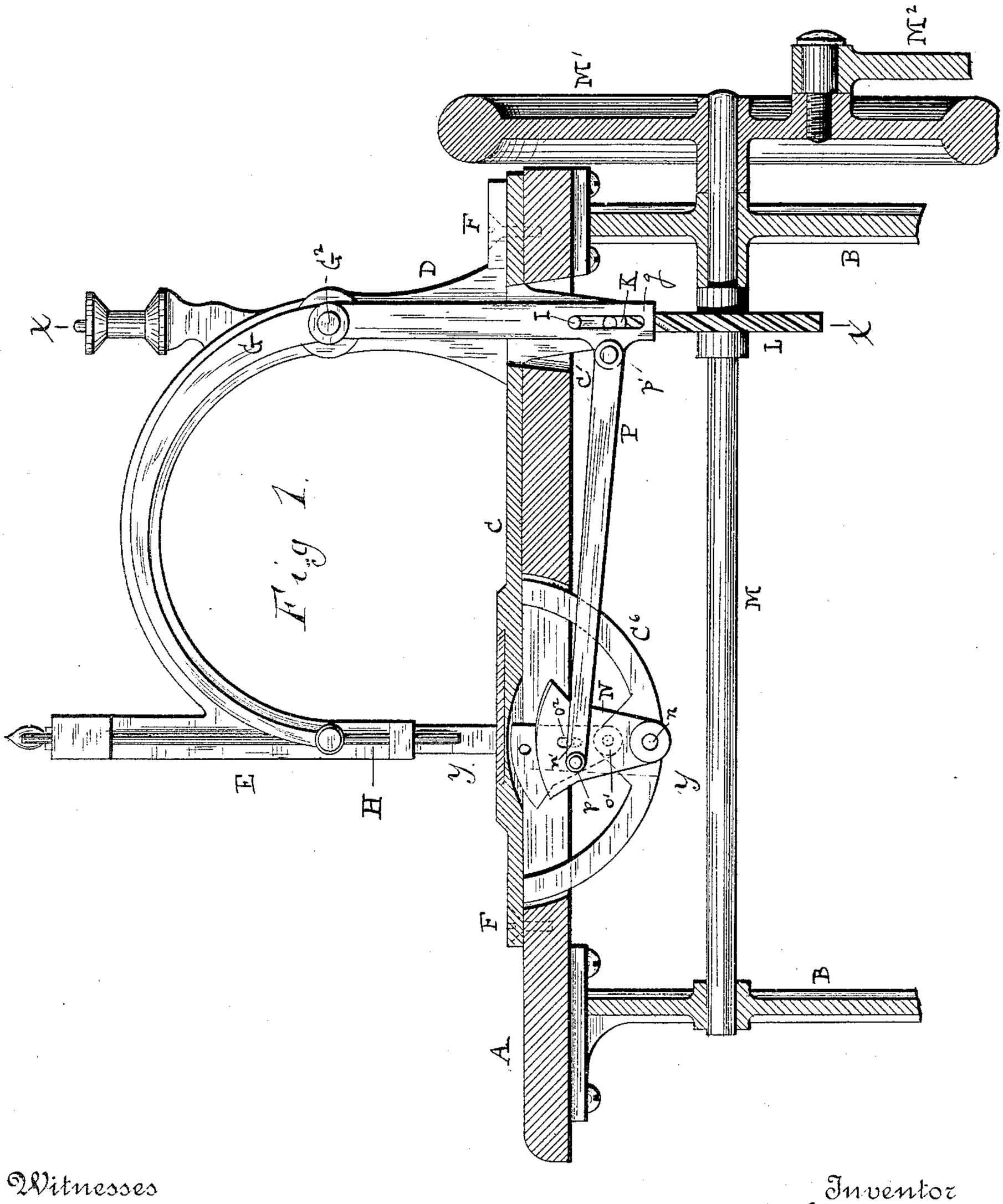
(No Model.) 2 Sheets—Sheet 1.

C. R. SQUIRE.

SEWING MACHINE.

No. 432,957. Patented July 22, 1890.



