(Model.) 3 Sheets—Sheet .1

A. W. JOHNSON.

SEWING MACHINE EMBROIDERY ATTACHMENT.

No. 307,657. Patented Nov. 4, 1884.

Fig 1.

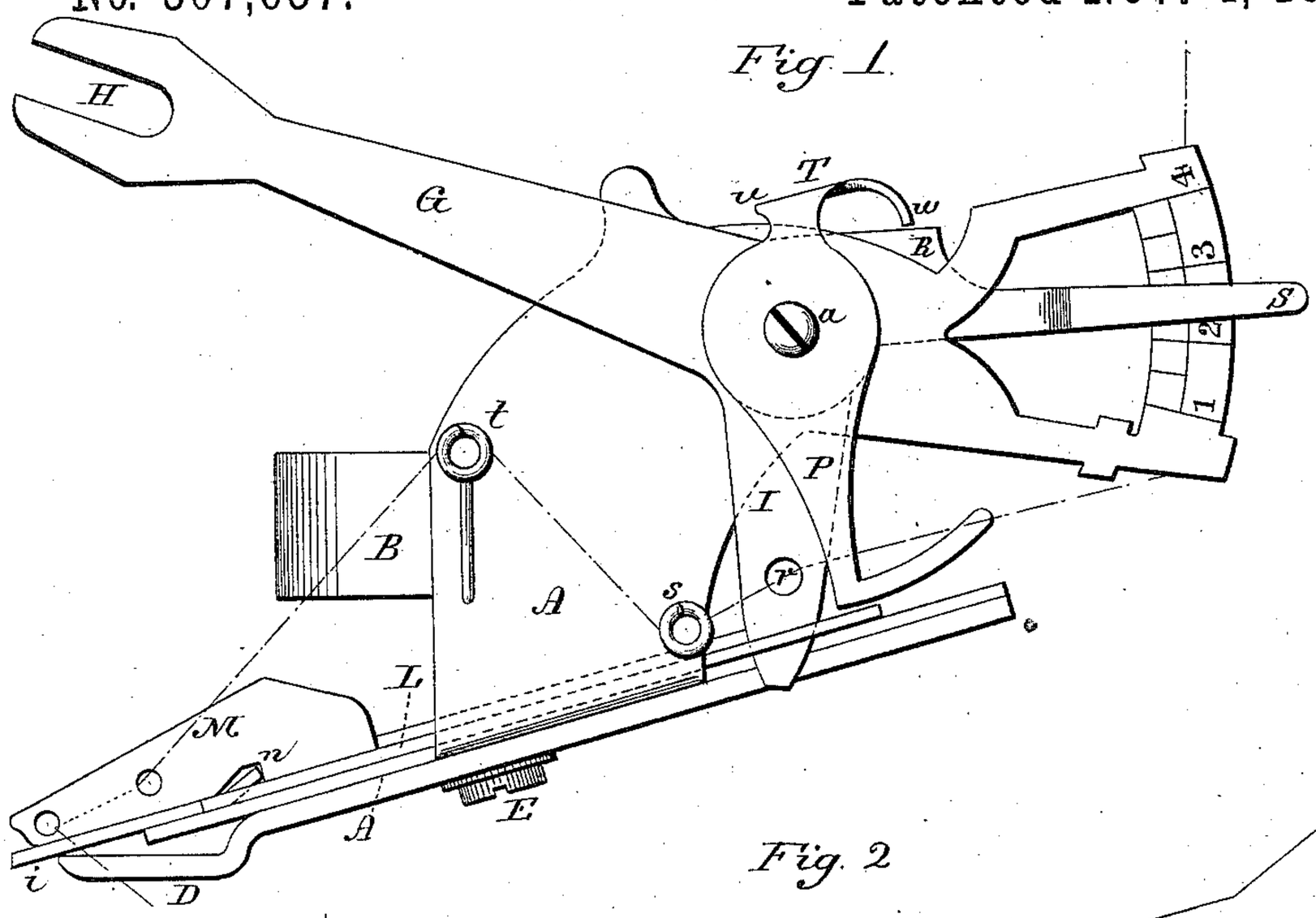


Fig. 2

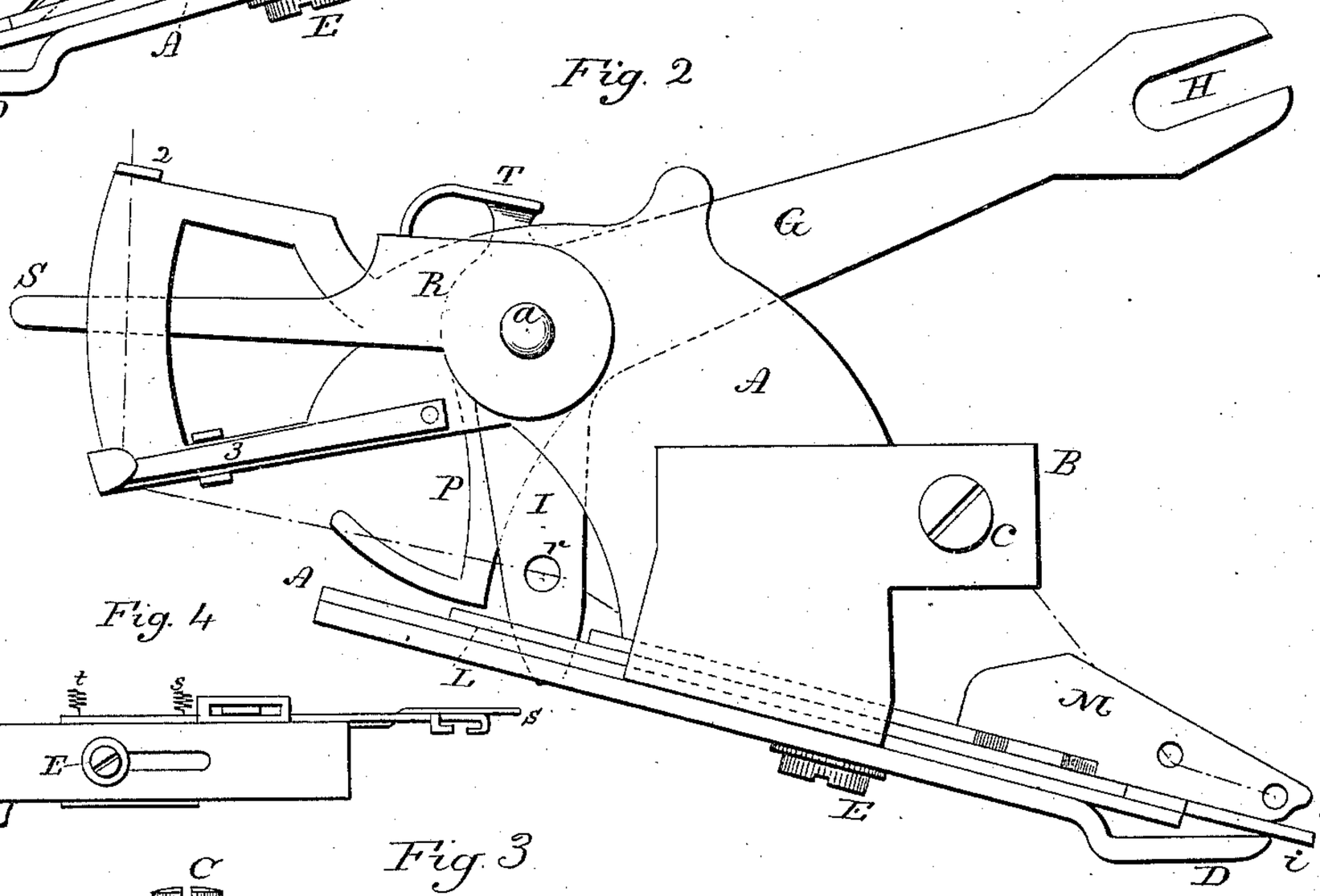
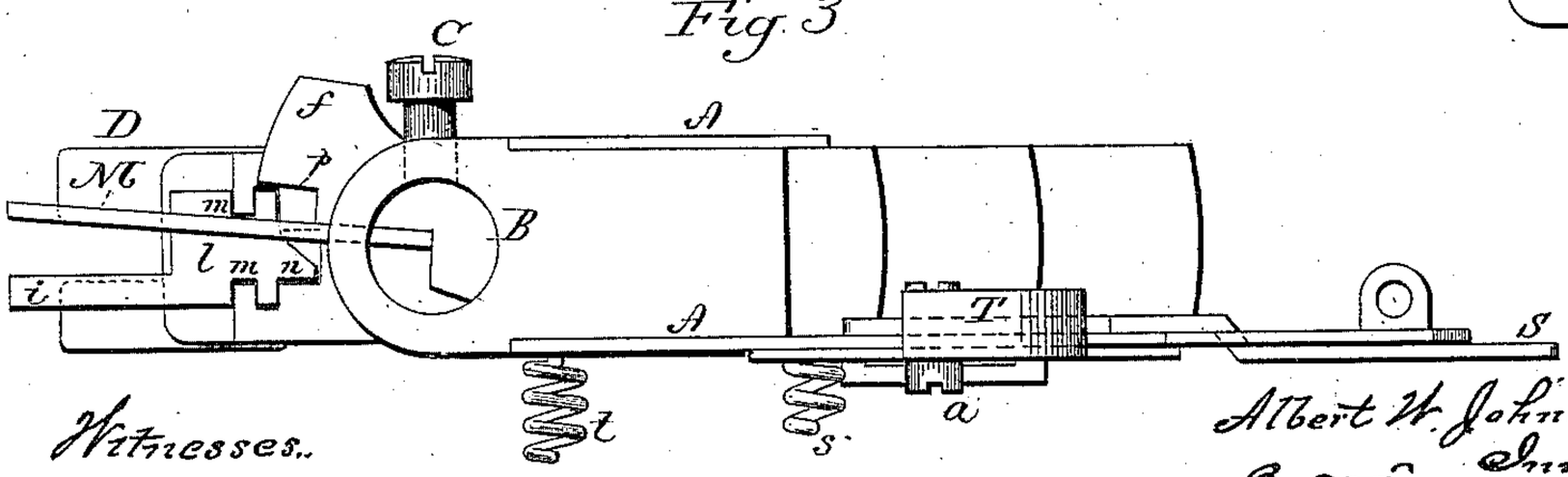


