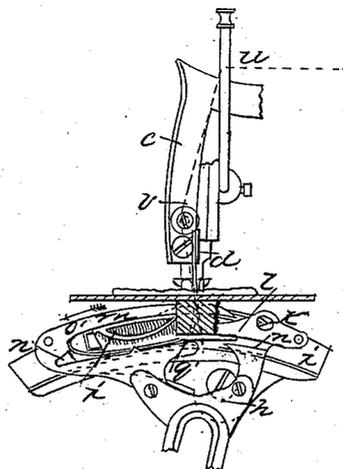
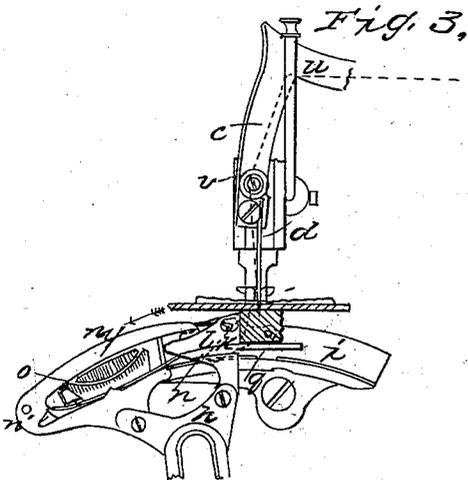
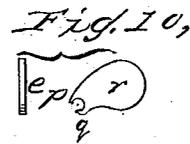
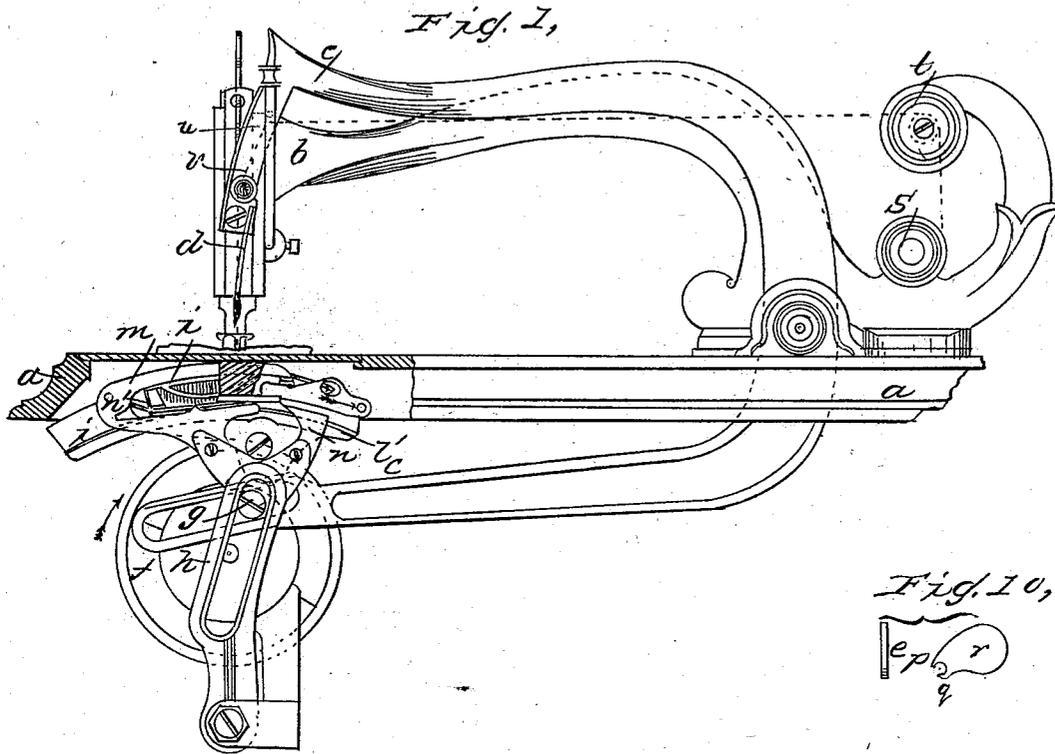


L. BOLLMAN.  
Sewing Machine.

2 Sheets—Sheet 1.

No. 33,415.

Patented Oct. 1, 1861.



Witnesses:  
D. H. Bunn  
J. C. Wade.

