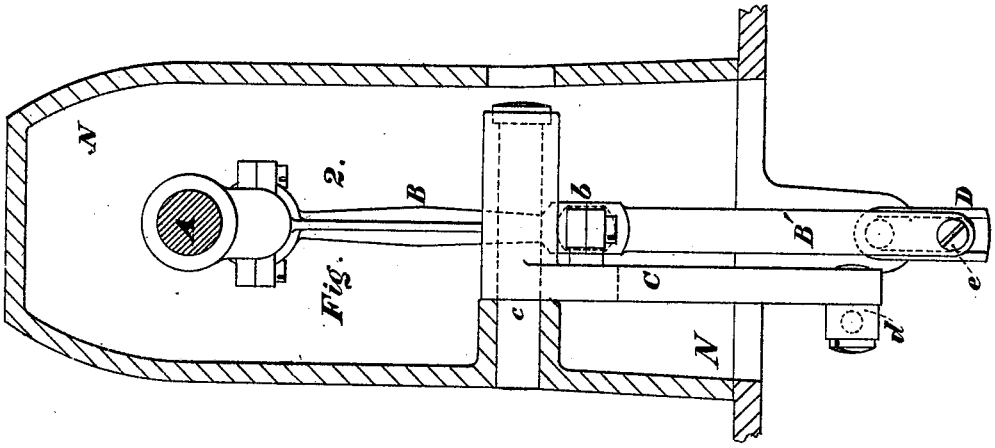
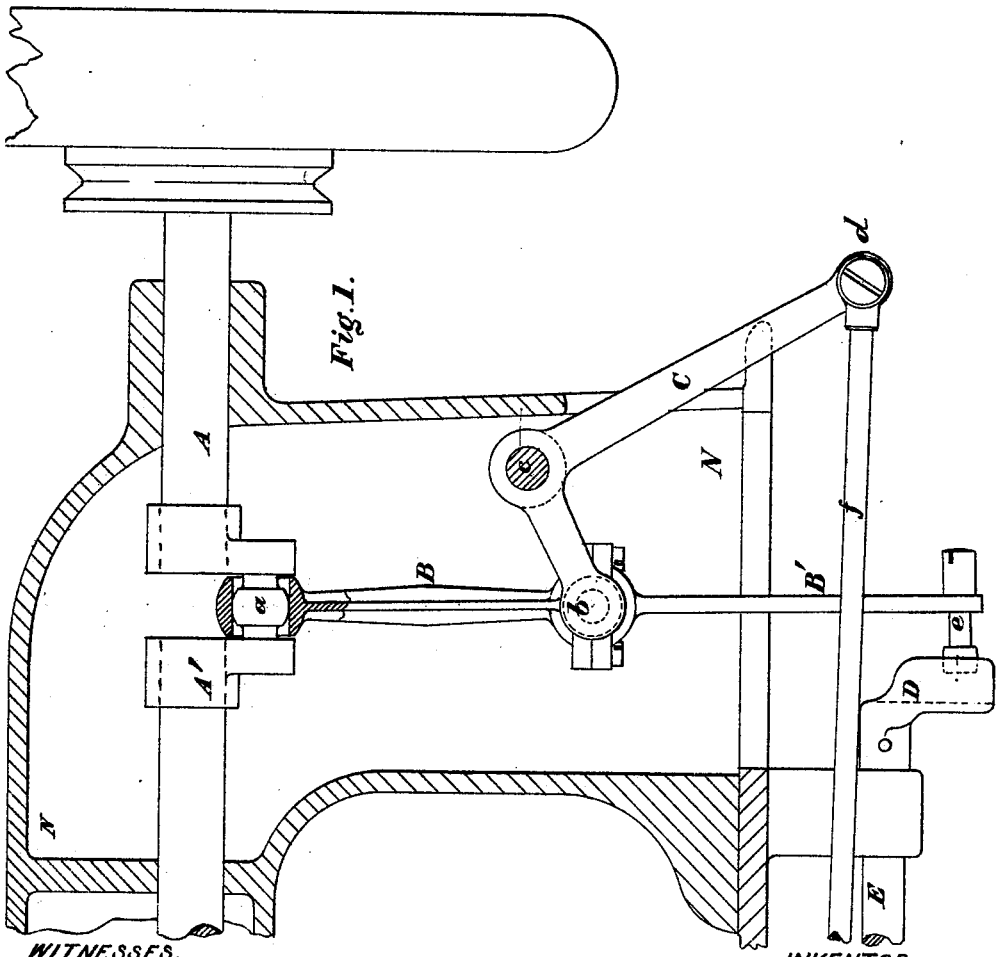
3 Sheets—Sheet 1.

