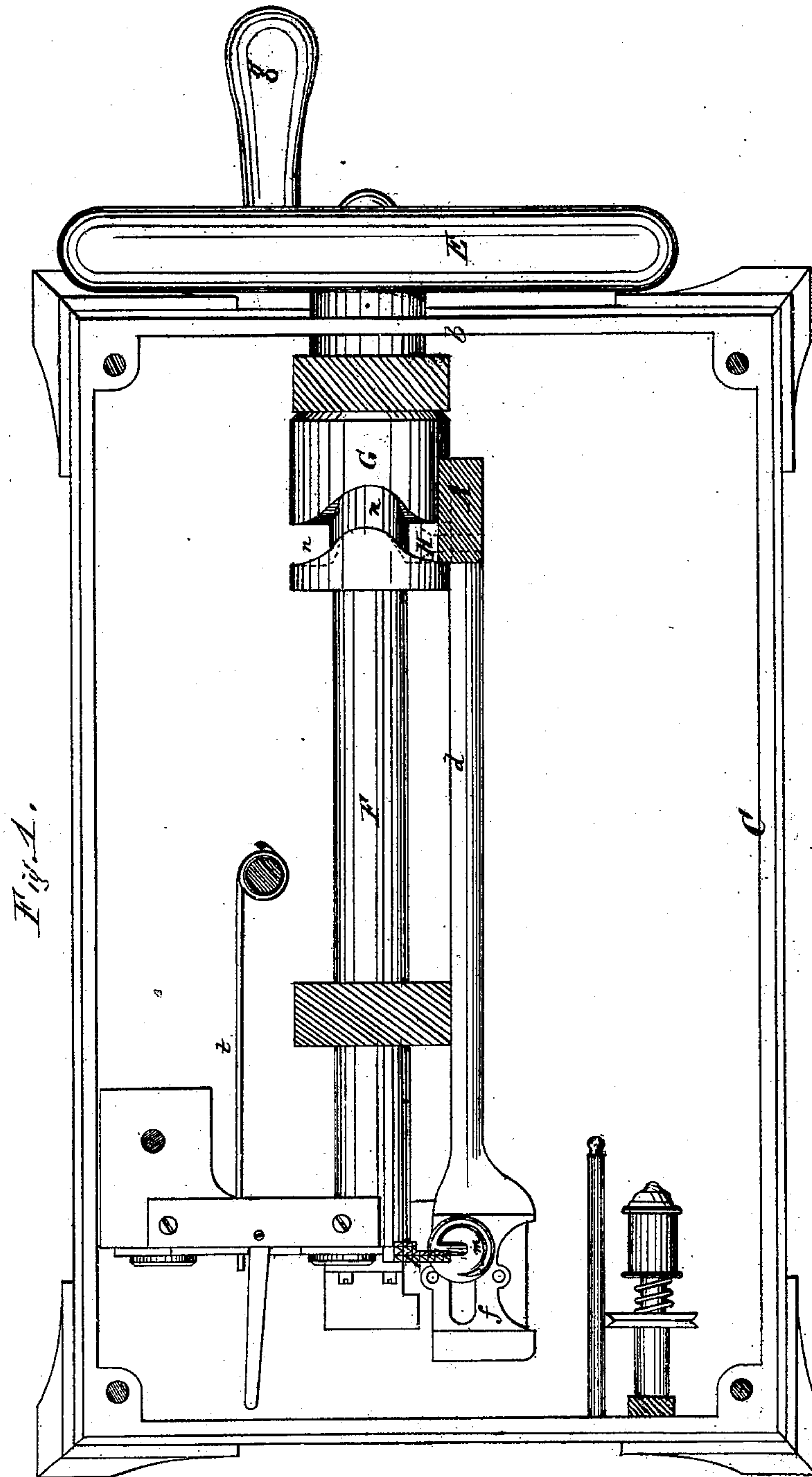


W. O. GROVER.  
Sewing Machine.

No. 100,139.

Patented Feb. 22, 1870.



