

Feb. 12, 1963

R. BRUSCAGLIONI

3,077,169

PORTABLE FREE ARM TYPE SEWING MACHINE

Filed Feb. 9, 1960

FIG. 1

4 Sheets-Sheet 1

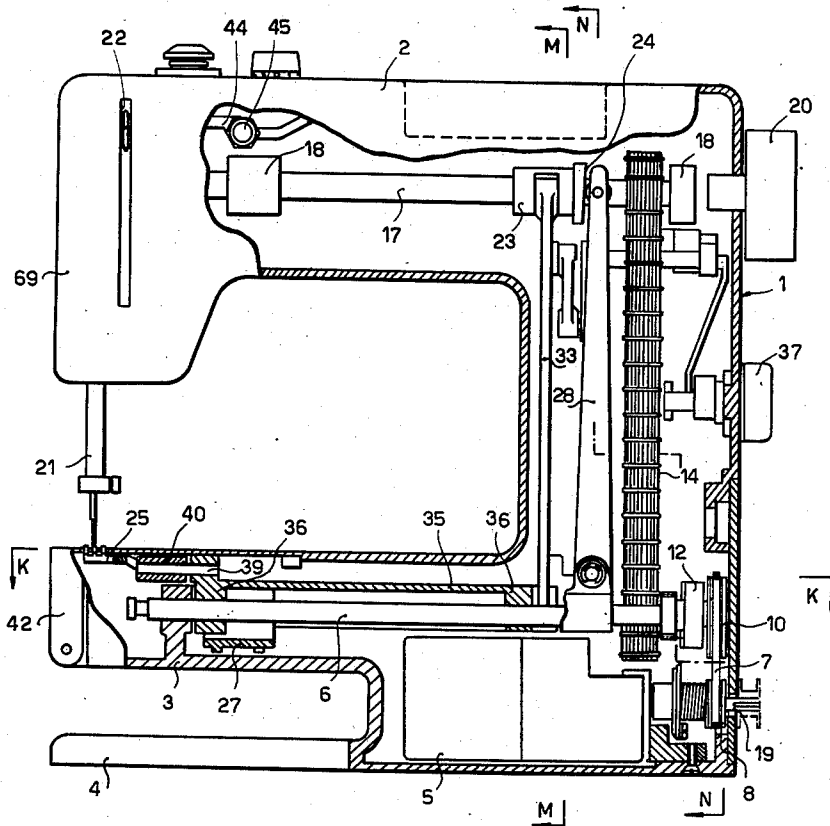
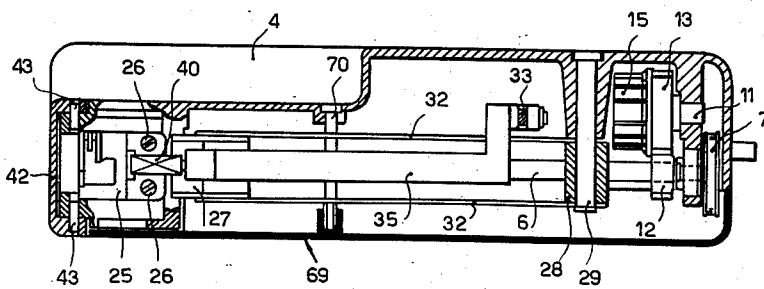


FIG. 2



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FIG. 4

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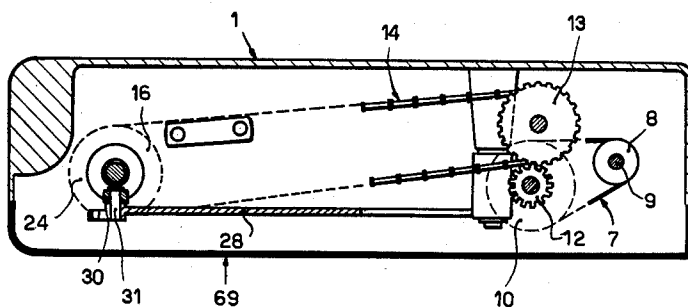


