CHARLES H. WILLCOX
AND
CYRUS CARLETON.

SEWING MACHINE.

PATENTED JUL 4 1871

FEED MOTION.

116783

FIG. 1.

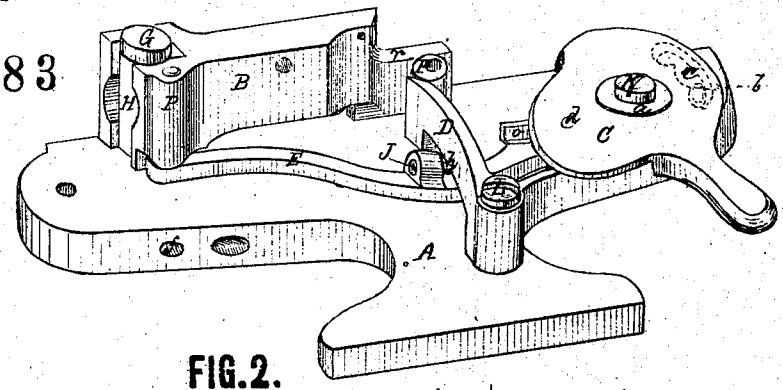


FIG. 3.

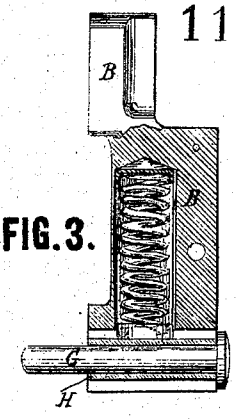


FIG. 2.

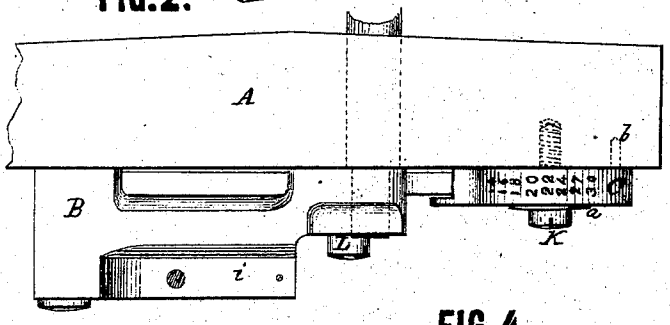


FIG. 10.

FIG. 11.

FIG. 4.

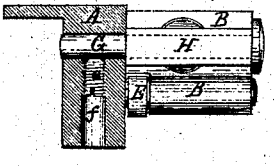


FIG. 6.

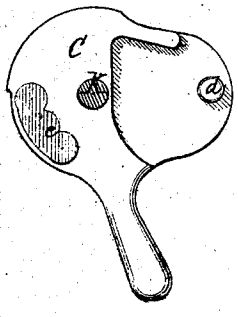


FIG. 5.

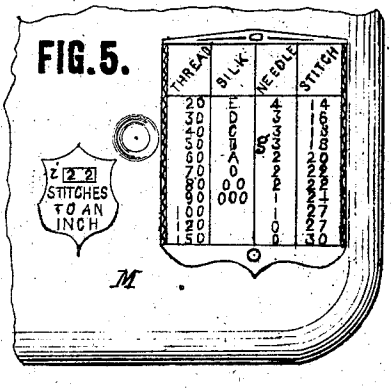
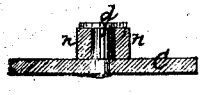


FIG. 7.

FIG. 9.



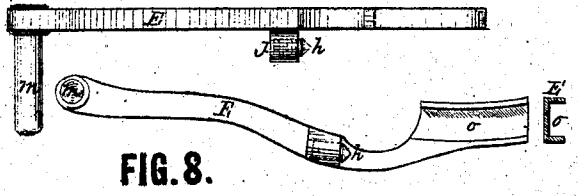


FIG. 8.

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& Cyrus Carleton
by A. Pollok
their atty

D. D. Parmelee
WITNESSES. C. B. Nottingham

UNITED STATES PATENT OFFICE.

