United States Patent

Casas-Robert

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[54] **BOBBIN MOUNT FOR SEWING MACHINE**

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Dec. 6, 1968 Switzerland 18239/68

[52] **U.S. Cl.** ..... **112/218 R**

[51] **Int. Cl.** **D05b 43/00**

[58] **Field of Search** ..... 112/218 R, 218 A, 169, 259

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[57] **ABSTRACT**

A sewing machine wherein the upper thread spool is held fast on its spindle within the housing provided for it while the thread is wound off the spool in a direction extending substantially in alignment with the spool axis. The cover of the housing may be shifted outwardly together with the spindle which is secured to it to allow removing and replacing the spool. A cap-shaped member fitted loosely over the spool includes a broad flange guiding the thread as it passes off the spool while means are provided to lock the cover in its closed position and to lift the cap-shaped member off the spindle before releasing the cover.

7 Claims, 6 Drawing Figures

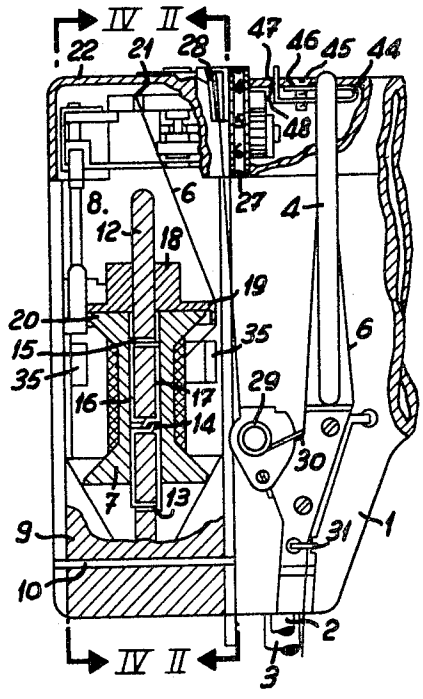

FIG. 2

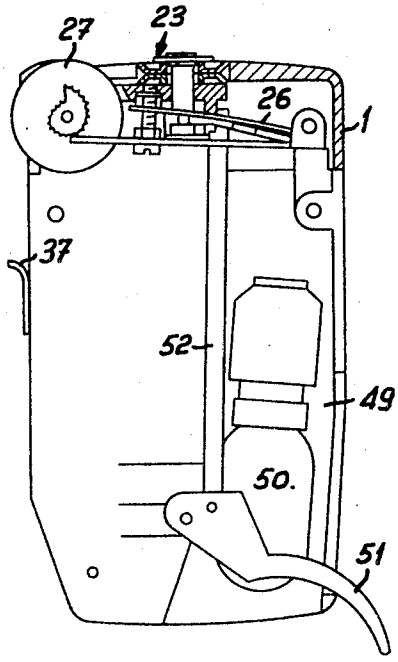

FIG. 1

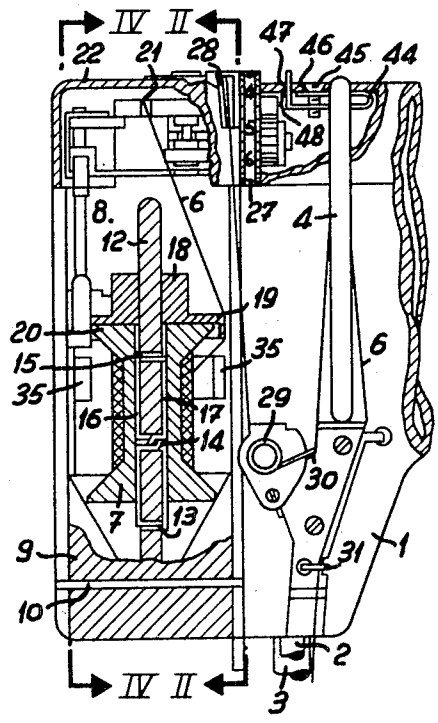

FIG. 3

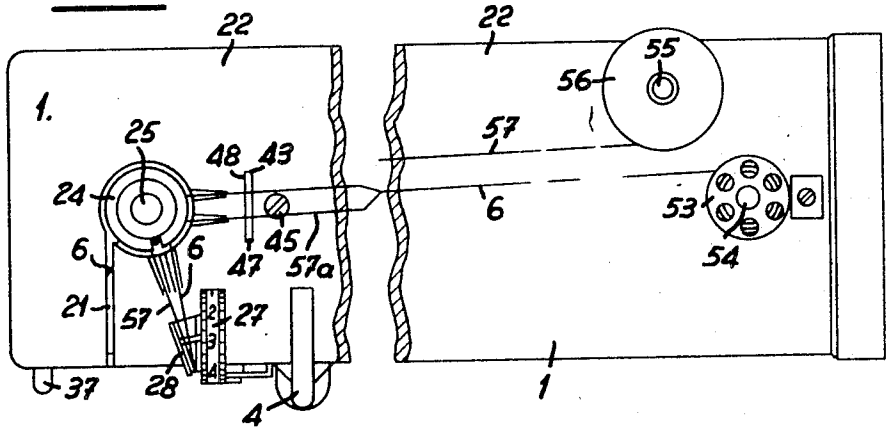

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FIG.4

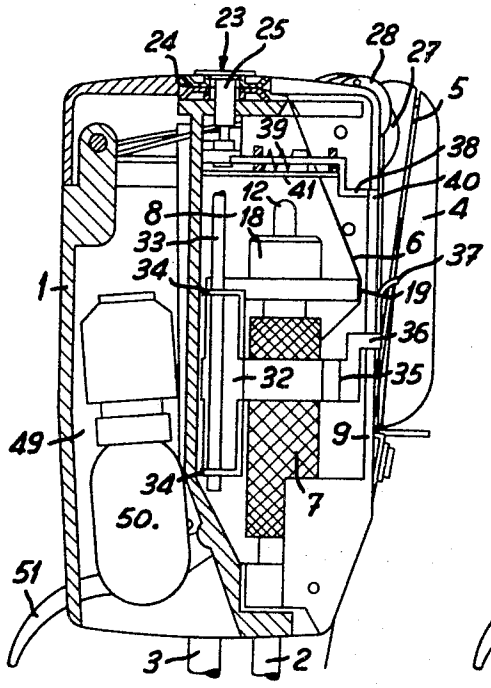
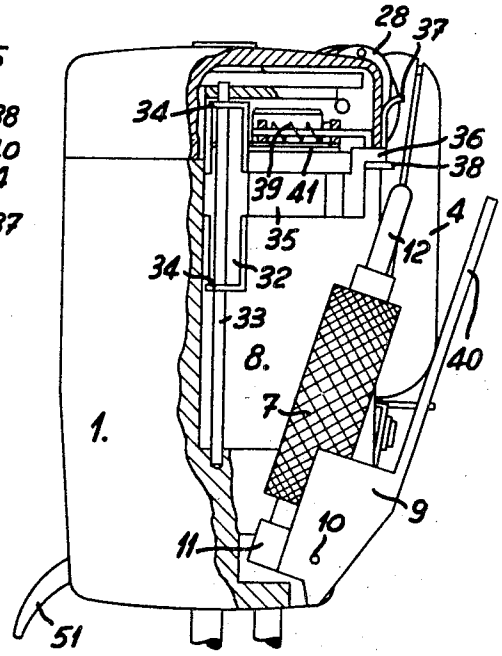


FIG.5



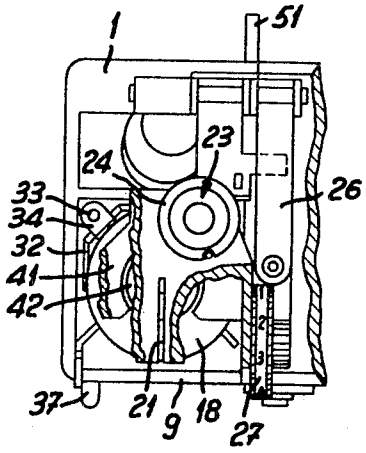


FIG.6

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BOBBIN MOUNT FOR SEWING MACHINE

The present invention has for its object a sewing machine the upper part of the frame of which is provided with a housing in which is located a spindle adapted to carry the upper thread spool.

