3 Sheets—Sheet 1.

R. EICKEMEYER.

SEWING-MACHINES.

No. 182,182. Patented Sept. 12, 1876.

Fig. 1.

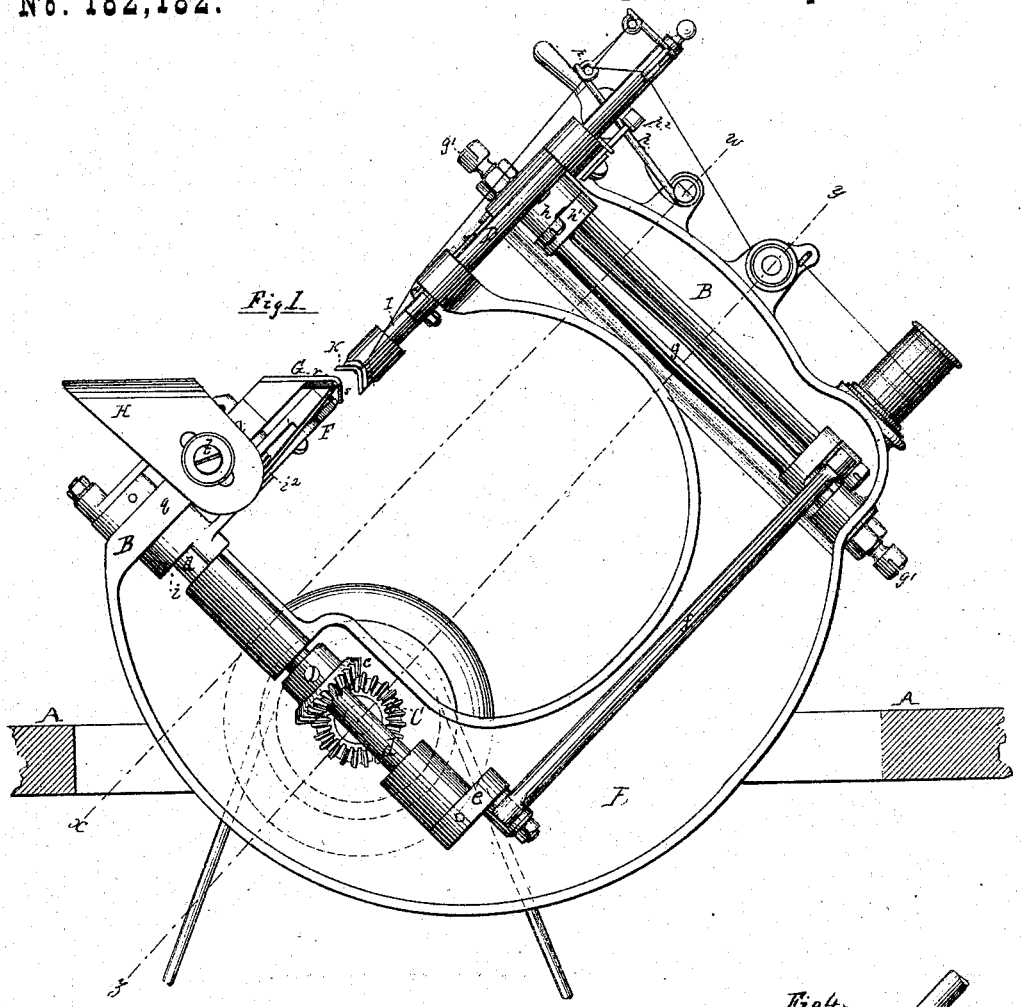

Fig. 2.

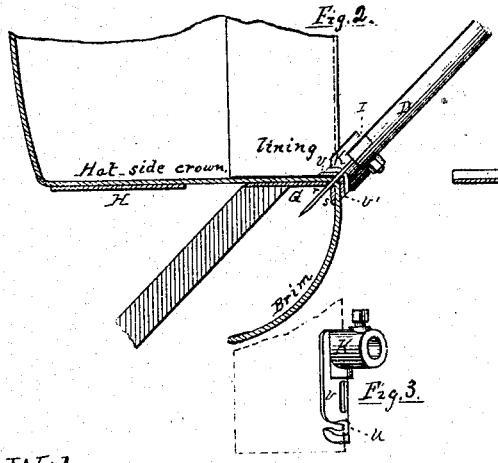

Fig. 3.

