

J. BOND, Jr.
Sewing Machine.

No. 12,939.

Patented May 22, 1855.

Fig. 2

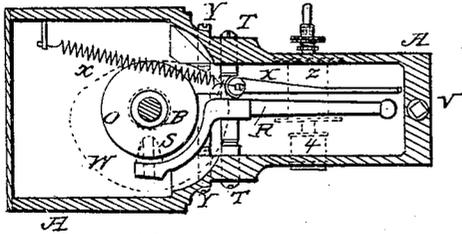


Fig. 1

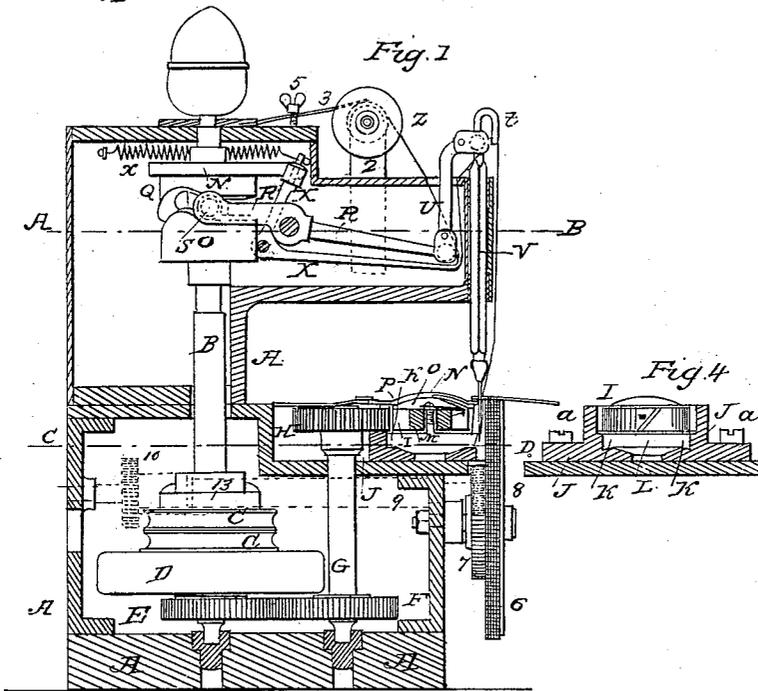


Fig. 4

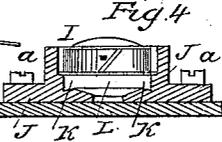


Fig. 3

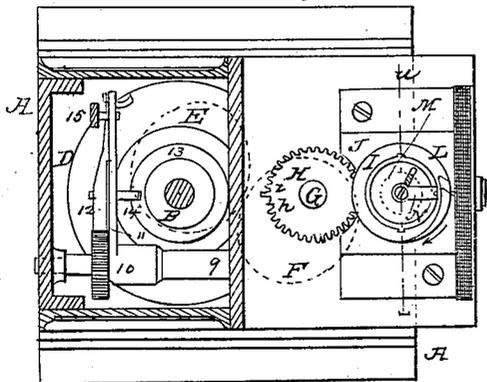


Fig. 5



WITNESSES
Alvin D. Schumaker
Henry Rowson

INVENTOR
Jesse Joseph Bond, Jr.

UNITED STATES PATENT OFFICE.

JOS. BOND, JR., OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **12,939**, dated May 22, 1855.

To all whom it may concern:

Be it known that I, JOSEPH BOND, the younger, of the city of Philadelphia and State of Pennsylvania, have invented certain Improvements in Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in producing a stitch in fabrics, known as "Howe's lock-stitch," by means of a spool-case caused to revolve horizontally, while the needle has a vertical movement. The said spool-case rests and revolves on a ledge in a spool-case holder, the ledge, as well as spool-case, being so constructed as not to interfere with the needle-thread. The spool-case is a circular hollow box, of steel, with teeth on its outer edge. It has also on its edge a nose for catching the needle-thread, in place of the shuttle of ordinary sewing-machines, the nose being arranged in regard to the above-mentioned ledge in such a manner that as the case revolves the needle-thread passes perfectly free. Within the case I place the spool in such a manner that both may revolve together, and radiating from the center of the spool is an arm whose movement is entirely independent of the spool or case, this movement being given by the spool-thread which passes from the said spool through a small hole at the end of the arm, and thence through another hole in the center of the spool-cap toward the goods to be operated upon. The spool-case is, with its spool, caused to revolve on the ledge within the holder by means of the teeth on the periphery of the case gearing into the teeth of a wheel on a vertical shaft, which has an irregular or differential revolving motion given to it by means of an elliptical toothed wheel which gears into a similar wheel on the driving-shaft, thus causing the spool-case and spool to turn in such a manner that in some portions of a complete revolution it turns faster than at others, causing a dwell or hesitation, which, in conjunction with the movement of the needle, effects a full and complete stitch.