A number of sewing machines are already known, wherein the upper thread spool is concealed within a housing of the frame. However, in such known machines, the spool is free within its housing and the traction exerted intermittently on the thread by the thread-drawing means incorporated with the sewing machine produces an uneven unwinding of the spool. Now, the machine according to the present invention eliminates said drawbacks and its novelty consists in that it includes means for restraining the rotation of the spool while guiding elements provide for the unwinding of the thread in a general direction extending substantially coaxially with the spool.

The accompanying drawings illustrate diagrammatically and by way of example a preferred embodiment of a sewing machine according to the invention. In said drawings:

FIG. 1 is an elevational, partly cross-sectional view of the upper part of the frame of the sewing machine forming the head thereof.

FIG. 2 is a cross section through line II—II of FIG. 1.

FIG. 3 is a top plan view of the head of the sewing machine.

FIG. 4 is a cross section through line IV—IV of FIG. 1, showing the arrangement of the spool-carrying spindle in its operative condition.

FIG. 5 is a view of the spool-carrying spindle in the position the spool is released with reference to the said spindle.

FIG. 6 is a fragmentary top plan view of the head of the machine.

The sewing machine illustrated includes a frame 1 enclosing all of the mechanism controlling the needle bar 2 which moves in a vertical reciprocatory manner within the head of the sewing machine. Said head also carries the presser foot 3 adapted to hold the fabric to be sewn over the mechanism conveying it and which is not illustrated.

The mechanism driving the needle bar 2 also drives the thread-drawing means which, in the example illustrated, includes an oscillating lever which is not shown in the drawing since it is concealed by a protective cover 4 provided with a slot 5 (FIG. 4) through which the upper thread 6 passes. Said upper thread 6 is fed by a spool 7 located in a housing 8 formed for this purpose within the head of the sewing machine. In practice and as illustrated in FIGS. 1 and 5, the frame is provided with a recess forming said housing 8, which recess is closed by the cover 9 pivotally secured to a spindle 10 carried by the frame 1. A member 11 rigid with said cover 9 serves as a support for the spool-carrying spindle 12 which is thus rigid with the cover 9. Said spool-carrying spindle 12 is provided with three transverse recesses 13, 14 and 15 through which the wires 16 and 17 made of spring steel are inserted. Said steel wires 16 and 17 are adapted to lock the spool 7 when required with reference to its carrier spindle 12. As a matter of fact, said steel wires 16 and 17 extend when inoperative outside the spool-carrying spindle 12. When a spool 7 has been threaded over said spindle, the steel wires 16 and 17 are urged against the outer periphery of the spindle and exert a frictional stress within the hub of the spool 7 whereby they prevent the latter from rotating round its spindle.

As illustrated more particularly in FIGS. 1 and 4, the spool-carrying spindle 12 extends along a substantially vertical line. In order to allow the thread 6 to be unwound upwardly, that is in a general direction which is substantially coaxial with the axis of the spindle, elements are provided for guiding the thread, one of said guiding elements comprising a revolvable member 18 in the shape of a cap which revolves around the spool-carrying spindle. The outer circular edge 19 of said cap 18 has a diameter larger than that of the flange 20 of any spool 7 which may be used with the machine whereby the thread 6 may unwind without contacting at any time the corresponding flange 20 of the spool 7, which flange may even be broken or chipped in certain cases.

