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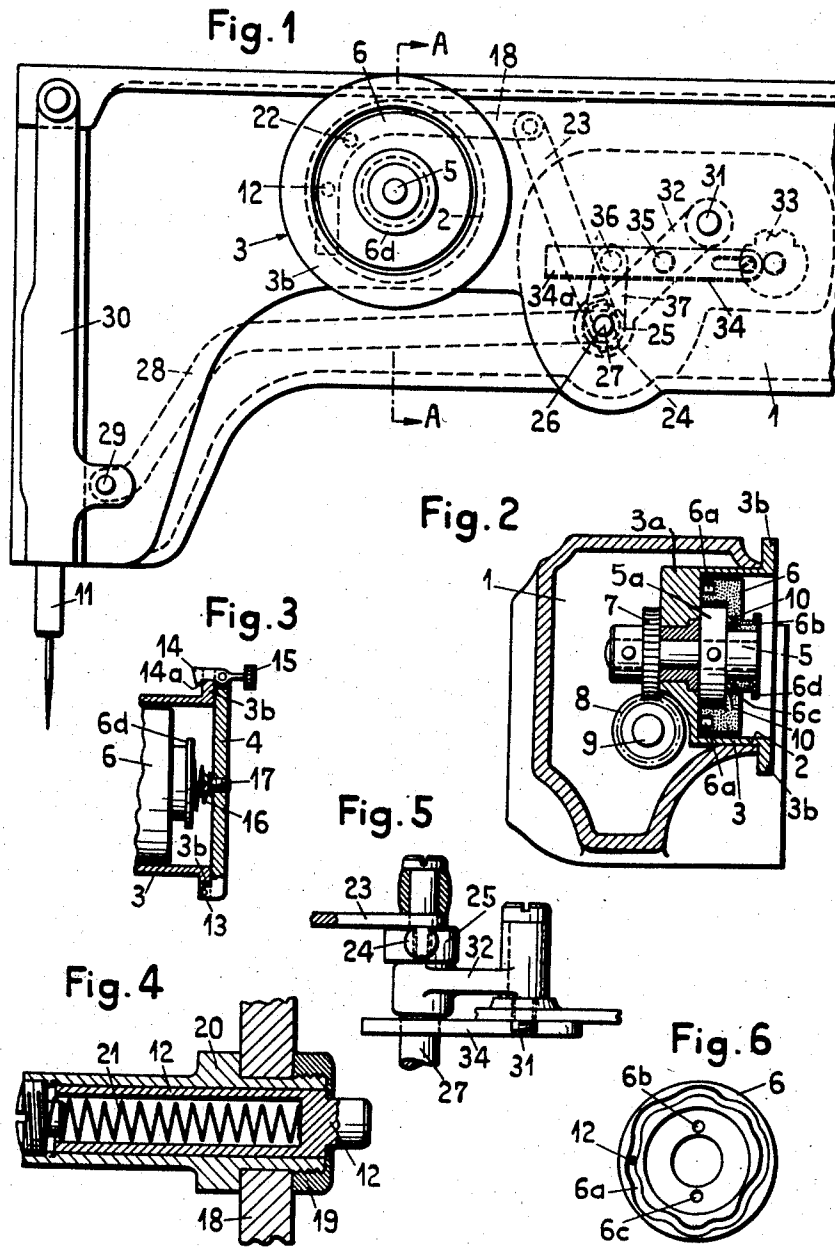
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SEWING-MACHINE WITH ZIGZAG OR ORNAMENTAL STITCHING ATTACHMENT

Filed Dec. 27, 1954

3 Sheets-Sheet 1



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Fig. 7

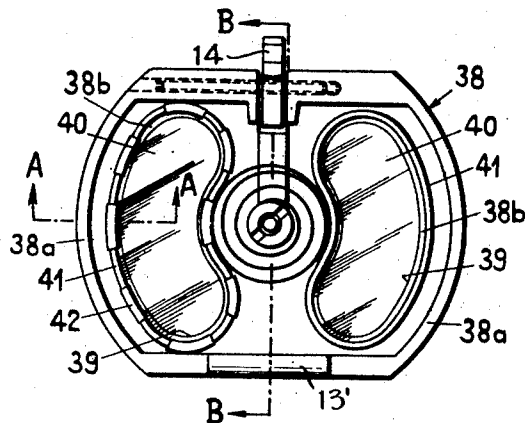
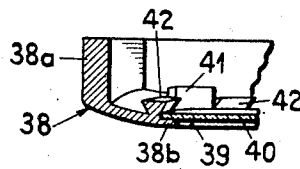


