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C. H. MOORE

2,919,080

YARN GUIDE

Filed May 16, 1955

FIG 1

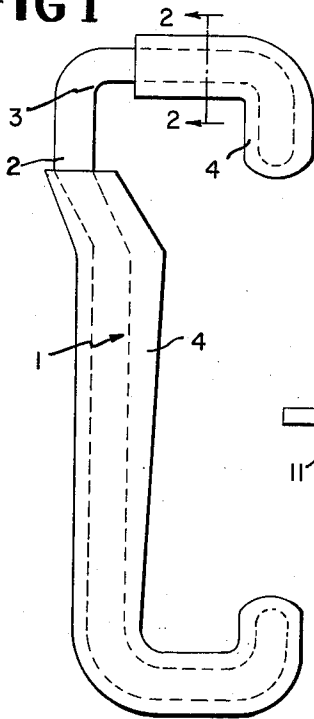


FIG 2

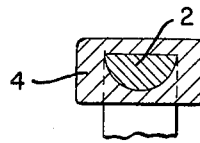


FIG 3

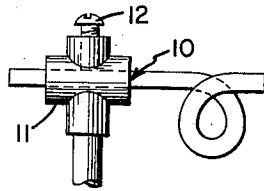


FIG 4



FIG 5A

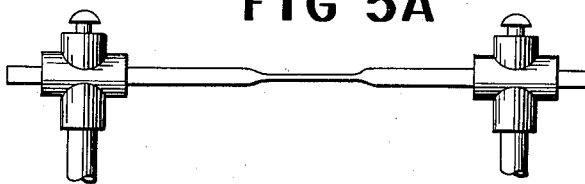


FIG 5B

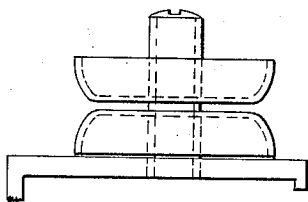
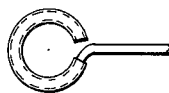


FIG 5C



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2,919,080

YARN GUIDE

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1 Claim. (Cl. 242—157)

This invention relates to guides for textile yarns, including guides such as ring travelers, pigtails, pins, detectors and drop-wire guides, eyes, and like elements for slidably contacting yarn.

Textile yarns, especially those made of synthetic polymer (such as nylon, linear polyesters, or acrylonitrile polymers) rapidly abrade or cut into guides made of conventional materials. This damage to the guides is greater if the yarn is pigmented, whether for delustering or for coloring; furthermore, the tensions of present-day high-speed winding operations aggravate the problem. Frequent replacement of the guides is costly and time-consuming; consequently, the textile industry requires the best possible yarn guides regardless of their initial cost.

A primary object of this invention is provision of yarn guides exhibiting superior resistance to abrasion by yarn traveling in contact therewith. Another object is construction of an improved traveler for twister rings. Other objects will be apparent from the following description of the invention and the accompanying diagrams.

Figure 1 is a side elevation of one form of yarn guide according to this invention. Figure 2 is a transverse cross section of the guide of Figure 1 taken on 2—2. Figure 3 is a side elevation of another form of guide. Figure 4 is a front elevation of the guide of Figure 3. Figures 5A, 5B, and 5C show still other yarn guides that may be constructed according to this invention.

In general, the objects of this invention are accomplished by constructing yarn guides from hardened titanium metal. Although it may be desirable to make some part of a particular guide from other material, at least the yarn-contacting surfaces of guides of this invention are composed of titanium.

Figure 1 shows generally C-shaped traveler 1 having almost rectilinear corners and an arched back. Core 2 is a hard titanium wire of semicircular cross section exposed at upper inside corner 3 but otherwise covered with coating 4. The coating, which preferably is nylon, has a rectangular cross section, as shown more clearly in Figure 2. The core is shaped by bending drawn titanium wire, and the coating is molded thereon to give an excellent bond between the two materials.

The nylon coating just mentioned is not essential to the traveler but is useful to eliminate necessity for lubrication of the traveler on the supporting ring (not shown). Other polymeric coating materials may be substituted for nylon with varying degrees of success. A traveler so coated has further advantages over an all-nylon traveler, for example, of being more flexible and more stain-resistant at the yarn-contacting surface. This invention comprehends uncoated titanium travelers, of course.

In one test, a simple C-shaped design of a titanium wire traveler was compared with the similarly shaped type of steel traveler surface-hardened by heat treatment for this particular use, as is customary. The travelers, formed of hand-drawn titanium wire about 0.046 inch in diameter and 1/2 inch in total length, had Brinell hardnesses of from 180 to 250 (at 3000 kg. load). The titanium guides showed considerably less wear in the winding

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and twisting of pigmented acrylonitrile yarn, being cut to an average depth of 4×10^{-5} inches per pound of yarn passing therethrough, as against slightly over 23×10^{-5} inches per pound of yarn for the steel travelers. This six-fold reduction in wear was supplemented also by decreased yarn damage attributed at least in part to better surface characteristics and perhaps the lighter weight of the titanium.

Figures 3 and 4 show yarn guide 10 constructed in the usual form known as a "pigtail." This guide may be made wholly of titanium according to this invention or may be surfaced therewith. Support 11 holds both the guide and adjusting screw 12 bearing thereon. The guide itself consists of a unitary piece extending in a straight section from the clamp for some distance, then assuming a helical configuration as if surrounding a screw, and terminating in a shorter straight section upon completion of slightly more than one turn. Figure 5 shows additional guides for which hardened titanium is an excellent composition including a pin guide (A), which is merely a rod, supported at the ends, with reduced diameter near the middle thereof; a tension-disc guide (B), which comprises two discs adjustably mounted opposite one another and juxtaposed sufficiently to resist the passage of yarn therebetween; and an eye type of guide (C), which has a layer of titanium on a common wire eye permitting passage of the yarn.

The titanium used for the yarn guides of this invention need only be hardened in customary manner, such as by drawing, rolling, or other hand working, but optionally may be nitrided in known manner for increased hardness and abrasion resistance, if desired, either before or after fabrication into guide form. Specifications for suitable wire are given by the American Society for Testing Materials as B265-52T. Some polishing of the yarn-contacting surface is usual but is not essential to this use.

This type of guide has the considerable advantage of simplicity of manufacture over guides made of gem materials (natural or synthetic), while presenting equal or greater wear-resistance, as well as greatly reduced breakage and increased range of light traveler sizes. In general performance, it is much superior to other metal travelers, whether made of steel or other alloys, as well as travelers made of ceramics and other conventional materials. This guide is especially preferable to the ceramics for this use because of attendant, simplicity, and flexibility in its design and manufacture. Because of the relatively little known characteristics of titanium when the present invention was made, few or none of these advantages could be predicted.

The claimed invention:

A flexible, stain resistant yarn guide composed of an inner core of titanium metal, an outer coating of nylon covering all but a portion of said core and being intimately bonded thereto, the portion of said core which is uncovered constituting a yarn contacting surface.

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