

Feb. 2, 1932.

F. M. CARD

1,843,896

ORNAMENTAL SEAM SEWING MACHINE

Filed June 9, 1930

3 Sheets-Sheet 1

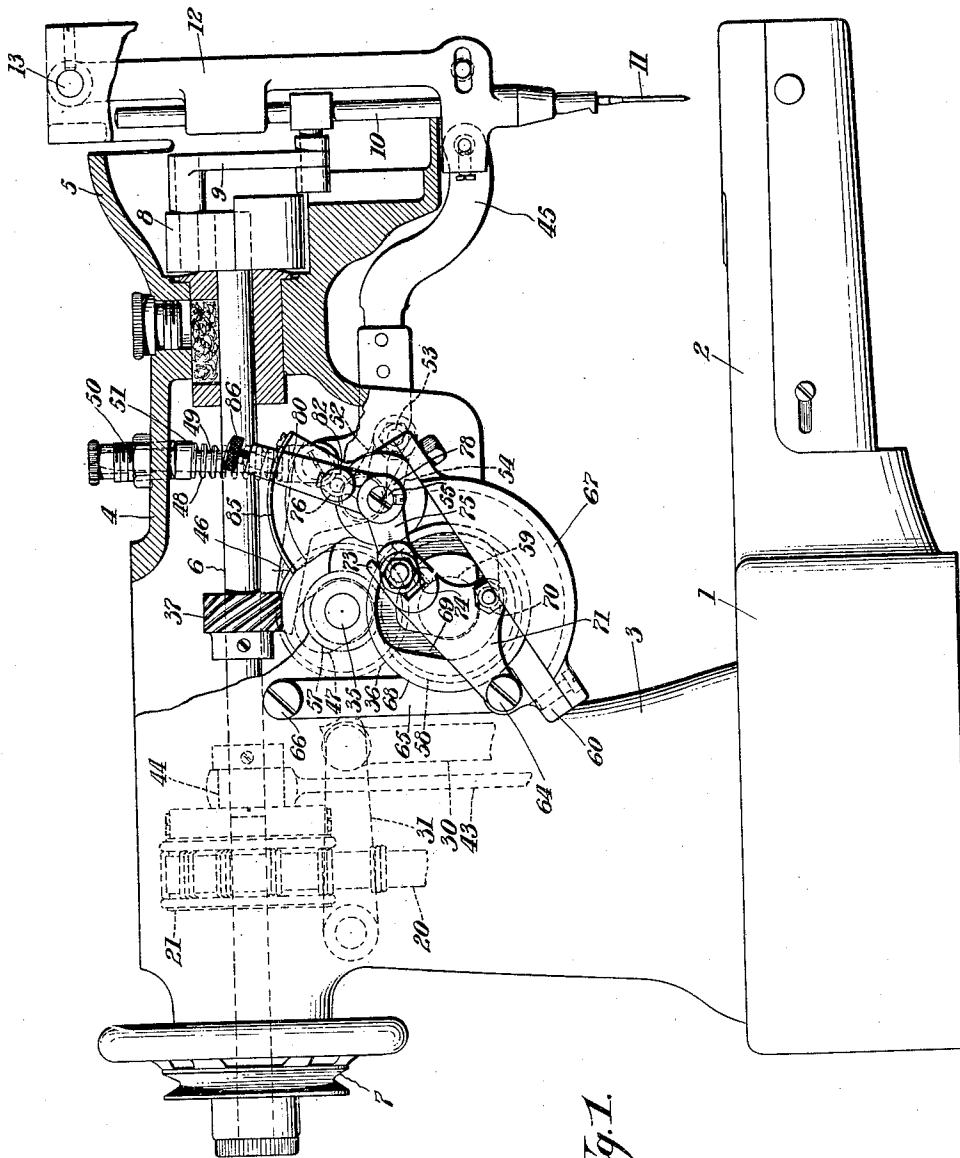


Fig. 1.

