitable set-screw, or in other usual manner, the awl e¹⁰ which is to make the hole through the material for the passage of the needle.

The needle-bar reciprocates in suitable bearings in the head of the frame, said bearings being covered by suitable face plate f attached by suitable screws, the said face plate covering the bearings for the presser-bar to be described.

The awl-bar has its bearings in a swinging head E', pivoted at E², see dotted lines Fig. 1, said head having a suitable face plate or cover E^{2*} attached thereto by suitable screws, and in said head I prefer to provide an adjustable gib or side-wall E³, partially shown in Fig. 2, it being controlled by suitable screws as e¹⁴ to compensate for any wear of the needle-bar. The pivoted head E' has an ear E⁴ upon which is pivoted a feed regulating lever E⁵, said lever at its inner end having a link E¹⁵ connected with a two part sliding block E¹⁶ on a pin, e²⁰, see Fig. 1^a, one part of the said block entering a slot 2 at the rear side of the swinging head, the other part entering a groove in the face of the rocking arm d, fast on the rock shaft d' having a second arm d² extended downwardly, as best shown in Fig. 9, and provided at its lower end with a roller or other stud d²⁰ which enters the cam groove d³, see Fig. 4, at one side of the cam disk D, said cam groove d³ rocking the said arm d and turning the swinging head carrying the awl-bar, more or less, about its pivot, according to the position of the block E¹⁶ controlled by the link and lever E⁵ with relation to the center of oscillation of the rock-shaft d'.

Viewing Fig. 10 the part of the cam designated 12 is for moving the swinging head from its elevated backward position toward the elevated needle, so as to place the awl the distance of the next stitch to be made from the needle; and give the awl-bar a chance to descend and the awl to enter the material; the part 13 is to then further move the swinging head, the awl being in the material, to thus feed the material; the part 14 holds the head while the awl is being retracted from the material, and then the part 15 acts to move the head into its extreme backward position or laterally to the right viewing Fig. 1, the part 16 of the cam designating a rest for the head while the needle descends and the awl-bar is up.

The cam C has at one side a cam groove c which receives in it a roller or other stud c' of an arm c² pivoted on a stud c³, shown by dotted lines in Fig. 1, and partially by dotted lines in Fig. 9, the outer end of said arm having jointed to it a rod c⁴ which is shown as extended loosely through a clutch c⁵ suitably shaped or forked at its inner end to embrace the T-shaped flange of the clutch wheel or device c⁶, fast on the shaft c⁷, said clutch embracing the periphery of said wheel, as best shown in Figs. 8 and 9. The rod c⁴ above the clutch c⁵ is provided with a suitable adjusting nut c⁸,—one or more,—and has attached to it a spring c⁹. The spring c⁹, attached at one end to a fixed part of the machine, acts normally to keep the clutch in such position

that the clutch wheel c^6 may be turned freely between the forked part of the clutch without any restraint therefrom, but whenever the rod c^4 is thrown down so as to depress the outer end of the clutch c^6 , then the forked part thereof bites quickly the T-shaped rim of the wheel c^6 and turns the same sufficiently to cause the arm c^{30} , see Figs. 1 and 2, acting on the stud 122 extended from the presser-bar c^{13} , to lift the presser foot c^{14} from the work, whatever may be its thickness, for a definite distance. The lifting movement of the presser foot is effected during the downward movement of the rod c^4 , and as soon as the said rod starts to rise, owing to the shape of the cam groove c , the spring c^9 assumes instantaneously the control of the clutch, and leaves the wheel c^6 free to turn by or due to the action of a spiral spring c^{33} , fixed at its upper end to one end of an arm c^{44} fast on the rock-shaft c^7 , the other end of the spring being attached to a stud c^{15} secured to the framework. The outer end of the arm c^{44} has attached to it a rod c^{16} , partially shown in Figs. 8 and 9, which rod in practice will be extended down to the floor, and connected with a suitable treadle by which to lift the presser foot whenever it is desired to remove or insert the work.

In Figs. 8 and 9 I have shown the rod c^4 as provided with a collar 102 on which rests one end of a small spiral spring c^{90} , which aids in counterbalancing the weight of the outer end of the clutch-lever c^5 and causes the inner end of an adjustable stop 103 mounted on said clutch to be borne against a rigid or fixed part of the frame-work.