The upper part of the frame 1 of the sewing machine is provided with a slot 21 (FIG. 3) through which the thread 6 is adapted to pass into the tension-adjusting means 23. In fact, the tension-adjusting means 23 is fitted on the upper plate 22 closing the frame 1, said means including two plates 24 fitted round a spindle 25, a spring 26 being adapted to urge said plates against each other. A knurled wheel 27 provides for the adjustment of the tensioning of the spring 26 and consequently of the force urging said plates 24 against each other. The tension-adjusting means need not be described with any further detail since it is the subject of U.S. Pat. No. 3,557,731 filed by the same applicant. When the thread 6 has passed beyond the gap between the plates 24, it engages a guiding element 28 formed by a trough and is directed downwardly so as to partly surround a thread guide 29 and to engage a compensating spring 30; it then moves over the thread-drawing means concealed by the cover 4 and beyond the latter it enters the thread guide 31 from which it is directed towards the needle-clamping means and the eye of the needle, which latter are not illustrated.

The above-described sewing machine may operate perfectly with only the elements disclosed with reference to the accompanying drawings.

However, in order to further the operation of such a sewing machine and primarily to facilitate the insertion and removal of the spool with reference to its carrier spindle 12, said machine advantageously includes means for raising the cap 18 so as to allow it to be removed from the spindle 12 before the latter is rocked outwardly outside its housing 8. Said raising means includes a support 32 slidingly engaging a spindle 33 extending vertically inside the housing 8. Said spindle 33 is thus substantially parallel with the axis of the spool-carrying spindle 12 when in its operative position. The support 32 slides over its spindle 33 as provided by its terminal folded extensions 34. The remainder of said support 32 is in the shape of a strap. In other words it includes two flanges 35 lying to either side of the spool-carrying spindle 12 when in its operative position, said flanges extending in proximity with the walls of the housing 8. One of the flanges 35 is provided with an extension 36 projecting outside the housing 8. Said extension 36 forms at its end 37 a control member through which it is possible to operate the support 32 from the outside of the sewing machine when the cover 9 has been closed over the housing 8. It should be noted that said control member 37 serves a further function in connection with said sewing machine.

As a matter of fact, since the extension 36 of the arm 35 extends beyond the outside of the frame 1 of the machine, said control member 37 may also serve as a bolt holding the cover 9 in its closed position over the housing 8. As illustrated in FIGS. 3, 4 and 6, the cover 9 is held closed over the housing by the member 37 engaging the outer surface of said cover 9. The latter can therefore be opened only after raising of the support 32, which is accomplished by a shifting of the control member 37. During said raising movement, the support 32 urges the cap-shaped member 18 upwardly and the latter is held in its raised position together with its support 32 by a locking mechanism when the spool-carrying spindle is in its collapsed position. Said locking mechanism includes a bolt 38 adapted to slide transversely across the upper part of the frame 1 under the action of a spring 39 urging said bolt 38 outwardly of the frame 1. The bolt 38 is normally held in its inoperative position within the frame 1 by the edge 40 of the cover 9 which engages it when the latter is in its closed position as illustrated in FIG. 4. As soon as the support 32 has been shifted upwardly through operation of the control member 37 and has released the cover 9 after it has risen above the upper edge 40 of the latter, the bolt 38 is urged outwardly and thus moves the cover 9 into its open position so as to engage the underside of the control member 37 and hold the latter in the position illustrated in FIG. 5. A plate 41 extending horizontally across the upper part of the frame 1 is provided with a central opening 42 adapted to guide the cap-shaped member 18 and to ensure thus its centering with reference to the operative location of the spool-carrying spindle 12, even when the latter has been shifted away from said spindle 12.

