2 Sheets--Sheet 1.

J. CARTER.

Sewing-Machine.

No. 165,711. Patented July 20, 1875.

Fig. 1.

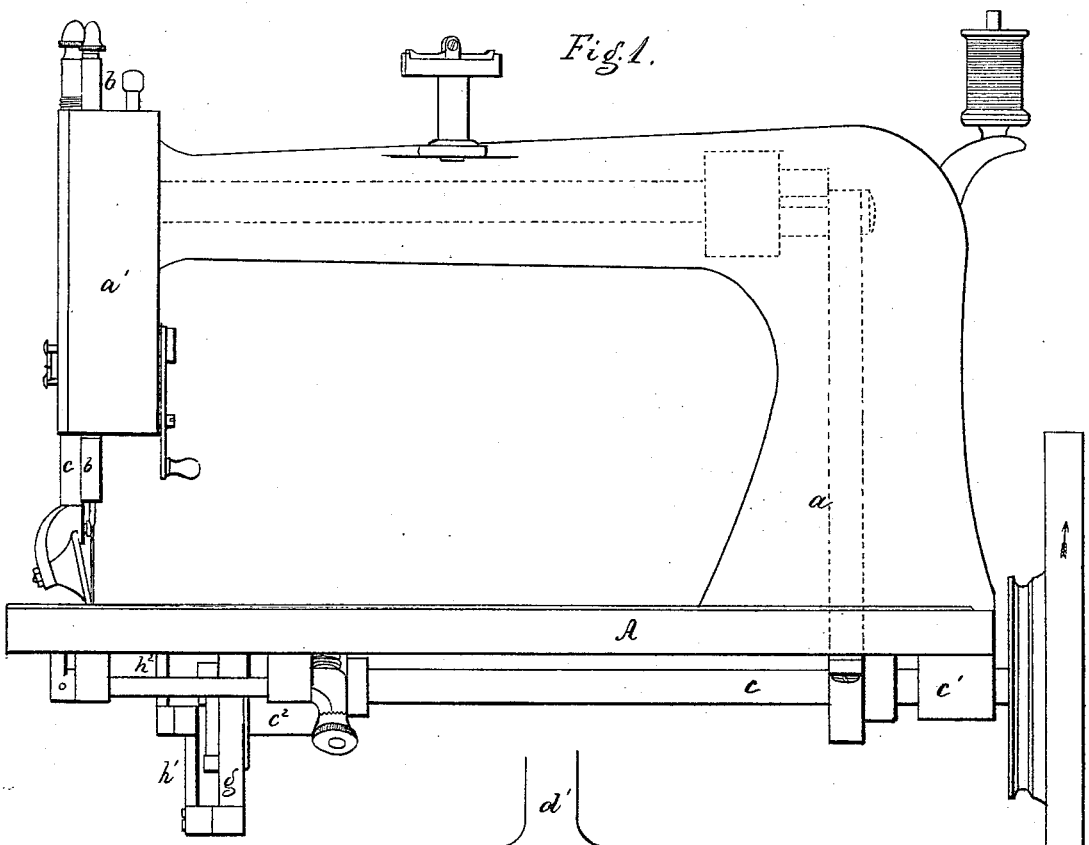


Fig. 2.

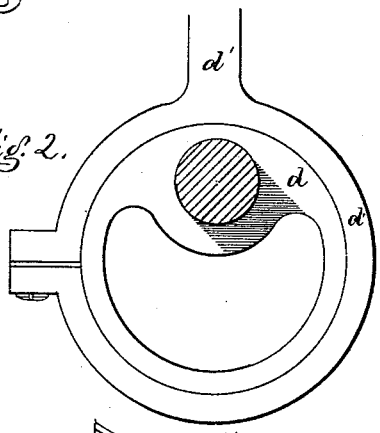
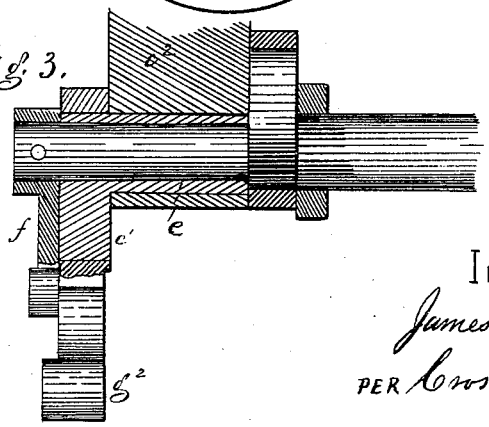


Fig. 3.



