Sept. 3, 1946. I. M. A. GARCIA 2,407,148

SEWING MACHINE

Filed Sept. 8, 1942 3 Sheets-Sheet 1

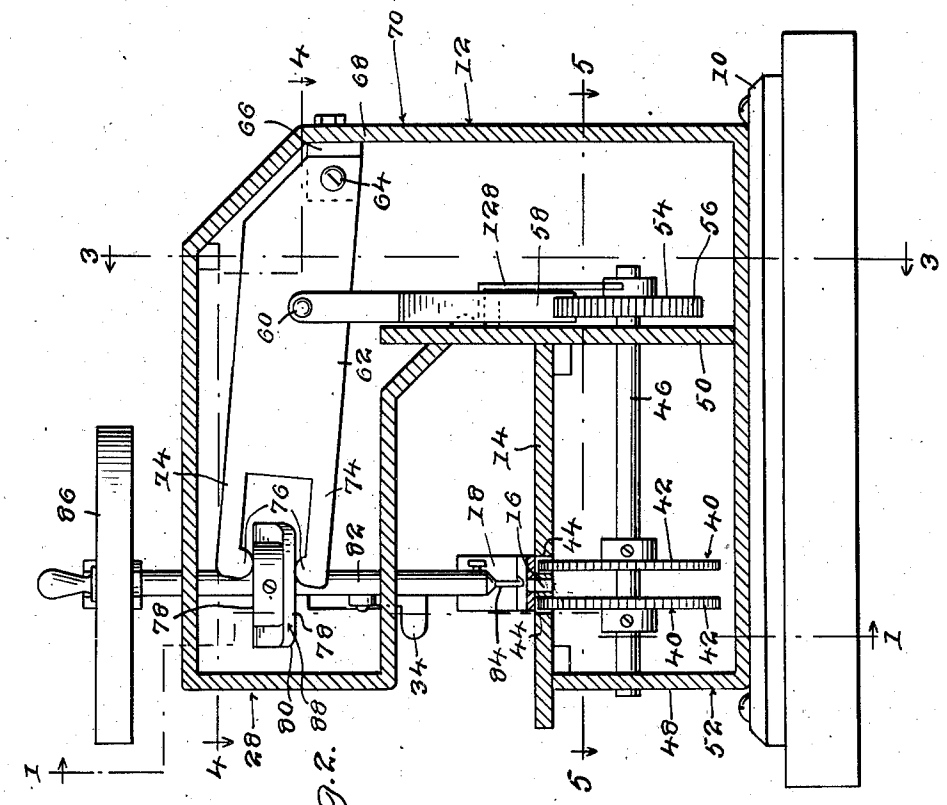

Fig. 2.

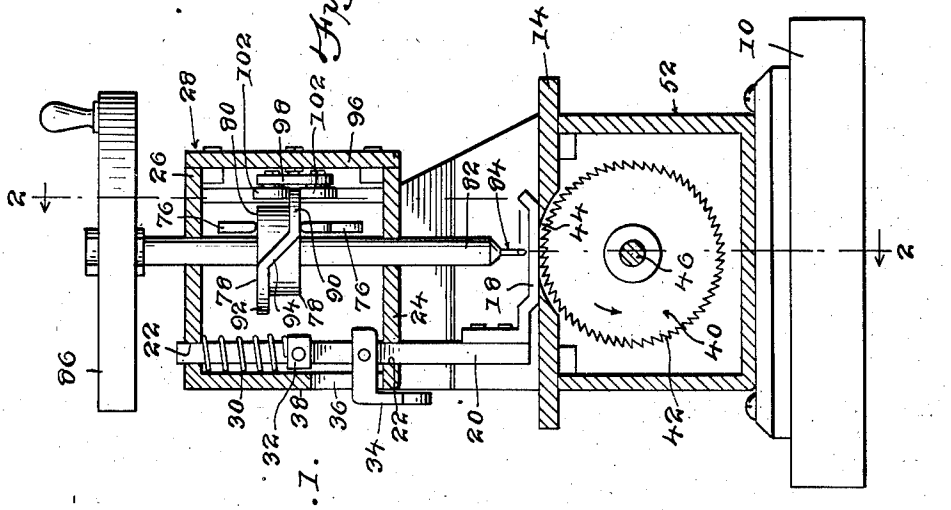

Fig. 1.