It will be readily understood upon inspection of the drawings and particularly FIGS. 4 and 5 that, at the moment of the return of the cover 9 into its closed position over the housing 8, whereby it passes from the position illustrated in FIG. 5 to that illustrated in FIG. 4, the upper edge 40 of said cover 9 urges the bolt 38 back inside the frame 1 which allows the support 32 and cap-shaped member 18 to drop under the action of gravity over the spool-carrying spindle 12 in contacting relationship with the upper flange 20 of the spool 7. It should be noted that such a sewing machine allows the use both flanged spools 20 and of bobbins such as those illustrated in FIGS. 4 and 5 which include no transverse flanges. In the latter case, the annular flange 19 of the cap 18 forms an advantageous substitute for the flange 20 of the spool and this is all the more true since the cap is preferably made of a material which facilitates the sliding of the thread over it, which is not always the case for the actual spool flanges 20.

In order to further the winding of a thread around the cop 53 in the sewing machine described hereinabove, which cop is adapted to be rotatably driven by the winding spindle 54 projecting above the upper surface 22 of the frame 1, said upper surface carries a thread guide 43 constituted by a blade projecting above the frame 1. Said thread guide 43 restricts the path followed by the thread to so that it will remain constantly located in the medial plane of the cop 53. As illustrated in FIG. 1, said thread guide 43 forms the raised end of a metal blade 44 folded in U-shape and carried inside the frame 1. A screw 45 engaging a transverse opening 46 in the upper surface 22 of the frame 1 and passing freely through one of the arms of the U-shaped blade 44 is screwed into the opposite arm of the latter. The raised end 47 of the blade forming the thread guide passes through a slot 48 in the frame 1. It will be readily understood from inspection of the drawings that tightening or loosening of the screw 45 adjusts the spacing between the two arms of the U-shaped blade 44 and thus produces a more or less considerable projection of the raised end 47 above the surface 22 of the frame 1.

When a cop 53 is to be placed over its winding spindle 54, the thread 6 passing off the spool 7 and out of the frame 1 through the slot 21 engages the gap between the plates 24 of the tension-adjusting means which exerts a preliminary tensioning stress on said thread. The latter then engages the thread guide 43 before it is wound around the cop 53. Said special structure of the sewing machine thus allows the cop 53 to be wound while an adjustable tensioning is exerted by means of the conventional tension-adjusting means on said thread as it leaves the spool 7 towards the cop 53, which is not generally the case in conventionally constructed sewing machines. The tensioning exerted by the thread 6 during the winding operation thus ensures a more uniform distribution of the thread with reference to the cop carrying it.

It should be noted that the sewing machine described hereinabove may be provided above the upper surface 22 of the frame 1 with a second spool-carrying spindle 55 which permits making two-thread stitchings by such a sewing machine. In practice, a second thread spool 56 may be fitted over said spool-carrying spindle 55 and said spool 56 supplies a second thread 57 extending over the thread guide 43 and engaging the gap between the plates 24 so as to be fed by the guide element 28 towards the corresponding needle. The thread 57 then passes between the plates 24 in a direction opposed to that followed by the thread 6 passing off the spool 7. The tension-adjusting means provided for the threads would then exert an action simultaneously on both threads 6 and 57 without any difficulty and without any further plate being required, since the two threads pass through the tension-adjusting means in opposite directions while the input and output provided for the two threads in said adjusting means are not in registry. In order to facilitate the passage of both threads between the plates 24, their central portion is concave as illustrated in FIG. 4. Of course, it would also be possible to provide the tension-adjusting means with three superposed plates so as to form different passages for the threads 6 and 57.

The sewing machine described may obviously permit a winding of the cop not only by means of the thread 6 supplied by the spool 7, but also by means of the thread 57 supplied by the spool 56. In such a case, the thread 57 would engage the gap between the plates 24 and then return along the path 57*a* towards the cop 53 carried by its spindle 54. In such a case the winding of the cop would also be executed with the possibility of adjusting the tensioning of the wound thread.

The head of the sewing machine also includes, as illustrated in FIGS. 2 and 4, a housing 49 enclosing a lamp 54 adapted to illuminate the fabric which is being sewn by the sewing machine. As in the case of conventional sewing machine, the lever 51 which controls the operation of the presser foot 3 may also act by means of a connecting rod 52 on the tension-adjusting means formed by the plates 24 so as to release said plates each time the presser foot is raised off the fabric.