Witnesses.

L. H. Latimer,

Wm. Pratt.

Inventor.

James Carter

per Crosby & Gregory Attys.

2 Sheets--Sheet 2.

J. CARTER.
Sewing-Machine.

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Fig. 5.

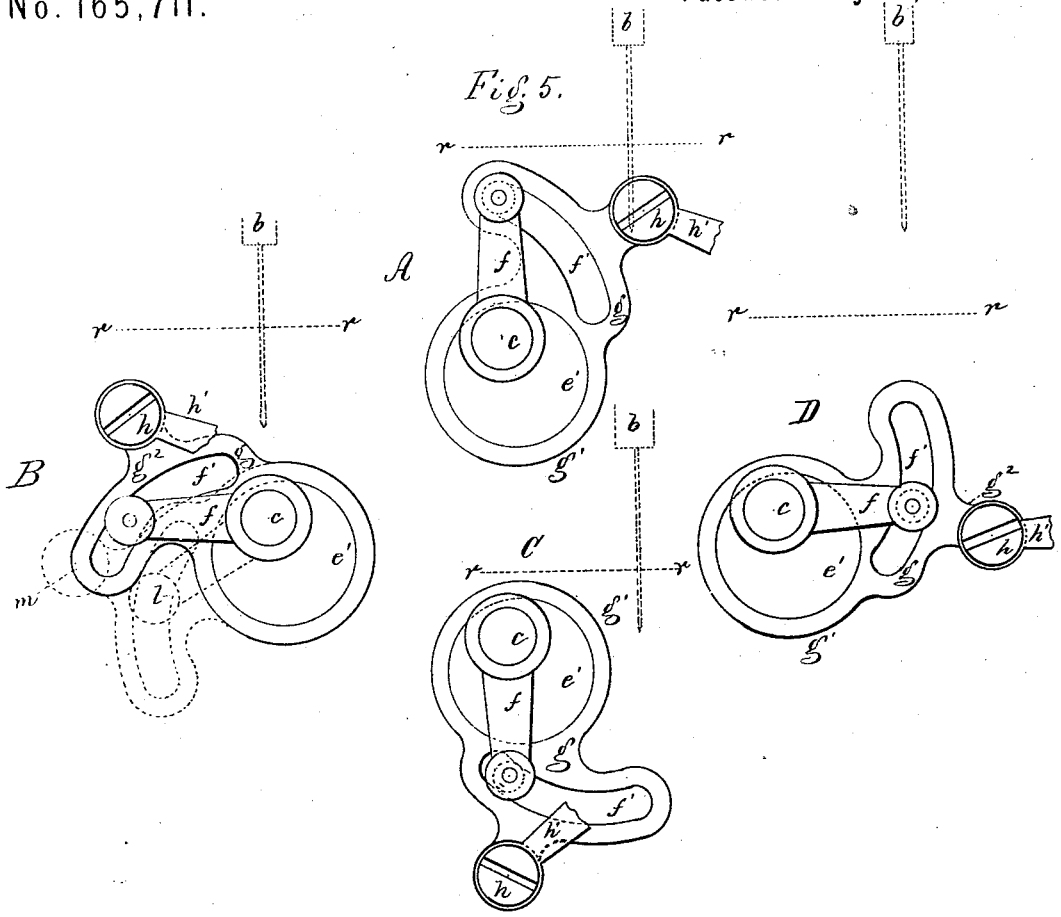
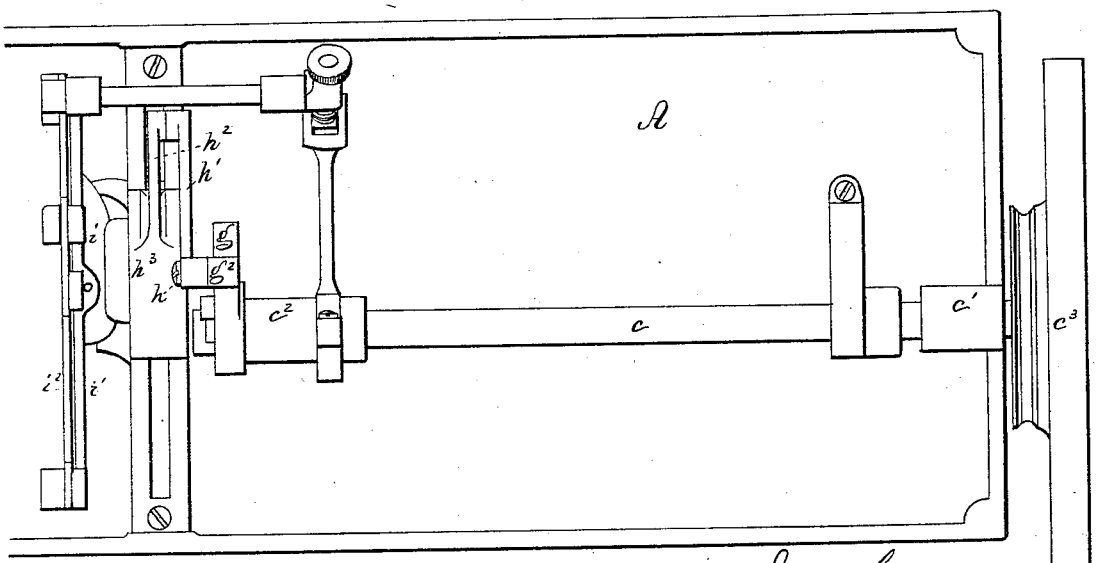