Witnesses  
John Reithbone Jr  
W. L. Bennett

Inventor.  
W. O. Grover  
by his atty.  
C. S. Kemmick

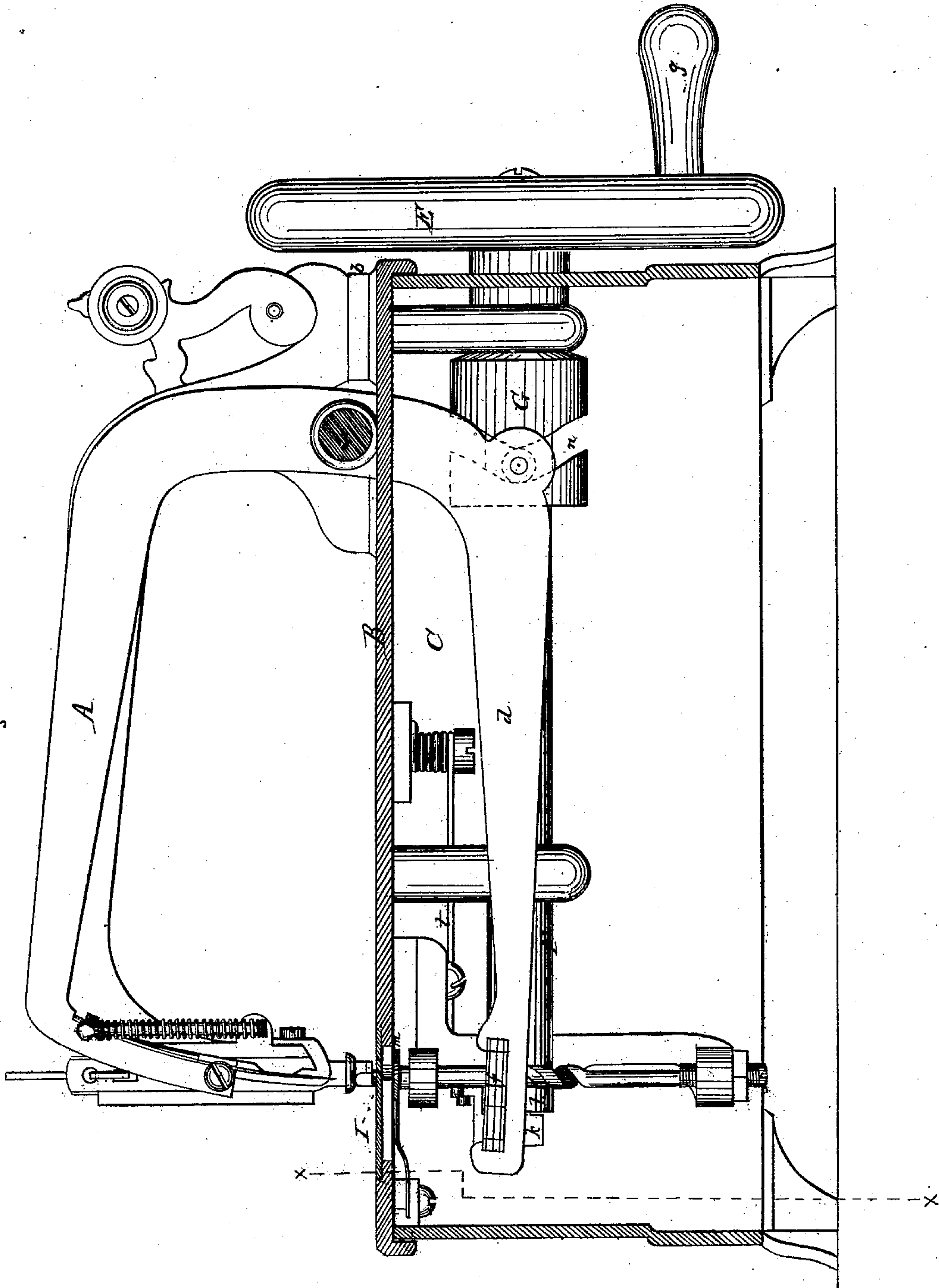
W. O. GROVER.  
Sewing Machine.

3 Sheets—Sheet 2.

No. 100,139.

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Fig. 2.