Witnesses.
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Joseph Seim

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3 Sheets-Sheet 2

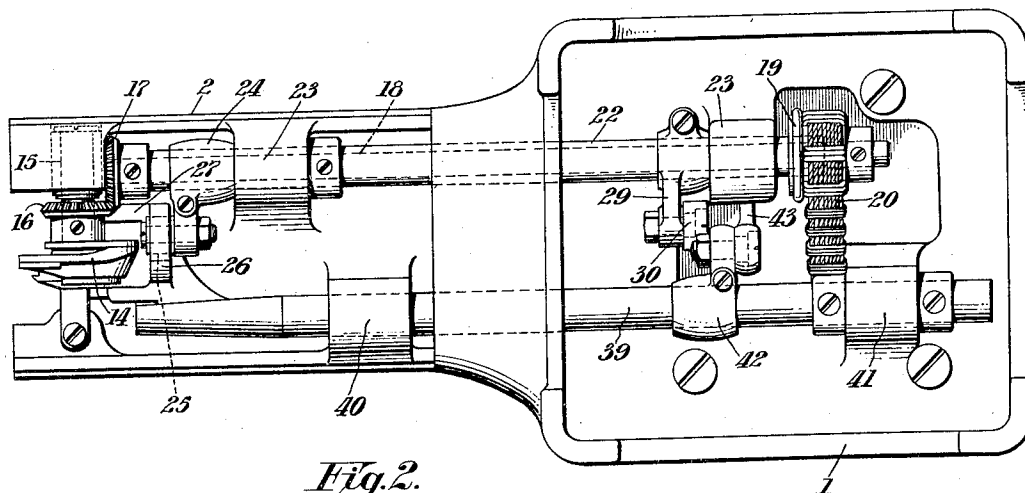


Fig. 2.

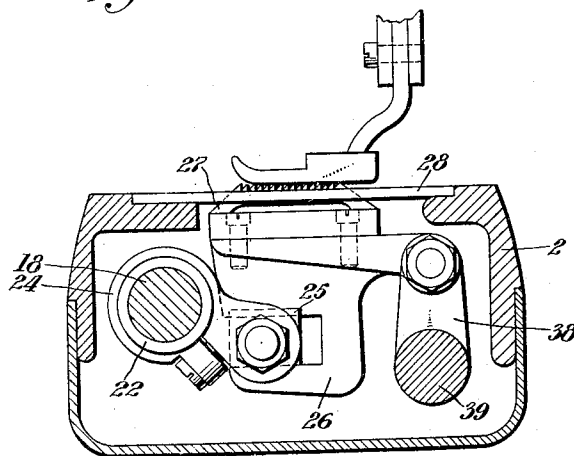


Fig. 3.

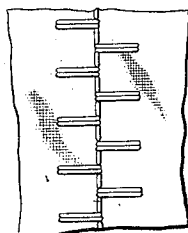


Fig. 4.

Witnesses.
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3 Sheets-Sheet 3

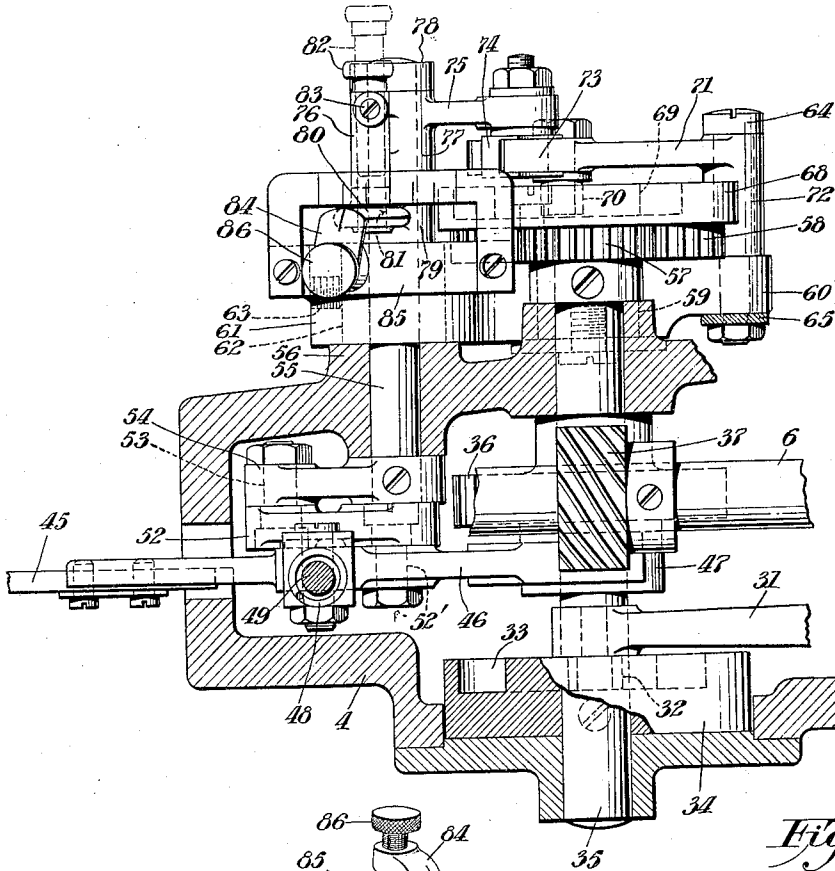


Fig. 5.

