(No Model.) 2 Sheets—Sheet 1.

J. C. GOODWIN.

OVERSEAMING SEWING MACHINE.

No. 408,009. Patented July 30, 1889.

FIG. 1.

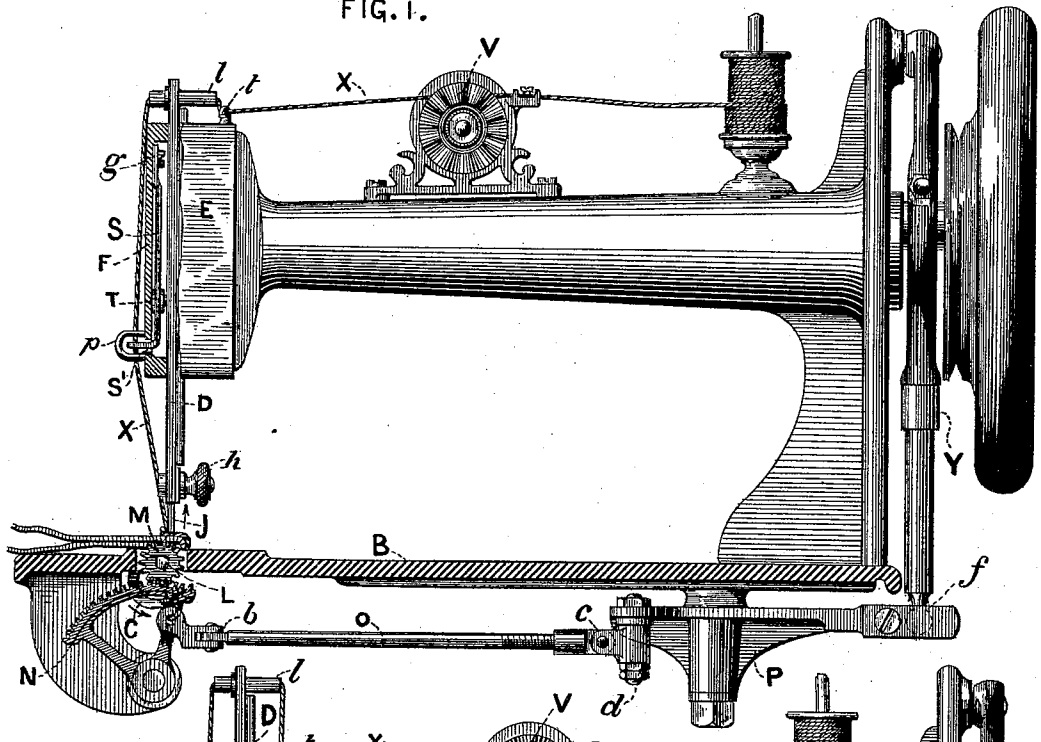


FIG. 2.

