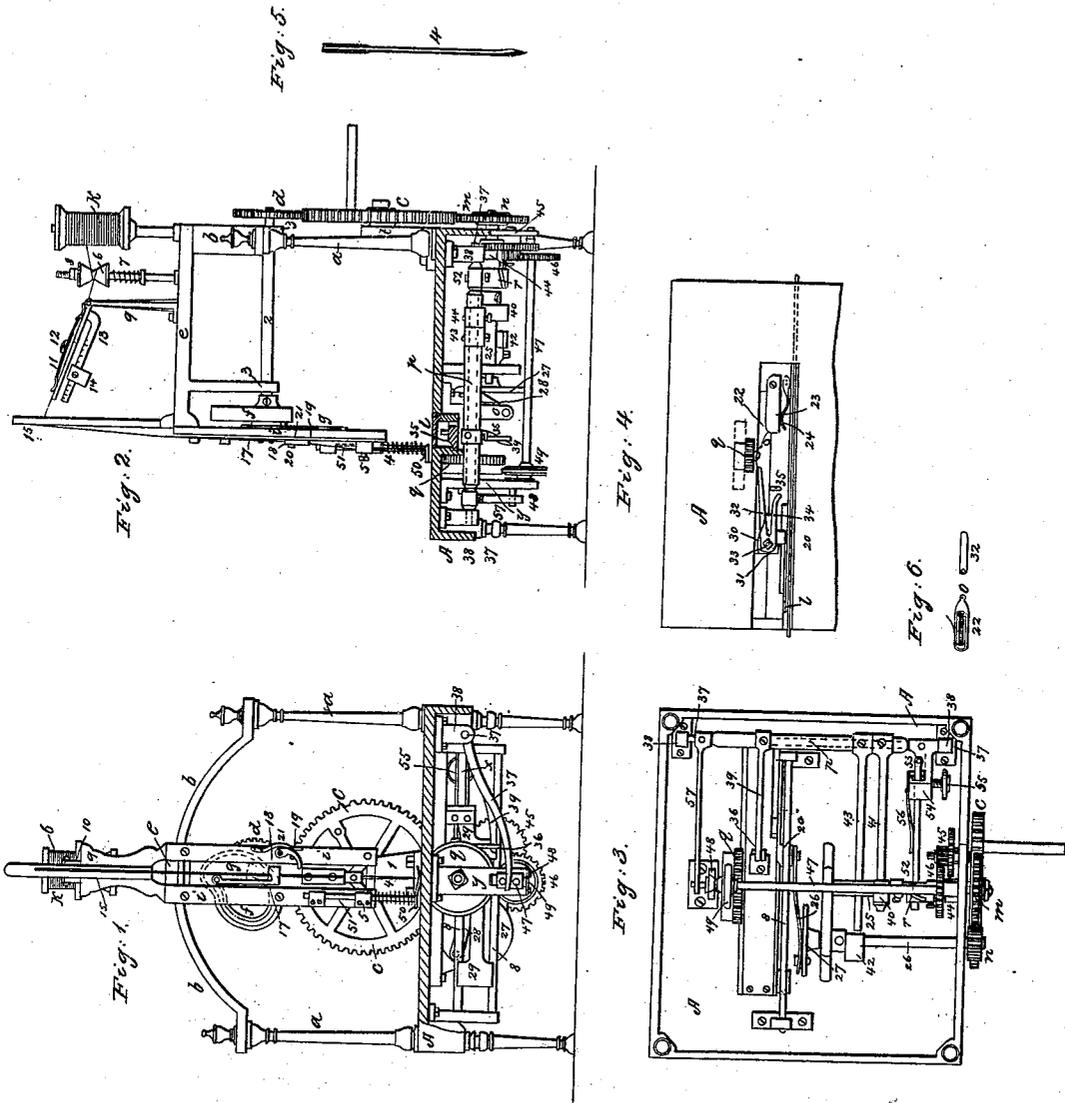


G. H. & B. H. HORN.

Sewing Machine.

No. 12,389.

Patented Feb. 13, 1855.



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# UNITED STATES PATENT OFFICE.

GEO. H. HORN AND BENJ. H. HORN, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 12,389, dated February 13, 1855.

*To all whom it may concern:*

Be it known that we, GEORGE H. HORN and BENJAMIN H. HORN, of Brooklyn, in the county of Kings and State of New York, have invented, made, and applied to use certain new and useful Improvements in Machines for Sewing Cloth or other Similar Substances; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a front elevation of the machine complete, but with a portion of the bed removed to show the parts. Fig. 2 is a similar side elevation. Fig. 3 is a plan, looking at the under side of the bed, as from below. Fig. 4 is a plan of the box or race in which the shuttle moves. Fig. 5 is a section in larger size of the needle, and Fig. 6 shows the point of the shuttle and forceps.

