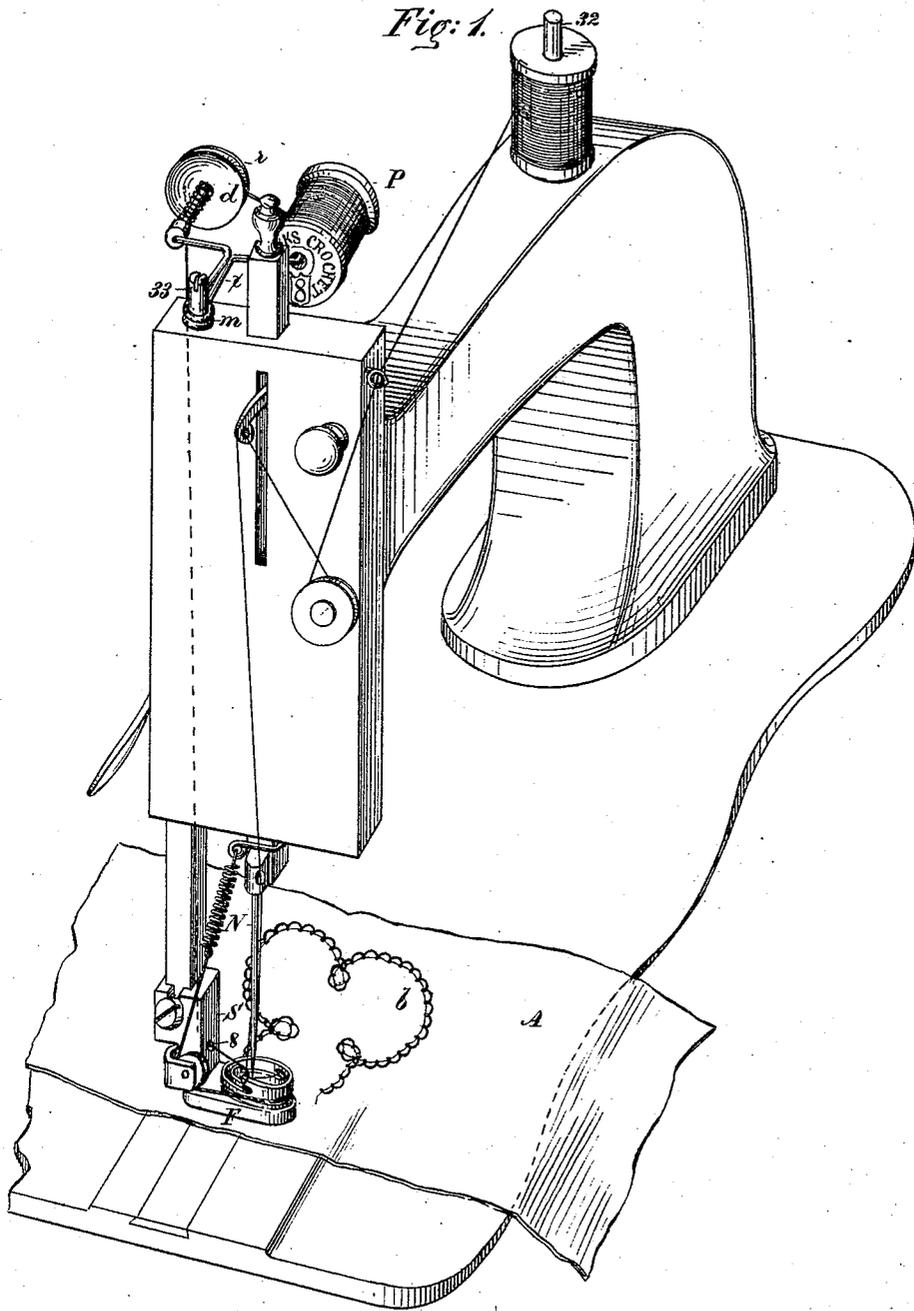


I. M. ROSE

EMBROIDERING ATTACHMENT FOR SEWING-MACHINES.  
No. 183,330. Patented Oct. 17, 1876.



