2 Sheets--Sheet 1.

G. W. HUNTER.

Sewing-Machines.

No. 143,766. Patented Oct. 21, 1873.

Fig. 1.

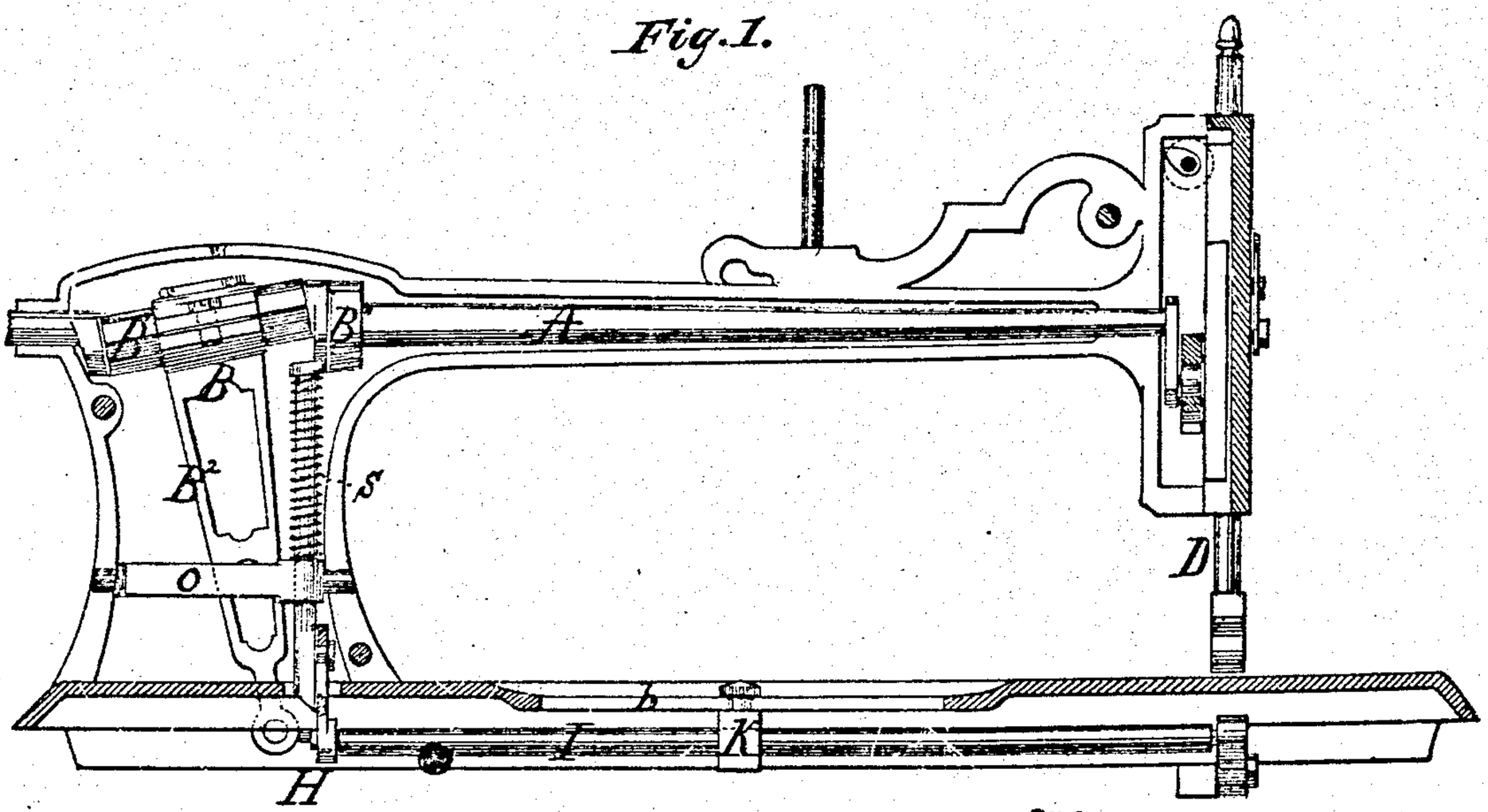


Fig. 2.

