CHARLES H. WILLCOX
AND
CYRUS CARLETON.

SEWING MACHINE.

PULL-OFF.

PATENTED JUN 27 1871

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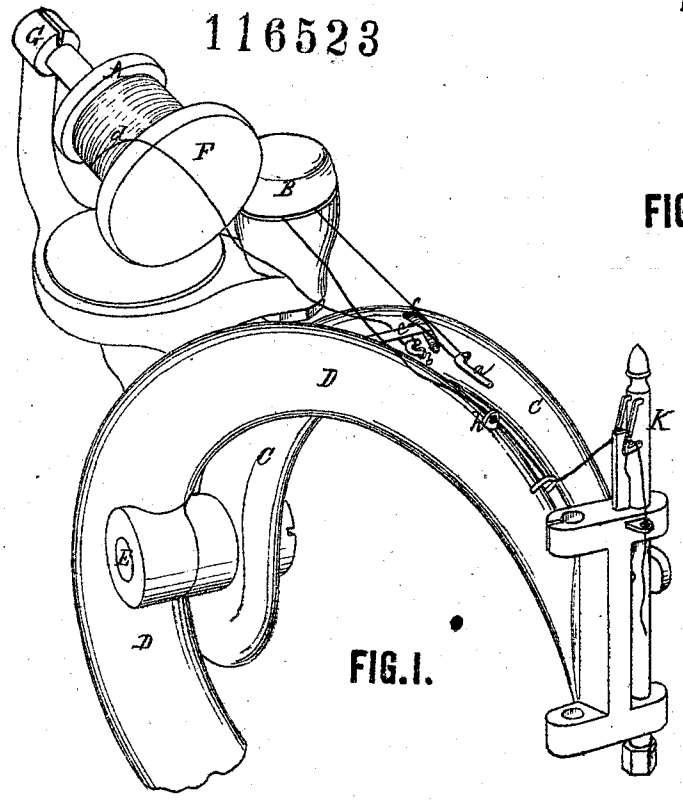


FIG. 1.

FIG. 2.

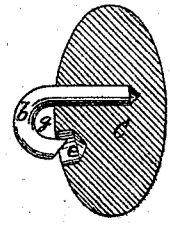


FIG. 3.

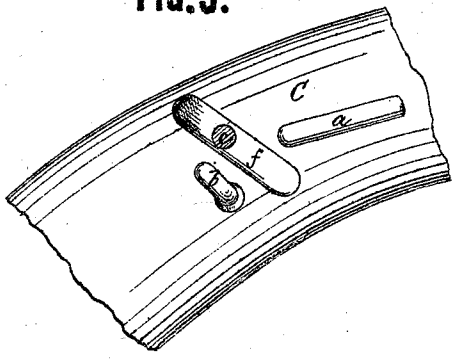
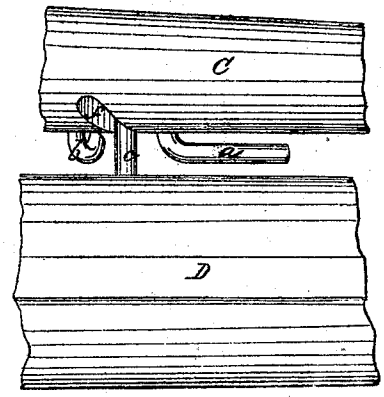


FIG. 4.



Charles H. Willcox
& Cyrus Carleton by
A. Pollok
their atty.

WITNESSES. D. D. Parmelee
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. 116,523, dated June 27, 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 to pull-offs for sewing-machines—that is to say, devices for pulling off from the spool the thread required to form a stitch—and, while adapted for any sewing-machine of suitable construction, is especially intended to be used with sewing-machines in which the thread from the pull-off is held tightly between the two clamping-surfaces of a tension device until the loop is almost or quite drawn up to the cloth, and is then suddenly released for the purpose of forming the next stitch. The object of our invention is to draw from the spool and supply to the needle as much thread as is ever needed for a stitch of any length of which the machine is capable, whether made on thick or thin goods, so that the needle may draw all the thread it needs from the pull-off without the increased friction which would arise if it were compelled to draw an additional amount directly from the spool. To this end we combine with the needle-arm and frame three pins or eyes, two of which are on the needle-arm and the intermediate one on the frame, the thread passing over or through these three pins or eyes, substantially as hereinafter described, so that the needle-arm, which is one of the two parts, may, with the usual stroke, cause the pull-off to draw from the spool a length of thread amply sufficient for the requirements of any stitch. A further object of this invention is to facilitate the introduction of thread into the pull-off; and to this end the pull-off is composed of a pin, hook, and self-threading eye, arranged substantially as hereinafter set forth, whereby, by stretching the thread across these devices in the manner hereinafter described, it will enter or engage with the same, and thus effect the threading of the pull-off.

To enable those skilled in the art to understand and use our invention, we will now proceed to describe the manner in which the same is or may be carried into effect by reference to the accompanying drawing, in which—

Figure 1 is a perspective view of a portion of the frame and needle-arm of a Willcox & Gibbs sewing-machine, to which our invention is applied. Fig. 2 is a transverse section through that part of the needle-arm in which the self-threading eye of the pull-off is located. Fig. 3 is a side view of that part of the needle-arm in which the two movable pins or eyes of the pull-off are located. Fig. 4 is a top view of that part of the needle-arm and frame in which the pull-off is contained.