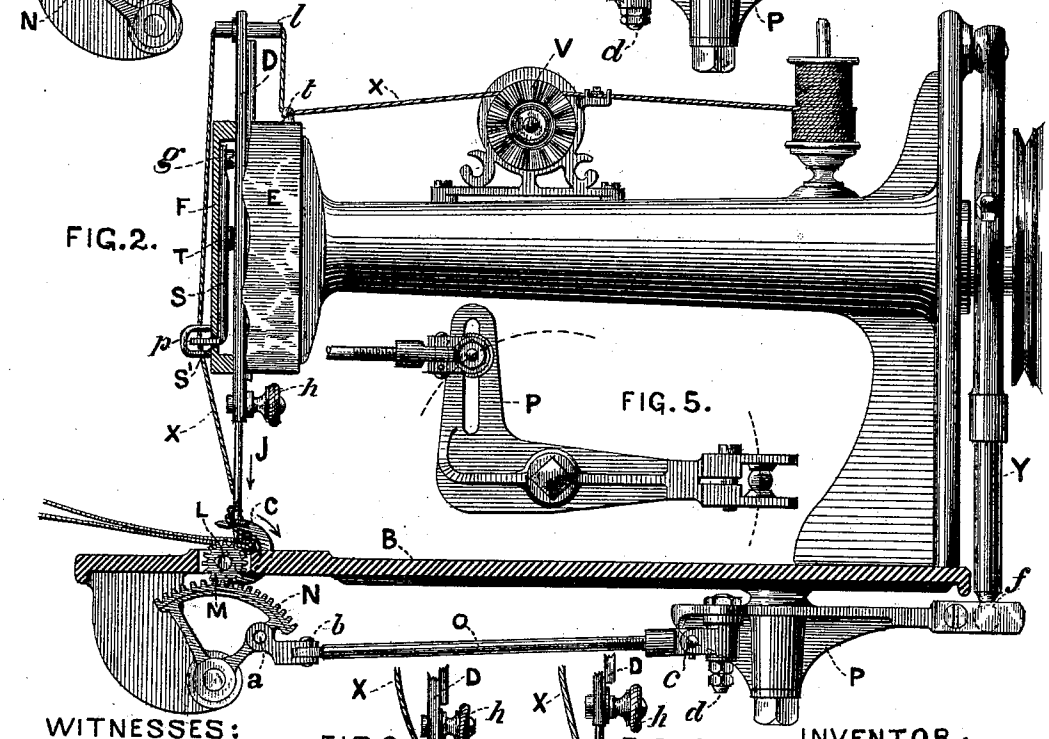


FIG. 5.

FIG. 3.

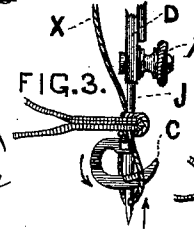
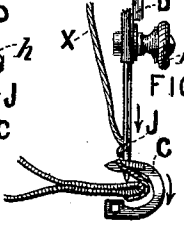


FIG. 4.



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(No Model.) 2 Sheets—Sheet 2.

J. C. GOODWIN.

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FIG. 6.

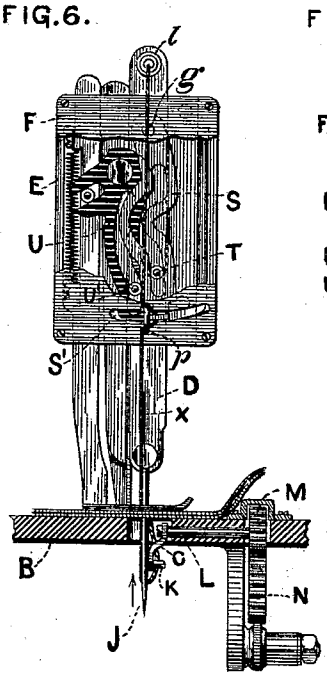


FIG. 7.

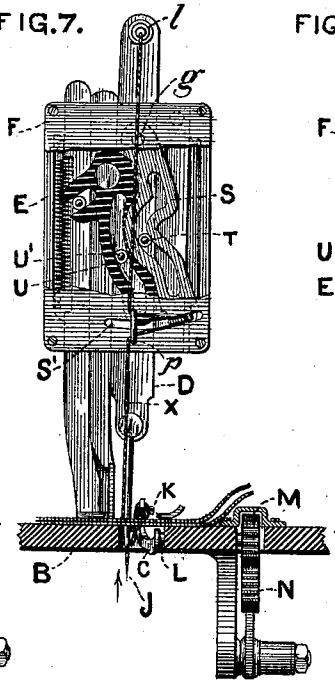


FIG. 8.

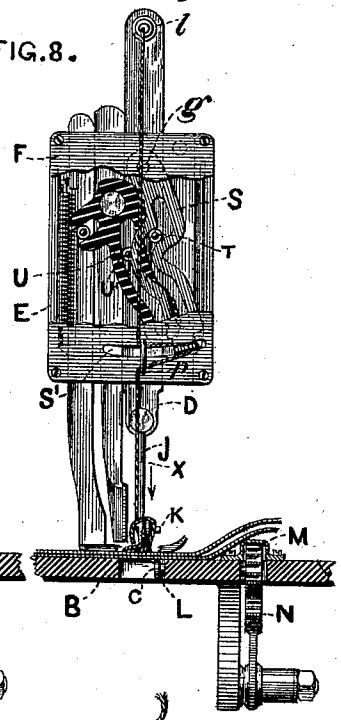


FIG. 9.

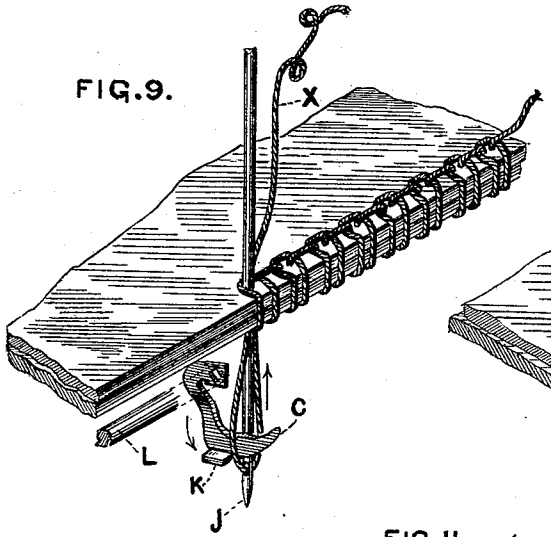


FIG. 10.

