

May 20, 1947.

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2,420,697

SEWING MACHINE

Filed June 18, 1945

2 Sheets-Sheet 1

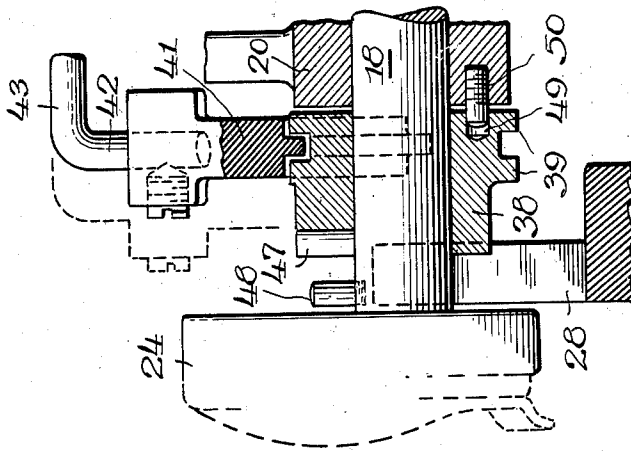


Fig. 4

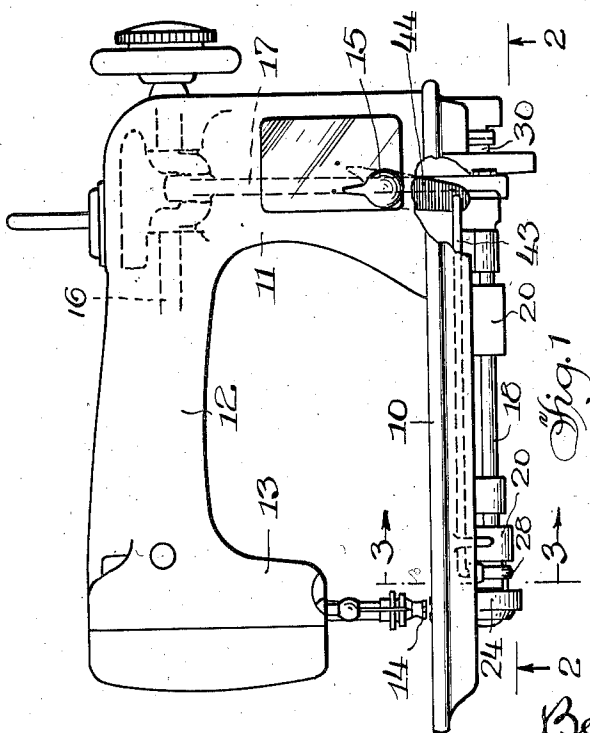


Fig. 1

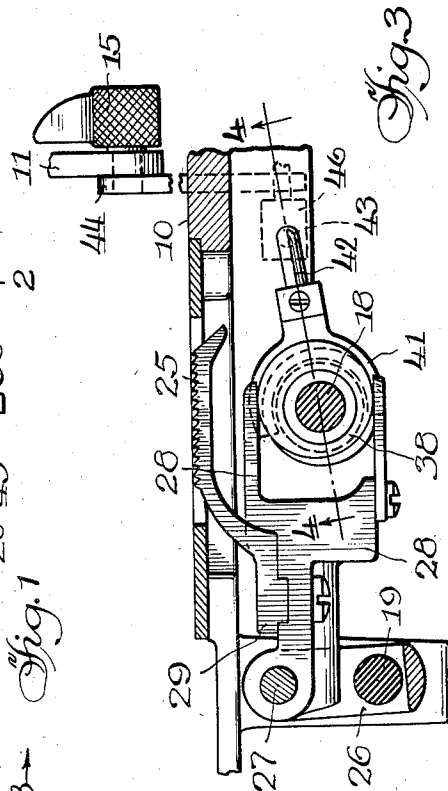


Fig. 3

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2 Sheets-Sheet 2

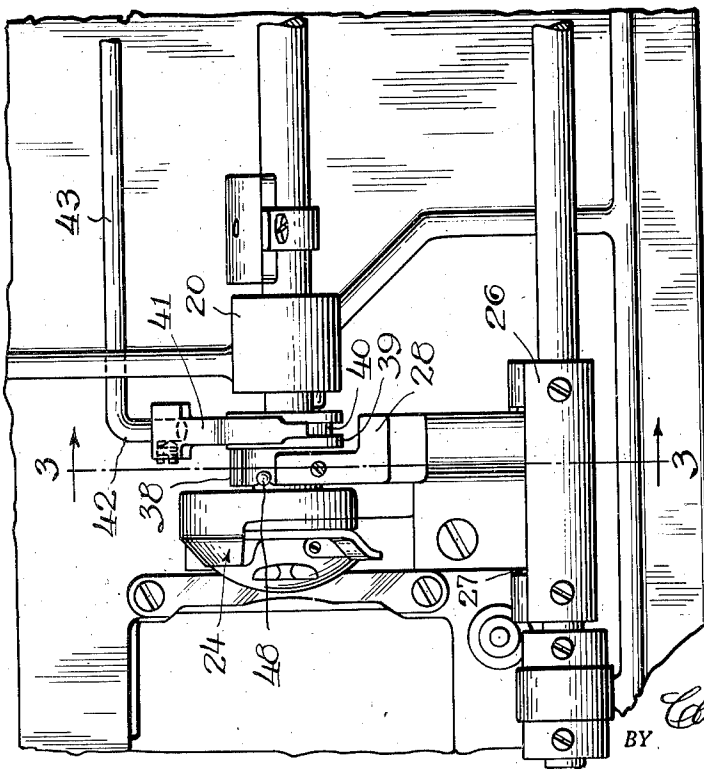
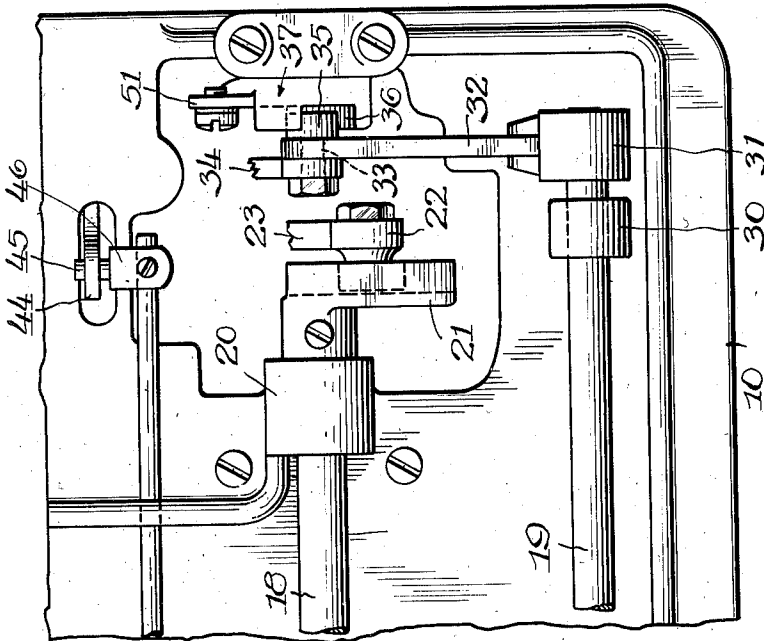


Fig. 2

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2,420,697

SEWING MACHINE

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Application June 18, 1945, Serial No. 600,126

7 Claims. (Cl. 112—210)

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This invention relates to improvements in sewing machines, and particularly to drop feed mechanisms.

The feed dog is located in the bed plate of the sewing head, beneath the presser foot and needle. Its purpose is to move the cloth to be sewn in the stitch forming operation. Some sewing machines are equipped with means for reversing the direction of movement of the feed dog, to move the cloth to be sewn toward or away from the operator. In such machines, the operator may sew in one direction and then reverse the direction of sewing by manipulating control means provided for that purpose.

For certain kinds of work, particularly for mending and darning, it is desirable to sew back and forth, that is, to reverse the direction of sewing frequently, and for this purpose it is convenient to be able to manipulate the cloth manually, alternately toward and away from the operator, without the necessity of operating reversing control means.

I accomplish the desired result by providing means for dropping the feed dog below its normal position in the bed plate, so as to be out of contact with the work, thus permitting the cloth to be manipulated by the operator in desired directions without reversing the direction of movement of the feed dog.

By my invention, I have devised simple and efficient mechanism for dropping the feed dog and for easily restoring it to normal position.

In the drawings:

Fig. 1 is an elevational view of a sewing machine embodying my invention.

Fig. 2 is a bottom plan view, on an enlarged scale as compared with Fig. 1, taken in the plane of the line 2—2 of Fig. 1, looking in the direction indicated by the arrows.

