2 Sheets—Sheet 1.

T. BLETCHER.

SEWING MACHINE.

No. 105,631. Patented July 26, 1870.

Fig: 1.

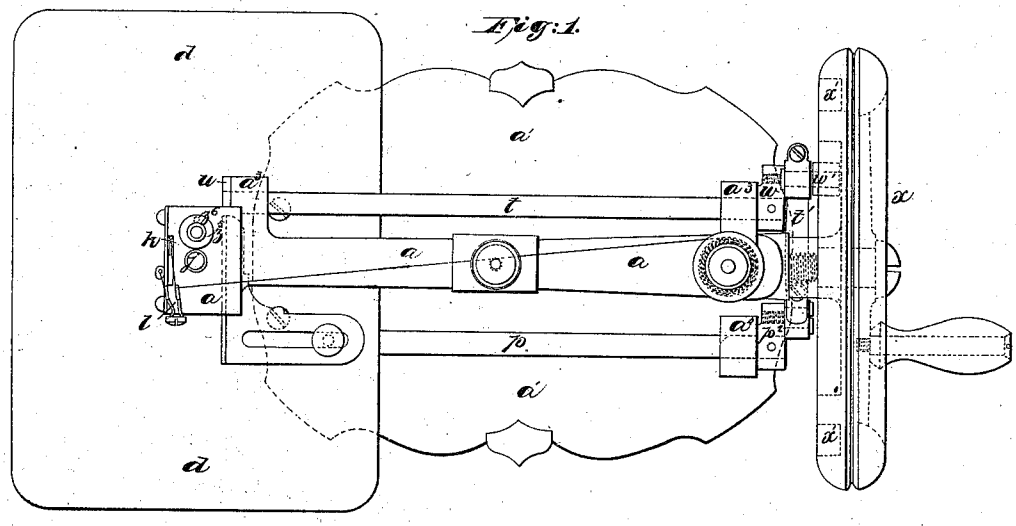
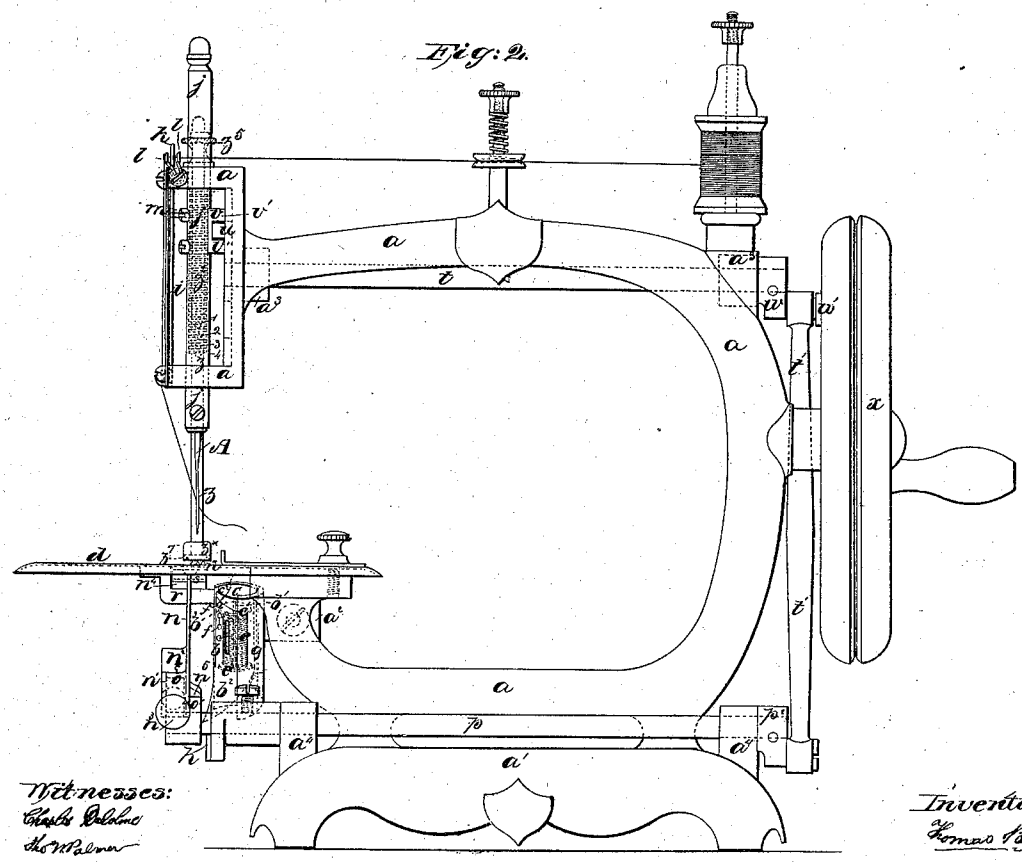


Fig: 2.



