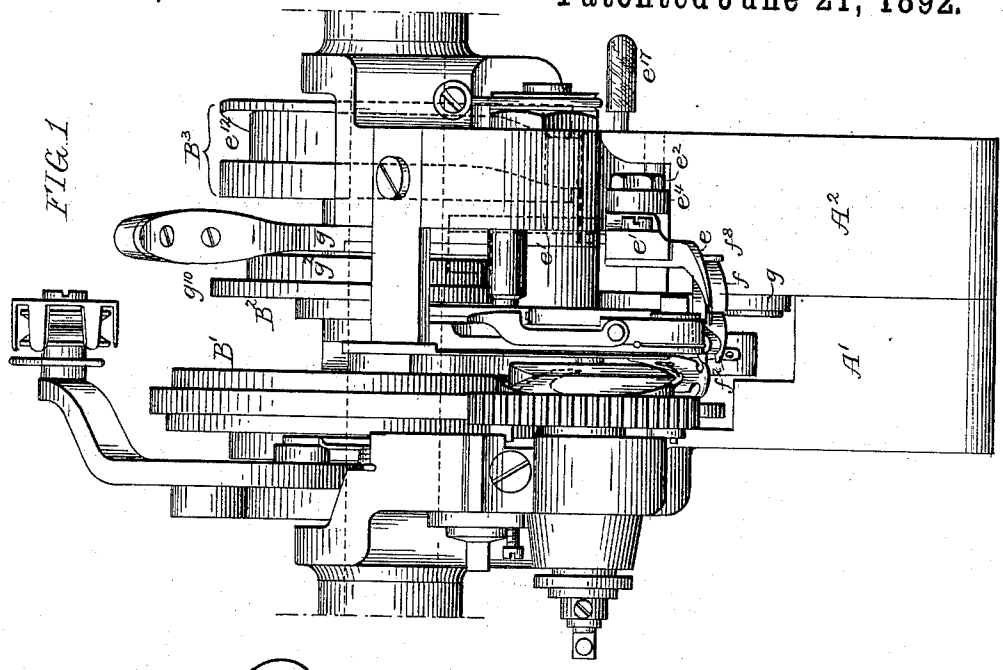
(No Model.) 2 Sheets—Sheet 1.

# D. MILLS.

## FEEDING MECHANISM FOR BOOT OR SHOE SEWING MACHINES.

No. 477,434. Patented June 21, 1892.