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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

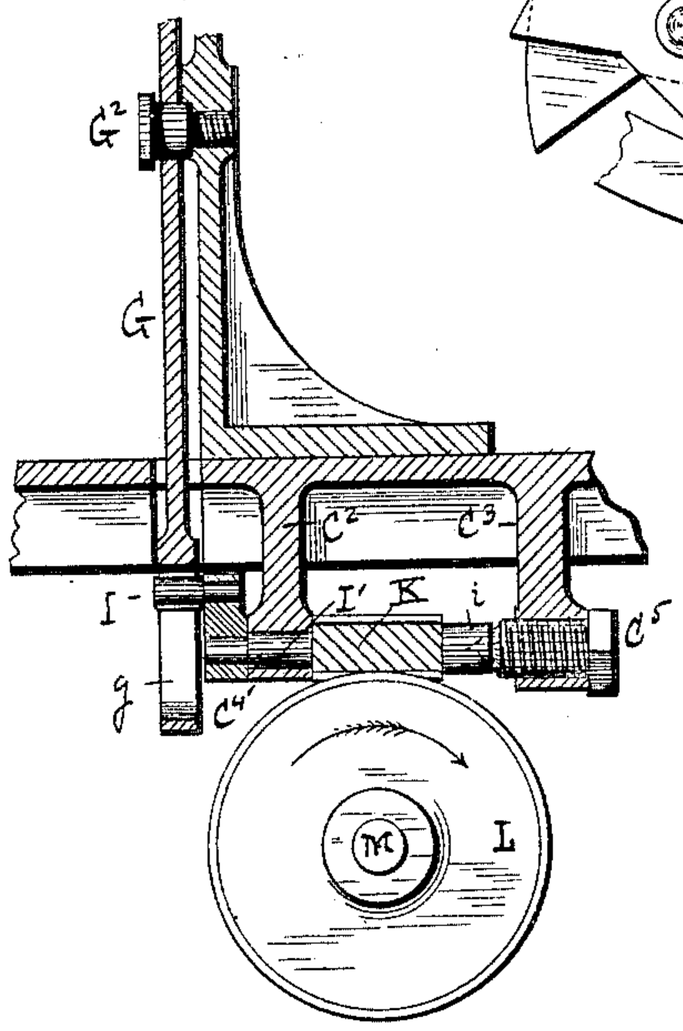


Fig. 3.

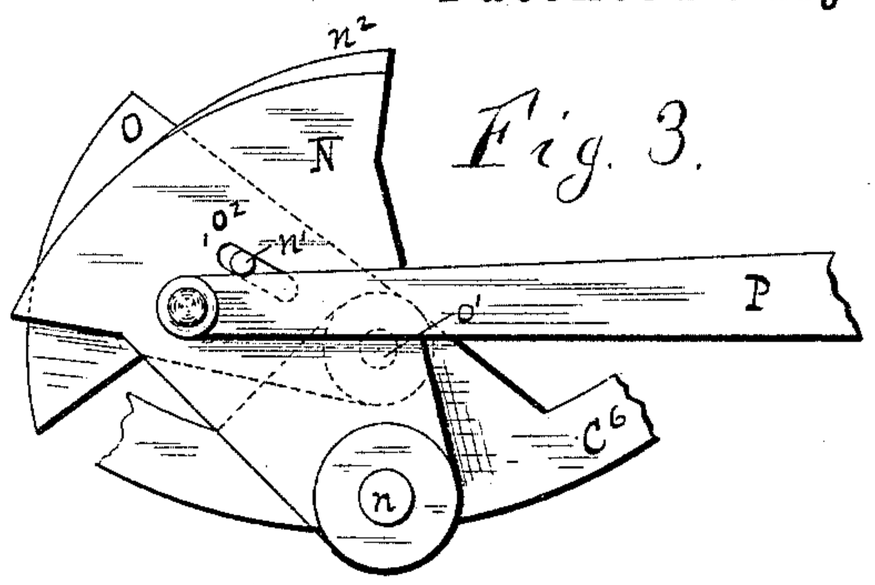


Fig. 4.