Fig. 3 is a transverse, vertical sectional view, taken in the plane of the lines 3—3 of Fig. 1 and 3—3 of Fig. 2, looking in the direction indicated by the arrows.

Fig. 4 is an enlarged fragmentary sectional view, taken in the plane of the line 4—4 of Fig. 3, looking in the direction indicated by the arrows.

Conventional sewing machine parts, shown in the drawings, comprise the bed plate 10, upright standard 11, overhanging arm 12, sewing head 13 and presser foot 14. On the upright standard 11 is a turn button 15 for controlling the drop feed mechanism of my invention. In Fig. 1, dotted lines indicate the conventional main drive shaft 16 for operating the needle bar, and a vertical crank drive connecting rod 17 for actuating the

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hook shaft 18 beneath the bed plate 10. The feed shaft is indicated at 19.

The hook shaft 18 is rotatably mounted in bearings 20, and is operatively connected to the power shaft 16 through a crank 21 and crank pin 22 mounted on the end 23 of the connecting rod 17. At the opposite end, the hook shaft 18 carries the hook, race and bobbin indicated as a whole by the numeral 24.

The feed shaft 19 is a rock shaft the function of which is to impart reciprocating movements to the feed dog 25 in horizontal planes. Said shaft 19 is operatively connected to the feed dog through the following mechanism: a feed rocker 26 fixedly mounted on the shaft 19, a short shaft 27, and a feed block fork 28 on which is mounted the feed dog 25 as indicated at 29 (Fig. 3). At its other end, the feed shaft 19 is mounted in a bearing 30, and is operatively connected with power means (not shown) for imparting rocking motion to said shaft 19 through the bifurcated member 31, link 32, pivot pin 33 and link 34. The link 32 carries the roller 35 which travels in the slot 36 of the reversing bracket 37 which is pivotally connected to the bed plate 10 or other fixed part of the machine in such manner that the position of the bracket and the angle of the slot 36 may be altered, as will be explained hereinafter.

As is well understood in the art, the rotatable shaft 18 rotates the hook 24 which carries the bobbin and cooperates with the needle in the stitch forming operation, while the rock shaft 19 imparts a reciprocating feed and return or push and pull motion to the feed dog 25 for moving the cloth away from the operator in conventional sewing, or toward the operator in reverse sewing, depending on the adjustment of the reversing bracket 37. The feed dog 25 must be in raised or cloth-engaging position during the push stroke and it must be in lowered position, out of engagement with the cloth, during the pull stroke of the reciprocating motion.

This rise and fall action of the feed dog is accomplished by means of a clutch-cam 38 slidable longitudinally on the shaft 18. The clutch-cam 38 consists of an eccentric member and an adjacent concentric portion, the latter being provided with a pair of square edged ribs 39 which provide between them a groove 40 rectangular in cross section, adapted to be engaged by a clutch-cam shifting fork 41 connected rigidly to the end 42 of a longitudinally extending rod 43. The rod 43 is actuated by the control button 15 through a link 44 connected to a pin 45 in the block 46 which is fixedly mounted on the rod 43.

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When the rod 43 has been actuated by the control button 15, to move the fork 41 and clutch-cam 38 to the left, as in Fig. 2, a notch 47 in the cam adjacent the hook 24 engages a pin 48 on the shank of the hook 24, and causes the clutch-cam 38 to be rotated with the hook and thereby to produce the rise and fall of the feed dog 25, due to the engagement of the clutch-cam 38 with the arms of the feed block fork 28, as best shown in Figs. 2 and 3. When the rod 43 has been actuated toward the right, as indicated in Fig. 4, a recess 49 in the clutch-cam 38 and a pin 50 which projects from the bearing 20 come into register with each other and thus the clutch-cam 38 is disengaged from the shaft 18 and retained in a non-rotating position where it holds the feed block fork 28 in its lowermost position, and consequently holds the feed dog 25 in dropped position below the surface of the bed plate 10 and out of engagement with the cloth.

The shaft 19 continues to impart the push and pull motion to the feed dog, but since the clutch-cam 38 is being held stationary relatively to the shaft 18 by reason of the engagement of the recess 49 and pin 50, and the clutch-cam 38 is in a position where it depresses the fork 28 and consequently the feed dog 25, the cloth may be manipulated by the operator, back and forth, as required for mending and darning, without utilizing reversing means for that purpose. The reversing bracket 37 is provided with connections 51 leading to manually controlled means (not shown) for actuating the bracket 37 to set the machine for either regular or reverse sewing. However, when the drop feed mechanism of my invention is employed for the purpose of dropping the feed dog to inoperative position, it is immaterial whether the reversing mechanism is in one position or another, because the operator is able manually to move the cloth back and forth without interference by the feed dog and regardless of its direction of movement.