CHARLES H. WILLCOX, OF NEW YORK, AND CYRUS CARLETON, OF BROOKLYN, NEW YORK, ASSIGNORS TO THE WILLCOX & GIBBS SEWING-MACHINE COMPANY, OF NEW YORK CITY.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 116,783, dated July 4, 1871.

To all whom it may concern:

Be it known that we, CHARLES H. WILLCOX, of the city, county, and State of New York, and CYRUS CARLETON, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification:

This invention relates, in part, to the feeding mechanism of sewing-machines, and, in particular, to that known as the Wilson or four-motion feed; and its principal object is to get rid of the noise which usually accompanies the feed-motions of sewing-machines on account of the several parts of the mechanism striking against each other at every throw or revolution of the driving eccentric. The invention further relates to certain means whereby the operator is enabled readily and accurately to adjust the needle, thread, and stitch in proper relation to each other, this latter part of our improvement being particularly adapted to sewing-machines which are provided with a self-adjusting tension—that is, a tension which never requires alteration—and consists of clamping-surfaces which hold tightly onto the the thread until the loop is almost or quite drawn up to the cloth, and then suddenly release their hold in order to give out thread enough for the next stitch, substantially as patented to CHARLES H. WILLCOX on the 9th of August, 1864. The invention principally consists of a four-motion spring feed-bar, constructed and combined with a single eccentric, so that during both its up-and-down and back-and-forth movements it shall maintain a yielding-pressure contact with said eccentric; or, in other words, so that the yielding-pressure contact between the feed-bar and eccentric shall be maintained unbroken at all times and during all the varied movements of the two. The invention further consists in the construction and arrangement of the devices whereby the back-and-forth movement of the feed is obtained in such manner that the link through the medium of which the said back-and-forth movement is imparted to the feed-bar from the eccentric shall also constitute the means by which, in connection with the spring in the feed-bar, the yielding-pressure contact of the said feed-bar with the eccentric is maintained.

These and other features of our invention, relating both to the feed mechanism and to the means hereinbefore mentioned for securing the ready adjustment of the needle, thread, and stitch, can best be explained by reference to the accompanying drawing, in which—

Figure 1 is a perspective view of the feed mechanism and the front of the sewing-machine frame on which the same is supported, this portion of the frame when in position in the machine being placed in a vertical position. Figure 2 is a top view of the same. The remaining figures are views of detached parts both of the feed mechanism and cloth-plate, which will be hereinafter referred to.

The feed-bar B, of ordinary or suitable construction, fits and is adapted to slide back and forth on the box H, which is mounted on the stud or pin G so as to be capable of a slight rotary motion thereon. Side and end views of this box are shown in Figs. 10 and 11. The end of the stud fits in a socket or hole in the front A of the frame of the machine, and is there fastened by means of a set-screw passed up through the hole *f*, as indicated more clearly in Fig. 4, which represents a transverse section through the frame A, showing the stud G and the set-screw *e* in the hole *f*. The free end of the feed-bar is in contact with the eccentric F, formed on or attached to the main driving-shaft in the usual manner. This eccentric, by its direct contact with the bar B, produces, when it is in revolution, the up-and-down motions of the feed-surface, which is fastened to the bar at *i*. Within a recess formed in the feed-bar is the spiral spring I, (see Fig. 3,) one end of which presses against the box H around the projection *k* on the same, and the other against the feed-bar. The spring is maintained in a compressed state by the link E, hinged at one end to the feed-bar, and at or near the other end bearing against the rocker D, the upper end of which rests against the eccentric. As the link is hinged to the feed-bar at a point below its axis G of vibration, the pressure of the spring I, reacting through the link and the rocker against which it bears, tends to press down the feed-bar upon the eccentric, and thus the spring feed-bar at all times and during all parts of its movement maintains a yielding pressure-contact with the eccentric. By employing, for the purpose of maintaining this constant contact of the feed-bar with

the eccentric, the link and rocker, I am enabled, through the medium of the latter instrumentalities, to impart the back-and-forth movement to the feed, the rocker being rotated back and forth by the eccentric with which it is in contact, and thus imparting a corresponding sliding back-and-forth movement to the feed-bar through the medium of the link E. The link is hinged to the feed-bar by means of a spindle, *m*, with which it is provided, as seen more plainly in Fig. 7, which slips freely into a hole formed in the feed-bar at P, below the axis of vibration of the bar.

