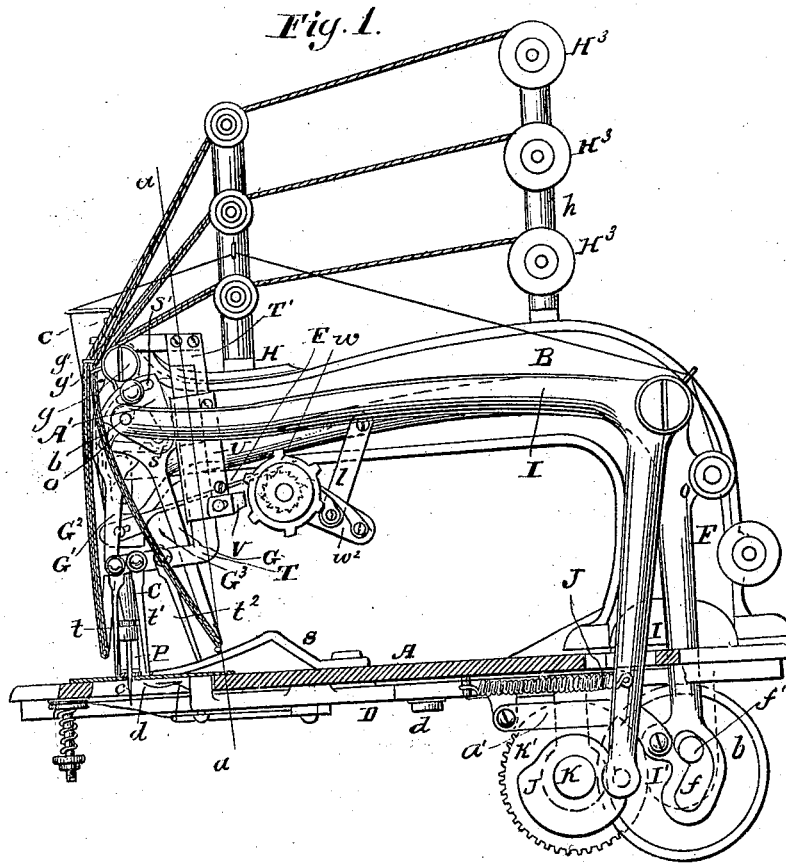


A. H. BOYD.
Sewing Machine.

2 Sheets—Sheet 1.

No. 52,374.

Patented Jan'y 30, 1866.



Witnesses:
A. C. Lombard
Wm. C. Hubbard

Inventor:
A. H. Boyd.

UNITED STATES PATENT OFFICE.

AMOS H. BOYD, OF MEDWAY, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 52,374, dated January 30, 1866.

To all whom it may concern:

Be it known that I, AMOS H. BOYD, of Medway, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, taken in connection with the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of the machine with my improvements attached thereto. Fig. 2 is a plan of the same. Fig. 3 is a front-end elevation; and Fig. 4 is a sectional elevation on the line *a a* of Fig. 1.

The letters refer to the same parts in all the figures.

The subject-matter of my invention relates to the mechanism employed in connection with a sewing-machine for the purpose of making the various kinds of a manufacture known as "Amosine braid," for which Letters Patent were granted to me January 27, 1863, which mechanism may also be regarded as an improvement upon the mechanism for making the simpler forms of said manufacture, as described in Letters Patent granted to me April 2, 1861.

The first part of my invention relates to the method of operating the vibrating arms which carry the embroidering threads or material; and it consists in moving said arms simultaneously in opposite directions by means of a pin or stud moving radially toward and from the fulcrum of said arms with a measured movement, and working in a diagonal slot in each arm, the said slots being inclined in opposite directions, the said pin being arranged to receive the reciprocating movement described by being inserted in the extremity of an arm which is moved by a cam, or it may be operated by any other suitable mechanical arrangement that will give the same movement; and it also consists in so constructing the diagonal slot in the arm that its obliquity can be adjusted so as to give a greater or less extent of motion to the arm to enable it to make the several kinds of work contemplated.

The second part of my invention relates to certain devices which may be used in connection with the aforesaid vibrating arms or their equivalent for the purpose of making certain

kinds of goods; and it consists in the employment, in combination with the said embroidering-arms or their equivalent, of one or more movable fingers which serve to hold the embroidering threads or cords down upon the face of the goods when extended across the line of the seam, so as to determine the size and position of the loops of the embroidering-threads upon either side of that line, the particular operation of which will be hereinafter described.

