

HOWE & BLISS.
Sewing Machine.

No. 17,679.

Patented June 30, 1857.

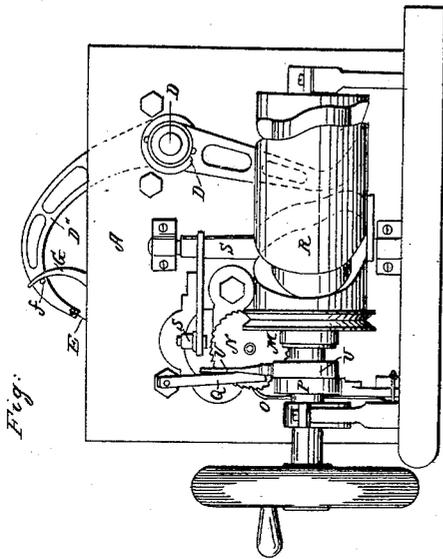


Fig. 1.

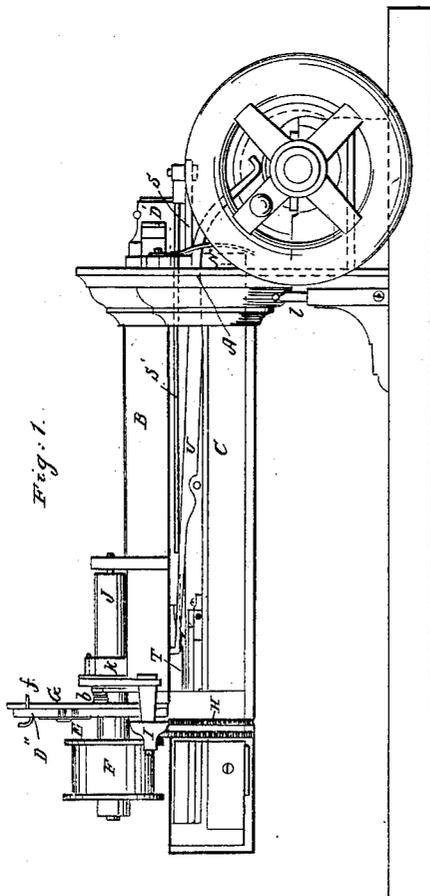


Fig. 2.

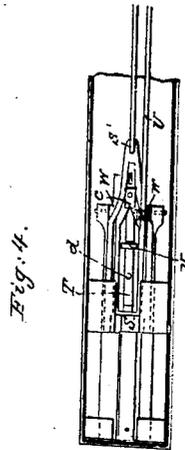


Fig. 3.

Fig. 4.

Fig. 5.

