(No Model.)

H. P. ALDRICH.

SEWING MACHINE.

No. 332,317. Patented Dec. 15, 1885.

Fig. 2.

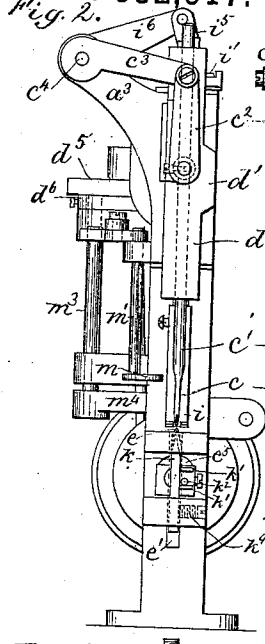


Fig. 1.

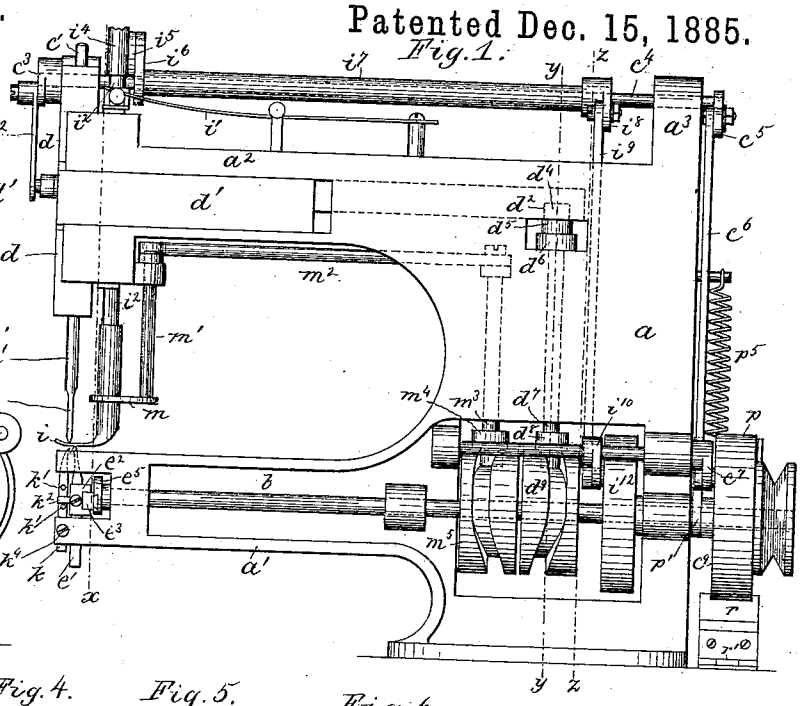


Fig. 3.

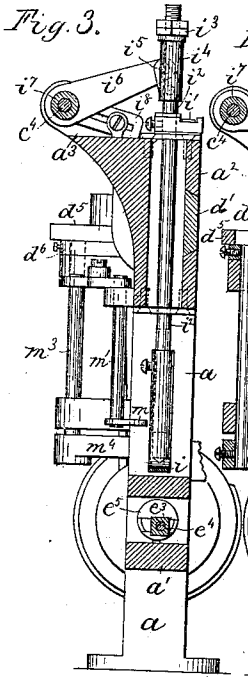


Fig. 4.

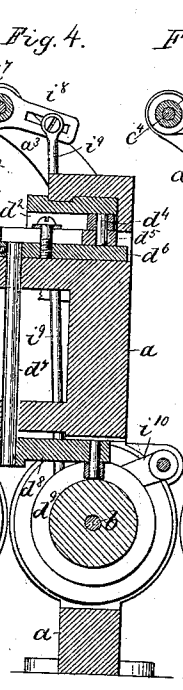


Fig. 5.

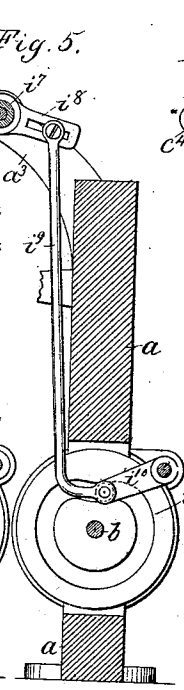


Fig. 6.

