

No. 865,149.

W. M. AMMERMAN. PATENTED SEPT. 3, 1907.
SEWING MACHINE.
APPLICATION FILED SEPT. 18, 1906.

3 SHEETS—SHEET 1.

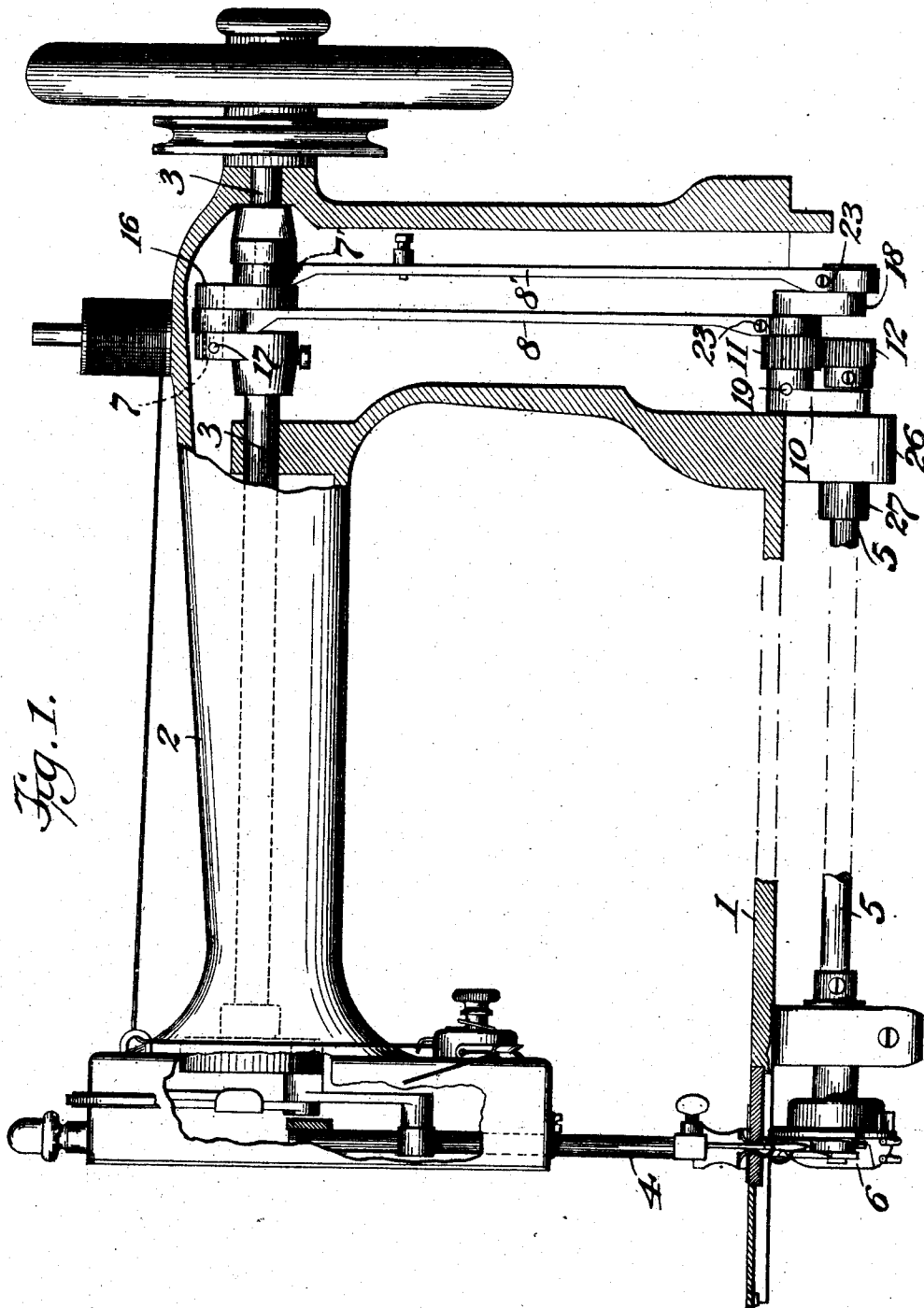