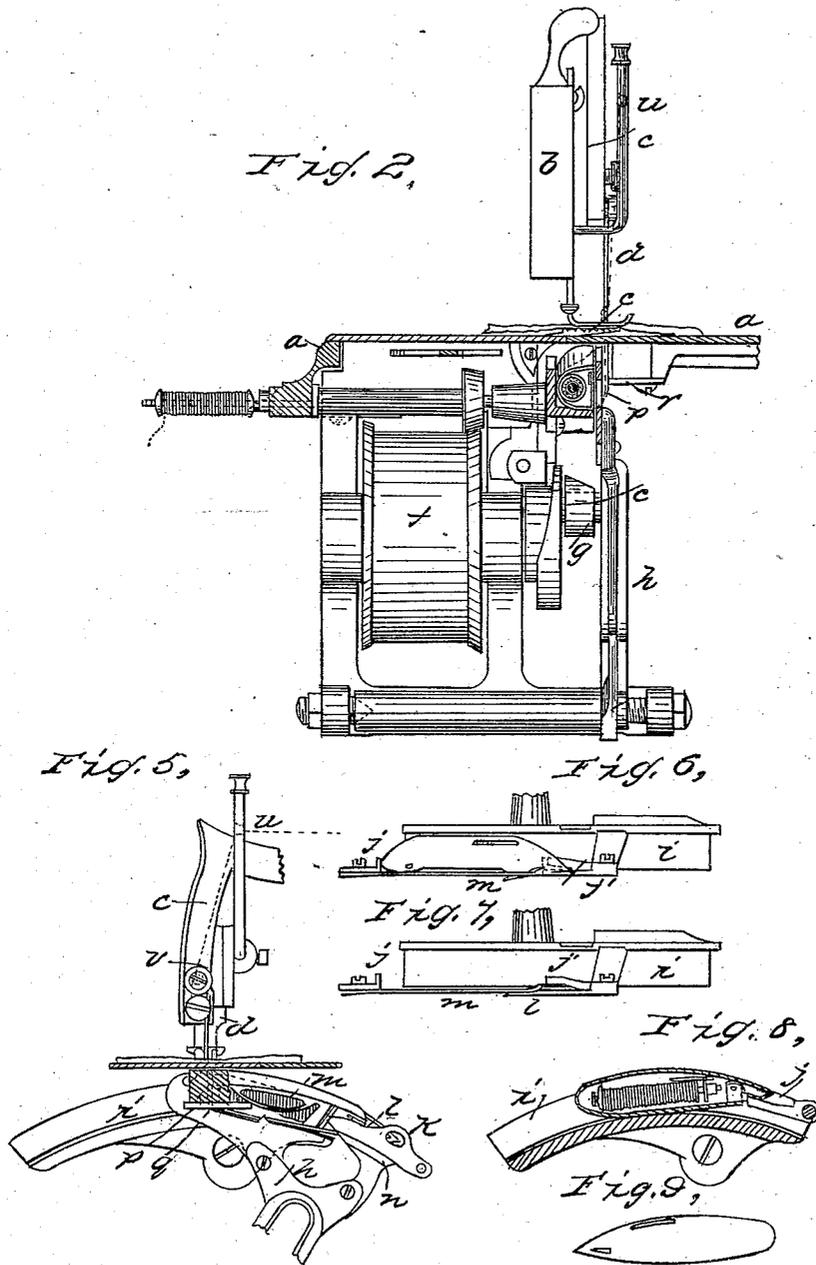
Inventor:  
Lewis Bollman

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Witnesses:  
J. H. Brown  
J. C. Wade

Inventor:  
Louis Bollman

# UNITED STATES PATENT OFFICE.

LOUIS BOLLMAN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GROVER & BAKER SEWING MACHINE COMPANY, OF SAME PLACE.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 33,415, dated October 1, 1861.

*To all whom it may concern:*

Be it known that I, LOUIS BOLLMAN, of the city of Boston, county of Middlesex, and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines; and I do hereby declare that the following, taken in connection with the drawings, is a full, clear, and exact description thereof.

In the drawings, Figure 1 is a side elevation of the machine in which my improvements are embodied, with a portion of the bed-plate represented as broken away. Fig. 2 is an end elevation of the machine with part of the bed-plate removed. Figs. 3, 4, and 5 are detail drawings, showing different positions that the needle-shuttle and hooks assume in the operation of the machine. Fig. 6 is a plan of the shuttle, shuttle-race, shuttle-driver, and seizing and detaining hooks. Fig. 7 is a plan of the same without the shuttle. Fig. 8 is a longitudinal section through the shuttle and its race. Fig. 9 is a rear elevation of the shuttle, and Fig. 10 is a plan and elevation of the loop-stop.

