June 26, 1951 G. C. SPORNEY 2,558,010

PRESSER FOOT BAR LIFTING MECHANISM FOR SEWING MACHINES

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Fig. 1.

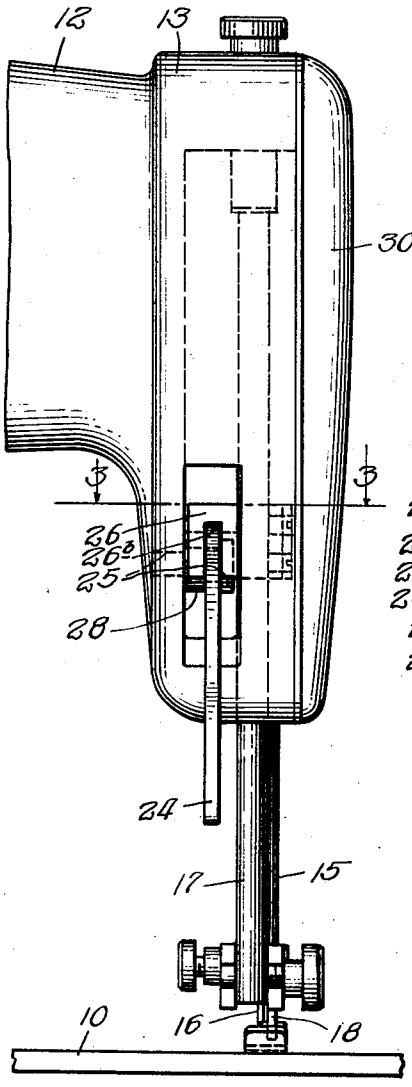


Fig. 2.

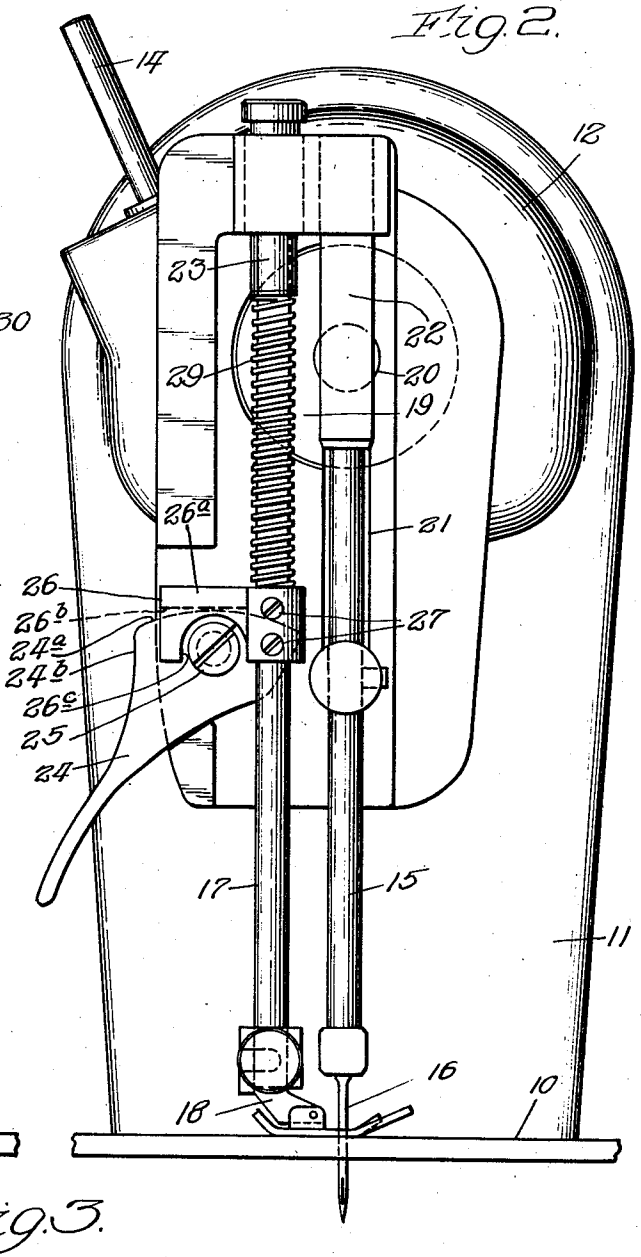
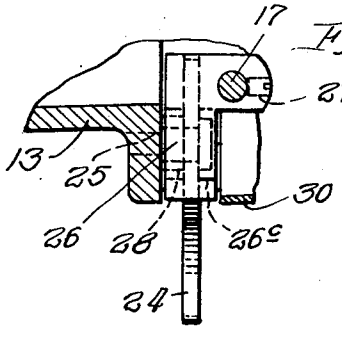


Fig. 3.