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by his attorney  
C. L. Kemwick

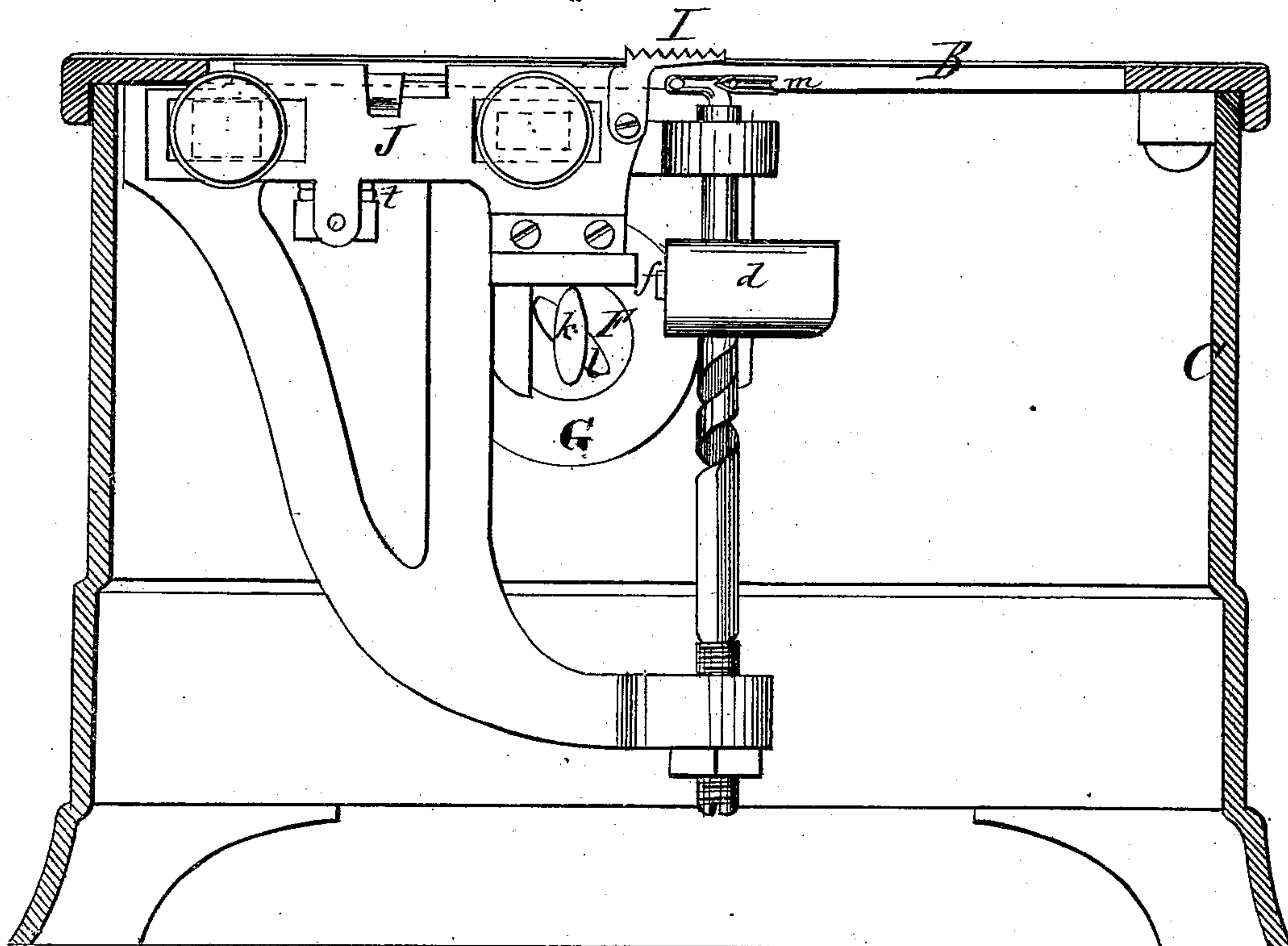
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*Fig. 3.*



Witnesses.  
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Inventor.  
W. O. Grover  
by his atty  
C. S. Penwick



# United States Patent Office.

WILLIAM O. GROVER, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 100,139, dated February 22, 1870.

## IMPROVEMENT IN SEWING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

### To all whom it may concern:

Be it known that I, WILLIAM O. GROVER, of Boston, in the State of Massachusetts, have made an invention of certain new and useful Improvements in the Construction of Sewing-Machines, and that the following is a full, clear, and exact description and specification of the same.

The object of my invention is to enable the driving-power to be applied to a sewing-machine at the side thereof which is behind the axis of the needle-arm, while the needle-arm and the looper are constructed to operate substantially as those instrumentalities operate in the Grover & Baker family sewing-machines now in common use.