The like marks of reference designate the same parts.

The nature of our said invention consists in the use of a hollow needle with an eye on one side, which needle protects the thread from unnecessary wear, and avoids the liability of the loops becoming entangled, and in the use of forceps which pass through the loop of thread (formed by the retraction of the needle) opening the same and seizing, by an eye in the nose thereof, the shuttle that carries the second thread, drawing the same through the loop, and then forcing the shuttle back into place as the needle is drawn up out of the cloth, thereby pulling on each thread simultaneously. The forceps then open and leave the shuttle, and move back, ready to pass through the loop, as before.

In the accompanying drawings, A is a suitable bed or table carrying the parts. *aa* are standards carrying an arch-frame, *b*, with an arm, *c*, and bearings 3, carrying a shaft, 2, on the end of which is a gear-wheel, *d*, driven by a wheel, *e*, on a standard, *l*, to which wheel suitable power is to be applied, and a fly-wheel may be used to insure the regular motions of the machine, if necessary. On the end of the shaft 2 is a shell-cam, *f*, in the shape shown in Fig. 1, so as to give the proper motion to the needle-carrier *g* and slide the same in slides *i*, that depend from the end of the arm *e*.

4 is the needle, secured by a screw, 5, in a socket on the needle-carrier *g*. This needle is made hollow, as shown in larger size in Fig. 5, with an eye in one side thereof to pass the thread out. By this means the thread is protected from the usual wear in the eye and is less liable to be obstructed or tangled in use.

*k* is a spool of thread or other fibrous substance, mounted on a stud, and the thread passes therefrom around a barrel, 6, set to rotate on a stud, with a spring, 7, below and a nut, 8, above, by moving which nut any desired amount of friction can be applied by the compression of the spring to prevent the barrel turning, and thereby the tension on the thread can be regulated as desired. The thread passes from the barrel beneath the points of a spring, 11, adjustable by a screw, 12, to give greater or less pressure on the thread as it passes between the spring and an arm, 10, set on a fulcrum on a standard, 9.

13 is a scale-beam or arm beneath the arm 10, with a weight, 14, attached thereto. The thread passes through holes in a standard, 15, or over rollers, which may be used, if desired, and from there the thread passes downward beneath a spring-clamp, 17, and through the hollow needle 4. The operation of this part is that as the needle-carrier *g* and needle 4 are forced down, the needle passes through the cloth while the lever or arm 10 is elevated, together with its scale-beam 13 and weight 14, which thereby gives off the necessary amount of thread to allow of the motion of the needle, and the shape of the heart-cam is such that, so soon as the needle is forced all the way down, it is slightly withdrawn to form a loop in the thread for the forceps to pass through said loop; but it will be seen that the thread being free, the weighted lever 10 would draw the thread back, preventing the formation of a loop; hence we use the spring 17, beneath which the thread passes freely; but the spring has an inclined point, 18, which, at the moment the needle-carrier commences to rise, passes beneath a catch, 19, and clamps the thread against the needle-carrier, allowing the farther upward motion of the needle-carrier to form the loop through which the forceps pass, and the needle-carrier, again descending, leaves the thread free to be pulled through the needle by the shuttle as it passes through the loop. The catch 19 is set

on a fulcrum, 20, with a spring, 21, behind it, so that the point of the spring, taking the end of the catch in its descent, removes the same, the latch turning on its fulcrum and springing back after the point 18 has passed. It will be thus seen that the tension of the thread in sewing is dependent on the weight applied by the arm 13, by regulating the rise or position of which weight the machine is fitted for sewing with coarse or fine thread, and the means used to regulate the amount of thread given off is such as to supply the requisite amount for each stitch; and if even more should be given off than required, still, by the lever or arm 10 descending farther, the strain on the thread to pull the stitch tight will be the same.

*l* is the cover to the shuttle-box, set on hinges, so that the box can be opened to replenish the shuttle 22, which is formed, in any usual manner, to slide against the side of the shuttle-box in a race provided therefor; and in order to prevent the shuttle moving except when operated on by the forceps, we cause the same to pass under and against a clamp, 23, which is kept against the shuttle by a spring, 24, the end of the clamp being inclined, to allow the shuttle to force the same slightly aside as the shuttle is forced back into place.

