C. S. CUSHMAN.
Sewing-Machine.

2 Sheets—Sheet 1.

No. 209,026. Patented Oct. 15, 1878.

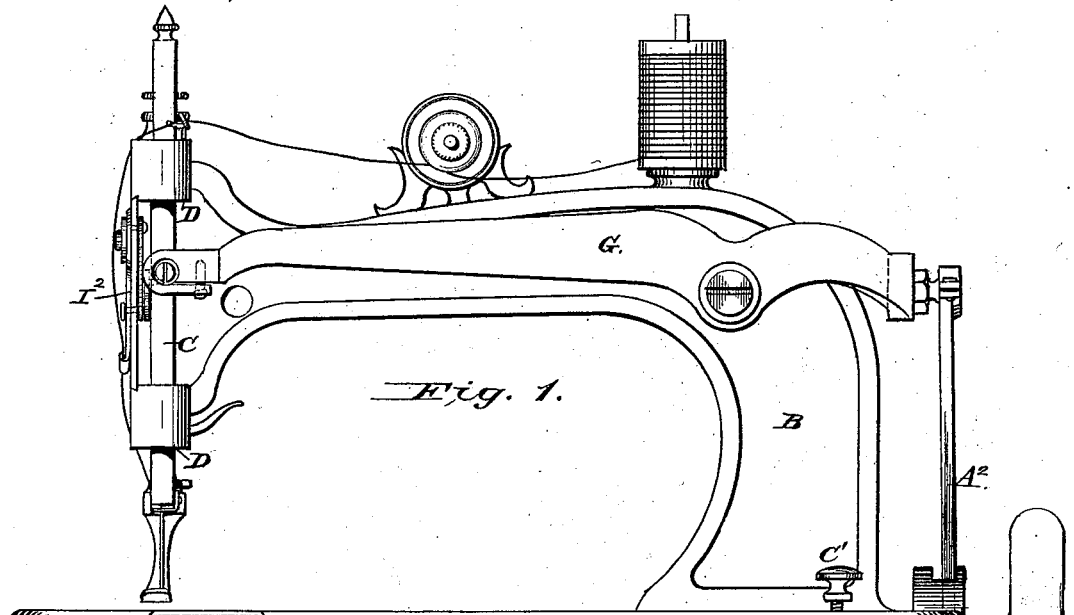



Fig. 1.

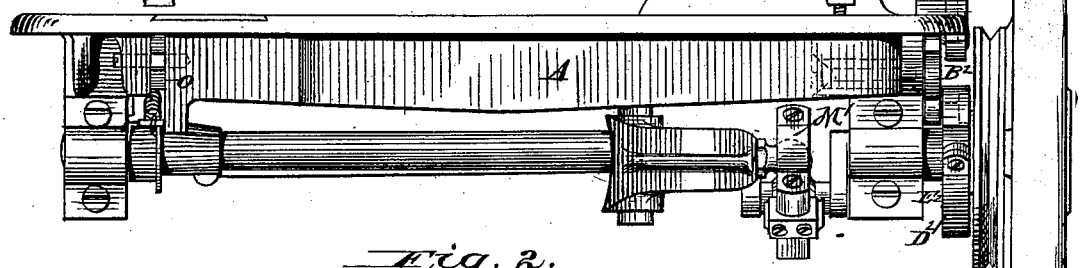
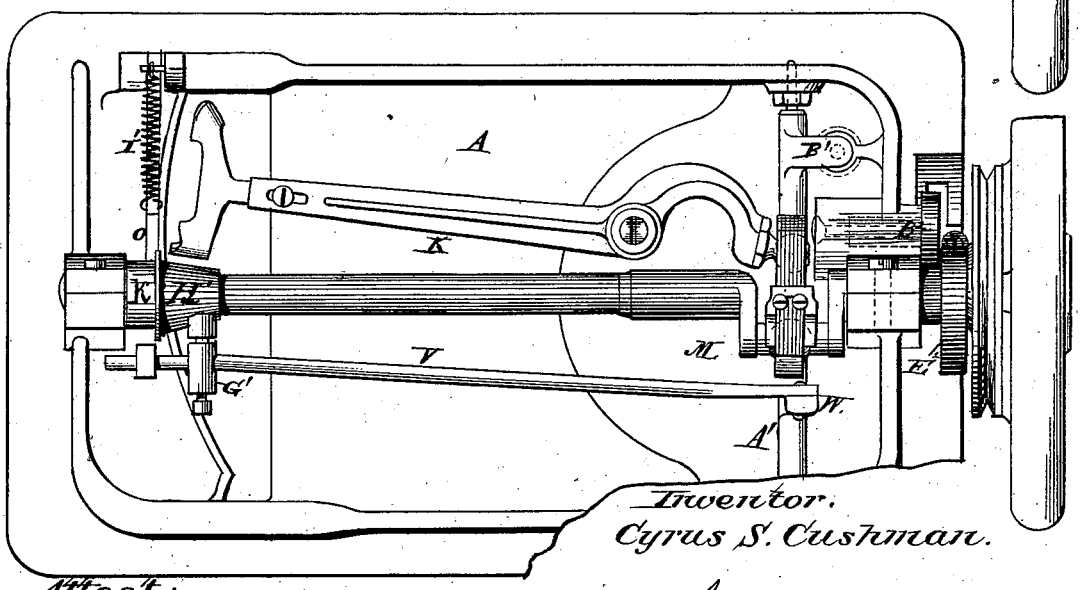



Fig. 2.




