

G. M. EAMES & J. S. FINCH.  
 SEWING MACHINE.  
 APPLICATION FILED DEC. 14, 1911.

1,155,050.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.

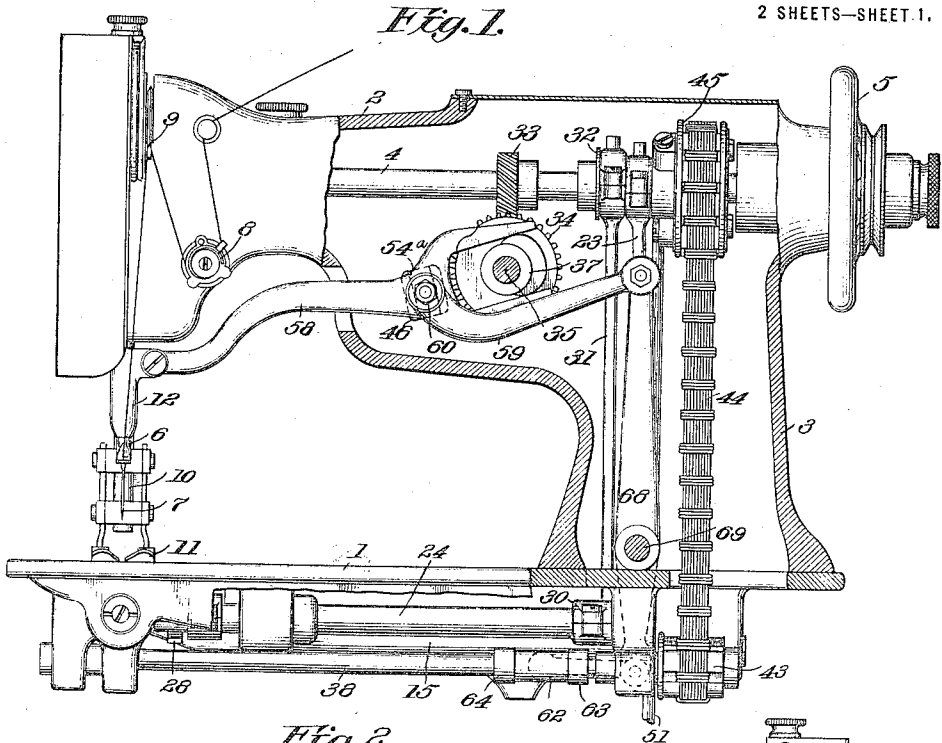
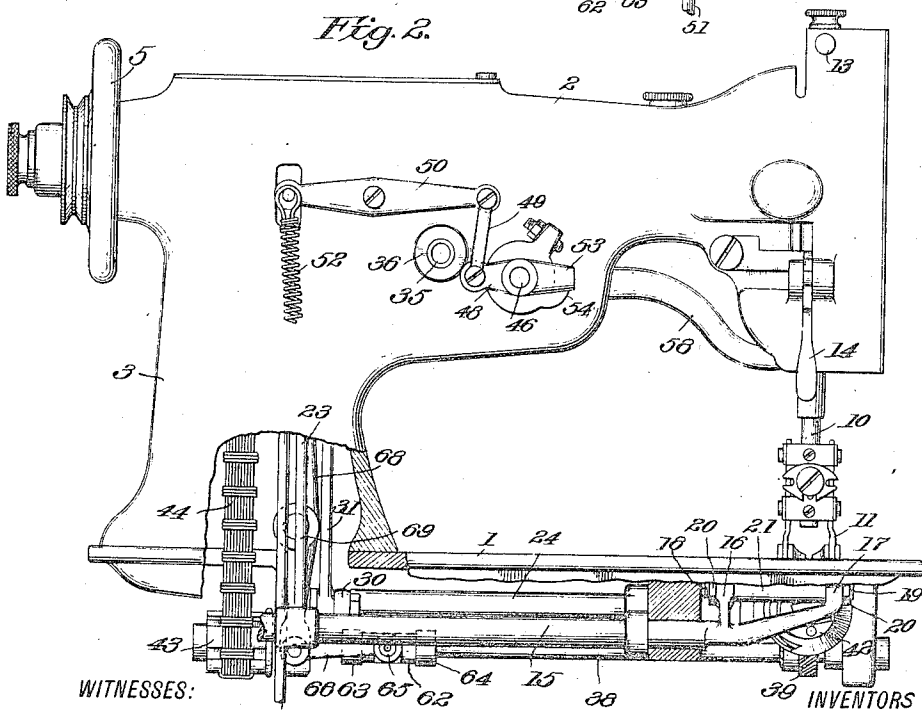


Fig. 2.