Witnesses:
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H. M. Palmer

Inventor:
Thomas Bletcher

2 Sheets—Sheet 2.

T. BLETCHER.

SEWING MACHINE.

No. 105,631. Patented July 26, 1870.

Fig: 4.

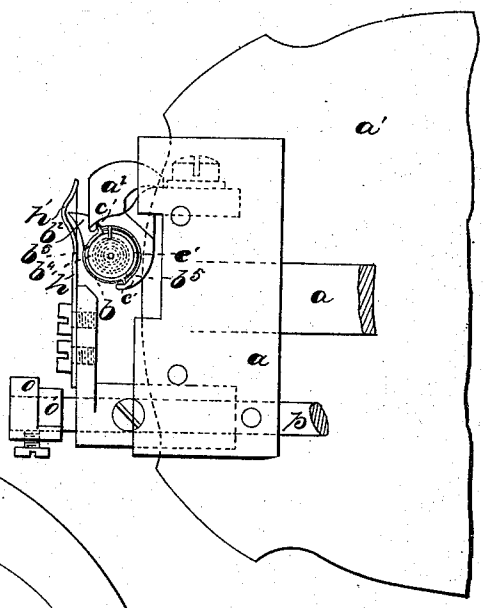

Fig: 5.

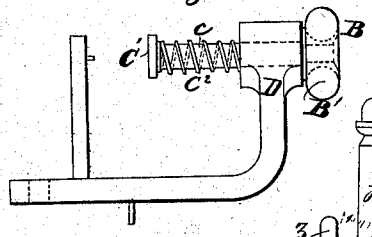

Fig: 3.

Witnesses:
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Thos. N. Palmer

Inventor:
Thomas Bletcher

United States Patent Office.

THOMAS BLETCHER, OF LONDON, ENGLAND, ASSIGNOR TO HIMSELF AND WILLIAM RIDDELL, OF SAME PLACE.

Letters Patent No. 105,631, *dated July* 26, 1870; *antedated July* 19, 1870.

IMPROVEMENT IN SEWING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, THOMAS BLETCHER, of London, England, have invented certain new and useful "Improvements in Sewing-Machines;" and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification.

These improvements relate to sewing-machines which work with two threads and produce a stitch known as the "lock-stitch."

The said improvements consist chiefly in the novel construction, arrangement, and combination of the devices for forming the stitches, and in the mechanism for operating the same. The upper thread is carried by a vertically reciprocating needle, and is thereby passed through the cloth or other material in the usual manner. The under thread is carried by a bobbin, which is supported to turn freely upon a pin or rod inclosed in a case or holder. The latter is somewhat similar in form to the flying shuttle employed in other sewing-machines, but, instead of being caused to move through the loops of needle-thread, the said holder remains stationary, while the successive loops of thread are passed over it by means of a vibrating hook of peculiar formation, and a lever with elastic arms. The hook places the loop upon the point of the bobbin-case, and the elastic lever draws the said loop upward between the said case and its support, and tightens the thread as each stitch is formed. The hook is fixed upon a vibrating shaft, which also carries the cams for operating the feed-bar. The reciprocating needle which carries the upper thread is fixed in a sliding bar and operated by an arm on the end of another vibrating or rocking shaft, whose motion is derived from a cam attached to the driving-pulley at the rear of the machine, or from other suitable devices. The said shaft is provided with a crank-arm, which is connected by a rod or link to a similar arm on the shaft for operating the feed-bar and hook, and both shafts vibrate simultaneously. Or the needle-bar may be operated by a rotating shaft geared in connection with the driving-wheel. The feed-bar is formed with a broad flat web at one end, and is thereby supported in a guide attached to the under surface of the cloth-plate, in the proper position to be actuated by the cams on the lower rocking-shaft. The presser-bar is forced down by a spiral spring, whose pressure is regulated by means of a pin which may be inserted in any one of a series of holes formed in the said bar. The presser-foot is formed with grooves or projections at its sides, whereby a hemmer, a feller, a binder, friller, or other device, may be readily attached to and removed from the said foot. A device for filling the bobbin is attached to the machine. The bobbin is supported between a fixed center and a spindle, which is provided with a toothed or friction-wheel. When the bobbin is inserted the said wheel is pressed into contact with the driving-wheel of the machine, and thereby caused to rotate; but when the bobbin is removed the said wheel is drawn out of contact with the driving-wheel by means of a spring.

