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SEWING MACHINE THREAD GUIDING MEANS

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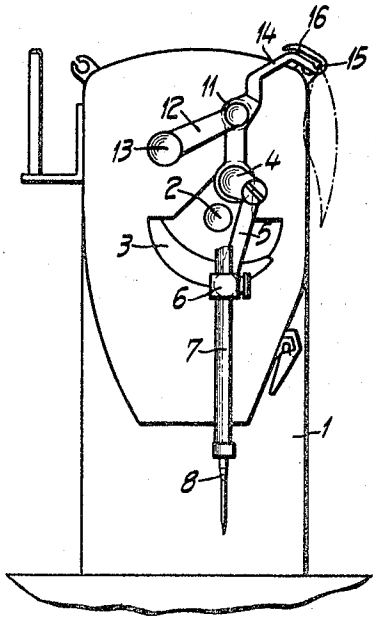


Fig. 1

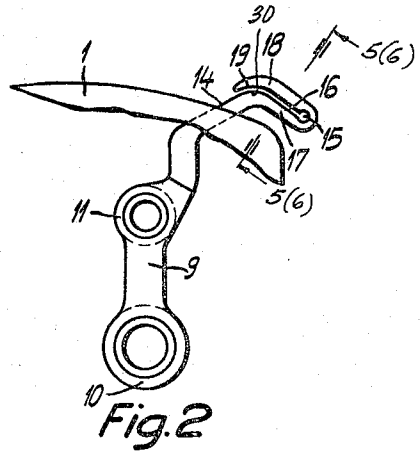


Fig. 2

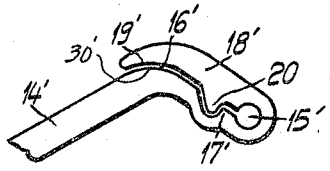


Fig. 3

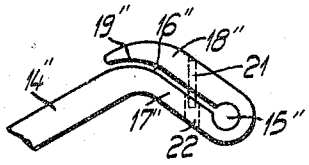


Fig. 4

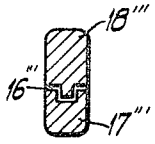


Fig. 5

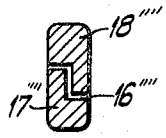


Fig. 6

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SEWING MACHINE THREAD GUIDING MEANS

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8 Claims. (Cl. 112—245)

This invention relates in general to a sewing machine construction, and in particular to a new and useful construction of a pickup lever for such machines which is constructed in a manner to prevent the threading out of a needle thread during sewing.

The present invention provides a machine which makes it possible to guide the thread between the bobbin and the needle eye in a single step without requiring passing the thread through closed borings or eyelets. The present invention has particular reference to the shaping of a thread guiding end of a take-up lever, which end attains high velocity in rapid sewing. In sewing machines in which the thread supply is controlled by the motion of the needle bar, such as is the case in the widely known shuttle machines, the take-up lever is provided with a threading slot extending up to a thread guiding boring. This arrangement permits the suspension of the thread in the take-up lever. A disadvantage of such prior art constructions is that the thread moves out of the slotted take-up lever and is caught or retained without feeding at such location. The threading out of the thread from the slotted take-up lever and the "catching" of the thread at the lever was not possible in these machines owing to the fact that the downward movement of the take-up lever was adapted to the thread requirement and slinging of the thread was not possible. However, machines with rotating or oscillating hooks cannot be provided with a take-up lever having a thread slot of the type which has been employed for known machines, since it would not be possible to sew a seam of one centimeter in length before the thread would spring out from the threading slot or would be caught in the threading slot of the guiding part of the take-up lever. For this reason, all modern sewing machines with a rotating or oscillating hook have a take-up lever with a closed thread eye or boring.

In accordance with the present invention, a take-up lever construction is provided which includes the advantages of a slot construction which permits convenient and easy threading in a construction with a rotating or oscillating hook by the provision of a slot construction which will prevent the thread from threading out during sewing. In a preferred arrangement, the elongated threading slot is defined to extend around a high point on the take-up lever which prevents the thread from moving out of a thread eye or boring defined at the end of the slot. The construction of the slot is such that the thread will not tend to be caught therein during operation of the sewing machine.

Accordingly, it is an object of this invention to provide an improved take-up lever construction for a sewing machine.

A further object of the invention is to provide a take-up lever with a slot defined at the outer end thereof for receiving the thread which construction prevents the falling out or the "catching" of the thread during operation.

A further object of the invention is to provide a take-up lever construction which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

In the drawings:

FIG. 1 is a somewhat diagrammatic illustration of a sewing machine, as indicated from the front cover side;

FIG. 2 is an enlarged partial elevational view of the take-up lever mechanism of the machine of FIG. 1 constructed in accordance with the invention;

FIG. 3 is a partial elevational view of another embodiment of take-up lever;

FIG. 4 is a view similar to FIG. 3 of still another embodiment; and

FIGS. 5 and 6 are sections corresponding in location to the section line indicated 5—5 and 6—6 of FIG. 2 but of additional embodiments of take-up lever constructions.

Referring to the drawings in particular, the invention embodied therein is indicated in reference to a sewing machine having a housing 1. An arm shaft 2 is rotatably mounted in the housing 1 and at the forward end of this shaft there is provided a crank disc 3 which actuates a needle bar 7 having a needle 8 in a well known manner through a crank or pitment 4 and an arm 5, as well as through a guiding piece 6 for the needle bar.

The mechanism includes a take-up lever 9 having a lower eyelet portion 10 which is carried on the crank 4. This portion rotates around the shaft 2 on the disc 3. An upper eyelet portion 11 is pivotally connected to a swing link 12, the other end of which pivots about a lever bolt 13 which is rigidly mounted in the housing 1.

