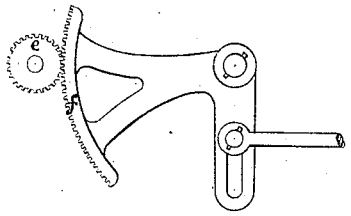
L. R. BLAKE.

SOLE SEWING MACHINE.

No. 107,155. Patented Sept. 6, 1870.

Fig. 2.

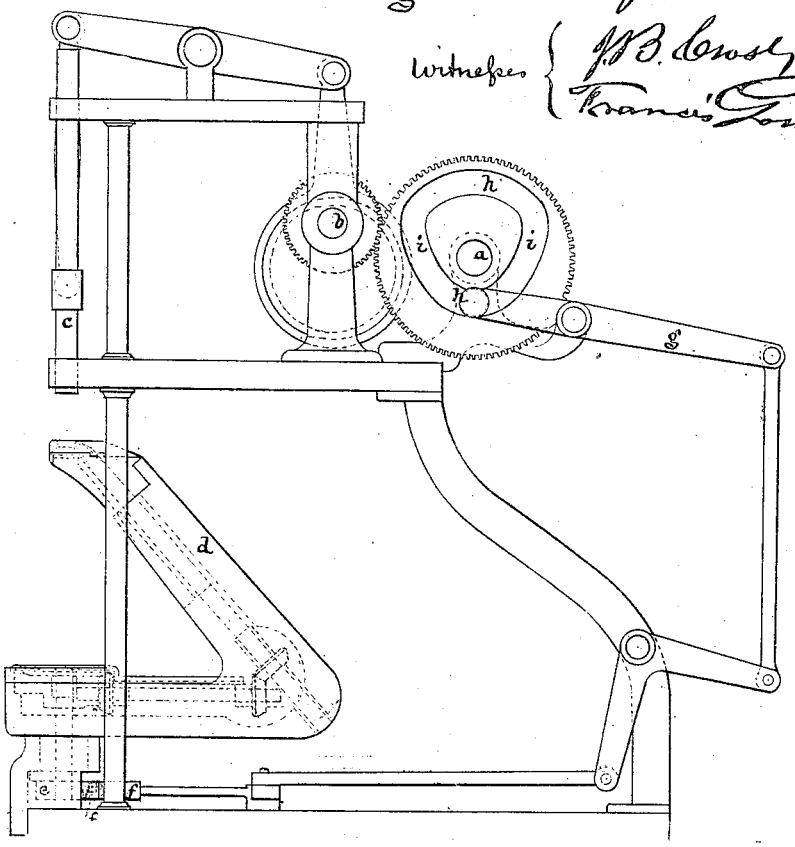


Inventor.

Lyman R. Blake

Fig. 1

Witnesses { J. B. Crosby, Francis Gould



UNITED STATES PATENT OFFICE.

LYMAN R. BLAKE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN SOLE-SEWING MACHINE.

Specification forming part of Letters Patent No. **107,155**, dated September 6, 1870.

To all whom it may concern:

Be it known that I, LYMAN R. BLAKE, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Sole-Sewing Machines; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

This invention relates to an improvement in operating the whirl or the device which conveys the thread to lay it into the hook of a crotchet-needle.

In sole-sewing machines making use of a "horn," on which to support a boot or shoe in the operation of sewing the sole thereunto, the whirl or thread-carrier is very small and delicate, and is subject to so much stress and wear that it soon gives out and has to be replaced at intervals by new ones. These whirls are expensive, as they are made of steel with the teeth of a bevel-gear on the outside, and it is an object of considerable importance to make any improvement that will add to their durability. Little can be done in the way of improving their construction, which is now probably as perfect as it is possible to make them. Such whirls or thread-carriers have heretofore been operated in one of the two following ways: First, the whirl has been made to turn around the needle, say about two-thirds of a revolution, at a time when the needle has arrived at the lowest point of its stroke, carrying and laying the thread into the hook of the needle, and then, when the needle is withdrawn from the whirl, this fleets or turns back to its first position, ready to again perform the operation of laying the thread into the hook of the needle. Second, the whirl has been made to turn continuously, laying the thread into the hook of the needle by each complete revolution.