Fig. 4

Fig. 3



Witnesses.
L. N. Shumway
Jos. C. Earle

Albert W. Johnson
Inventor
By atty
John C. Earle

(Model.) 3 Sheets—Sheet 2.

A. W. JOHNSON.

SEWING MACHINE EMBROIDERY ATTACHMENT.

No. 307,657. Patented Nov. 4, 1884.

Fig. 5

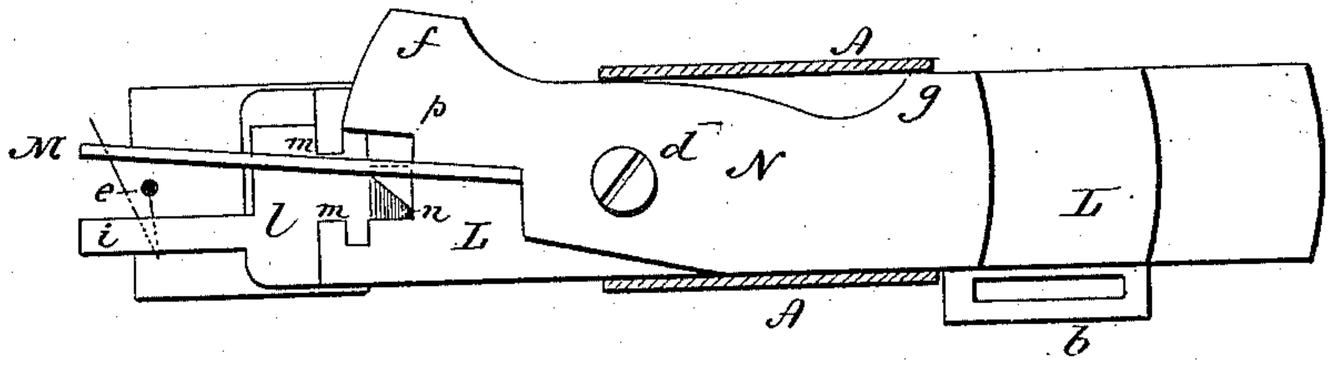


Fig. 6

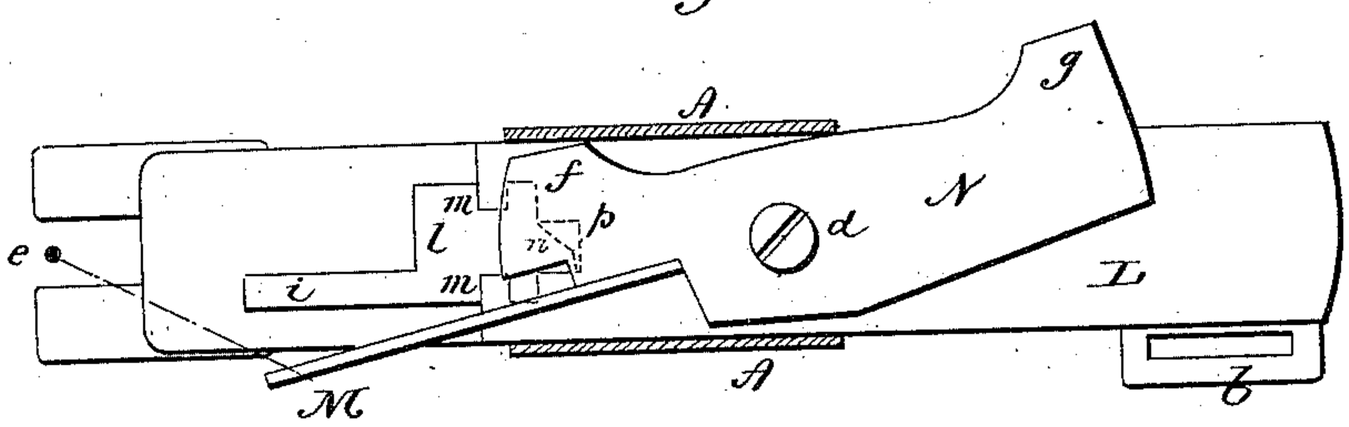


Fig. 7

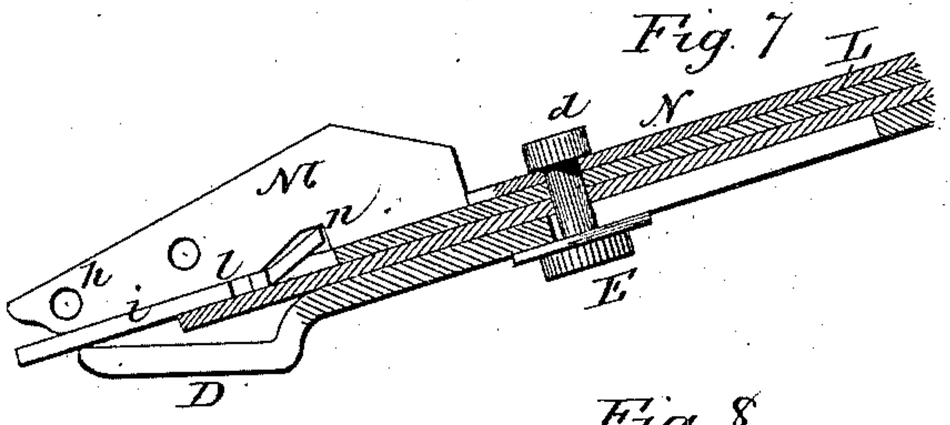


Fig. 8