FIG. 3

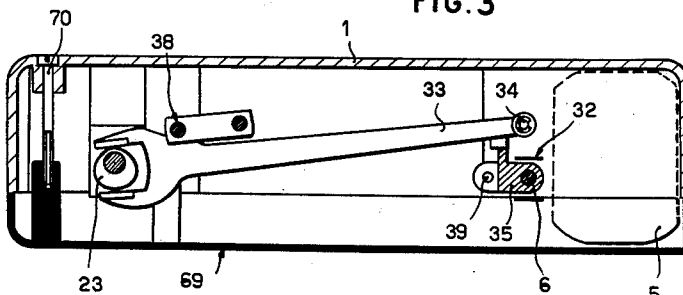
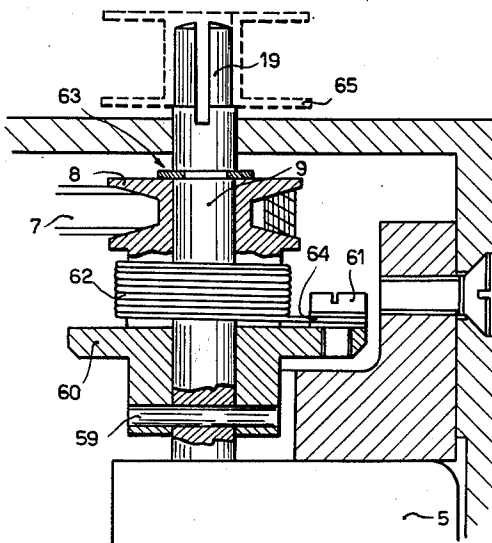


FIG. 5



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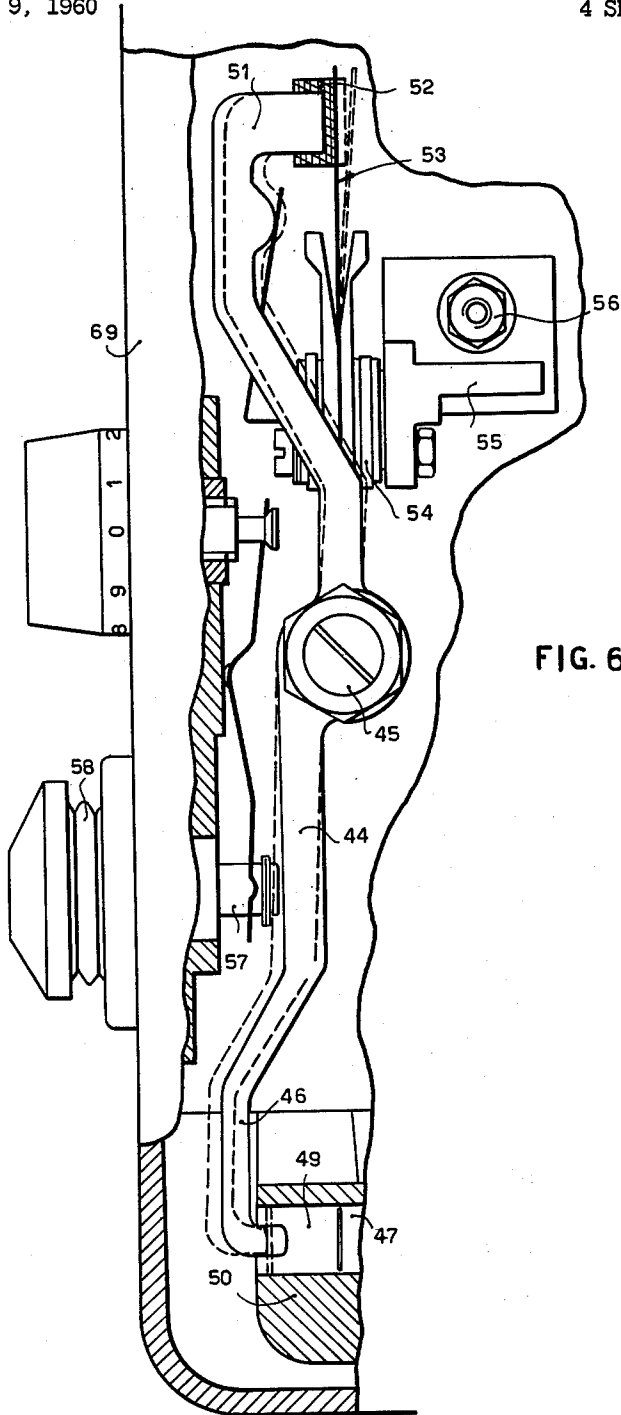
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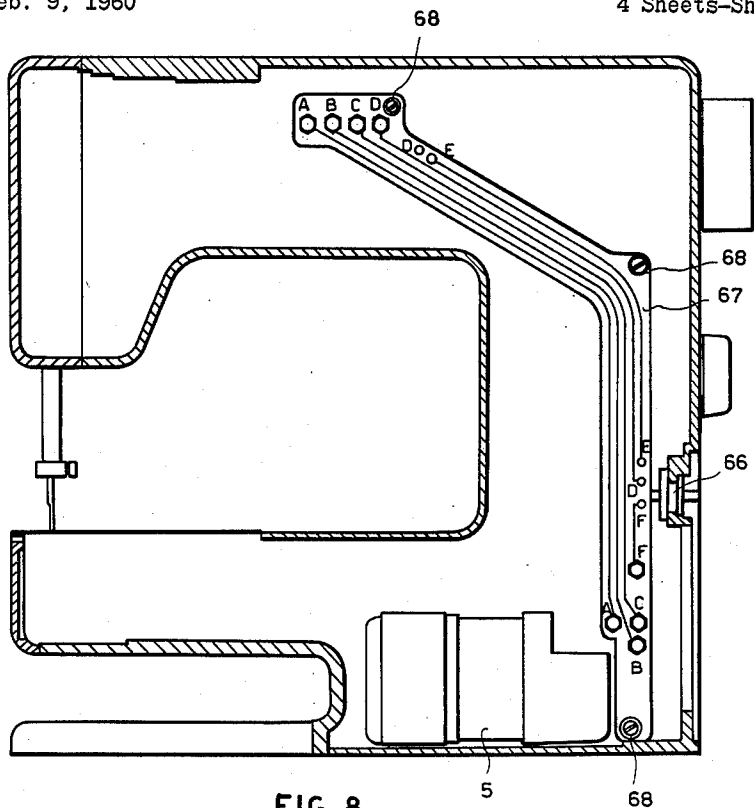