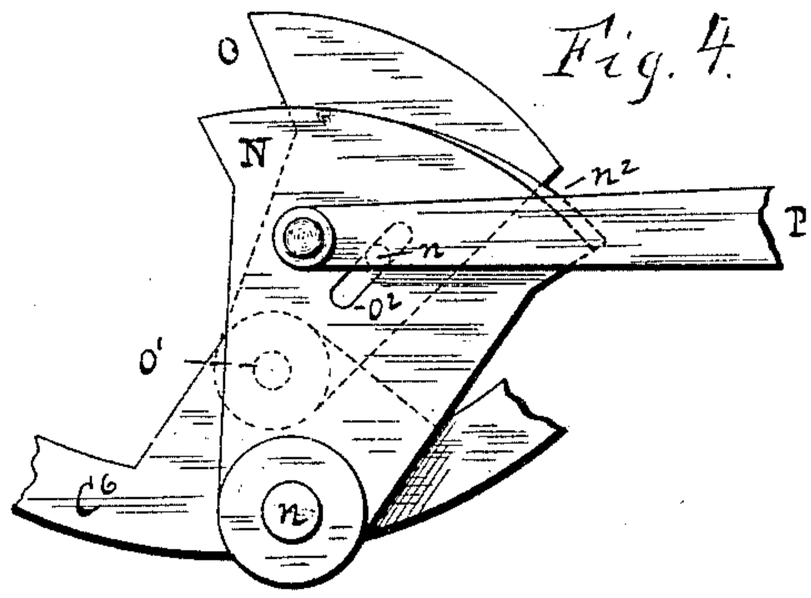


Fig. 5.

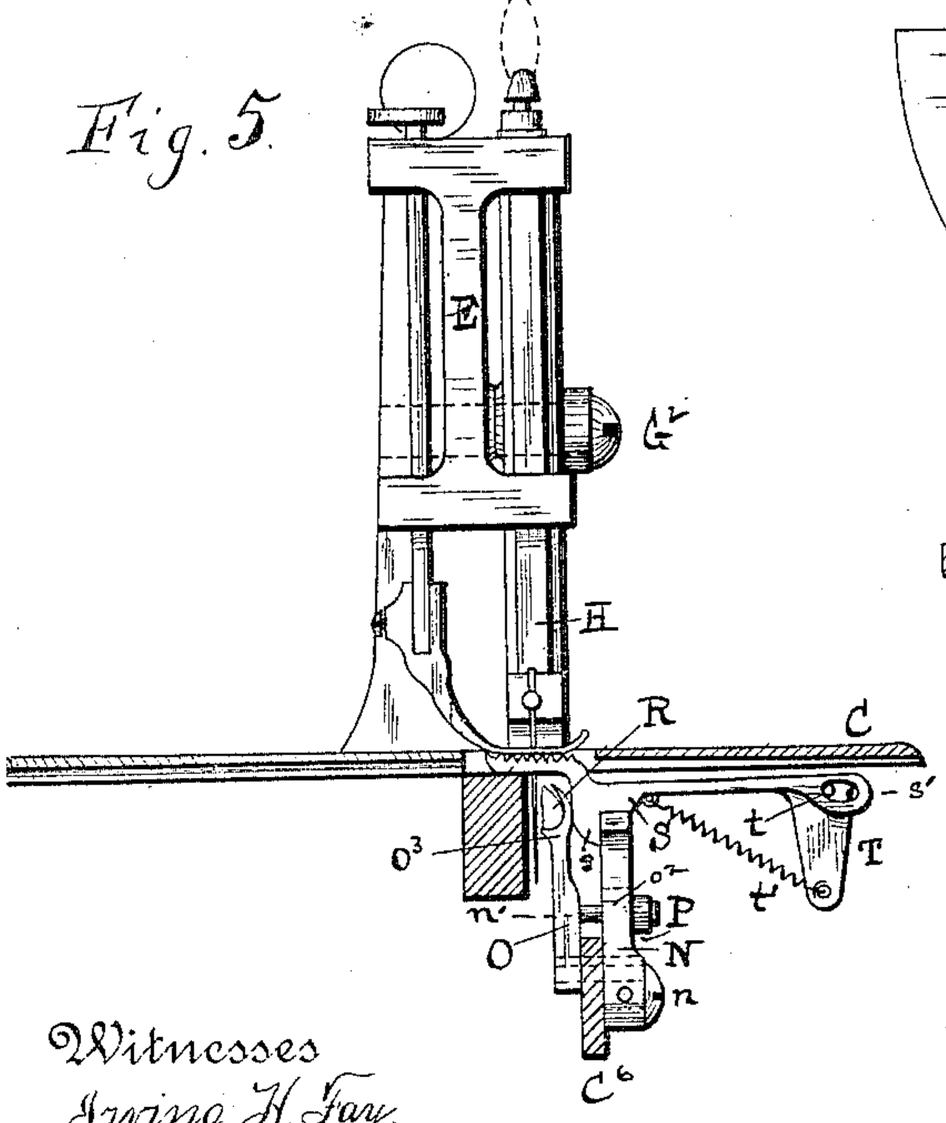


Fig. 6.