Fig. 8



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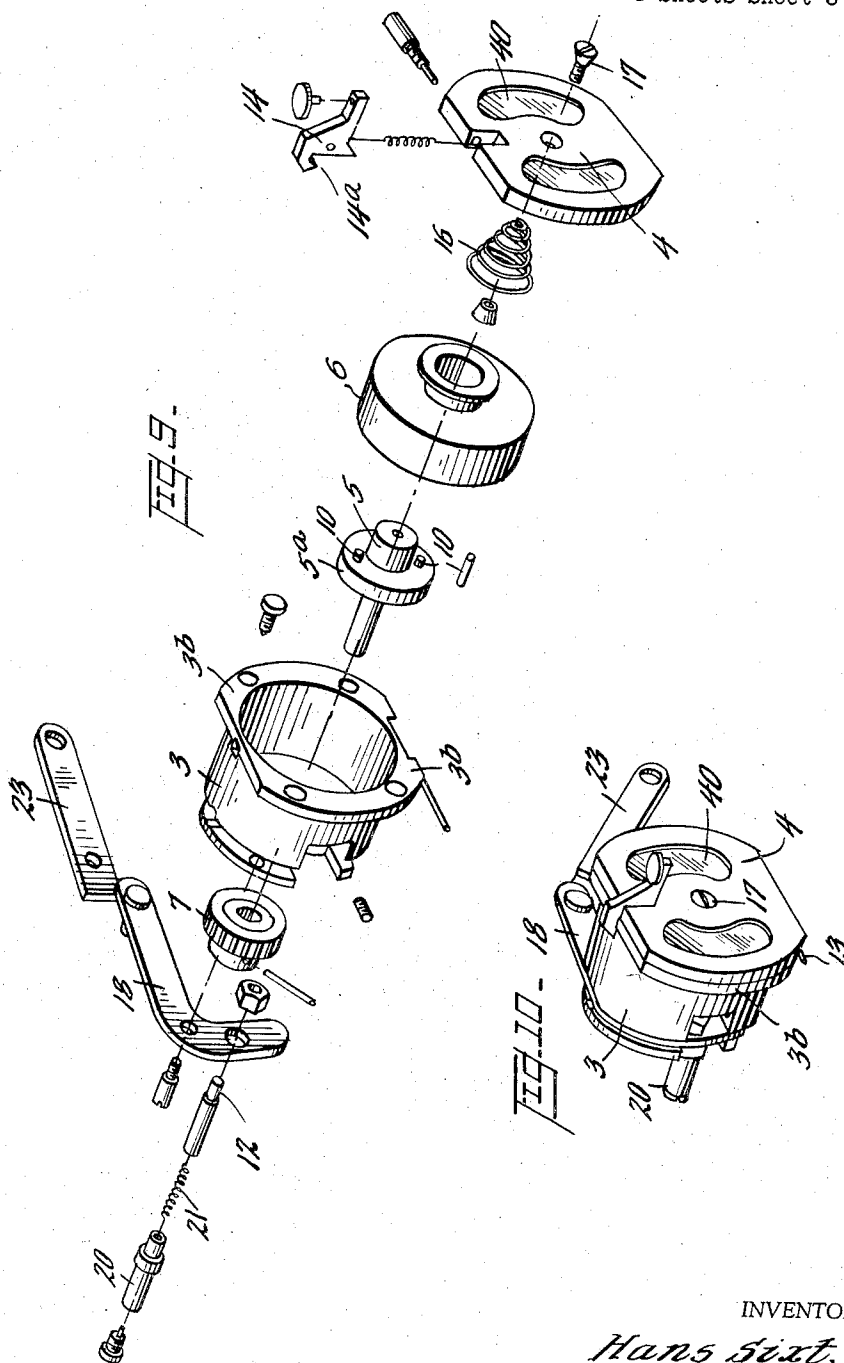
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SEWING-MACHINE WITH ZIGZAG OR ORNAMENTAL STITCHING ATTACHMENT

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8 Claims. (Cl. 112—158)

The invention relates to sewing machines with zigzag or ornamental stitching attachment, by which at least the needle-bar can be influenced by at least one exchangeable cam disc so as to effect alterations in the lateral zigzag deflection and also to displace it to the left or right of the straight seam.