FIG. 8

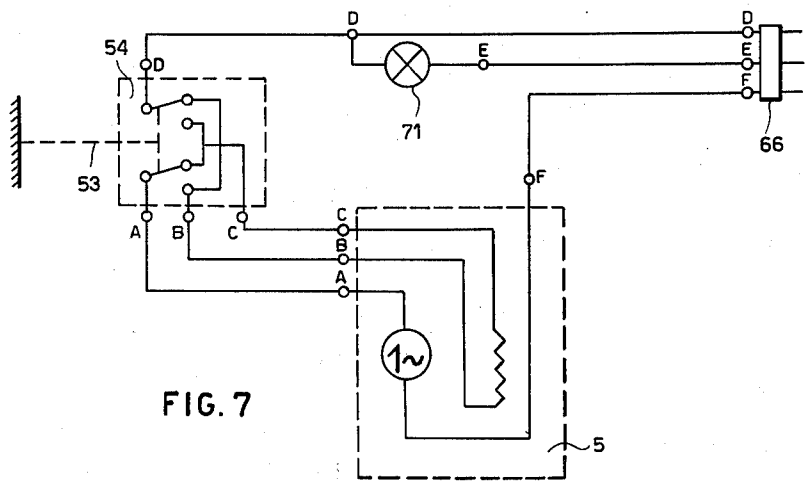


FIG. 7

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PORTABLE FREE ARM TYPE SEWING MACHINE
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Filed Feb. 9, 1960, Ser. No. 7,557

Claims priority, application Italy Feb. 19, 1959

8 Claims. (Cl. 112-220)

Portable sewing machines embodying free arm, and presented on the market in small suitcases are well known. However, these sewing machines are too voluminous and heavy to adhere to their description and duty of portable sewing machines in the correct sense of the word.

Moreover, the dimensions of the free arm are so large that it is impossible to sew narrow and/or tubular shaped pieces of cloth, therefore the range of operations of these machines is very restricted.

The present invention deals with a portable sewing machine built with new principles of construction; and in a particular manner to a new arrangement of the parts commonly known to those skilled in the art to which this patent application applies. These new principles in the construction as well as the new arrangements of the parts, offer notable advantages over the machines built up to the present day, both as to the overall size and lighter weight, as well as to the smallness of the section of the free arm.