WITNESSES:

*D. M. Somers*  
*Ernst Bilhuber.*

INVENTOR:

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Fig. 2.

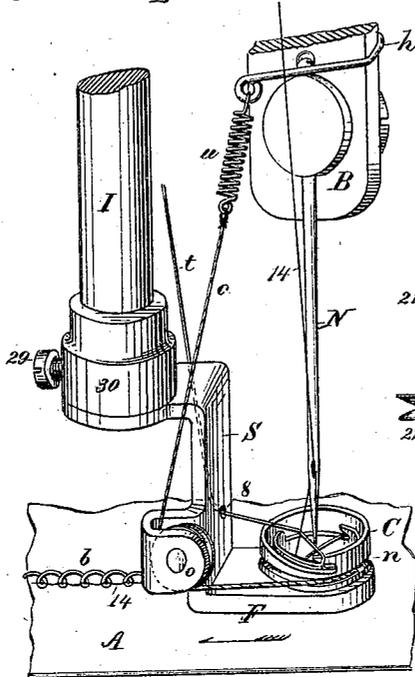


Fig. 13.

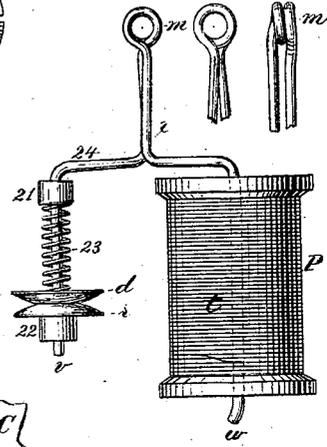


Fig. 1.

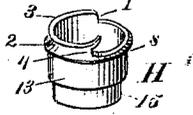


Fig. 8.

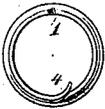


Fig. 9.

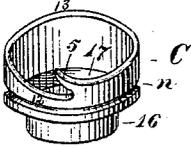


Fig. 10.

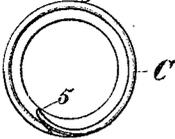


Fig. 11.

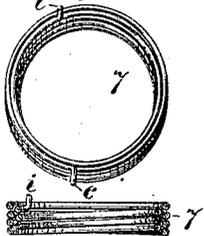


Fig. 3.

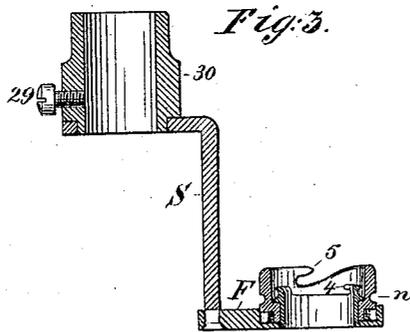


Fig. 4.

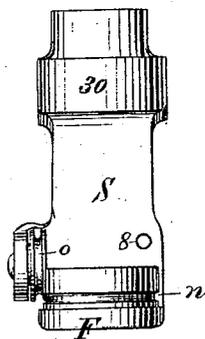


Fig. 5.

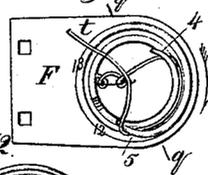


Fig. 6.

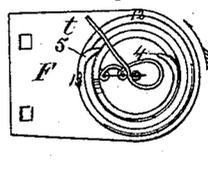
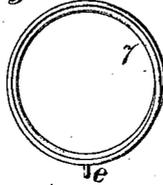


Fig. 12.



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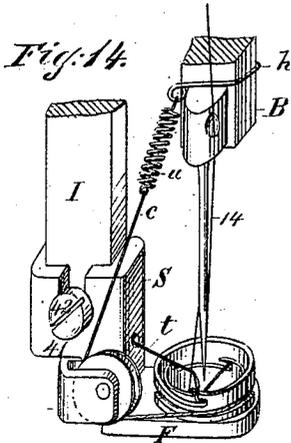


Fig. 15.