The cam disk E has a suitable crank g , which, by a link g' , is jointed to an arm g^2 fixed on a rock-shaft g^3 , herein shown as mounted upon pivot screws, said rock-shaft having a toothed segment g^4 , the teeth of which engage the teeth of a gear g^5 fast on a short shaft g^6 , which shaft at its forward end is provided with a suitable shuttle driver g^7 , see the detail Fig. 7, adapted to engage the circular shuttle g^8 , said shuttle having an open side adapted to receive a suitable bobbin case g^9 , see detail Fig. 7, which in turn receives within it a disk bobbin g^{10} , said bobbin rotating on a cylindrical pivot extended therethrough from the bobbin-case, the rotation of the bobbin-case being, however, prevented by means of a suitable lug, as g^{12} , engaging a suitable notch in the holder g^{13} suitably pivoted to be moved toward and from the bobbin-case.

The rotating shuttle does not differ particularly from other rotary shuttles used in dry thread machines, and the bobbin case and its means for restraining the rotation of the same during the stitching operation are and may be as usual.

The parts of the machine with which the thread contacts in its passage from the usual wax pot to the material to be stitched and from the disk bobbin to the material will be

suitably heated to keep the wax, or whatever liquid is upon the thread, at the proper degree of softness.

The frame-work of the machine supports a suitable raceway plate m chambered for the reception of the shuttle and to constitute a race-way for the same in its movements, and the top of the said race-way plate m has attached to it a throat plate m' , said throat plate being slotted at its forward end in usual manner for passage through it of the needle and awl.

I have now described all the parts of the machine with the exception of the slack thread controller. This thread controller consists essentially of a finger h suitably attached to a slotted arm h' , see Fig. 5, mounted loosely upon a vertical stud h^2 fixed in the head of the machine, the slot in said arm receiving in it the lower end of a vibrating lever h^3 , pivoted at h^4 and having a pin h^5 which enters a slot h^6 at the rear side of the needle-bar, see Fig. 4, the lower end of said groove, as said needle-bar completes its ascent, acting upon said vibrating lever and moving the arm h' to its fullest extent in one direction, viz:—to put the finger h farthest toward the front of the machine so as to be out of the way of the awl-bar during its movements. After the awl-bar has been elevated and retracted and just as the needle-bar begins to go down, the spring h^7 acts quickly on and moves the said vibrating lever, causing it to move the arm h' and slack thread controller h to quickly cross the path of movement of the needle and act upon the needle-thread between the throat-plate and the eye of the needle—which is then in its elevated position—carrying said needle-thread aside so that the needle in its further descent will not become entangled in its own slack thread.

Assuming the parts to be in the position shown in Figs. 1 and 2, the normal position of the parts when the work is to be inserted or removed, it being, however, also understood that the presser foot would be resting upon the material to be stitched rather than upon the throat-plate, as shown.

Now in the further rotation of the cam-shaft in the direction of the arrow marked on the cam E, the needle-bar descends and enters the hole previously made for it by the awl, the needle-bar rises slightly to throw out a loop, the point of the shuttle enters the loop, expands the same, and casts the loop of needle-thread about the bobbin, shortly after the point of the needle rises from the work. The needle-bar then continues to rise and is lifted sufficiently to carry its lower end above the off-set portion of the awl-bar, when the upward movement of the needle ceases, and at about this time the take-up commences to act to pull up the thread about the shuttle and set the stitch, the shuttle, in the meantime, having moved backwardly to substantially its starting point.

While the needle-bar is in its elevated po-

sition, the swinging-head carrying the awl-bar will be moved forward toward the needle until the awl occupies a position with relation to the needle equal to the length of the next stitch to be made, when the awl-bar commences to descend and the awl is made to pass vertically through the leather and is then moved laterally while in the material to carry the awl into a position immediately below the then elevated needle. The material having been carried forward the length of a stitch the awl is retracted vertically from the material and the swinging-head is then rocked backwardly to bring the off-set part of the awl also out of the path of movement of the needle bar, and while the awl-bar is in its backward position the needle-bar is thrown down and the needle is made to penetrate the hole just made in the material by the awl, but just before the awl commenced to descend the slack thread controller was thrown forward, so that after the needle started down a little the slack-thread controller engaged the needle thread between the work and the eye of the needle, and, as the needle continued to descend, carried that part of the needle-thread out of the way of the descending needle.

