(No Model.) 2 Sheets—Sheet 1.

H. H. BUFFUM.

SEWING MACHINE.

No. 570,902. Patented Nov. 10, 1896.

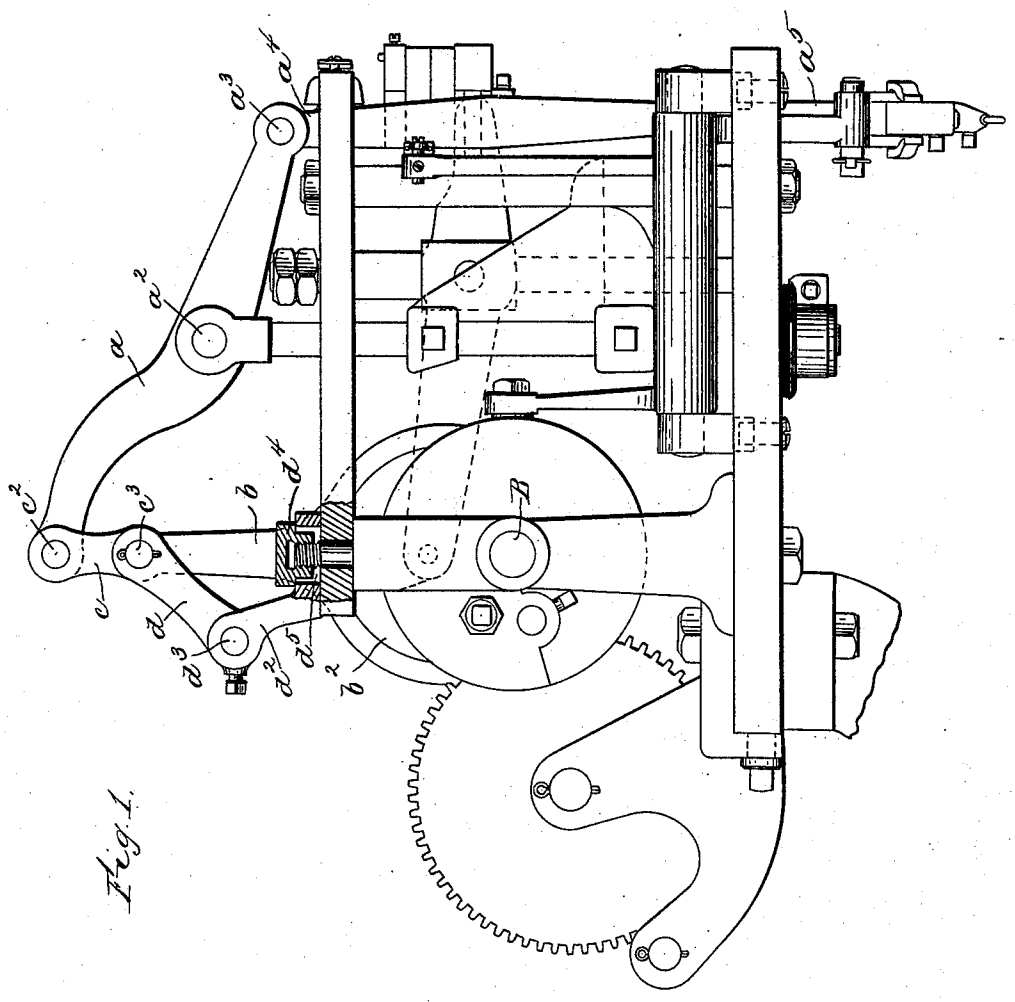

Fig. 1.

Witnesses
Jas. J. Maloney.
H. J. Swinnon

Inventor.
Herbert H. Buffum
by Jos. P. Livermore
Atty.

(No Model.) 2 Sheets—Sheet 2.

H. H. BUFFUM.

SEWING MACHINE.

No. 570,902. Patented Nov. 10, 1896.

