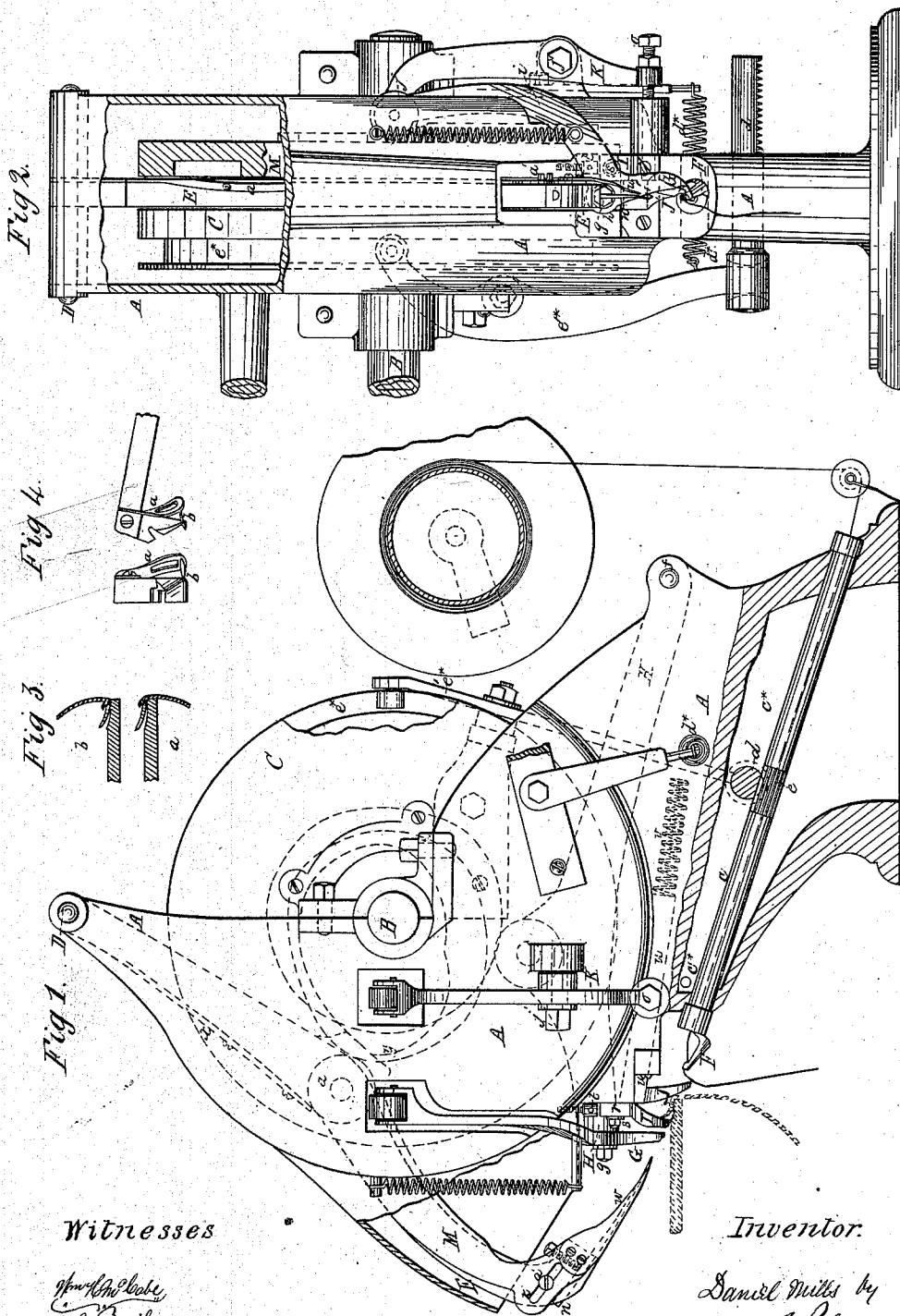


D. MILLS.
Sewing Machine.

No. 97,951.

Patented Dec. 14, 1869.



Witnesses

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SEWING-MACHINES FOR SEWING BOOTS AND SHOES.

Specification forming part of Letters Patent No. 97,951, dated December 14, 1869.

To all whom it may concern:

Be it known that I, DANIEL MILLS, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, in which—

Figure 1 represents a sectional side elevation of a machine, made in accordance with this invention; Fig. 2, a sectional front view of the same.

Similar letters indicate corresponding parts.