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PRESSER FOOT BAR LIFTING MECHANISM FOR SEWING MACHINES

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6 Claims. (Cl. 112—237)

1

This invention relates to a sewing machine, and particularly to a mechanism for lifting the presser foot bar of a sewing machine.

The ordinary household type sewing machine has a cast iron or other cast metal head in which is located the slidable bar which carries the presser foot. The presser foot bar is normally arranged with the foot pressing the material against the bed of the machine so that the feed dogs can operate against the material being sewed to feed it through the machine. There is usually employed a lever operatively connected to the presser foot bar and used in lifting the bar to raise the presser foot from the material when material is being removed or inserted beneath the needle. In the usual domestic sewing machine, the cast metal head is cut with a slot through which the lever moves in its guided path so that this lever, which is attached to the presser foot bar, will retain the bar against twisting and will cause it to move in a vertical path when the lever is operated.

The cut head of the ordinary domestic type sewing machine is unsatisfactory in many respects. In the first place it is extremely difficult to cut cast metal, such as cast iron, and in the second place it is difficult to make such a cut with the parallel sides which are necessary to hold the lever and the presser foot bar against rotation. Because of this, the cutting operation is expensive and many heads are ruined due to the difficulty of cutting the cast metal with the necessary preciseness.

I have discovered that this cutting of the head of the sewing machine may be avoided by employing the improved presser foot bar lifting mechanism of this invention. In this invention, the lever which is used for raising and lowering the presser foot bar is mounted on an outer surface of the head for rotation through an arc. The head, therefore, does not require cutting. On the presser foot bar there is provided a guide member attached thereto and closely embracing a portion of the lever throughout its range of movement to prevent rotation of the bar at all times. Means are provided in conjunction with the guide member and the lever for causing longitudinal movement of the presser foot bar when the lever is rotated. In the preferred construction this lever comprises a sheet metal stamping having substantially parallel side surfaces that are embraced by the guide member. The means for causing longitudinal movement of the bar when the lever is rotated preferably comprises a cam surface formed on the lever and engaging the guide member so that as the lever is rotated, the cam surface causes longitudinal movement of the presser foot bar. In the preferred lever the cam surface is provided on an edge of the lever and operates against the bottom of a slot on the guide member which embraces the lever. This lever is provided with a flattened portion adjacent this cam surface edge and arranged to engage the bottom of the slot and retain the presser foot in extreme raised position when the lever has been rotated to one end of its path of movement.

2

The invention will be described as related to the embodiment shown in the accompanying drawings. Of the drawings: Fig. 1 is a side elevation showing the head of and adjacent part of a sewing machine embodying the invention; Fig. 2 is an end elevation of the sewing machine taken from the right hand end of Fig. 1, but with the end cover plate removed; and Fig. 3 is a fragmentary horizontal section taken substantially along line 3—3 of Fig. 1.

The sewing machine shown in the accompanying drawings comprises the usual base 10, standard 11, overhanging arm 12 and head 13. The sewing machine includes a spool holder 14, while the head 13 has slidably mounted therein for vertical movement a needle rod 15 with a needle 16 attached at the bottom end thereof, and a presser foot bar 17 having the usual presser foot 18 attached at the bottom thereof.

The needle rod 15 is reciprocated by a rotating member 19 attached to the main drive shaft 20 for rotation therewith. The member 19 and the needle rod 15 are connected by a crank arm 21 so that rotation of the drive shaft 20 and thus the member 19 causes reciprocation in a vertical path of the needle rod 15 and thus the needle 16. This rod 15 is slidably mounted in a sleeve 22 for guiding the movement of the needle rod. The sewing machine also employs a thread feed lever (not shown) also operated by the rotating member 19. The presser foot bar 17 is movable in a vertical path and is guided in this movement by a sleeve 23.

Mounted on the end surface of the casing which forms the head 13 is a lever 24, preferably made of a sheet metal stamping. This lever is rotatably mounted on a bolt 25 which extends into a threaded hole in the head 13. The lever 24 is rotatably mounted on the bolt adjacent the head thereof and the lever is held spaced from the adjacent surface of the head 13 by a bushing 26. The lever 24, which is rotatably mounted on the bolt adjacent one end of the lever, is provided

at this end with a curved cam surface 24*a*, as is shown most clearly in Fig. 2.

Mounted on the presser foot bar 17 adjacent the bolt 25 is a guide member 26 that is locked on the presser foot bar by set screws 27. This guide member 26 is provided with an extended body portion 26*a* provided with a downwardly directed slot 26*b* having substantially parallel sides closely embracing the substantially parallel sides of the lever 24 adjacent the cam surface 24*a*. The sides of the guide member 26 which form the slot are arcuately cut away, as indicated at 26*c*, with these cut away portions providing room for the head of the bolt 25 and the bushing 28 when the presser foot bar is in lowered position as shown in the drawings.

