Dec. 21, 1926. 1,611,372

I. RADER

CONTROL ATTACHMENT FOR EMBROIDERY SEWING MACHINES

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Fig. 1

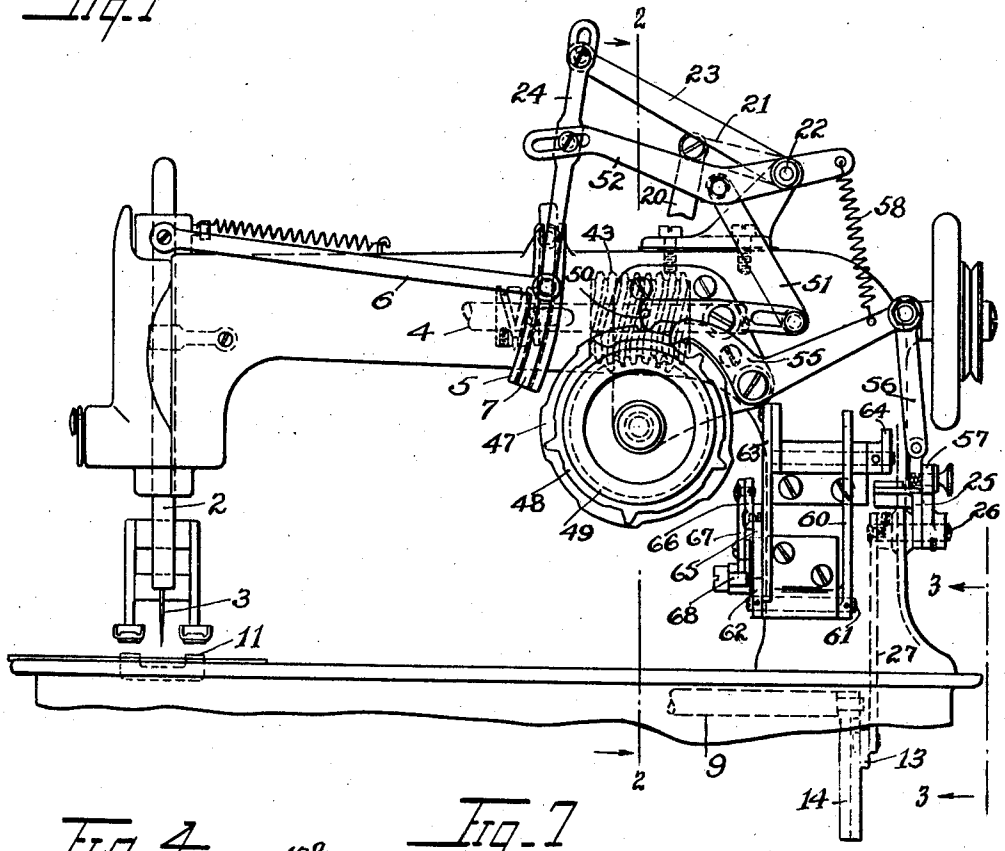


Fig. 4

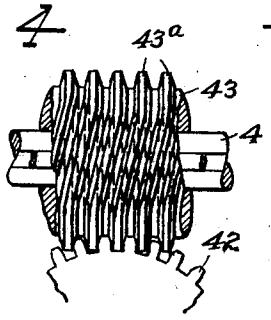
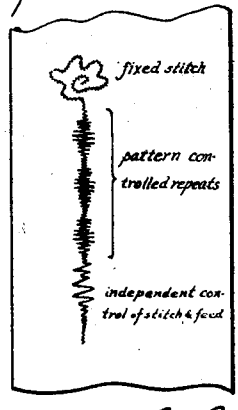