Description of the Drawings.

Figure 1 is a plan of the top of my improved machine,

Figure 2 is a side elevation, and

Figure 3 is an end elevation of the same.

Figure 4 is a plan of part of the said machine, with the cloth-plate removed.

Figure 5 represents a detached portion of said machine.

Like letters indicate the same parts in each of the figures.

The parts of the mechanism are supported upon a suitable frame, *a*, which is preferably of an oval shape, and is provided with a foot or stand, a^1.

The bobbin-case or holder *b* is supported in a nearly vertical position in a chamber or channel, *c*, formed in a bracket, a^2, cast upon or attached to the frame *a* of the machine, below the cloth-plate *d*.

The central pin or spindle b^1, which receives the bobbin *e*, is fixed in the front end or point b^2 of the case *b*, whose other end, b^3, is left open to allow the said bobbin to be conveniently inserted and removed. The bobbin *e* is preferably formed of a small metal tube, with a flange, e^1, at each end. The upper end of the bobbin *e* lies near the under surface of the cloth-plate *d*, and its thread it drawn through a number of small holes, *f*, formed in the case or in a web or flange, b^4, on the exterior of the same.

The case or holder *b* is formed with two lateral ribs or wings, b^5, which project into grooves c^1 formed in the side of the chamber *c*, and prevent the turning round of the said holder.

The latter is held and kept from falling out of the chamber *c* by the pressure of a spring, *g*, which is attached to the back of the chamber *c*, and yields to allow the loops of needle-thread to pass up between the case *b* and chamber *c* as each stitch is formed.

The nose or lower end b^2 of the case or holder is pointed and curved outward, to facilitate the passing of the thread-loops over the same.

The vibrating hook *h*, which brings down these loops, is formed and arranged to vibrate across the front of the case *b*.

The outer end of this hook is formed with a triangular piece, h^1, which is curved laterally, as shown in fig. 4, to correspond with the shape of the point b^2 of the bobbin-case *b*, to allow the said hook to work in close proximity to the same. The extremity of the

hook h is bent down outside this triangular piece h^1, and forms a guard to prevent the slipping of the thread from the hook.

The loop of needle-thread, when caught by the hook h, lies in the notches or recesses h^2, and behind the curved triangular piece h^1, and a space is left between the thread and the back of the latter, as shown in fig. 4, wherein the point b^2 of the bobbin-case b enters as the hook h moves upward.

A lever, i, with elastic arms i^1 i^2, preferably formed of steel wire, is pivoted to the frame a, in front of the needle-bar j.

One arm, i^1, of this lever is formed with an eye, k, through which the needle-thread passes, the same thread being also conducted through two fixed eyes or guides, l.

The other arm, i^2, of the said lever is curved or bowed in its central portion i^3, and is arranged to be acted upon by a pin or stud, m, projecting from the needle-bar j, or part attached to the same.

This stud m strikes the curved lever-arm i^3, at both its upward and downward stroke, and, when passing over the straight portion of the said arm, keeps the lever back, with the proper tension upon the thread. This lever is so arranged in relation to the other parts of the mechanism as to be drawn back at the end of the upward stroke of the projecting stud m, and pull the thread-loop upward as the same is passed by the vibrating hook h over the point b^2 of the bobbin-case b. The action of the projecting stud or pin m upon the elastic lever i, at the end of its downward stroke, also causes the latter again to tighten the thread-loop as it is drawn behind the bobbin-case b, and to slacken the needle-thread in time to allow a fresh loop to be caught upon the vibrating hook h.

The feed-bar n is arranged in front of the vibrating hook h, the cams o o^1, for operating the said bar, being fixed on the end of the lower rocking-shaft p.