In order to readily effect the proper adjustment of the feeding-surface in the cloth-plate, we form the device, which, by means of the link, takes its bearing upon the rocker D of an adjusting-screw, J, which fits in a socket formed on one side of the link, and is provided with a taper point, *h*, which rests against the rocker. By screwing this point more or less toward the rocker, the feed-surface of the bar B will be correspondingly lowered or raised and may thus be readily adjusted to its proper position in the cloth-plate. Fig. 8 is a front elevation of the link, representing the arrangement of the groove or slot *o*, hereinafter referred to. The rocker D oscillates on a stud, L, by which it is held to the frame A, and its upper end or surface, upon which the eccentric acts, is beveled, or in other ways is inclined at such an angle, with relation to the feed-bar and eccentric, that the feeding-surface will descend below the cloth-plate before its forward movement ceases, thus preventing the catching or entangling of the prongs or teeth with the cloth or other material with which they are intermittently brought in contact. This will be readily understood by reference to Fig. 1, where it will be seen that, owing to the inclination of the surface of the rocker upon which the eccentric acts, the feed-bar begins to descend and the feeding-surface falls below the surface of the cloth-plate before or by the time the most eccentric portion of the cam F acts upon the inclined surface of the rocker to advance the feed to its most forward position.

In order to vary the length of stitch at pleasure, we combine with the link E a stitch-regulating cam, C, capable of being revolved partly around the screw K by which it is held to the frame A. The cam is kept in the position to which it is moved by the operator by means of the spring washer *a*, interposed between the cam and the head of the screw. The extent of movement of the cam is limited by the stop-pin *b* driven firmly into the front of the frame A, (more clearly seen in Fig. 2,) which enters a slot, *c*, formed in the under side of the cam, (see Fig. 6,) and thus regulates and determines the extent to which the cam may be rotated. The cam, at the point where it is to be connected with the link, is recessed on its under side, as shown plainly in Fig. 6, and is provided with a pin, *d*, provided with a leather bushing, *n*, seen in section in Fig. 9. A slot or groove, *o*, is formed in the end of the link E for the reception of this pin, and the cam and link are thus connected. It will be seen that by rotating the cam the link E will be raised or lowered, and consequently its tapering bearing point *h* will be moved away from or toward the axis of the rocker, thus increasing or lessening the back-and-forth movement of the feed.

If the groove *o* were straight it would at times—when, for instance, the link is raised or lowered to the full extent—be inclined to the point of movement of the feed, and consequently the point of the bearing-screw J would move up and down on the rocker during the vibratory movement of the latter, thus not only causing the parts to wear, but rendering the stitch irregular. We therefore make the slot or groove, as shown in the drawing, of such curvilinear form that whatever part of it is, by the raising or lowering of the link, caused to have its play around the pin *d*, shall be parallel, or nearly so, with the path of movement of the feed, or with the table or cloth-plate through which the feed operates. If desired, the cam may be provided with the groove, and the link with the pin *d*, but we prefer the arrangement first described.