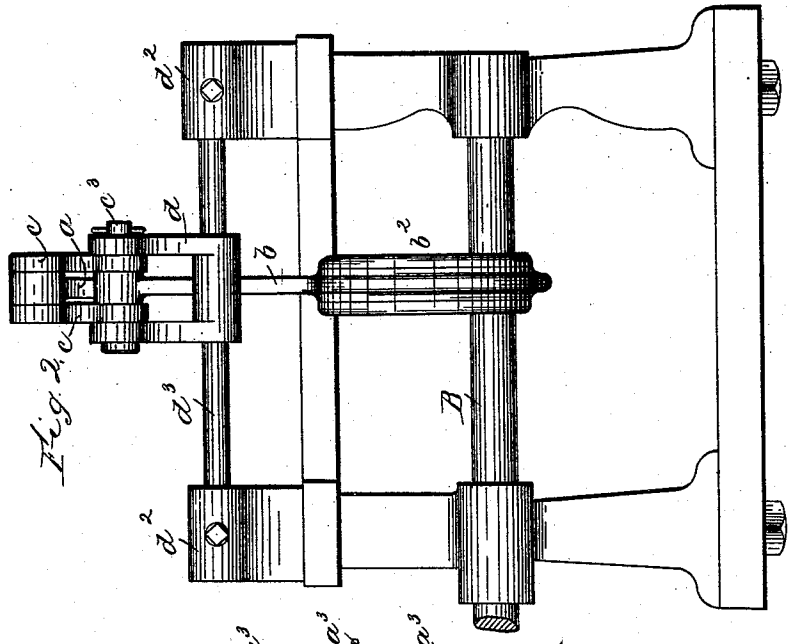

Fig. 2.

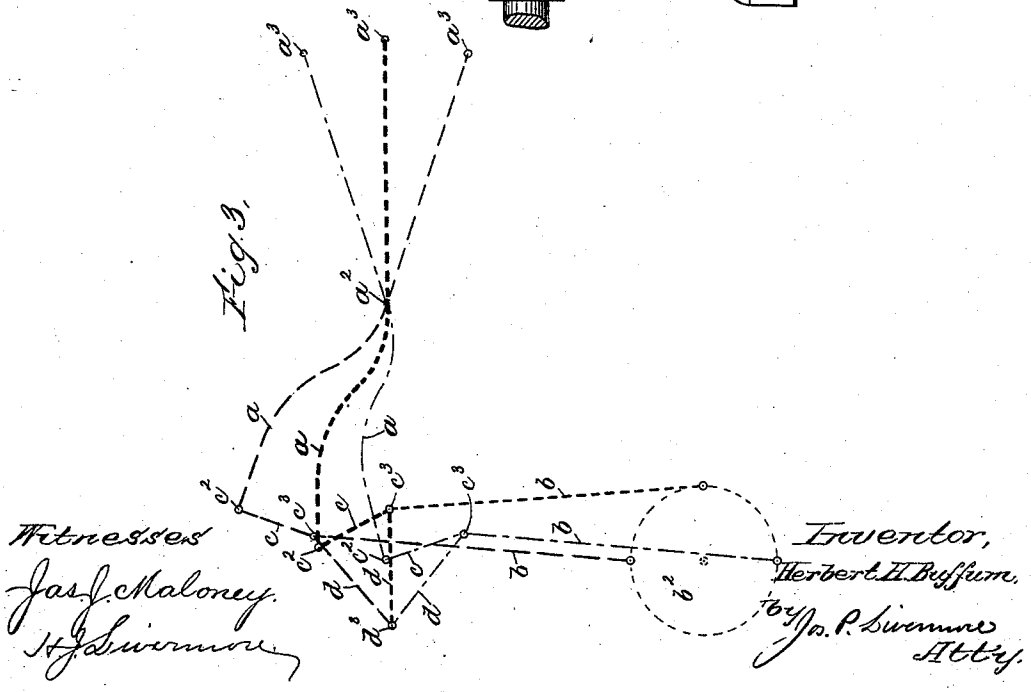

Fig. 3.

Witnesses
Jas. J. Maloney.
H. J. Sweeney

Inventor,
Herbert H. Buffum.
by Jno. P. Sweeney
Atty.

UNITED STATES PATENT OFFICE.

HERBERT H. BUFFUM, OF ABINGTON, MASSACHUSETTS, ASSIGNOR TO THE STEAM HEATED HORN COMPANY, OF PORTLAND, MAINE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,902, dated November 10, 1896.

Application filed June 24, 1895. Serial No. 553,837. (No model.)