Fig. 7



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Fig. 2

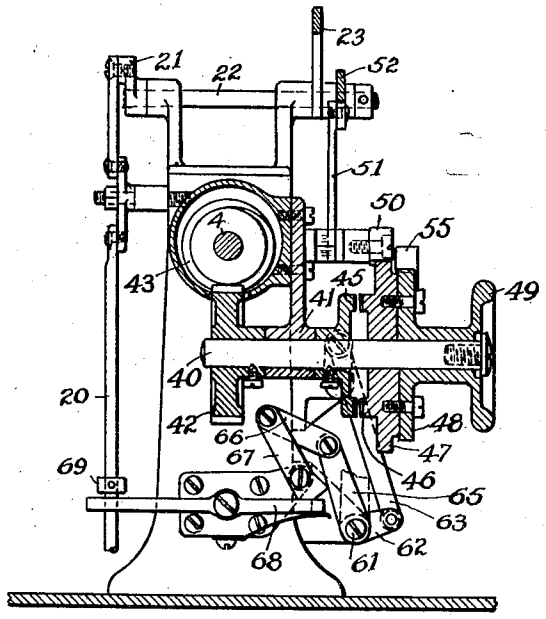


Fig. 3

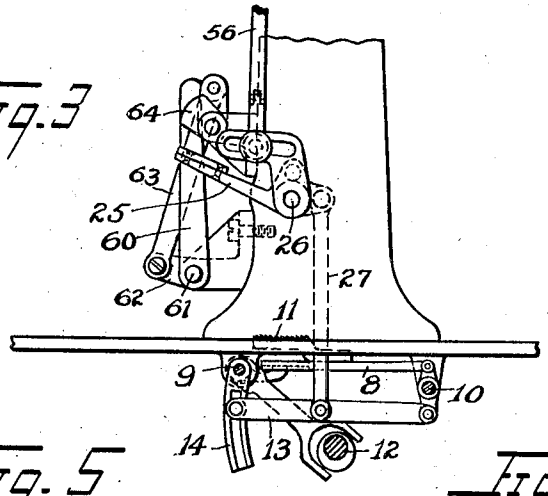


Fig. 5

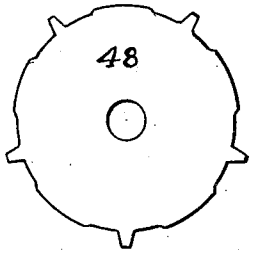
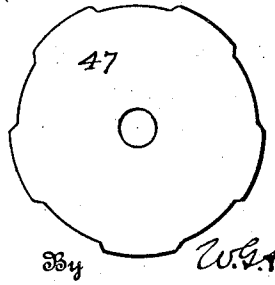


Fig. 6



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UNITED STATES PATENT OFFICE.

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CONTROL ATTACHMENT FOR EMBROIDERY-SEWING MACHINES.

Application filed March 15, 1924. Serial No. 699,513.

My invention relates to embroidery sewing machines having a vertically reciprocated and variedly oscillated needle and a variedly movable feed bar jointly adapted to produce any width of stitch within said needle oscillations and any length of fabric feed between said stitches up to the maximum of said feed bar movements; and my improvement relates to means adapted for either automatically controlling said needle and feed bar movements for the production of repeat patterns, for jointly seating them in a determined fixed relation, or for independent manipulation thereof as desired. The invention is fully described in connection with the accompanying drawings, the novel features being set forth in the subjoined claims.

Fig. 1 is a side elevation of a portion of a sewing machine embodying my invention, non-essential old construction being omitted for purposes of clearly presenting the new construction.

Fig. 2 is a vertical section on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary end view looking in the direction of arrow 3, Fig. 1.

Fig. 4 is a separate view of the worm drive gear employed.

Figs. 5 and 6 are separate views of the discs controlling respectively the needle oscillations and the fabric feed.

Fig. 7 indicates an embroidery pattern produced by my improved attachment.

The type of sewing machine employed is more fully set forth in U. S. patents to Druckerman, No. 1,089,751 of March 10, 1914, and No. 479,739 of July 26, 1892, to Dimond. As indicated in the drawings the needle bar 2, which carries the needle 3 is vertically reciprocated as usual by the head shaft 4, and its lateral oscillation is effected by rocker arm 5 and link 6; said rocker arm being oscillated as heretofore by said shaft 4, and its action on needle bar 2 varied by adjustment of the end of said link 6 in the slotted recess 7 of rocker arm 5. The feed bar 8, for advancing the fabric under the needle between stitches of the latter, is actuated as heretofore by rocker shafts 9 and 10 to effect respectively the raising and lowering of the toothed fabric engaging foot portion 11, and the feeding reciprocative movement of the latter; said shaft 9 as usual receiving its oscillating movement from a cam on base shaft 12, and shaft 10 oscillated from shaft 9 by a link 13 connecting crank arms on the respective shafts. Variation of the oscillating movements effected is controlled by the position of said link-end 13 in the arcuate slot of crank arm 14 on shaft 9.

