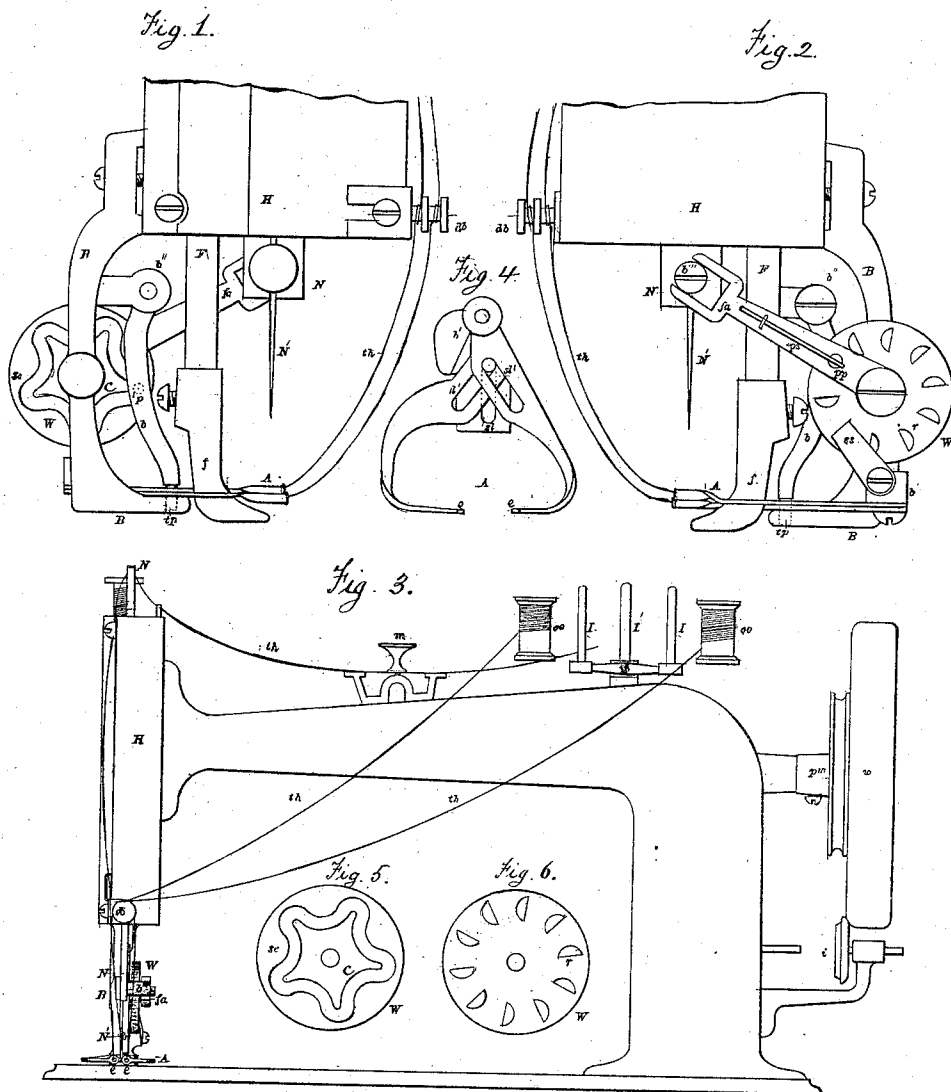


W. A. MACK.
 EMBROIDERING ATTACHMENT FOR SEWING MACHINES.
 No. 111,071. Patented Jan. 17, 1871.



Witnesses: *James A. Mack*
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WILLIAM A. MACK, OF NORWALK, OHIO.

Letters Patent No. 111,071, dated January 17, 1871.

IMPROVEMENT IN EMBROIDERING ATTACHMENTS FOR SEWING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

I, WILLIAM A. MACK, of Norwalk, in the county of Huron and State of Ohio, have invented certain Improvements in Sewing-Machine Attachments for Embroidering, of which the following is a specification.

Nature and Object of my Invention.

My invention relates to the means of actuating the arms of embroidering attachments of sewing-machines in an absolute manner, co-ordinately with the movements of the needle-bar, needle, and feed devices of such machines.

Description of the Accompanying Drawing.

Figure 1 is an elevation of one side of the attachment, fastened in place to a sewing-machine.

Figure 2 is an elevation of the opposite side of the same.

Figure 3 is a front view of the same.

Figure 4 is a top view of the slotted arms and slotted foot of the body part.

Figure 5 is the cam-side of the wheel W, and

Figure 6 is the ratchet-side of the same.

The same letters represent the same parts.