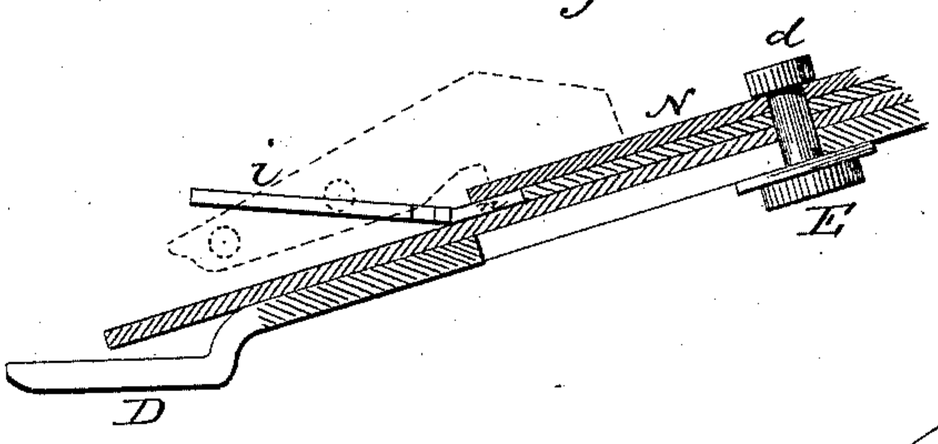


Fig. 12

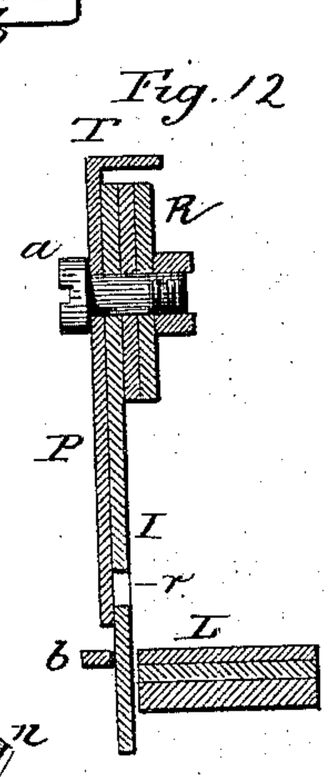


Fig. 9

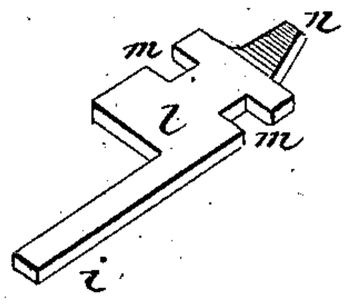


Fig. 10

Fig. 11

Witnesses.
J. A. Shumway
Jos. C. Earle

Albert W. Johnson
Inventor
By atty
Jos. C. Earle.

(Model.) 3 Sheets—Sheet 3.

A. W. JOHNSON.

SEWING MACHINE EMBROIDERY ATTACHMENT.

No. 307,657. Patented Nov. 4, 1884.

Fig. 13.