Fig. 4.

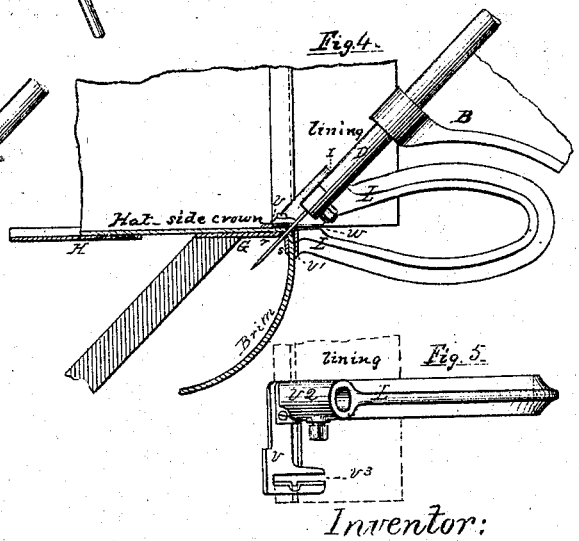

Fig. 5.

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3 Sheets—Sheet 2.

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SEWING-MACHINES.

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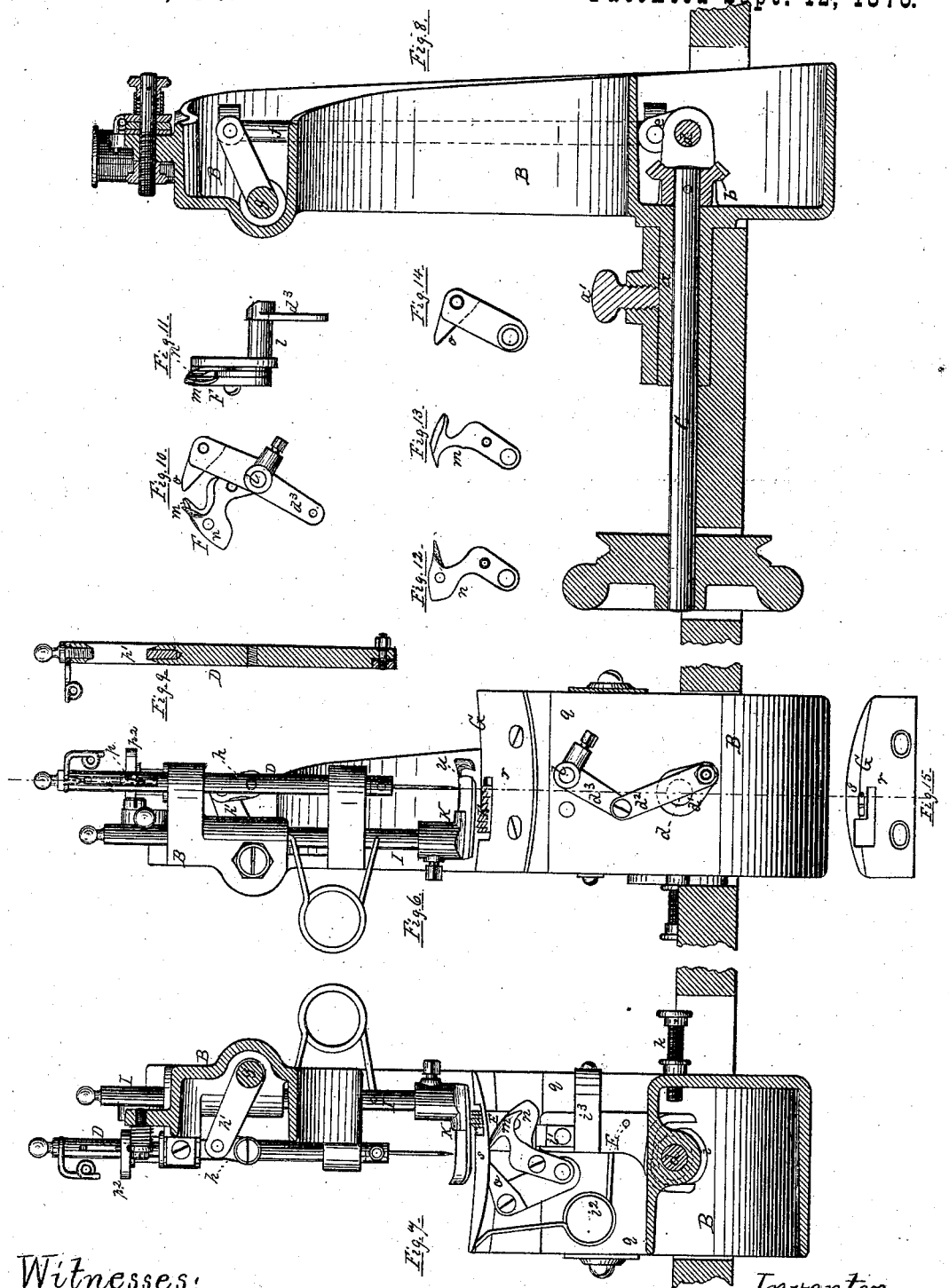