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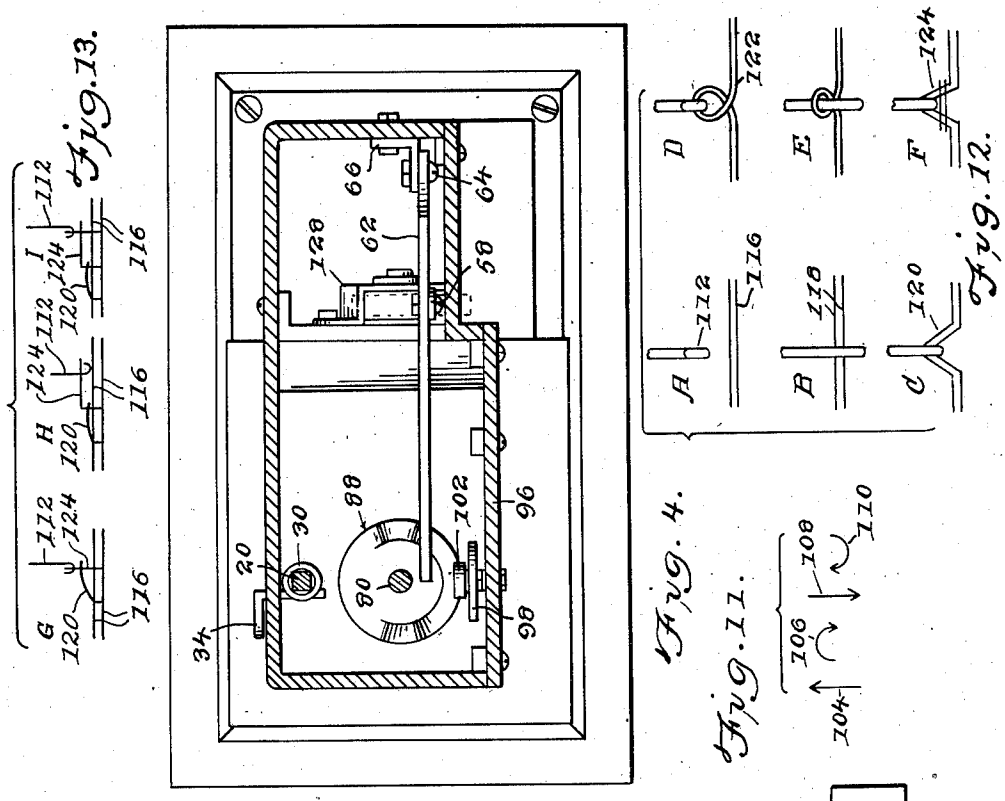

Fig. 12.

Fig. 13.

Fig. 4.

Fig. 11.

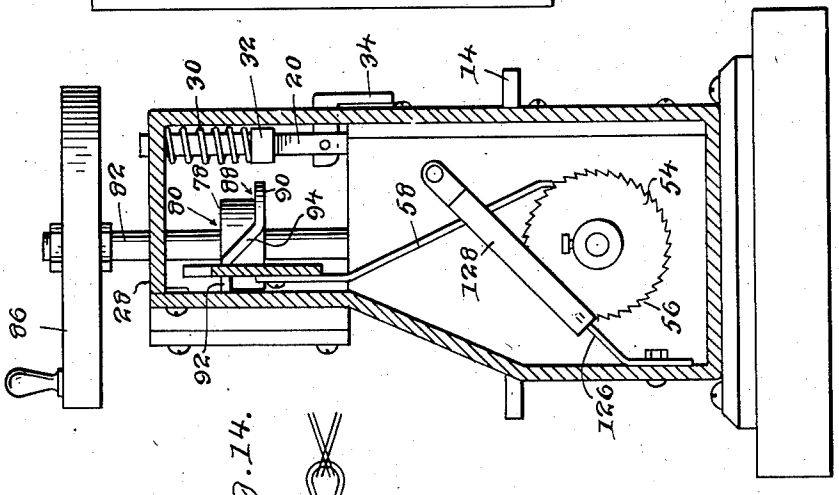

Fig. 3.