These known movements thus briefly referred to jointly produce stitches varying in width and feed from zero to maximum according to the positions of the link ends 6 and 13 in their respective slotted arms 5 and 14. Link 6 has heretofore been positioned in its slot 7 of link 5 by a hand or knee actuated bar 20 engaging one arm 21 of a bell crank pivoted at 22, the other arm 23 thereof being connected to said link end by a connecting member 24. Link 13 has heretofore been shifted by means of a hand lever 25 on pivot shaft 26, said shaft having a connecting member 27 to said link 13 for varying its engagement in slotted arm 14. Expert manipulation of the bar 20 and lever 25 enables the production of any variety of embroidery stitches within the capability of the machine.

Having in mind the embroidery machine thus described, my invention relates to improved attachments thereto which may, when desired, take control of the stitch and feed movements and automatically actuate them for the production of desired varying stitch embroidery patterns, or a fixed embroidery stitch for following fabric stamped pattern outlines.

Beneath the head shaft 4, and arranged transversely thereto, is a pattern shaft 40, mounted in a bearing 41 secured to the machine head, and this shaft carries a gear 42 driven by a worm gear 43 on head shaft 4. Said gear 43 as shown separately in Fig. 4, has its teeth arranged with a dwell or straight tooth portion 43^a so that rotation of shaft 4 only actuates worm gear 42 part of each revolution, the gears being timed so that such revolution occurs when the needle 3 is in raised position and free from engagement with the fabric.

Shaft 40 fixedly carries one member 45 of a clutch device, the cooperating member 46, as shown, being formed on the face of a pattern disc 47 loosely mounted on said shaft and movable longitudinally thereof. A sec-

ond pattern disc 48 is shown secured to disc 47 and having hand wheel 49 for jointly shifting said discs longitudinally of the shaft, though obviously these may be made in one piece if desired. The rim portion of each disc 47 and 48 is provided with rises and falls forming desired pattern control cams for the movements of the needle, and feed mechanism respectively, as later herein described.

Pattern disc 47 controls the oscillation of needle 3 through rim-engaging lever 50, connecting link 51 and lever 52 pivotally actuating connecting member 24 to vary the position of link end 6 in slot 7. Pattern disc 48 controls the fabric feed bar 8 through rim engaging lever 55, connecting link 56 and lever 57 on pivot shaft 26; rotation of the latter acting on link 13 through connecting member 27 and lever 25. Tension spring 58, as shown, maintains lever ends 50 and 55 in rim-engaging position to follow the rises and falls thereof and the latter through their respective connections described variously oscillate the needle and vary the fabric feed as thereby determined, when discs 47 and 48 are shifted longitudinally on shaft 40 by hand wheel 49, to engage clutch members 45 and 46. Disengagement of said clutch members 45 and 46 frees the needle and feed mechanisms for independent control through their respective hand bar 20 and lever 25. Each rotation of shaft 40 will produce one pattern as determined by the rises and falls of said disc rims, and continued rotations thereof will faithfully and accurately produce repeats thereof as desired. By changing discs 47 and 48 for others, or merely changing the peripheries thereof, different repeat patterns may be produced.

For quickly setting the machine at a determined fixed needle oscillation and cooperating fixed fabric feed, as for following irregular and non-repeat fabric stamped pattern outlines, I provide as shown, a hand lever 60 on bracket carried pivot shaft 61, said shaft having a bell crank, one arm 62 thereof through link 63 rotating cam 64 to press on hand lever 25 and depress same a fixed distance; and the other bell crank arm 65 through link 66 swinging cam lever 67. Said cam lever 67 is adapted to operate a centrally pivoted lever 68, its opposite end contacting with a collar 69 on bar 20 so as to shift the latter and through its connections set link 6 for a determined fixed oscillation of the needle 3.