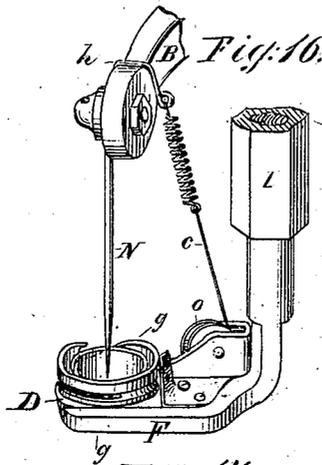


Fig. 17.

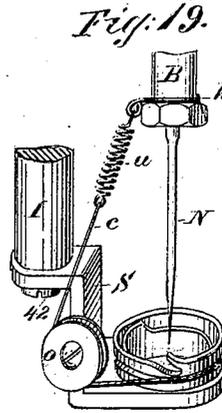


Fig. 18.

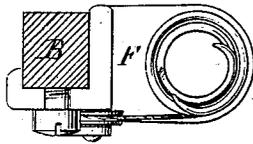


Fig. 21.

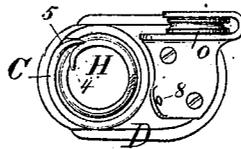


Fig. 20.

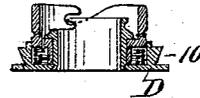


Fig. 23.

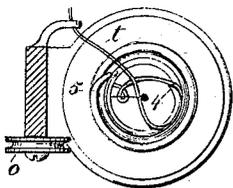


Fig. 22.

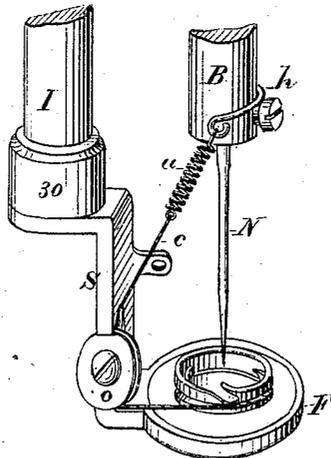
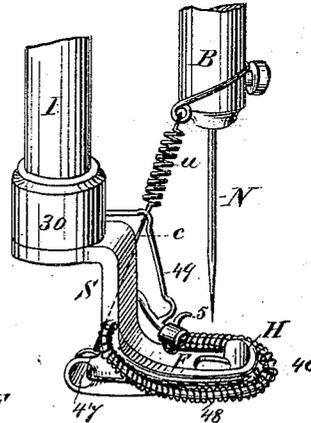
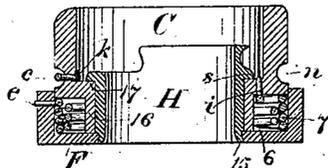


Fig. 24.



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# UNITED STATES PATENT OFFICE.

ISRAEL M. ROSE, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN EMBROIDERING ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. 183,330, dated October 17, 1876; application filed August 28, 1876.

*To all whom it may concern:*

Be it known that I, ISRAEL M. ROSE, of Brooklyn, Kings county, New York, have invented a certain new and useful Improvement in Embroidering Attachment for Sewing-Machines, of which the following is a specification:

In the accompanying drawings is shown, in Figure 1, a perspective view of a sewing-machine with my invention adjusted to it in operative position; Fig. 2, a perspective view, showing the invention attached to the presser-bar and connected with the needle-bar; Fig. 3, a sectional elevation of the device; Fig. 4, a front elevation of the same; Fig. 5, a plan of the foot-piece; Fig. 6, a similar view, showing the looping-hook in a different position; Fig. 7, a perspective view of the loop-laying hub; Fig. 8, a plan of the same; Fig. 9, a perspective view of the rotating looping-hook carrier; Fig. 10, a plan of the same; Fig. 11, a perspective top view and a sectional view of the returned double spiral spring; Fig. 12, a bottom view of the same; Fig. 13, plan views of the spool-holding clamp and tension device; Fig. 14, an adaptation of the device to a squared presser-bar; Fig. 15, a plan of the same; Fig. 16, an adaptation of the device to a bifurcated presser-foot; Fig. 17, a plan of the same detached from the presser-foot; Fig. 18, a sectional elevation on line *g g*, Fig. 16, looking toward the rear; Fig. 19, the device adapted for attachment to the end of a presser-bar; Fig. 20, a modification of the device, in which the looping-hook carrier is provided with a scroll-spring; Fig. 21, a plan of the same; Fig. 22, a sectional elevation of the same; Fig. 23, a modification, in which the spring-seated looping-hook runs on a suspended curved guide-bar; and Fig. 24, an enlarged sectional elevation on line *q q*, Fig. 5, looking toward the front.