In contrast to all the sewing machines built up to the present day; in the machine which is the subject of the present invention, all the supporting mechanisms of the machine are contained in one unique open faced housing comprising a free arm having a base plate, an upper arm and a vertical portion interconnecting the arms. A removable cover plate is provided which acts as the front cover or lid of the machine, and this offers the advantage of having all the components in the housing in clear vision, and of ready access from the front after the front cover or plate is removed. This allows for the simultaneous control of the sewing operation, and the individual units of this machine.

In consideration of the fact that all portable machines have to be contained in small suitcase type containers, particular attention has been given to both the size, and the shape, and the position of all the control elements which protrude from the housing profile.

In particular, in the machine which is the subject of the present invention, the disengaging control button for onward feed winding of the lower bobbin has been abolished. For the disengaging operation in the machine subject of this invention, the bobbin is applied to the machine housing flank to a suitably shaped shaft of the small electric motor.

Automatic control of the disengagement of the sewing feed of the thread is obtained by means of the presser bar lifter. In other words, the drive direction of the electric motor shaft is reversed when pressure of the presser bar is released.

This reversal of the drive direction automatically causes disengagement of the thread feed by means of devices described hereinafter, and in such a manner that bobbin winding operations may be accomplished. The automatic disengaging system has another advantage in the fact that, if the operator takes his foot off the pedal before cutting off the electric motor, irregular or mistaken sewing is avoided.

Another feature of the machine to which this invention pertains consists in the fact that it is furnished with a printed electrical circuit, feeding all the electrical units, as well as having the advantage of easy mountability, and occupying less space. The accompanying drawings

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show by way of example, a form of construction of the portable sewing machine described in this present application for patent rights.

FIGURE 1 shows a part section frontal view of the machine.

FIGURE 2 shows a section plan view across line K—K of FIG. 1.

FIGURE 3 shows a partial transverse section view across line M—M of FIGURE 1.

FIGURE 4 shows a partial transverse section across line N—N of FIGURE 1.

FIGURE 5 shows an enlarged view and in partial section, the clutching engagement for transmission from the electric motor shaft to the lower shaft.

FIGURE 6 shows an enlarged partial section view of the disengaging control element of the machine.

FIGURE 7 shows an electric wiring diagram and the electrical units of the machine.

FIGURE 8 shows the electric circuit applied to the machine housing.

Referring to the drawing: all the members are arranged in the machine housing, comprising the mounting upright 1, the upper arm 2, the free arm 3, and the base plate 4. The electric motor 5 is secured to the base plate 4, and operates through a clutch, to be described in more detail hereinafter, the lower transmission shaft 6, by means of a belt 7 connecting pulley 8 keyed to shaft 9 of the electric motor, and pulley 10 keyed to the lower shaft 6.

The movement of this shaft is transmitted to shaft 11 by means of gear coupling 12 and 13, and then by belt 14 wound round pulleys 15 and 16 to the upper transmission 17 rotating on bearings 18. The free end of shaft 9 of the electric motor protrudes externally on the housing flank, and is shaped as a winding device 19 to which can be attached the lower thread bobbin.

The upper shaft 17 carries a hand wheel 20 at one extremity situated externally on the housing flank, whilst the other extremity operates the units commonly known to those skilled in the art to which this invention pertains, a needle carrier rod 21 and the sag absorbing lever 22. Further, the upper shaft 17 carries eccentric 23 which is skew cut at the right hand extremity in order to constitute an inclined plane guide surface.

In order to execute feed operation, the tooth member 25 fixed by screws 26 to support 27 is provided, and to said element are given lift and advance cycles. The lifting movement of the tooth element is obtained by means of lever 28 which is hinged at lower end to journal 29 fixed to the machine housing, and furnished at upper extremity with a roller bearing 30 (FIGURE 4) free to rotate on the small pin 31 fixed to the lever.

The small bearing 30 carries out a rotating motion on the skew surface of the eccentric 23, and the control between the two members is ensured by a suitable tension spring, not shown.

The lever 28 is then connected by means of the resilient plates 32 to bearing 27 of tooth member 25, and thus embodying a resilient parallelogram connection in conformity with Italian Patent No. 56,099 of the same applicant.

