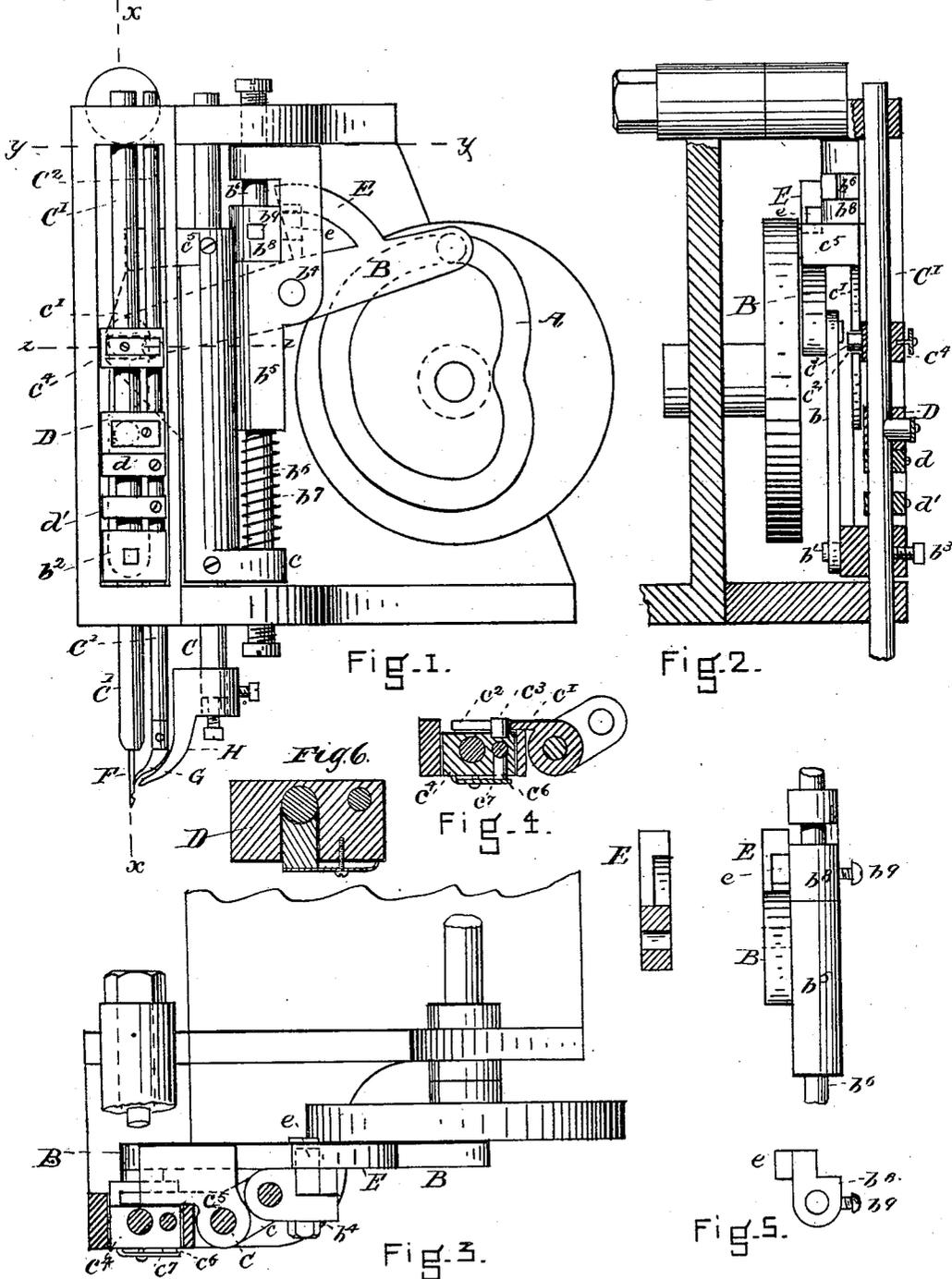


(Model.)

E. WOODWARD.
WAX THREAD SEWING MACHINE.

No. 247,285.

Patented Sept. 20, 1881.