WITNESSES:

R. C. Fischer  
 Gisa Tuma

INVENTORS  
 George M. Eames  
 and  
 John S. Finch.  
 BY  
 F. H. Ostrom.  
 ATTORNEY

G. M. EAMES & J. S. FINCH.  
 SEWING MACHINE.  
 APPLICATION FILED DEC. 14, 1911.

1,155,050.

Patented Sept. 28, 1915.  
 2 SHEETS—SHEET 2.

Fig. 3.

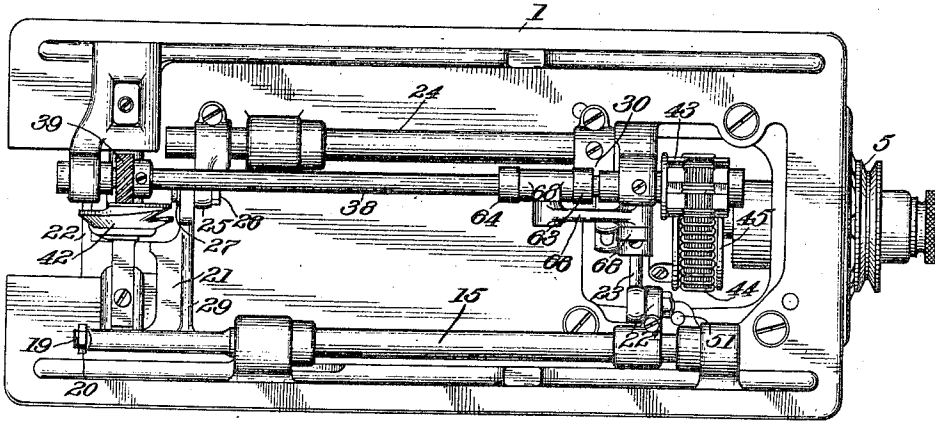


Fig. 4.

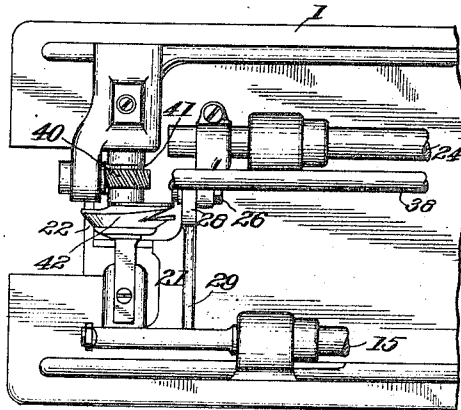


Fig. 5.

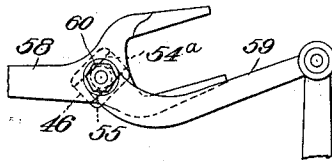
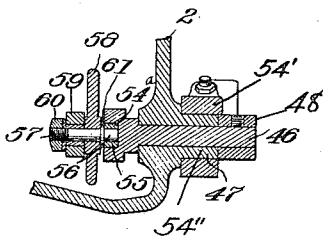


Fig. 6.



WITNESSES:

R. C. Fischer

G. J. Juma

INVENTORS.  
 George M. Eames.  
 and  
 John S. Finch.

BY  
 J. H. Cotton  
 ATTORNEY

# UNITED STATES PATENT OFFICE.

GEORGE M. EAMES AND JOHN S. FINCH, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS TO  
THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

## SEWING-MACHINE.

1,155,050.

Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed December 14, 1911. Serial No. 665,643.

*To all whom it may concern:*

Be it known that we, GEORGE M. EAMES and JOHN S. FINCH, citizens of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to that class of sewing machines employing a needle-carrying bar having movements first in one and then in the other of two vertical planes for effecting a seam comprising zigzag stitches, and has for its object to provide improved means for retarding and accelerating the movements of the loop-taker to meet the requirements of the two separate lines of needle actuation. In the present device this object is attained without interfering with the construction or arrangement of the train of elements regularly employed in straight-away sewing machines of the same class for transmitting power from the main or needle-bar-driving shaft to the loop-taker shaft, thus preventing increased lost motion and the weakening of said train by inserting additional elements, and permitting the employment of a one-part loop-taker-actuating shaft, whereby certain difficulties existing in such heretofore proposed means are obviated.

In the accompanying drawings illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a view in front side elevation of a sewing machine equipped with the present invention, the bracket arm and bed-plate being broken out to better illustrate certain details in construction later to be referred to, and Fig. 2 is a rear side view of Fig. 1, the like elements being broken out for the same purpose. Fig. 3 is an underside view of the previous figures. Fig. 4 is a view corresponding to the front end portion of Fig. 3, the spiral gear carried by the loop-taker-actuating shaft being omitted to bring to view its coacting gear carried by the loop-taker shaft. Figs. 5 and 6 are views in full lines and in section, respectively, of the means employed for controlling the amplitude of vibration of the needle-bar.