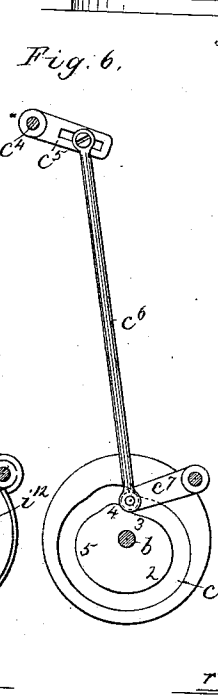
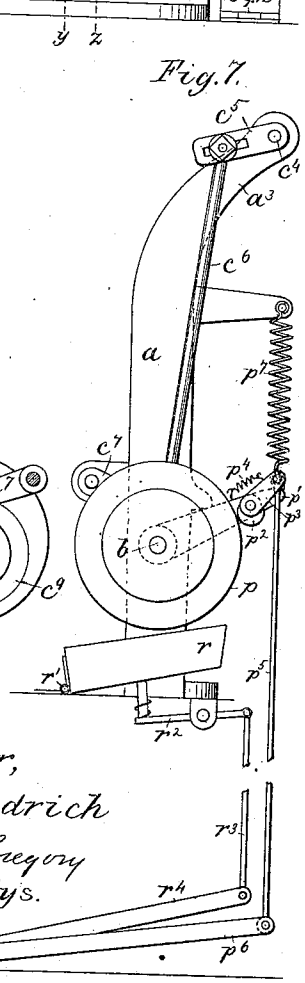


Fig. 7.



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UNITED STATES PATENT OFFICE.

HOSEA P. ALDRICH, OF BOSTON, MASSACHUSETTS.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 332,317, dated December 15, 1885.

Application filed July 19, 1884. Serial No. 138,134. (No model.)

To all whom it may concern:

Be it known that I, HOSEA P. ALDRICH, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is embodied in a waxed-thread sewing-machine of that class in which the sewing is made by a single thread drawn through the material from one side thereof in a series of loops or stitches, each loop being drawn through the one previously made in order to prevent the latter from pulling out from the material sewed. Machines of this class contain the following elements or devices for making the stitches or loops, namely: an awl to pierce the material, a hook or needle to engage the thread and draw it through the hole made by the awl, a thread-guide to throw the thread around the shank of the needle and into the hook thereof, and a cast-off to throw the loop previously formed off from the needle around the new loop that is being drawn through by the needle, and together with these elements a rotary-moving actuating-shaft and connecting mechanism between it and the said devices, by which each is moved at the proper time, and a work-support and clamp or presser-foot to hold the material being sewed. In addition to its longitudinal movement through the stock or material being sewed, either the awl or the hooked needle has also a lateral movement while in the said stock, carrying the said stock with it or feeding it so that each new stitch is formed at a new place in the stock, making a continuous line of stitching. The train of mechanism by which this lateral or feeding movement is produced is called the "feed mechanism," and in order to permit the feed to take place the presser-foot has to be lifted to unclamp the stock while the lateral movement is being made.

My invention consists, mainly, in novel connecting mechanism between the main shaft and the different devices for forming the stitches and feeding the stock, the main object of the novel construction being to increase the speed of operation without material decrease in the durability of the machine, and another object being to facilitate the handling by the operator of the material being sewed, and thereby effecting a considerable saving of time.

Figure 1 is a side elevation of a sewing-machine embodying this invention; Fig. 2, a front end elevation thereof; Fig. 3, a vertical section on line *x x*, showing the presser-foot and a portion of its actuating mechanism; Fig. 4, a vertical section on line *y y*, showing a portion of the feed mechanism; Fig. 5, a vertical section on the line *z z*, showing the actuating-cam and connected parts for raising the presser-foot during the feed; Fig. 6, a detail showing the actuating-cam for the awl, and Fig. 7 a rear end elevation of the machine.

The frame-work *a* has a lower arm, *a'*, containing the main actuating-shaft *b* and hooked needle with its actuating mechanism, and an upper arm, a^2, containing the awl and presser-foot and a portion of the feed mechanism. The lower arm, *a'*, is long and slender, so as to enter a tubular article, such as a boot-leg while stitching a longitudinal seam thereof, the machine being shown in this instance as of the kind known to the trade as an "alligator," the said arm constituting the work-support and feed being lengthwise of the said arm. The awl *c* is connected with a bar, *c'*, sliding in a guide-piece, *d*, supported at the forward end of the arm a^2 and having a sliding movement in the said arm lengthwise thereof. The awl-bar *c'* is connected by a link, c^2, with an arm, c^3, of a rock-shaft, c^4, having bearings in brackets a^3 on the frame-work and extending to the rear end of the frame-work, where it is provided with an arm, c^5, connected by a rod, c^6, with an arm, c^7, having a stud or roller operated by the actuating-cam c^9 on the main shaft *b*. These parts constituting the awl-operating mechanism are substantially the same as heretofore used, except a peculiarity in the actuating-cam c^9. (See Fig. 6.) The portion of the cam-groove between the points 2 and 3 causes the depression of the awl, through the stock, and then the awl, instead of dwelling in its depressed position or gradually rising while the feed takes place, is caused to rise quickly for a short distance insufficient to re-