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3 Sheets—Sheet 3.

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SEWING-MACHINES.

No. 182,182. Patented Sept. 12, 1876.

Fig. 16.

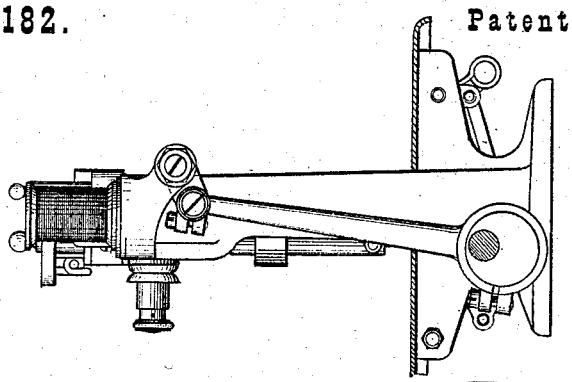


Fig. 18.

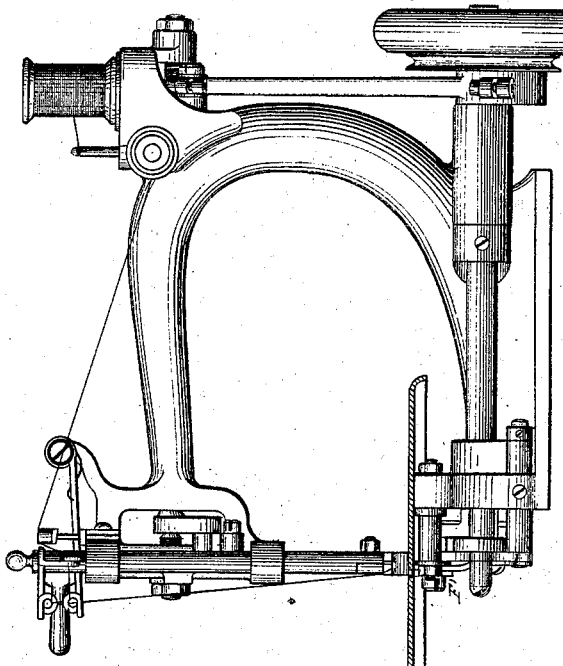


Fig. 17.

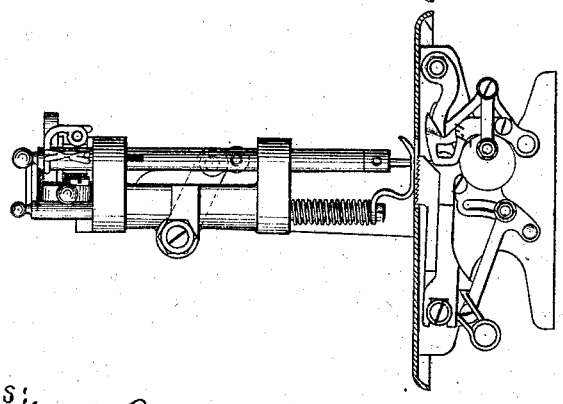


Fig. 22.