It will be understood that the presser foot will be lifted automatically, by the devices described, from the surface of the material during the time that the awl in the material is moving the same to feed the material the length of a stitch, the presser foot descending quickly upon the material as soon as the forward stroke of the awl has been completed it resting upon the material during the ascent of the awl and during the time that the needle penetrates the material and remains therein.

In my machine it will be understood that the point of the shuttle, when taking the loop of needle-thread, moves in the direction of the feed of the material rather than opposite the direction of the feed of the material as in ordinary dry thread machines using rotary shuttles, and as a result of such direction of movement the tension and draw of the shuttle thread on the needle thread is such as to twist, once around, the shuttle thread.

The clamping tension B^{15} consists essentially of a rod n having at one end a head or collar n^{20} , see Figs. 1 and 11, said rod having at its outer end a finger n' which is acted upon by a cam n^2 suitably attached to or forming part of the rocking sleeve a^7 , the said cam being held in adjusted position on said sleeve by screw n^3 , the cam being preferably in the shape of an open loop, so that it may be adjusted in order to clamp the thread at just the proper period with relation to the stitching as may be desired. A spring 33, see Fig. 2, acts normally to keep the clamping tension open, said spring working in opposition to the cam n^2 , the spring acting at one end on a suitable projection shown as the screw n^8 used to hold n' on the rod n .

Having described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. A sewing machine containing the following instrumentalities, viz:—a needle-bar, a connected eye-pointed needle, a stationary guide for the said needle bar means to move the said needle-bar and needle vertically in said stationary guide; an awl-bar; an awl; a swinging head in which the awl-bar is mounted, means to reciprocate the awl-bar and to vibrate said head, and a throat-plate, stitch-forming mechanism below the throat plate complementary to the needle-bar, the devices for moving the awl bar laterally and vertically being constructed as set forth, whereby the awl located at the same side of the material as the needle is made to move toward the needle while the latter is elevated to occupy a position a distance from the needle equal to the length of a stitch, the awl-bar then being thrown down to puncture the material and feed the same when it is raised from the material and moved upwardly out of the way of the needle-bar and needle preparatory to its next descent, substantially as described.

2. In a sewing machine the following instrumentalities, viz:—a work-support; a needle-bar provided with a needle; a stationary guide for the said needle bar means to reciprocate the needle vertically in said stationary guide with relation to said work support; a swinging guide-box, an awl bar located at the same side of the work-support as the needle-bar and offset at its lower end toward the needle-bar and provided with an awl; means to reciprocate said awl-bar in said guide box; and devices to move the guide box away from the needle-bar and needle always for a distance greater than the length of the stitch next to be made, and to turn the said guide-box toward the needle-bar and needle while both the said bars are elevated, and place the awl distant from the needle equal to the length of the next stitch and keep it there while the awl-bar is depressed to enter the material, and to thereafter further turn the guide-box toward and into the path of movement of the needle to thus cause the awl to feed the material for a stitch, the said guide-box remaining in said position while the awl is being retracted from the material, the said devices thereafter again moving the said guide-box away from the needle-bar for a distance in excess of the length of the stitch, as and for the purposes set forth.

3. In a sewing machine the following instrumentalities, viz:—a work support; a needle-bar provided with a needle; a stationary guide for the said needle bar means to reciprocate the needle vertically in said stationary guide with relation to said work-support; a swinging guide-box, an awl bar located at the same side of the work support as the needle-bar and offset at its lower end toward the needle-bar and provided with an awl; means to reciprocate said awl-bar in said guide-box; and devices to move the guide-box away from the

needle-bar and needle always for a distance greater than the length of the stitch next to be made, and to turn the said guide-box toward the needle-bar and needle while both
5 the said bars are elevated, and place the pawl distant from the needle equal to the length of the next stitch, and keep it there while the awl-bar is depressed to enter the material, and to thereafter further turn the guide-box
10 toward and into the path of movement of the needle to thus cause the awl to feed the material for a stitch, the said guide-box remaining in said position while the awl is being retracted from the material, the said devices
15 thereafter again moving the said guide-box away from the needle-bar for a distance in excess of the length of the stitch, and an under thread carrier, and devices to move the same through the loop of needle thread in a direction opposite the direction of the feeding
20 movement of the material, as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE F. NASON.

Witnesses:

GEO. W. GREGORY,
EMMA J. BENNETT.