The pull-off, as above intimated, consists of three pins or eyes, which may be of any suitable construction. These pins or eyes are represented at *a*, *b*, and *c* in the drawing. The two outer pins *a b* are attached to the needle-arm C, and the needle or intermediate pin to the frame D, and the thread from the spool is passed under the pin *b*, or through it if it is made like an eye, over the pin *c* and under the pin *a*, and thence carried back to the tension, as will be presently described. Under this arrangement the thread, at each oscillation of the needle-arm, is bent between the three pins in the shape of an inverted V, and by this means a quantity of thread at least double that supplied by ordinary pull-off devices can be obtained at each up-and-down movement of the needle-arm. The two outer pins are represented as attached to the movable arm and the middle pin to the stationary frame. The pins may be arranged on any suitable part of the frame and the needle-arm; but we prefer to arrange them on the side of the needle-arm, so that the top of the machine may be unencumbered; and in order to get the pull-off out of the way as far as possible, both to conceal it from view and to prevent it from being injured or interfered with, we arrange it between the frame and the needle-arm. It is this arrangement that in practice we prefer, and will now proceed to describe more particularly. One end of the pin *b* is driven firmly into a hole drilled in the side of the arm C, as shown in Fig. 2, or is otherwise suitably fastened thereto. The projecting part of the pin is bent downward so as to form, in connection with the side of the arm C, an eye, through which the thread is passed; and in order to allow the thread to be readily inserted or drawn through the eye the end of the pin is beveled off, as shown in the figure above referred to, and enters a shal-

low hole or recess, *e*, which is of somewhat larger size than the pin, so as to leave an open space all around the end of the latter. The pin enters the recess to such an extent that the lower portion of the beveled surface at the end of the pin will remain outside. By placing a thread on this beveled surface and then pulling on both ends the thread will be drawn up the beveled surface over the end of the pin and into the open space or eye *g*; and the thread, when once in, cannot slip out by the same path. A "self-threading" eye is thus formed for the pull-off, which will hold the thread securely, and can be used to great advantage. The other pin *a*, which is also attached to the needle-arm, is driven firmly into a hole formed in the side of the needle-beam C, or is otherwise secured thereto, at a suitable distance from the pin *b*. The outer end of this pin is bent to form a hook, as shown in Fig. 4, to allow the thread to be readily drawn into it. Between these two movable pins is located the stationary pin *c*, which is driven firmly into or otherwise secured to the side of the frame D. This pin is a simple straight pin, the projecting end of which enters a slot, *f*, somewhat wider than the diameter of the pin, cut in the side of the needle-arm, at such an inclination that the end of the pin in the slot will not interfere with the free movement of the needle-arm. The object of this arrangement is to prevent the thread from slipping over and dropping from the end of the pin. With the pull-off is used a spool-holder, F, tension B, and take-up K, the arrangement of which parts is indicated in Fig. 1. Their construction, however, it is unnecessary here to describe. Any ordinary or suitable spool-holder, tension, and take-up may be used; and whatever is peculiar in the construction and arrangement of these parts is described and claimed by us in separate applications for Letters Patent. The lever or needle-arm C oscillates upon the stud E, which is screwed into the frame D. The movement of the arm is produced by means of a connecting-rod and eccentric on the main shaft in the usual manner. In Fig. 1 the course that the thread takes is plainly shown. In leaving the spool A it passes over the edge of the disk of the spool-holder F through the self-threading eye formed by the pin *b*, as above explained, over the stationary pin *c*, under and around the movable pin *a*, back and around the tension B, between its two clamping-surfaces, and thence to the take-up K through the eye H on the top of the frame. In threading, first raise the needle-arm C to the highest point of its stroke, at which time the two movable pins *a b* of the pull-off will stand above the stationary pin *c*. Having drawn about eight inches of thread from the spool, take hold of the thread with both hands, leaving about four inches between them. Draw the thread thus held between the under side of the two pins *a b* and the upper side of the stationary pin *c*, after which the two hands may be raised and brought together, still drawing on the thread, the effect of which will be to cause one portion of the thread to slip up over the beveled end of the pin through the recess *e* and into the eye *g*, and the other portion of the thread will be drawn up over the pin *a*, thus threading the pull-off. The end of the thread is now carried around the spindle, which carries the clamping-surfaces of the tension device; thence through the eye *h* to the take-up K, and thence to the needle.

The operation of the combined mechanism is as follows: Supposing the needle-arm to be at the highest part of its stroke, the revolution of the main shaft will soon cause the clamping-surfaces of the tension B to clamp the thread, and then the lever C, in its descent, will carry down the pins *a b*, which will cause the thread to be bent over the stationary pin *c* in the form of an inverted V, and, as the thread is held firmly at B, the pull-off will draw from the spool an amount of thread which, owing to the arrangement of the pins, will be almost if not quite double the amount that would be drawn by a single pin or eye attached to the needle-arm, and, in any event, will be sufficient for the longest stitch when sewing the thickest goods.

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. The herein-described double-acting pull-off for sewing-machines, the same consisting of three pins or eyes of suitable construction, the intermediate pin or eye attached to the frame or stationary part of the machine, the two outer pins or eyes to the needle-arm or other parts moving in unison therewith, substantially as and for the purposes shown and set forth.

2. The self-threading eye of the pull-off, constructed and operating substantially as shown and set forth.

3. The arrangement, on the needle-arm, of the self-threading eye and the bent pin or hook, through and over which the thread passes, in combination with the transverse pin on the frame traversing the path of the thread, substantially as shown and set forth.

4. The needle-arm, slotted to receive the end of the transverse or intermediate pin of the pull-off, substantially as and for the purposes set forth.

5. The pull-off, consisting of the three eyes, substantially as described, when arranged upon the interior opposite sides of the frame and needle-arm, substantially in the manner herein shown and set forth.

6. In combination with the pull-off, constructed substantially as described, the spool-holder, tension, and take-up, under the arrangement and for operation, as set forth.

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

CHAS. H. WILLCOX.
CYRUS CARLETON.

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