My invention has been made with a view of overcoming certain defects incident to the operation of shuttle-machines, and by means of my improvements I am enabled to produce a sewing-machine with a short stroke of needle, with a needle driven by a crank-motion, and without any thread-controlling apparatus above the cloth, which will run at great speed and almost without noise, and make the ordinary shuttle-stitch; and the nature of my invention consists in combining both a seizing and a detaining hook, acting substantially as hereinafter described, with a shuttle and an eye-pointed needle, the combination operating substantially as hereinafter set forth, and also in combining a loop-stop, acting as described, with a seizing-hook and an eye-pointed needle, substantially in the manner as hereinafter specified.

In the drawings my improvements are shown as embodied in what is usually termed a "family" machine, with a curved needle, and what is commonly known as a "four-motion" or "Fitzgerald" friction-feed, and with the shuttle-driver and hooks and needle-arm moved by the same crank-pin; but my improvements are applicable to machines of various forms with

various feed apparatus, and the shuttle employed may move in a straight line.

In the drawings the bed-plate of the machine is shown at *aaa*, the standard carrying the presser-foot at *b*, the needle-arm at *cc*, the needle at *d*, the roughened feeding-surface at *e*, the driving-pulley at *f*, and the crank-pin actuating the needle, the shuttle, and the hooks at *g*. By inspection of the drawings it will be perceived that the crank-pin acts in a slot in the needle-arm, and in what is termed a "hook-stock," *h*, and that a revolution of the pulley will cause both the needle and the hook-stock to reciprocate.

Under the top plate of the machine is fixed a shuttle-race, *ii*, and the portion of the top plate above the shuttle-race is movable, as in many sewing-machines. In this race is to play a shuttle of any ordinary kind; but I prefer that shown in the drawings, with an equalizing-curve, as at *i'*, for the thread to pass under. This thread is to pass out of an aperture in the top of the shuttle (see Fig. 6) when the machine is to be put in operation. This shuttle lies, as usual, in the bottom of the race, and is to be driven by a shuttle-driver composed of a projection, *j*, acting against the heel of the shuttle, and a pin, *j'*, acting against the shuttle-case and entering a small hole cut in the case. (See Figs. 6, 7, 8, and 9.) The shuttle has a small amount of play in the driver. These drivers are, in fact, attached to the hook-stock, and to this stock are also secured two hooks—a seizing-hook, *l*, and a detaining-hook, *m*. The seizing-hook lies in close proximity to the front of the shuttle, and is to be formed substantially as shown in the drawings to produce the results specified. The point of the shuttle is slightly bent toward the hook and lies in a hole, groove, or depression in the hook shown at *k*, the extreme point lying within the hook. This hook has also a groove in it on the side farthest from the shuttle, as shown at *n*. The detaining-hook *m* is also attached to the hook-stock. Its end laps beyond the point of the seizing-hook, and is bent toward the shuttle, (see Fig. 6,) so as to enter a small depression in the shuttle-case. This hook is to be shaped substantially as shown in the drawings, so as to detain or control loops of needle-thread in the manner hereinafter specified, and its end rests upon

a small piece of bent metal, *o*, secured in the shuttle in such a way that the point of the shuttle is thereby prevented from rising. This shuttle has projecting from it a sort of pin, *o'*, which, like the piece *o*, underlies the hook, and by means of this pin the heel of the shuttle is held down. I prefer to make this detaining-hook springy, or to mount it on a hinge, in order that it may be bent away from the shuttle, so as to permit the latter to be lifted upward and removed, and so that it will bend outward when the shuttle is introduced; but other ways permitting removal and introduction of the shuttle may be employed. This detaining or controlling hook has a groove, *n'*, cut in it, which performs no part in the operation of the machine, but merely permits the hook to play freely past a loop-stop hereinafter described. If the shuttle be in place and the main shaft revolved, both hooks and the shuttle will reciprocate as well as the needle, and the needle will be at rest while the hooks are moving fast, and these latter will be at rest while the needle is ascending or descending swiftly. The hooks, shuttle, and needle must have relative motion, so they operate to produce the effects as described; but the mechanical appliances by which such motions are produced are immaterial.

In this machine there are two loop-stops, *p* and *q*. For the sake of convenience they are formed in one piece, *r*, which is attached beneath the bed-plate of the machine in such position that both stops lie in the groove *n* at parts of the oscillation of the hook—that is to say, the points of the stops lie within the plane of the hook. One of these loop-stops, *q*, was invented prior to the invention of the improvements herein described, and is specified as of my invention in an application for Letters Patent now pending.