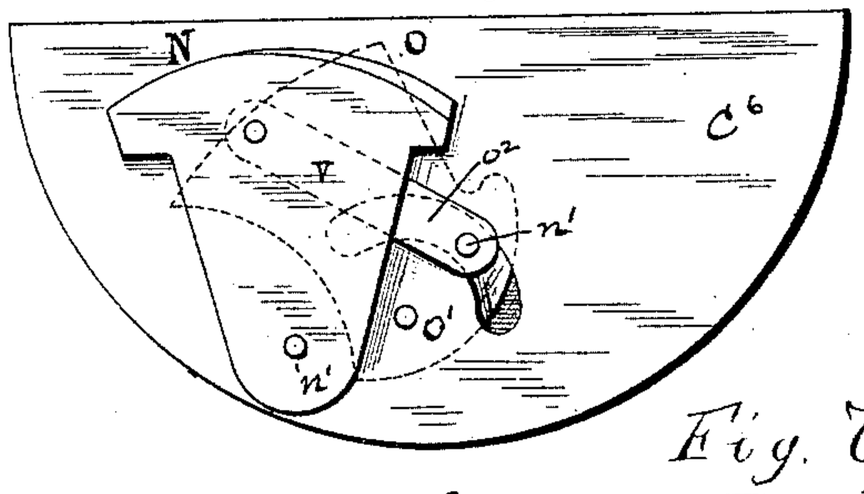
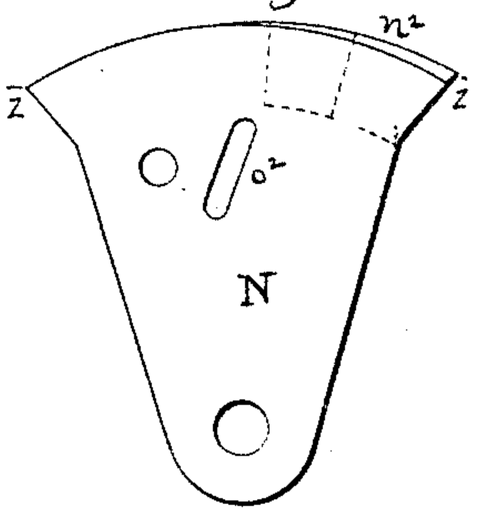


Fig. 8.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,957, dated July 22, 1890.

Original application filed August 31, 1887, Serial No. 248,383. Divided and this applicatication filed August 26, 1889. Serial No. 322,020. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. SQUIRE, of the city of Brooklyn, in the county of Kings, in the State of New York, have invented a certain new and useful Improvement in Sewing-Machines; and I declare the following to be a specification thereof, reference being had to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a front elevation, partly in vertical section, of such parts of a sewing-machine as embody my invention. Fig. 2 is a transverse vertical section on the line *x x* of Fig. 1. Figs. 3 and 4 show in front elevation the feed and shuttle carriers at the end of their forward and backward movements, respectively, and the link operating the same with a differential motion. Fig. 5 is an end elevation with the bed-plate in vertical section on line *y y* of Fig. 1. Fig. 6 shows a modified form of the feed-carrier and shuttle-carrier and their intermediate connection. Fig. 7 is a side elevation of the feed-carrier. Fig. 8 is a cross-section on line *z z* of Fig. 7.

My invention relates to mechanism for giving a differential or variable motion to the feed-carrier and shuttle-carrier of a sewing-machine.

