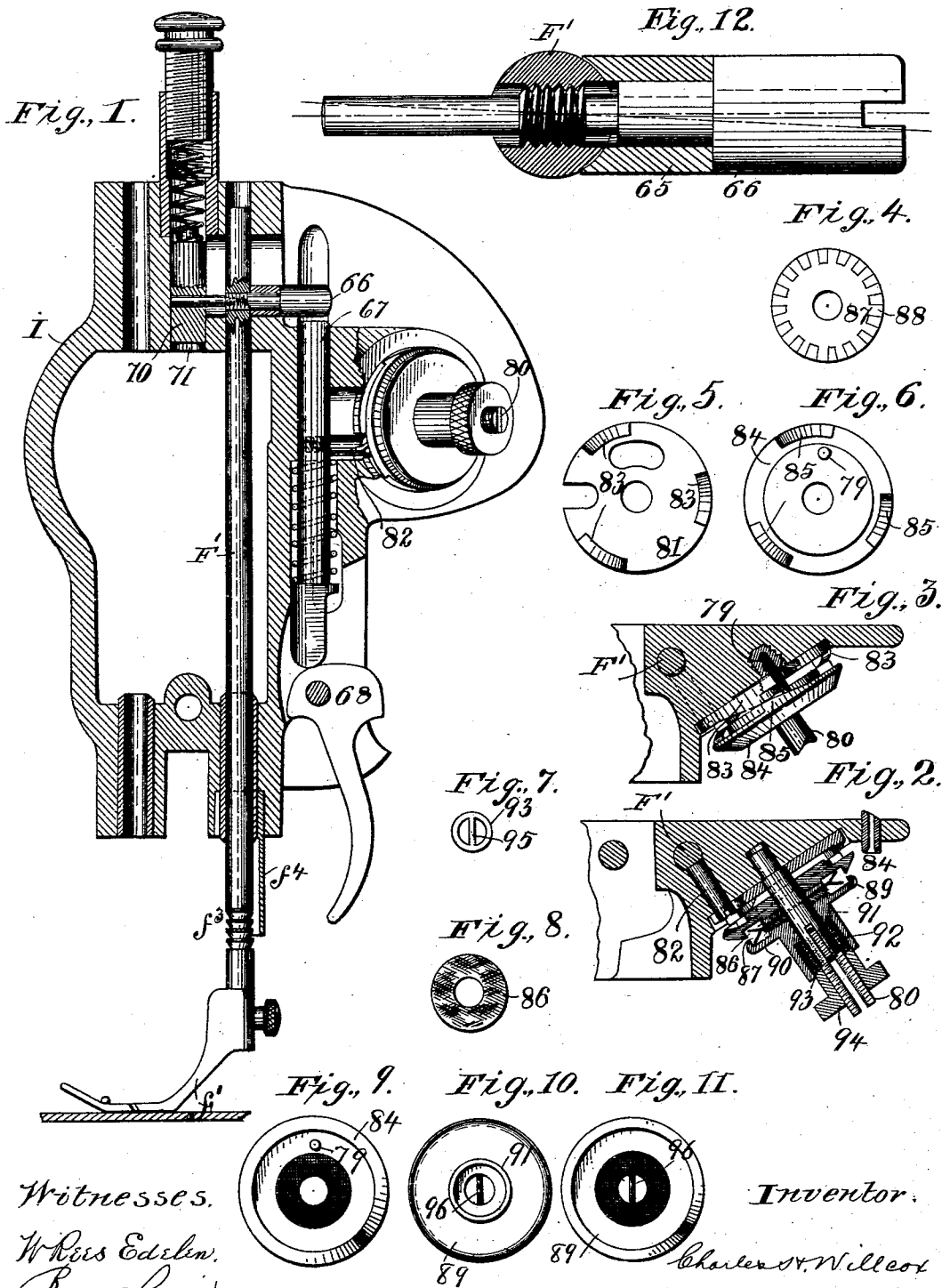


(No Model.)

C. H. WILLCOX.
SEWING MACHINE.

No. 572,040.

Patented Nov. 24, 1896.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES H. WILLCOX, OF NEW YORK, N. Y., ASSIGNOR TO THE WILLCOX & GIBBS SEWING MACHINE COMPANY, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 572,040, dated November 24, 1896.

Application filed August 10, 1895. Serial No. 558,852. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WILLCOX, of New York, N. Y., have invented new and useful Improvements in Sewing-Machines, which improvements are fully set forth in the following specification.

This invention has reference to improvements in the tension of a sewing-machine and in the construction of the presser-bar and its lifting mechanism.