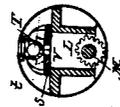


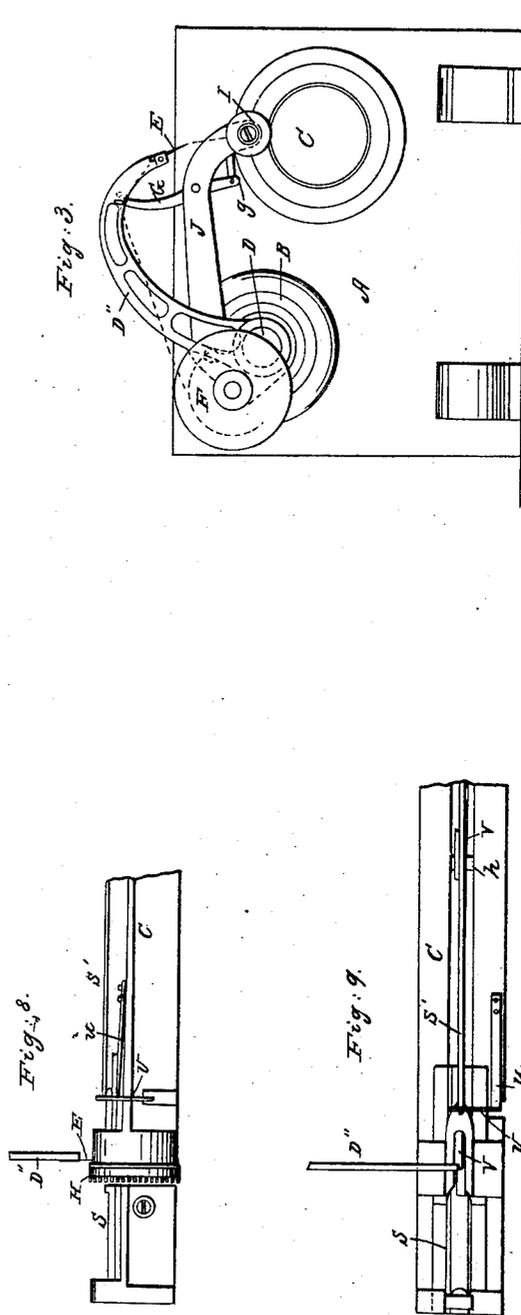
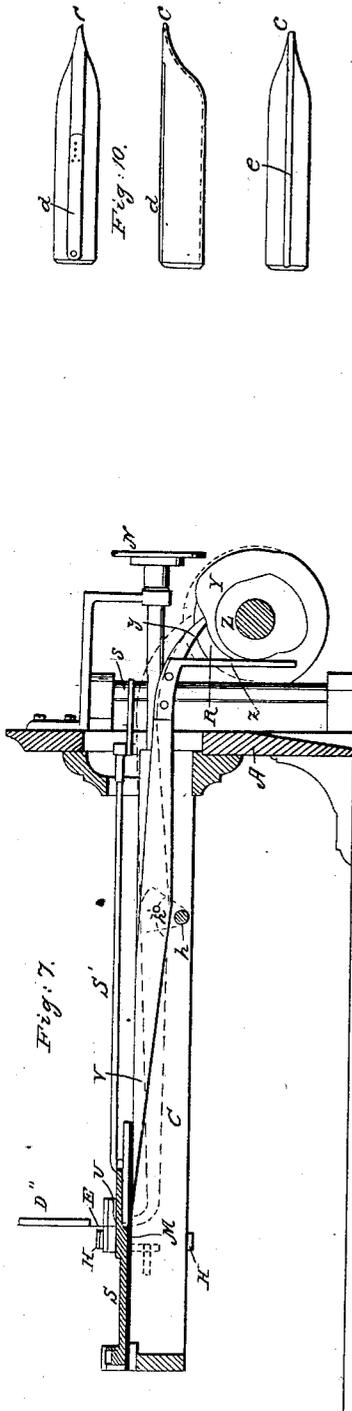
Fig. 6.



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UNITED STATES PATENT OFFICE.

E. HOWE, JR., OF CAMBRIDGE, AND W. R. BLISS, OF BOSTON, MASS.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. 17,679, dated June 30, 1857.

To all whom it may concern:

Be it known that we, ELIAS HOWE, JR., of Cambridge, in the county of Middlesex and State of Massachusetts, and WILLIAM R. BLISS, of Boston, in the county of Suffolk and State aforesaid, have invented certain new and useful Improvements in Sewing-Machines; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation thereof, taken in connection with the accompanying drawings, which make a part of this specification.

The subject-matter of our invention consists of certain improvements upon the sewing-machine patented to Elias Howe, Jr., September 10, 1846, by means of which improvements the machine is better adapted to the sewing of leather and other similar hard substances, and to the sewing of a certain class of objects to which the machine of the said Howe, as it was formerly arranged, is not applicable. The seam formed by this machine is of the same kind and is produced by the same general mode of operation as that described in said Howe's specification of September 10, A. D. 1846.

The first part of our invention relates to an improvement in the manner in which the needle and shuttle are made to co-operate to interlock the threads; and it consists in so modifying the mechanism and movements of them, respectively, as that the needle may be entirely withdrawn from the material to be sewed after it has inserted the loop, before the shuttle has passed through it. In the operation of said Howe's machine the shuttle is passed through the loop of the needle-thread while the needle is inserted, which sustains the loop under the operation of the shuttle and enables it to draw through so much of the needle-thread as is requisite to permit its passage. In that case the thread is drawn through the material, while the needle also occupies the hole that is formed by it. In the sewing of elastic bodies, like cloth, this is not very objectionable; but in the sewing of leather it becomes necessary to use a comparatively large needle with deep grooves in the sides and a comparatively small thread, so that it can move past the needle when it is inserted, and in this case, when the sewing is completed, the thread will be found not to fill the holes, which gives work a loose and infirm appearance; but in our machine a short and small needle is used, which

passes the loop but a short distance through the material, and the shuttle is formed with a slim pointed nose of a peculiar shape, which, in connection with a certain device to be hereinafter described, seizes the loop and holds it until the needle is withdrawn to the surface. The shuttle is then thrust through the loop, and as the thread alone occupies the hole made by the needle it can be drawn freely through the same, and at the same time be large enough to fill it. The stitch is then drawn up in the usual manner.