Fig. 21.

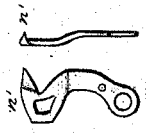


Fig. 20.

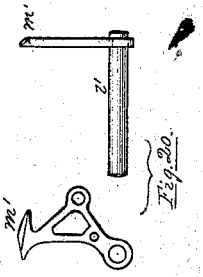
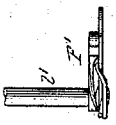


Fig. 19.



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UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, OF YONKERS, NEW YORK.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **182,182**, dated September 12, 1876; application filed April 26, 1876.

To all whom it may concern:

Be it known that I, RUDOLF EICKEMEYER, of the city of Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a true, clear, and complete description of my invention and of machines embodying my improvements.

Certain features of my invention are applicable to machines adapted to general service, and other features are only adapted to perform the special service of stitching sweat and other linings into hats.

One portion of my invention consists in axially mounting the entire mechanism in a frame, which is supported by and pivoted upon a transverse main driving-shaft, so that the machine may be operated as is usual with sewing-machines, or at will be thrown backward and made to operate while in an inclined position. This feature is of great practical value in connection with hat-work, and is also of value in many other connections, as thereby, for instance, an operative may run a power-machine with equal facility, whether seated on a chair, as usual, or in a standing position.

Another portion of my invention relates to single-thread stitching mechanism; and it consists in the combination, with a cast-off, of a complex looper, composed of two hooks, which project in opposite directions, are united to each other, are vibrated together, and are so arranged that one hook performs the well-known function of a looper for drawing out a loop from the needle, and the other hook operates as a spreading and controlling device, for opening the loop and carrying its lower end past the path of the needle, and for maintaining control of the loop after the cast-off has cleared it from the looper-hook, and then releasing it while the looper-hook is drawing out a succeeding loop. This feature is of general value in single-thread machines employing a vibrating hook or looper; but it has a special value in machines of this class which are adapted to hat-work, involving the stitching of heavy sweat-linings into full stiff hats.

Another feature of my invention relates to hat-work, and is designed to locate the outside stitch-line sufficiently above the exterior junction of side crown and brim to enable the outside stitch-line to be covered by the hat-band. This portion of my invention consists in a work-plate, having two faces, rectangular to each other, and a needle, which moves in a line with or parallel to a line bisecting the angle of the work-plate, in combination with a presser-foot, having faces which correspond with the faces of the work-plate, which presses equally on both faces, and which moves to and from the work-plate in a line parallel with the path of the needle.

Another portion of my invention relates exclusively to hat-work; and consists of such a construction of the work-plate, adjacent to the feeding-dog and presser-foot, that a stiff, curled brim of a hat will not be unduly bent during the stitching of a sweat-lining into the hat. This novel construction, briefly stated, consists in a work-plate, having a front face for supporting the side crown, and a narrow rear face for supporting the brim, mounted upon a standard, which projects above the driving-shaft, and contains or supports the feeding and the stitch-forming mechanism, whereby a free open space is afforded at the rear of the standard, between the driving-shaft and the rear face of the work-plate, for the reception of a stiff, curled brim.

Another portion of my invention relates exclusively to hat-work, and is designed to provide a work-plate which may be adjusted so as to support hats with crowns of various forms, and also to facilitate the guiding of the hat to the stitching mechanism. This feature consists in the combination, with the main work-plate, of an auxiliary work-plate, mounted adjustably on the frame of the machine, so that it may be set in any desired position with relation to the main work-plate.

Another feature of my invention also relates exclusively to hat-work, and is designed to enable the machine to stitch a turned lining, as well as linings which are not turned after stitching. This feature consists in an attachable presser-foot, which is provided with two compressing-faces, and an intermediate space between the two for the reception of the sweat-lining. It is also provided with a transverse

slot, having an open end, which serves as a guide for the edge of the lining which is adjacent to the needle.

Other minor features of my invention will be hereafter definitely set forth.