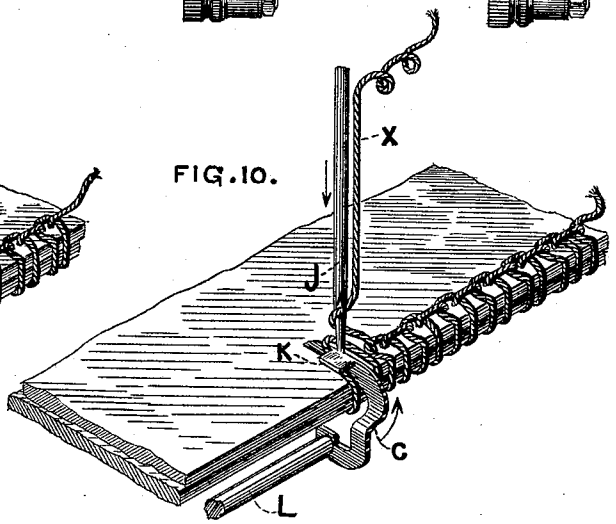


FIG. 11.

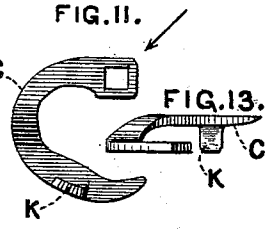
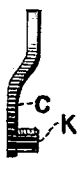


FIG. 13.

FIG. 12.



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UNITED STATES PATENT OFFICE.

JULIUS C. GOODWIN, OF PHILADELPHIA, PENNSYLVANIA.

OVERSEAMING SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 408,009, dated July 30, 1889.

Application filed April 7, 1887. Serial No. 234,003. (No model.)

To all whom it may concern:

Be it known that I, JULIUS C. GOODWIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Overseaming Sewing-Machines, of which improvements the following is an explicit and exact specification, enabling one skilled in the art to make and construct the same.

My invention relates to that class of overseaming sewing-machines in which only a single thread is employed to form the stitch, this thread being supplied in the usual manner to an ordinary reciprocating eye-pointed sewing-machine needle vibrating through the material to be stitched and forming a loop on the side, which, for the sake of distinction, I will term the "under side" of the said fabric, where appropriate mechanism secures the said loop and carries it over the edge and to a position on the upper side of the fabric where the needle in its succeeding downward vibration can pass through the same, thus completing a stitch. Heretofore machines of this description have been characterized by great complexity and number of parts, needles of abnormal form have been required to attain the desired object, while in other instances the loop was twisted in such manner that the twist remained visible on the edge of the goods, presenting an unsightly appearance, besides impairing the efficiency of the stitch.

The object of my invention is to reduce the number of elements to a minimum, to employ a needle of the ordinary form, and to produce an overseaming stitch free from the defects mentioned above.

To this end my improvements consist, in connection with the employment, preferably, of a straight eye-pointed sewing-machine needle reciprocating vertically, or approximately so, and supplied with thread in the usual manner, of an oscillating hook adjacent thereto and vibrating in a plane at right angles to the path of the feed, so that its vibrating extremity shall be alternately beneath and over the fabric, the bed-plate of the machine being slotted appropriately to allow the passage of the hook. This hook is provided with a projection or horn, hereinafter more fully described, and is secured upon a horizontal shaft journaled in bearings upon the under side of the bed-plate parallel to the direction of the feed and actuated by appropriate mechanism from the horizontal shaft of the machine. In addition to the above I also provide means for taking up the slack of the thread at the moment of forming the stitch, as hereinafter more fully set forth.

The nature of my improvements and the manner in which they are to be carried out will be understood, reference being made to the accompanying drawings, in which—

Figure 1 is a vertical front elevation, partially in section, of a sewing-machine embodying my improvements, showing the relative position of the various parts of the machine and of the needle and hook beneath the plate at the moment when the oscillating hook is taking up the thread from the needle to form the overseaming-loop. Fig. 2 is a similar elevation at the moment when, the needle and hook meeting above the fabric, the needle is passing through and taking the loop off of the hook. Figs. 3 and 4 are detail views showing more clearly the relative position and function of the needle and hook in Figs. 1 and 2, respectively, their direction as per arrows. Fig. 5 is a detail view, from beneath, of the bell-crank lever, the direction of the oscillation of its arms as per dotted lines. Figs. 6, 7, and 8 are end elevations, partially in section, of the needle-bar box, with face-plate partially broken away, showing relative position of mechanism for regulating the take-up at the time that the needle and hook are in the position shown in Figs. 1 and 2, and also an intermediate position between the two, respectively. Figs. 9 and 10 are detail views in perspective and on an enlarged scale, showing more clearly the construction of the stitch and the manner in which it is formed, the small arrows indicating the direction in which the needle and hook are moving. Figs. 11 and 12 are a side and rear elevation, also on an enlarged scale, showing the overseaming-hook detached. Fig. 13 is a top view of the hook from the direction indicated per arrow in Fig. 11.