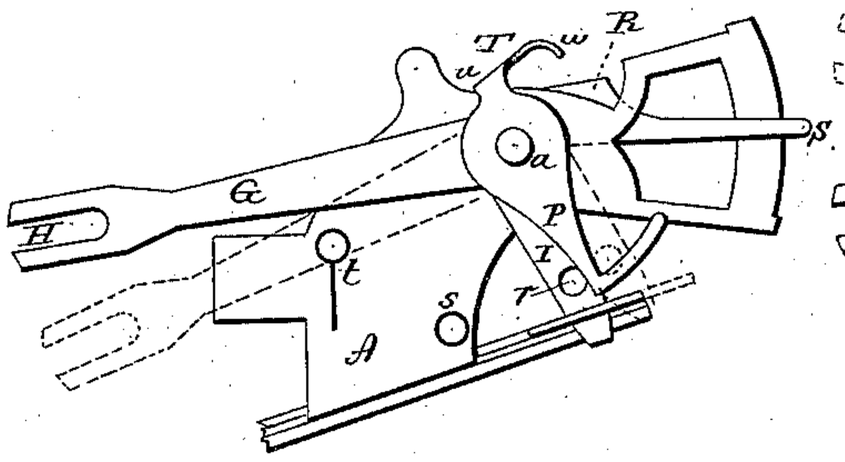


Fig. 14.

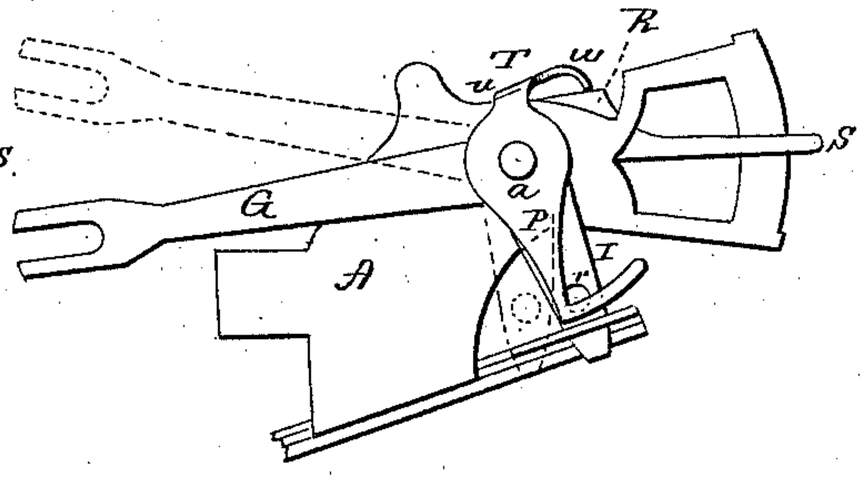


Fig. 15.

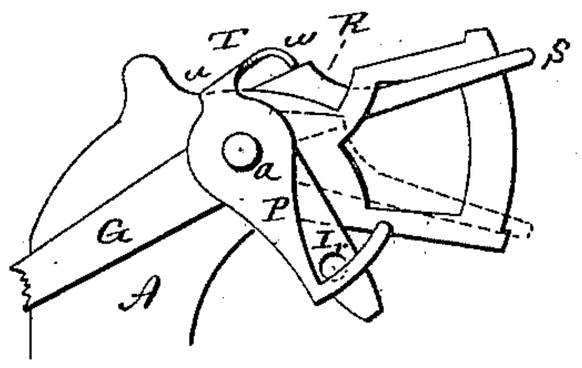


Fig. 16

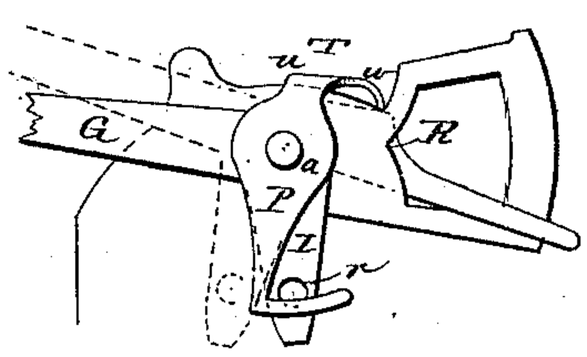
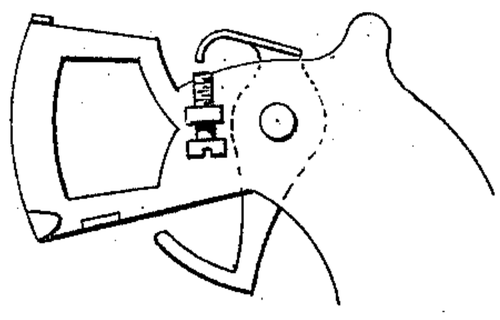


Fig. 17.



Witnesses.
L. F. Shumway
Jos. C. Earle

Albert W. Johnson.
Inventor
By atty.
Wm. D. Ewell.

UNITED STATES PATENT OFFICE.

ALBERT W. JOHNSON, OF NEW HAVEN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SACKETT MANUFACTURING COMPANY, OF WALLINGFORD, CONNECTICUT.

SEWING-MACHINE EMBROIDERY ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 307,657, dated November 4, 1884.

Application filed April 21, 1884. (Model.)