The second part of our invention consists in a peculiar manner in which we have combined and arranged the baster and the mechanism which operates the shuttle and its thread, so that they may be contained and worked within the compass of a small standard of a cylindrical or other convenient form, by means of which the machine is adapted to sew through the sides of objects of a tubular form—such as the legs of boots, hose, and other things of a similar nature—provided that the aperture is of sufficient size to receive the standard.

In the drawings, Figure 1 represents a side elevation of the improved machine with the casing that surrounds the shuttle-standard removed to show its internal structure. Fig. 2 is an end elevation of the machine, showing the arrangement of the cams and driving-shaft. Fig. 3 is an elevation of the opposite end of the machine. Fig. 4 is a plan of the outer end of the shuttle-standard, showing the construction of the shuttle, shuttle-race, and subordinate mechanism. Fig. 5 is a longitudinal section through the middle of Fig. 4. Fig. 6 is a transverse section on the line *x* of Fig. 5. Fig. 7 is a sectional elevation of the shuttle-standard and a part of the machine, showing a modification of the mechanism by which the loop of the needle-thread is caught and held while the shuttle passes through it. Fig. 8 is a side elevation of the end of the shuttle-standard modified as in Fig. 7, with the casing removed. Fig. 9 is a plan of the same, and Fig. 10 shows the shuttle in three views drawn to full size.

The letters refer to the same parts in all the figures.

A is the foundation-plate of the machine, from which are projected horizontally two cylindrical standards, B and C. The standard B carries a rocking shaft, D, extending longi-

tudinally through the center, upon one end of which is an arm, *D'*, by which it receives a vibrating motion from the cam *R*, and upon the other end is an arm, *D''*, which carries the needle *E*. The needle is made with an eye near its point, and of a curvature corresponding to the arm *D''* as a radius, and passes a loop of thread through the material to be sewed in the usual manner. The needle-thread is wound upon the bobbin *F*, and is prevented from unwinding by friction applied by any convenient device.

G is a small lever, upon the lower end of which are fixed a pair of light blades or forceps, *g*, slightly pressed together, which are thrown forward by the upward motion of the needle-arm, by means of the pin *f*, and seize the thread, when it is drawn tight between the needle and material, and when the needle-arm descends to insert the needle again the lever *G* is swung back by the spring *h*, coiled around its fulcrum, and removes the thread out of the way of the needle as it is inserted.

C is another cylindrical standard projecting from the foundation-plate *A*, which contains the mechanism by which the shuttle-thread is operated. It is made with a skeleton framing within, of such form as to receive conveniently the internal mechanism, and is inclosed by a cylindrical metallic casing, as is shown in the drawings.

H is an annular baster-plate, which is made with teeth upon one edge, which engage with the pinion *L*, and with asperities upon its external surface to seize the material to be sewed and carry it forward.

I is a wheel, which rests upon the material in sewing and presses it against the baster. It is attached to the arm *J*, which is hung upon the standard *B*, and is pressed downward by the flat spring *K*. It performs the function of the guard-plate marked *X* in the specification of said Howe before mentioned, and holds the material firm against the draft of the needle-thread when the stitch is drawn up. The wheel *I* may also be used as a baster in certain cases to sew lengthwise or diagonally with the standard *C*, and I intend so to use it; and in this case it must be attached to the arm which supports it by a swivel, so that it can stand at any angle with the axis of the cylinder, and have its surface roughened to seize the material, and the cylinder beneath it must be made smooth, and must also be connected by proper mechanism with the other movements of the machine, so as to have a proper intermittent motion.

L is a pinion upon the shaft *M*, which carries the baster-plate and receives an intermittent motion from the ratchet *N* upon the other end of the shaft by means of the pawl and lever *O*, worked by the cam *P* upon the driving-shaft in a sufficiently obvious manner.

Q is a friction-spring to hold the ratchet *N* firm in feeding.

R is the main cam of the machine. It has two grooves in its periphery, one of which

actuates the needle through the needle-arm *D'*, and the other the shuttle through the rocker *S* and shuttle-driver *S'* within the standard *C*. These grooves have such a form and relation to each other as to give the needle and shuttle, respectively, the movements to be hereinafter described.

