(No Model.) 2 Sheets—Sheet 1.

A. STEWARD.

MECHANISM FOR IMPARTING VARIABLE MOTION TO SEWING MACHINE LOOP TAKERS.

No. 369,619. Patented Sept. 6, 1887.

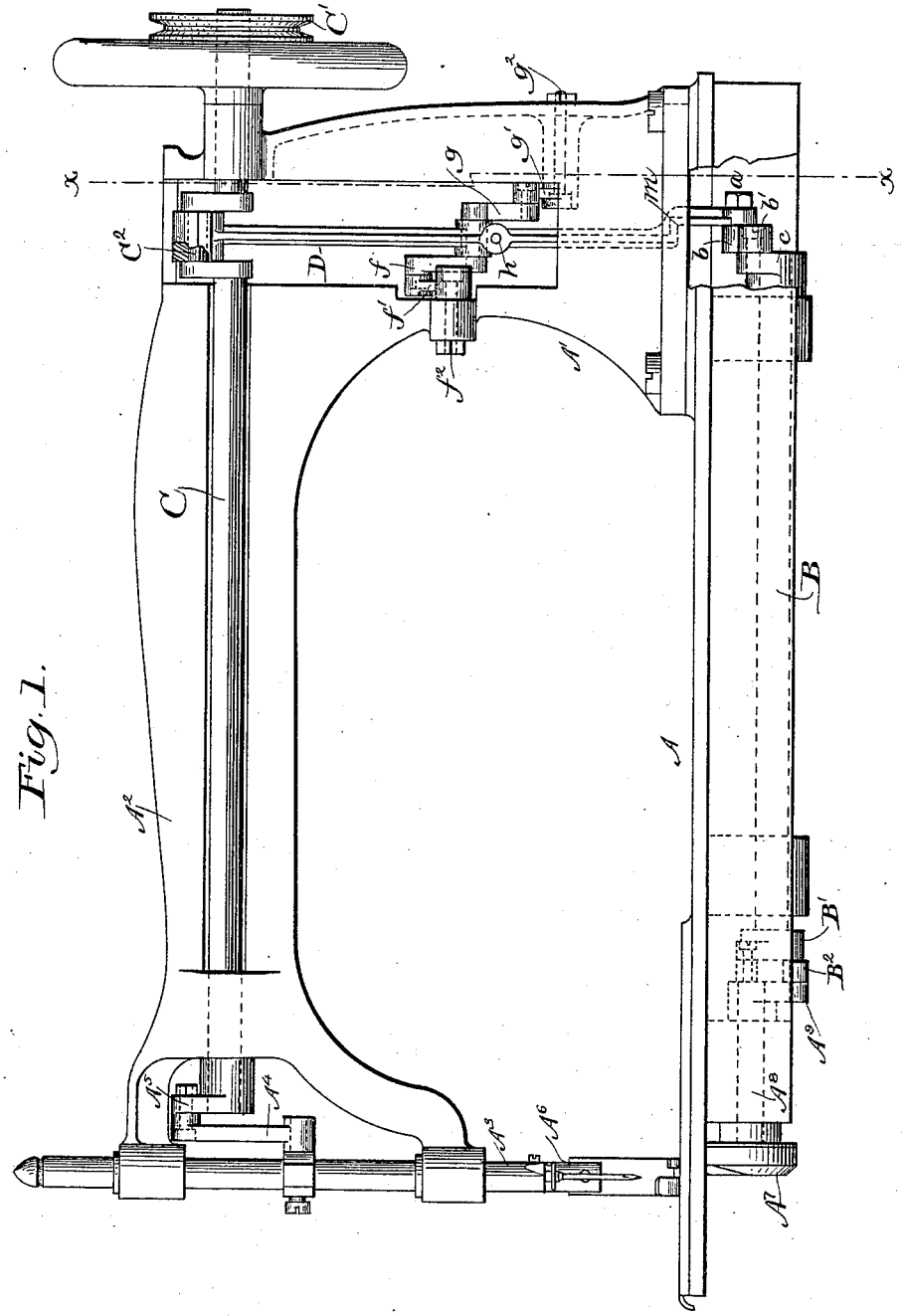


Fig. 1.

Witnesses
Fred. Emery.
Howard F. Eaton.

Inventor
Aurelius Steward
by Crosby & Gregory
Attys.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. STEWARD.

MECHANISM FOR IMPARTING VARIABLE MOTION TO SEWING MACHINE LOOP TAKERS.

No. 369,619. Patented Sept. 6, 1887.