The feed-bar n is formed with the teeth n^*, which act on the cloth between the fulcrum q of the said bar and the cams o o^1 for operating the same. By this means the friction upon the lifting-cam o^1, and consequent wearing away of its surface, are greatly reduced.

The curved end of the feed-bar n is provided with two jaws, n^1 n^2, for the cam o to act upon in imparting the required endwise movement to the said bar while it is lifted by the other cam o^1.

The length of the feed is preferably regulated by a screw, n^3, which projects through the jaws n^1 of the feed-bar n.

The latter is formed at its other end with a broad, flat piece or web, n^4, which is fitted to slide through a guide, r, attached to the under side of the cloth-plate d. This guide forms the fulcrum upon which the bar n vibrates, and a spring, s, attached to the cloth-plate d is arranged to act with just sufficient pressure upon the bar n to keep the surface of the part n^5 of the said bar properly in contact with the cam o^1.

The rocking-shaft t, which operates the needle-bar j, is supported in suitable bearings, a^3, attached to or formed on the upper part of the frame a.

An arm, u, on the front end of this shaft, works in a groove, v^1, formed in a plate, v, attached to the said bar, and imparts thereto the required reciprocating motion.

The rear end of the shaft t is provided with another arm, w, which, by preference, carries a friction-roller, w^1, arranged to run in a cam groove, x^1, formed in the driving-wheel x. This groove may be formed to produce two or more reciprocations of the needle A to one revolution of the said wheel.

The shaft p, for operating the feed-motion, is carried in bearings a^4, attached to the lower part of the frame a and the arm p^2, whereby this shaft is connected to the upper shaft t, is fixed on its rear end in a convenient position to be taken hold of by the rod t^1, which connects the two arms p^2 and w.

The holes 1 2 3 4, in the presser-bar z, are arranged one above the other, and when the adjustable pin z^1 is inserted into either of these holes, the spring z^2, bearing on the said pin and upon the upper part of frame a, causes the presser-foot z^* to exert a pressure upon the cloth proportionate to the distance of the hole from the upper end of the spring z^2.

The presser-bar z is preferably provided with a pin or feather, z^3, which projects into a groove, z^4, in the bearing of the said bar, and prevents its turning round.

The bar z is supported, when raised, by a movable collar, z^5, which fits the upper end of the bar, and is provided with a pin, z^6, arranged to drop into a hole when the bar is down, the said collar being turned round on the bar z when the latter is to be adjusted.

The grooves z^7 in the presser-foot z^*, or the projections thereon, are preferably made V-shaped, and the flange of the hemmer, or other device to be attached to the said foot, is made of corresponding form. These grooves or projections may extend entirely or partially from end to end of the foot.

The flange of the hemmer or other device is preferably formed of sheet brass, steel, or other suitable metal, with its sides bent or otherwise adapted to the shape of the presser-foot. The flange and foot are fitted together in such manner that the former will readily slide endwise on the said foot, whereon it can be further secured by screws, if desired.

The device, fig. 5, for filling the bobbin is arranged, when in use, at the rear of the machine. The wheel B, on the adjustable spindle C, may be formed with teeth corresponding with other teeth on the driving-wheel x, or may be furnished with an India-rubber band or ring, B', and driven by friction. When this friction-ring is employed, I arrange the same to run in contact with the side of the rim of the wheel x, which then not only rotates the spindle C, but also serves to press the said spindle forward to hold the bobbin.

The spindle C is supported in a bearing, D, secured to the foot or base of the frame, and is formed with a concave center, C', to receive the end of the bobbin. When the spindle C is driven by a toothed wheel, the said spindle is caused to hold the bobbin, while the same is being filled, by the pressure of a coiled spring surrounding the said spindle; but when the wheel B is provided with the friction-ring B', arranged at the side of the wheel, as above described, this spring will not be necessary.

What I claim, and desire to secure by Letters Patent, is—

1. The vibrating hook h, formed as described, and the stationary inclined shuttle, in combination with the eye-pointed needle and its thread-controlling device i, when constructed and operating together as set forth.

2. The rocking-shaft p, having feed-operating cams and the vibrating hook h, when the same are arranged with the shuttle and feeding-dog, and all constructed as herein described.

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