To all whom it may concern:

Be it known that I, HERBERT H. BUFFUM, of Abington, county of Plymouth, State of Massachusetts, have invented an Improvement in Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to an improvement in sewing-machines, and is applicable to the well-known McKay sewing-machine, in connection with which it will be hereinafter shown and described.

The invention consists in an improved mechanical connection between the driving-shaft and the needle-bar-actuating lever, its object being to produce a relatively slower movement of the needle near the ends of its strokes, both up and down, and a relatively more rapid movement near the middle part of its stroke than is produced by the actuating mechanism therefor heretofore commonly used. By thus reducing the speed of movement of the needle near the end of its stroke the laying of the thread in the hook by the whirl is rendered more certain and the tightening of the last stitch is effected with less of a jerk and sudden strain on the thread, thus improving the operation of the machine and also improving the quality of the sewing.

The change in the relative speed of movement of the needle in different portions of its stroke is accomplished in accordance with the present invention by connecting the usual eccentric rod or pitman which actuates the needle-lever with said lever by devices which in effect change the position of the point of application of the force from said pitman on said lever with relation to the fulcrum of the lever, so as to correspondingly change the effective length of the lever-arm during the reciprocation of the said pitman. The arrangement is such that the pitman operates upon the greatest length of lever-arm when at or near the ends of the stroke, thus causing the opposite end of the lever which carries the needle-bar to move a shorter distance in a given time, the movement, therefore, being slower, and conversely the pitman acts upon a shorter length of lever-arm during the middle part of its stroke, thus accelerating the movement of the needle during the middle part of its strokes, both up and down.

Figure 1 is a side elevation of a sufficient portion of a McKay sewing-machine to illustrate the present invention; Fig. 2, a rear elevation of the portion thereof to which this invention relates, showing the driving-shaft, the reciprocating rod or pitman carried thereby, and the connection between said pitman and the needle-bar lever; and Fig. 3, a diagram view showing the relative positions of the parts in different positions of the needle, dotted lines of different character being used to show the relations at the middle position and both end positions of the needle-bar, respectively.

As has been stated, the construction of the main portions of the machine is well known, and therefore needs no detailed description in connection with the present invention, which consists in a novel construction of the actuating mechanism for the needle-shaft lever a, fulcrumed at a^2 and connected at a^3 by the link a^4 with the needle-bar a^5 in the usual manner. The said lever is arranged to reciprocate the needle-bar by a rocking movement on the pivot a^2, and such movement is caused by means of a rod or pitman b, which may be the same as heretofore used in these machines, and is reciprocated by means of the usual eccentric b^2 upon the main shaft B of the machine. The connection between said pitman b and the lever a is made in accordance with the present invention by a link c, connected at c^2 to the lever a and at c^3 to the rod b, the end thereof which is pivoted at c^3 being connected with a movable guide, in this case shown as a link or radius bar d, pivotally supported at one end in a bracket or extension d^2 from the frame of the machine and pivotally connected at its other end with the rod or pitman b. As the rod b moves up and down, therefore, in response to the action of the eccentric the link d will move on an arc, as indicated in Fig. 3, thus carrying the upper end of the pitman b toward the fulcrum a^2 of the lever a in the middle part of the stroke, thus practically shortening the arm of said lever and accelerating the movement of the opposite end

thereof during the middle part of the stroke and correspondingly retarding the movement near the ends of the strokes, both up and down.

The axis or fulcrum d^3 of the guiding-link or radius-bar d is at an intermediate point between the upper and lower positions of its end that is jointed at c^3 to the pitman b, the result being that it throws the said joint farthest inward toward the fulcrum a^2 of the needle-bar lever at an intermediate point in its stroke and throws said joint c^3 outward or away from said fulcrum a^2 in the movement from the middle toward the ends of the strokes in both directions. In other words, the fulcrum d^3 of the guiding-link is at the opposite side of the pitman b from the fulcrum a^2 of the needle-bar lever a, and is at a distance from the actuating-shaft B approximately equal to the length of the said pitman.