Fig. 14.

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Fig. 6.

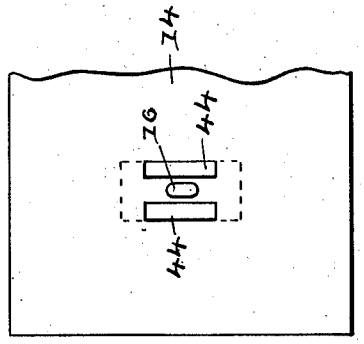


Fig. 9.

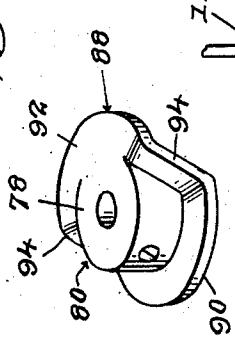


Fig. 10.

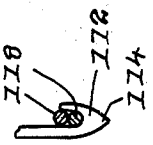


Fig. 5.

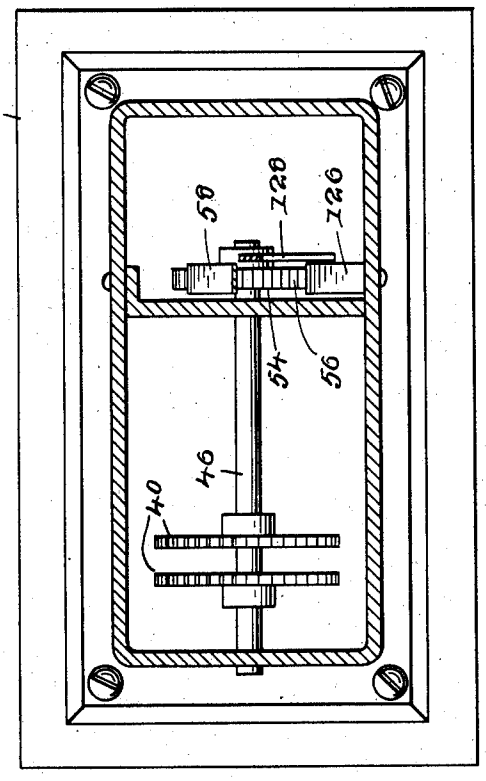


Fig. 8.

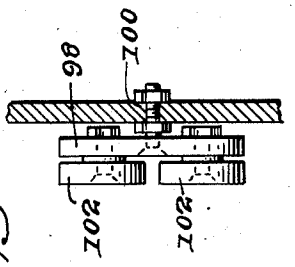
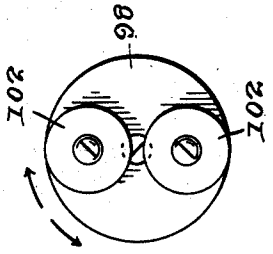


Fig. 7.



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Patented Sept. 3, 1946

2,407,148

UNITED STATES PATENT OFFICE

2,407,148

SEWING MACHINE

Iván M. A. Garcia, Bremerton, Wash.

REISSUED

Application September 8, 1942, Serial No. 457,668

5 Claims. (Cl. 112—198)

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My invention relates to sewing machines, and has among its objects and advantages the provision of an improved machine designed to stitch fabrics by looping together threads of the fabrics acted upon.

In the accompanying drawings:

Figure 1 is a sectional view taken along the line 1—1 of Figure 2;

Figure 2 is a sectional view taken along the line 2—2 of Figure 1;

Figure 3 is a sectional view taken along the line 3—3 of Figure 2;

Figure 4 is a sectional view taken along the line 4—4 of Figure 2;

Figure 5 is a sectional view taken along the line 5—5 of Figure 2;

Figure 6 is a face view of the bed plate;

Figure 7 is a face view of cam actuator wheels;

Figure 8 is a side view of the structure of Figure 7;

Figure 9 is a perspective view of a cam;

Figure 10 is a view of the fabric working end portion of the needle;

Figure 11 is a diagrammatic view illustrating the needle section;

Figure 12 is a diagrammatic view illustrating the needle action with respect to the formation of interlocking sewing loops from the fabric being sewed;

Figure 13 is a diagrammatic view showing the action of the needle during the operation of completing engaged loops; and

Figure 14 is a detail view of the interengaged loops formed by the needle.