T. A. MACAULAY.

Sewing-Machines.

No. 195,939. Patented Oct. 9, 1877.





WITNESSES.

Fred. Jordan

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INVENTOR.

Thos. A. Macaulay

3 Sheets—Sheet 2.

T. A. MACAULAY.

Sewing-Machines.

No. 195,939. Patented Oct. 9, 1877.

Fig. 3.

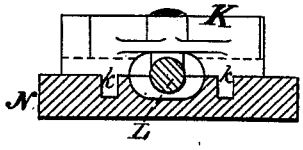


Fig. 4.

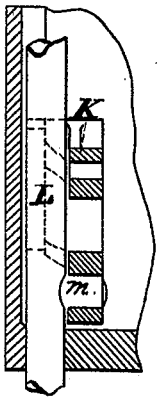
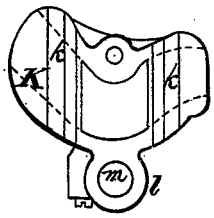


Fig. 5.



Witnesses.
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C. Dueacone

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3 Sheets—Sheet 3.

T. A. MACAULAY.

Sewing-Machines.

No. 195,939. Patented Oct. 9, 1877.

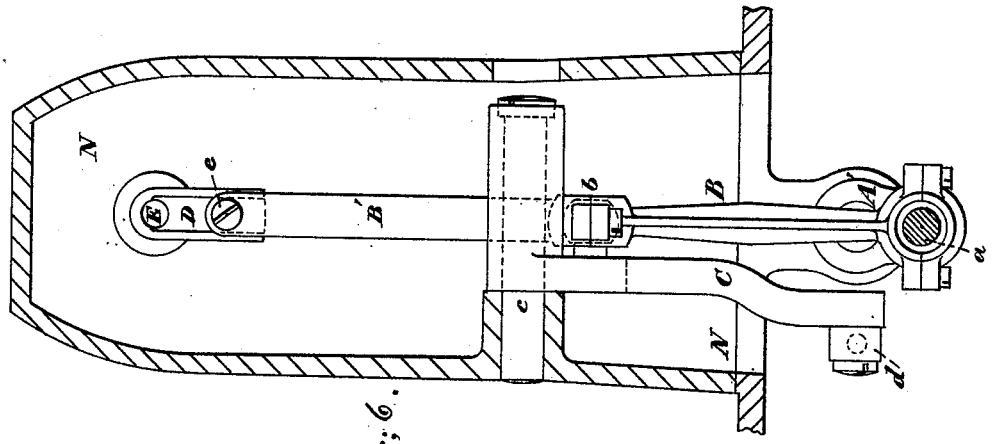

Fig: 6.