In sewing-machines as ordinarily constructed when the presser-bar is lifted and the work taken from under the foot the thread must be drawn out against the resistance of the tension. One object of the present invention is to take the tension off the thread at such times, leaving it entirely free, and to this end the foot-bar lifter mechanism is connected with the tension, so that when the former is actuated to lift the bar the tension is automatically relaxed and when actuated to lower the bar is automatically restored. It is not admissible to connect the foot-bar itself directly with the tension, because the former constantly rises and falls with the feed during the operation of the machine, and if it were connected with the tension the latter would release and clamp the thread at each rise and fall of feed. Hence according to the present invention the foot-bar is provided with an auxiliary lifter-rod which is independent of the foot-bar and does not partake of its normal reciprocating movement. This lifter-rod is connected by means of suitable devices with the tension for the purposes above indicated, removing the tension when the foot is raised. Of course the lifter can be connected with the tension by mechanism of any suitable sort which will leave the latter free from the normal movements of the presser-bar, but the arrangement described is found to be convenient and advantageous.

The combination, with the presser-bar, of a separate lifter-rod is an improvement irrespective of the connection of the latter with the tension. When the lifter is connected to act directly upon the presser-bar, it is necessary either to cut a slot in the lower part of the head for connection between the lifter

and the bar, which slot is very objectionable at this point, owing to the opportunity it offers for the escape of oil, or to place the lifter on top of the head, which is inconvenient. In the present invention the lifter is pivoted outside the head at the bottom thereof and acts upon the lower end of the lifter-rod.

The tension may be of different forms. As hereinafter described it is of the style known as a "wheel-tension," which is turned constantly in one direction by the thread, its movement being resisted by the adjustable pressure of a tension-spring. By the operation of the lifter mechanism already referred to this pressure is removed when the foot is lifted and restored when it is lowered.

The devices for removing and restoring the pressure of the spring may be of different forms, and generally the principle of the invention may be carried out in various ways.

In the accompanying drawings, which form part of this specification, Figure 1 is a rear elevation, partly in section, showing the presser-bar and its lifter mechanism and the tension arranged on the head of a sewing-machine. Fig. 2 is a sectional view in the plane of the axis of the tension. Fig. 3 is a plan view of part of the tension, partly in section. Figs. 4 to 11 are details of the different elements of the tension. Fig. 12 is an enlarged view in plan, partly in horizontal section, of the pin connecting the presser-bar with the plunger.

The presser-bar F' works in bearings in the top and bottom walls of the hollow head I. Near its upper end is a transverse screw-pin passing through a threaded opening in the presser-bar and at its inner end inserted in a hole in the plunger 70, which works in a socket 71 in the upper part of the head I. This pin also prevents the presser-bar from turning in its bearings. Its outer end extends through a slot in the side of the head and overlies the upper end of the independent lifter-rod 67, which is not in the interior chamber of the head, but works in a vertical hole bored in the metal of the head alongside of said chamber. The cam lever or lifter 68 acts upon the lower end of this lifter-rod, and thus an opening near the bottom of the presser-bar, through which oil could escape

from the interior chamber, is avoided, while the lifter is placed in the most convenient position.

It has been found desirable to provide for a very slight axial adjustment of the presser-bar, so that in the initial assembling of the machine it may be adjusted to bring the needle-hole through the presser-foot f' into exact alinement with the axis of the needle. This adjustment is provided for by constructing the screw-pin 66 so that it may have a very slight lateral play in the threaded opening in the presser-bar through which it passes. Fig. 12 illustrates the construction described, and from inspection thereof it will be seen that after the pin is in place, its inner end being inserted in a hole in plunger 70, the presser-bar can be turned axially through a very small arc. Between the head of pin 66 and the presser-bar is a small clamping-sleeve 65, hollowed out at its inner end to fit the curvature of the bar. The adjustment above described is made before tightening the screw-pin 66, and when made the latter is tightened, the presser-bar being thereby clamped in its adjusted position between the curved end of sleeve 65 and the threaded portion of the screw-pin.

The tension is located on the head of the machine. In the form shown it is composed of the following elements: A screw-pin 80, split at its outer end, projects from the base of the tension. Upon this turns a disk 81, placed in a circular recess in the metal of the head and having on its periphery a notch into which takes a screw 82, carried by lifter-rod 67. Disk 81 has on its face three inclined or cam projections 83. Adjacent to disk 81 is a tension-washer 84, having reversely-inclined cam projections 85, and a pin 79, passing through a slot in disk 81 and entering a hole in the head of the machine to prevent axial movement of the washer. Against the other face of washer 84 (which is roughened) lies a felt washer 86, which bears against the tension-wheel 87. The latter, Fig. 4, is formed of a thin plate of steel, into the edge of which a series of radial cuts are made, forming tongues 88, which are bent alternately in opposite directions, forming an annular thread space or recess. The other tension-washer 89 (between which and the tension-wheel is a second felt washer 90) has a hub 91, in which is inclosed the spiral tension-spring 92, bearing at one end against a shoulder inside the hub and at the other against a washer 93, interposed between the spring and the thumb-nut 94, by which the compression of the spring is regulated. Washer 93 has a cross-piece 95, Fig. 7, which lies in the cleft of pin 80, so that the washer cannot turn. Tension-washer 89 has a similar cross-pin 96, which serves the same function and also limits the movement of the washer in the direction of its complementary washer 84.