The third part of my invention relates to a device to be used, in connection with the aforesaid fingers, for the purpose of modifying their action in making certain kinds of work; and it consists in the employment, in combination with the mechanism which operates the said fingers, of a device for interrupting their action upon the embroidering threads or cords in such order and at such intervals as may be desired, the particular structure and mode of operation of which will be more fully described.

A is the bed-plate of the machine, and B is the overhanging part of the frame, called the "goose-neck." C is the needle-bar, and *c* is the needle, working vertically in the usual manner. D is the looper-bar, and *d* is the looping-needle which manipulates the lower thread, and, in conjunction with the needle, forms the "double-loop stitch," so called, and is worked by the connecting-rod *a'* from the lever F and from the face-cam *b*, which acts laterally against the back end of the bar. The looper-bar is made with a slot near the middle, which embraces and slides upon the screw *d'* as a fulcrum, so that the combined action of the longitudinal and lateral movements of the bar give to the looper-needle an elliptical movement, which enables it to co-operate with the sewing-needle to form the stitch in the usual manner.

E is the main shaft of the machine, which carries the cams that actuate the several operative parts of the sewing mechanism.

F is the lever which actuates the needle-bar by means of the cam-slot *f* in its lower end, which receives the crank-pin *f'*, which is fixed in the disk of the face-cam *b*.

The sewing mechanism is, in its general construction and mode of operation, like those in common use, and is designed to be used as a sewing-machine when the parts which manipu-

late the ornamenting-cords are removed, so that it need not be described in detail, nor is it material to the purpose of making the "Amosine braid" that the sewing mechanism employed should make this kind of stitch, as mechanism making other kinds of stitches may be used instead.

G G' are light pendulous levers, working upon a fulcrum at *g* upon the piece H, which is attached to the goose-neck in the position shown, which vibrate across the line of the seam and carry the embroidering threads or cords G² G³, &c., as shown, in different colors, which are to be interwoven with the sewing to form the embroidery. These levers are provided with eyes at their extreme lower ends, through which the embroidering-cords are led, as is shown. The eye of the lever G is placed as near to the table as it can be conveniently worked, and the eye of the lever G' is placed a little above this, to permit the cords to pass each other as they are worked across the seam. The reciprocating movement of these levers is given by the bent lever I by means of a pin, *i*, fixed in its outer end, which works up and down in the diagonal slots *a a* in the levers, which, being inclined in opposite directions, impart a simultaneous motion to the levers in opposite directions. The bent lever I is worked by means of the cam J on the secondary shaft K and the spring *j*, which holds the lever against the cam, which together impart the necessary reciprocating motion to it, at the proper time in the operation of the machine. The shaft K is driven from the main shaft E of the machine by the gears I' K', and revolves with one-half of the velocity of the main shaft, so that a single alternation of the lever I and arms G G' is made at every revolution of the main shaft, or, in other words, at each stitch.

The cords G² G³, &c., are wound upon bobbins H² H³, &c., which are mounted upon the piece *h*, and are led through eyes *g'* in the upper ends of the arms G G', and down to the eyes in their lower ends, from which they lead to the surface of the material to be operated upon at the point where the stitches are made, as is shown in the drawings.

In order to be able to modify the extent of movement of the arm G the diagonal slot in which the pin *i* works is made in a separate piece, A', which is made to swing upon a fulcrum, *s*, at the lower end of the same in the arm G, and the other end is secured by the clamping-screw *s'*, working in a segmental slot in the piece A'.

By this mode of adjustment the limit of movement of the arm outward is constant, while the inward extent of movement depends upon the amount of obliquity of the slot, and is adapted to the making of fringes or other kinds of work where the loop is extended to one side of the line of the seam, and in Fig. 1 the arm G is represented in the position to make such work. But other modes of adjusting the obliquity of the slot might be used to

modify the movement of the arm according to the requirements of the work to be done.

T is a piece, of the form shown in Fig. 1, the lower point of which two or more slender fingers or points, *t t'* *t''*, are attached, which extend downward and have their lower ends bent so as to be parallel with the table, and also extend forward a little beyond the needle, passing outside of the presser P, which is made narrow for that purpose. These fingers can be adjusted to a greater or less distance apart upon either side of the needle, to determine the length of the loops of the embroidering-cord. Although three fingers are represented in the drawings, only two of them would be used generally at once, as when the finger *t''* was used the finger *t'* would be removed, and vice versa.