In the embodiment selected for illustration, I make use of a base 10 upon which the sewing machine 12 is mounted. The machine includes a horizontal bed plate 14 provided with a needle opening 16. A presser 18 is attached to the lower end of a vertical bar 20 square in cross section and guided for vertical movement in openings 22 in the walls 24 and 26 of a housing 28 spaced vertically from the bed plate 14. The presser 18 is yieldingly pressed against the bed plate 14 by reason of a compression spring 30 having one end engaging the wall 26 and its other end engaging a collar 32 secured to the bar 20. The fabric being sewed is arranged between the presser 18 and the bed plate 14 in the usual manner. A finger bar 34 is attached to the bar 20 and extends through a slot 36 in the wall 38 of the housing 28 to facilitate lifting of the presser, as when the work is being placed in position on the bed plate 14.

Means for feeding the work comprises two

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wheels 40 having notched peripheral faces 42, portions of which peripheries extend through slots 44 in the bed plate 14 for engagement with the work. Both wheels 40 are fixed to a shaft 46 rotatably journaled in the walls 48 and 50 of the base housing 52. To the shaft 46 and exteriorly of the housing 52 is keyed a wheel 54 having a notched peripheral face 56 engaged by a feeder link 58 having its upper end pivotally connected at 60 with a lever 62 having one end pivotally connected at 64 to a bracket 66 attached to a wall 68 of the arm 70 which constitutes a support for the housing 28.

The opposite end of the lever 62 is provided with two spaced fingers 74 having bearing formations 76 lying in engagement with the opposite faces 78 of a cam 80 fixed to a vertical bar 82 to the lower end of which the needle 84 is detachably connected. This bar may be rotated through the medium of a handwheel 86 or other source of power (not shown).

In Figure 9, the cam 80 includes a flange 88 having two vertically spaced portions 90 and 92 located at diametrically opposite points with respect to the axis of the cam. The portions 90 and 92 are interconnected by diagonal portions 94.

To the wall 96 of the housing 28 is mounted a disk 98, as by a bolt 100. Two rollers 102 are rotatably mounted on the disk 98 and are spaced to receive the flange 88 therebetween, as illustrated in Figure 1. Since the rollers 102 are fixed against vertical movement, rotation of the bar 82 will impart reciprocatory motion thereto in addition to its rotary motion.

In Figure 11, the bar 82 has an upward motion indicated by the arrow 104, a rotary motion through one-half revolution indicated by the arrow 106, a downward motion indicated by the arrow 108 and a rotary motion through one-half revolution indicated by the arrow 110. Since the needle 84 moves with the bar 82, a corresponding motion is imparted to the needle. In other words, the needle penetrates the work in its downward stroke, rotates one-half revolution, withdraws from the work and then makes another half revolution.

The lower part of the needle 84 is of U-shaped formation, as shown at Figure 10, having an upturned hook 112 providing a thread engaging crotch while the lower extremity tapers to a point indicated at 114.

A spring arm 126 fastened to the side wall of the machine frame is directed so that its end portion is resiliently pressed against the teeth 56 of

wheel 54 to preclude reverse rotation of this wheel when the link 58 traverses its return in operative stroke. An inclined arm 128 having its upper end fastened against the wall 50 extends adjacent to one side edge of the lower part of the link 58 and the upper free end portion of the spring arm 126, as shown to advantage at Figures 2, 3 and 5 so that this inclined arm on one side and the wall 50 on the opposite side restrain sidewise movement of the link and spring arm to maintain the same in contact with the notches of the wheel 54.