Sewing-machines heretofore used for stitching sweat-linings into hats have failed in many respects to meet the requirements of the art. As an instance, I will state that when linings are stitched into hats with curled brims by any of those machines, it is necessary to turn or bend the brim down closely in order that it may clear the work-plate and the stitching mechanism, whereby the stiff of the hat and its shape is always more or less impaired. Again, machines for this purpose, as heretofore constructed, have either had only a capacity to stitch the lining at the edge with a fancy stitch, or through and through from the front side of the lining in plain stitching, leaving the line of stitches in each case in full view, or, on the other hand, a capacity for stitching a lining from its rear side, so that it could be subsequently turned, and thereby conceal the line of stitches.

So far as my knowledge extends, no machine prior to my present invention has possessed the double capacity of performing either service when desired, nor the capacity to operate on hats with curled brims without bending or flattening said brims.

To more particularly describe my invention, I will refer to the accompanying drawings, of which there are three sheets.

Figure 1, Sheet 1, represents one of my machines in side view, with a portion of its table or stand in section. Fig. 2 represents a portion of the work-plate and presser-foot in section, and the needle-bar and needle in relative position as if operating upon a hat shown partially in section, and a lining which is being stitched directly through its face to the hat. Fig. 3 represents, in perspective, the presser-foot shown in Fig. 2. Fig. 4 represents the work-plate, presser-foot, and needle, as if stitching a lining, which is to be subsequently turned. Fig. 5 represents, in top view, the presser-foot shown in Fig. 4. Fig. 6, Sheet 2, represents the machine in front view, with the adjustable auxiliary work-plate removed. Fig. 7 represents the upper and lower portions of the machine in section on line *w x*, Fig. 1, and also represents the looping mechanism as viewed from the rear of the work-plate. Fig. 8 represents the machine in lateral vertical section on line *y z*, Fig. 1. Fig. 9 represents the needle-bar detached and in section. Fig. 10 represents, in side view and detached, the looper, the auxiliary hook, their axis, a lever by which they are vibrated, and the cast-off. Fig. 11 represents, in edge view, the devices shown in Fig. 10. Fig. 12 represents the looper in side view and detached. Fig. 13 represents the spreading-hook in side view and detached. Fig. 14 represents the cast-off in side view and detached. Fig. 15 represents the main work-plate in top view. Fig. 18, Sheet 3, represents, in side view, a sewing-machine embodying my novel stitching mechanism adapted to ordinary service, with a flat work-plate of the usual form. Fig. 17 represents the same in front end view. Fig. 16 represents the same in rear end view, with the driving-wheel removed from the main shaft. Fig. 19 represents the looper and spreading-hook detached, in top view. Fig. 20 represents the spreading-hook and its axis detached, in front and edge views. Fig. 21 represents the looper detached, in front and edge view. Fig. 22 represents the cast-off detached, in front and edge views.

It is to be understood that my machine, in practice, is mounted upon a bench or table, as at A, and arranged to be operated by a treadle or other well-known driving mechanism.

In Fig. 1 the form of the frame at B is clearly shown. It resembles in outline the letter G, and is composed of cast metal. The frame is laterally recessed for the reception of the operative mechanism, as is clearly shown in Figs. 1, 7, and 8. The entire machine is mounted upon a transverse main driving-shaft, as at C, which is embraced within a neck or sleeve, *a*, cast solid with the frame, as clearly indicated in Fig. 8. This sleeve serves as a trunnion for the frame, and permits it to assume any desired position, and it is securely held therein by a set-screw, as at *a'*, in the housing of this sleeve, as indicated in Fig. 8. The main driving-shaft has at its inner end a bevel-gear, *b*, which meshes with a bevel-gear, *c*, on the counter driving-shaft *d*, which is mounted in bearings attached to the frame. Motion is imparted to the needle-bar D from the counter-shaft by means of the crank *e*, rod *f*, rock-shaft *g*, with a lever at each end, and the link *h*, which connects the lever *h'* at the front end of the rock-shaft with the needle-bar. The needle-bar operating rock-shaft *g* has an adjustable screw-center at each end, as at *g'*, thereby securing a bearing having a minimum of friction and a capacity for readily taking up wear, thereby securing at all times a smooth and easy motion of the needle-bar. The shaft *d*, which operates the needle-bar, the feeding and the looping mechanism, is referred to by me herein as a "counter-shaft," and also as a "driving-shaft," in contradistinction to the transverse main driving-shaft C, on which the entire machine is mounted. The feeding mechanism and the stitch-forming mechanism are mounted upon the base or standard *q*, which extends upward above the driving-shaft *d*, and on the top of this standard or base the work-plate is mounted. The feeding mechanism is operated by the counter-shaft *d* by means of a cam, *i*, which lifts and vibrates the feed-bar E in its forward or feeding movement. The bar is guided by means of a vertical slot and a pivoted guide-block, as at i^1. The downward and backward movement of the feed-bar is effected by means of the spring i^2. The adjusting-screw at *k*, Fig. 7, regulates