Fig. 2.

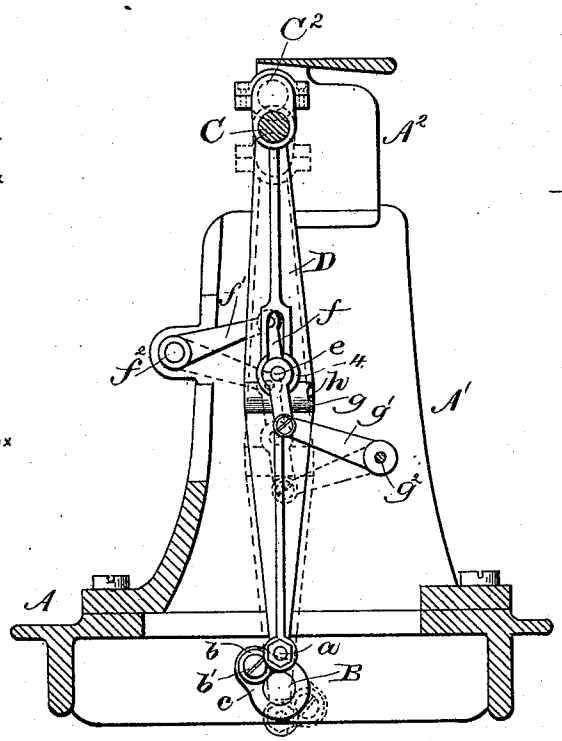


Fig. 4.

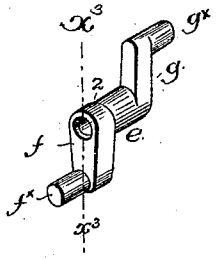


Fig. 5.

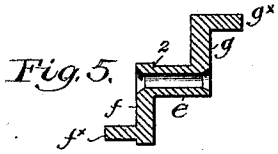


Fig. 6.

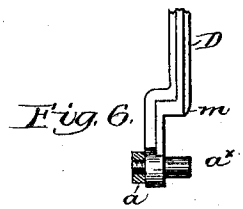
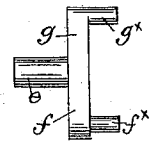


Fig. 8.

Fig. 7.



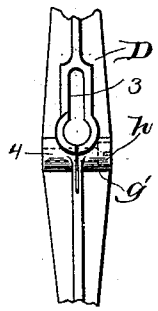


Fig. 3.

Witnesses

Fred L. Emery

Howard F. Eaton.

Inventor

Aurelious Steward

by Crosby & Gregory

attys

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

AURELIUS STEWARD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE WHEELER & WILSON MANUFACTURING COMPANY, OF SAME PLACE.

MECHANISM FOR IMPARTING VARIABLE MOTION TO SEWING-MACHINE LOOP-TAKERS.

SPECIFICATION forming part of Letters Patent No. 369,619, dated September 6, 1887.

Application filed February 25, 1887. Serial No. 228,842. (No model.)

To all whom it may concern:

Be it known that I, AURELIUS STEWARD, of Bridgeport, county of Fairfield, and State of Connecticut, have invented an Improvement in Mechanical Movements for Sewing and other Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to provide a novel mechanical movement by which to rotate one of two parallel shafts from the other, the said invention, among other purposes, being especially applicable for use in sewing-machines having a rotating needle-bar-actuating shaft and a rotating under shaft to actuate a rotating hook or loop-taker, and I shall therefore illustrate and describe my invention as applied to a sewing-machine.

In accordance with my invention a crank-wrist of the upper rotating crank-shaft is embraced by a connecting-rod, the opposite end of which is shown as offset and provided with a pin or stud which engages a link mounted loosely upon a crank secured to the under shaft, the said connecting-rod between its ends receiving through it a short fulcrum-crank having at its ends oppositely-directed arms, which are jointed above and below the fulcrum-shaft to the ends of radius bars or links pivoted at opposite sides of the longitudinal center of the connecting-rod. The said radius bars or links for the best results are so located as to permit the fulcrum-crank to move up and down in a straight line, thus insuring that the strains on all the parts are in straight lines, which obviate twisting strains and side drafts.

Figure 1, in side elevation, represents my invention as embodied with a sufficient portion of a sewing-machine of the Wheeler & Wilson class to enable my improvement to be understood. Fig. 2 is a section of Fig. 1 to the left of the line *x;* Fig. 3, a detail of the central part of the connecting-rod. Fig. 4 is an enlarged detail showing the fulcrum-crank detached; Fig. 5, a section of Fig. 4 in the line x^3. Fig. 6 is a detail showing the lower offset end of the connecting-rod with its attached stud, pin, or projection; Fig. 7, a modified form of fulcrum-crank, and Fig. 8 a modified form of connection between connecting-rod and lower crank-shaft.