FIG. 1



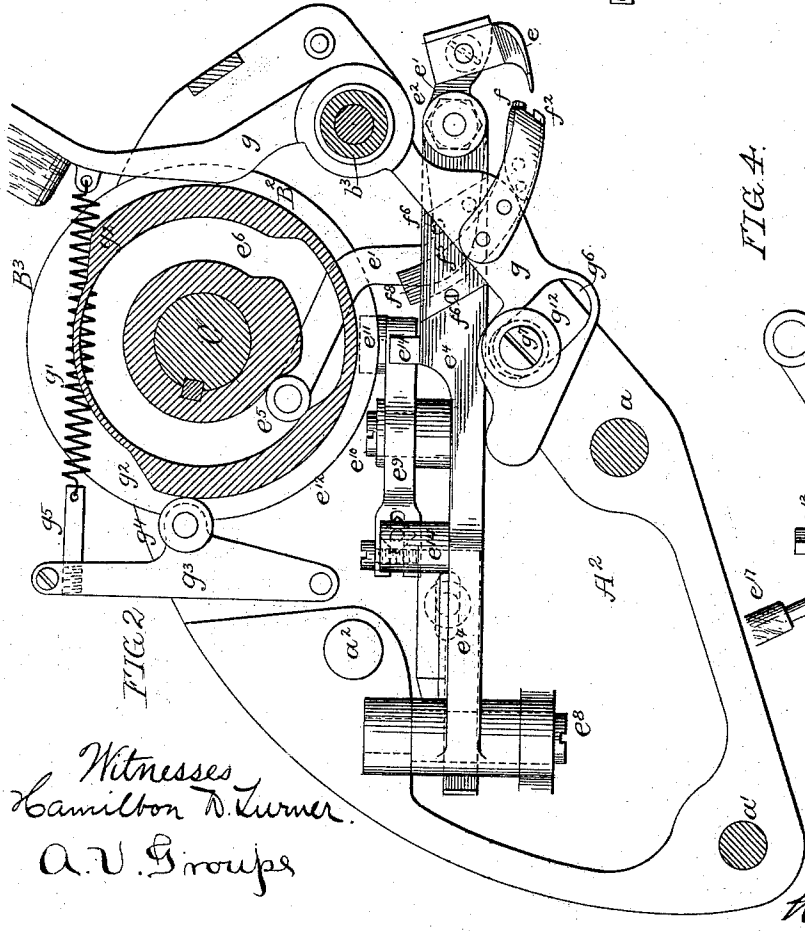
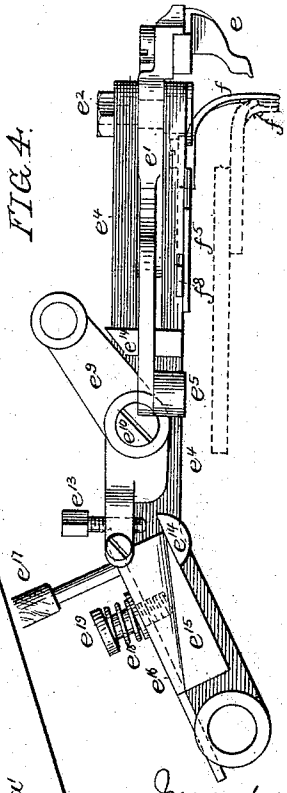


FIG. 2

FIG. 4.



Witnesses
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by his attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

# D. MILLS.

## FEEDING MECHANISM FOR BOOT OR SHOE SEWING MACHINES.

No. 477,434. Patented June 21, 1892.

FIG. 6

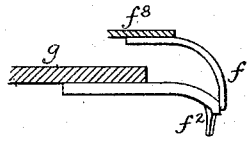



FIG. 7

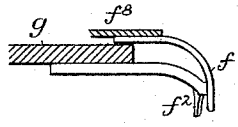



FIG. 3

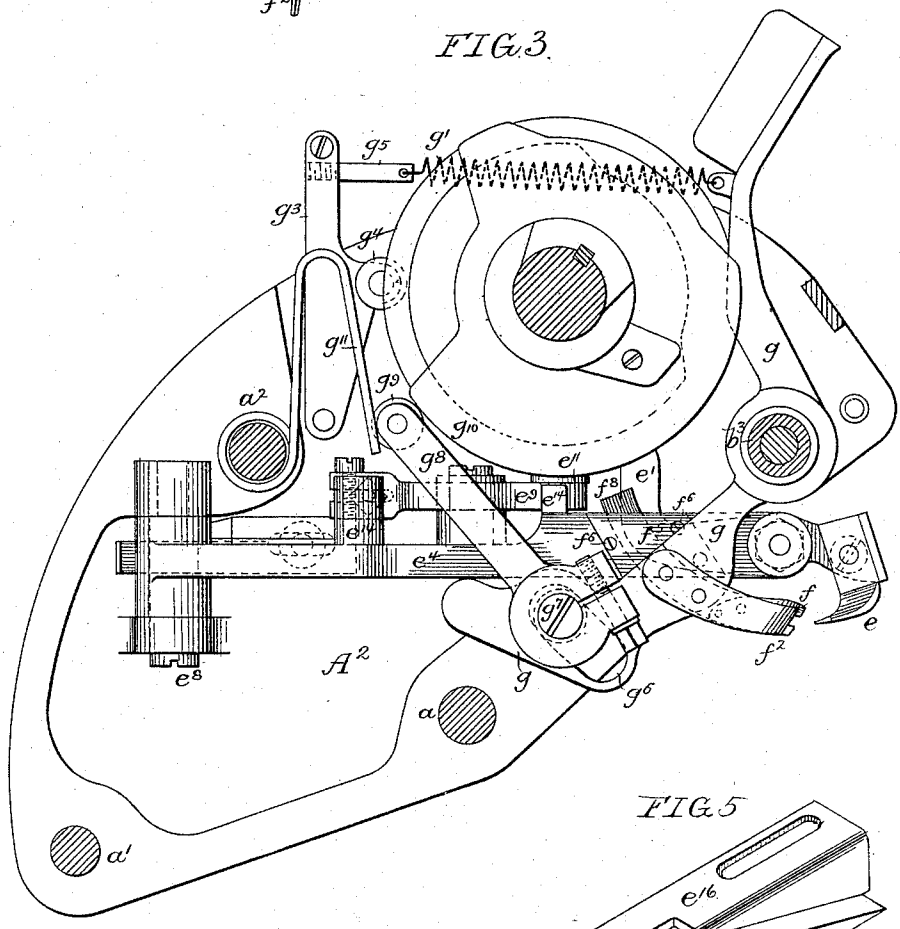
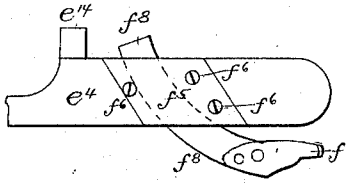