In the normal position of the parts, Figs.

2 and 3, the presser-bar being lowered, the cam projections are in such position that the washer 84 is thrust the maximum distance away from disk 81. In this position it forms the unyielding stop by which the pressure of the tension-spring is taken. When, however, lifter-rod 67 is raised, the crank-disk 81 is partly rotated through screw 82, the cam projections 83 85 sliding on each other, permitting washer 84 to yield to the action of the tension-spring and move on pin 80 away from washer 89. The washer 89 follows this motion until cross-pin 96 reaches the end of the cleft in screw-pin 80, which now takes the entire pressure of the spring, relieving the tension-wheel therefrom.

The presser-bar is provided, as shown, with a series of ratchet-shaped notches extending entirely around the bar. These notches constitute a series of steps acting to arrest drippings of oil from the bearing, which can be conveniently wiped off by the operator. The bar is also provided with a curved guard f^4 , partly surrounding it, protecting the work, which sometimes has a tendency to curl up, from contact with the bar.

It is obvious that modifications may be made in the details of construction herein described and shown in the accompanying drawings, and that some of the improvements set forth may, if desired, be used without employing the invention in its entirety.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a sewing-machine, the combination with the chambered head, of a presser-bar having bearings in said head, a lifter-rod outside the chamber of the head and disconnected from said bar but adapted to engage and lift the same when raised, and a lifter for actuating and raising said rod, substantially as described.

2. In a sewing-machine, the combination with the chambered head, of a presser-bar extending through the chamber and having bearings in the head, a cross-pin projecting from said bar through an opening in the head, a lifter-rod outside the chamber of the head and having its upper end beneath said pin so as to engage the same when raised, and a lifter for elevating said lifter-rod, substantially as described.

3. In a sewing-machine, the combination with the head of a presser-bar having bearings therein, a plunger, a cross-pin having a screw-thread engaging in a threaded opening extending transversely through said bar and inserted in a hole in said plunger, the opening through said bar being somewhat larger than the threaded portion of said pin, and a clamping-sleeve between the head of the pin and the presser-bar, substantially as described.

4. The combination with the presser-bar and its lifting mechanism of a tension comprising two tension-washers and a spring

pressing one washer toward the other, a disk forming a rest or support against which one of said washers bears and by which it is held against the pressure of said spring, connections between said supporting-disk and the said lifting mechanism, whereby the support of said disk is withdrawn permitting motion of the contiguous washer away from said spring, and a stop for arresting the motion of the other washer, substantially as described.

5. The combination with the presser-bar and its lifting mechanism, of a tension-pin having a longitudinal slot, an inner tension-washer embracing said pin, means actuated by said lifter mechanism when the presser-bar is raised for permitting movement of said washer lengthwise of said pin, an outer tension-washer also embracing said pin and having a cross-bar lying in the slot therein to arrest longitudinal motion of said washer, and a tension-spring pressing the outer washer toward the inner washer, substantially as described.

6. The combination with the presser-bar and its lifting mechanism including a lifter-rod independent of said bar, of a tension comprising a tension-wheel, washers one on each side of said wheel and a spring normally pressing said washers together, a disk having cam projections against which one of said washers bears, opposing cams on the contigu-

ous washer, and a connection between said disk and lifter-rod, whereby the former is turned by the movement of the latter in raising and lowering the presser-bar, substantially as described.

7. The combination of the tension-pin having a longitudinal slot extending from one end, an inner tension-washer embracing said pin, means for permitting said washer to move lengthwise of said pin, a tension-wheel, an outer tension-washer having a cross-pin lying in the slot of the tension-pin to limit the longitudinal motion of said washer, and a tension-spring pressing the outer washer toward the inner washer, substantially as described.

8. The combination with the head of the machine, of a presser-bar having a bearing therein, and provided beneath the bearing with a series of notches extending entirely around the bar, and a guard extending downward from said head inclosing said notches on one side, but leaving them exposed and accessible on the other, substantially as described.

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

CHAS. H. WILLCOX.

Witnesses:

J. PARMLY,
S. BORTON.