*m* is a wheel of the same size as the wheel *d*, set on a shaft, 25, and also receiving its motion from the wheel *c*. *n* is a pinion of half the size of the wheel *m*, fitted on a shaft, 26, on the end of which is a disk, 27, and a pitman, 28, to a slide, 29, set in slides *x*. The slide 29 passes up into the shuttle-box, and carries the fixed jaw 30 of the forceps and movable jaw 32, set on a fulcrum 31, and with a spring, 33, to keep the jaws closed. The moving jaw 32 has a point which enters an eye, *o*, on the end of the shuttle, to move the same. (See Fig. 6.) It will now be seen that for each vibration of the needle the forceps make two strokes or vibrations, first passing through the loop of thread, seizing the shuttle, pulling it through, and then returning the same beneath the clamp, leaving it and returning, ready to pass through another loop; hence it is necessary at the first vibration to open the forceps and allow them to close on the eye of the shuttle, and at the next vibration to open the forceps and keep them open until they retire clear of the eye of the shuttle. To effect this object we use an arm, 34, from the moving jaw 32, which is operated on by a pin or roller, 35, which is on the end of the lever 36, set on a fulcrum near its center, the lower end being inclined, as seen in Fig. 2.

*p* is a cylinder or sleeve, around a shaft, 37, set in bearings 38, from which sleeve an arm, 39, passes against the inclined end of the lever 36, and an arm, 41, passes from the sleeve *p* over a cam, 40, on the shaft 25; and another arm, 43, passes to a cam, 42, on the shaft 26. The operation is that the cam 42, elevating the arm 43, operates, by the arm 39, on the lever 36, causing the pin 35 to open the jaws of the

forceps, and the cam 42, clearing the end of the arm 43 as the pitman 29 passes the center, allows the jaws to close on the eye of the shuttle and draw the same along, holding on there-to until the shuttle is nearly into place, when the cam 40 (which only revolves once to two revolutions of the cam 42) comes into operation through the arm 41, sleeve *p*, arm 39, and lever 36, and opens the forceps and holds them open until they draw back from the shuttle the fixed jaw of the forceps on which there is no hook, forcing the shuttle back into its place.

44 is a pinion on the shaft 25, gearing to an intermediate wheel and pinion, 45, so as to communicate a slow motion to the wheel 46, on a shaft, 47, one end of which is set in a fixed journal-box on the frame or bed. The other end enters a sliding box, 48, set in slides *y* on the bed. 49 is a small wheel, faced with or formed of india-rubber or similar elastic substance. *q* is a feed-wheel the upper surface of which is on a line with the top of the bed or table *A*.

50 is a clamp set on a slide-rod, 51, and kept toward the wheel by a suitable spring, so as to hold the cloth or other substance to be sewed to the wheel *q*. The wheel 49 thus has a continuous motion, and, when brought in contact with the wheel *q*, communicates motion there-to to feed the cloth, and if held in contact a long period each stitch will be long; but if only just made to touch and then leave the wheel *q*, the stitch will be very short. The time, therefore, which said wheels are held in contact is effected by means of an arm, 54, on the shaft 37, taking a pin, 57, on the sliding journal 48. *r* is a cam on the shaft 25, the edge of which is diagonal, so as to operate on an arm, 52, a greater or less time, according to the position of the end of said arm along on the surface of the cam. This arm 52 is jointed at 53 to a fixed arm, 54, on the shaft 37, and the position of said arm 52 transversely is regulated by a screw, 55, and spring 56 on the fixed arm 54. It will now be seen that according to the position of the end of the arm 52, so the cam *r* will cause the wheels 49 and *q* to remain in contact a greater or less time, and thereby regulate the length of stitch.

We are aware that sewing has been effected by two threads, the one being carried by a shuttle, the other by the needle. Therefore we do not claim the same, and we are aware that the stitch has been pulled tight by the motion of the needle and needle-carrier, and we do not claim the shuttle; but we are not aware that forceps have ever been used to pass through the loop of thread and open the same, thereby insuring the opening of the loop and preventing tangling; nor do we know that the shuttle has been drawn through a loop by means of an eye on the end, thereby avoiding all liability of the shuttle not passing into the loop, and where the shuttle is forced through the loop as the needle draws up, its thread has to pass between the

rear end of the shuttle and the part which has forced the shuttle forward, which is liable to break the thread. Therefore

What we desire to secure by Letters Patent is—

1. A hollow needle with an eye in the side to pass the thread, as specified.

2. Opening the loop by means of forceps, thereby insuring that the loop is properly opened, and avoiding tangling of the thread, as specified.

3. Drawing the shuttle through the loop by

means of the eye *o*, or its equivalent, on the end of the said shuttle, as specified, thereby avoiding the risk of breaking the loop when the shuttle is forced through the same, as specified.

In testimony whereby we have hereunto set our signatures this 16th day of November, 1853.

G. H. HORN.

BENJN. H. HORN.

Witnesses:

LEMUEL W. SERRELL,

THOMAS G. HAROLD.