A represents the embroider-arms;

B, the body, to which the details are secured, and which is itself secured to the head of the sewing-machine;

b, a lever of the third class, for actuating the arms A;

b', a boss or branch of the body B, to which the vibrating arms A and the spring-stop S S are secured;

b'', a boss or branch of the same, to which the lever b is secured at its upper end;

b''', a boss on the needle-bar, engaged by the fork of the lever f a;

d b, double guide and tension-button;

e e, eyes, carrying the embroidery-thread or cord;

f a, a fork-ended lever, which operates the attachment;

f, the foot-presser;

F, the foot-bar;

H, the sewing-machine head;

I I, the embroidery-spools and spindles;

I', the sewing-machine thread-spindles;

N, the needle-bar, and

N', the needle;

o o, spools adjoining their spindle;

p, the slot-pin, running in the slot of the slotted cam S c, and secured in the lever b;

p p, the pawl-pin;

p s, the pawl-spring;

r, the ratchet-teeth in surface of the wheel W;

S c, the slotted cam and surface of the same;

S l, the slot in the foot of the body B, made straight;

S l', the corresponding diagonal slots in the arms A;

S S, the stop-spring of the ratchet;

t h, the three threads; and

t p, the terminal point of the lever b.

It is evident that the fork of the lever f a, engaging the boss b'', may be replaced by a solid continuation or arm of that lever, working between two pins on the needle-bar; and also that the lever b might be replaced by a lever of the first class, operated by substantially the same devices.

The operation of the invention is as follows, viz:

Commencing with the parts in the respective relations represented in fig. 2, it will be seen that the downward movement of the needle-bar will tend to depress the fork-ended lever f a. The relative proportions and movements are adjusted to, and will thereupon cause, the pawl-pin p p to be pressed up the incline of the ratchet-tooth against the resistance of the pawl-spring p s until it reaches the surface of the wheel W, when, the same motion continuing, the pawl-pin p p is slid along until, its position permitting, the action of the pawl-spring s p drops it into or engages it with the next tooth.

While this has been occurring the needle and thread have penetrated the cloth and formed an incipient stitch or loop over the cord or material being embroidered on the cloth, at the point where the two threads thereof cross each other. The needle-bar being about to act in reverse—i. e., upward—the pawl-pin p p engaging the tooth, when it moves the lever f a, is carried—and, necessarily, the wheel W—one step or tooth. By this movement the incipient stitch is perfected and the embroidery-stitch or cross secured.

At the beginning of the first movement and at the end of this last the spring-stop S S rests against a tooth, and prevents any backward motion of the wheel W when the lever f a is depressed. If, now, the tooth of the ratchet-wheel engaged by the pawl-pin p p during this movement is one of those just in front of an advanced point or angle of the interior cam of the opposite side of the wheel W, the cam-pin p of the lever b will have been forced down the retreating slot toward the retreated angle of the same cam c and the center of the wheel W. This movement will, of course, carry the lever b and the terminal pin t p thereof backward toward the heel of the attachment, and this terminal pin moving in the diagonal slots of each arm, which cross each other at an acute angle, and being held and guided by the straight slot S l, the two arms A will be separated, and, consequently, the threads they each carry in their eye-points e e will be crossed ready for the next loop or stitch which the machine is preparing to make.

When the needle-bar makes its next motion all the parts are stationary, as before, except the lever f a

and its immediate attachments, until the cloth is punctured and the next upward movement is imminent. The pawl-pin *p p* has meanwhile dropped into or engaged the next tooth, and as the upward movement of the needle-bar progresses the wheel *W* makes another step, of which there are ten, corresponding to the ten teeth on the ratchet-face. During this movement the advancing side of the inner cam of the wheel *W*, acting upon the pin *p* of the lever *b*, forces that pin and the lever outward from the center again, thus forcing the terminal pin *t p* of the lever *b* toward the toe of the attachment and the needle, moving in the three slots previously described. The arms *A* are thereby approached to each other, and their terminal thread-carrying eyes *e e* again passing each other, the embroidery-thread is again crossed, ready for the next stitch, at the same time that the rest of the sewing-machine mechanism is prepared to make that stitch, as before.

There are ten teeth in the ratchet, and five advanced and five retreated points or angles in the slotted-cam face *S c*, as herein organized. There are, consequently, ten crossings of the embroidery-thread and ten stitches

made for every revolution of the wheel *W*; and by continual repetition of the action described continual embroidery may be done. The five points of the cam are not, however, absolute and necessary to the operation of the attachment, for their number may be varied, the other parts being organized accordingly.

The double button *d b* carries the embroidery-threads, each with one or more turns thereon, led to the same from the spools on the spindles *I I* of the spindle attachment, and led therefrom to the eyes of the embroidery-arms *e e*, whence they connect with the progressing work. This double button performs the double function of guiding and creating a gentle and very suitable tension on the embroidery-thread.

What I claim is—

The combination, with the support or body *B*, arranged for attachment to the sewing-machine, of the cam and ratchet-wheel *W*, lever *b*, and slotted arms *A*, constructed, arranged, and operated as described.

WILLIAM A. MACK.

Witnesses:

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