The zigzag or ornamental stitching attachment according to the invention is essentially characterized by means through which, after positioning the cam disc in any desired way on its driver axle, the coupling of both parts and contacting against the disc of the tracer connected to the needle-bar, take place automatically upon starting the machine.

Further features of the invention will be evident from the claims, the specification and the drawing, wherein a preferred form of embodiment of the attachment is illustrated purely by way of example.

In said annexed drawing:

Fig. 1 is a side elevation of an over-hanging arm of a sewing-machine with the zigzag or ornamental stitching attachment;

Fig. 2 is a sectional view through a cam disc and its casing taken on the line A—A of Fig. 1;

Figs. 3-6 are details of the attachment;

Figs. 7 and 8 are details of a variant of the embodiment according to Fig. 3;

Fig. 9 is an exploded view in perspective and Fig. 10 is a perspective view of the cam disc holding casing.

The sewing machine according to the present constructional form has two externally accessible knobs (not particularly shown in the drawing), one of which acting upon the zigzag attachment in order to adjust the stitch width, while another knob acts on the same attachment in such a way that the zigzag stitch may be displaced to the left or right from the zero position or the straight seam. A third knob acts upon the feed-dog and consequently serves to change the stitch length of the seam. By actuation of these knobs, zigzag stitches may be changed by hand while sewing, both with respect to stitch width, displacement of the seam, and stitch length, so that certain ornamental seams may be made, based on the known zigzag seam.

This manner of forming ornamental seams by means of suitable knobs generally attached to the overhanging arm or to the standard, has been known for a long time.

In more recent time also zigzag or ornamental stitching attachments have become known, in which the respective ornamental stitching seams are no longer made only by hand, i. e. by actuation of knobs, but automatically by insertable and exchangeable discs or cams. Very different kinds of such attachments are known, wherein the stitch width, displacement of the seam, and the stitch length may be changed automatically by cams in accordance with a certain ornamental sewing pattern. Either the discs may constitute a fixed set with one to three cams, or a special insertable and exchangeable cam disc is available for each change (stitch width, displacement, stitch length). Each disc may be exchanged for another

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having one or several other curves, in order thus to obtain the different ornamental sewing stitches.

In the present form of embodiment there is provided only one exchangeable cam disc for altering the stitch width, i. e. the zigzag deflection and for its displacement to the left or right of the straight seam, together with any desired varying within the track prescribed by the cam disk in use. In the present case, a cam disc for the automatic change of the stitch length is not provided.

According to the illustrated form of embodiment the following means are provided automatically to effect—upon starting the machine—the coupling of the driver axle with the cam disc placed thereon with the machine at rest, and also automatically to bring about the contacting of the cam disc with the tracer connected to the needle-bar.

In the arm 1 of the sewing machine casing there is an opening 2 provided on the side facing the operator. In said opening is inserted and fixed a special casing 3 closed at the rear, and open in the direction facing the operator, being however closable by means of a plate or cover 4 (Fig. 3). In the rear casing wall 3a the driver shaft 5 for discs or cams 6 is journaled. Each cam 6 has a circumferential flange 6d to permit the respective cam to be grasped by the fingers when it is to be removed or inserted in the machine. The end of the driver shaft 5 facing the operator is designed as a stub shaft and adapted for mounting or changing the discs, each with a different track. The other end of the driver shaft 5 carries a worm 7 meshing with a wormwheel 8 of the arm or driving shaft 9. The portion of the driver shaft 5 adapted to receive the cam discs 6 has attached thereon a collar 5a which carries two diametrically opposite dogs 10 running parallel to the axis. The cam disc 6 which, by preference, may consist of any hard plastic material, has at its front-end, directed towards the casing rear wall 3a, a grooved cam 6a in which the tracer 12 engages and is positively guided, said tracer being associated with the needle bar 11 and described as description proceeds. The cam disc 6 has two diametrically opposite holes 6b, 6c parallel to the axis, which correspond with the dogs 10 of shaft 5. The dogs 10 and holes 6b, 6c of the cam disc 6 serve to couple the two parts. The opening in the casing 3 for placing the disc 6 onto the driver shaft 5 can be closed by the spring cover 4, being therefore on the one hand swivable round a hinge 13 on the flange 3b of the casing 3, and, on the other hand, capable of being locked in the closed position by a spring pawl 14 with knob 15 on said casing flange 3b. For this purpose said flange 3b has at the respective point a groove, while the pawl has a lifting face 14a. On closure of said cover, the pawl is lifted at the bottom of said groove and engages behind the flange 3b in the closed position. To open the cover, the knob is depressed, thus disengaging the pawl and the cover 4 springs up.