Fig. 4.



L. H. Bateman.
Wm. Pratt.
} Witnesses.

Inventor. { James Carter
PER Crosby & Gregory Attys

UNITED STATES PATENT OFFICE.

JAMES CARTER, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE WEED SEWING-MACHINE COMPANY, OF SAME PLACE.

IMPROVEMENT IN SEWING-MACHINES.

Specification forming part of Letters Patent No. **165,711**, dated July 20, 1875; application filed March 17, 1875.

To all whom it may concern:

Be it known that I, JAMES CARTER, of Hartford, in the county of Hartford and State of Connecticut, have invented an Improved Sewing-Machine, of which the following is a specification:

My invention relates to mechanism for operating the shuttle in sewing-machines; and consists in the combination, with a shuttle-carrier, of a crank, and a rotating slotted link controlled by the crank and an eccentric, substantially as described, whereby the proper varying speed is given to the shuttle, and the shuttle-thread is drawn with relation to the needle-thread, and the stitch is made taut.

In the drawing, Figure 1 is a side elevation of a sewing-machine, to which my improvements are applied. Fig. 2 is a detail of the eccentric and its link for moving the needle-operating rock-shaft. Fig. 3 is a cross-section through the shuttle-operating devices. Fig. 4 is an under-side view of the sewing-machine; and Fig. 5 is a detail, showing the shuttle-driving mechanism in different positions.

A is the bed-plate of a sewing-machine, having rising therefrom the arm *a*, which carries the head *a'*, in which the needle-bar *b* and presser-bar *c* are operated and guided. The driving-shaft *c*, supported in hangers c^1 c^2 cast with or secured to the bed-plate, is provided with a fly-wheel, c^3, through which the machine is driven, and with an eccentric, *d*, connected by means of an eccentric strap, d^1, with a rock-shaft having at its forward end a crank, which, by means of a short link, is connected with and operates the needle-bar, the arm and link being within the head *a'*. In the hanger c^2 is placed the sleeve *e* of an eccentric, *e'*, and a screw tapped into the hanger and meeting the sleeve enables the eccentric to be fixed in any adjusted position. This fixed eccentric bearing receives through it and through its sleeve the end of the main shaft *c*, preferably reduced in size, and to the end of the main shaft is attached a crank, *f*, having a pin surrounded, preferably, with a friction-roller, and which projects into a slot, *f'*, in a slotted link, *g*, the circular strap g^1 of which is fitted to and surrounds the stationary yet adjustable eccentric *e'*. This slotted link *g* has an ear, g^2, to which, by means of a screw, *h*, is pivoted a link, h^1, which is connected with the projecting arm h^2 of the shuttle-carrier h^3, constructed in any well-known way to carry the shuttle or drive it along the shuttle-race, and through the loop of needle-thread. The shuttle is represented at *i*, and in this instance of my invention is shown as resting between projections on a carrier. The shuttle-race face is represented by i^1, and the feed by i^2. They are constructed in the usual or any suitable well-known way. The shuttle is driven through the action of a crank and slotted link, the latter being connected by a link with the shuttle-carrier. When a crank is used alone the forward and backward movements of the shuttle must be uniform, and to produce an irregular motion a plate projecting from a shuttle-carrier has been provided with an irregular slot, in which crank-pins have worked, but this does not give the smooth easy motion which can be derived from a crank-and-link motion, and when a plate is so slotted the movement or timing cannot be changed.