The sewing-machine to which said invention is specially adapted is the subject-matter of my pending application for Letters Patent, Serial No. 248,383, and it has instead of a driving-belt a device consisting of a worm-wheel rigidly mounted upon the main driving-shaft and gearing with a worm mounted on a shaft at a right angle with said main shaft, which worm, by means of a crank-pin at its end and an intermediate connection, moves forward and backward a link-bar, thereby giving an oscillating movement to a pivoted feed-carrier and a differential movement to a pivoted shuttle-carrier, which is connected with said feed-carrier by a pin-and-slot arrangement. My said pending application fully describes said invention; but said application is divided, and this present application relates to the means for giving a variable or differential oscillation to said carriers in relation to each other.

My invention consists of a pivoted feed-carrier mounted on a fixed bracket beneath the bed-plate, a shuttle-carrier having a shorter radius than that of the feed-carrier, and which is pivoted on said bracket at a point higher up than the pivot of the feed-carrier, and loose connecting means between said carriers, whereby motion is imparted to the shuttle-carrier from the feed-carrier, the latter being oscillated by a link-bar from the lower extremity of the needle-arm, as hereinafter particularly specified.

As the several parts of my improved sewing-machine illustrated in the drawings are fully specified in my said pending application, they need only to be briefly described here.

A represents the table, and B the legs, of the sewing-machine.

C is the bed-plate, cut away at C′ to allow the lower end of the needle-bar to extend through it. It is fastened to the table A by bolts F. The pitman M^2 of a treadle revolves the wheel M′ in the well-known manner. The wheel M′ is rigidly fastened upon the main shaft M, which is mounted upon the legs B of the machine. A worm-wheel L is secured upon the main shaft M and turns with it.

The bed-plate C has hangers C^2 C^3 projecting downwardly. A shaft I′ is mounted within a bearing C^4, formed in the hanger C^2, and at its rear end has a central conical recess *i*, into which enters a screw-bolt C^5, which passes through the hanger C^3 and engages with said recess *i* to furnish a bearing for the shaft I′ at that end, and to take up the lost motion of said shaft longitudinally. The shaft I′ has a crank and pin I and a worm K formed upon it.

A needle-arm G is pivotally mounted at G^2 on the fixed arm D, and has its lower extremity slotted longitudinally, as shown at *g*. The crank-pin I enters and engages with said slot *g*. At its opposite end the needle-arm G carries the vertically-reciprocating needle-bar H in the usual manner, said bar H being supported within guides of the standard E. A bracket C^6 extends downwardly from the bed-plate C. A feed-carrier N is pivoted thereto at *n* and a shuttle-carrier O is pivoted to said bracket C^6 at *o*′. The feed-car-

rier N has a slot o^2, and the shuttle-carrier O has a pin n', which enters and engages with said slot o^2. A link-bar P, pivoted to the end of the needle-arm at p', is also pivoted to the feed-carrier at p.

The operation of said parts of my sewing-machine is as follows: The revolution of the wheel M′ by the pitman M^2 of the treadle, in the usual manner, turns the main shaft M and the worm-shaft L, which is fastened on said main shaft. The worm-wheel L engages with and turns the worm K of the shaft I′, and the crank-pin I, engaging with the slot g of the needle-arm G, causes said needle-arm to vibrate, which vibratory motion gives a reciprocating motion to the link bar P, and at the same time gives a vertical reciprocating motion to the needle-bar H and causes the needle inserted therein to pass into and out of the cloth. The link-bar in turn oscillates the feed-carrier N, which oscillation is communicated to the shuttle-carrier O by means of said pin-and-slot connection n' o^2. The carriers N O have a differential movement, because the distance from the pivot n of the carrier N to the pivot p, by which the link P is connected with said feed-carrier, is greater than the distance from the pivot o' of the shuttle-carrier O and the pin n' of said carrier, which enters the slot o^2 of the feed-carrier N. The consequence is that the shuttle-carrier O has a quicker travel and describes a greater arc than the feed-carrier N. The feed-carrier has two cams—one a side cam n^3, projecting laterally from the rear face of said carrier, and the other a segmental cam n^2, formed eccentrically upon the periphery of said feed-carrier.