The drawings represent the general arrangement of the well-known Davis sewing-machine; but my improvement may be applied to almost any machine employing a reciprocating needle and needle-bar, the Davis be-

ing selected merely for the sake of the facility afforded in making the connection between the running-gear and operating mechanism of my invention. Beneath the upper surface of the bed-plate B a shaft L is journaled parallel to the direction of the feed and slightly to the left of the needle-hole and extending to a point adjacent to the front side of the same, carrying at its outer extremity a pinion M and at its inner end or that contiguous to the needle a C-shaped hook C, rigidly secured thereon. The hook C is so located relatively to the needle J that it rotates in a plane at right angles to the feed, and hugs the outer or front side of the needle closely when the latter is in its extreme forward position.

Upon the side of the hook C opposed to that which comes in contact with the needle I provide a projection or horn K, located so as to prevent the thread from slipping over the hook. The hook C is oscillated upon its rotating axis about two-thirds of a revolution each way, isochronously with the vibrations of the thread-needle, by means of the pinion M upon the outer extremity of the shaft L. Said pinion meshes with a toothed gear or segment N, carrying a wrist-pin *a*. Fitting over this wrist-pin is an adjustable connecting-rod O, jointed horizontally and vertically at *b* and *c*, respectively, which connects the toothed gear with a wrist-pin *d* upon the bell-crank lever P.

The length of the connecting-rod O is adjustable by means of a screw-thread cut upon its extremity, which screws into the socket pivoted at *c*, and the throw of the bell-crank lever P is susceptible of adjustment by shifting the wrist-pin *d* either inwardly or outwardly upon the bell-crank lever, which is slotted for that purpose, the wrist-pin being provided with a collar and nut for clamping it rigidly when in the required position. The bell-crank lever P is oscillated by the action of the vibration of the eccentric-lever Y, pivoted at its upper extremity upon the frame of the machine and actuated by an eccentric, which it clasps upon the horizontal shaft, this eccentric-lever being connected with the bell-crank lever by means of a ball-and-socket joint at *f*. This movement will be readily understood, being well known in the art as common to all Davis vertical-feed sewing-machines, differing therefrom only in the substitution of a bell-crank lever P for the straight shuttle-throwing lever of the said Davis machine.

I do not confine myself to the particular gearing mechanism herein set forth, as there is a variety of methods of accomplishing the same result well known in mechanics.

The threaded needle J, similar to the ordinary sewing-machine needle with an eye near its point, is securely fastened to the needle-bar D by means of a thumb-nut *h* and vibrates vertically with it between the guide-plate and the feed-bar. The needle-bar D carries upon its exterior face near the center of its length two rollers T and U′, which I term, respectively, the "take-up roll" and the "feed and presser lifter-roll." These rolls work in cam-slots provided in the feed and presser bar lifter-cam-lever U and the take-up cam-lever S, respectively. The former of these I need not describe, as it forms no part of my invention, its functions being well known and understood, and being common to all Davis shuttle-machines. The take-up cam-lever S is pivoted at *g* upon the inner face of the face-plate F of the needle-bar box E and is sinuously slotted the greater part of its length, the edges of the slot forming a cam-face for the reception of the take-up roll T upon the needle-bar D, the rectilineal motion of which imparts vibrations to the lever in accordance with the irregularities of the slot. The lower extremity of the take-up cam-lever extends at right angles outwardly and projects through a curved slot S′ in the face-plate F, having the pivot *g* of the lever S for a center. This foot or projection is perforated vertically for the passage of the thread. Straddling the slot S′ and at the vertical center of the face-plate a U-shaped thread-guide *p* is provided for holding the thread in position before and after passing through the eye in the take-up lever S. The thread X, after passing around the tension V, through the thread-guide *t*, thence through the guide *l* at the upper extremity of the needle-bar, is led downward through the thread-guide *p*, thence through the eye in the take-up lever S, back through the thread-guide *p*, and thence through the eye of the needle J.