Inventor.
Cyrus S. Cushman.

Attest:
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J. A. Rutherford

By James L. Norris,
Atty.

2 Sheets—Sheet 2.

# C. S. CUSHMAN.

## Sewing-Machine.

No. 209,026. Patented Oct. 15, 1878.

Fig. 6.

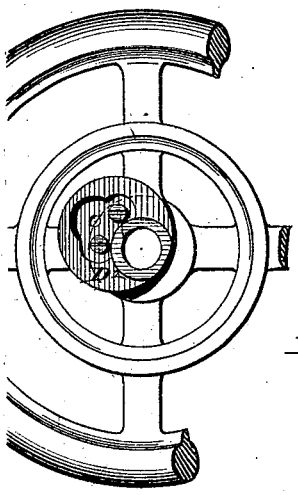


Fig. 3.

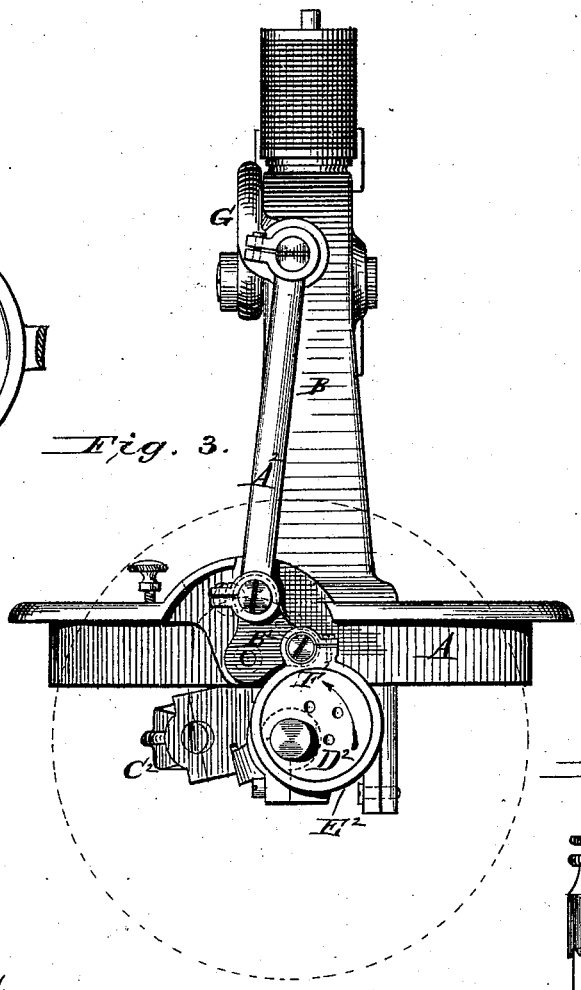



Fig. 4.

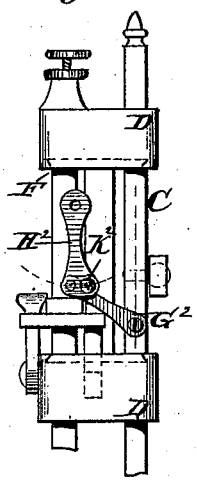
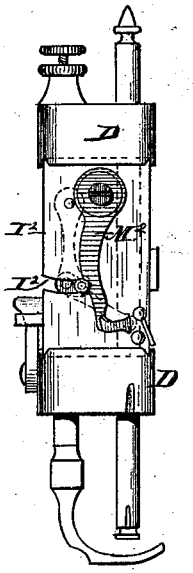



Fig. 5.

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Inventor.
Cyrus S. Cushman.
By James L. Norris Atty.

# UNITED STATES PATENT OFFICE.

CYRUS S. CUSHMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO NESBITT D. STOOPS, OF SAME PLACE.

## IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **209,026**, dated October 15, 1878; application filed May 25, 1878.

*To all whom it may concern:*

Be it known that I, CYRUS S. CUSHMAN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification:

This invention relates to certain improvements in sewing-machines; and it has for its object to prevent the strain upon the needle-thread during the passage of the shuttle through the loop of the same, whereby all danger of the breaking of said thread is avoided.

To this end my invention consists in the combination, with the driving-shaft of a sewing-machine, of a horizontal shuttle-operating lever, the short arm of which oscillates in a plane below the axis of said shaft, and which is connected to a crank thereon by means of a link equal in length to the throw of the crank and the needle-bar and needle-bar lever, the latter being connected, by means of a link, to a triangular lever pivoted to the bed of the machine, said triangular lever having pivoted to it an eccentric-strap embracing an eccentric on the driving-shaft, whereby a dip is given to the needle to form the loop for the passage of the shuttle, the shuttle-lever and needle-bar lever being operated by their respective mechanisms to accelerate the passage of the shuttle through the loop formed by the dip of the needle, as more fully hereinafter set forth.