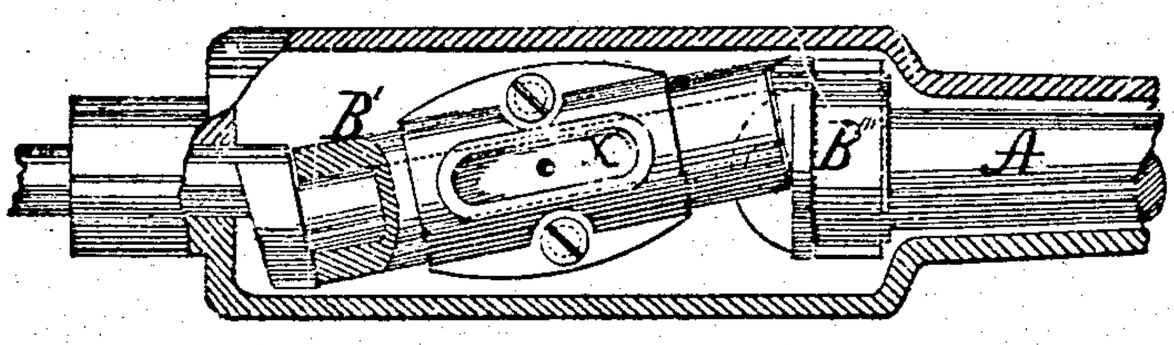
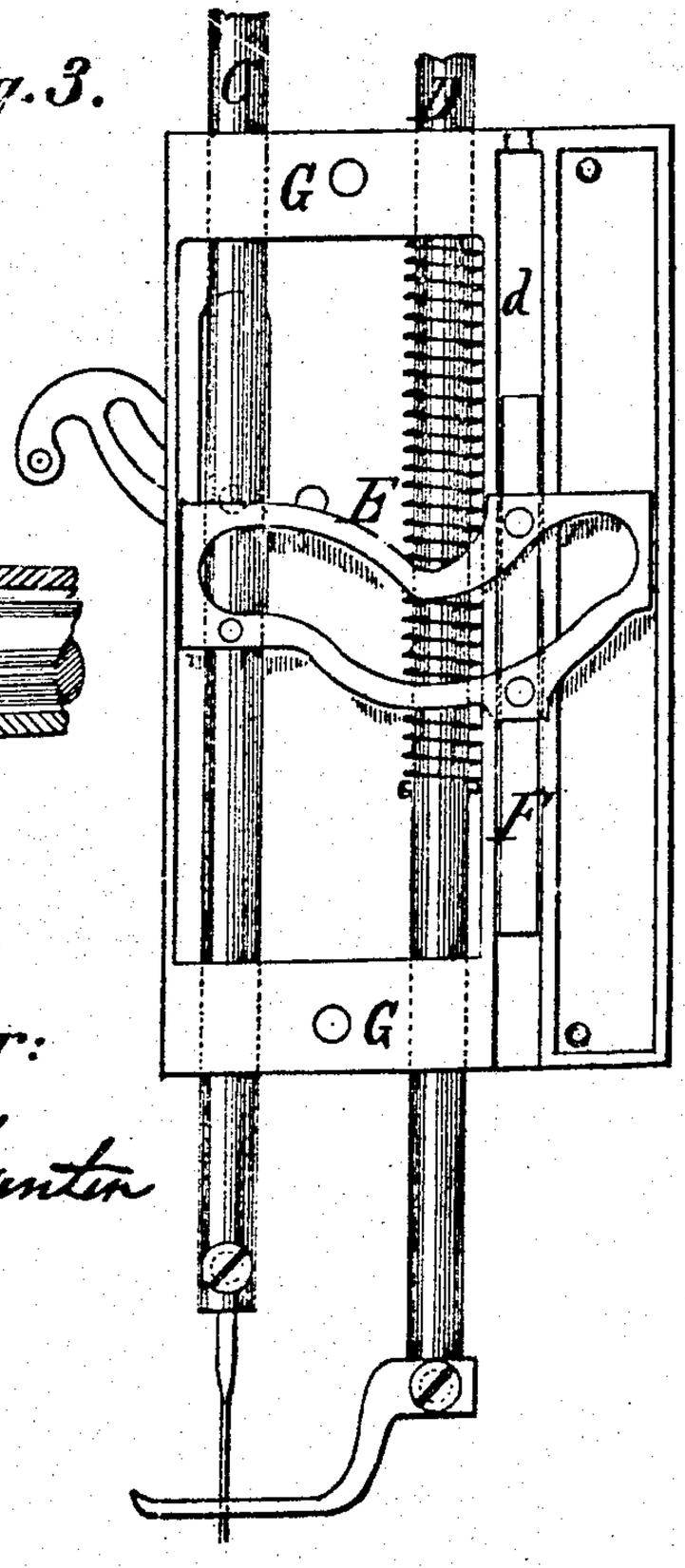