FIG. 5




FIG. 8




Witnesses Hamilton W. Turner
A. V. Groupe

Inventor
Daniel Mills
by his Attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

DANIEL MILLS, OF PHILADELPHIA, PENNSYLVANIA.

## FEEDING MECHANISM FOR BOOT OR SHOE SEWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 477,434, dated June 21, 1892.

Application filed October 6, 1891. Serial No. 407,941. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL MILLS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Work Supporting and Feeding Mechanism for Boot or Shoe Sewing Machines, of which the following is a specification.

My invention relates to improvements in machines whose general character is set forth in my United States Patents Nos. 93,731, 96,944, and 97,951, of 1869; No. 101,644, of 1870, and No. 127,423, of 1872, and English patents No. 1,237 of 1870, Nos. 937 and 2,899 of 1871, No. 4,279 of 1875, and No. 1,160 of 1876.

The machines described in the specifications of said Letters Patent are designed for sewing a welt to the insole and upper, for stitching the outsole to the welt, and also for sewing the soles to the uppers of "turned" shoes, no one of the machines, however, being adapted for the proper performance of all of these different classes of work.

The characteristic features of the mechanism in said machines are a curved needle, which has a reciprocating motion or partial rotation to and fro around an axis and operates either with or without an awl and with a looper, feed-dog, and back or bottom gage, and in the case of the lock-stitch machines with a discoidal bobbin, a hook for carrying the thread over the same, and other devices actuated by suitable cams, the whole of the mechanism being supported in a strong head placed on a stand in such a manner as to permit the work to be properly presented to the sewing mechanism.

The present machine is intended for performing all of the different classes of work before alluded to, the improvements herein described and claimed, however, relating only to the devices for feeding and supporting the work, and comprising a device for readily and quickly changing the length of stitch while the machine is in operation, also a feed back gage mounted so as to perform its functions more acceptably than before, and also a needle back gage used in addition to the feed back gage.

In the accompanying drawings, Figure 1 is a front view of sufficient of the machine to illustrate my present improvements. Fig. 2 is a transverse section of the same. Fig. 3 is a similar view showing some of the other parts of the machine. Fig. 4 is a plan view of part of the feeding mechanism, showing the device for effecting the change in the length of stitch. Fig. 5 is a perspective view of said device detached from the feed-lever. Figs. 6 and 7 are sectional plan views illustrating the relation of the feed back gage and needle back gage, and Fig. 8 is a side view showing part of the feed-lever and the feed back gage secured thereto.

Like letters indicate corresponding parts in each of the figures.