The imperfection in both of these modes of operating the whirl is, that the whirl has more movement given to it than is absolutely necessary for the performance of its function, and hence its wear, and the wear of the end of the horn containing it, and of the gearing driving it, is unnecessarily great; and the object of my invention is to reduce the amount of the unnecessary wear, which I accomplish by so gearing and timing the movement of the whirl that it will turn part of a revolution in one direction to lay the thread into the hook of the needle, and will then rest when it has accomplished its function till the needle arrives again at or about at its lowest point of stroke, when the whirl turns in a reverse direction to its first movement, and, before arriving at its first starting point, again performs its function, and then rests until the needle again arrives at or about at its lowest point of stroke, these operations being constantly repeated.

In practice, I have found that whirls operated in accordance with my present invention last more than twice as long as the same whirls will endure when operated in either of the former methods, so that a saving of several dollars per year is effected in cost of whirls in machines that are much operated.

The movement of the whirl, in accordance with my mode of operation, takes place at a time when the needle is not drawing upon the thread, and so the wear is lessened beyond what is due merely to a lessened amount of movement of the whirl, because the whirl only moves to change the position of a comparatively slack thread, whereas, when the whirl is moved as it was before this invention, part, at least, of its movement was resisted by its necessarily deflecting a taut thread.

The means by which my mode of operating the whirl is accomplished are not of the essence of my invention, and may be varied; but those shown in the drawing are perfectly effective and cannot be easily excelled.

Figure 1 of the drawing shows, in elevation, enough of a sole-sewing machine to illustrate fully my present invention, Fig. 2 being a detail in plan of a portion of the mechanism employed.

The main shaft of the machine is denoted by *b*, the needle-bar by *c*, the horn, which is of the kind that may be rotated, by *d*. The whirl, which is contained in the end of the horn, has a bevel-gear formed on its periphery, and is rotated by a pinion on the end of an inclined shaft located in the inclined part of the horn, said inclined shaft being supplied with a bevel-gear, into which meshes another bevel-gear on a horizontal shaft located in the horizontal arm of the horn, said horizontal shaft being driven from an upright shaft by

means of bevel-gears, the upright shaft being concentric with the axis of rotation of the horn, and having, at its lower end, spur gear or pinion, *e*, which is operated by the vibrations of segment-gear *f*. This arrangement of gearing is shown in dotted lines in Fig. 1.

In sole-sewing machines in common use, the segment, which is marked *f* in the drawing accompanying this specification, is vibrated by means of lever-and-link connections from a cam on the main shaft of the machine, which makes one rotation to each complete double or up-and-down stroke of the needle, while, in this invention, the segment *f* is vibrated by means of link-and-lever connections from a cam on a secondary shaft, *a*, which is driven by gearing from the main shaft *b*, so that *a* and the cam thereon make one revolution to two complete double or up-and-down strokes of the needle. The segment *f* has an arm attached to it, which arm is slotted, as seen in Fig. 2, so that, by adjusting the link connection in the slot, more or less throw can be given to the segment to vary the fraction of the partial rotations given the whirl.

The cam is double acting, the parts *i i* of the groove therein being the parts which give motion to the lever *g*, and the concentric parts *h h* of the groove being the rests of the cam.

In one revolution of the shaft *b*, which gives a complete double or up-and-down stroke of the needle, it will be seen that the cam on shaft *a* turns but half round, bringing into requisition but one of the operative parts *i* and one rest of the cam-groove, producing movement of the whirl from a state of rest around the needle, and causing rest of the whirl till the next rotation of the shaft, which gives another double stroke of the needle and another start of the whirl from rest, causing it to move back around the needle, and again to rest.

In sole sewing machines in common use, the cam, which is similar to the cam on shaft *a*, and which works the whirl through the intervention of the means before specified, necessarily vibrates the whirl both back and forth at each double stroke of the needle; while, by placing the cam on a shaft which turns but half as fast as the main shaft, the movement of the whirl is reduced as described.

I claim—

The combination, with a supporting-horn, of the whirl, when operated to lay the thread in the hook of the needle at each movement of the whirl in reverse directions, substantially as described.

LYMAN R. BLAKE.

Witnesses:
J. B. CROSBY,
FRANCIS GOULD.