To this end my invention consists of the combination of the following three instrumentalities, viz:

First, a vibrating double-headed arm, which operates the needle from above the table of the sewing-machine, and also extends beneath the said table, and is connected with a vibrating looper so as to operate it.

Second, a driving-shaft arranged with its axis parallel or thereabouts with the plane of vibration of the said vibrating arm.

Third, a vibrating eye-pointed looper to interchain a second thread with the thread carried by the needle.

My invention consists further of the combination of the aforesaid three instrumentalities with a reciprocating toothed advancing-instrument for moving the cloth or material to be sewed past the needle.

My said new combinations are embodied in the sewing-machine represented in the accompanying drawings—

Figure 1 representing a plan of the machine with the bed-plate and parts above it removed;

Figure 2 representing a vertical longitudinal section of the machine; and

Figure 3 representing a vertical transverse section of the box-stand at the line  $x x$  of fig. 2, showing parts of the machine beneath the bed-plate.

In the said machine the needle is carried by a double-headed vibrating arm, A, which is constructed with a rock-shaft,  $e$ , that is arranged to vibrate upon centers secured to the bed-plate B.

One branch,  $d$ , of this arm extends beneath the bed-plate, and carries at its front end the driver  $f$ , by means of which motion is imparted to a vibrating eye-pointed looper,  $m$ , which is secured to the upper end of the spirally grooved arbor upon which the driver  $f$  operates.

The construction of the looper and of the mechanism for imparting motion to it from the double-headed vibrating arm A are the same as in the ordinary Grover & Baker family sewing-machines in general use, and therefore need not be more particularly described.

The driving-shaft F extends under the bed-plate, and its axis is parallel with the plane of vibration of the arm A.

The cam G, for operating said arm, is secured to this driving-shaft, and the pin H, by which motion is imparted from the cam to the vibrating arm, projects laterally from the said arm into the groove  $n$  of the cam. The stem of the pin is fitted with a friction-wheel or bowl in the usual manner.

The cam groove  $n$  in this instance is so formed as to cause the vibrating arm A to make two complete double vibrations for each revolution of the cam, but this construction of the cam groove forms no part of the invention.

The front end of the driving-shaft F has two cams  $k l$  secured to it, for the purpose of imparting motion to the advancing-instrument I of the sewing-machine, one of said cams ( $k$ ) operating to raise said instrument and to permit it to descend, and the other cam ( $l$ ) operating to move said instrument horizontally in one direction, a spring,  $t$ , being applied to move it horizontally in the opposite direction, so that the said instrument has a reciprocating motion imparted to it.

The operating surface of the advancing-instrument is roughened by small teeth, in the usual manner, and the construction of the stock J of said instrument and its appurtenances are, in this instance, the same as the corresponding parts of the Grover & Baker family sewing-machine.

The driving-shaft F extends beyond the side  $b$  of the machine, which is behind the rock-shaft  $e$ , whose axis is the axis of vibration of the needle-arm A, and the projecting extremity of the driving-shaft is fitted with a fly-wheel, E, to one of the arms of which a crank-handle,  $g$ , is secured for the purpose of enabling the machine to be operated by hand.

If the machine is to be operated by power, the crank-handle is removed, and a pulley is secured to the outer side of the fly-wheel or to the extremity of the driving-shaft to receive the driving-belt.

The bed-plate B forms the top of a box, C, which contains all the parts of the machine that require protection, and forms a convenient case by which they are protected from injury, and it also sustains the fly-wheel E at such a height above the legs of the box-stand that the machine may be set upon any ordinary table and operated by hand.

Having thus described a sewing-machine embodying my invention, I declare that I do not now claim severally the separate instrumentalities of which my combinations are composed, but what I claim as the invention to be secured by these Letters Patent is—

The combination and arrangement of the double-headed vibrating arm, the driving-shaft, having its axis arranged parallel to the plane of vibration of said arm, and the vibrating eye-pointed looper, the

whole constructed to operate substantially as before set forth.

Also, the combination and arrangement of the double-headed vibrating arm, the driving-shaft, having its axis arranged parallel to the plane of vibration of said arm, the vibrating eye-pointed looper, and the reciprocating toothed advancing-instrument, the

whole constructed to operate substantially as before set forth.

In testimony whereof, I have hereto set my hand this 3d day of March, 1869.

Witnesses:

W. O. GROVER.

JAMES H. BROWN,  
JAMES C. WADE.