Fig. 3.



Witnesses:

Wm. F. Stone

L. Poole

Inventor:

Geo. W. Hunter

2 Sheets--Sheet 2.

G. W. HUNTER.
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Fig. 4.

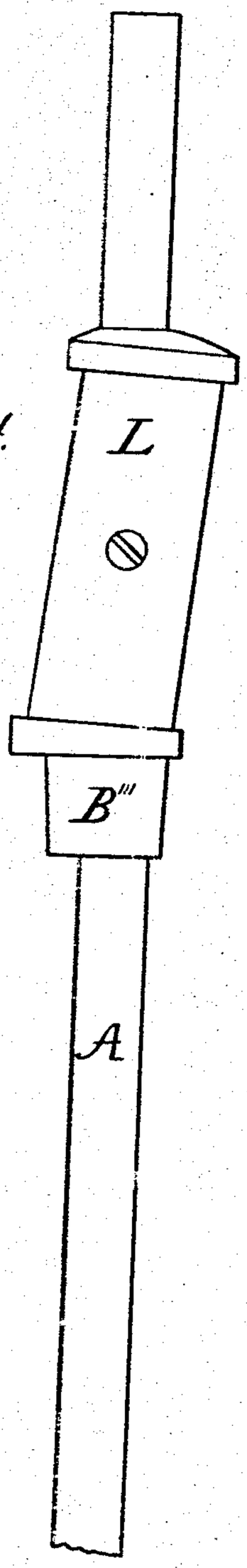
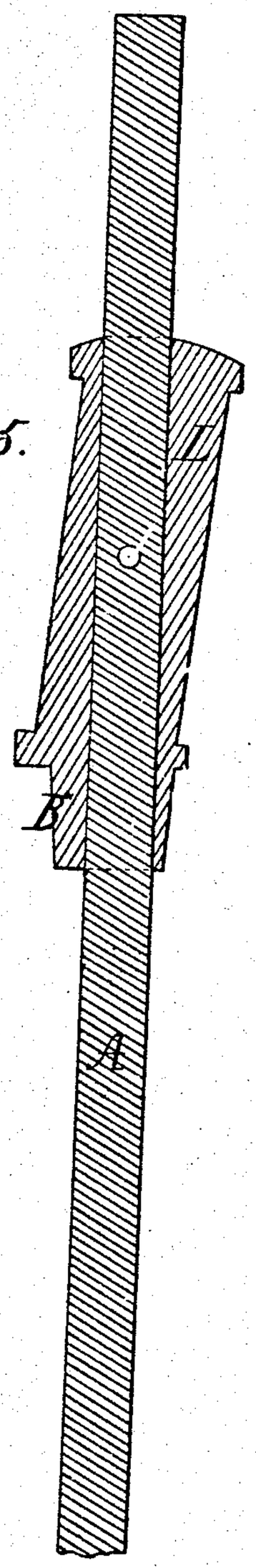


Fig. 5.