move it from the stock by the portion 3 4 of the cam-groove, thus relieving the pressure of the stock on the work-support while the feed is taking place during the farther rise of the awl caused by the portion of the cam between the points 4 and 5. The point of attachment of the rod c^6 with the arm c^5 is adjustable toward and from the axis of the shaft c^4, enabling the amount of longitudinal movement of the awl to be varied. The awl c enters the stock at a point in advance of the hooked needle e, as shown in Fig. 1, and is then moved laterally to feed the stock until the awl-hole is in line with the needle, so that the latter enters the said hole as the awl recedes therefrom. The lateral feeding movement of the awl takes place while it is in the stock, and the mechanism for producing the feed comprises a slide-bar, d', connected with the awl-guide d, and having a longitudinal movement in the upper arm, a^2, of the frame-work near the rear end of which the said bar d' is provided with a transverse groove, d^2, which receives a block, d^4, pivotally connected with an arm, d^6, fixed upon a rock-shaft, d^7, having an arm, d^8, having a projection or roller engaged and actuated by a cam, d^9. The block d^4 is attached to an adjusting-piece d^5 on the arm d^6 enabling the block d^4 to be held at the proper distance from the axis of the shaft d^7 to produce the desired length of feed, the feed being greater the farther the said block is from the axis of the said shaft. The presser-foot or work-clamp i normally pressed down by a spring, i', to clamp the work or material being sewed, while the stitch is being made, is raised to release the stock while the feed is taking place by the presser-foot-lifting mechanism, as follows: The presser-foot i is connected with a bar, i^2, having a vertical sliding movement in the frame-work, and provided at its upper end with an adjustable stop or shoulder, i^3, shown in Fig. 3, as consisting of nuts on the threaded upper end of the said bar i^2. A sleeve, i^4, has a sliding movement on the bar i^2, below the projection i^3, and in its upward movement engages the said projection, lifting the bar and presser-foot. The sleeve i^4 is connected by a link, i^5, with an arm, i^6, on a shaft, i^7, (shown as tubular,) and turning on the shaft c^4. The shaft i^7 is provided with another arm, i^8, connected by a rod, i^9, with an arm, i^{10}, having a stud or roller actuated by the cam i^{12} on the main shaft b. The parts last described constitute the presser-foot-lifting mechanism, and are independent of the other parts. The hooked-needle e is connected with a bar, e', having a sliding movement in suitable guide-passages in the portion a' of the frame. The bar e' has connected with it a block, e^2, having a transverse groove, which receives a slide-block, e^3, on a wrist-pin, e^4, (see Fig. 3,) connected with a disk, e^5, on the main cam-shaft a. The pin e^4 is adjustable radially on the disk e^5 to regulate the amount of movement of the needle, which is projected upward through the hole made by the awl c as the latter recedes after the feed has taken place. The needle-operating mechanism just described occupies but little space vertically, and gives a powerful and easy movement to the needle. The cast-off k is operated by the needle-actuating mechanism in the usual manner, it having projections k', that are engaged by a projection, k^2, on the needle-bar e', and being held by a friction device, k^4, until positively moved by the needle-bar. When the hook of the needle is projected up through the hole in the stock, the thread, which is taken from a suitable spool or ball in usual manner, is thrown around the shank of the needle and into the hook by the thread-guide m, connected with a rock-shaft, m', having an arm connected by a rod or link, m^2, with an arm of a rock-shaft, m^3, extending downward at the rear part of the frame-work of the machine, and provided with an arm, m^4, having a roller operated by a cam, m^5, on the main shaft, this thread-guide mechanism being substantially the same as in Letters Patent No. 113,962, dated April 25, 1871.