The present invention is shown as applied to a Singer 107w class machine, substantially

the same as is represented by United States allowed application of C. F. Gray, Serial No. 314,671, filed May 1, 1906, but as it relates mainly to the construction and application of the means for maintaining a given relative action of loop-taker and needle, only such reference will be made to the other elements of the machine as is deemed necessary for a proper understanding of its application.

Referring to the figures, 1 represents the bed-plate of the sewing machine upon which is mounted the bracket arm comprising the arm bracket 2 and standard 3, 4 the main or needle-bar-driving shaft provided at its rear end with a band or hand wheel 5 and at its opposite end with a commonly employed shaft flange (not shown) to which is pivotally connected the usual needle-bar-actuating link (not shown) operatively connected with the needle-bar 6 carrying the eye-pointed needle 7, 8 and 9 the needle-thread tension and take-up, respectively, 10 the cloth-presser-carrying bar and 11 the cloth-presser. The needle-carrying bar 6 is mounted to move vertically in the needle-bar-carrying frame 12 pivoted at its upper end on a suitable stud bolt threaded into the bracket arm, as shown at 13, Fig. 2, and 14 represents the presser-lifting lever for moving the cloth-presser vertically to accommodate the positioning of the fabric with respect to the line of needle actuation.

15 represents the feed-shaft mounted in suitable bearings formed at the underside of the bed-plate and having formed integral with it bearings 16 and 17 into which are threaded the respective pintle screws 18 and 19 secured against accidental movement by nuts, as 20, and upon said pintle screws is pivoted a feed-dog-carrying bracket 21 provided with a feed-dog 22, the opposite end of said shaft being connected by an arm 22' with a feed-connection 23, the upper end of which latter embraces the usual feed-connection eccentric (not shown) carried by the main shaft, thus transmitting from said last mentioned shaft feed movements to the feed-dog.

24 represents the feed-lift shaft mounted in the manner of the shaft 15 and carrying at its forward end an arm 25 provided with a stud screw 26 carrying a slide block 27 which engages the usual slot (not shown) formed in one end 28 of a lever 29, the latter

forming a part of the feed-dog-carrying bracket 21. The opposite end of said feed-lift shaft is connected by an arm 30 with a feed-lift connection 31 the upper end of which embraces a feed-lift eccentric 32 carried by the main shaft, from which latter vertical movements are transmitted to the feed-dog.

33 represents a spiral gear carried by the main shaft, said gear meshing with a spiral gear 34 carried by a cam shaft 35 mounted at one end in a bearing 36 formed in the bracket arm and at its opposite end in a suitable bearing formed in the bracket arm plate (not shown), and as said gears are of the ratio of two to one, the cam shaft 35 is given two rotations to one rotation of said main shaft. On the cam shaft 35 is mounted a needle-vibrating cam 37, later to be referred to.

38 represents a rotary loop-taker-actuating shaft mounted in suitable bearings depending from the sewing machine bed-plate and carrying at its forward end a spiral gear 39 which meshes with a like gear 40 secured on the rotary loop-taker shaft 41, the latter being mounted in the usual manner below said bed-plate and carrying a loop-taker 42. Upon the rear end of the shaft 38 is secured a belt-driven pulley 43 operatively connected by a belt 44 with a belt-driving pulley 45 carried by the main shaft. Said belt driving and driven pulleys are of the ratio of two to one, thus giving to the loop-taker shaft two rotations to one rotation of said main shaft.

All of the foregoing parts are usually found in sewing machines of the present class, and are herein shown as best representing one form of construction to which the present invention is applicable.

Referring now to the parts more directly connected with the present invention, 46 represents an oscillating cam shaft mounted in a bearing 47 formed in the bracket arm and carrying at its outer end a crank arm 48 connected by a link 49 with one end of a rock lever 50 the opposite end of which is connected with a rod 51 which in turn is moved vertically at the will of the operator through a suitable knee lever (not shown) and in opposition to the resiliency of the spring 52, the latter normally acting to hold the end 53 of the crank arm 48 in contact with a stationary lug 54, forming a part of the collar 54' secured on the hub 54'' of the bearing 47, or in position to hold the needle-bar against lateral or zigzag movements.

The inner end of the shaft 46 is provided with a groove 54<sup>a</sup> in which tracks a slide block 55 mounted on the end 56 of a stud 57 which passes through a needle-carrying frame connection 58 and through a shifting lever connection 59, and is secured by a nut 60 and flange 61 against movement in the

direction of its length, the connection 58 being forked to embrace the cam 37 and at its opposite end pivotally connected to the needle-bar-carrying frame.

62 represents a sleeve loosely mounted on the shaft 38 and held against lengthwise movement on said shaft by collars 63 and 64, said sleeve having formed integral with it a bearing hub 65 upon which is pivoted one end of the loop-taker actuating shaft link 66, the opposite end of said link being pivotally attached to the lower end of the loop-taker-actuating shaft shifting lever 68 mounted to oscillate on a bearing stud 69 secured in the standard 3 and pivotally connected at its upper end with the shifting lever connection 59.