Changes may be made in details of construction without departing from the scope of my invention as set forth in the appended claims.

I claim:

1. A sewing machine provided with drop feed mechanism comprising a rotatable hook shaft, a bed plate, a feed dog movable in the bed plate, a rock shaft journaled under the bed plate, operative connections between the rock shaft and the feed dog for imparting reciprocating feed and return motions to the feed dog, means for rocking said rock shaft, a clutch-cam slidably mounted on the hook shaft, manually controlled means for slidably moving said clutch-cam on the hook shaft, cooperating means on the clutch-cam and hook shaft for causing the clutch-cam to rotate with the hook shaft when the clutch-cam has been moved to a predetermined position on said hook shaft, and means for holding the clutch-cam against rotation when the clutch-cam has been moved to another predetermined position on said hook shaft, said operative connections between the rock shaft and the feed dog for imparting reciprocating feed and return motions to the feed dog including a pivotally mounted member which engages the clutch-cam and imparts to the feed dog rise and fall movements while the clutch-cam rotates with the hook shaft and which holds the feed dog in dropped position while the clutch-cam is non-rotating.

2. The drop feed mechanism defined by claim 1, in which the cooperating means on the clutch-cam and hook shaft for causing the clutch-cam

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to rotate with the hook shaft comprises a radially extending pin on the hook shaft and a recess in the proximate end of the clutch-cam.

3. The drop feed mechanism defined by claim 1, which includes a bearing for the hook shaft spaced a predetermined distance from the hook on said shaft, and in which the clutch-cam is slidable between the hook and said bearing, and the means for holding the clutch-cam against rotation comprises cooperating means on said bearing and clutch-cam.

4. The drop feed mechanism defined by claim 1, in which the manually controlled means for slidably moving the clutch-cam on the hook shaft comprises a rod parallel with the hook shaft and longitudinally movable relatively thereto, an extension arm on the rod at right angles thereto engaging said clutch-cam, and a manually operable lever for shifting the rod.

5. A sewing machine provided with drop feed mechanism comprising a rotatable hook shaft, a bed plate, a feed dog movable in the bed plate, a rock shaft journaled under the bed plate, operative connections between the rock shaft and the feed dog for imparting reciprocating feed and return motions to the feed dog, means for rocking said rock shaft, a clutch-cam slidably mounted on the hook shaft, manually controlled means for slidably moving said clutch-cam on the hook shaft, cooperating means on the clutch-cam and hook shaft for causing the clutch-cam to rotate with the hook shaft when the clutch-cam has been moved to a predetermined position on said hook shaft, and means for holding the clutch-cam against rotation when the clutch-cam has been moved to another predetermined position on said hook shaft, said operative connections between the rock shaft and the feed dog for imparting reciprocating feed and return motions to the feed dog including a pivotally mounted forked member which engages the cam portion of the clutch-cam and is raised and lowered by the rotation of the clutch-cam when the latter is being rotated with the hook shaft and remains in its lowermost position while the clutch-cam is non-rotating.

6. A sewing machine provided with drop feed mechanism comprising a rotatable hook shaft, a bed plate, a feed dog movable in the bed plate, a rock shaft journaled under the bed plate, operative connections between the rock shaft and the feed dog for imparting reciprocating feed and return motions to the feed dog, means for rocking said rock shaft, means for imparting rise and fall motions to the feed dog including a cam member slidably mounted on the hook shaft, manually controlled means for moving said slidable cam member on the hook shaft, means for causing said slidable cam member to rotate with the hook shaft when it has been moved to a predetermined position on said hook shaft, and means for rendering said slidable cam member non-rotative and thereby holding the feed dog in lowered non-rising position when the slidable cam member has been moved to another predetermined position on the hook shaft, said operative connections between the rock shaft and the feed dog for imparting feed and return motion to the feed dog including means engaging said slidable cam member on the hook shaft for imparting rise and fall motions to the feed dog.

7. The drop feed mechanism defined by claim 6, in which the manually controlled means for moving said slidable cam member on the hook shaft comprises a rod longitudinally movable be-

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neath the bed plate and a lever accessible above
the bed plate for moving said rod.

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file of this patent:

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