To all whom it may concern:

Be it known that I, ALBERT W. JOHNSON, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Embroidery Attachments for Sewing-Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view looking from the right; Fig. 2, a side view looking from the left; Fig. 3, a top or plan view; Fig. 4, an under side view; Fig. 5, a horizontal section showing the embroidery finger and looper in the extreme advance position; Fig. 6, the same as Fig. 5, showing the embroidery finger and looper at the extreme of their retreat; Fig. 7, a longitudinal section showing the parts in the position seen in Fig. 5; Fig. 8, a longitudinal section showing the parts as seen in Fig. 6, except the embroidery-finger, which is shown in broken lines; Fig. 9, a perspective view of the looper detached; Fig. 10, a diagram showing the successions of loops produced by the attachment; Fig. 11, a diagram showing a series of loops as gradually increased and then diminished under the operation of the adjusting apparatus; Fig. 12, a vertical section through the pivot *a;* Figs. 13, 14, 15, and 16, detached views of the take-up mechanism illustrating its operation and adjustment; Fig. 17, a modification of the adjusting device.

This invention relates to an improvement in embroidery attachment for sewing-machines, and to that class in which the embroidery-thread is carried by a finger moving over the surface of the fabric upon which the embroidery is to be made to present the embroidery-thread to the needle, the finger having substantially a vibratory movement, the object of the invention being to enable the operator to reduce or increase the width of the line of embroidery while the machine is in operation, and so that the line of embroidery may gradually increase from the single line of thread to the broadest extent of which the attachment is capable, or from the same broadest extent reduced to the narrowest or single line of thread; and the invention consists in the construction as hereinafter described, and more particularly recited in the claims.

The attachment as illustrated is designed to be fixed to the presser-foot; but it will be understood that, like other attachments, it is adapted to be applied directly to the work-table or at any point where it may be operated by connection with the needle-bar.

A represents the frame upon which the mechanism is supported; B, the socket by which it is attached to the presser-foot bar, and to which it is secured by a set-screw, C. Upon the under side of the frame the presser-foot D is attached.

G is a bell-crank lever, hung to the frame upon a pivot, *a*, its longer arm extending forward toward the needle-bar, its end terminating in a fork, H, by which to engage the needle-bar in like manner for sewing-machine attachments. Its other arm, I, extends downward and engages a slide, L, by means of a slot, *b*, therein. This slide is arranged in the frame to move in suitable guides toward and from the needle. The bottom of the frame stands inclined upward and rearward from the presser-foot, and the slide L is arranged to move thereon between the two sides of the frame, as seen in Fig. 5. It is held to the frame by means of a screw, E, through a slot in the bottom of the frame, as seen in Fig. 4. The up and down reciprocating movement of the needle-bar, operating through the lever G I, imparts a reciprocating movement to the slide L toward and from the needle.

M is the finger which carries the embroidery-thread. It is attached to or made a part of a plate, N, hung to the slide L by a pivot, *d*, so as to swing in a plane parallel with the slide, say, as from the position seen in Figs. 3 and 5 to the position seen in Fig. 6, Fig. 5 showing it in its extreme advance movement and Fig. 6 at its extreme retreat. The reciprocating movement of the finger M as from the position in Fig. 5 to that in Fig. 6 and return is imparted, as before described, by the lever G I through the slide L. In its extreme advance

position the finger stands to the left of the needle, as seen in Fig. 5, *e* indicating the needle. In its extreme rear movement it passes to the opposite side of the needle, as seen in Fig. 6, then, in advancing, the finger returns to the position seen in Fig. 5. Thus the finger has imparted to it a transverse vibratory movement during its forward and back reciprocating movement. This vibratory movement is imparted to the finger by means of the peculiar shape of the plate N. This plate works with the slide L between the two sides of the frame A A, as seen in Figs. 5 and 6. One edge of the plate N is constructed with two cams—one, *f*, upon the same end of the pivot as the finger, the other, *g*, upon the opposite end. As the slide brings the finger to its extreme forward position the cam *g* strikes the frame A and turns the finger to the left, as seen in Fig. 5. In the return movement, as seen in Fig. 6, the cam *f* strikes the frame in like manner, and turns the finger to the opposite side, as seen in Fig. 6. The location of the cams *f g* with relation to the finger is such that transverse movement is imparted to the finger as it approaches its two extremes. The finger M is provided with an eye, *h*, through which the embroidery-thread is run.

i is the looper. This looper is constructed as seen in Fig. 9, and consists of a finger projecting from a body, *l*. In each of the opposite edges of the body is a notch, *m*, and upon the opposite end of the body is a tail-piece, *n*, which is turned upward from the plane of the body, as seen in Figs. 7 and 9. The slide L at the needle end is constructed with a recess corresponding to the shape of the body, and as seen in Fig. 5, the slide L and body *l* being of substantially equal thickness, and so that the reciprocating movement of the slide L will be imparted to the looper *i*, and take the looper from the position seen in Fig. 5 to that seen in Fig. 6 and return.