In accordance with the invention, the take-up lever 9 includes a first or upper lever arm portion 14 which projects from the upper end of the housing 1. The upper lever arm portion 14 is inclined in respect to a vertical line by an angle of about 45° up to a high rounded surface 30. A second arm portion 17 slopes downwardly from the first portion 14 at a similar angle in an opposite direction. The construction is such that the high rounded surface 30 prevents any sliding of the thread into the machine housing. The take-up lever further includes a third arm portion 18, which together with the lower portion 17 and a portion of the first arm portion 14 defines an elongated slot 16 which terminates in a thread guiding boring or thread eye 15 at the lowermost end thereof.

During operation of the machine, the thread eye 15 effects the motion indicated by the dot and dash lines in FIG. 1. The threading slot is limited by the surfaces of the lever arm parts 14, 17 and 18 which face each other. The parts 14 and 17 define the high point 30 and an overlying surface 19 is defined on the portion 18. By providing the high rounded surface 30 and the opposing overlying surface 19, there is formed a high abutment and overlying surface which permits easy threading of the thread into the eye 15 but prevents the thread from moving out of the eye during the operation of the machine.

For the threading operation of the machine, a needle thread is placed onto the support surface of the lever arm portion 14, when the take-up lever 9 is in its upper position, as indicated in the drawings, and is then tightened to cause it to slide automatically through the slot 16 to reach the thread eye 15. The arched nose prevents the catching of the slung around thread at the entry of the threading slot 16 and the configuration of the slot 16 prevents the thread from moving out of the eyelet 15 during operation. Catching of the thread may always be prevented, as experience has shown, when the ratio of the width of the slot to the length thereof, as measured from the entry of the slot to the guiding boring or eyelet 15, is a least 1 to 40.

In FIG. 3, a further embodiment is indicated where the eyelet portion 15' is additionally isolated to prevent falling out of the thread by the provision of a projection 20 formed on the part 18' which extends into the part 17'. Of course, other types of interruptions may be provided for preventing the threading out of the thread. For example, in the modification indicated in FIG. 4, there is provided a pin 21 which is carried in a bore of the part 18'' which extends into a boring 22 of the part 16''. In FIGS. 5 and 6 variations of the cross-sections of parts 17''', 17'''' and 18''', 18'''' are indicated. By providing the stepped cross-section indicated in FIGS. 5 and 6, it can be seen that the outward movement of the thread during operation of this machine will be effectively prevented. Other types of locking means may be provided for preventing the threading out of the thread. For example, the thread guiding boring may be provided with a resilient lock lifted by the thread in the threading operation and closing the slot when the thread is in the thread guiding boring.

While specific embodimens of the invention have been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invenion may be embodied otherwise without departing from such principles.

What is claimed is:

1. In a sewing machine having means for articulating a needle carried by a needle bar, the improvement comprising a take-up lever connected to said means for articulating the needle and having an elongated slot defined therein; said slot having a lowermost portion for accommodating the thread during the sewing operation, the lowermost portion being adapted to move in substantially a vertical reciprocating movement, said take-up lever having a first portion which extends obliquely upwardly, said first portion having a high rounded surface portion connected to the upper end of said obliquely extending portion, said first portion having a downwardly extending portion extending from the high rounded surface portion of the obliquely extending portion and a second portion spaced from and overlying the first portion and extending around the top of the high rounded surface portion and obliquely downwardly from the high rounded surface portion to said first portion, and said lowermost portion of the slot being defined at the juncture of said first and second portions, the length of the slot and the high rounded surface portion being such that the thread will not normally be able to move upwardly over the high rounded surface portion during the operation of said lever.

2. A take-up lever for a sewing machine adapted to be connected to means for moving said lever backwardly and forwardly, comprising a take-up lever member having bearing means intermediate its length for pivotally mounting said lever and including a first arm portion extending obliquely upwardly and outwardly from said bearing means, said first arm portion having an intermediate high rounded surface connected to the upper end of the obliquely extending portion, an obliquely downwardly extending portion extending downwardly away from the high rounded surface to a lowermost point at the end of the downwardly extending portion, an overlying arm portion connected to the lowermost point of said first arm portion and extending backwardly from the lowermost point in spaced relationship to the lowermost arm portion and around the high rounded surface and defining with said first arm portion an elongated curved slot having an inlet on one side of the high rounded surface along the first arm portion and a lowermost slot end on the opposite side of the high rounded surface for holding and guiding the sewing thread, the lowermost slot end being movable upon operation of said lever in a substantially vertical direction, said slot being elongated sufficiently and extending upwardly by an amount to prevent the thread from moving upwardly in the slot and over the high rounded surface during the normal operation of the lever.

3. A take-up lever according to claim 2 wherein said first arm portion includes a recess formed therein and said overlying arm portion includes a projection extending into said recess at the boundary of said slot to define a tortuous path substantially blocking withdrawal of the thread from said slot.

4. In a sewing machine, according to claim 1, wherein said first and second portions of said take-up lever include slot boundary surfaces defining the slot which are offset in a longitudinal direction to define a tortuous slot path to impede the withdrawal of the thread therethrough.

5. In a sewing machine, according to claim 1, wherein said first and second portions of said take-up lever include boundary surfaces defining the threading slot which are offset transversely to provide a slot passage portion of an irregular side-to-side formation to impede the passage of thread therethrough.

6. In a sewing machine, according to claim 1, wherein said first and second arm portions of said take-up lever include boundary surfaces which define a slot having a width and an overall length in the ratio of 1 to 40.

7. In a sewing machine according to claim 1, wherein said first and second portions of the take-up lever include a straight and a curved portion forming the threading slot.

8. A sewing machine according to claim 1, including locking means associated with the slot and preventing withdrawal of the thread from the slot.

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