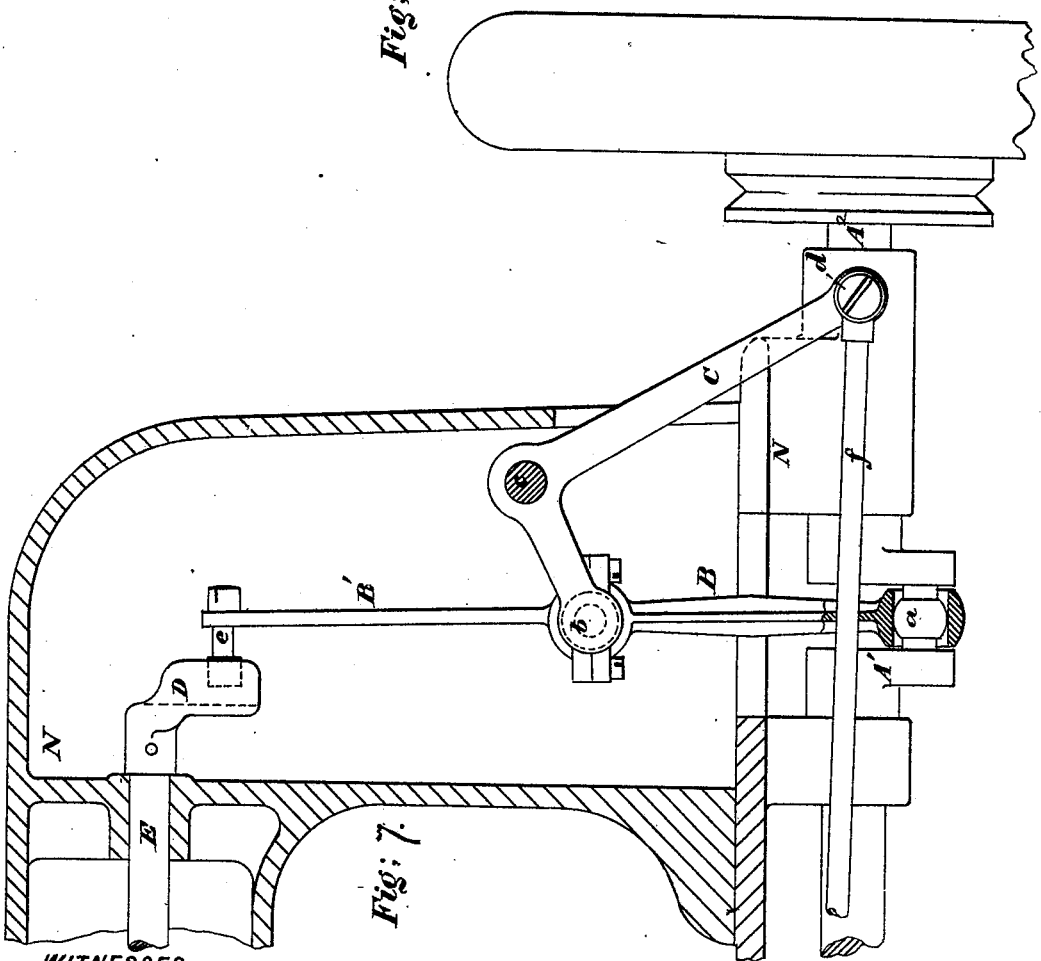

Fig: 7.

WITNESSES,

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UNITED STATES PATENT OFFICE.

THOMAS A. MACAULAY, OF NEW YORK, N. Y.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **195,939**, dated October 9, 1877; application filed May 16, 1874.

To all whom it may concern:

Be it known that I, THOMAS A. MACAULAY, of New York, in the county and State of New York, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification:

The first part of my invention relates to a device for communicating motion to the shuttle and the feed. The said device consists in a pitman operated by a crank on the main shaft, and communicating with a bell-crank lever, the plane of whose axis of oscillation is at right angles to the main shaft, the shuttle-carrier being operated by a rod connected with the extremity of the bell-crank lever, and the feed being operated by a shaft deriving rotation from a wrist mounted on the extremity of a rigid extension of the pitman, which derives a compound vertical and horizontal movement from the motion of the crank-shaft. The particular improvement in this part of my invention consists in mounting the bell-crank lever on an axis at right angles to the plane of the main shaft, as aforesaid, and constructing the crank-arm of the feed-shaft, and the wrist which actuates it, so as to permit the movement of the latter relatively to the former, both vertically and longitudinally, as hereinafter described.