The bed-plate A, standard A′, overhanging arm A^2, needle-bar A^3, sliding in bearings therein, link A^4, crank A^5, presser-bar A^6, its foot, the rotating hook A^7, the short shaft to which it is attached, the crank A^9, attached to the shaft A^8, the rotating under shaft, B, its crank or disk B′, and the link B^2, connected to the crank A^9 in such manner as to enable the shaft B to rotate the shaft A^8 at a different speed, are substantially as in the Wheeler & Wilson machine, style No. 10, so need not be herein more fully described; but instead of the usual rotating hook the short shaft B may have a saddle at its end and rotate a loop-taker in a loop-taker guide, all as in United States Patent No. 328,165, October 13, 1885, which is an improvement on the Wheeler & Wilson machine.

In this class of machines, or in machines employing a reciprocating eye-pointed needle above the bed-plate and a rotating device located below the bed-plate to take the loop of needle-thread, distend it, and cast it off about a bobbin, the said rotating device moving at a differential speed during each rotation, it has been customary to operate the needle-bar by means of a rock-shaft in the overhanging arm; but such is objectionable, because the employment of a rock-shaft materially limits the speed at which the machine may be run practically, for with great speed the shock and jar, and consequently the wear of the parts, is excessive.

To obviate the use of a rock-shaft for moving the needle-bar and yet move the needle and the rotating device for taking its loop below the bed-plate in the same relative time and order as now commonly practiced in the Wheeler & Wilson machine, I have substituted for the rock-shaft a rotating shaft, and have devised, as I shall now describe, a peculiar system of devices for connecting it with and rotating the shaft below the bed-plate.

The rotating needle-bar-actuating crank-shaft C, driven by a belt on the pulley C′, has a crank-wrist, as C^2, which is embraced, as herein shown, by a box at the upper end of a connecting-rod, D, the lower end of the said

connecting-rod being offset, as at *m*, and provided with a pin, stud, or projection, as $a^{\times}$, (see Fig. 6,) which is herein shown as held in place by a jam-nut, *a*. The stud, pin, or projection, as $a^{\times}$, of the connecting-rod D engages a link, *b*, pivoted on a suitable crank-pin, *b'*, shown as a stud-screw extending from a crank, *c*, fast on the shaft B. The connecting-rod D is offset, as shown in Figs. 1 and 6, in order that the strain exerted on it between its ends shall be in a straight line between the wrist C^2 and the link *b*, thus avoiding all tendency of the connecting-rod to be twisted by operative strains.

To enable the shaft C to rotate the shaft B through the connecting-rod D, I have mounted the said connecting-rod between its ends upon a fulcrum-crank composed, essentially, of a shaft-section, *e*, having oppositely-extended arms *f g*, provided with crank-pins $f^{\times}$ $g^{\times}$, which in practice are embraced, respectively, by radius bars or links *f' g'*, pivoted at f^2 g^2 on the upright A' at opposite sides of the longitudinal center of the connecting-rod D. (See Fig. 2.)

In the present embodiment of my invention I have shown the fulcrum-crank and radius bars or links so constructed and located each with relation to the other as to enable the constantly and uniformly rotated shaft C to rotate the parallel shaft B at substantially the same speed, or the rotations of the two shafts are substantially isochronous, and consequently the crank-pins $f^{\times}$ and $g^{\times}$ are at equal distances from the longitudinal center line of the central shaft portion, *e*, of the fulcrum-crank, the crank-pins $f^{\times}$ $g^{\times}$ being also parallel to the said central line, and so, also, the fulcra or centers of motion f^2 g^2 of the radius bars or links referred to are so located that when the wrist C^2 is equidistant between the upper and lower limit of the throw the portion *e* will be equidistant between the fulcra f^2 g^2. To insure greatest strength for the fulcrum-crank with least weight, I prefer to and have made the portion *e* and its crank and crank-pins as integral parts, and have bored out the portion *e*.