This invention relates to sewing-machines, which are intended particularly for "turned work," so called, *i. e.*, where the uppers of boots and shoes are sewed directly to their soles without the intermediary of welts, the work being inside out during the operation of sewing; (this invention, however, may also be adapted for sewing on welts to insoles and uppers;) and said invention consists, first, in an organization consisting of the following elements in combination: First, a barbed needle mounted on an oscillating arm or lever operated by a suitable cam in such manner that the power is applied to the needle-arm between the needle and its center of oscillation; second, a looper and its actuating mechanism, so as to effect the chain-stitch in connection with said needle; third, a top feed mechanism propelling the work during the interval of stitches; fourth, one or more gages for guiding and holding the work in the line of the seam to be made. Second, in the arrangement, substantially as hereinafter described, of a cam disk or disks mounted on one and the same shaft, and to operate as and by the means hereinafter shown and set forth: first, the needle-arm, when the same is a lever of the third order; second, the looper, with its reciprocating rotary motion; third, the feed, with its up and down and back and forth movement; fourth, the edge-gage, with its locking mechanism; and, fifth, the barb-coverer. Third, in the combination, with a barbed needle mounted on an arm, being a lever of the third order, and a barb-coverer mounted in like manner and upon the same fulcrum with the needle-arm, of independent cams mounted on the same shaft to operate

the needle and the barb-coverer in the manner and for the purposes hereinafter set forth. Fourth, in the combination with the needle and barb-coverer oscillating upon the same fulcrum and operated by cams, as described, of a spring, and a slot and stud, or their mechanical equivalents formed on the barb-coverers and needle levers respectively, whereby, at the proper intervals, the action of the barb-coverer is regulated and controlled by the movement of the needle-arm, as hereinafter set forth. Fifth, in mounting the looper on the end of a tubular shaft, through which the thread with which the looper is supplied passes, when said shaft is arranged to pass through the cavity in the frame, and there exposed to the action of a flame, substantially as herein shown and described.

In the drawing, A represents a frame, which forms the bearings for the shaft B, on which is mounted the cam-disk C that imparts motion to the various parts of the sewing mechanism and its appurtenances. Through the upper part of the frame A extends a rod, D, which forms the fulcrum of a lever of the third order, E, and in the free end of this lever is secured the needle *n*, as shown in Fig. 1 of the drawing. An oscillatory motion is imparted to the lever E by a cam-groove in the disk C, the groove acting on a roller-stud, *a*, secured to said lever between the needle and the fulcrum D, so that the moving force is applied to said lever at a point as close to the needle as possible, thus furnishing the power required to cause the needle to pass through leather or other thick material, and at the same time preventing said lever from springing sufficiently to disturb the correct operation of the sewing mechanism.

The thread is delivered to the needle by the action of the looper F, which is secured to a tubular arbor, *c*, to which a reciprocating revolving motion is imparted by the action of a rack, *d*, and pinion *e*, said rack receiving the required reciprocating motion by a cam-groove, *e**, in the periphery of the disk C, which connects with the rack by a lever, *e**.

The looper F, being made to extend eccentrically from the end of the tubular arbor *c*, partakes of the reciprocating motion of said arbor, and in doing so it carries the thread round the barb of the needle.

The tubular arbor *c* extends through a cavity, *c**, in the bottom part of the frame A, and it is exposed to the flame of a lamp or gas burner, a draft-hole, *c**, being provided in the upper end of said cavity, so that the waxed thread, in passing through said tubular arbor, becomes heated and pliable.

The pinion *e* is either keyed to the arbor *c* or it is produced by cutting teeth in the circumference of said arbor, and the reciprocating motion of the rack *d* is facilitated by the action of a spring, *d**, connected to the lever *e**, as shown in the drawing.

The required feed motion is imparted the work by the feed-dog G, which has its fulcrum on the free end of the lever H, and receives an oscillating motion by the action of a cam on the side of the disk C. The feed-lever H has its fulcrum on a pivot, *f*, situated on a level with the work, and it receives an oscillating motion by a cam mounted on the shaft B. By placing the fulcrum of the feed-lever on a level with the work, the point of the feed-dog is brought down square upon said work, which is not the case if the fulcrum be situated higher or lower than the level of the work, and the oscillating motions of the feed-dog and of the feed-lever are so timed that the feed-dog is first brought down upon the work by the action of the feed-lever, then receives its oscillating motion, so as to push the work along; it is then raised from the work and carried back to its original position, ready for the subsequent feed.

The connection between the feed-dog and feed-lever is effected by a pivot, *g*, projecting from the free end of the feed-lever and passing through an eye, *h*, formed in the elbow of the feed-dog at the point farthest removed from the arm *i*, which carries a roller, *j*, that acts against the cam on the side of the disk C. Said eye or pivot is so situated in relation to the working-face of the feed-dog and to the roller-arm *i* that it lies on that side of a vertical plane passing through the working-face of the feed-dog opposite to that on which the roller-arm *i* is situated, whereby the pressure of the feed-dog against the work has a tendency to keep the roller *j* in contact with its cam, thus rendering the feed motion sure and uniform.

This machine is intended particularly for sewing the uppers of boots and shoes to the soles in what is technically known as "turned work," and the work is turned inside out and put on a last in the usual manner, a channel being made in the inner surface of the sole to receive the stitches, as indicated in red outlines in Fig. 1 of the drawing, Fig. 3 representing at *a* and *b*, respectively, the work before and after it is turned.