The advance movement is obtained by means of a rider fork 33 (FIG. 3) which at one extremity encompasses eccentric 23 whilst other extremity is hinged by pin 34 to the oscillator. The latter in turn is hinged to the lower transmission shaft 6 with the two lugs 36. Reference numeral 37 indicates the stitch length control button, and the commutation for the backwards and forwards movement of the cloth, said button, by means of parts commonly known to those skilled in the art to which this invention pertains, acts on rider fork 33, which is connected to said

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parts by means of journal 38. The oscillator 35, at its left hand extremity is furnished with a journal 39, the axis of which is situated above the axis of the lower shaft 6.

All the elements as described in the foregoing for the advance motion and the switch position are situated in the mounting 1, and free arm 3, which is closed at its free extremity by means of small cover cap 42 rotatable downwards around hinge 43. The disengaging control of the machine units is obtained by operating the presser bar which causes rotation of the electric motor shaft to be reversed.

For this purpose, the machine is provided with a suitably shaped lever 44 (FIGURE 6) fulcrumed to pivot screw 45, which is fixed to the machine housing. Said lower lever 44, at one of its extremities, is furnished with a curved arm 46, situated above pin 47 of the presser bar, in correspondence with hole 49 of the sewing head 50, for the vertical motion of the said bar.

The other extremity of said lever 44 terminates with another curved arm 51 covered with an insulating material sheath 52 which acts on spring 53 of the micro-switch 54. Said micro-switch situated behind lever 44, is fixed to support 55, which in turn is fixed to the machine housing with screw 56.

Above lever 44, and fixed to the machine housing, is located the upper thread tension device, substantially conforming to Italian Patent No. 63,829, of the same applicant and to which reference can be made. The presser member 57 of said device is situated above the upper side of lever 44 on the side of the curved arm 46, and at a convenient distance from fulcrum 45.

In FIGURE 6, the presser bar including pin 47 is shown in lowered position, and lever 44 as represented by solid line accordingly is in position wherein the sewing machine may perform its sewing function under operation of the reversible electric motor 5 in the corresponding direction of rotation. With further reference to FIGURE 6 it will also be understood that lever 44, as shown by dotted line, is in a position brought about by movement of the presser bar including pin 47 to a raised position of the presser bar wherein the sewing machine motor 5 has a reversed operation which disengages the clutch system and accordingly discontinues the sewing function. Also in the raised position of the presser bar, member 57 of the upper thread tensioning device is lifted by lever 44 and the device accordingly has slackened the tension which it ordinarily imposes on the upper thread. The motor shaft 9, for the raised position of the presser bar, is effective, in the corresponding direction of motor drive, for winding thread on a lower thread bobbin 65 when the bobbin is attached as indicated in FIGURE 5 and used for the purpose.

The switch 54 in the electric motor circuit in consequence of the movement of small contact spring 53, produces reversal of the rotary drive of the electric motor shaft 9. As already stated in the foregoing, the transmission of the movement of the electric motor shaft to the lower shaft 6 is obtained by a clutch system, shown more particularly in FIGURE 5. In the latter figure, it can be seen that bush 60 is fastened by a peg 59 to the shaft 9 of the electric motor 5, and an extremity of helical spring 62 is secured by a screw 61 to the bush periphery.

The helical spring 62 is wound round the bush of transmission pulley 8, which in turn is fitted to shaft 9; and from which it cannot slide out by means of circlip 63. When the rotation of shaft 9 is such that the extremity 64 is made to turn in direction to wind spring body 62, the spring grips the pulley bush, and therefore due to friction, the pulley is made to rotate with shaft 9.

When, on the other hand, shaft 9 rotation is reversed as opposed to the preceding instance, the spring 62 unwinds and frees pulley bush 8, and for which reason this latter remains stationary whilst shaft 9 rotates. In this condition of the motor shaft, feed winding of the lower

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thread bobbin 65 can take place on projection 19 of the motor shaft.

The electric circuit 67 devised in printed form (FIGURE 8) is fixed to the machine housing with screws 68. The electric current is received by means of three pole plug 66 fixed to the machine frame (FIGURE 7).

The current is then sent through the printed circuit to the micro-switch 54 and lamp 71 situated on the upper arm, and to the electric motor located on the base. The electric circuit members which connect the micro-switch, the lamp and the electric motor to the corresponding poles of the printed electric circuit are indicated by the same letters in FIGURES 7 and 8.

Finally the machine housing is closed in front by cover 69 and secured to said frame by means of screws 70.

