
Candidate's answer

Title: Sewing machine

The present invention relates to a sewing machine according to the preamble of claim 1.

Such a sewing machine is known, e.g. from Figure 3A. The pulley is connected to the treadle via a belt and a fly wheel, so that the shaft is driven by moving the treadle. The pulley is fixed to the shaft.

However, at the end of a sewing operation, the driving arrangement of the fly wheel and the treadle can come to rest in such a position that, upon starting of the next operation, the fly wheel will start rotating in the wrong direction. If this happens, the operator has to reposition the flywheel itself (manually driven), to get a correct starting position. If the operator fails to notice incorrect rotation of the shaft and does not stop it, the sewing operation is ruined and the machine may even suffer damage.

It is an object of the invention to prevent rotating the shaft in the wrong direction.

Thereeto, the present invention provides a sewing machine according to claim 1.

By providing a one-way clutch connecting the pulley with the shaft, such that the one-way clutch engages in the driving direction of rotation, a machine is obtained wherein the shaft can only be driven in one way. Consequently, rotating the shaft in the wrong direction is prevented.

Further advantageous features of the invention are disclosed in the dependent claims. In particular, claim 3 provides a machine, wherein the shaft can be selectively driven by either the treadle or an electric motor, as a non-driven pulley can freewheel with respect to the shaft, thereby solving the problem that the motor and the treadle drive each other in the system shown in Figure 3B.

The invention also relates to a method for upgrading a sewing machine.

Claims

1. Sewing machine, comprising a shaft (20) and a pulley (32A) connectable to a treadle (5) for driving the shaft (20) in a driving direction of rotation, characterized in that the machine further comprises a one-way clutch (31A) connecting the pulley (32A) with the shaft (20) such that the one-way clutch (31A) engages in the driving direction of rotation.
2. Sewing machine according to claim 1, further comprising a separate pulley (32B) connectable to an electric motor (16) for driving the shaft (20) in the driving direction of rotation.
3. Sewing machine according to claim 2, further comprising a separate one-way clutch (31B) connecting the separate pulley (32B) with the shaft, such that both clutches (31A;31B) engage in the same direction of rotation.
4. Sewing machine according to any of claims 1-3, further comprising an adaptor bushing (22A;122;214) mounted on the shaft (20) and connected to the clutch (31A) that connects the pulley (32A) connectable to the treadle (5), with the shaft (20).
5. Sewing machine according to claim 3 and 4, wherein the adaptor bushing (122;214) as a common bushing also is connected to the separate clutch (31B).
6. Sewing machine according to claim 3 and 4, further comprising a separate adaptor bushing (22B) mounted on the shaft (20) and connected to the separate clutch (31B).

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7. Sewing machine according to any of the previous claims, wherein a pulley (32A;32B) and a corresponding clutch (31A;31B) form a clutch-pulley assembly (30A;30B).
 8. Sewing machine according to any of the previous claims, further comprising a handwheel (35) for fine rotation of the shaft (20).
 9. Sewing machine according to any of the previous claims, wherein the handwheel (35) is mounted on an extension shaft (14;214) fixed to the shaft (20).
 10. Sewing machine according to claim 9, wherein the extension shaft (214) is formed by an extended portion of an adaptor bushing.
 11. Sewing machine according to claim 9, wherein the extension shaft (14) is a separate element.
 12. Sewing machine according to any of claims 9-11, wherein the extension shaft is fixed in position by fixing means, such as a screw (24).
 13. Sewing machine according to any of claims 4-12, wherein an adaptor bushing (22A;22B;122;214) is made from a copper-based alloy.
 14. Sewing machine according to any of claims 4-13, wherein a clutch (31A;31B) is kept on position on a corresponding bushing (22A;22B;122;214) via a splined engagement.
 15. Sewing machine according to any of claims 4-13, wherein a clutch (31A;31B) is kept on position on a corresponding bushing (22A;22B;122;214) via a retainer ring (26) and a screw (27).

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16. Method for upgrading a sewing machine, comprising the steps of mounting a one-way clutch (31A) on a shaft (20) of the machine and connecting the clutch (31A) to a pulley connectable to a treadle, such that the clutch engages in a driving direction of rotation of the shaft.

 17. Method according to claim 16, comprising the steps of heating an adaptor bushing, sliding it over the shaft, cooling it down and fixing the bushing with the clutch.