The last is secured in a last-holder, which is placed on a table, (not shown in the drawing,) and said table is forced up by means of a spring or weight, so that the work will be pressed up against the surface-gage I. This gage is secured to the edge of the frame, and

it is provided with side flanges *r*, which overlap the edges of the frame and prevent the gage from swinging out sidewise. A screw, *s*, retains the gage in position, and another screw, *t*, which bears on the top edge of said gauge, serves to adjust the same up and down, so that the work will be presented to the needle in the proper position. The correct position of the work is further insured by the edge gage J, which is secured to the outer end of a pin or slide, *u*, fitted into a cavity in the frame A and subjected to the action of a spring, *v*, which keeps said gage in contact with the edge of the work and allows the same to follow the sinuosities thereof.

This edge-gage also serves to retain the work against the thrust of the needle; and to effect this purpose a locking-lever, K, is applied, which is operated by a cam in the side of the disk C. This lever has its fulcrum on a pivot, *j'*, secured in a lug projecting from the frame A, and it carries a set-screw, *o*, which acts on the slide *u* of the edge-gage at the proper intervals, and serves to retain the same firmly in position while the needle passes through the work. By adjusting the set-screw the locking-lever can be made to do its work with great precision and without fail.

Although this machine is, as before said, particularly adapted to "turned work," it can also be used for welt-sewing by the appliance of a welt-guide to the edge-gage. At one side of the latter, and rigidly connected with it, is a slotted piece of sheet metal of angular formation, as shown in front and side elevation in Fig. 4. The face *a* of the welt-guide is so inclined in relation to the face *b*, and the slot therein so formed, that the inner edge of the welt, which is or may be fed from a strip of any length, is bent or turned outward from the upper or work at the point where the stitching takes place, and is presented at right angles, or nearly so, to the needle. In this way the needle will go squarely through the welt instead of going obliquely through, as it would do if the welt were not so bent up. The correct operation of the needle in retaining and releasing the loop of the thread at the proper intervals is insured by the barbcoverer *w*, which is secured to a lever, M. This lever has its fulcrum on the rod D in the top of the frame A, and it is situated close to the side of the needle-lever E, and subjected to the action of a spring, *x*, which is secured to the edge of the needle-lever. A cam, *y*, on the shaft B acts on the lever M, and serves to impart to the barbcoverer its own distinct motion, as will be presently explained. The free end of the lever M is provided with an oblong slot, *z*, through which passes a screw, *a'*, which is secured in the needle-lever.

The motion of the barbcoverer in relation to the needle is as follows: When the needle enters the work the barbcoverer is resting against the work, being pressed up by the spring *x*, which is fastened to the needle-lever. When the needle recedes the barbcoverer re-

mains stationary until the barb is covered; then the set-screw *a'* in the needle-lever strikes the end of the slot *z* in the lever *M*, and carries the barb-coverer up with it until near the outer end of its motion, when the barb-coverer receives an additional outward movement by its own cam, and is retained there, while the needle comes back, and it does not overtake the needle until the same is near entering its work again. By these means the loop is prevented from slipping out of the barb while the needle is out, and as soon as the needle moves in the barb is uncovered, and the loop is free to drop out, and the barb-coverer does not move in until the loop has been carried out of the way by the feed motion imparted to the work.

In this specification I have described some parts that I consider novel, and of my invention, yet have not claimed here, as they are made the subject-matter of another application for a patent now pending; and, therefore,

Having described this invention, and the manner in which the same is, or may be, carried into effect, what I now claim, and desire to secure by Letters Patent, is—

1. An organization, substantially as described, consisting of the following elements in combination: first, a barbed needle mounted on an oscillating arm or lever operated by a suitable cam in such manner that the power is applied to the needle-arm between the needle and its center of oscillation; second, a looper and its actuating mechanism, so as to effect the chain-stitch in connection with said needle; third, a top-feed mechanism propelling the work during the intervals of stitches; fourth, one or more gages for guiding and holding the work in the line of the seam to be made.

2. The arrangement, substantially as herein

described, of a cam disk or disks mounted on one and the same shaft, and to operate as and by the means hereinafter shown and set forth: first, the needle-arm when the same is a lever of the third order; second, the looper having a reciprocating rotary motion; third, the feed with its up and down and back and forth movement; fourth, the edge-gage with its locking mechanism; and, fifth, the barb-coverer.

3. The combination, with a barbed needle mounted on an arm, being a lever of the third order, and a barb-coverer mounted in like manner and upon the same fulcrum with the needle-arm, of independent cams mounted on the same shaft to operate the needle and the barb-coverer, in the manner and for the purposes herein set forth.

4. The combination, with the needle and barb-coverer oscillating upon the same fulcrum, and operated by cams, as described, of a spring and a slot and stud or their mechanical equivalents, formed on the barb-coverer and needle-levers, respectively, whereby at the proper intervals the action of the barb-coverer is regulated and controlled by the movement of the needle-arm, as herein set forth.

5. The looper, mounted on the end of a tubular shaft, through which the thread, with which the looper is supplied, passes when said shaft is arranged to pass through the cavity in the frame, and there exposed to the action of a flame, substantially as herein shown and described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

DANL. MILLS.

Witnesses:

M. BAILEY,
A. POLLOK.