W. O. GROVER.

SEWING MACHINE.

No. 33,940. Patented Dec. 17, 1861.

Fig. 1.

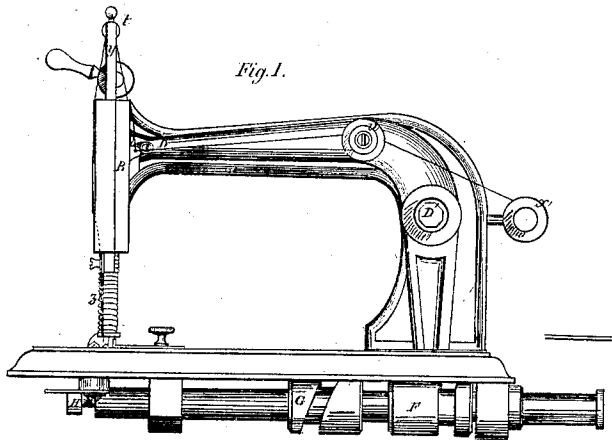
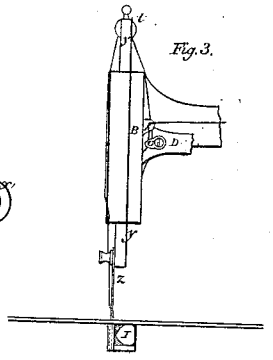


Fig. 3.



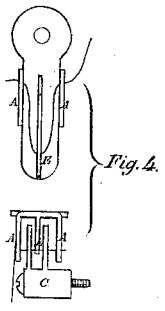


Fig. 4.

Fig. 2.

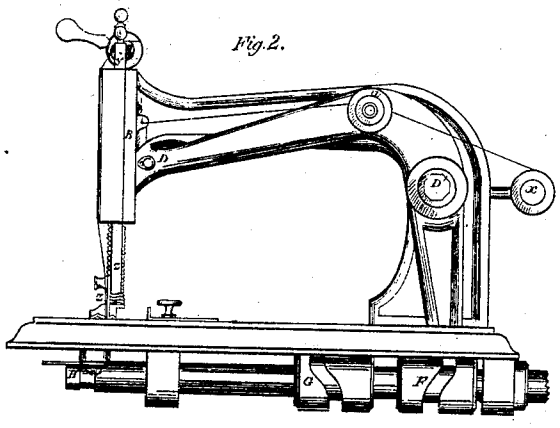


Fig. 6.

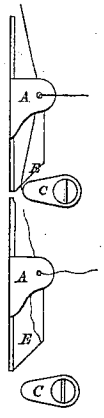
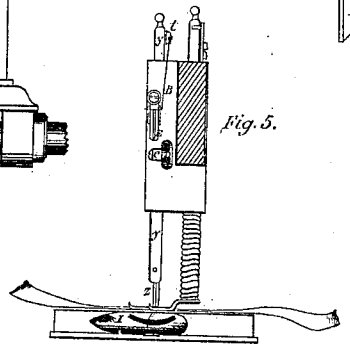


Fig. 5.



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UNITED STATES PATENT OFFICE.

WM. O. GROVER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **33,940**, dated December 17, 1861.

To all whom it may concern:

Be it known that I, WILLIAM O. GROVER, of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Take-Up Apparatus for Sewing-Machines; and I do hereby declare that the following schedule, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is a side elevation of a machine with my apparatus applied thereto, the needle being at its highest position. Fig. 2 is also a side elevation of the same parts, the needle being down to its greatest extent. Fig. 3 is a side elevation in detail. Fig. 4 is a rear elevation of the eyes and edge of the take-up apparatus, and also a plan of the same, together with the fork or wiper, on a large scale. Fig. 5 is a rear elevation, in detail, of the take-up apparatus, needle, shuttle, &c.; and Fig. 6 is a side elevation of the eyes, edge, and fork or wiper on a large scale and in different relative positions.

My take-up apparatus attains the same result as the lifting-pin and its appurtenances in Elias Howe's sewing-machine—it prevents slack thread from forming below the point of the needle as it descends, and gives out thread when the eye of the needle passes through the cloth, and has no tendency to steal the loop of needle-thread, and, in addition to these results of Howe's contrivance, it lays the stitch truly.

