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THREAD GUIDING DEVICE HAVING A MOVABLE THREAD GUIDE

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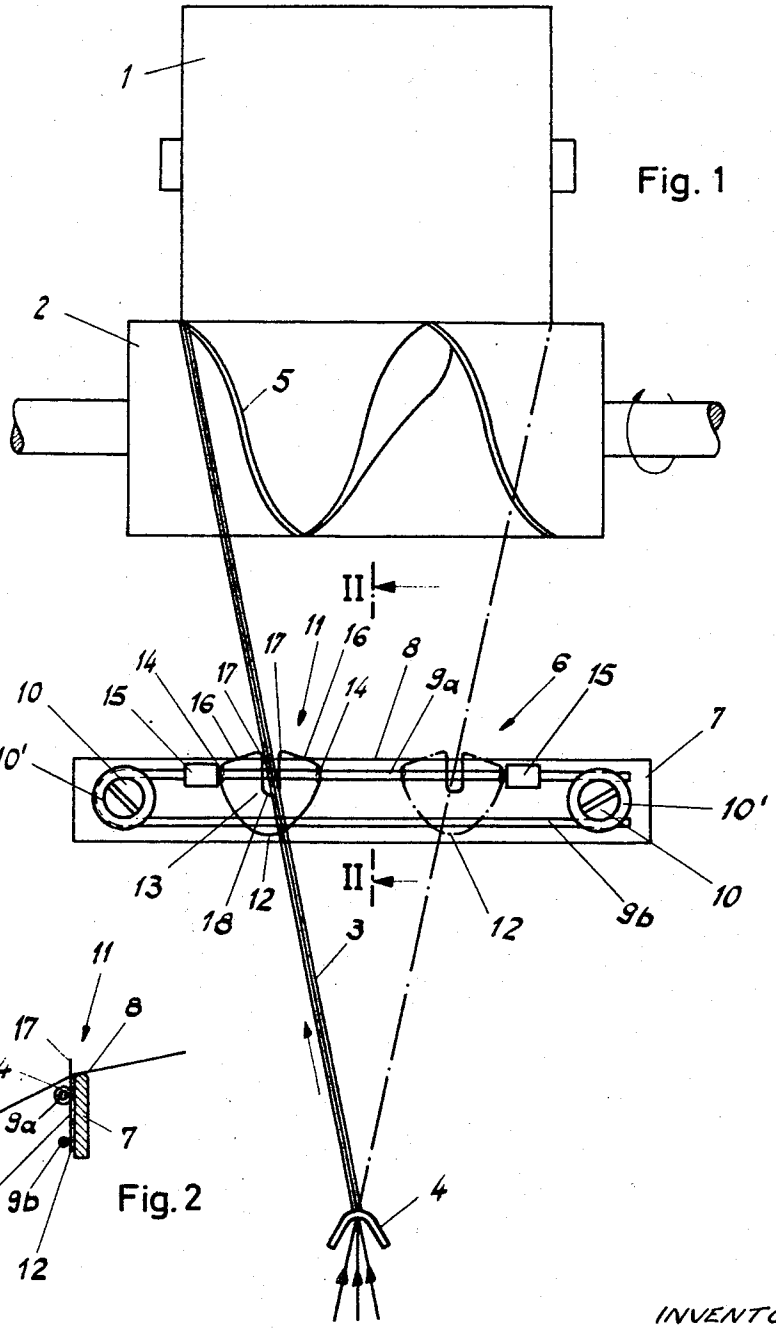

Fig. 1

Fig. 2

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THREAD GUIDING DEVICE HAVING A MOVABLE THREAD GUIDE

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ABSTRACT OF THE DISCLOSURE

A thread winding machine wherein one or more threads are guided onto a spool by a grooved or slotted drum and including a thread guide freely movable on a rod located parallel to the drum axis, the guide being moved in response to the traverse of the thread or threads guided thereby.

Field of the invention

The invention relates to thread guiding devices for use in the textile industries and is particularly concerned with thread guiding devices which guide one or more threads being wound on a spool.

Description of the prior art

In winding spools the thread is conventionally reciprocated transversely of the spool to be wound either by means of a grooved or slotted drum or sleeve or by means of a mechanically guided thread guide.