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WAX-THREAD SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 247,285, dated September 20, 1881.

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To all whom it may concern:

Be it known that I, ERASTUS WOODWARD, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented an Improvement in Wax-Thread Sewing-Machines, of which the following is a specification.

This invention has for its object the following-described improvements in wax-thread sewing-machines. It is an improvement upon the sewing-machine shown and described in Letters Patent, Reissue No. 6,535, granted Gordon McKay and Robert H. Mathies, assignors, dated July 6, 1875. It embraces, first, means whereby the length of stroke of the needle-bar is determined by the position of the presser-foot; second, means whereby the cast-off bar is adjusted automatically by the needle-bar and presser-foot.

Reference is made to the accompanying drawings, forming a part of this specification, in explaining the nature of the invention, in which—

Figure 1 is a front elevation of my improvement. Fig. 2 is a view part in side elevation and part in section. Fig. 3 is a view partly in plan and partly in section upon the line *yy* of Fig. 1. Fig. 4 is a cross-section on the line *zz* of Fig. 2. Fig. 5 represents certain details of construction. Fig. 6 is a view representing a friction-block attached to the needle-bar, and adapted to be placed in position thereon, according to the thickness of the work, by the presser-foot, in a manner substantially as hereinafter set forth.

In wax-thread sewing-machines having a stationary rest or bed for the work, organized for sewing material of varying thicknesses with a chain-stitch, it is necessary to vary the length of thread used in making a stitch as the sewing progresses from thin to thick work, and vice versa, and this variation must be effected by the needle. Therefore, as more thread is used in sewing thick work, the needle-bar must have a greater throw than in sewing thin work. The needle must always descend to the same base-line, and consequently the variation in the length of stroke of the needle-bar must be from that line upward. It is also desirable to connect the cast-off with the needle-bar and presser-foot, so that the movements given the

cast-off may be automatically determined by them and be obtained by simple mechanism.

A represents the cam for operating the needle-bar. The lever B connects the cam with the link *b*, which is pivoted at its lower end by the stud *b'* to the block *b²*, through which the needle-bar passes, and to which it is fastened by means of the set-screw *b³*. The said lever B is pivoted at *b⁴* to a sliding sleeve, *b⁵*, which is adapted to have a limited movement upon the rod *b⁶* against the stress of spring *b⁷*, as hereinafter explained. The stop *b⁸*, fastened to said rod by the set-screw *b⁹*, serves to adjust said sleeve, and consequently the fulcrum of the lever, in its proper position. The presser-foot bar C is provided with the projecting arm *c*, which is arranged to slide on the rod *b⁶*, against the pressure of the spring *b⁷*, before named, and in addition is provided with a bracket or arm, *c¹*, having a recess, *c²*, which receives a stud, *c³*, fastened to a friction-block, *c⁴*, through which the needle and cast-off bars *c¹* *c²* pass. The presser-foot bar has also an arm, *c⁵*, which projects over the end of the lever B.

The operation of this part of my mechanism, by which a varying stroke is provided the needle-bar governed by the presser-foot, is as follows: The cam A is cut to provide the needle-bar, by its connecting mechanism, with a throw that will be sufficient for drawing the thread necessary for making a stitch in the thickest material. The pivot *b⁴* in this instance will be stationary. For sewing work of less thickness the needle-bar is not provided with so great a stroke, and this is accomplished by causing the arm *c⁵* to act as a stop, against which the end of the lever B comes in contact, thereby causing the fulcrum *b⁴* of the lever B to yield downwardly. Of course, the higher the arm or stop *c⁵* the less the downward movement of the fulcrum and the greater the throw of the needle-bar. The presser-foot bar is operated by a cam or any other suitable mechanism, and as it lifts from the work it compresses the spring *b⁷*, and also adjusts the arm or stop *c⁵* to a position to which the end of the lever B may arise before the fulcrum *b⁴* takes up the lost motion.

The block *c⁴* is provided with a friction-plug, *c⁶*, which is forced inwardly against the cast-

off bar by means of the spring c' , fastened to the block. The needle-bar moves freely in the block. This construction provides for an upward movement of the cast-off bar, for reasons hereinafter explained.