My invention further consists in the adaptation of an auxiliary lever operated by a peculiarly-shaped cam on the driving-shaft, for the purpose of taking up the excess of slack in the needle-thread independent of the motion of

the needle, thereby requiring the vertical movement of the needle to be considerably less than that of ordinary sewing-machines, and consequently resulting in a greater amount of speed being attained.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On referring to the accompanying drawings, Figure 1 is a transverse sectional elevation of the machine. Fig. 2 is a sectional plan on the line A B; Fig. 3, the same on the line C D; Fig. 4, a detached section on the line E F, showing the spool case and holder; Fig. 5, a detached plan of the spool-case and spool-cap.

The same letters of reference allude to similar parts throughout the several views.

A is the frame-work of the machine.

B is the main vertical or driving shaft, caused to revolve in bearings on the frame A by means of a cord passing round a fly-wheel situated in any adjacent and convenient position and round the grooved pulleys C.

D is a balance-wheel on the same shaft for equalizing the motion of the same, and below this is keyed the elliptical toothed wheel E, gearing into a similar wheel, F, as shown in red lines, Fig. 3, on a second vertical shaft, G. This has likewise its bearings on the frame A, and has through the elliptical wheels a differential or unequally revolving motion imparted to it.

To the top of the shaft G, and outside the frame A, is secured the wheel H, which has at one point in its periphery a portion of the teeth cut away at *h*, and near the portion thus cut away it has one of its teeth *i* lengthened, for a purpose hereinafter shown. The teeth of the wheel H gear into teeth on the exterior of the spool-case I, which is a hollow box, of steel, the bottom resting and revolving on the ledge K, within the holder J, the latter being permanently secured to the frame A of the machine.

It will be seen on reference to the detached figures, 4 and 5, that the spool-case I has an inclined point or nose, L, formed on its outside edge and interrupting the teeth on the same. This interruption corresponds with the portion of the wheel H where the teeth are cut away, so that no impediment may be offered to the free movement of both wheels, the lengthened tooth *i* meeting a corresponding recess in

the outside edge of the spool-case, giving a further security to the due performance of the said movement.

In front of the spool-case holder J, and directly under the needle, is a slot or recess to allow the said needle to move freely therein.

Within the case I, I place the spool M, projections on which fit into corresponding spaces in the spool-case, so that the spool may be easily removed, but when in its proper position cannot turn round independent of the case.

On the top of the spool M is the radiating arm N, which is so constructed as to be capable of being turned round on a pin screwed into the center of the spool, this radial movement being entirely independent of the motion of the spool or spool-case. The radiating arm N has a slight friction or drag given to it by means of the center screw, by turning which the friction may be increased or diminished at pleasure. The thread from the spool passes through a hole at the end of the radial arm, and is thence directed to another small hole in the cap O of the spool-case, the latter hole being directly over the center of the spool. The thread thence passes between the cap O and another stationary cap, P, toward the fabric to be operated upon. The serrated feed-wheel 6, which is similar to that of other sewing-machines, is hung on a spindle screwed to the frame, and has at the back a toothed wheel, 7, gearing into a pinion, 8, on the horizontal shaft 9. The latter is actuated by means of the cam 13 on the upright or driving shaft B, the pin 14 on the lever 11 bearing against the incline on the cam, and causing the catch 12 to operate the notched wheel 10 on the shaft 9, and thereby producing the required feed-motion. A spiral spring is attached to the end of the lever, which serves to keep the latter depressed when not raised by the incline on the cam. In order to vary the amount of feed, I use the adjustable piece 15, having a projection against which the end of the lever is brought on its downward movement.

Q is a scroll-cam on the shaft B, arranged to operate the lever R by means of the conical roller S, which works within the grooves of the cam. This lever has its fulcrum on pins T, screwed to the frame of the machine, and the end of the long arm of the lever is attached to the lower end of the connecting-rod U by means of a ball-and-socket joint, a similar joint serving to connect the upper end of the same rod to the needle-bar V, which has a hooked piece, *t*, at the top for guiding the needle-thread, and at the bottom a needle of the description commonly used in sewing-machines.

Above the scroll-cam Q, and attached to the same shaft, B, is a horizontal cam, W, the shape of which is shown in red lines, Fig. 2. By means of the spiral spring *x*, the roller on the end of the bell-crank lever X is caused to bear against the edge of the cam W. The lever X has its fulcrum on pins Y, screwed to the frame

of the machine, and the long arm has its end turned upward. Through this upturned end of the lever passes the needle-thread toward a hole in the hooked top of the needle-bar, and through this toward the needle, in another direction, to the spool Z, from whence the supply is drawn. This spool is allowed to turn on a spindle projecting from the bracket 2, attached to the frame, and a slight friction is imparted to it by means of the spring 3, the end of which bears on a small roller, 4, attached to the spool, the amount of pressure on the roller being regulated by means of the set-screw 5.