My improved mechanism thus fully described provides the usual independent manipulation of the needle oscillation and fabric feed as heretofore. By the mere engagement of clutch members 45 and 46, discs 47 and 48 are engaged and rotated and jointly assume control of said needle oscillation and fabric feed for desired repeat pattern embroidery stitches. And by disengaging said clutch members 45 and 46 and operating lever 60, a fixed needle oscillation and cooperating fabric feed is jointly effected for following fabric stamped pattern outlines. Thus one machine is quickly and positively adapted for a variety of work, producing accurately desired patterns with less skilled labor, and greatly increasing the output. It will of course be understood that the proposed construction herein shown and described may be readily modified in detail without departing from the spirit of my invention and I do not desire to limit myself to the specific mechanism set forth.

What I claim is:

1. In an embroidery sewing machine comprising a vertically reciprocated and variedly oscillatable needle bar and a variedly movable fabric-feed mechanism, independently operated means for varying said needle oscillations and fabric-feed movements, and separate means operative jointly upon said normally independently operated means for locking said needle oscillating and fabric feed movements in fixed adjusted cooperative relation.

2. In an embroidery sewing machine comprising a vertically reciprocated and variedly oscillatable needle bar and a variedly movable fabric-feed mechanism, independently operated means for varying said needle oscillations and fabric-feed movements, separate means operative jointly upon said normally independently operated means for locking said oscillating and feed movements in fixed adjusted cooperative relation, separate pattern mechanism operative upon said normally independently operated means for determinedly varying said cooperative oscillating and feed movements between the needle reciprocations, and a clutch for selectively throwing said pattern mechanism into and out of operation.

3. In an embroidery sewing machine comprising a vertically reciprocated and variedly oscillatable needle bar and a variedly movable fabric-feed mechanism, independent operating means for varying said needle oscillations and fabric-feed movements, pattern mechanism operative jointly upon said normally independent operating means comprising a pattern actuating shaft, means for intermittently rotating the same between said needle oscillations, a clutch member on said shaft and a pattern disc loosely carried by said shaft and movable longitudinally thereof into and out of engagement with said clutch member.

4. In an embroidery sewing machine comprising a vertically reciprocated and variedly oscillatable needle bar and a variedly movable fabric-feed mechanism, independent operating means for varying said needle oscil-

lations and fabric-feed movements, pattern mechanism operative jointly upon said normally independent operating means comprising a pattern actuating shaft, means for intermittently rotating the same between said needle oscillations, a clutch member on said shaft and a pair of pattern discs loosely carried by said shaft and jointly movable longitudinally thereof into and out of engagement with said clutch member, said discs having cam peripheries adapted to respectively control said needle oscillations and said fabric-feed movements and their cooperative relation.

5. In an embroidery sewing machine comprising a vertically reciprocated and variedly oscillatable needle bar and a variedly movable fabric-feed mechanism, and a movable bar for varying said needle oscillations, a lever for varying said fabric-feed movements, and a compound lever mechanism adapted to jointly move said bar and fabric feed varying lever and to lock the same in regulated position, whereby said needle oscillations and fabric-feed movements are maintained in fixed adjusted relation.

6. In combination with an embroidery sewing machine having a vertically reciprocated needle bar, a rocker arm for oscillating the same having an adjustable connection to said needle bar for varying said oscillations, and a fabric-feed presser foot, a rocker arm for reciprocating the same having an adjustable connection for varying said reciprocations, of lever mechanisms for independently moving said adjustable connections in their respective rocker arms, other lever mechanism for jointly holding said connections in a fixed adjusted relation in their respective rocker arms, pattern discs rotatable between said needle reciprocations adapted to move said connections in their respective arms in determined cooperative varied relations, and a clutch mechanism for engaging and disengaging said pattern discs.

In testimony whereof I affix my signature.

IRVIN RADER.