the length of the stitch by limiting the backward movement of the feed-bar. A bent plate, at i^3, is secured to the frame, and passes to the rear of the feed-bar adjacent to the guide-block i^1, which, by contact with the bar, serves to maintain it in position. The feed-bar dog has two serrated surfaces for engaging with the side crown and the brim at their exterior junction.

The stitch-forming devices, which operate in conjunction with the needle, are also operated by the counter-shaft D, which extends through the frame at the front, and has a crank, d^1, at its outer end, clearly shown in Fig. 6. The crank d^1, by means of a link, d^2, is connected with the hub-lever d^3, which is connected by a set-screw with a rock-shaft, *l*, on the opposite or rear end of which the looper is mounted. The looper F is clearly shown in working position, and is also illustrated in detail on Sheet 2. It is composed of the vibrating looper-hook *m* (similar to others heretofore in use) and the novel spreading-hook *n*. These hooks project in opposite directions, and are secured to each other, side by side, on the same rock-shaft *l*. The working-point of the spreading-hook is curved toward the coincident side of the looper-link, and is closely adjacent thereto, so that the thread of the loop between the looper-hook and the spreading-hook will, as the loop is drawn out, be carried outside said curved point, and so enable the spreading-hook at the return movement to freely enter the loop and open it.

The cast-off is shown at *o*. It is fixedly mounted on an arm which is secured to a stationary sleeve, in which the looper rock-shaft *l* is located. The looper and cast-off, with the rock-shaft and its lever, all in their proper relative positions, are shown detached in Figs. 10 and 11, and the looper-hook *m*, spreading-hook *n*, and cast-off *o*, are shown in detail in Figs. 12, 13, and 14, respectively. The peculiar operation of these parts will be hereafter fully described.

The tension devices and take-up are clearly shown in Fig. 1. The thread passes from the spool, through an eye, thence between spring-disks, thence through an eye on the needle-bar, thence through the take-up eye in the tension-spring *p*, thence upward through a second eye on the needle-bar, and from thence through the eye of the needle. The tension-spring lever *p* is secured to the frame of the machine, and extends through a central vertical slot, at p^1, in the needle-bar, shown in Fig. 8. The tension-lever is forced downward by its spring, and limited in its upward movement by the cross-bar p^2, which is cushioned to prevent undue noise in operation. The two thread-eyes on the needle-bar are formed of one piece of wire, and are secured by means of a screw inserted in the upper end of the bar, as shown in Fig. 9.

I will next describe those peculiarities of construction and arrangement of the work-plate and of the mechanism beneath it, which provide for maintaining a curled brim intact while stitching a sweat-lining. It is to be observed, at Fig. 1, for instance, that the counter-shaft *d* extends through the front base *q* of the frame, which is, in practice, in a full-sized machine, only about one-half inch in thickness. By reason of this extension of the counter-shaft the operative connecting devices between it and the looper are located in front of the base, and this necessitates at the rear of the base or standard *q* the occupation of a space only sufficient to accommodate the feed-bar and looper.

In practice, these last-named parts, with the front base *q* of the frame, occupy a space of about one and one-quarter inch, measuring from the front of the base to the rear.

It will also be observed that the work-plate G is well elevated on the standard *q* above the lower portion of the frame, and that there is a free open space below and surrounding the rear edge of the work-plate for the reception of even a very wide curled brim. This elevation of the work-plate is practically effected by reason of the feeding mechanism, and the looping or other stitch-forming mechanism being wholly mounted upon the standard, and connected with the driving-shaft by suitable communicating mechanism, and it will be seen that the feed-bar and a vibrating looper or hook may readily be mounted on and supported by the elevated standard, but that a revolving hook mounted on a revolving shaft, as heretofore, could not be practically employed with the elevated standard, because the great length of the hook required would necessarily involve the manipulation by a take-up of an excessive length of thread.