Witnesses.
Wm. F. Stone
Jos. H. Vermilye

Inventor.
Geo. W. Hunter

UNITED STATES PATENT OFFICE.

GEORGE W. HUNTER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF PART OF HIS RIGHT TO WM. F. STONE, HENRY M. BAKER, AND JAMES H. VERMILYE, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **143,766**, dated October 21, 1873; application filed June 7, 1873.

To all whom it may concern:

Be it known that I, GEO. W. HUNTER, of the city of Washington, District of Columbia, have invented a new and useful Improvement in Sewing-Machines, of which the following is a specification:

My invention consists of an improvement in the mode of operating any ordinary four-motion feed, the parts intermediate between the operation-surface and the driving-shaft being so constructed and arranged, substantially as hereinafter described, that a single adjustment will regulate the length and the rise of the feed simultaneously. It consists, also, of an improved mode of connecting the vibrating arm that operates the shuttle-carrier, and the cam that operates the feed, with the driving-shaft, through the medium of an angularly-bored cylindrical sleeve, whereby great facility in the assembling of the parts and great cheapness and simplicity are secured. It consists, finally, in a special arrangement of the needle-bar and the cam by means of which the power of the driving-shaft is applied thereto.

In the accompanying drawings, Figure 1 is a side elevation of the operative parts, the frame being shown in sections. Fig. 2 is a top view of the bent or crank shaft and sleeve or socket of the vibrating arm which operates the shuttle-carrier, the frame being cut horizontally. Fig. 3 is an inside plan of the face-plate, showing the needle-bar, its cam, and the presser-foot, and in position. Fig. 4 is an elevation of the driving-shaft, in which the inclined bearing for the vibrating arm that operates the shuttle-carrier, as well as the cam that operates the feed mechanism, is furnished by means of an angularly-bored sleeve properly secured to the straight shaft. Fig. 5 is a longitudinal section of the shaft thus constructed.

Referring to the figures of the drawings, A represents the main driving-shaft of the machine, which, in the form shown in Fig. 1, is cast with an inclined section, upon which is adjusted the head of the vibrating arm B^2. A cam, B''', is also formed upon this main shaft, this cam serving, in the manner hereinafter explained, to communicate the requisite motion to the feed. The end of the main or driving shaft is provided with a crank-pin, as shown in Fig. 1, for operating the needle-bar. B^2 is the vibrating arm which operates the shuttle-carrier, this vibrating arm being secured to the inclined part of the main or driving shaft by means of a sleeve or socket cast in two parts, B and B^1. The joint between these two parts of the sleeve is made on a horizontal plane, both for convenience of manufacture, and, also, so that the parts may be ground down to compensate for the wear of the parts, which takes place mainly in a vertical direction, or at the top and bottom of the sleeve. These two sections of the sleeve are fastened together by means of screws passing through the lugs cast upon the sections for this purpose. The upper section, B^1, of the socket is provided with a cup or recess, *x*, through which a hole leads to the shaft, and by means of which the bearing is conveniently lubricated through a perforation in the top of the frame leading thereto.

The shuttle-carrier is operated through the medium of the vibrating arm B^2, as in my patent bearing date September 3, 1872.

The feed mechanism consists of the cam B''' upon the driving-shaft; the feed-lever I, to the outer end of which the roughened-surface feed or dog (not shown in the drawings) is attached; the movable fulcrum K, upon which this feed-lever is supported; a connecting-rod, which is forked at its upper end to embrace the cam B''', and which, at its lower end, is attached to the inner end of the feed-lever; the bar O, through which the connecting-rod passes, and which serves as a fulcrum for such connecting-rod; and the spring S, which rests upon the bar O, and serves to maintain the contact of the forked head of the connecting-rod with the cam upon the driving-shaft.