The upper end of the piece T is embraced by the slide U, which is suspended upon the leaf-spring T', and through which it slides up and down with a light friction, which spring is attached to the piece H, as shown, and serves both as a support to the piece T, and permits it to vibrate toward and from the needle by its flexure. The piece T receives its motion from the needle-lever F by means of devices that are best seen in Fig. 4, where the piece T is seen in its highest position and the needle-lever F in its descent, just ready to depress the same.

Upon the inside of the piece T are two studs, *e e'*, and an incline, *o'*, all of which are acted upon by the lug O, which is attached to the needle-lever F at the upper and lower portions of its movement. When the needle-lever rises the lug *o* meets the incline O' upon the inside of the piece T, and throws it outward, withdrawing the fingers *t* out of the way of the embroidering-cords, and the continued upward motion of the lever causes the lug *o* to impinge against the stud *e*, and raise the piece T and fingers *t* to their upper position. When the needle-lever descends the lug *o* passes below the incline O' and permits the piece T to swing forward by the action of the spring T', which places the lower extremities of the fingers *t* above the embroidering-cords, the friction between the slide U and piece T being sufficient to prevent the latter from descending. When the needle-lever is near the lower limit of its motion the lug O impinges against the stud *e'* in the piece T, and forces the fingers *t* down upon the embroidering-cords. By these motions of the fingers *t* they first pass over the embroidering-cords, which are drawn across the seam by the arms G G', and then press them down upon the table. The presser P, by the action of appropriate mechanism, then rises, and the levers G G' vibrate back, passing the embroidering-cords under the presser, and leaving them looped around the fingers *t t'*. The presser then descends and the needle rises, and by the action of the lug O upon the piece T, already described, the fingers are drawn out of the loops and raised to the position first mentioned.

S is a guard which is secured to the table A and extends beneath the arm G toward the needle. Its upper surface is curved to the arc of a circle described by the extremity of the arm, as is shown in Fig. 1, and its purpose is to co-operate with the finger in the position t^2 , in making fringe or other extended loop, and hold the loop so that the finger may be drawn out of it, as before described. In making short loops this would not be used, but would be removed from the machine.

By the arrangement of mechanism just described the fingers t' would repeat their operations at every stitch; but in making some kinds of braid or gimp it is necessary that their operations should at certain intervals be suspended, and for this purpose the device W is employed, which is a circular plate mounted upon a stud which projects from the under side of the goose-neck, and is provided with a ratchet with the appropriate number of teeth to work the round of the pattern to be produced or some multiple thereof, which ratchet is worked by a pawl, W' , on the vibrating lever W^2 , which receives its motion from the needle-lever F by the link L. The periphery of the plate W is cut away in such places, and to such an extent as the order of working the fingers $t't'$ requires, and is so placed that the full part of the periphery will pass behind the latch-piece V, which is attached to the piece U, as is shown. The form of plate W shown in Fig. 1 would arrest the operation of the fingers $t't'$ at every other stitch, and when in the position shown would permit the fingers to operate as before described; but when the plate has turned a distance equal to one notch of the ratchet, which is done when the needle-bar is near its upward limit of motion and the piece T thrown out, the full part of the pe-

riphery passes behind the latch V, and holds it so that the fingers cannot operate upon the embroidering-cords until the plate W has been turned so as to bring a vacant space opposite to the latch, when the piece U is again liberated and the fingers are permitted to act.

The method of working the fingers above described may evidently be much modified, so far as regards the machinery employed to perform the several operations, but that shown is a mode of construction that I have employed with good success, and I have therefore represented it as an embodiment of this part of my invention.

Having thus described the nature of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The method of operating the arms which carry the embroidering threads or cords by means of the pin moving radially in diagonal slots in said arms, substantially as described.

2. Making the slots adjustable to vary the extent of movement of said arms, substantially as described.

3. The employment, in combination with the arms G G' , or their equivalent, for carrying the embroidering material, of the fingers $t't't^2$, either collectively or singly, and operating substantially as described.

4. In combination with the fingers $t't't^2$, or either of them, operating as described, the device W or its equivalent, for the purpose of interrupting the operation of said fingers in any required order, substantially as described.

Executed at Boston this 29th day of July, A. D. 1864.

A. H. BOYD.

Witnesses:

N. C. LOMBARD,
WM. C. HIBBARD.