This invention consists in an attachment for sewing-machines, the function of which is, in connection with the sewing devices of such machines, to produce an ornamental pattern upon the surface of a fabric.

The principal characteristic of the invention is a rotating loop-forming mechanism, operated by the needle-bar; but it embodies details of construction and combinations of elements

too fully hereinafter pointed out to need a preliminary description.

The essential parts of the loop-forming mechanism are a stationary loop-laying hub, around which rotates a spring-seated looping-hook carrier. The loop-laying hub *H* is a short cylinder, preferably made of steel, the upper end of which is cut away on one side, so as to form an abrupt shoulder, 1, and a hooked projection, 4, leaving on the other side a ledge, 3, whose exterior surface is cut out to form a channel, 2. The body of this hub is contracted to form a shoulder, *s*, and its lower end is reduced and formed into a collet, as at 15. The looping-hook carrier *C* is also of cylindrical form, and has its upper end cut away to form the looping-hook 5, which is bent slightly toward the center. The lower portion of this carrier is contracted to form a neck, 16, Fig. 24, which construction provides an interior annular shoulder, 17, and an exterior annular recess, 6, and the body portion is cut out to form a channel, *n*. These devices are secured in a holder, the foot-piece *F* of which is provided with a circular recess and an opening to receive them. The looping-hook carrier *C* is placed in the recess in the foot *F*, being seated therein upon its bottom end, while its lower edge, or that portion of its exterior surface which is below the channel *n*, bears against the upper edge of the recess in the foot *F*. It is securely held in place by means of the loop-carrying hub *H*, which, inserted through the said carrier *C*, is fastened to the foot *F* by the collet 15, which is turned outward, so as to embrace the walls of the opening in the foot. The shoulder *s* of the hub *H* is thus secured in a position directly over the shoulder 17 of the carrier *C*, and prevents its rising out of its seat in the foot *F*. The said carrier is thus seated, so as to be capable of revolving freely upon this hub as a center, being supported between its shoulder *s* and the side and bottom walls of the recess in the foot *F*.

The neck 16 of the carrier is surrounded by a spiral spring, which, having one end attached to the carrier, as at *i*, Fig. 24, and the other attached to the foot-piece, as at *e*, may be wound up upon said neck, which thus acts as a drum to receive it; and the annular re-

cess 6, provided between said neck or drum and the walls of the foot-piece, is of dimensions sufficient to permit the contraction and expansion of the spring as it is wound upon and unwound from the neck 16. The foot-piece F, carrying the parts constituting this loop-forming mechanism, is provided with a suitable means for attaching it to the presser-bar I of a sewing-machine; and the device thus constructed and attached constitutes a substitute for the presser-foot of a sewing-machine, so far as the pressing function of the foot is concerned.

A propelling-cord, *c*, is fastened to the looping-hook carrier C, being passed through a suitable eye, and knotted on the inside, as at *k*. It is bent once around the carrier C, lying in its exterior channel *n*, and thence passes around a pulley, *o*, hung on a stud or in bearings on the side of the shank S. This cord is provided with a short spiral spring, *u*, for a purpose yet to be explained, said spring being attached to a hook, *h*. When this cord is drawn so as to rotate the carrier, its effect will be to wind up the spring 7 upon the neck or drum 16, and when the cord is released the resiliency of the spring will cause it to expand and rotate the carrier in the reverse direction.

In operating this device the presser-foot of a sewing-machine is removed, and my device attached in its place, as seen in Fig. 1, it being so adjusted that the needle N will play directly through the hub H. The propelling-cord *c* is then hung to the needle-bar B by means of the hook *h*, and the pattern-thread *t* is drawn from a supply-spool, P, threaded through the guide-eye 8 in the shank S, and drawn down through the hub H. The machine is then ready to run, as in the operation of ordinary machine-sewing, the result of which will be the production upon the fabric of an embroidered pattern, as *b*, the formation of which will be presently described.