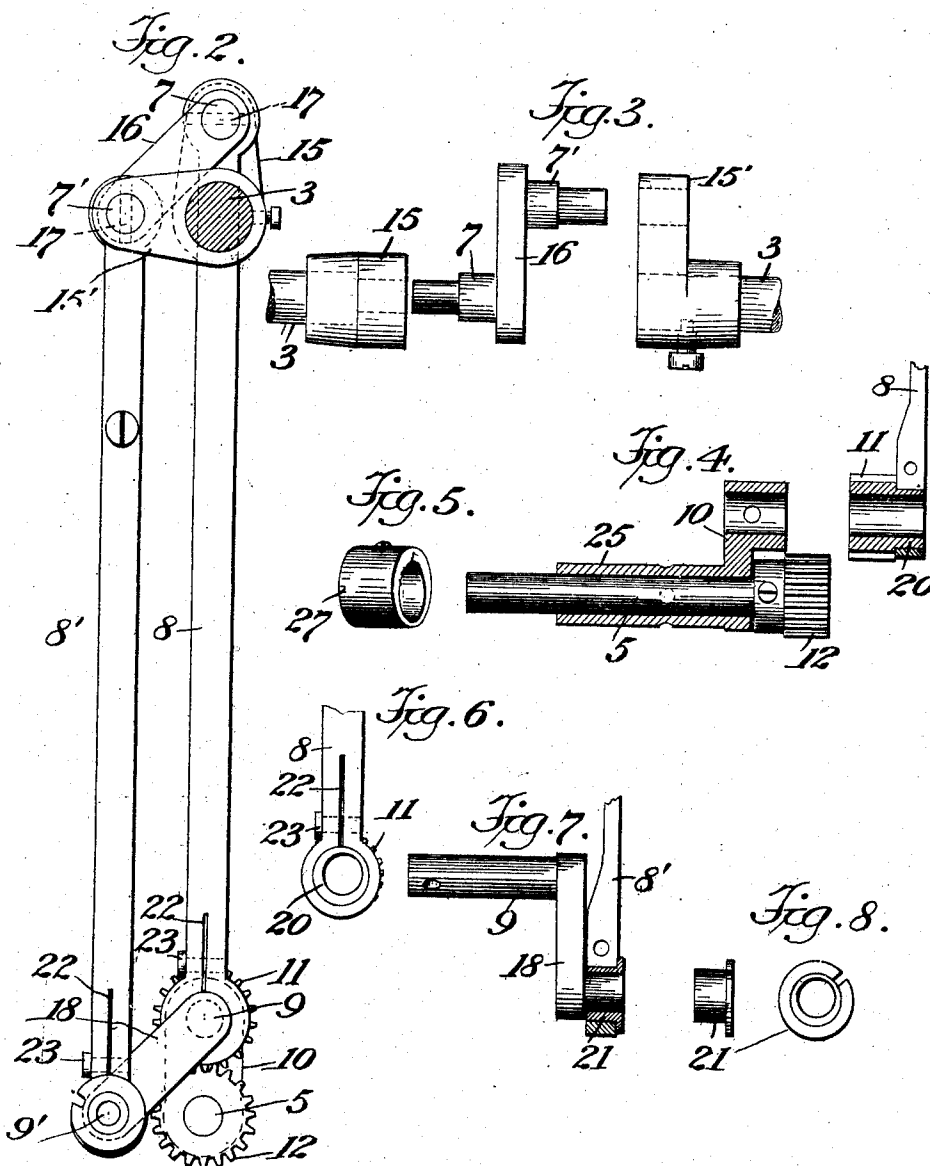
Fig. 1.

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3 SHEETS--SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 9