Below the friction-block c^4 there is arranged another friction-block, D, which is similar in construction to the one first described; but the friction-plug, instead of bearing upon the cast-off bar, bears upon the needle-bar, and the cast-off bar is arranged to move freely therein.

Below the last-named friction-block there are two blocks, d and d' , which are fastened by set-screws to the cast-off bar.

The operation of the needle-bar, cast-off bar, and presser-foot to accomplish the proper movements of the cast-off in relation to those of the needle-bar or needle is as follows: The needle-bar is lifted a short distance, equal in extent to the thickness of the work and the extent of the needle below the surface-plate to the barb. The cast-off bar is then started and moved upwardly at the same rate of speed with the needle-bar until the highest point of the needle-bar stroke is reached. The needle-bar is then moved downwardly sufficiently to uncover the barb, and the cast-off bar is then moved simultaneously with the needle-bar until it reaches the surface of the work.

As it is essential that the needle-bar have a varying extent of throw, and as the presser-foot, while it lifts a uniform distance from the surface of the work, yet by the variations in the thickness of the work has an irregular throw from the work-plate of the machine, it is necessary to provide a compensating mechanism whereby the cast-off bar may continue to have the same relative movements with the needle-bar while the variations in the length of throw are transpiring. In order to understand this portion of my mechanism it is necessary to bear in mind, first, that the cast-off bar is lifted by the needle-bar by means of the block b^2 , fastened to the needle-bar, and the block d' , fastened to the cast-off bar, the said block d' being so placed as to allow the cast-off to descend to the lowest position in which it can be used; second, that the friction-block c^4 , which is positively moved by the presser-foot-operating mechanism, is so attached to the cast-off bar that while it allows the same to be moved therein when positively actuated, it also, by means of suitable frictional mechanism, operates at certain times to hold the same, so that upon the upward movement of the presser-foot bar the cast-off bar is moved upward; and, third, that the friction-block D, attached to the needle-bar, and the block d , attached to the cast-off bar, serve to lower the cast-off bar.

The position of the friction-block D upon the needle-bar is changed automatically during the upward stroke of the needle-bar and cast-off bar by contact with the upper block, c^4 , (which is held stationary while the needle-bar continues to rise,) and thereby, upon the downward movement of the needle-bar, by contact with the block d , moves the cast-off to the sur-

face of the work. As it is necessary, however, that the needle should commence to descend before the cast-off, that the barb of the needle may be uncovered, the cast-off bar is retained by the friction-block c^4 in its highest position, while the needle-bar is moved downwardly a short distance. The cast-off bar is then caused to descend simultaneously with the needle-bar by the regulating-block D, which, moving down with the needle-bar, comes in contact with the block d . This regulating-block is always placed in position by the block c^4 upon its upward movement, so that the space between it and the block d determines the extent of downward movement of the needle-bar before the cast-off bar is operated. The friction-block c^4 also holds the cast-off in position upon the work until it is positively lifted upon the upward movement of the needle-bar by the blocks b^2 and d' . The friction-plug in the block D must bear with greater force or stress against the needle-bar than the friction-plug in the block c^4 bears against the cast-off bar, in order that the said block D in its downward movement may draw the cast-off bar with it and not slip on the needle-bar.

It will be noticed that the lost motion or compensation, whereby the movement of the cast-off bar is not increased during the increased movement of the needle-bar, is obtained or effected by the regulating-block D, which is adjusted by contact with the block c^4 to a given position upon the needle-bar in relation to the block d at every upward movement, and which also comes to rest when the cast-off reaches the work, while the needle-bar continues to descend, thereby taking up the difference of movement between the two bars, both at the end of the downward and upward stroke thereof.

To guard against the yielding or spring of any part of the needle-driving mechanism while the needle is in the work, I provide the lever B with a curved arm, E, the end of which rides upon the stationary block c from the time when the needle is about to enter the material on its downward stroke until it has cleared it upon its upward, thereby holding the fulcrum b^4 in a fixed position during this part of the movement of the needle-bar. The tripping of this locking-arm upon the further upward movement of the needle-bar leaves the fulcrum b^4 and sliding sleeve b^5 free to be moved downwardly against the stress of the spring; yet such downward movement will not take place to any extent until the outer end of the lever-bar comes in contact with the stop c^6 .