As the supply-spool P must be provided with a means for attaching it to sewing-machines as now constructed, and its pattern-thread furnished with a tension independent of that provided for the sewing-thread 14, a combined tension device and spool-holder has been devised as an indispensable adjunct of this embroidering attachment. This is shown in Fig. 13, where a wire is bent to form two parallel arms, *v* and *w*, between which it is bent in an opposite direction, to form a shank, *x*, which terminates in a spiral coil or eye, *m*. The arm *w* receives the spool, and the arm *v* carries two disks, *d* and *r*, placed loosely thereon, and held in position by rubber or leather washers 21 and 22. These disks are pressed together by a spiral spring, 23, which abuts against the washer 21 and the disk *d*. To increase the frictional contact of these disks, and consequently the tension which they will apply to the pattern-thread *t* when passed between them, the power of the spring may be increased by forcing the disks *d* *r* toward the shoulder 24 of the arm *v* and advancing the

washer 22 to hold them in that position, which movement will compress the spring 23, and of course increase its power.

The eye formed by the spiral *m* is adapted to be slipped over any stud or spindle projecting from the machine, such as 32 or 33, (shown in Fig. 1,) and by pressing the arms *v* *w* toward each other this spiral *m* will be so distended as to increase the circumference of the opening through it, as in Fig. 13, when it may be readily slipped over the stud or spindle, and when released it will contract, so as to tightly embrace the spindle, and be thereby securely held in place.

As seen in Fig. 2, each loop of the pattern-thread is held upon the fabric by the sewing-thread 14, which passes through each eye formed by said loop. As the needle rises it draws the sewing-thread 14 up with it, stretching the same taut behind the pattern-thread. In this upward movement of the needle its bar B draws upon the propelling-cord *c*, and thus rotates the looping-hook carrier C in the direction shown in Fig. 5. When the carrier C has reached the limit of its rotation in that direction, the further upward movement of the needle-bar distends the spiral spring *u*, with which the cord *c* is provided. In this rotation of the looping-hook 5 it engages the pattern-thread *t*, and carries it against the stop-hook 4, laying it, as the said looping-hook rides over the upper surface of the ledge 3, in the channel 2, and partially around the laying-hub H. When the looping-hook 5 has reached the position shown in Fig. 5, the needle N will have reached the limit of its upward movement, and the pattern-thread will then be distended in the form of a large loop, which, beginning with the point of its attachment to the fabric, extends around the stop-hook 4, and lies for a distance equal to about one-half of a circle in the channel 2 of the laying-hub H, emerging from which it is stretched from the forming-hook 5 diametrically over the laying-hub, and through the guide-eye 8, but passes in front of the sewing-thread 14. (See Fig. 2.) In this position of the devices the looping-hook will draw the pattern-thread taut, and the sewing-thread will be stretched from the stitch-forming point in the cloth through the needle-eye, and by its tension device will also be held taut.

The feed of the cloth in the direction of the arrow, Fig. 2, is accomplished while the needle is near its highest position, which movement draws the sewing-thread 14 into the rearward position therein shown. As the needle begins its descent the spring *u*, whose coils have been stretched apart in the upward stroke of the needle-bar, recovers itself before the spring 7 imparts rotary movement to the hook-carrier, for the reason that the said spring *u* has the greatest power, and hence will recover its normal condition before the weaker spring 7 can act. The result produced by this operation of the spring is, that the looping-hook 5 will stand in the position shown in Fig. 5 until