Operation of the machine: The working portions of the machine being in the position shown in Fig. 1, the threaded needle having descended into the slot in front of the spool-case holder J, and a loop being formed in the thread by means of the needle rising a little after having descended to its lowest point, the nose L, on the exterior of the spool-case holder, catches the said loop and revolves in the direction of the arrow at an increased speed, caused by the peculiar arrangement of the elliptical wheels E and F. While the spool-case thus moves round to a distance of two-thirds of an entire revolution, the needle, through the form of the scroll-cam Q, remains stationary. The spool-case having now arrived at the position shown in Fig. 5, or, as before remarked, having performed two-thirds of its revolution, it continues to travel the remaining one-third at a reduced speed, allowing the needle to rise, the feed-motion to operate, and the needle again to descend, forming another loop preparatory to recommence another revolution. In order, however, to thoroughly understand the operation of the machine, it will be necessary again to return to the position from whence we started—that is, with the needle descended. As the nose L, on the exterior of the spool-case, carries the needle-thread round, it will be seen that the said thread must be delivered at a speed and in a quantity commensurate with the distance moved. This is effected by means of the auxiliary lever X, which, as the thread is being carried round, has its long arm raised, and allows the thread to move freely, but without any slack, until the nose L has carried it round to the point farthest from the needle, when the lever X is caused to descend, taking up the thread, which would otherwise become slack on the further movement of the spool-case. The lever X, however, is so arranged in conjunction with the movement of the needle that it ceases to descend before the needle has finished its upward motion, the object of this being that the movement of the lever X and that of the needle may not cease at the same time; otherwise a double jerk on the same thread would occur at the completion of each stitch. The spool-thread, which is colored green in the drawings, passes through the end of the radial arm N, as before described, and thence through a hole in the cap directly over the center of the spool toward the fabric, where

it is caught by the needle-thread on its passage over the spool-case and interlocked under the fabric. The delivery of the spool-thread is effected at a uniform tension by the slight friction given to the radiating arm N, the feed movement extracting the thread at the rate required. The method of giving motion to the needle and giving the required movement to the serrated feed-roller 6 will be easily understood without further reference.

By means of the peculiar construction of the spool and spool-case, as described above, I obtain the advantage of having a greater amount of spool-thread than can be wound on the spools or bobbins of any other lock-stitch machine, the amount of thread in the bobbins of other machines being confined to sixty yards at most. On my spool can be wound no less than from two hundred to four hundred yards, according to the size of the thread.

Another advantage obtained by the use of my spool-case arrangement is the regular delivery at a uniform tension of the spool-thread, caused by the radiating arm N, which has a motion independent of that of the spool-case.

Another advantage is the facility with which the spool can be removed to renew the thread without removing the case. This advantage will be apparent when it is remembered that the whole shuttle of ordinary sewing-machines has to be removed for a similar purpose. The difficulties attending the use of front and back drivers of the shuttles of other machines are likewise avoided, inasmuch as my revolving spool and case require no drivers other than that of the teeth on the wheels H and the spool-case, which are so arranged as to present no interference with the threads.

The advantages obtained by the use of the auxiliary lever are, that it enables more spool-thread to be passed through the loop of the needle-thread, and again to enable the needle-bar to bring it tight into the fabric at a motion of the needle little more than half that

of ordinary sewing-machines. All the motion required by my needle is just sufficient to enable the loop to be formed and the required feed to be given, the auxiliary lever serving to complete the stitch, which in other machines is performed by a lengthened lift of the needle. Thus I obtain an increased rate of speed, the number of stitches per minute having in the machine which accompanies this specification reached the amount of one thousand.

Although in the foregoing I have described the construction and operation of an entire sewing-machine, I wish it to be understood that I do not lay any claim to the feeding apparatus or to the method of actuating the needle; but

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

1. The spool-case I, with teeth or their equivalents on its outer edge, and the nose L, for catching the needle-thread, in combination with the wheel H, having teeth cut away at *p*, substantially in the manner and for the purpose specified.

2. The hollow spool-case I, with its spool M, in combination with the radiating arm N or its equivalent, as shown and described.

3. The auxiliary lever X, as operated by cams on the driving-shaft, not for the purpose of controlling the needle-thread between the eye of the needle and the goods, as in Harris' and Howe's machine, nor for the purpose of tightening the stitch, as this is done by the needle-bar, but in conjunction with the spool-case I, so as to accommodate the needle-thread as it passes over the spool-case, thereby diminishing the extent of movement required in the needles of other machines.

JOSEPH BOND, JR.

Witnesses:

A. SCHOENBEIN,
HENRY HOWSON.