T is the shuttle, the body of which is of cylindrical form, and contains the bobbin *t*, upon which the thread is wound. The point is made of a peculiar form, as is shown at *c* in the drawings, and is thus made to enable it to enter the loop of the needle-thread, and in connection with the finger *v* to hold the bight of it until the needle is withdrawn to the surface of the material. The shuttle has upon its under side a shallow groove, *e*, extending from the point through its entire length, in which the point of the finger *v* works as the shuttle moves back and forth, and by which the action of the finger *V* is insured in catching the loop of the needle-thread and preventing it from being carried forward by the motion of the shuttle. This finger *V* is inserted into an axis, *W*, which permits it to vibrate, and about which a helical spring, *w*, is coiled, which holds the finger up against the shuttle as it moves back and forth. When the shuttle is thrown entirely back, or at the opposite end of the race from what is shown in Figs. 4 and 5, the finger and shuttle are not in contact, but a small space is left between them, into which the needle passes when it inserts the loop.

Upon the upper side of the shuttle is placed the tongue *d*, in the free end of which is a hole, through which the thread passes as it leaves the shuttle. The tongue acts as a light spring, and produces sufficient friction upon the thread to prevent it from being delivered from the shuttle so freely as to entangle it when in rapid operation. When the shuttle goes forward to the end of its stroke, the clipping-piece *U* is pressed down upon the tongue *d* by its cam *U'*, and the thread is held firm, and the distance that it shall be drawn in by the needle-thread is thus definitely determined.

Fig. 7 shows a manner of arranging the finger *V* so that it seizes the loop of itself and is made to work by cams, instead of deriving its motion from the shuttle, as in the manner before described. In this case the finger *V* is made in the form of a long lever, hung near the middle upon a vibrating arm, *h*. It has a vibratory motion in a lateral direction that it receives from a cam, *Y*, upon the main shaft, and a longitudinal movement that it receives from the cam *Z*, acting upon the arm *z*, attached to the lever. By the joint action of the cams *Y* and *Z* the point *v* of the finger has a movement indicated by the dotted line—that is to say, immediately after the needle is inserted and is retracted sufficiently to open the loop the point *v* of the finger is thrust forward into the loop. The needle is then withdrawn to the surface and the finger then depressed, so as to draw the loop through the

material a sufficient distance to permit the passage of the shuttle. The shuttle is then passed and the finger drawn horizontally back to release the loop and permit it to be drawn up by the retraction of the needle-arm in the usual manner. The shuttle-thread is held by the clipping-piece U, which in this case is made of a lunette form and hung upon the spring *u*, which raises it, and its lower end passes below the finger V and is drawn down, when the finger V is depressed and retracted to release the loop, as before described.

In arranging the needle and shuttle to work in the manner first described the motions required to be given by the cam R are substantially as follows: The needle is first inserted and retracted sufficiently to open the loop. The shuttle is then advanced sufficiently to insert the point thereof into the loop and for the finger V to enter the groove *e* in the shuttle. The needle is then withdrawn to the surface and the shuttle is thrust forward through the loop, enlarging it sufficiently to permit its passage by chewing through the needle-thread. The shuttle-thread is then held and the stitch is drawn up by the retraction of the needle-arm in the usual manner.

l is an adjustable stop, by means of which the extent of vibration of the lever O is determined and the length of the stitch regulated.

Many of the minor details of the machine are not particularly described, as they are not essential to our improvements.

The standard C need not necessarily be of a cylindrical form, as any form that will contain

the mechanism for working the shuttle-thread and for feeding the material along, and is sufficiently elongated to reach into a tubular object the requisite distance, will answer the purpose; but the cylindrical form here represented is the one we have tried with success, and is believed to be the most convenient.

Having thus set forth our invention, what we claim as new, and for which we ask Letters Patent, is—

1. In connection with the mode of forming a seam by means of two threads, as described, the seizing and holding of the loop of the needle-thread after it is inserted by means of the point *e* of the shuttle and finger V, or their equivalent, and the withdrawing of the needle from the material to be sewed before the shuttle-thread is passed through the loop, substantially in the manner and for the purpose described.

2. The combining and arranging of the mechanism which works the shuttle-thread and the baster, or its equivalent, with the standard C, and in connection therewith so arranging the mechanism which works the needle-thread as that they shall co-operate and form the seam when the standard is inserted in objects of a tubular form, as is hereinbefore described.

Boston, August 23, 1853.

ELIAS HOWE, JR.
WM. R. BLISS.

Witnesses:

WM. C. HIBBARD,
H. A. PEELER.