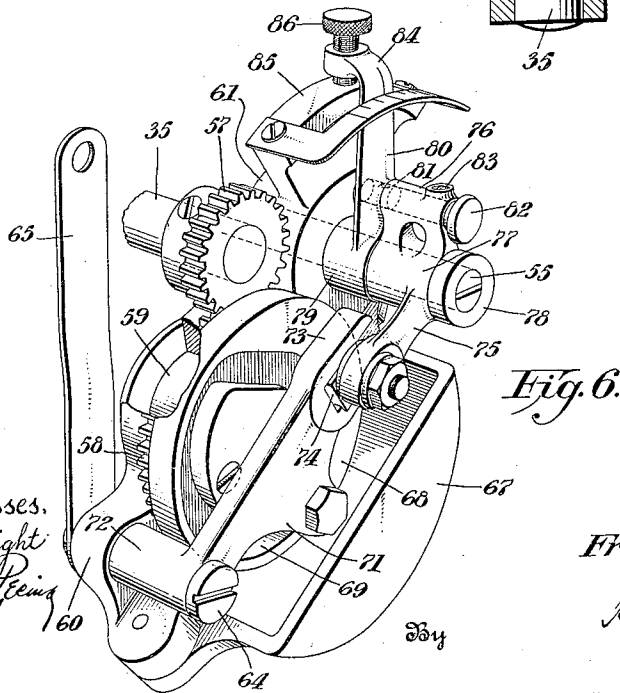


Fig. 6.

Witnesses.
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UNITED STATES PATENT OFFICE

FREDERIC M. CARD, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE SINGER MANUFACTURING COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY

ORNAMENTAL SEAM SEWING MACHINE

Application filed June 9, 1930. Serial No. 459,875.

This invention relates to improvements in ornamental seam sewing machines and has for its primary object to increase, in a simple manner, the range of production of machines of this type.

The object and advantages in view, together with means whereby the same may be carried into effect, will best be understood from the following description of a preferred embodiment thereof illustrated in the accompanying drawings, in which:—

Fig. 1 is a rear side elevation, partly in section, of the improved ornamental seam sewing machine. Fig. 2 is a bottom plan view of the machine base and work-supporting arm. Fig. 3 is a transverse section of the work-supporting arm adjacent the stitching point. Fig. 4 is a top plan view of a seam produced by the present machine. Fig. 5 is a horizontal section of a portion of the machine bracket-arm, illustrating, in top plan view, the needle-bar controlling mechanism and omitting the oil-guard bracket. Fig. 6 is a perspective view, partly in section, of the needle-position controlling mechanism.

Referring to the drawings, the sewing machine has a frame comprising a base 1 from which projects a work-supporting arm 2. Rising from the base 1 is the standard 3 of a tubular bracket-arm 4, overhanging the arm 2 and terminating in a head 5.

Journalled in the bracket-arm 4 is a main actuating shaft 6 carrying at its outer end a combined belt-pulley and balance-wheel 7, and at its opposite end a crank-disk 8 connected in the usual manner by means of a link 9 with a needle-bar 10, carrying a needle 11. The needle-bar 10 is journalled for endwise, substantially vertically reciprocatory movements in suitable bearings provided in a swinging frame 12 pivotally supported at its upper end upon a fulcrum-pin 13 secured in the head 5 to provide a frame-axis transverse to the axis of rotation of the main-shaft 6.

Cooperating with the needle 11 in the formation of lock-stitches is a loop-taker 14, of the rotary hook type and carried by a short shaft 15 journalled in the free end of the work-supporting arm 2 so as to be disposed trans-

versely of the path of needle vibration. The loop-taker shaft 15 carries a bevel-gear 16 in mesh with a similar gear 17 upon one end of a loop-taker actuating shaft 18 carrying at its opposite end a pulley 19 connected by a cleated belt 20 with a driving pulley 21 fixed upon the main-shaft 6. In the present machine, the belt-pulleys are proportioned so that the loop-taker rotates twice for each needle reciprocation.

The loop-taker actuating shaft 18 is rotatively journalled within a hollow, feed-lift rock-shaft 22, which is in turn journalled in spaced bearing-lugs, as 23, within the work-supporting arm 2. Clamped upon the rock-shaft 22 is a crank-arm 24 carrying a pivot-block 25 slidably disposed in a suitable slot provided in a feed-bar 26, upon which feed-bar is secured a feed-dog 27 operating through a throat-plate 28 secured upon the free end of the arm 2.