A feed-bar S, having a downwardly-projecting lip s, rests upon the periphery of the feed-carrier N, and has at its end a longitudinal slot s'. A hanger T extends downwardly from the bed-plate C, and has a fixed pin t. The pin t, entering the slot s', supports the feed-bar S at that end. As the carrier N moves forward, the feed-bar S is lifted by the segmental cam n^2, and is also advanced by the lateral pressure of the side cam n^3 of said carrier. As the carrier N moves backward, the cam n^2 causes the feed-bar, which rides upon it, to descend, and the passage of the cam n^3 allows said feed-bar to return to its former position by the action of the spring t'. These movements of the feed-bar, in connection with the presser-foot, feed the cloth from stitch to stitch.

The shuttle-carrier O has a rest o^3, in which the shuttle R is supported and carried. When the feed and shuttle carriers are thrown back in the position shown in Fig. 4, the needle is down to its full extent, and will rise a short distance to loop the thread before the shuttle reaches the loop in its forward movement. The shuttle-carrier advances more rapidly than the feed-carrier, and passes the shuttle through the loop and moves rapidly forward out of the way, while the feed-carrier follows with a slower movement to raise and push forward the feed-bar, after the needle has been withdrawn from the fabric.

In Fig. 3 the carriers are shown in position at the end of their forward throw, and the needle is then up to its full extent. As the needle descends, the carriers rock back, the feed-bar is lowered and pulled back by the spring to its normal position, as shown in Fig. 5, and the shuttle is carried back by its carrier to the full extent of its backward throw, so as to give ample space and time for the needle to descend and make the next loop.

Instead of connecting the carriers by a pin upon one passing through a slot in the other, as hereinbefore described, they may be connected by a link V′, and mounted, as shown in Fig. 6, and produce the same movements. In Fig. 6, however, the bracket is shown as being solid and having a slot, through which the pin n' extends. In such a construction of the parts the carriers are mounted upon opposite sides of the bracket.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. In a sewing-machine having a downwardly-projecting bracket, the combination of a vibrating needle-arm, a reciprocating needle-bar and needle, an oscillating feed-carrier pivoted to said bracket and movable in a plane parallel to the plane of said needle-arm, an oscillating shuttle-carrier pivoted upon said bracket eccentrically to the center of oscillation of said feed-carrier and in a plane parallel with said feed-carrier, said carriers being connected together at points unequally distant from their centers, and a link connecting said vibrating needle-arm and feed-carrier, substantially as specified.

2. In a sewing-machine having a downwardly-projecting bracket, the combination of a pivoted feed-carrier and a pivoted shuttle-carrier, a slot-and-pin connection of said carriers for operating them jointly with a differential movement, a connecting-link pivoted to one of said carriers, a vibrating needle-arm having said link pivoted thereto, and a shaft having a crank adapted to vibrate said arm, substantially as specified.

3. In a sewing-machine provided with a downwardly-projecting bracket, the combination of a vibrating needle-arm, a reciprocating needle-bar and needle, an oscillating feed-carrier formed with a slot and pivoted to said bracket so as to be movable in a plane parallel to the plane of said needle-arm, an oscillating shuttle-carrier pivoted upon said bracket eccentrically to the center of oscillation of said feed-carrier and having a pin projecting laterally into the slot of said feed-carrier, said shuttle-carrier being movable in a plane parallel to said feed-carrier, and a link connecting said feed-carrier and needle-arm, substantially as specified.

4. In a sewing-machine having a downwardly-projecting bracket, the combination of a pivoted oscillating feed-carrier having a

slot, a pivoted oscillating shuttle-carrier arranged eccentrically to the center of oscillation of said feed-carrier and provided with a pin projecting laterally into said slot, a vibrating needle-arm and needle, a link pivoted to said feed-carrier and needle-arm, and a shaft having a crank adapted to vibrate said needle-arm, substantially as specified.

5. In a sewing-machine having a bed-plate, standard, driving mechanism, a vibrating needle-arm, a reciprocating needle-bar, a needle, and a downwardly-projecting bracket, the combination of a link-bar receiving motion from said driving mechanism, an oscillating feed-carrier pivoted to said link and mounted on said bracket in a plane parallel to the plane of said needle-arm, a pivoted shuttle-carrier mounted on said bracket in a plane parallel to the feed-carrier and eccentrically with reference to the center of the oscillation of the feed-carrier and provided with loose connecting means to communicate from said feed-carrier a differential motion to the shuttle-carrier, substantially as specified.

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Witnesses:
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CHAS. E. FERRELL.