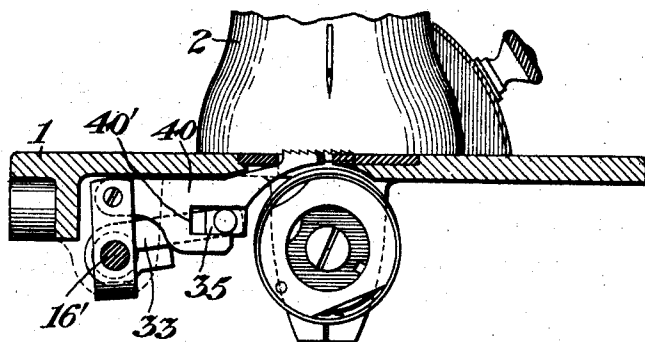


Fig. 10

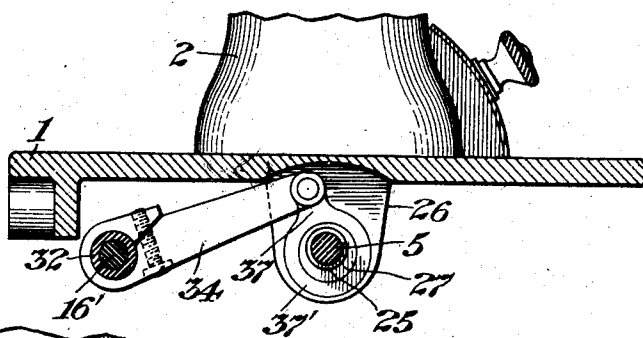
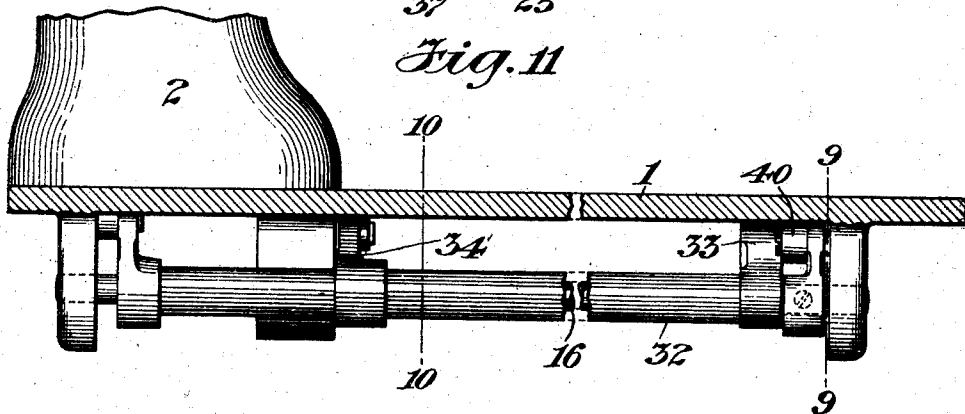


Fig. 11



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UNITED STATES PATENT OFFICE.

WILLIAM M. AMMERMAN, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE EDWIN J. TOOF COMPANY, OF NEW HAVEN, CONNECTICUT, A CORPORATION OF NEW JERSEY.

SEWING-MACHINE.

No. 865,149.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed September 18, 1906. Serial No. 335,089.

To all whom it may concern:

Be it known that I, WILLIAM M. AMMERMAN, a citizen of the United States, and a resident of New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

My invention relates particularly to improvements in sewing machines of the rotary looper type. In this type of machine, the looper is usually rotated with a variable or differential movement so as to properly cooperate with the other parts of the stitch-forming mechanism. Such movement is objectionable, however, in that it obviously increases the vibration of the machine and also causes a greater strain and wear on the operating parts than would be caused if the looper was operated at a uniform speed of movement. Because of such objectionable features incident to the use of a differentially operated looper, it has been the main object of my present invention to provide a simple and efficient means for rotating the looper at a uniform speed of movement.

To this end the invention, in a preferred form thereof, comprises the combination of a double driving crank, a double driven crank, two links operatively connecting said cranks to impart motion from the driving crank to the driven crank and one of said links being provided with a rigidly attached gear to be moved or carried thereby in a circular path, and a looper shaft having a gear in mesh with said link gear to be rotated thereby with a uniform speed of movement.

The invention also includes other features of construction and combinations of parts as hereinafter referred to in detail and pointed out in the appended claims.

Referring now to the accompanying drawings forming part of this specification,—Figure 1 is a front elevation, partly broken away and in section, of a sewing machine embodying my invention. Fig. 2 is an enlarged side view of the cranks and their connections viewed from the right in Fig. 1. Fig. 3 is a plan view of the driving crank with the several parts comprising the same disassembled. Fig. 4 is a sectional detail of a part of the driven crank with one of the connecting links, and also shows the associated end of the looper shaft. Fig. 5 is a detail perspective of a feed-operating-device disconnected from a tubular extension of the driven crank. Figs. 6, 7 and 8 are detail views of the driven crank connections to be hereinafter referred to. Figs. 9 and 10 are

transverse sections on lines 9—9 and 10—10 respectively, of Fig. 11, showing certain of the feed mechanism, and Fig. 11 is a longitudinal sectional elevation of a part of the machine showing certain of the said feed mechanism.