For reasons hereinafter described it is necessary to raise the looper in its rear movement as from the position seen in Fig. 7 to that seen in Fig. 8. The tail *n* of the looper is turned upward, as before described, and stands in the path of a shoulder, *p*, on the plate N, and in the vibratory movement of the plate N from the position seen in Fig. 5 to that seen in Fig. 6. The shoulder *p* passes over the raised tail *n* of the looper, and in so doing forces the tail downward and raises the looper, as seen in Fig. 8, then on the return movement of the slide so soon as the shoulder *p* passes from the tail *n*, the looper falls to the position seen in Fig. 7.

The operation of the embroidery finger and looper thus arranged in connection with the needle of the machine is as follows: Suppose the machine to be at work, the needle-thread in the usual position, the needle down. In that condition the finger M is in its rear position. The thread, it being understood, is engaged at the needle, and extends from the needle to the eye in the finger M, as seen in broken lines, Fig. 6. At this time the looper *i* is raised, as seen in Fig. 8, and to a position considerably above the thread. Then as the needle rises the slide L advances, the looper falls upon the thread, the finger M passes to the opposite side of the needle, carrying the thread over the looper, as seen in broken lines, Fig. 5, the eye of the finger M at this time being in rear of the line of the needle. Then the needle descends in rear of the thread, as seen in Fig. 5, and after it has entered the work the finger M and looper begin their retreat, the finger passing to the opposite side of the needle, and the looper withdrawing from the loop which has been formed around it will leave that loop lying upon the work, as seen in Fig. 10, and so continuing each full reciprocating movement of the slide L will lay a loop upon the surface of the work, as seen in Fig. 10, thereby forming a series of loops, one stitch being made in each loop, as indicated in Fig. 10, which stitches secure the loops so made upon the work. As thus far described the embroidery would consist of a series of loops of equal extent.

To carry out the principle object of my invention whereby these loops may be gradually reduced or increased in size, as seen in Fig. 11, I provide a device whereby a regulated quantity of embroidery-thread may be delivered to the embroidery-finger at each operation. This device, as here represented, consists of a clamping-finger, P, hung upon the same pivot, *a*, as the bell-crank lever, and in a plane parallel with the arm I, and so as to bear with frictional contact upon that arm. Through the arm I is an eye, *r*, through which the embroidery-thread passes, and from which it is led through tension devices *s t* to the eye in the embroidery-finger, as seen in broken lines, Fig. 1. The thread is led to the eye *r* through an eye, 2, on the frame and beneath a suitable tension device, 3, here represented as a spring, as seen in Fig. 2. These eyes and tension device may be placed at any convenient position on the machine, not necessarily as a part of the attachment. The eye *r* in the arm I runs freely over the embroidery-thread in its retreat, and then as the embroidery-finger advances and carries the thread over the loop it permits the thread to run freely through it in the formation of such loop. Hung upon the pivot *a* is a lever, R, from which an arm, S, extends, and by which the lever may be conveniently turned in a plane parallel with the arm I and finger P. This lever is hung upon the side of the frame opposite that to the lever G, and so that it does not partake of the movement of the lever. The finger P is hung in frictional engagement with the lever G, so as to partake of its movement if permitted, as seen in Fig. 12. From the upper side of the hub of the finger P is an extension, T, turned over so as to stand above the lever R, as seen in Fig. 12. The operation of the finger P in connection with the arm I and the lever R is as follows: Supposing

the needle to be approaching its extreme descent, as seen in Fig. 13, up to this point the eye *r* of the arm I has been running freely back upon the thread. As the needle continues its descent, turning the lever G, the rear end *u* of the projection T strikes the top of the frame or other suitable stop, which arrests the further return of the finger P. Then as the needle completes its descent the arm I moves independent of the finger P until the finger covers the eye and passes onto the thread, as in broken lines. Then as the needle ascends the lever G rises, and in such ascent the arm I advances, taking with it the finger P with the embroidery-thread grasped, until as it approaches its extreme up position, as seen in Fig. 14, the opposite end, *w*, of the projection T strikes the back of the lever R, and is arrested thereby. From that point to the extreme up position the finger P is held and the arm I passes from beneath it, as seen in broken lines, Fig. 14, opening the eye *r* to free the embroidery-thread, and so that in the next descent of the needle the arm I may run free on the embroidery-thread until the finger P engages it as before. The finger grasping the embroidery-thread will hold it with sufficient strength to draw it through the tension device which holds back the embroidery-thread, and therefore deliver to the embroidery-finger a length of thread equal to the distance in which the arm I moves while the thread is grasped by the finger P. The tension upon the embroidery-thread back of the finger P should be sufficient to draw up the loop made by the embroidery-finger. On the descent of the lever G the finger P is arrested always at the same point, and if no adjusting device were applied, then all the loops would be alike, and each consist of such an amount of thread as would be delivered or fed by the finger P grasping the embroidery-thread. If, however, the finger be adjusted so that it will release the thread at different times in the up movement of the lever G, the length of thread delivered will vary accordingly—that is, the sooner the finger P relieves its grasp upon the thread the shorter will be the length of thread fed, and consequently the smaller the loop, for the reason that the loop is formed from the amount of thread delivered by the coaction of the finger P and the arm I. To adjust this feed the lever R is provided. If it be raised to its extreme up position, as seen in Fig. 15, then the end *w* of the projection T on the finger P will meet the back of the lever and prevent only the very slight movement of the finger, sufficient to give thread of the length of a single stitch under the ordinary feed of the machine, and in this condition the embroidery-thread will lie in a straight line upon the work. If, however, the lever R be turned to the extreme down position seen in broken lines, Fig. 15, then the finger P will follow the arm I, grasping the embroidery-thread until near the extreme up position of the lever G, as seen in Fig. 16, but so as to be stopped before that lever quite completes its up movement, in order that the eye may be opened, as seen in Fig. 16, to relieve the thread from the grasp of the finger P, and so that in the next descent of the needle the eye *r* of the arm I may run back free upon the embroidery-thread until it approaches its extreme rear movement, where it is again grasped as before. By adjusting the lever R from one extreme position to the other the take-up or amount of thread delivered for the embroidery-loop will be varied accordingly. Therefore, if, commencing in the up position where no loop is made, the lever R be gradually moved downward, each succeeding loop will increase in extent until at the extreme down position, and as seen in Fig. 11. Returning the lever R, the loops will gradually be contracted until the straight line of thread is reached, as also seen in Fig. 11. Thus the operator may at any time increase or diminish the size of the loops. As an illustration of the use of such increasing and diminishing of the width of the embroidery stitch or loops, it is sufficient to mention that of writing, where the lines which form the letter may be increased and diminished to correspond to the letter as made with a pen.