In the machine specially described the upper-thread spool is mounted upon the bed-plate at *s*, the thread being passed through a tension apparatus at *t*, thence through an eye at *u*, through another tension at *v*, and finally through the eye of the needle; but the position of the tensions, and the kind thereof, and the way of leading the thread are immaterial; and one of the tensions may be dispensed with, provided the thread is in some proper way furnished, as wanted, to the needle.

In operating the machine the needle descends and rises a little to form a loop. (See Fig. 4.) The seizing-hook, moving in the direction of arrow, Fig. 4, enters this loop, spreads it, carries one side of it between loop-stop *q* and the hook, and when the thread has caught upon loop-stop *p* carries the loop into position, as shown in Fig. 3, by considering which it will be perceived that the stop *p* has aided the hook to draw out and tighten a larger loop of thread than the hook could if unaided. Before the parts reach the position shown in Fig. 3 the part of the loop nearest the shuttle has slipped between the points of the shuttle and

the hook, and the hooks then commence to move in the direction shown by the arrow, Fig. 1. The first motion in that direction slacks the loop. The nose of the shuttle then strikes it and carries the loop from stop *p* against stop *q*. The latter holds the loop, and as the parts move the shuttle passes into the loop, which then surrounds the seizing-hook, the shuttle, and the detaining-hook. Further motion in the same direction withdraws the seizing-hook from the loop, and the parts arrive at the position shown in Fig. 1. The parts move on in the same direction to the position shown in Fig. 5, and as the needle has here descended through the cloth, it has in its descent partially pulled up the loop that surrounded the shuttle, so that it has slipped up under the heel of the shuttle, between it and the driver *j*, and now surrounds the detaining-hook only. As the parts move from position Fig. 5 to position Fig. 4 the loop slips along the detaining-hook, between it and the shuttle, till the seizing-hook takes a fresh loop. As the seizing-hook spreads this fresh loop it draws up the one surrounding the detaining-hook until it slips out free between the end of the detaining-hook and the shuttle, and as the seizing-hook, aided by loop-stop, fully spreads this new loop, it in so doing draws up the cast-off loop to the cloth, thus tightening the stitch. The shuttle-drivers do not impede the loop during these operations, as they are alternately out of contact with the shuttle, the shuttle being driven by *j'* while the loop is slipping over its heel, and being propelled by the projection *j* while the thread is passing between the shuttle and the pin *j'*.

The seizing and detaining hooks and shuttle may be variously changed in form so long as they operate, substantially as described, in combination, and the special offices of the seizing-hook are to seize a loop, spread it, and hold it so that the reciprocating shuttle may enter it. The peculiarities in the action of the detaining-hook are that it shall control and take charge of slack loops after the shuttle has passed through them, and shall also hold the heel of the shuttle in place and prevent it from flying out of the race, this latter duty being chiefly performed by that end of the hook nearest the heel of the shuttle. This hook therefore detains or aids in holding the shuttle in place, and also detains and controls slack loops of needle-thread; and the shuttle must support a bobbin of thread, and pass that thread through loops spread by the seizing-hook. The essential office of the loop-stop *p* is to aid the seizing-hook to spread widely loops of needle thread that have been seized, and, as a result thereof, assist in pulling tight slack loops of needle-thread that have been traversed by the shuttle. The action of the detaining-hook is important in preventing any intertangling of slack loops with the needle or with the seizing-hook.

Having thus described my improvements as

reduced to practice, in combination with other parts, which make up a complete sewing-machine, I claim as of my own invention—

1. The combination of these four elements or parts of a sewing-machine, viz: first, an eye-pointed needle; second, a seizing-hook; third, a detaining-hook, and, fourth, a shuttle, all reciprocating and all substantially such as described, intending to claim none of these parts separately, but only in combination and acting conjointly, substantially as hereinbefore set forth.

2. In combination with an eye-pointed needle

and a seizing-hook, acting substantially as specified, a loop-stop substantially such as is described, and acting to aid a seizing-hook in spreading loops of needle-thread, substantially in the manner specified.

In testimony whereof I have hereunto subscribed my name, in the city of Boston, on this 16th day of January, A. D. 1861.

LOUIS BOLLMAN.

In presence of—

I. H. BROWN,

J. C. WADE.