During operation, as for example to stitch a pair of superposed sheets of fabric 116 fed horizontally from right to left along the bed 14 and under the presser 18, as viewed from Figure 1, the needle is initially caused to move downwardly from its uppermost position above the sheets, as shown at A in Figure 12, to penetrate both sheets. When the hook 112 attains its lowermost position below the sheets it is turned through a half-turn movement, as seen at B, following which it is pulled straight upward. During its return movement through the sheets it successively engages a pair of superposed threads thereof, indicated at 118, and elevates the same to looped arrangement as at C. After reaching its elevated position the needle is again turned through a half-turn and twists the lops 120 as shown at D. Upon subsequent descent of the needle from the last position the link 58 effects a one-step partial turn of wheel 54 and, through the shaft 46, similar movement of the feed wheels 40 in a counterclockwise direction, referring to Figure 1, to advance the sheets a predetermined step toward the left. Since the needle remains within the loops thus formed the latter are elongated and pulled to down turned arrangement by the tension thereon, the needle again penetrating the sheets in an advanced point. At the bottom of its stroke the needle is again turned so that during its subsequent upward stroke it again engages and loops a pair of threads which are drawn through the now stationary first loops as illustrated at F of Figure 12 and G of Figure 13. When the needle has again attained its top position it executes another half-turn and the sheets are advanced to the second step to bend the second loops 124 downwardly and enchain the first loop. as seen at H. The operation is repeated, as at I, for the desired length of the sheets to form a succession of chain stitches as shown at Figure 14, securely connecting the sheets of fabric.

I claim:

1. A sewing machine for uniting woven superposed fabrics, comprising a needle bar mounted for both rotary and reciprocatory movement, means for continuously rotating the needle bar, a needle carried by the needle bar having a hook shaped to pass freely through the fabrics and to pull threads from the fabrics upon withdrawal of the needle to form a loop from the thread, a cam means acting on the needle bar to reciprocate the same during rotation, whereby the said needle is caused to pass through the fabric and after a half-turn of the needle to pick up the threads and then to withdraw the needle from the fabric and after the next half-turn to withdraw said loop and impart a twist thereto.

2. The invention described in claim 1 wherein a bed plate is provided for supporting the fabric and provided with an opening through which said needle passes, a rotary feed for the fabric, and an operating connection between said cam means and said rotary feed to impart feeding motion thereto.

3. The invention described in claim 1 wherein said needle is detachably connected with the rotary and reciprocatory needle bar, and in which said cam means comprises a cam fixed to said needle bar, a relatively fixed cam actuator for imparting reciprocatory motion to the needle bar through relative rotation of the cam with respect to the actuator, said cam having a continuous flange provided with portions offset one from the other axially of the shaft and interconnected by diagonal portions, said actuator comprising two rotary wheels engaging opposite sides of said flange, and a mount for said wheels.

4. The invention described in claim 1 wherein a bed plate is provided for supporting the fabric and having an opening for passage of the needle therethrough, said reciprocatory and rotary needle bar having said needle detachably connected therewith, said cam means comprising a cam fixed to said needle bar and a relatively fixed cam actuator imparting reciprocatory motion to the needle bar through relative rotation of the cam with respect to the actuator, a rotary feed member for the fabric, a notched wheel fixedly connected with said rotary feed member, a pivoted lever operatively connected with said cam to be pivoted through reciprocatory motion of the bar and the cam, and an operating connection between said lever and said notched wheel to impart step by step rotary motion to said feed member.

5. The invention described in claim 1 wherein a bed plate is provided for supporting the fabric and having an opening for passage of the needle therethrough, said reciprocatory and rotary needle bar having said needle detachably connected therewith, said cam means comprising a cam fixed to said needle bar and a relatively fixed cam actuator imparting reciprocatory motion to the needle bar through relative rotation of the cam with respect to the actuator, a rotary feed member for the fabric, a notched wheel fixedly connected with said rotary feed member, a pivoted lever operatively connected with said cam to be pivoted through reciprocatory motion of the needle bar and the cam, an operating connection between said lever and said notched wheel to impart step by step rotary motion to said feed member, a presser coacting with said bed plate, said presser being attached to a bar, non-circular in cross section and mounted in corresponding openings in a support therefor for guiding the presser bar in a reciprocatory path, a finger lift on said presser bar and spring means acting on said presser bar to yieldingly press the presser against the fabric on the bed plate.

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