In the former case a winding is obtained which is generally known as a wild winding, while in the latter case a precision winding is obtained. Mechanically controlled thread guides which are usually guided by a cam are subject to relatively heavy wear and in practice are used for thread speeds up to about 400 to 500 r.p.m. Grooved or slotted drums permit velocities up to about 1200 r.p.m. At these speeds, or already at lower speeds, in the event that the spool is to be wound relatively softly, for example for dyeing purposes, there frequently result irregularities when grooved or slotted drums are used which are the result of the inertia of the thread which swings to and fro transversely of its direction of travel. The inertia of the thread causes a continuously changing deviation from a straight line as the tensile stress decreases. This phenomenon is particularly inconvenient when a plurality of threads disposed alongside one another are simultaneously wound on the same spool such as is the case with machines employed in the trade as preliminary stages for twining, and that is because the individual threads can be deformed to a different extent. In order to avoid the defects and breaks resulting in twining operations from non-uniform winding, it was necessary heretofore to reduce the winding speed, i.e. it was not possible to take full advantage of the velocity which is attainable with the grooved or slotted drums.

Summary of the invention

It is, therefore, an object of the invention to overcome this disadvantage in winding spools by means of a grooved or slotted drum without being limited to the solution of this problem. The invention provides a thread guiding device having a movable thread guide which is caused to move by the thread or bunch of threads that must be guided. In traveller spinning machines a movable thread guide in the form of a ring or traveller is made to rotate along a circular path. The thread guiding device in accordance with the invention differs with respect thereto in that the thread guide is of resilient construction and is

loosely seated to be guided on a rail or bar on which it is movable to and fro between two end abutments or stops.

The invention is also concerned with the use of this thread guiding device for guiding a thread or bunch of threads which is or are fed to a grooved or slotted drum in order to be wound.

Description of the drawings

As explained more in detail in the following specification, the invention makes it possible to avoid the above mentioned shortcomings completely. These advantages will become more apparent from the specification with reference to the accompanying drawings which illustrate one embodiment of the invention and in which:

FIG. 1 is a schematic illustration of a machine used in the industry where a thread guiding device is provided having a movable thread guide; and

FIG. 2 shows schematically a section through the thread guiding device taken along line II—II in FIG. 1.

A winding bobbin or spool **1** of an industrial machine is illustrated in FIG. 1 which rests on a grooved drum **2** and is driven thereby and serves for winding a bunch of threads **3**. The bunch of threads **3** comprises three threads which run together in a stationary machine mounted thread guide **4**. The thread bunch **3** is illustrated in one extreme position of its movement in full lines, while it is indicated in dash and dot lines in the other extreme position. Actually the path of the thread bunch **3** between the thread guide **4** and the grooved drum **2** along which it moves to and fro in a known manner does not follow a straight line, but departs therefrom more or less, in view of its inertia and as determined by its tension and its particular position and direction of movement. In this connection there may result considerable differences in the form of the individual threads, which results in non-uniform winding. When the thread bunch of spool **1** is fed to a twist machine, there result errors, for example so-called corkscrews, or the threads may even tear one after the other during twining operations. It may also happen that a single thread is not correctly received in the guiding groove **5** of the grooved drum **2**, so that the wound thread becomes partly or entirely useless. The danger of such irregularities is, of course, all the greater as the winding velocity is increased, or the number of the to and fro movements per unit of time. In order to avoid these irregularities the thread guiding device **6** is provided.

The thread guiding device **6** has a base plate **7** which is mounted on the frame in stationary position. This base plate, however, is not located in the plane in which the thread bunch **3** moves, as is assumed in FIG. 1 for convenience in drawing, but extends almost vertically thereto (FIG. 2). At a small distance from the base plate **7** two guide rails or rods **9***a* and **9***b* are provided, which are parallel to one another and to the rounded edge **8** of the base plate **7** and which in the present case are defined by the two legs of a rod bent in U-shape and of circular cross-section. The rods **9***a* and **9***b* are mounted proximate their free ends and at their ends which come together in an arc on the base plate **7**, each by means of a screw **10** between two each washers **10'**. Of these base disks or washers **10'**, that which is located on the side of the base plate **7** and which serves simultaneously as a spacer, is not seen in the drawing.

