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THREAD GUIDE ARRANGEMENT FOR A WINDING MACHINE
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This invention relates to a thread guide arrangement for a winding machine. More particularly, this invention relates to a thread guide arrangement for a winding machine which permits replacement of a thread guide during operation.

Heretofore, thread guide arrangements have been known which utilize devices for guiding thread guides in a reciprocating manner during the winding of continuous lengths of filaments, threads, fibers, or the like, on a spool. In some of these devices, the thread guide has been mounted within a stationary rail and driven in reciprocating manner by a plurality of grooved drums each of which has been either discoengageably coupled to a common motor drive or coupled to an individual variable motor drive. However, these devices have not been suitable since they tend to wear at a rapid rate and, especially in the case of using individual motor drives, they are expensive.

An additional disadvantage of the heretofore known devices is that the thread guide rails have to be disassembled to replace the thread guides after they have become worn. Attempts have been made to overcome this additional disadvantage; however, these attempts have only made the wearing parts of materials having better wear-resistant characteristics in order to lengthen the use-life of the parts and, thus, have been expensive.

Accordingly, it is an object of this invention to provide a thread guide arrangement for winding machines which facilitates rapid replacement of worn thread guides.

It is another object of this invention to provide a thread guide arrangement for winding machines which enables replacement of a worn thread guide during operation.

It is another object of this invention to provide a thread guide arrangement which is inexpensive to construct and assemble.

Generally, the invention provides a thread guide arrangement for a winding machine which comprises a pivotally mounted guideway having a slot for guiding a thread guide in a reciprocal manner facing and adjacent a rotatable drum having a peripheral surface containing a continuous undulating groove and a discontinuous groove directed in a direction opposed to the direction of rotation of the drum and communicating at one end thereof with the undulating groove. The guideway slot is provided with an enlarged opening at one end for insertion of a thread guide. In order to replace a thread guide the guideway is pivoted away from the drum and the thread guide is inserted through the enlarged opening into the slot. Thereafter, the guideway is pivoted back to its original position with the thread guide occupying a position which coincides with the discontinuous groove of the drum. Since the drum is constantly rotating in a direction away from the juncture of its two grooves, the thread guide is guided from the discontinuous groove into the continuous groove where it remains until replacement is necessary.

These and other objects and advantages of the invention will become more apparent from the following detailed description and appended claims taken in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a schematic view of a thread guide arrangement;

FIG. 2 illustrates a view of the thread guide arrangement of the invention;

FIG. 3 illustrates a developed view of a grooved drum of the invention;

FIG. 4 illustrates a view taken at line IV—IV of FIG. 2; and

FIG. 5 illustrates a view taken at line V—V of FIG. 2.

Referring to FIG. 1, the general winding assembly for a thread 1 includes a reciprocally mounted thread guide 2 which guides the thread 1 onto a conventional rotating spool 3 which is driven by a constant speed drive roller 4 through frictional contact. The thread guide 2 is moved in a reciprocating path by a grooved drum 6 which is mounted on a drive shaft 5. It is noted that a plurality of drums 6 are mounted on the shaft 5; however, for purposes of explanation only one drum 5 will be described and shown.

Referring to FIGS. 2 to 4, the grooved drum 6 has a continuous undulating groove 7 formed in the surface as well as a discontinuous circumferential groove 8 of slightly greater width which communicates at one end with the groove 7. As shown in FIGS. 2 and 3, the groove 8 is directed into communication with the groove 7 in a direction opposite to the direction of rotation of the drum 6 as indicated by the direction of the arrows.