The head is composed of two parts $A'$ $A^2$, fitted and bolted together by bolts $a$ $a'$ $a^2$, the various parts of the operating mechanism being mounted on said head, the sides $A'$ $A^2$ of which have bearings bored or drilled in them for the reception of the main shaft C. The feed-dog is shown at $e$, $f$ being the feed back or bottom gage, $f^2$ the needle back gage, and $g$ the locking-arm for the back gages. The feed-dog lever $e'$ is journaled to turn freely on a bolt $e^2$, carried by the bifurcated front end of the feed-lever $e^4$, the upper end of said feed-dog lever $e'$ being provided with an anti-friction roller $e^5$, which projects into and is controlled by a suitable groove $e^6$ in the cam-disk $B^2$, as shown in Fig. 2. The rear end of the feed-lever $e^4$ is journaled on the stud-screw $e^8$, secured to the part $A^2$ of the frame or head, as shown in Fig. 2, and upon this feed-lever $e^4$ is mounted the stitch-regulating lever $e^9$, which is journaled on the screw-stud $e^{10}$, carried by the feed-lever, the front end of said lever $e^9$ being provided with an anti-friction roller $e^{11}$, actuated by a grooved cam $e^{12}$ in the periphery of the cam-disk $B^3$. The rear end of the stitch-regulating lever $e^9$ is provided with a set-screw $e^{13}$ and the feed-lever $e^4$ has stop-lugs $e^{14}$, one of which serves to limit the movement of the stitch-regulating lever upon the feed-lever in one direction, while the other serves, in connection with the set-screw $e^{13}$, to limit such movement in the opposite direction, so that by adjustment of said set-screw $e^{13}$ the lost motion of the stitch-regulating lever can be increased or diminished and the movement of the feed-lever thus

caused to be as much less than the positive throw of the cam as is required for the amount of feed desired for each stitch. It is occasionally necessary, however, to quickly vary the length of stitch. For instance, when sewing in the shank portion of the shoe the stitch is much longer than in sewing around the fore portion, and as it is usual to begin the sewing at the heel end of the shank at one side of the shoe it is desirable to start with a long stitch and to quickly change from said long stitch to a short stitch in passing from the shank to the fore part of the shoe and back again from a short stitch to a long stitch in passing from the fore part to the shank on the opposite side of the shoe. In order that this may conveniently be done, I provide the feed-lever $e^4$ with a wedge $e^{15}$ for interposition between the short arm of the lever $e^9$ and the corresponding lug $e^{14}$ on the lever $e^4$, so as to reduce the lost motion of the lever $e^9$, and thus cause a longer stroke of the feed-lever as long as the wedge is thus interposed. The wedge $e^{15}$ in the present instance forms part of a plate $e^{16}$, provided with a suitable operating-handle $e^{17}$, projecting at the right-hand side of the machine, said plate being retained in the position to which it is adjusted by reason of the friction of a spring $e^{18}$, interposed between the plate and the head of a set-screw $e^{19}$, carried by the feed-lever $e^4$, as shown in Fig. 4.