The feed-lift rock-shaft 22 of the present machine is actuated in a well known manner to receive only one complete rocking movement for three complete rotations of the main-shaft 6, so that the feed-dog 27 is projected above the throat-plate once only during three complete needle reciprocations. The actuating mechanism of the rock-shaft 22 is disclosed, for instance, in the U. S. Patent of W. Myers, No. 1,825,634, Sept. 29, 1931, and comprises, in general, a crank-arm 29 clamped upon the rock-shaft 22 and connected by a link 30 with a rock-lever 31 fulcrumed upon the machine bracket-arm. The rock-lever 31 carries a roller 32 tracking a suitably shaped cam-groove 33 provided in the inner face of a cam-disk 34 fixed upon a rotary shaft 35, journalled in the bracket-arm 4 below and disposed transversely of the main-shaft 6. The cam-shaft 35 carries a spiral gear 36 driven by a similar but smaller gear 37 fixed upon the main-shaft 6, the proportions of the gears 36 and 37 being such that the cam-shaft 35 is rotated once only for three rotations of the main-shaft.

To impart work-advancing and return movements to the feed-dog 27, the feed-bar 26 is pivotally connected with a crank-arm 38 of a feed rock-shaft 39 journalled in bear-

ings provided in a lug 40 within the work-supporting arm 2 and a lug 41 within the machine base 1. Suitably clamped upon the feed shaft 39 is a crank-arm 42 connected with a pitman 43 of which the upper end has a strap embracing an eccentric 44 adjustably secured in the usual manner upon the main-shaft 6.

The swinging needle-bar frame 12 is pivotally connected with one end of a vibratory member 45 of which the opposite end has an offset arm 46 resting upon a cam 47 carried by the transverse cam-shaft 35. As more fully disclosed in the before mentioned patent of W. Myers, No. 1,825,634, the arm 46 of the vibratory member 45 is yieldingly maintained in contact with the cam 47 by means of a spring 48 coiled about a vertically disposed rod 49 of which the lower end is pivotally connected with the member 45. The tapered upper end of the rod 49 is guided by and has sufficient clearance within a bushing 50, adjustably threaded into an aperture in the bracket-arm 4, to provide for the relatively short, lateral vibrations imparted to the lower end of the rod by the needle jogging movements of the member 45. Preferably a swivel-washer 51 is interposed between the upper end of the spring 48 and the lower end of the bushing 50.

The cam 47 imparts lateral vibratory movements to the member 45 about its pivotal connection with the swinging frame 12. These lateral movements of the member 45 are in part converted into endwise reciprocatory movements thereof by a fulcruming device for said member consisting of a link 52 pivotally connecting the member with a shouldered fulcrum-bolt 53 carried by an arm 54 suitably secured upon an adjusting shaft 55. The shaft 55 is substantially part of the member 45 to be in part converted in an apertured bearing-boss 56 provided at the rear side of the bracket-arm 4. In the operation of the machine, the point of pivotal connection 52' of the link 52 with member 45 swings in an arc about the bolt 53 when the member is vibrated by the cam 47. When the fulcrum-bolt 53 is located in an imaginary line connecting the axis of the cam-shaft 35 and the point of pivotal connection of the member 45 with the needle-bar frame, the swinging movements of the link 52 about the fulcrum-bolt 53 cause no appreciable endwise movement of the member 45 and consequently the needle-bar reciprocates vertically in a central or neutral path. However, when the fulcrum-bolt 53 is positioned either above or below said imaginary line, there develops a component of motion of the link 52 which causes the lateral vibrations of the member 45 to be in part converted into endwise movements thereof whereby jogging movements are imparted to the needle-bar either to the left or to the right of

said neutral path of the needle-bar dependent upon whether the fulcrum-bolt is disposed above or below said imaginary line.

The mechanism hereinbefore described is embodied in a commercial machine well known in the art and it was the prior practice to provide manually operated means for swinging the fulcrum-bolt 53 into fixed positions determining the desired extent of needle-jogging movements at the selected side of said neutral position. In accordance with the present improvement, there is provided an actuating mechanism which may be conveniently coupled with the fulcrum-bolt adjusting means for automatically changing the field of needle-jogging movements from one side to the other of the neutral position of the needle alternately with pairs of successive reciprocations of the needle in its neutral path of non-vibration. The feed-lift actuating mechanism is timed to be effective only between the successive reciprocations of the needle in said neutral path. To this end, a pinion 57 is secured upon the end of the cam-shaft 35 projecting rearwardly beyond its bearing in the bracket-arm, which pinion is in mesh with a spur-gear 58 carried by a stub-shaft 59 journaled in a bearing aperture provided in a bracket 60 secured upon the rear side of the machine bracket-arm 4. In the present machine, the bracket 60 has at one end an apertured boss 61 mounted upon a reduced extension 62 of the bearing-boss 56 and secured thereupon by a screw 63. At its opposite end, the bracket 60 is connected by a shoulder bolt 64 to a supporting bar 65 secured by a screw 66 upon the bracket-arm 4. Detachably fastened to the under side of the bracket 60 is a segmental oil-guard bracket 67.