the needle-point has descended far enough to be in front of the pattern-thread, as in Fig. 2. This accomplished, the carrier-spring 7 comes into operation and rotates the looping-hook carrier C backward, carrying its hook to the position shown in Fig. 6, thus leaving the loop of pattern-thread stationary, and supported by the ledge 3 of the laying-hub H, and by the needle, as in Fig. 21. The loop remains thus suspended until the sewing-thread, where it passes into the needle-eye, bears upon the pattern-thread, and, drawing the loop off from the ledge 3, deposits it within the laying-hub, upon the surface of the fabric, as in Fig. 6, where it rests while the sewing-thread is carried below the fabric in the process of forming the sewing-stitch, during which time both the pattern and sewing threads are slack. At the moment when the needle rises both threads are again stretched taut, and the looping-hook begins its rotary movement to form a new loop, as before described. In laying this new loop, the one last formed, which lies loosely within the laying-hub, is drawn up or contracted so that it will snugly embrace the sewing-thread, which, stretched taut at this period of the operation, acts as a pivot, guiding this movement of it. The slack of the loop is thus drawn up tightly about the needle, for the reason that the resistance of the pattern-thread is greater than that offered by the loop; but when the loop has been drawn up tight, its resistance overcomes the pattern-thread tension, and the hook 5 then draws off from the spool the length of pattern-thread necessary to form the new loop. At the next downward movement of the needle the sewing-thread will form a new stitch, which stitch, it will be observed, embraces and fastens down the bend of the pattern-loop just formed.

As the mechanism is in the position shown in Fig. 5, the supply end of the pattern-thread is supported upon the raised ledge 13 of the loop-laying hub H, which ledge is constructed with an inclined surface, 12, gently rising from the hook 5, so that as the carrier is rotated back to re-engage said thread, its inclined surface will raise the thread upward, so that it will be supported on the ledge 13, which will ride smoothly under it until the thread drops down before the hook, when it is ready to be again engaged and formed into a loop. The pattern thus produced is a succession of cycloidal curves, the dimensions of which may be governed by varying the tension upon the pattern-thread or changing the cloth-feed, or both.

By diminishing the tension upon the pattern-thread an enlarged pattern-loop or cycloidal curve is produced, and by diminishing the cloth-feed the bends of the loops are brought closer together, and vice versa. When, however, the tension on the pattern-thread is slackened, the needle will draw it forward to a slight degree in its descent, to contract and fasten a formed loop upon the cloth, which is not the case when the tension is strong.

The spiral spring *u*, attached to the propelling-cord *c*, in addition to its function hereinbefore described, affords an elastic connection between the positively-moving needle-bar and the rotating carrier C, so that the former shall not, by any sudden movement, or by the extent of its throw, cause the said cord to be broken.

The holder or foot F (shown in Figs. 14 and 15) is of a form adapted to machines provided with a rectangular presser-bar, I, upon the end of which a socket, 41, is arranged to slide, so as to embrace the set-screw 42, which, turned up to place, securely holds it in position.

In Fig. 19 the shank S has a simple angular arm, through which the set-screw 42 projects into the end of the presser-bar I.

In Figs. 2, 20, and 23 the shank S of the holder or foot has a set-collar, 30, held by a set-screw, 29, as in Fig. 2.

In Figs. 16, 17, and 18 is illustrated a form of presser-foot adapted to receive a plate which slides into its bifurcated foot-piece F. My invention is adapted to such a foot-piece by having its rotating carrier C, hub H, guiding-eye 8, and pulley *o* all mounted upon a plate, D, constructed to slide into its bifurcated end. This plate D is provided with beveled channels 10 in its sides, which channels fit correspondingly-formed ways on the inner faces of the arms of the bifurcated presser-foot. The plate D is thus securely held in the foot-piece, and prevented from being displaced by the movements of the machine.

The drawings thus represent my attachment as adapted to the principal classes of sewing-machines now found in the market, and it is obvious, from the modifications of it herein illustrated, that it may be constructed so as to be attached to any sewing-machine.

Since this device is applied to the presser-foot, and rests upon the cloth at the seam-forming point, it is obvious that it is desirable to reduce its surface area to the minimum dimensions that a view of the operation of forming each stitch of the embroidered pattern or seam may not be unnecessarily obstructed; and in order that the looping-hook carrier may make nearly a complete revolution at each impulse given to it by the needle-bar through the cord *c*, it is also necessary that the annular recess, which contains the spring 7, shall be large enough for the spring to be wound up on the barrel 16, and, when unwound, to expand without obstruction.