It will be observed that the mechanism for effecting the variations in the stroke of the needle-bar is very simple, and that upon the contact of the outer end of the lever with the stop c^6 the fulcrum of the lever is changed from the pivot b^4 to its outer end, and the pivot b^4 and the supporting-sleeve yield downwardly; also, that the position of the stop c^6 is automatically fixed by the presser-foot; also, that the cast-off is actuated by the needle-bar

and presser-foot bar through the medium of intermediate compensating frictional mechanism.

F is the needle; G, the cast-off; H, the presser-foot.

The rod b^6 may be adjusted vertically by means of suitable adjusting-screws, thereby adjusting the stop b^8 .

The cam for operating the mechanism reciprocating the needle is so shaped that the needle-bar starts slowly and has a gradually accelerating movement, in order that the strain upon the thread may not be severe at the commencement of the upward movement of the needle.

It will be noticed that the spring b^7 not only serves to automatically return the sliding sleeve b^5 to its original position on each throw of the needle-bar, but that it also acts to hold down the presser-bar; also, that the higher the presser-foot is lifted the less the sliding sleeve is depressed, and therefore the strain upon the spring during all depressions is very nearly uniform.

The operation of my mechanism has been explained coincidentally with its description.

The presser-foot may be held down by an independent spring in lieu of the spring b^7 , if desired.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a wax-thread sewing-machine, the combination of the cam A, the lever B, the needle-bar C', the devices connecting the end of the lever with the needle-bar, with the sliding lever-supporting sleeve b^5 , and the stop c^6 , adapted to be placed in position by the material sewed, substantially as and for the purposes described.

2. In a wax-thread sewing-machine, as a means of varying the stroke of the needle-bar, the lever B, adapted to be operated by a cam, and mechanism, substantially as specified, placed in position by the work for transferring the fulcrum of the lever from or near its center to its outer end, all substantially as and for the purposes described.

3. In a wax-thread sewing-machine, the combination of a lever, B, for reciprocating the needle-bar, pivoted at b^4 to the sliding sleeve

b^5 , the said sliding sleeve b^5 , the spring b^7 , and the stop c^6 , all substantially as and for the purposes described.

4. In a wax-thread sewing-machine, the combination of the lever B, pivoted at b^4 to a yielding sleeve, b^5 , with locking mechanism, substantially as specified, whereby the said sleeve is prevented from yielding during a certain portion of the movement of the lever, all substantially as and for the purposes described.

5. The combination, in a wax-thread sewing-machine, of a lever, B, for operating the needle-bar, with a yielding sleeve, b^5 , to which the lever is pivoted, and means for reciprocating the lever, all substantially as described.

6. In a wax-thread sewing-machine, the combination of the presser-foot bar, adapted to be lifted a uniform distance from the level of the work, and provided with the stop c^6 , and arm C, with the lever B, the sliding sleeve b^5 , spring b^7 , and cam A, all adapted to operate substantially as set forth.

7. The block D, frictionally attached to the needle-bar, in combination with the presser-foot and connecting mechanism, whereby the block is placed in position upon the needle-bar according to the thickness of the work, all substantially as and for the purposes specified.

8. The combination, in a wax-thread sewing-machine, of a needle-bar and cast-off bar, and block D, frictionally attached to the needle-bar, and placed in position thereon by the presser-foot, and the block d , rigidly fastened to the presser-foot bar, all adapted to automatically regulate the downward motion of the cast-off bar, all substantially as and for the purposes described.

9. In a wax-thread sewing-machine, the block b^2 , attached to the needle-bar, the block d' , fastened to the cast-off bar, the frictional block c^4 , positively actuated by the presser-foot and frictionally attached to the cast-off bar, the friction-block D, and the block d , attached to the cast-off bar, all adapted to operate to automatically vary the throw of the cast-off bar, substantially as described.

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Witnesses:

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