In the drawings, Figure 1 represents a side elevation of the machine with parts broken away, showing portions of the working mechanism in section; Fig. 2, a bottom view thereof. Fig. 3 represents a rear elevation of the machine with the driving-wheel removed, showing the eccentric, triangular lever, needle-bar lever, and connecting-rod in the proper positions to give the needle-bar its full down-stroke. Fig. 4 represents a vertical section through the head of the standard, showing the mechanism for operating the take-up; and Fig. 5 represents a front view of said head, showing the take-up arm attached to its front, and the mechanism for operating the same in dotted lines.

The letter A represents the bed of the machine, and B the standard which supports the upper works. C represents the needle-bar, mounted in ways D at the end of the standard, and E the presser-foot bar, mounted in similar ways F, as usual. The letter K represents a lever pivoted to the lower side of the bed A, by means of which the shuttle-carrier is actuated. The said lever is carried downwardly at its rear end, forming a short arm, which lies and oscillates in a horizontal plane below the axis of the driving-shaft, said short arm being connected to a crank, M, on the driving-shaft by a link, $M^1$, of a length equal to the throw of the driving-shaft. By this means an accelerated movement is given to the shuttle during its passage through the loop formed by the dip of the needle, as more fully hereinafter explained.

The letter O represents the feed-dog, which is secured to the forward end of a rod, V, the other end of which is secured to an arm, W, extending downwardly from a rock-shaft, $A^1$. Said rock-shaft is provided with a horizontal arm, $B^1$, against which the end of a set-screw, $C^1$, is adapted to bear, by means of which said rock-shaft may be shifted to regulate the throw of the feed-dog and determine the length of the stitches. The forward end of the bar V is provided with an adjustable rider, $G^1$, which bears against an irregular cam, $H^1$, on the driving-shaft, by means of which a forward motion is imparted to the bar V and the feed-dog, the return motion of said feed-dog being effected by means of a spring, $I^1$. The letter $K^1$ represents a cam mounted on the driving-shaft, and bearing against the lower side of the feed-dog, by means of which a vertical movement is imparted to said dog.

The above-mentioned parts of the machine form no part of my present invention, but are simply described in order to better illustrate my present improvements, which are hereinafter described.

The letter G represents the lever which actuates the needle-bar, which is connected at its rear end by means of a rod or link, $A^2$, to a triangular lever, $B^2$, pivoted at $C^2$ to the rear of the bed of the machine. The upper end of said rod or link is secured to the lever G by means of a ball-and-socket joint, and its lower end is pivoted to the lever $B^2$.

The letter $D^2$ represents an eccentric, secured to the driving-shaft in manner shown at Fig. 6, and $E^2$ a strap embracing said eccentric, and provided with a projection, $F^2$, which is pivoted to the triangular lever $B^2$, by means of which an oscillating motion is imparted to said lever as the driving-shaft is rotated. The lever G, its rod $A^2$, and the lever $B^2$ are so arranged relatively to each other that, when the needle-bar is at its full downstroke, the rear end of the lever G, the pivot by which its link or rod is secured to the lever $B^2$, and the pivot by which said lever is secured to the machine, will all be in line with each other, as shown in Fig. 3. As the driving-wheel is carried forward the upper end of the lever $B^2$ will pass forward, throwing the parts out of line, slightly depressing the rear end of the lever G, so as to elevate the needle-bar sufficiently to form the loop. The return movement of the lever $B^2$ then commences, carrying the parts back and returning the needle-bar to its full downstroke, the shuttle passing through the loop of the needle-thread during the downward movement or second dip of the needle. After the shuttle has passed through the loop the eccentric gives the needle-bar its proper upward stroke.

The letter $G^2$ represents a link pivoted to the needle-bar C at one end, and at the other to a link, $H^2$, pivoted to the front plate $I^2$ of the standard-head. Said link $H^2$ is provided with a projection or pin, $K^2$, extending through a curved slot, $L^2$, in the plate $I^2$, the said pin abutting against the take-up arm $M^2$. The link $H^2$ receives an oscillating motion through the medium of the link $G^2$ as the needle-bar is reciprocated, moving the take-up arm in one direction, its return movement being effected by means of a suitable spring.

I make no claim in this application to the take-up and its operating mechanism.

What I claim is—

In combination with the driving-shaft of a sewing-machine, the horizontal shuttle-operating lever, the short arm of which oscillates in a plane below the axis of said shaft, and which is connected to a crank thereon by means of a link equal in length to the throw of the crank and the needle-bar and needle-bar lever, the latter being connected, by means of a link, to a triangular lever pivoted to the bed of the machine, said triangular lever having pivoted to it an eccentric-strap embracing an eccentric on the driving-shaft, whereby a dip is given to the needle to form the loop for the passage of the shuttle, the shuttle-lever and needle-bar lever being operated by their respective mechanisms to accelerate the passage of the shuttle through the loop formed by the dip of the needle, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of the subscribing witnesses.

CYRUS S. CUSHMAN.

Witnesses:

JAMES L. NORRIS,

JAS. A. RUTHERFORD.