Referring to Fig. 5, A, the crank *f* is on its upper vertical center, its friction-roller rests in the outer end of the slot *f'* of the slotted crank *g*, the heel of the shuttle in its backward movement is about on a line with the needle, and the eye of the needle in its descent has passed about one-third across the depth of the shuttle-race face. From this position A, and while the crank *f* is passing over about forty-five degrees, the crank and slotted link move at a uniform speed and rapidly, and when the crank has moved about forty-five degrees, or midway, or nearly so, between the two positions A B the needle has reached its lowest point; but the shuttle has not yet entirely passed the needle. As the crank moves from this assumed position of forty-five degrees to the position B of ninety degrees, the shuttle is caused to move less rapidly and in the position B, the needle has risen a little and is about to dip to throw out its loop for the shuttle, and the point of the shuttle in its backward movement has almost passed the needle. While passing from the position shown at B in full lines to position shown in dotted lines, the shuttle moves completely

back, and the needle reaches its extreme lowest position preparatory to its final rapid rise, which is completed when the crank *f* reaches position D. When the centers *m l* and the center forming the connection between link h^1 and the arm h^2 of the shuttle-carrier are in line, which is immediately after leaving the position shown in dotted lines at B, then the needle commences to rise, and while the crank *f* is passing from the dotted position to the last-assumed position the shuttle is substantially at its extreme backward movement, and is substantially at rest, and after the crank *f* passes its center point *l* (marked at the end of the crank) out of this assumed line, then the shuttle commences to move forward through the loop of needle-thread, and at position C the shuttle has entered the loop sufficiently far to pass the loop beyond the point of the shuttle; then from position C to position D the shuttle is moved rapidly through the loop of needle-thread, and when in position D the shuttle has a momentary rest while the needle is at its highest position, and the stitch is being drawn taut. From position D to position A the backward movement of the shuttle-carrier is gradually slower, and while the shuttle is moving slowly back, and the crank moves from position D to position A the needle rapidly descends. The positions at which the shuttle shall move slowly and rapidly may be changed by adjusting the position of the stationary eccentric *e'*. The slotted link is moved fastest when the friction-roller of the crank *f* is in the inner end of the slot *f'*, and slowest when at its outer end. The actuating link of the shuttle-driver is, it will be noticed, connected at *h* with a link, and this point *h* of the link always moves in a circle described from the center of the bearing or support for link, or from the center of *e'*; but as the crank *f* is set eccentrically to the bearing it follows that its pin, which enters the slot *f'*, is, during the rotation of the crank at a uniform motion, made to act on the slotted link at different distances from its fulcrum or bearing, and is made to increase and decrease the speed of the slotted link with reference to the speed of the crank, and give the required rapid and slow motions to the shuttle. The slotted link is really a crank, having for its only motor the crank *f* and its pin.

I do not desire to limit myself to the exact devices shown, as pivoted circularly-moving links of other shapes, and connected with shuttle drivers or carriers, may be moved from a rotating crank, and it is evident that the form of the parts might be changed without departing from my invention, the gist of which is to rotate one crank—as, for instance, *g*—from another crank, and so connect them that the movement of the one crank from a rotating shaft shall quicken or retard the action of the other, owing to the action of the positively-moved crank on the other crank at different distances from its center, or the point about which it turns. The dotted lines *r* in Fig. 5 represent the line of the cloth-plate.

I claim—

1. The combination, with the rotating shaft and its attached crank, of an intermediate rotating crank-link, supported eccentrically to the crank on the rotating shaft, and operated by the crank of the rotating shaft at a variable speed, substantially as described.

2. In combination, the rotating shaft, its attached crank, a shuttle carrier or driver, and an intermediate rotating crank-link, supported substantially as described, and operated at variable speed by the crank of the shaft, and a link for connecting the crank-link and shuttle driver or carrier, substantially as set forth.

3. The combination, with the rotating shaft and its attacked crank, of the adjustable bearing *e'* and slotted crank-link *g*, all constructed and operating substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES CARTER.

Witnesses:

EDWIN S. HOUSE,

WALTER C. FOSTER.