In the form of spring shown in Fig. 22, which is a flat spiral or scroll spring, seven coils of wire (four only being shown) have been found necessary to produce the required retracting power. The use of this form of spring, therefore, requires a considerable spreading of the foot-piece, as seen in Figs. 20, 21, and 22, to provide a recess large enough to permit its proper operation. To avoid this objectionable feature, I have devised a spring which, while possessed of great power, occupies but

a small space. It consists of a double series of coils, made from a single piece of wire bent to form an interior pile of coils, upon which an exterior pile of coils is wound, the said coils lying close to each other in all of their movements, as seen in Figs. 3 and 24, the former showing the spring wound upon the barrel 16, and the latter showing it unwound or distended. The projecting end of the inner coil is fastened to the carrier at *i*, and the projecting end from the outer coil is fastened to the foot at *e*, as is seen in Fig. 24.

A further modification of this device is shown in Fig. 23, wherein the looping-hook 5 is made to run on a suspended curved guide-bar, 46, attached by its ends to the shank S. It is rotated around the hub H in one direction by the propelling-cord *c*, which runs in a channel in the outer edge of said hub, and passes through an eye, 47, thence up to the needle-bar, as in the other forms. In this movement the hook compresses the spring 48 upon the guide-bar 46, and when the tension of the propelling-cord *c* is released this spring forces the hook back to its starting-point. In this instance the pattern-thread is governed by an elongated guide, 49.

The foregoing description has been limited to a looping-hook carrier, when actuated in that direction contrary to the motion imparted by the cord and pulley by means of a spring coiled about its base or neck; but it is apparent that the said actuating-spring may be otherwise located, as upon the rear side of the shank S, and its power be transmitted to the carrier C by a cord connecting it therewith. In this construction the form of the spring may also be changed, any of the known forms being equally well adapted to accomplish the desired result.

Thus far this description has also been confined to the manipulation of a single pattern-thread. A plurality of such pattern-threads may be supplied from a number of spools, P, and such threads passed in a bundle through the guide-eye 8, and operated upon by the looping-hook in the same manner as has been described with reference to the single pattern-thread. The pattern produced will then have its loops formed of many threads lying side by side. The number of the threads and their size and color will vary the embroidered pattern in bulk, appearance, and finish.

What therefore is claimed is—

1. A thread-looping hook adapted to be positively rotated in one direction by the vibrating needle-bar and a cord and pulley, and to be retracted by a spring, substantially as described.

2. A rotating spring-seated thread-looping hook, substantially as described.

3. The combination of a rotating spring-seated thread-looping hook with a stationary laying-hub, substantially as described.

4. The combination of a looping-hook carrier, a stationary laying-hub, and a coiled spring attached to and rotating the carrier upon said hub, substantially as described.

5. The combination of a stationary laying-hub, a rotating looping-hook carrier, a coiled spring actuating the latter, and a recessed foot-piece or support, substantially as described.

6. The combination of the stationary laying-hub, the rotating looping-hook carrier, coiled actuating-spring, and propelling-cord, substantially as described.

7. The loop-laying hub, constructed with a hooked projection, 4, and a channel, 2, for supporting the pattern-thread, substantially as described.

8. The combination of the rotating looping-hook 5 with the stationary laying-hub, the construction being substantially as described, whereby the said hook is made to ride upon the ledge 3 of the hub, and thus prevent the pattern-thread from slipping backward, substantially as described.

9. As an article of manufacture, an embroidering attachment, consisting of a holder adapted to be attached to the presser bar or foot of a sewing-machine, and supporting a stationary loop-laying hub, a spring-seated looping-hook, a propelling-cord, and its guide, substantially as described.

10. A plate, as D, having mounted upon it the stationary laying-hub, looping-hook carrier, and its actuating mechanisms, and adapted to be inserted into a bifurcated presser-foot, substantially as described.

11. The returned double spiral spring, Figs. 11 and 12, constructed substantially as described.

12. In combination with the propelling-cord of a rotating thread-carrying device, the compensating-spring *u*, substantially as described.

13. The carrier C, having its ledge 13 constructed with a hook, 5, and an inclined plane, 12, extending up to the ledge, substantially as and for the purpose specified.

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

I. M. ROSE.

Witnesses:

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M. B. PHILIPP.