The second part of the invention consists in guiding the heart-cam yoke, by which the needle-bar is operated, in the manner hereinafter described, so as to prevent any lateral strain or wear upon the needle-bar.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of the standard and elbow portion of the hollow arm of a sewing-machine, showing the mechanism for operating the shuttle and feed in elevation. Fig. 2 is a vertical transverse section of the same. Fig. 3 is a plan view of the heart-cam yoke, showing the needle-bar and the head of the machine in section. Fig. 4 is a vertical longitudinal section of the same, showing the needle-bar in elevation. Fig. 5 is an inner face view of the heart-cam yoke. Figs. 6 and 7 are, respectively, a vertical transverse section and a longitudinal section, illustrating a modification or inversion in the relative arrangement of the operating mechanism.

N N, Plate 1, Fig. 1, is the frame or body of the machine. A is the main shaft; A^1, the crank; *a*, crank-pin; B, pitman; B′, an extension of the same. C is a bell-crank lever; *c*, a bolt on which C is suspended. *b* is a ball-pin. D is a slotted crank on shaft E. *d* is a pin in lower end of C, for connecting the shuttle-driving rod *f*.

The shaft A being rotated, the crank A^1 gives motion to the pitman B, which simultaneously moves the bell-crank lever C, (imparting a reciprocating motion to the shuttle-carrier, through the medium of the rod *f*,) and turns the shaft E, which operates the feed.

It will be observed that the extended pitman B B′, oscillating on the center *b* as a fulcrum, imparts a horizontal motion to the wrist *e*, in a plane perpendicular to the crank-shaft, so as to avoid any dead-center in turning the shaft E.

It will further be observed that, as the bell-crank lever C oscillates on an axis, *c*, at right angles to the crank-shaft, a reciprocating motion is necessarily imparted to the wrist *e* in planes coincident with the crank-shaft A. I thus transfer the point of compensation required by the varying movements of the shaft-driving and feed mechanism to that part of the apparatus which actuates the feed, and hence locate the friction, which is unavoidable in such compensating mechanism, in the parts which have the least motion. To this end the crank-arm D of the shaft E is constructed with a long and deep slot, as indicated by the dotted lines in Fig. 1, so that the extremity of the wrist *e* may advance and recede in a direction longitudinal to the shaft without escaping from the crank-arm D, on which it acts.

Figs. 6 and 7 show my improved mechanism inverted, the shaft A^2 being the first mover, while the top shaft E, that moves the needle-bar, is rotated by the lever B at the same time that it operates the bell-crank lever C, which operates the shuttle by means of the rod *f*.

The top shaft, as shown in Fig. 7, may be an oscillating shaft, if deemed more desirable.

Figs. 3, 4, and 5 represent my improved mechanism for communicating motion to the needle-bar from the driving-shaft A. K is a heart-cam yoke, constructed with ribs *k k*, projecting from its face, fitting in grooves of corresponding shape in the face-plate *n*′. L is a needle-bar. *m* is a pivot connecting the needle-bar to the heart-cam yoke. *l* is a projection on the

heart-cam yoke which receives the pivot *m*. By pivoting the heart-cam yoke to the needle-bar, and constructing it with a rib or ribs fitting in corresponding grooves in the face-plate, the needle-bar is effectually relieved and protected from any lateral or transverse strain, all such strain or pressure being taken up by the guides and the face-plate.

I am aware that a bell-crank lever has been used heretofore in sewing-machines for operating the shuttle, and I do not wish to be understood as broadly claiming the bell-crank lever. I desire to claim the use of a bell-crank lever so far only as it is used as a fulcrum for a feed-actuating device, which may be a rotating shaft, a rock-shaft, or an oscillating lever.

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

1. The combination, with the crank-shaft A, of the pitman B, bell-crank lever C, pitman-extension B′, pin *e*, shaft E, and open-slotted crank-arm D, constructed as herein shown and described, to permit the endwise motion of the pin *e*, due to the oscillation of the fulcrum *b* on the center *c*.

2. The combination, with the grooved face-plate and needle-bar, of the pivoted heart-cam having lips entering the grooves in the plate, substantially as described.

THOS. A. MACAULAY.

Witnesses:

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C. DUVEUX.