Preferably the cover 9 is made of a translucent or transparent material which allows the amount of sewing thread carried by the machine to be ascertained.

Numerous modifications of the sewing machine described and illustrated may be made within the scope of the present invention as defined by the accompanying claims. Thus, instead of providing a spool-carrying spindle 12 rocking in unison with the cover 9, said spindle together with the cover 9 may pivot round a vertical axis so as to allow the spool-carrying spindle to be shifted out of the housing 8. According to the further embodiment, said spool-carrying spindle 12 could also be located horizontally provided the housing 8 is given a shape which allows the spool to be introduced horizontally into the head of the sewing machine. As to the means locking the spool 7 over its spindle 12, instead of resorting to steel wires, such means may comprise a catch fitted inside the spool-carrying spindle 12 or any other clamping means, the clamping being performed automatically as soon as the spool has been fitted over its spindle 12. Also the clamping may be obtained by means of a special arrangement such, for instance, as an eccentric system controlled by means carried at the free end of the spindle 12. A further modification may consist also in clamping or retaining means provided for the spool 7 which, instead of acting by means of the spool-carrying spindle 12, may act directly on the outer periphery of the spool.

I claim:

1. In a sewing machine including a body provided with a housing, a needle, means feeding a thread to the needle, and a mechanism carried by the body and controlling the needle, the combination of a spindle located inside the housing when in its operative position, an upper thread spool fitted on the spindle, thread guiding elements over which the thread is fed off the spool to the needle, said thread extending initially in a general direction substantially coaxial with the axis of the spindle, means locking the spool on the spindle during unwinding of the thread from the spool to the needle, means whereby the spindle is movable out of its operative vertical position into an inoperative position projecting outwardly of the housing when the machine is inoperative to allow the spool to be fitted over said spindle, said latter means including a cover pivotally mounted on said machine body to close the housing over the spindle as well as the spool carried thereby when said spindle is in its operative position, and a support integral with the inner surface of said cover and on which said spindle is mounted.

2. A sewing machine as claimed in claim 1 wherein one of said thread-guiding elements comprises a cap-shaped member fitted on said spindle above said spool, said cap-shaped member including a flange the outer diameter of which is larger than the diameter of any part of said spool.

3. A sewing machine as claimed in claim 2 including slidable means mounted inside said housing and engaging said cap-shaped member to lift said cap-shaped member off said spindle when the spindle is in its operative position prior to moving said spindle to its inoperative position outwardly of said housing.

4. A sewing machine as claimed in claim 3 wherein said slidable means includes an auxiliary, upwardly directed spindle rigidly secured to said machine parallel with said first-mentioned spindle when the latter is in its operative position, a support slidably fitted over said auxiliary spindle, said support, when shifted upwardly over said auxiliary spindle, raising said cap-shaped member off the first-mentioned spindle when the latter is in its operative position inside said housing prior to movement of said first-mentioned spindle into inoperative position outwardly of said housing.

5. A sewing machine as claimed in claim 4 including a control member extending outside of said machine body and connected with said slidable support to control the movement thereof along said auxiliary spindle, and locking means holding said slidable support and said cap-shaped member engaged by said support in their uppermost position.

6. A sewing machine as claimed in claim 5 wherein said control member includes means for locking said cover in a closed position against said housing when said slidable support is in its lowermost inoperative position on said auxiliary spindle.

7. A sewing machine as claimed in claim 5 wherein said locking means for said slidable support and said cap-shaped member includes a bolt engaging a portion of said support when the latter is in its raised uppermost position, spring means urging said bolt into its support-engaging position, said cover when in its closed position urging said bolt back against the action of said spring and out of its support-engaging position permitting said support and said cap-shaped member to drop by gravity into their lowermost positions.

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