

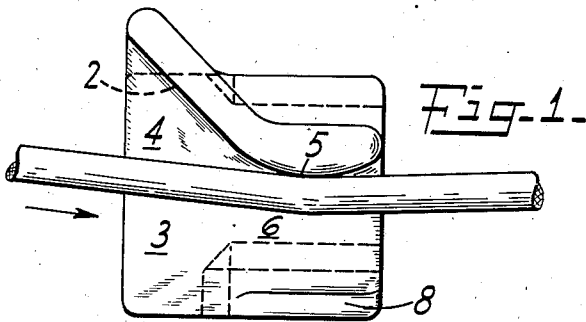
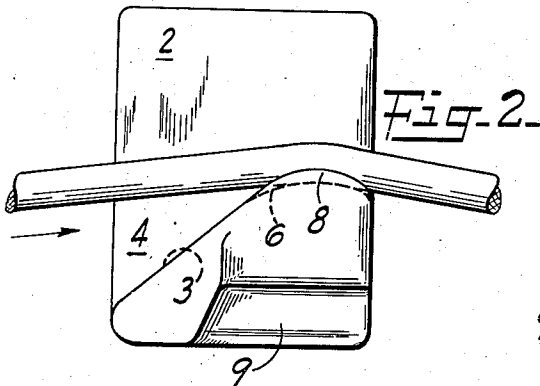
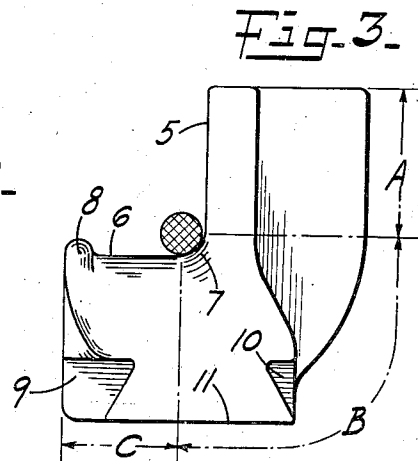
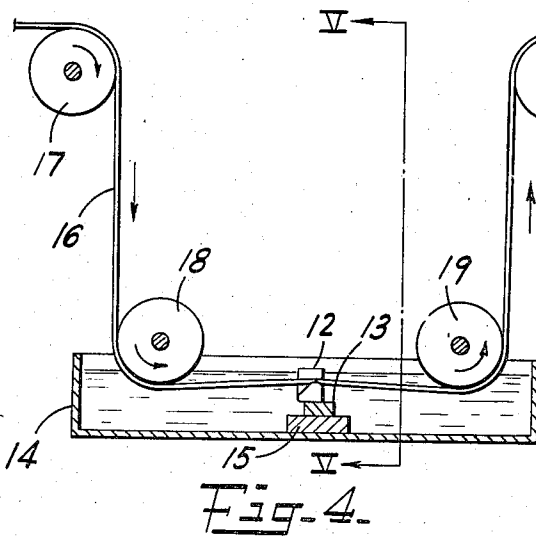
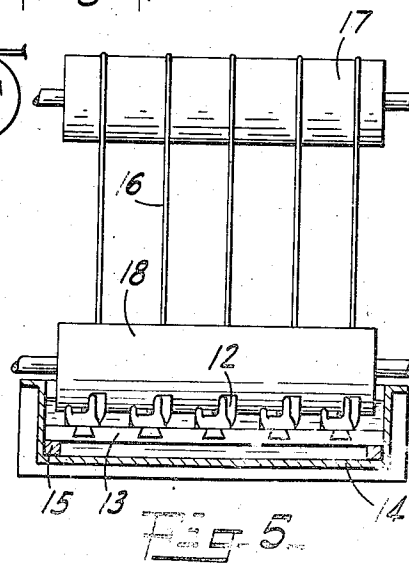
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2,369,809

FILAMENTARY GUIDE

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FILAMENTARY GUIDE

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9 Claims. (Cl. 68—175)

This invention relates to guides for filamentary materials, and particularly to guides for controlling the movement of filamentary materials while submerged or at least partially submerged in liquid.

It has heretofore been proposed to use hooks and rods for controlling the movement of filamentary material, such as yarns, tows, or other bundles of freshly spun or other artificial continuous filaments, while subjecting such filaments to liquid treatments by submersion thereof while traveling under the surface of one or more treating liquid baths in succession. The use of hooks and rods for this purpose, however, is accompanied with serious disadvantages. For example, any loose and broken filaments tend to float about the guide and become caught and tangled thereon. When the tangled filaments built up on the guide contact further lengths of the yarn or tow being guided, the filaments thus contacted are liable to be damaged. Furthermore, a guide having tangled filaments thereon offers a more favorable receptacle for the catching and tangling of additional loose or broken ends.

It is an object of the present invention to provide a guide for controlling the movement of filamentary material through liquid baths, the use of which is substantially free of the disadvantages heretofore associated with the handling of filamentary material beneath liquid surfaces. Further objects and advantages of the invention will be apparent from the drawing and the description thereof hereinafter.

In the drawing illustrative of the invention—

Figure 1 is a plan view of a guide made in accordance with the invention;

Figure 2 is a side elevation of the guide;

Figure 3 is an end elevation of the guide;

Figure 4 is a side elevation, partially in cross-section, showing one application of the guide to the handling of filaments traveling through liquid baths; and

Figure 5 is a section taken on line V—V of Figure 4.