From the foregoing it will be readily understood that provision is made for actuating the needle-carrying bar either in a given vertical plane, as when effecting the ordinary straight-away seam, or in two separate vertical planes, as when effecting the so-termed zigzag seam, and that when effecting the last mentioned seam the looper-actuating shaft will be given movements in the direction of its length from the eccentric 37, through the connections 58, 59, 68, 66 and 62, thus causing the gear 39 to accelerate or retard the movements of the gear 40 depending upon whether the shaft is given movements in the direction of its length toward the front end of the machine or in the opposite direction.

Supposing the shaft 46 to be in its normal position, as illustrated in dotted lines, Fig. 1, and full lines, Fig. 2, the slide block 55 will be moved in and parallel with the groove 54<sup>a</sup>, by the action of the cam 37 on the connection 58, without transmitting through said connection movements to the needle-bar-carrying frame 12 or shifting lever 68; but when, at the will of the operator, the shaft 46 is adjusted to the position illustrated by dotted lines, Fig. 5, the movements of the slide-blocks 55 will be at an angle to the groove 54<sup>a</sup> thus causing the connection 58 to be moved in the direction of its length and transmit to the frame 12 movements to cause the needle to form stitches in separate vertical planes and, through the connections 59, 68, 66 and 62, move the shaft 38 in the direction of its length, which causes the teeth of the gear 39 to act upon the teeth of the gear 40 to accelerate or retard the rotary movements of the loop-taker to correspond with the separate lines of needle actuation, thus maintaining a given timing of needle and loop-taker in the formation of the successive zigzag stitches.

By reference to Figs. 1, 2 and 4, it will be readily understood that the width of the face of the pulley 43 is sufficient to permit of the shaft 38 being moved in the direction of its length a distance sufficient to effect the

function of retarding or accelerating the movements of the loop-taker without interfering with the driving action of the belt 44.

We claim:—

5 1. In a sewing machine, the combination with fabric-feeding and stitch-forming mechanisms including a main-shaft, a loop-taker shaft provided with a loop-taker and a spiral-gear, a loop-taker actuating shaft  
10 operatively connected at one end with said main-shaft and at its opposite end provided with a spiral-gear, the latter coacting with the spiral-gear carried by said loop-taker shaft to transmit to said loop-taker stitch-  
15 forming movements, a needle carrying-bar, a needle and means for imparting to the latter jogging movements, of connections including said loop-taker actuating shaft for transmitting to one of said spiral-gears  
20 movements in directions transverse to the axis of said coacting spiral-gear, whereby the movement of said loop-taker is accelerated and retarded to maintain its proper timing with respect to the movements of said  
25 needle in different lateral positions.

2. In a sewing machine, the combination with fabric-feeding and stitch-forming mechanisms including a main shaft, a loop-taker-actuating shaft, a loop-taker shaft  
30 provided with a loop-taker, a needle and a needle-carrying bar, the latter having movements first in one and then in the other of two vertical planes, of means including a  
35 needle-vibrating cam actuated from said main shaft and an oscillating cam shaft for giving to said loop-taker-actuating shaft movements in the direction of its length, whereby the movements of said loop-taker  
40 are accelerated and retarded to maintain a given timing of said loop-taker with respect to the movements of said needle in different vertical planes.

3. In a sewing machine, the combination

with fabric-feeding and stitch-forming mechanisms including a main shaft, a loop-taker-actuating shaft, a loop-taker shaft  
45 provided with a loop-taker, a needle and a needle-carrying bar, the latter having movements first in one and then in the other of two vertical planes, of means including a  
50 needle-vibrating cam actuated from said main shaft, an oscillating cam shaft, and a sleeve mounted on said loop-taker-actuating shaft for giving to said last mentioned shaft movements in the direction of its length,  
55 whereby the movements of said loop-taker shaft are controlled to maintain a given timing of said loop-taker with respect to the stitch-forming movements of said needle in different vertical planes.

4. In a sewing machine, the combination with a vertically reciprocating needle and needle-jogging means for imparting to the  
60 needle lateral movements, of a loop-taker actuating shaft, means for imparting thereto operative turning movements, means for imparting to said shaft endwise movements corresponding in frequency with the needle-jogging movements, a loop-taker shaft, a  
65 loop-taker operatively connected therewith and having its axis of movement substantially coincident with that of said loop-taker shaft, and means including spiral gears  
70 mounted directly upon said actuating and loop-taker shafts whereby both movements of the former are transmitted to the latter  
75 in turning movements.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

GEORGE M. EAMES.  
JOHN S. FINCH.

Witnesses:

F. W. CUTTING,  
ABBIE M. DONIHEE.