Instead of employing the lever R as a stop to adjust the take-up, it may be otherwise adjusted—as, for illustration, a screw arranged in the frame against which the end *w* of the take-up will strike, as seen in Fig. 17.

I have arranged the feeding device as a part of the operating or bell-crank lever; but it will be evident to those skilled in the art to which this invention pertains that an equivalent feeding device may be employed in other positions, it only being essential to this part of my invention that there shall be a feed between the finger which carries the embroidery-thread and the tension which will draw through the tension the requisite quantity of thread to be delivered to the embroidery-thread to form the loop.

In case the feed is not employed, and as I first describe the invention, it will be understood that the tension upon the embroidery-thread will be such as to permit the embroidery-finger to properly draw up the loop, but yield, as the embroidery-finger advances, to permit the requisite quantity to form a loop to be drawn through.

I claim—

1. In an embroidery attachment for sewing-machines, the combination of the reciprocating and horizontally-vibrating finger M, carrying the embroidery-thread, and the reciprocating and vertically-vibrating looper *i*, substantially as described.

2. In an embroidery attachment for sewing-machines, the combination of the slide L, arranged for longitudinal reciprocation, a lever constructed for connection with the needle-bar, and whereby the reciprocating movement of the needle-bar is imparted to said slide, the looper *i*, hung to said slide and so as to partake of its reciprocating movement,

the looper constructed with the tail-piece *n*, the plate N, hung upon said slide so as to swing in a plane parallel with the slide but partake of the longitudinal movement of the slide, and the embroidery-finger M, attached to or made a part of said slide, said slide constructed with a shoulder, *p*, to operate upon the tail-piece *n*, whereby an up and down movement is imparted to the looper, substantially as described.

3. In an embroidery attachment substantially such as described, the combination of the reciprocating and horizontally-vibrating finger M, the reciprocating and vertically-vibrating looper *i*. a tension device to act upon the embroidery-thread, and a feed between said tension and embroidery-finger, substantially as described, and whereby the requisite quantity of thread is delivered to the finger to form the loop.

4. In an embroidery attachment substantially such as described, the combination of the reciprocating and horizontally-vibrating looper *i*, the tension device to act upon the embroidery-thread, and an adjustable feed between said tension and the embroidery-finger, substantially as and for the purpose described.

5. The combination of the slide L, horizontally-vibrating finger M, vertically-vibrating looper *i*, both arranged upon said slide, a bell-crank lever one arm of which is constructed for connection with the needle-bar, the other arm, I, in connection with said slide, whereby reciprocating movement is imparted to said slide, finger, and looper, the said arm I provided with an eye, *r*, through which the embroidery-thread passes, and an adjustable finger arranged to engage the thread at the said eye, substantially as described, and whereby the loop formed in the embroidery-thread may be increased or reduced in extent.

6. The combination of the slide L, carrying the embroidery-finger and looper, the bell-crank lever G I, finger P, in frictional connection with said bell-crank lever, the said finger constructed with an extension, T, and the lever R, arranged to swing in a plane parallel with the plane of said bell-crank lever and in the path of one end of said extension T, the other end of said extension T in the path of the said bell-crank lever, substantially as described.

ALBERT W. JOHNSON.

Witnesses:
JOS. C. EARLE,
J. H. SHUMWAY.