I claim:

1. In a sewing machine of the type having a cloth feed mechanism, a presser bar adapted to be raised and lowered with respect to the cloth feed mechanism and a needle carrier rod having a needle positioned therein, the improvement comprising a reversible rotary electric motor having a rotatable drive shaft, transmission means operatively connected between the motor drive shaft and the needle carrier rod and the cloth feed mechanism, reversing switch means operatively connected to the motor, and a lever having one end connected to the presser bar and the opposite end connected to the switch means, whereby, when the presser bar is lowered, the opposite end of the lever actuates the switch means to thereby cause the motor to rotate in a direction to drive the needle carrier rod and cloth feed mechanism in a cloth sewing function, and then the presser bar is raised, the opposite end of the lever actuates the switch means to thereby rotate the motor in a reverse direction to discontinue the drive of the needle carrier rod and cloth feed mechanism, and, thus, the sewing function.

2. A sewing machine according to claim 1, wherein the end of the motor drive shaft has a bobbin mounted thereon, whereby thread may be wound on the bobbin when the motor is being driven in the reverse direction.

3. A sewing machine according to claim 1, wherein the transmission means includes a bushing rigidly mounted on the motor drive shaft, a pulley rotatably mounted on the motor drive shaft and spaced from the bushing, and a helical spring mounted on the shaft between the bushing and the pulley, one end of the spring being connected to the bushing and the opposite end of the spring being connected to the pulley, whereby when the motor is driven in one direction the spring tends to wind up thereby driving the pulley, and when the motor is driven in the reverse direction the spring tends to unwind thereby maintaining the pulley stationary while the motor shaft rotates relative thereto.

4. A sewing machine according to claim 1, wherein the machine includes a thread tensioning device having thread tensioning and thread releasing positions, the lever being operatively connected to the tensioning device, whereby when the presser bar is lowered the device is moved to a thread tensioning position, and when the presser bar is raised the device is moved to a thread releasing position.

5. A sewing machine comprising a housing including a first free arm having a base, a second free arm spaced above the first free arm and an upright member interconnecting the arms, a cover pivotally connected to one end of the arms to give access to the interior of the arms and the upright member, a cloth feed mechanism positioned in the lower free arm, a presser bar and a needle carrying rod positioned within the upper free arm, said presser bar adapted to be raised and lowered with respect to the cloth feed mechanism, a reversible rotary electric motor positioned within the base of the lower free arm, said motor having a drive shaft, the free end of which extends outwardly of the housing, transmission means operatively connected between the motor drive

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shaft and the needle carrying rod and the cloth feed mechanism, reversing switch means mounted within the upper free arm, said switch means being operatively connected to the motor, and a lever pivotally mounted intermediate its ends within the upper free arm, one end of the lever being connected to the presser bar and the opposite end being connected to the switch means, whereby when the presser bar is lowered, the opposite end of the lever actuates the switch means to thereby cause the motor to rotate in a direction to drive the needle carrying rod and cloth feed mechanism in a cloth sewing function, and when the presser bar is raised, the opposite end of the lever actuates the switch means to thereby rotate the motor in a reverse direction to discontinue the drive of the needle carrying rod and cloth feed mechanism and, thus, the sewing function.

6. A sewing machine according to claim 5, wherein the end of the motor shaft has a bobbin mounted thereon, whereby thread may be wound on the bobbin when the motor is being driven in the reverse direction.

7. A sewing machine according to claim 5, wherein the transmission means includes a bushing rigidly mounted on the motor drive shaft, a pulley rotatably mounted on the motor drive shaft and spaced from the bushing, and a helical spring mounted on the shaft between the bushing and the pulley, one end of the spring being connected to the bushing and the opposite end of the

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spring being connected to the pulley, whereby when the motor is driven in one direction the spring tends to wind up thereby driving the pulley, and when the motor is driven in the reverse direction the spring tends to unwind thereby maintaining the pulley stationary while the motor shaft rotates relative thereto.

8. A sewing machine according to claim 5, wherein the sewing machine includes a thread tensioning device mounted on the upper free arm, said tensioning device having a thread tensioning position and thread releasing position, the lever being operatively connected to the tensioning device, whereby when the presser bar is lowered the device is moved to a thread tensioning position, and when the presser bar is raised the device is moved to a thread releasing position.

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