Referring to Figs. 4 and 5, it will be seen that the arm *f* at its junction with the portion *e* is of greater diameter than the portion *e*, to thus leave a shoulder, as 2, to come against one end of the hub 4 of the connecting-rod D, to thus retain the fulcrum-crank in correct longitudinal position; but the arm *g* at its junction with the portion *e* is reduced in size sufficiently to enable it to be passed readily through an aperture, 3, as shown in Fig. 3, when the crank-pin $g^{\times}$ is uppermost, and thereafter the said fulcrum-crank is given a half-turn or into the position, Fig. 1, and the crank-pins are connected to their proper radius bars or links, *f' g'*, in which condition of the fulcrum-crank it will be seen that the crank *g* falls opposite a solid part of the connecting-rod, and, being against the other end of the hub 4 of the connecting-rod, co-operates with the shoulder 2 to prevent any longitudinal movement of the fulcrum-crank.

The hub 4 is shown as slotted, and the connecting-rod has a screw, *h*, by which to compensate for any wear between the fulcrum-crank and the connecting-rod.

As shown in Figs. 1 and 2, the arms *f g* of the fulcrum-crank are located at opposite sides of the connecting-rod, (see Fig. 1,) as I prefer, such construction avoiding twisting strains; but I should deem it within the scope of my invention should both arms *f g* be extended in opposite directions from one and the same end of the portion *e*, as in Fig. 7, in which case both radius-bars would be pivoted at one and the same side of the connecting-rod D, viewing the machine from the position, Fig. 1, or to either the right or left of the connecting-rod D, according to which side of the connecting-rod the two arms are made to occupy.

As herein shown, the short shaft A^8 is given a variable movement, for purposes well understood, through the link B^2, and such I prefer in order that the parts to move at a variable speed during each rotation may be as light as possible.

When the rotation of the two shafts C and B is substantially isochronous, the length of the connecting-rod D is such that the movement of the pin or stud $a^{\times}$ is as nearly as possible concentric with shaft B and crank C; but by changing the length of the connecting-rod D, so that the pin or stud $a^{\times}$ shall move eccentrically with relation to the shaft B and crank C, a variable motion may be given to shaft B, the pin or stud $a^{\times}$ at such time being provided with a longer link; or the pin or stud might enter a slot in the crank or a disk thereon, as in Fig. 8.

The radius bars or links and fulcrum-crank, connected as described, constitute a fulcrum for the connecting-rod which is capable of moving up and down in a straight line with but the minimum of friction.

In Fig. 2 I have shown by full and dotted lines the two extreme positions of the connecting devices instrumental in rotating the shaft B from the shaft C.

In operation the machine herein described will be provided with suitable take-up lever, tension device, and feed mechanism; and in practice such devices may be those commonly used in the Wheeler & Wilson machine, though not having been illustrated herein, chiefly to avoid complication of the drawings.

I claim—

1. The combination, in a sewing-machine, of the following instrumentalities, viz: a bed-plate, a standard and overhanging arm, a needle-bar, a rotary needle-bar-actuating shaft journaled in the said arm above the said bed-plate, a rotating lower shaft, B, beneath the said bed-plate and parallel to the said needle-bar-actuating shaft, a rotating hook to take the loops of needle-thread, a short rotary shaft, A^8, to operate the said hook, variable-motion devices, substantially as described, be-

tween the said shafts B and A^8, and rotary-motion-transmitting mechanism connecting the needle-bar-actuating shaft with the shaft B, to enable the former to rotate the latter, to operate substantially as set forth.

2. The rotating crank-shaft C, the crank-shaft B, parallel thereto, the connecting-rod located between them, and operative connections between the said rod and shafts to enable one to move the other, combined with a movable fulcrum-crank and with radius bars or links, to which the said fulcrum-crank is joined at opposite sides of the center of oscillation of the said fulcrum-crank, substantially as described.

3. The rotating crank-shaft C, the crank-shaft B, parallel to it, and the intermediate connecting-rod offset and provided with a stud, pin, or projection, as $a^{\times}$, combined with the fulcrum-crank having oppositely-extended arms and with radius bars or links, to which the said arms are jointed, substantially as described.

4. The rotating crank-shaft, the crank-shaft B, parallel to it, and the intermediate connecting-rod, combined with the fulcrum-crank having arms extended from its opposite ends in opposite directions, one arm being at one and the other at the opposite side of the connecting-rod, and with radius bars or links, to which the said arms are jointed, substantially as described.

5. The two crank-shafts and the intermediate connecting-rod having an opening through it, combined with two radius bars or links, and the intermediate fulcrum-crank having oppositely-extended arms adapted to embrace the connecting-rod and be held therein against longitudinal motion, substantially as described.

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

AURELIUS STEWARD.

Witnesses:
G. W. GREGORY,
C. M. CONE.