The operation of my machine is substantially as follows: The necessary adjustments having previously been made—namely, the proper relative positions of the needle and hook to each other by means of the screw-thread upon the connecting-rod O and the required degree of rotation of the hook C by regulating the throw of the bell-crank lever P through the position of the shifting crank-pin *d* upon the same, and the tension having been properly adjusted—I will suppose the machine to have already made a number of stiches and to be in the position represented in Figs. 1, 3, 6, and 9. At this period of the formation of the stitch the hook is represented as moving in the direction of the arrow. The point of the hook, closely hugging the needle J has passed between the front side of the needle and the thread. As the hook continues rotating the horn K prevents the thread from slipping over the rear of the hook and carries it up, forming a loop over the edge of the fabric to a point slightly in advance of the position shown in Figs. 2, 4, 7, and 10. Meanwhile the needle J, which reciprocates isochronously with the oscillations of the hook C, likewise moves upward to a point slightly above the position shown in the figures last named.

The object of causing the needle and hook

to reciprocate and oscillate farther than the exact distance absolutely required is with a view to allowing a certain amount of slack to the thread, thus obviating the possibility of dropping a stitch. During the upward movement of the needle and needle-bar and of the hook the thread is taken up from the spool by the combined movements of the take-up lever S and the thread-guide *l* at the upper extremity of the needle-bar. Simultaneously, also, the feed-bar is depressed and the presser-foot raised in the usual manner by a cam-movement. (Not shown in the drawings, as not forming part of this invention.) The feed, operating, draws the fabric, with the needle and needle-bar, to their extreme rearward position, the presser-foot again descending before the needle has reached its extreme upward position, at which time its point is slightly above the back of the hook when the latter is at the extreme of its upward oscillation. At this juncture the hook C has oscillated so far over the fabric that the horn K is slightly to the left of the needle J. At this moment three different movements take place simultaneously, to wit: The feed-bar pushes the needle to the normal position, and consequently to a point immediately on a line with the rear edge of the oscillating hook, the needle-bar commences its downward motion, and the hook begins to recede. As the needle-point descends and comes in contact with the receding hook the horn K has not yet completely passed to the right of the needle, and the latter passes between it and the inner edge of the loop. At this moment it becomes necessary that the thread should be under the full resistance of the tension V. To this end, and in order that the thread should be tightened before the eye of the needle enters the fabric, a quick movement of the take-up lever S is effected by the action of the roll T in its downward progress against the interior cam-face of said lever, which throws the take-up toward the front of the machine, the position of the various elements at this stage of the process being illustrated in Figs. 2, 4, 7, and 10. From this point forward the needle, descending, penetrates the fabric in time to hold the loop as it drops from the receding hook C, thus securing it over the edge, the needle and hook continuing their downward course until the needle has reached its extreme lower position, which is somewhat below the position shown in Figs. 1 and 3. The hook also clears the needle, being somewhat to the left of it. As the needle and hook commence their upward movement their positions are so timed that the point of the hook closely hugging the front side of the needle passes between it and the thread and continues until the thread rests against the horn K, as shown in Figs. 1, 3, 6, and 9, as previously described.

I am aware that heretofore various devices have been employed for forming an overseaming-stitch, and that among such devices oscillating hooks, in combination with reciprocating needles, are mentioned; but such combinations require the use of two separate threads to form the stitch, whereas in my improvement one and the same thread effects the required result. I therefore disclaim, broadly, the use of a reciprocating needle and oscillating hook; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In an overseaming sewing-machine, the combination, with a reciprocating eye-pointed needle and means for operating the same, of a horizontal shaft L, journaled in the bed-plate parallel with the direction of the feed, a single hook C, rigidly mounted on said shaft in front of and contiguous to the line of travel of the needle and provided with a laterally-projecting horn K, and means, substantially as described, for rotating the shaft, whereby the hook is reciprocated above and below the material to be operated on and in close proximity to the front side only of the needle, for the purpose specified.

2. In an overseaming sewing-machine, the combination, with a reciprocating eye-pointed needle carrying a single thread and means for operating the said needle, of a horizontal shaft L, journaled in the bed-plate parallel with the direction of the feed, a single hook C, rigidly mounted on one end of said shaft in front of and contiguous to the line of travel of the needle and provided with a laterally-projecting horn K, a pinion M, mounted on the other end of said shaft, a toothed segment N, meshing with said pinion, a bell-crank lever P, pivoted on the bed-plate, an adjustable rod O, connecting the bell-crank and the toothed segment, and means, substantially as described, for oscillating the bell-crank lever, for the purpose specified.

JULIUS C. GOODWIN.

Witnesses:
CHARLES RUCKOLDT,
WM. H. MYERS.