A guideway 10 which includes a rail 12 having a longitudinal slot 11 for guiding the thread guide 2 in reciprocal fashion longitudinally of the rail 12 and an enlarged opening 17 near one end of the slot 11 for passage of the thread guide 2 into or out of the slot 11 is pivotally mounted in a horizontal plane passing through the axis of the drum 6 at one end 13 on a stationary frame 14 and positioned adjacent the surface 9 of the drum 6. The frame 14 is constructed so as to be adjacent the drum 6 but spaced from the ends of the drum 6. The free end of the guideway 10 is locked within the frame 14, as shown in FIG. 5, by a suitable locking means such as a snap-lock 18 formed by a pair of spaced balls 20 which are suitably confined in recesses 19 and spring biased towards each other by springs 21.

The thread guide 2 includes a conventional outwardly extending thread eye 15 for guiding the thread 1 and an inwardly extending portion 16 which is sized to extend into the grooves 7, 8 of the drum 6 when the guideway 10 is adjacent the drum 6.

In order to replace or check a thread guide 2 while the drum 6 is rotating, the guideway 10 is manually released from the snap-lock 18 and pivoted away from the drum 6 so that the thread guide 2 is prevented from further reciprocation in the slot 11 under the influence of the drum 6. The thread guide 2 is then moved through the slot 11 and removed through the enlarged opening 17. A new thread guide is then inserted through the opening 17 into the slot 11 and positioned at a point M on the rail 12 which coincides with the location of the discontinuous groove 8 in the drum 6. The guideway 10 is then pivoted towards the drum 6 and locked in the frame 14 by the snap-lock 18 so that the new thread guide is received within the groove 8. As noted above, the groove 8 is slightly wider than groove 7 so that a thread guide 1 can more easily be positioned therein without a need for a precise initial positioning of the thread guide in the slot 11.

Since the drum 6 is constantly rotating in a direction as indicated by the arrows, the new thread guide is directed out of the groove 8 into the groove 7. The thread guide remains in the groove 7 and is driven thereby in a reciprocating path along the rail 12 so as to direct the thread received within the eye 15 to the spool 3.

The thread guides which are used with the apparatus of the invention can be made of any suitable inexpensive...
material for use as a throw-away-type guides due to the
efficient, simple and rapid manner used to replace them.

Having thus described the invention, it is not intended
that it be so limited as changes can be readily made
therein. Accordingly, it is intended that the subject matter
described above and shown in the drawings be taken in
an interpretive sense.

What is claimed is:

1. A thread guide arrangement for a winding machine
   comprising
   a rotatable shaft,
   at least one drum mounted on said shaft, each said
drum having a continuous undulating groove in the
periphery thereof, and
   a guideway pivotally mounted adjacent each said drum
   in a horizontal plane passing through the axis of said
   shaft, said guideway including a longitudinally ex-
tending slot therein facing said drum for reciprocally
guiding a thread guide therein, said slot having an
enlarged opening near one end thereof for passage
of a thread guide therethrough whereby a thread
guide is positioned in said slot on pivotal movement
of said guideway away from said drum and posi-
tioned in said groove on pivotal movement of said
guideway towards said drum so as to be driven in
reciprocating manner in said slot upon rotation of
said drum.

2. A thread guide arrangement as set forth in claim 1
   wherein each said drum further includes a discontinuous
groove in the periphery thereof communicating at one
end thereof with said continuous undulating groove where-
by the thread guide is initially positioned in said discon-
tinuous groove on pivotal movement of said guideway
towards said drum during rotation of said drum for sub-
sequent direction into said continuous undulating groove
upon continued rotation of said drum.

3. A thread guide arrangement as set forth in claim 2
   which further comprises a stationary frame adjacent said
   drum for pivotally mounting said guideway thereon at
   one end thereof, said stationary frame including a locking
   means for locking said guideway therein at the other end
   thereof.

4. A thread guide arrangement as set forth in claim 3
   wherein said locking means is a snap-lock.

5. A thread guide arrangement as set forth in claim 1
   wherein said discontinuous groove is slightly wider than
   said continuous groove to facilitate initial positioning of
   the thread guide therein.

6. A thread guide arrangement as set forth in claim 2
   wherein said discontinuous groove is circumferentially
   formed in said drum.

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