Similar reference characters designate like parts in the several figures of the drawings.

In said drawings, the frame of the machine comprising the bed-plate 1 and overhanging bracket-arm 2, the upper driving shaft 3 supported in bearings in said bracket-arm, the vertically reciprocating needle-bar 4 actuated from the driving shaft through the medium of suitable connections, and the looper shaft 5 supported in bearings at the under side of the bed-plate and carrying a looper 6 at its forward end, are all of usual construction and arrangement as disclosed in my pending application Serial No. 229,627.

In accordance with my present invention as hereinbefore referred to, the driving shaft is provided with two cranks 7, 7' set at right angles to each other, which cranks are connected through the medium of two links 8, 8', with two driven cranks 9, 9', of corresponding throw and relative angular arrangement; the said driven cranks are shown being rigidly united and being carried by one crank-arm proper, indicated at 10, which is loosely mounted on the looper shaft 5 to revolve thereon whereby the axis of the driven cranks will be coincident with that of said looper shaft. Rigidly attached to the link 8 in position adjacent to the driven crank 9 is a gear 11 which meshes with a gear 12 fixed to the looper shaft 5. With this arrangement and organization of parts, the double driving crank 7—7' having a uniformly continuous rotating movement, imparts through the links 8, 8', a corresponding movement to the double driven crank 9—9', and said driven crank, carrying the connecting link gear 11 in a circular path about the intermeshing gear 12 on the looper shaft, imparts a like uniformly rotating movement to said looper shaft. Preferably, and as shown in the drawing, the intermeshing link gear 11 and looper-shaft gear 12 are provided with a like number of teeth whereby the main driving shaft 3 will be caused to impart two revolutions to the looper shaft and looper to each reciprocation of the needle-bar and needle; such relative movements of the looper and needle being necessary for their proper cooperation when the looper is operated at a uniform speed of movement, as in the present case, instead of at a variable speed as ordinarily.

The driving and driven cranks may be formed in any

suitable or desired manner. The double driving crank in the present case comprises the two crank-arms 15, 15', projecting from the shaft 3 in directions at right angles to each other and having openings adjacent to their outer ends which receive the crank pins 7, 7', projecting from opposite sides of an intermediate link 16 and which crank-pins are rigidly connected with the crank arms by fastening-pins 17 passing through openings in the same and which fastening-pins are preferably made tapering to assure a close and rigid union of the parts. This construction of crank is desirable in that it permits of a ready and convenient assembling of the several crank parts and the connecting links. The lower or driven crank is formed similarly to the upper or driving crank with the exception that one of the supporting crank-arms is omitted, the same comprising the supporting crank-arm 10 and the rigidly connected link 18 with its oppositely projecting crank-pins 9, 9', the rigid connection of the link 18 with the arm 10 being effected by the crank-pin 9 entering an opening in said arm and being connected therewith by the fastening-pin 19.

As a means to permit of the ready assembling and adjustment of the cranks and connecting links, I have interposed adjustable eccentric bushings 20 and 21 between the links at one end thereof and the connecting cranks, and formed the links with slits 22 in communication with the openings which receive the bushings whereby the walls of said openings may be rendered adjustable through the medium of screws 23 to clamp and hold the bushings in adjusted position. As shown in the drawings, one of the bushings, indicated at 20, is formed as the hub of the link gear 11.

As a further feature of my present invention, I have formed the hub of the crank-arm 10 with a tubular extension 25 extending through the hanger 26 at the under side of the bed-plate and carrying at its inner end a feed-actuating-device in the form of a cam or eccentric 27; this cam or eccentric being operative through the medium of suitable mechanism to impart to the feed its vertical movement. The tubular extension or shaft 25 projecting through the hanger 26 forms a bearing for the rear end of the looper shaft, and this shaft 25 and the looper shaft 5 and the upper driving shaft 3, by reason of the connections described, are all caused to rotate in the same direction; thereby promoting ease and lightness of running and also lessening friction between the parts.