The main shaft b of the machine is shown as provided with means for enabling the operator to turn it slowly for a portion of a revolution by the foot-power in order to set the needle in proper position to begin to stitch while the work is held in proper position by both hands of the operator. The mechanism for thus turning the shaft consists of a disk or wheel, p, fast on the main shaft, and an arm, p', loose on said shaft provided with an engaging device, shown in this instance as a friction-dog, p^2, by which the said arm engages the said wheel and carries it with it while moving in one direction, but at other times leaves the said wheel free to move independently of the said arm. The friction-dog p^2 consists of a round block eccentrically pivoted on the arm p', and itself provided with an arm, p^3, drawn in one direction by a spring, p^4, and connected by a link, p^5, with a treadle, p^6, by which it may be moved in the other direction. When the treadle p^6 is depressed, it first turns the arm p^3 and dog p^2 on the pivot in the arm p' without moving the latter, which is held in its highest position by a spring, 7, stronger than the one p^4, until the surface of the said dog comes in contact with and binds on the disk p, thus locking the disk and arm p' together, so that in the farther downward movement of the treadle the disk and main shaft of the machine will turn with the arm. When the pressure is removed from the treadle, the spring p^4 first turns the dog, disengaging the disk p, and the spring p^7 then raises the arm p' without moving the main shaft, and by again depressing the treadle the main shaft is turned from the point where it was previously left.

In applying a piece of work to the machine, if the stitching mechanism is not in proper position to receive the work, the main shaft can be turned by one or more movements of the treadle p^6 to bring the stitching mechanism to the proper position without requiring the hand of the operator, which can thus be

employed in holding the work in proper condition, and as soon as the work is in place under the presser-foot the main shaft can be turned by the treadle p^6 to place the stitching mechanism in proper position to begin to operate at full speed, and the actuating-belt may then be caused to drive the machine by moving the proper treadle, the entire operation of applying the work thus being done without loss of time, the operator always having both hands to properly hold the work.

In order to enable the machine to be run at full speed to within two or three stitches of the end of the seam, and then suddenly stop, the main shaft b is provided with a brake consisting of a block, r, hinged at r' in position to be moved against the periphery of the disk p. The said block r is operated by a lever, r^2, connected by a rod or link, r^3, with a treadle, r^4, which may be placed close beside the pedal p^6, so as to be operated by the same foot, the heel of the foot resting on one of the said treadles near its pivoted end, and then rocking so as to place the ball of the foot on either of the treadles r^4 or p^6, as may be desired, in operating the machine.

The two usual treadles for shipping the belt and for raising the presser-foot may be operated by the other foot of the operator, who thus has both hands at liberty for handling and guiding the material being stitched.

The mechanism for controlling or operating the main shaft by means of treadles, as just described, is not claimed in the present application, but will form the subject of another application for Letters Patent.

I claim—

1. In a sewing-machine, the following elements, namely: the main shaft, awl, and actuating mechanism for the latter, and the presser-foot and its actuating rock-shaft independent of the awl-actuating mechanism, and provided with two arms, one of which is connected with the presser-foot and operates to lift the same from the work, and the other of which arms is connected with the main shaft, substantially as described.

2. The presser foot and bar having an engaging projection, combined with the sleeve, having a free longitudinal movement on said bar below said projection, the arm connected with the said sleeve, the rock-shaft connected with the said arm and having a second arm, and the actuating cam and rod connected with the said arm, substantially as described.

3. In a sewing-machine, the main shaft, work-support, awl, and actuating mechanism for the latter by which the said awl has a longitudinal movement toward the work-support, in which movement it pierces the stock or material followed by partial movement away from the work-support insufficient to withdraw it from the material, and a lateral feeding movement while in this position, followed by a longitudinal movement by which it is wholly withdrawn from the material, substantially as and for the purpose described.

4. The awl having a longitudinal movement and its guide-piece having a lateral movement, combined with the slide-bar connected with the said guide-piece and actuating-cam, whereby the awl is caused to have a lateral movement, substantially as described.

5. The awl and awl-guide having a sliding movement, combined with the slide-bar, the rock-shaft having two arms, one connected with the said slide-bar, and an actuating-cam engaging the other arm of the said rock-shaft, substantially as described.

6. A sewing-machine having a slender work-supporting arm, main shaft passing longitudinally therethrough, and needle operating transversely in the said arm, as described, and an upper-arm awl and awl-guide having a sliding movement lengthwise of the said upper arm, and actuating mechanism, substantially as described.

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

HOSEA P. ALDRICH.

Witnesses:

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