Suitably secured upon the spur-gear 58 is a cam-disk 68 having in its rear face a cam-groove 69, the ratio of the gears 57, 58 being such that the cam-disk 68 is rotated at one half the speed of rotation of the cam-shaft 35, i. e., at one sixth the speed of rotation of the main-shaft 6. The cam-groove 69 is entered by a cam-roller 70 carried by a vibratory arm 71 having its hub 72 journaled upon the bracket-securing bolt 64. The vibratory arm 71 is provided with a fork 73 embracing a pivot-block 74 carried by an arm 75 of an elbow-lever 75, 76 having its hub 77 loosely journaled upon the adjusting shaft 55, i. e., upon an axis coincident with the axis of the shiftable fulcrum-bolt 53. The lever-hub 77 is disposed between a shaft collar 78 and the hub 79 of an adjusting-arm 80 suitably secured upon the shaft 55. The adjusting-arm 80 has an apertured 81 adapted to be entered, in the aligned position of the parts, by a coupling pin 82, shiftable disposed in the apertured free end of the lever-arm 76 and secured therein by a set-screw 83.

The adjusting-arm 80 has a laterally bent

free end 84 overhanging a segmental extension 85 of the bracket 60. Threaded into the overhanging end 84 of the adjusting-arm is a securing screw 86, which may be employed to lock the adjusting-arm to the stationary bracket-segment 85, in different selected positions of said arm when the coupling pin 82 is withdrawn from the adjusting-arm aperture 81. Consequently, the machine may be employed as heretofore, in effecting the production of lateral and return stitches at one or the other side of the neutral position of the needle and in the non-feeding position of the feed-dog, it being understood that with the present timing of the parts, the feed-dog advances the work only between successive reciprocations of the needle while in its neutral position.

When it is desired to employ the herein described mechanism for automatically controlling the adjustment of the position of the fulcrum-bolt 53, the adjusting-arm securing screw 86 is released from engagement with the bracket segment 85 and the lever-arm 76 is connected with the adjusting arm 80 by means of the coupling pin 82. As thus operatively connected with the cam-actuated arm 71, the adjusting-arm 80 is intermittently shifted to change the positions of the fulcrum-bolt 53, whereby a seam as indicated in Fig. 4 of the drawings is produced by the stitch-forming mechanism. By changing the relative timing of the parts, it is evident that several variations may be effected in the ornamental seam produced.

Having thus set forth the nature of the invention, what I claim herein is:—

1. In a sewing machine, a reciprocatory needle-carrying bar, a rotary needle-reciprocating shaft operatively connected with said bar, a cam-shaft disposed transversely of the needle-reciprocating shaft, a needle-jogging member actuated from said cam-shaft, a swinging link pivotally connected with said member, an adjusting shaft carrying a shiftable support for said link, an arm carried by said adjusting shaft, a lever fulcrumed upon an axis coincident with the axis of the adjusting shaft, coupling means connecting said lever and the adjusting-shaft arm, and means for actuating said lever to intermittently shift said link-support in a direction cross-wise of the needle-jogging member.

2. In a sewing machine, a reciprocatory needle-carrying bar, a rotary needle-reciprocating shaft operatively connected with said bar, a cam-shaft disposed transversely of the needle-reciprocating shaft, a needle-jogging member actuated from said cam-shaft, a swinging link pivotally connected with said member, an adjusting-shaft carrying a shiftable support for said link, a needle-jogging member controlling lever, means for disconnectibly coupling said lever and said adjusting-shaft, means for intermittently rock-

ing said lever to thereby determine different paths of needle reciprocation, and means for adjustably securing said adjusting shaft against movement in the disconnected condition of said coupling means.

In testimony whereof I have signed my name to this specification.

FREDERIC M. CARD.

CERTIFICATE OF CORRECTION.

Patent No. 1,843,896.

Granted February 2, 1932, to

FREDERIC M. CARD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 42, strike out the words "of the member 45 to be in part converted" and insert instead the syllable and words *allel* with the cam-shaft 35 and is journaled, and line 125, for "apertured" read aperture; page 3, line 72, for "named" read name; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of March, A. D. 1932.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.