In Fig. 1 the lever is shown at the end of a complete downward movement of the needle, and the rod b is practically in line with the outer end of said lever, so that as said rod begins to move down it will operate upon the lever-arm of maximum length, causing a slow movement of said lever at first, said movement being gradually accelerated as the movement of the guide d carries the pivot c^3 toward the fulcrum a^2. Following the line of movement of the point c^3, as shown in Fig. 3, it will be seen that at about the center of the stroke the said point c^3 is nearest the fulcrum a^2, thus giving a maximum speed of movement to the lever, and as the rod b continues its movement the point c^3 again recedes from the fulcrum a^2, increasing the effective length of the lever a and causing the slower movement of the needle.

The retardation of the movement near both ends of the stroke relative to the speed produced by the usual crank or eccentric is of great advantage, that at the end of the downstroke affording more time for the whirl to lay the thread into the hook of the needle, and thus insuring greater certainty of this operation, while the slowing down near the upper end of the stroke causes the thread to be finally drawn tight by a slow, steady, and powerful pull of the needle, so that the machine does better work and with much less liability of breaking the thread than when the needle-bar lever is actuated directly from a pitman, as b, pivotally connected directly to the end of the lever, as has been heretofore the construction in McKay sewing-machines.

As shown herein, the link d is mounted upon a transverse shaft d^3 and is forked, as shown in Fig. 2, the rod b extending upward between the said forks and being connected thereto by means of a pintle c^3. The links c are made in duplicate, one of said links being connected to one side of the needle-lever a and the other to the opposite side thereof, the said links extending down to the pivot c^3 between the rod b and the forked extension of the movable guide or link d. Thus the end of the lever, the connecting-links, and the guide arm or link d may all fall together, as it were, as they descend in making the upstroke of the needle.

It is obvious that the construction of the variable connection between the pitman and the needle-lever can be varied considerably, while retaining the same essential relations between the same. The specific construction illustrated is of advantage, because it can be readily applied to existing machines, it being necessary only to substitute a new lever for the needle-actuating lever commonly employed and to add the links c, guide-arm d, and supporting-bracket for the latter to the existing machines, said parts coöperating properly with the same pitman or eccentric rod as employed in connection with the original lever. The brackets d^2, which support the guiding mechanism, may be connected with the usual frame over the usual uprights or posts connecting the upper and lower plates of the frame. For this purpose the brackets are secured over the ends of the uprights by tubular or thimble-like nuts d^4, (see Fig. 1,) which takes the place of the nuts commonly employed to fasten the top frame-plate to the uprights. The foot portion of the bracket that rests on the top of the frame-plate is preferably provided with an elongated opening d^5 to receive the tubular shank of the nut d^4, thus enabling the position of the bracket to be adjusted to vary somewhat, if desired, the effect of the guide-arm d in modifying the action of the pitman b on the lever a.

I claim—

1. The combination with the needle-bar-actuating lever of a sewing-machine; of the main shaft and pitman actuated thereby; and means for operatively connecting said pitman and needle-bar lever; and a guide-link pivotally connected at one end with the said pitman and pivotally connected at its other end with the framework at a point on the opposite side of said pitman from the fulcrum of said needle-bar-actuating lever, and at a distance from said main shaft approximately equal to the length of said pitman, whereby the movement of the needle-bar lever is retarded near both ends of the stroke and accelerated in the middle part of its stroke relative to the speed that would be produced if the pitman were directly connected therewith, substantially as and for the purpose described.

2. The combination with the needle-bar-actuating lever; of the main shaft and pitman actuated thereby; a link pivotally connected at one end with the pitman, and at the other end with the needle-bar lever; and a guide-link or radius-bar pivotally connected at one end with the joint between the pitman and link, and pivotally connected at its other end with the frame of the machine, as set forth, said guide-link causing the joint between the pitman and link to be carried toward the fulcrum of the needle-bar lever during the move-

ment from the end to the middle part of its stroke, and to be carried from said fulcrum during the movement from the middle to the end of the stroke in both directions, substantially as described.

3. The combination of the needle-bar lever a, and its fulcrum a^2; and links c pivotally connected to one end thereof; with the main shaft, and actuating-pitman b, connected by a pivotal joint with said links c; the forked guide-link d pivotally supported at one end on the framework, and pivotally connected at the other end with the joint between the pitman b and links c, substantially as and for the purpose described.

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

HERBERT H. BUFFUM.

Witnesses:
H. J. LIVERMORE,
JAS. J. MALONEY.