On the inner side of the spring cover 4 there is a helical spring 16 held by a screw 17 which, with cover 4 closed, causes the cam disc 6 at first to bear against the tracer 12. The tracer 12 which cooperates with the cam groove 6a can slide longitudinally and is under the action of a helical spring 21 tending to force the tracer 12 outwards, i. e. towards the disc 6.

The action and mode of using the exchangeable discs 6 are as follows:

With the machine at rest and spring cover 4 open, the cam disc 6 is simply placed on the driver axle without any definite positioning of the cam disc to be driven by the shaft. When the disc has been properly placed, the cover is closed, whereby the spring 16 presses the disc 6 inwards and against the tracer 12. Now the machine is started, the driver shaft 5 being set rotating by the machine drive. But then the disc 6 is still checked by its

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lying against the tracer, until its holes 6c, 6b register with the dogs 10 due to the force of the spring 16. Consequently the coupling of the cam disc 6 with the driver shaft 5 occurs automatically as soon as the machine is started. After coupling, the disc rotates with the shaft 5 so that now also the tracer 12 can fall into the cam groove 6a of disc 6 and normal operation begins of forming ornamental stitches in conformity with the cam 6a.

The feeler lever 18 having the tracer 12 seated thereon, can oscillate about a stationary axle 22 and is pivoted on a transmission member 23 connected to the sliding block 24 of a slotted link 25. On swinging the feeler lever 18 via tracer 12 away from the cam 6a around the axle 22, the sliding block 25 gets displaced in said link 25. Pivoted to the sliding block axle 26, which in zero position coincides with the axle 27 (Fig. 1), is the push rod 28 which in turn acts via joint 29 upon the needle-bar rocker 30, in which the needle bar 11 is caused to move up and down.

The slotted link 25 is rotatable about its axle 27 by means of a knob (not shown) located outside the machine casing. Instead of changing the width of the zigzag stitch through the knob, it is brought about through the cam 6a, according to the embodiment shown. By adjusting the knob, the needle deflection given by the cam 6a is varied correspondingly.

By actuating a second externally accessible knob, the seam may be displaced to the left or right of the straight seam, since the link 25 is oscillated about a swivel axle 31 located outside its axle 19, i. e. to the left or right from the zero position of the knob or straight seam. The link axle 27 is in fact held by a lever piece 32 which can oscillate about the axle 31 fixed on the machine casing.

Pivotally mounted in the notched disk 33 seated on the axle of said knob is a bar 34 adapted to oscillate about a stationary axle 35. Pivoted at 36 to the arm of bar 34 is a lever piece 37 which embraces the axle 27 of the link 25.

On turning said knob (on the axle of the notched disk 33) into the two outer of three positions corresponding to the three notches in the disk 33, the lever arm 34a is raised and lowered. Thereby the link axle 27 is carried-on and oscillated about the axle 31. Incidentally also the axle 36 will be driven which is associated with the first-named knob for changing the stitch width. Therefore this knob is displaced according to the three positions of the second knob at the outside of the machine, which may be determined by marks thereon.

The said functions and movements of the parts, resulting from manual operation of the second knob for displacing the stitch will, according to the embodiment shown, also be provided for by the cam 6a, since disc 6 can act upon link 25 in the same sense via cam 6a, tracer 12 and also levers 18 and 23.

To permit the operator to inspect the fitted disc 6 even with closed spring cover, the latter may advantageously consist of some transparent or plastic matter, or it may have at least one orifice permitting a view of the positioned disc 6. Such a design is illustrated in Figs. 7 and 8. Thereby the closing metal plate or spring cover 38, hinged at 13' to the machine, is slightly convex outwards and has a rim 38a roundabout with two thickenings, each on a straight portion above and below. The cover 38 has two orifices 39, each covered by a transparent disk 40. Inside, each of said disks 40 rests on a thin marginal portion 38b of the spring cover 38. For securing the disks 40, each orifice is surrounded inside by a bead 41 which, upon insertion of the disk 40, is pressed flat at several places 42 so that said disk will thus be retained by enlargements as shown in Fig. 8 on a larger scale. Obviously, said disks may also be retained on the plate in some other manner.