It will be seen, therefore, that it is important that the stitch-forming mechanism which is located below the work-plate should be mounted upon or supported by the standard, instead of being mounted upon or supported by the driving-shaft, as is usual in sewing-machines.

The work-plate shown in Fig. 15 is provided with the usual openings for the serrated faces of the feed-bar, and for the needle. It has a front face at *r* and a rear face at *s*. (Shown in side view in Fig. 1, and in section in Figs. 2 and 4, and in top view at Fig. 15.) The front face *r* has a bearing-surface of considerable area, and it is concave to conform generally with the exterior of a hat-body. At the junction of the two faces of the work-plate the edge is well rounded, although the line of either face is at right angles to the line of the other, as shown in Fig. 2. The needle in its movement bisects the angle of the work-plate, although similar results will be attained if the angle be not truly bisected, provided the path of the needle be in a line which is parallel with the path of the needle, as here shown, but advanced therefrom toward the front face of the plate. The rear face *s* is convex in its outline, as shown in Fig. 15.

H denotes an auxiliary work-plate. (Shown

in side view in Fig. 1 and in section in Figs. 2 and 4.) It is concaved to correspond with the surface of the main plate, and is provided with a slotted arm, whereby, by means of the holding-screw *t*, it is secured to the frame of the machine, and adjusted in any desired position. I denotes the presser-bar, which is provided with a spring and with a lifting-lever, as usual.

K denotes in Figs. 1, 2, 3, 6, and 7 a presser-foot, for use when the sweats are not to be turned, but are to be stitched through and through from their front faces. This presser-foot has two faces, *v* and v^1, for engaging with the two faces of the feed-bar and of the work-plate. It is also provided with a transverse slot, as at *u*, for the reception of the sweat-lining as it is fed with the hat to the stitching mechanism. The inner end of this slot serves as a guide for the upper or outer edge of the lining.

L in Figs. 4 and 5 denotes a presser-foot for stitching a lining, which is to be subsequently turned. It is provided with two compressing-plates, *v* and v^1. The plate *v* is for pressure upon the front face *r* of the work-plate, and the plate v^1 for pressure upon the rear face. The plates *v* and v^1 have an open intermediate space, as at *w*, between their adjacent edges, for the reception of the sweat-lining. The presser-foot is in the form of an elongated loop, the interior of which affords a space through which the lining passes. It is provided with a tubular neck at v^2 for the reception of the presser-bar, and a set-screw for securing it thereto. The plate *v* is provided with a transverse slot at v^3 for receiving the lining, and its lower end serves as a guide for the edge of the lining.

On Sheet 3 I show the stitching mechanism combined with an ordinary flat work-plate. The frame of this machine is unlike that previously described, and will be seen to be of ordinary construction. It is only necessary to explain that the looper F′, as a whole, is similar to that already described, having the rock-shaft *l′*, the looper-hook *m*, and spreading-hook *n′*, operating in conjunction with the cast-off *o′*. The two hooks are slightly different in form from those previously described, and the same is true of the cast-off, but they operate in precisely the same manner. The looper is vibrated by means of a link, which connects with a crank-pin on the driving-shaft, as clearly shown in Fig. 17.

The following description of the operation of the stitching mechanism is applicable to both forms of machine:

Referring to Fig. 7, it is to be understood that the needle is ascending after having made a stitch, and that the thread-loop is held by the looper-hook *m*. As the needle next descends the looper moves toward the left hand, and in doing so the point of the spreading-hook *n* passes inside the loop, opens it, and carries its lower end past the path of the needle; and before this backward movement is fully completed, the looper-hook *m* is relieved of the loop by the cast-off, the spreading-hook *n* meantime maintaining control of the loop. Now, as the looper next moves forward, the needle has been sufficiently elevated to open a new loop for the hook *m* to engage with; and as the needle continues to rise and the looper to move forward, the spreading-hook releases the previously-formed loop, and the stitch is drawn tight by the tension devices and the looper. The drawing out of each loop by the looper tightens the next previous one; and as the spreading-hook and looper move together, the spreading-hook is withdrawn from the previous loop as fast as that loop is tightened by the looper-hook in forming the new loop. The thread is thus held nearly tight during the action of the looper; but there is no strain on the thread, except when the looper-hook tightens the stitch, at which time the take-up provides for the length of thread necessary for forming the next stitch, and a firm seam can thus be made without danger to the thread, even if the machine be operating on full stiff hats with heavy linings.