The feed-dog may be connected with the lever I in any suitable manner. I prefer, however, to use a bar placed at right angles with the lever I, one end of such bar being connected with the outer end of said lever, and the other end of it supported in a loop or way, in or on which it may play trans-

versely of the bed-plate of the machine. In this way the roughened surface or dog, which is attached to the upper side or edge of this bar, is made to partake of the vertical and transverse movement of the outer end of the lever I, and thereby feed the goods with which it comes in contact.

Instead of the forked head of the connecting-rod, held in contact with the cam by means of a spring, as shown in Fig. 1, this rod might be provided with a yoke that would entirely embrace the cam, in which case the spring could be dispensed with. I prefer, however, to use the construction shown in Fig. 1, as the parts work more smoothly and with less noise.

The base or bed plate of the machine is provided with a straight longitudinal slot, through which passes the shank of a thumb-screw, which enters the movable fulcrum K. By means of this screw the movable fulcrum may be adjusted at any desired position along the entire length of the slot. It is plain to see that, according as the fulcrum is placed nearer to the point of connection of the feed-lever with the connecting-rod, both the length and the "rise" of the feed will be increased thereby, and vice versa.

G G represent the face-place, in which the needle-bar C and presser-foot stock are adjusted. This plate is provided with a groove, *d*, in which a guide, F, of the cam E works. The cam E and its guide may be made in one piece, if desired. Said cam may be connected to the needle-bar in any suitable manner; but in all cases, according to my present invention, it should be connected at or near the end nearest the operator, by which arrangement the downward stroke of the needle-bar is facilitated, inasmuch as the power of the driving-shaft is thrown upon the needle-bar above the line of its axis at the very time when it is necessary that this bar should move with the least friction, viz., at the time when the needle is just entering the goods. From this arrangement of the needle-bar relatively to the slotted cam and the crank-pin, whereby the needle-bar is placed near the edge of the face-plate which is next to the operator, it follows that the thread may be brought down squarely from the tension device to the eye of the needle in front of the operator without turning a corner, as is the case in other transverse-shuttle machines.

As shown in Figs. 1 and 3, the driving-shaft is cast in one piece, the inclined section and the cam being continuous with the plain portions thereof. The preferred mode of construction is to make this shaft cylindrical throughout, as shown in Figs. 4 and 5, and then, by means of a screw, key-spline, or by any other usual device adapted therefor, secure to it an angularly-bored cylindrical sleeve, L, provided with a cam for operating the feed, and with the requisite collars for guiding the movement of the arm that operates the shuttle-carrier. The object of this mode of construction is convenience and economy of manufacture. By means of it, it no longer becomes necessary (as where the shaft and sleeve are made in one part) to make the frame in sections in order to effect the assembling of the parts. The frame may now be cast in one piece, and the vibrating arm B^2 fitted together and inserted in position through the opening in the bottom of the frame, and then the main operating-shaft A may be passed through the outside of the frame, and through the cylinder L, after which said cylinder is secured to the shaft, as above described. By this construction, too, the angularly-bored sleeve and the vibrating arm B^2 may, if desired, be made in one piece.

What I claim is the following:

1. The combination of the cam upon the driving-shaft, the forked connecting-rod, provided with its spring and fixed fulcrum, and the feed-lever, provided with its adjustable fulcrum, substantially as and for the purpose set forth.

2. The combination of the straight driving-shaft A, the vibrating arm B^2, and the angularly-bored cylindrical sleeve L with its attached cam B''', for operating the shuttle and the connecting-rod of the feed mechanism, substantially as shown and described.

3. The combination of the needle-bar, the slotted cam, and cam-guide, when arranged substantially as shown and described, so that the needle-bar may be caused to move near that side of the needle-head which is next to the operator.

GEO. W. HUNTER.

Witnesses:
JAS. H. VERMILYE,
WM. P. REDDEN.