Through the invention a cam-controlled zigzag or orna-

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mental stitching attachment is created, the chief merit of which resides in the fact that, when the cam disc has been applied, the seamstress need not trouble about its coupling; she has merely to put it on, to close the cover and to start the machine, whereupon the cam disc becomes coupled automatically. Opening of the cover will permit any fitted cam disc to be removed manually. A wholly or partially transparent cover will enable the seamstress at any time to ascertain what cam disc has been inserted and whether the same rotates with the driver axle upon operation of the machine, without her having to open the cover for this purpose.

What I claim is:

1. A sewing machine comprising a vertically reciprocated and variably oscillatable needle bar, independently operating means for varying the needle oscillations and including a tracer, and pattern mechanism operative jointly upon said normally independent operating means comprising a pattern actuating shaft, means for intermittently rotating the shaft, a casing provided with a hinged cover plate and mounted on the shaft, a clutch member on said shaft, a pattern disc loosely carried by said shaft and movable longitudinally thereon into and out of engagement with said clutch member, the pattern disc having a cam in the form of a groove on the face of the disc and said groove positively guiding the tracer forming part of the said independently operating means for varying said needle oscillations, and a spring on the inside of the cover engaging said pattern disc in the closed position of the cover plate to force the cam groove onto the tracer, said cover when closed causing the cam in position to be clutched and the tracer to be in its operative position.

2. A sewing machine comprising an over-hanging arm having an opening therein, a vertically reciprocated and variably oscillatable needle bar, means for varying the needle oscillations and including a tracer, a drive shaft in the arm, a pattern actuating shaft in the form of a stub shaft, means for intermittently rotating the pattern actuating shaft, a clutch member on the last-mentioned shaft, a casing provided with a hinged cover plate and mounted on the shaft, a pattern disc loosely carried by said last-mentioned shaft and movable longitudinally thereon into and out of engagement with said clutch member, the pattern disc having a cam in the form of a groove on the face thereof to positively guide the tracer for varying said needle oscillations, said stub shaft, the clutch member and the pattern disc being mounted adjacent the opening in the arm, means connected to the shafts to operate the stub shaft from the drive shaft, and a spring on the inside of the cover engaging said pattern disc in the closed position of the cover plate to force the cam groove onto the tracer, said cover when closed causing the cam in position to be clutched and the tracer to be in its operative position.

3. A sewing machine according to claim 1, in which the shaft for driving the disc is arranged accessible through an opening in an arm of the sewing machine.

4. A sewing machine according to claim 1, in which the cam side of the shaft includes a collar having therein two diametrically opposite dogs rigidly inserted parallel to the axis of the shaft, said dogs corresponding to diametrically opposite holes in the pattern disc with which said dogs register to couple the disc to the shaft.

5. A sewing machine according to claim 1, in which a spring cover is provided for the disc and has at least one orifice to permit inspection of the disc.

6. A zigzag and ornamental stitching attachment for sewing machines applied in the arm of the machine and connected to a feeler lever and to a rod connected to operate the needle bar rocker, comprising a casing mounted in the arm of the machine and having the feeler lever pivotally mounted to the casing, a casing provided with a hinged cover plate and mounted on the shaft, a drive axle rotatably mounted in the casing and having means

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to receive rotation from a driving shaft of the machine, said axle having connecting means associated therewith, and a cam disc removably connected and mounted on the axle and having means to cooperate with the connecting means on the axle, said cam disc having a cam groove therein to cooperate with the feeler lever to actuate the latter and to control the operation of the needle bar rocker in dependence of the shape of the groove, and a spring on the inside of the cover engaging said pattern disc in the closed position of the cover plate to force the cam groove onto the tracer, said cover when closed causing the cam in position to be clutched and the tracer to be in its operative position.

7. An attachment according to claim 6, in which the spring is centrally mounted on the inside face of the cover plate.

8. A sewing machine according to claim 1, in which the

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tracer includes a feeler lever pivotally mounted in the casing and passing with clearance through a wall of the casing and cooperating with the groove in the pattern disc.

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