In order to enable the operator to easily regulate the length of stitch, a series of numbers—from 14 to 30—is stamped on a portion of the edge of the cam C, indicating the number of stitches to the inch. One of these numbers at a time is seen through an oblong hole cut through the cloth-plate M at *i*, Fig. 5. Should the operator be desirous of taking a certain number of stitches to the inch, all that he need do will be to turn the cam until the desired number is seen through the hole *i*, and the machine will then be set for that number of stitches per inch. In the cloth-plate around the hole *i* is stamped a shield inclosing the words "stitches to an inch" arranged below the opening through which the number on the cam is seen. By the side of this shield is stamped another shield inclosing a table, *g*, indicating the proper size of thread or silk and needle to be used in taking the different number of stitches to the inch indicated on the cam. The operator has thus ever before him a guide which cannot be lost or mislaid, and which will always indicate the proper relation of needle, thread, and stitch. For instance, the cam being turned so as to show the number 22, the operator looks in the table *g* in the column headed stitch, and finding the number 22, ascertains by reference to the neighboring columns that No. 70 thread or No. 0 silk and a No. 2 needle should be used in taking this number of stitches to the inch; and so with any other number.

We have described the best way of making this table a permanent part of the sewing-machine, so that the same may be always in view of the operator. But it is obvious that such a table may be permanently attached to any part of the machine or its supporting-table without departure from the spirit of our invention.

Having now described our invention, and the manner in which the same is or may be carried into effect, what we claim, and desire to secure by Letters Patent, is—

1. In a four-motion feed, the combination of a feed-bar with a single eccentric and intermediate mechanism, substantially as herein shown and described, the said bar being held by spring

pressure in unbroken contact with said eccentric, deriving its up-and-down movement directly from the eccentric, and its back-and-forth movement through the intermediary of the said mechanism operated by the eccentric, substantially as set forth.

2. In combination with an eccentric imparting to the spring feed-bar by direct contact with it the up-and-down motion of the feed, and with a stitch-cam regulating the length of stitches, the link connected with the feed-bar at a point below its axis of vibration, bearing with yielding pressure on a rocker operated by said eccentric to impart the back-and-forth motion of the feed, substantially as shown and described, so that the feed shall be noiseless at all adjustments of the stitch-cam, and whether the parts be worn or not.

3. In a four-motion feed mechanism, when operated by a revolving eccentric and a rocker, forming upon that portion of the rocker which is in contact with the eccentric, a bevel, as shown and described, or equivalently inclining that portion so that the feeding-surface may continue its forward movement until after it shall have receded below the table out of contact with the cloth.

4. The combination, with the rocker, of the adjustable bearing on the link, substantially as and for the purposes herein set forth.

5. The link and stitch-regulating cam, adapted to operate together, substantially as described, and combined with the feed-bar and rocker, so that the link may be adjusted on the rocker to regulate the feed, substantially as set forth.

6. The combination of the rocker with the link jointed at one end to the feed-bar and grooved or slotted at the other end to engage with the pin on the stitch-regulating cam, substantially as shown and described.

7. In the device herein described for regulating the back-and-forth movements of the feed-bar by means of a link, rocker, and cam, the groove or slot of such curvilinear form that that portion of the groove or slot which has its play around the pin on the cam shall be parallel with the table, or nearly so, in all positions of the cam.

8. The stitch-regulating cam, bearing on its concentric peripheral portion numbers indicating the stitches to an inch, and arranged, as to said portion, tangentially to the cloth-plate, so that the number which is upon the tangential portion of the cam may show through a slot formed for that purpose in the cloth-plate.

9. The recessed stitch-regulating cam, when constructed and combined with the cloth-plate, as claimed in the preceding clause, in combination with a stop-pin in the frame, to limit the play or movement of the cam within the compass of the series of numbers on the edge of the same, substantially as shown and set forth.

10. The combination, with a stitch-regulating cam indicating through the cloth-plate the number of stitches to the inch, of a table permanently attached to the sewing-machine indicating the number of thread or silk and needle corresponding with the number of stitches to the inch shown by the stitch-regulating cam, substantially as herein set forth.

11. The box surrounding the pin on which the feed-bar vibrates, as a bearing to the spring and to the feed-bar, substantially as herein shown and described.

In testimony whereof we have signed our names to this specification before two subscribing witnesses.

CHAS. H. WILLCOX.
CYRUS CARLETON.

Witnesses:
THEO. A. TAYLOR,
HENRY L. BESSEY.