On the guide rail **9***a* a thread guide **11** consisting of thin steel wire is displaceably mounted. The wire which is closed on itself, the ends of which are preferably soldered together at the lowest location **12** of the thread guide **11**, has approximately the shape of a rhomboid which is symmetric to a diagonal line (vertical in FIG. 1), whereby the location **12** constitutes the lower corner of the rhomboid. Opposite to this location **12** the wire forms a U-shaped indentation or recess **13** instead of an upper

corner, in which the thread bunch **3** is located. On both sides of the corners located along the other diagonal the wire forms two small loops **14** which are disposed in planes that are vertical to the plane of the rhomboid and which loosely encompass the guide rail *9a* proximate the edge **8**. When the thread bunch **3** as shown in FIG. 2 rests on the edge **8** due to being carried along by the groove **5** of the grooved drum **2** and is moved to and fro on this edge **8**, then the thread guide **11** is first sent in the one or into the other of two end positions, which are defined by two rubber sleeves **15** that are slipped onto the rail *9a* but are sufficiently fastened thereto and serve as stops. Then the thread bunch **3** slides along the upper part of the inclined wire leg **16** to one of the engagement points **17** of the recess **13** into which it then drops, but without falling to its lowest point **18**.

When the thread bunch **3** has been caught in the recess **13**, it takes along the thread guide **11** as it moves to and fro, while the same considerably decreases the above mentioned deformations in the thread bunch **3** or in its individual threads that are caused by the inertia of the thread. It is very important for the efficient operation of the device **6** that the thread guide **11** is very light and elastic so that it is lightly and resiliently repelled as it encounters the end stops **15** that serve as a bumper and thus does not exert any force upon the thread bunch which, counteracting the inertia of the thread bunch, accelerates the reversal of its direction of movement. The effect of the thread guiding device **6** is, of course, particularly good when it is installed where the deformation of the thread bunch **3** is greatest, i.e., about centrally between the stationary thread guide **4** and the grooved drum **2**. The rubber bumpers **15** also contribute to the resilient repelling of the thread guide **11**; their main advantage as compared to the hard end stops however, resides in the feature that the repelling takes place noiselessly.

The lower part of the thread guide **11** projects between the base plate **7** and the lower guide rail *9b*, whereby a rocking of the same about the guide rail *9a* is prevented. The thread guide **11** rests in operation always against the lower guide rail *9b* due to the slight friction of the thread bunch **3** and thus remains always in the same plane, which is practically parallel to the base plate **7**.

Timed loop photographs of the movement of the thread bunch **3** with or without thread guiding device **6** have established their outstanding effectiveness. With this device all faults are eliminated which heretofore have arisen with the use of the grooved or slotted drums at very high winding velocities. It is emphasized, however, that the thread guiding device **6** may in principle also be connected ahead of a forcedly guided reciprocating thread guide, for example a thread guide controlled by a cam, if this is desired for one reason or the other. Since during winding of very soft coils, that is with small thread tension, the deformations caused by the inertia, for example faults, are particularly strongly reflected, the use of the thread guiding device **6** as described becomes especially advantageous particularly also when an individual thread is being wound and not a bunch of threads.

Having now described my invention with reference to the embodiment illustrated in the drawings, I do not wish to be limited thereto, but what I desire to protect by letters patent is set forth in the appended claims.

I claim:

1. Thread guiding device for guiding one or more threads being wound on a spool wherein a rotatable grooved or slotted drum is disposed to reciprocate the thread or threads onto the spool, said device comprising a resilient guide member, a stationary guide rail defining a path of travel for said guide member parallel to the axis of said drum, a pair of stationary stop members, each arranged at one end of the path of travel of said guide member, and mounting means for loosely supporting said guide member on said guide rail, said guide member being responsive to the reciprocating movements of the thread or threads guided thereby.

2. Thread guiding device in accordance with claim **1**, where said resilient guide member is defined by a wire configuration closed on itself and defining a U-shaped recess for guiding threads, and a pair of small loops constituting said mounting means loosely encompassing said guide rail.

3. Thread guiding device in accordance with claim **2**, including a pair of legs extending in opposite directions each from one of said loops to one of the starting points of said recess.

4. Thread guiding device in accordance with claim **3**, where said thread guide member has generally the shape of a rhomboid, said loops being disposed at opposite corners of said rhomboid and said recess being defined at the location of one other corner of said rhomboid.

5. Thread guiding device in accordance with claim **1**, including a base plate having a rounded edge for engagement by threads and said guide rail being mounted on said base plate and disposed proximate said rounded edge and parallel thereto.

6. Thread guiding device in accordance with claim **5**, including a second rail mounted on said base plate parallel to said guide rail, and said guide member having a portion extending between said second rail and said base plate.

7. Thread guiding device in accordance with claim **6**, where said guide rail and said second rail are defined by two legs of a rod of circular cross-section bent to U-shape, supported on said base by screws and spaced therefrom by washers.

8. Thread guiding device in accordance with claim **1**, where said stop members are elastic sleeves disposed on said guide rail.

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