The apparatus is shown as applied to a machine with a needle, *z*, reciprocating in straight lines, and attached to a needle bar or stock, *y*. This bar is caused to move by a needle-arm, D, which is driven by a cam, F, on a revolving shaft below the table. The end of the arm projects through a slot in the rear of the piece B, which forms part of the needle-bar guide, and is suitably connected to the needle-bar, so that the arm and bar reciprocate together.

The machine has a presser-foot, shuttle, horizontal cloth-supporting table, a feed apparatus, and a shuttle-driving apparatus, all of any usual or proper form or construction.

The upper thread (colored red) is furnished from a bobbin, *x*, and passes thence through a tension apparatus, *u*. This tension apparatus is composed of two disks, concaved on their adjacent sides and bored through at the center. They are slipped upon a pin and pressed together by a spiral spring, and the thread is passed between the disks, around the spindle, and outward again between the disks. From this tension apparatus the thread passes through two eyes, A, pierced in two cheeks projecting rearward from the piece B, thence over a small roller secured to the top of the needle-stock, and finally through the eye of the needle. In passing from one of the eyes A to the other the thread leads across an edge, E, which projects rearward between the cheeks.

To the needle-arm is secured a fork, C, the prongs of which are rounded off at their points. This fork is so secured and formed that its prongs shall, during certain parts of the motion of the needle-arm, embrace the edge E and pass between the cheek-pieces. (See specially Fig. 4.) The edge is at its lower part curved or bent away from the fork.

The operation of the apparatus is as follows; Supposing that the needle has risen to its full extent, has tightened a stitch, and has drawn upper thread off of the spool or bobbin, the position of the parts then being as in Fig. 1, the needle now commences to descend, forced down by the needle-arm, and as the arm carries the fork the latter descends with the needle and strikes the thread, which extends from one eye to the other, the edge holding this thread rearward, so that the prongs of the fork carry the thread down with them. If there were no fork, the needle in its descent would form twice as much slack as is due to its own extent of motion. The fork, however, by its action, draws down a bight of thread, which, measured from one eye A to the other, is equal to twice its extent of motion, or a little greater or less, depending upon the shape or contour of the edge and the direction of motion and shape of the prongs. The thread therefore forms no slack below the needle, and the latter runs down the thread, leading always in a straight line from the needle's eye to the cloth. Just before the needle-eye reaches the cloth the bight of thread acted upon by the prongs rides over that part of the edge which is bent forward or away from the fork, and when the eye gets to the cloth, or at about that time, the bight on the edge has slipped so far forward that it is no longer acted upon by the fork. (See upper diagram in Fig. 4.) The needle now descending below the cloth takes up twice the length of thread, due to its length of motion; and the bight between the eyes,

being released from the fork, slips out between the prongs and the edge, and furnishes the needed length for the use of the needle. While the needle-eye is descending below the cloth the fork and its prongs are descending, doing nothing. (See lower diagram of Fig. 4.)

When the needle commences to rise to form a loop there is no strain on the thread, and consequently no tendency to steal a loop; and as the needle rises the fork ascends with it, doing nothing until it again reaches a position above the thread, and commences in its descent again to pull out a bight of thread.

There is no slack ever formed below the needle eye or point, and consequently no danger of intertangling or piercing of thread, and as the needle runs down a straight thread the stitch is properly and evenly laid.

The edge may be so shaped and adjusted in reference to the fork that more or less length of bight may be formed or pulled out by a given length of descent of the forks and a change of curve in its lower part; or a change of position in the forks will cause the bight to slip out free from the fork at a sooner or later period.

The office of the eyes is to hold a line of thread to be struck by the fork. The office of the edge is to hold the thread within the grasp of the fork as long as needed, and to a certain extent to regulate the time when the fork shall cease to act on the bight of thread, and it shall be permitted to slip out between the edge and the fork.

The office of the fork is to pull out or develop a bight of thread so long as the thread is held within its reach.

And these the acting parts of my contrivance may be variously formed, constructed, attached, and operated, so long as each performs its proper office, and they, in combination, operate substantially as specified.

I claim as of my own invention—

The combination of two eyes with an edge piece and a fork operating in the thread on the downstroke of the needle, the whole constituting a contrivance operating substantially in the manner hereinbefore set forth, and performing the offices specified.

In testimony whereof I have hereunto subscribed my name.

W. O. GROVER.

In presence of—
JAMES H. BROWN,
EDW. L. SHERMAN.