I will now describe how, with my machine, an unturned lining may be stitched into a hat.

The presser-foot being raised, a hat is placed on the work-plate, with its corner or outside junction of side crown and brim in contact with the junction of the two faces of the work-plate. The lining is then passed through the guiding-slot *u* in presser-foot K, and adjusted beneath the foot with relation to the path of the needle. The presser-foot is then lowered. The hat is thus properly held against the two faces of the feed-bar. The auxiliary work-plate H will be adjusted so as to afford a good bearing for the side crown. In order to secure good results the hat must be guided accurately, and to do this it should be balanced as nearly as possible on the serrated faces of the feeding bar or dog, and this is readily effected by tipping the machine backward or forward. For high-crown hats I prefer that the brim should incline toward the operative, and for low crowns I prefer the brim to incline in the opposite direction. These preferences are, however, modified somewhat by the shapes of crown and brim, and no definite rule can therefore be given in this connection. With a little practice on any style of hat, this system of adjustment will render the guiding of the hat almost automatic, leaving the operative to attend specially to the guiding of the lining. The auxiliary work-plate, by adjustment, will afford a good bearing for the hat, whether it be larger at the crown than at the band or smaller. The machine is then put in motion, and the lining stitched. The upper edge of the lining is held in contact with the guiding-surface at the end of the slot *u*, thus securing a stitch-line which is truly parallel with the edge of the lining.

For stitching a turned lining into a hat the presser-foot K is removed, and the presser-foot L applied to the presser-bar, as indicated in

Figs. 4 and 5. In this case the lining, wrong side up, is passed through the transverse guiding-slot v^3, with its lower edge extended into the open space in the bent arm of the foot, after which the machine is operated as before, and after the stitching is completed the lining is turned down into the hat. In both cases the needle enters closely adjacent to the interior junction of crown and brim, and forms the outside stitch-line sufficiently above the exterior junction to enable the band to fully cover said stitch-line.

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

1. Sewing mechanism contained within or mounted upon a frame, which is axially mounted upon a transverse driving-shaft, substantially as described, whereby the mechanism may be operated while the machine is set in any desired position with relation to its driving-shaft, as set forth.

2. The combination, with a cast-off, of a looper, composed of two hooks, which project in opposite directions, are united to each other, are vibrated together, and arranged with relation to a needle, substantially as described, whereby one of said hooks draws out a loop from the needle and the other hook spreads the loop, carries the lower end thereof past the path of the needle, and maintains control of the loop after the cast-off has released it from the looper-hook, substantially as described.

3. In a machine for stitching linings into hats, a work-plate, having two faces rectangular to each other, and a needle which moves in a line with, or parallel to, a line bisecting the angle of the work-plate, in combination with a presser-foot, having two faces which correspond with the faces of the work-plate, which presses equally on both faces, and which moves to and from the work-plates in a line parallel with the path of the needle, substantially as described.

4. In a machine for stitching linings into hats, a work-plate, having a front face for supporting the side crown, and a narrow rear face for supporting the brim, mounted upon a standard, which projects above the driving-shaft, and contains or supports the feeding and stitch-forming mechanism, substantially as described, whereby a free open space is afforded at the rear of the standard above the driving-shaft, and below the rear face of the work-plate, for the reception of the edge of stiff curled brims, as set forth.

5. In a machine for stitching linings into hats, the combination, with the main work-plate, of an auxiliary adjustable work-plate, substantially as described.

6. The presser-foot L, provided with two compressing faces and an intermediate space between the two faces for the reception of a sweat-lining, substantially as described.

7. A presser-foot, having two pressing-faces and a transverse open slot in one of the faces, substantially as described.

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