The cam or eccentric 27 corresponds in function to the cam or eccentric 38 of Letters Patent No. 809,661, issued to me January 9, 1906, and operates to impart to the feed its vertical movement through the medium of substantially like mechanism. This mechanism comprises a tubular rock-shaft 32 mounted on a horizontal shaft 16' as in my aforesaid patent, and being provided with two crank-arms 33 and 34, the arm 33 at the front end of the shaft having a pivotally-mounted block 35 engaging the feed-device 40 within a slot 40' therein, and the arm 34 toward the rear end of the shaft having connection with the arm 37 of a strap 37' embracing the cam or eccentric 27, as shown in Fig. 10. Vertical reciprocation of the arm 37 as caused by the cam or eccentric 27 imparts a rocking movement

to the shaft 32, and thereby an up-and-down movement to the end of its arm 33 which is imparted to the connecting feed-device.

The term "looper" appearing in the foregoing description and in the following claims is used generically to denote either a shuttle, hook, or other similar device adapted to cooperate with the needle in the formation of a stitch.

What I claim as my invention is:—

1. In a sewing machine, the combination of a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, a shaft having a gear in operative connection with the link gear to receive motion therefrom, and a looper actuated from said shaft.
2. In a sewing machine, the combination of a driving shaft having a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, a looper shaft having a gear in operative connection with the link gear to receive motion therefrom, a looper actuated from said looper shaft, and a needle-bar actuated from the driving shaft.
3. In a sewing machine, the combination of a driving shaft having a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, a looper shaft having a gear in operative connection with the link gear to receive motion therefrom, a looper actuated from said looper shaft, a feed-operating-device actuated from said driven crank, and a needle-bar actuated from the driving shaft.
4. In a sewing machine, the combination of a driving shaft having a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, a looper shaft provided with a gear having the same number of teeth as the link gear and being held in mesh with the latter to receive motion therefrom, a looper actuated from said looper shaft, and a needle-bar actuated from the driving shaft.
5. In a sewing machine, the combination of a driving shaft having a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, a looper shaft provided with a gear having the same number of teeth as the link gear and being held in mesh with the latter to receive motion therefrom, a feed-operating-device actuated from said driven crank, and a needle-bar actuated from the said driving shaft.
6. In a sewing machine, the combination of a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, a shaft having a gear in operative connection with the link gear to receive motion therefrom, a looper actuated from said shaft, a hollow shaft fitted over the looper shaft and having connection with the driven crank to be revolved thereby, and a feed-operating-device carried and actuated by said hollow shaft.
7. In a sewing machine, the combination of a driving crank, a driven crank, a link operatively connecting said cranks and being provided with a gear rigidly attached thereto, an eccentric bushing adjustably interposed between the link and one of the cranks, a shaft having a gear in operative connection with the link gear to receive motion therefrom, and a looper actuated from said shaft.
8. In a sewing machine, the combination of a driving crank, a driven crank, a link operatively connecting said cranks, a gear rigidly attached to said link and having a hollow eccentric hub interposed as a bushing between the link and one of the cranks, a looper, and a looper shaft having a gear in operative connection with the link gear to receive motion therefrom.
9. In a sewing machine, the combination of a double driving crank the two members of which are set at an angle to each other, a double driven crank the two members of which are set at an angle to each other corresponding to that of the driving crank, two links operatively con-

necting said cranks and one being provided with a gear rigidly attached thereto, a looper, and a looper shaft having a gear in operative connection with the link gear to receive motion therefrom.

- 5 10. In a sewing machine, the combination of a double driving crank the two members of which are set at an angle to each other, a double driven crank the two members of which are set at an angle to each other corresponding to that of the driving crank, two links operatively connecting
10 said cranks and one being provided with a gear rigidly attached thereto, an eccentric bushing adjustably inter-

posed between each of the two links and one of the connecting cranks, a looper, and a looper shaft having a gear in operative connection with the link gear to receive motion therefrom.

Signed at New Haven, in the county of New Haven, and State of Connecticut, this 27th day of August, A. D. 1906.

WILLIAM M. AMMERMAN.

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