The lever 24, which is rotatable in a substantially vertical plane, is used to move the presser foot bar upwardly from the position shown in the drawings and raise the presser foot 18 from the base 10 or bed of the machine. This raising action is caused by the cam surface 24*a* of the lever arm bearing against the bottom of the guide member slot 26*b* thereby forcing the guide member 26 and thus the bar 27 upwardly. This upward movement is against the force of a helical spring 29 that surrounds the presser foot bar in the region between the sleeves 23 and the guide portion 26*a*. This spring is employed to urge the presser foot bar downwardly at all times and hold the presser foot 18 against the material being sewed when the presser foot is in lowered position. As is shown in Fig. 2, the bottom of the slot 26*b* is slightly spaced from the cam surface 24*a* when the presser foot 18 is in lowered position. This spacing is provided so that the presser foot is urged at all times against the base 10 or against material on the base by the action of the spring 29.

The guide member 26 serves not only as means for raising and lowering the presser foot, but also serves as a guide to prevent rotation of the presser foot bar 17. As the needle moves between bifurcations on the presser foot, it is necessary that the presser foot be held against substantial rotation to prevent the needle striking one of these bifurcations. In the ordinary machine, this is usually done by attaching a lever to the presser foot bar and positioning this lever in a cut-out portion of the head 13 so that the cut-out portion will retain the lever for movement in a vertical plane and thus hold the presser foot against rotation. Cutting of the usual cast metal head is a difficult and an expensive operation and many heads are rejected as it is difficult to make the cut with the required preciseness. The guide member 26 avoids this cutting as the guide member is firmly attached to the presser foot bar 17 and closely embraces the lever 24 throughout the range of movement of the lever. Thus, as the lever is rotatable only in a vertical plane and the guide member closely embraces the lever 24, rotation of the bar 17 and thus the presser foot 18 is prevented.

When material is being removed from or inserted into the machine under the needle 16, it is necessary that the presser foot be held in elevated position. In the present invention this is accomplished by providing an approximately flattened surface 24*b* on the edge of the lever 24 adjacent the outer end of the cam surface 24*a*.

When the lever is rotated in clockwise direction, as shown in Fig. 2, the cam surface 24*a* operating against the bottom of the slot 26*b* raises the guide member 26 and thus the presser foot 18. As soon as the lever 24 has been turned to its extreme clockwise direction, the flattened surface 24*d* engages the bottom of the slot 26*b* and retains the bar 17 and the presser foot 18 in their extreme raised positions.

The end of the head 13 is provided with a removable cover plate 30, preferably of relatively thin sheet metal. This cover plate serves to hide the top parts of the needle rod 15 and presser foot bar 17 and the associated structure and also covers the bolt 25, guide member 26 and the adjacent portions of the lever 24. Space is provided between the end of the head 13 on which the lever is mounted and cover plate 30 to provide for rotation of the lever 24.

Having described my invention as related to the embodiment set out herein, it is my intention that the invention be not limited by any of the details of description unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying claims.

I claim:

1. In a sewing machine including a head and a presser foot bar longitudinally movable thereon, a lever rotatably mounted on an outer surface of said head for moving said bar, and a guide member fixed to said bar and closely embracing a portion of said lever to prevent rotation of the bar.

2. The sewing machine of claim 1 wherein said lever comprises a sheet metal stamping having substantially parallel side surfaces embraced by said guide member.

3. The sewing machine of claim 1 wherein said lever is provided with a cam surface engaging said guide member for causing longitudinal movement of said bar.

4. In a sewing machine including a head and a presser foot bar longitudinally movable thereon, a lever having substantially parallel sides and mounted on said head for rotation through an arc in a plane that is substantially parallel to the plane in which the bar is movable, said lever having a cam surface thereon, and a guide member fixed to the bar and provided with a slot closely embracing said sides of the lever to prevent rotation of the bar, the cam surface bearing against the bottom of the slot to raise said bar when the lever is rotated in one direction.

5. The sewing machine of claim 4 wherein said lever comprises a sheet metal stamping and is rotatably mounted adjacent one end thereof, an edge of said one end being of arcuate shape to provide said cam surface.

6. The sewing machine of claim 4 wherein said lever is rotatably mounted adjacent one end thereof and the edge of said one end is of arcuate shape to provide the cam surface, the edge of the lever adjacent the cam surface being flattened to engage the bottom of the slot and retain the bar in extreme raised position when the lever has been rotated to one end of its path of movement.

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No references cited.