The feed back gage $f$ is mounted on an arm $f^8$, which is fitted to work freely in a segmental recess in the side of the feed-lever $e^4$, said segment being concentric with the axis of the needle-lever, as shown in Fig. 2, and the arm is retained in the recess by a cover-plate $f^5$, secured by screws $f^6$. The feed back gage $f$ is bent forward, so as to bear upon the face of the needle back gage $f^2$, as shown in Figs. 6 and 7, said gage $f^2$ being secured directly to and projecting forward from the back-gage-locking lever $g$, which is mounted to turn freely on the outside of the sleeve $b^3$. The upper end of the lever $g$ is connected by a spring $g'$ to a lever $g^3$, which carries an anti-friction roller $g^4$, acted upon by a peripheral cam $g^2$ on the disk $B^2$, so that when the roller is acted upon by the high portion of the cam the lower end of the back-gage-locking lever is pressed forward; but when said roller is acted upon by the low portion of the cam there is no pressure upon the lever $g$. The backward motion of the feed-lever is effected while the awl is in the work and the spring $g'$ of the back gage lever is relieved from pressure, so that there is no bearing of the back gages upon the work, which would tend to pucker the same; but as soon as the rearward movement is completed the lever $g$ is subjected to the tension of the spring $g'$, and the back gages are thereby pressed against the work, so as to properly support it during the feeding movement. The tension of the spring can be regulated by the adjustment of the bolt $g^5$. The lower end of the back-gage-locking lever $g$ is provided with a radial slot $g^6$, through which passes the locking-screw $g^7$, which, by preference, is square-threaded, and screws into a threaded opening in the part $A^2$ of the frame or head. On the inner end of the locking-screw $g^7$ is mounted a lever $g^8$, on the upper end of which is an anti-friction roller $g^9$, which is acted upon by the cam $g^{10}$ on the cam disk $B^2$, and against the upper end of this cam-lever $g^8$ bears one arm of the spring $g^{11}$, whose other arm is attached to the confining-bolt $a^2$ of the frame or head. (See Fig. 3.) When the lever $g^8$ is released from the control of the cam $g^{10}$, the spring $g^{11}$ causes the lever $g^8$ to turn the locking-screw $g^7$ and force a collar $g^{12}$ on the same against the lower end of the back-gage-locking lever $g$ with a force equal to the strength of the spring $g^{11}$, so as to firmly secure said lever $g$ in position in a manner fully set forth in my English patents of 1871 and 1876, before alluded to. The needle back gage $f^2$ occupies a position in line with the needle and in advance of the feed back gage and is recessed for the passage of the needle and awl, as shown in Figs. 2 and 7, this needle back gage being secured to the back-gage-locking lever $g$ and moving with said lever, so as to firmly support the work against the feed-dog while the feeding operation is taking place, thus insuring the firm bite of the feed-dog in the channel formed in the work and resisting the thrust on the work caused thereby and by the projection of the awl through the work and the withdrawal of the needle therefrom.

By mounting the feed back gage $f$ on the feed-lever $e^4$ and making the locking-lever for said feed back gage independent of the latter I am enabled to permit the feed back gage to partake of the feed movement and yet lock it firmly in position when rigidity is necessary. Part of the face of the needle back gage $f^2$ serves as the backing for the feed back gage $f$, the latter traveling on the face of the needle back gage from the position shown in Fig. 6 to that shown in Fig. 7.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In a boot and shoe sewing machine, the combination of the feed-dog and its operating-lever, the feed back gage mounted on said feed-lever, and a locking device for said feed back gage independent thereof, substantially as specified.

2. The combination, in a boot and shoe sewing machine, of the feed-dog and its lever, the feed back gage having a segmental arm fitted in a segmental recess in said lever concentric with the axis of vibration of the needle, and a back-gage-locking lever independent of the gage, substantially as specified.

3. In a boot and shoe sewing machine, the combination of the pivoted feed-lever having a stud, the regulating-lever, one arm of which is acted upon by the feed-cam and the other arm provided with a regulating set-screw for acting on the stud of the feed-lever, and a sliding wedge for interposition between the regu-

lating-lever and stud to quickly change the extent of lost motion between the feed-lever and regulating-lever independently of the adjustment of the set-screw, substantially as specified.

4. The combination of the feed-lever and its studs, the regulating-lever and its set-screw, the feed-cam, the stitch-controlling wedge, the plate carrying the same and mounted on the feed-lever, and the set-screw and spring for retaining said wedge in its adjusted position, substantially as specified.

5. The combination of the feed-dog, the feed-lever, the feed back gage carried by said lever, the needle back gage located in advance of the movable feed back gage, and the back-gage-locking lever, substantially as specified.

6. The combination of the feed-dog, the feed-lever, the feed back gage carried by said lever, the back-gage-locking lever, and a needle back gage located in advance of the feed back gage and providing a bearing therefor, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANL. MILLS.

Witnesses:
EUGENE ELTERICH,
HARRY SMITH.