As shown in Figures 1 to 3, the operative surface of the guide comprises two lateral bearing surfaces 2 and 3 (more specifically, a side bearing surface 2 and a lower bearing surface 3), and a bearing surface 4 joining surfaces 2 and 3. The side surface 2 comprises a portion along the approach side of the guide having substantially constant slope which merges with a portion which is gently curved at 5 to form the mouth of the guide. The lower bearing surface 3 is similar and has a gently curved portion 6 along the mouth

of the guide. These sides 2 and 3 correspond to portions of adjacent lateral sides of a pyramid frustum, which may be formed on a triangular, quadrilateral, or other polygonal base, but is preferably formed on a substantially rectangular base as actually shown. It will be noted that a cross section taken transversely (that is, to the approximate yarn path) at any point through the guide in a plane parallel to the plane of the drawing of Figure 3, will cut traces in these surfaces 2 and 3 which will be approximately at right angles to each other. The surface 4 is an arcuate surface, essentially of the form of a quadrant of a substantially conical funnel with the arc 7 of the surface at the mouth of the guide constituting a trace-line containing the points of intersection of a transverse plane through the mouth with all arcs of inflection made by radiating lines extending from the approach portion of the surface 4 to the departure portions thereof. The surface 4 yields an arcuate tracing (including arc 7) constituted substantially of a quadrant of a circle with all such transverse planes which cut the guide, as shown in Figure 3, parallel to the plane of the drawing. Thus, the entire tracing of the guide surface in any of such planes comprises a straight-line portion corresponding to the dimension A (Figure 3) which is substantially at right angles to a straight-line portion corresponding to the dimension C, with these two straight-line portions being joined by an arcuate portion corresponding to an arc B.

As appears from Figures 1 to 3, the open character of the guiding surface affords easy lacing of the guide. The lower guiding surface 3 is provided with a smoothly rounded ridge 8 extending to both sides of the mouth portion 6 of the guide. This ridge may be of any desired height, depending upon the characteristics of the filamentary bundle being handled and the particular conditions of handling, and serves to prevent the filamentary bundle from slipping off the side of the guide at any periods when the filamentary bundle is relaxed, whether this occurs while the bundle is traveling or while it is at rest thereon.

The lower portion of the guide may be formed with recesses at 9 and 10 respectively. These recesses extend from the departure side of the guide, but do not extend completely through to the approach side of the guide. In this manner, they provide a mounting base or foot 11 in the form of a dovetail projection which cannot interfere with the streamlined character of the flow of the liquid over the guiding surface of the guide.

As shown in Figures 4 and 5, a plurality of

guides 12 of the type shown in Figures 1 to 3, are mounted at spaced points along a cross bar 13 suitably supported in a bath receptacle 14, such as by means of resting blocks 15 to which they may be secured by pins, bolts, screws, nails and the like (not shown). A plurality of tows or other bundles of filamentary material 16 which may be coming from another treatment device, or may be freshly spun artificial filaments coming from a coagulating bath, are shown proceeding over the top of the upper roll 17, which may be driven or an idler, and downwardly around and beneath the lower roll 18 (which may be driven or an idler depending on the particular type of machine being used) and thence through the respective guides 12 which may in this situation be used to cause axial displacement of the tows or bundles with respect to the roll 18; or they may simply be used to keep the several tows separate from each other as they pass to the next roll 19 within the bath. From roll 19 the tows may proceed to an upper roll 20 and from there to a succeeding treatment bath, or any other stage of processing. Rolls 19 and 20 may be driven or idlers.

While Figures 4 and 5 illustrate one application of the guides for liquid treatment, they may be used for any purpose in manipulating filamentary bundles, tows or yarns. They may be used for manipulating and controlling the travel of filamentary bundles, tows, yarns and the like, in gaseous media, such as in open air, though as will be pointed out hereinafter, they are of particular advantage for the control and manipulation of filamentary material within liquid media. They may be made of any material, such as glass, porcelain, Bakelite, Durez, Alsimag, agate, stainless steel and the like.

As will be apparent from the description of the drawing hereinabove, the approach and the departure sides of the guiding surface are so designed as to provide free and unrestricted flow of liquid over the guide with the tow or filamentary bundle. This assures that the passage of the filamentary bundle over the guide will be accompanied with the least amount of friction and with the least variation in tension.

The open character of the guide allows free passage of any irregular portions of the tow or yarn, and facilitates the lacing up. It also assures that equally good results may be obtained regardless of the size of tow being handled.

The long, flared funnel approach and sloped side and bottom guiding surfaces associated therewith assure the passage of all free and broken filaments without tangling and catching upon the guide. The upstanding portion of the guide presenting the surface 2 is preferably arranged to be substantially vertical and preferably projects out of the bath where the filaments being handled tend to float therein. Where the guide is in operation at a deep portion of the bath, this upstanding side of the guide may not project entirely out of the bath, but preferably extends 3 to 4 inches above the bottom surfaces 6 of the mouth of the guide, in order to assure that any broken ends or filaments which tend to float will not pass over and around this portion of the guide. By thus arranging the guide so that its side portion projects out of the bath or extends to a point well above the tow or yarn, the tendency of floating filaments to pass over and around the back of the guide is prevented. The prevention of passage of filaments around the side of the guide is largely assisted by the

streamlined character of the funnel approach to the guide, which causes the flow of the liquid to be well directed into the mouth of the guide, and prevents development of any currents back of the flared skirt of the guide of sufficient strength to cause such floating filaments to become tangled with the guide.

Where the filaments being treated are heavier than the density of the bath and tend to sink instead of float therein, the arrangement of the mounting base as shown is such as not to encourage the passage of the filaments beneath the guide. Here, again, the long sloped approach beneath the tow serves to streamline the flow of liquid and to cause it to follow a definite path into the guide and to avoid any straying beneath or to the side thereof.

While preferred embodiments of the invention have been disclosed, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. A guide for filamentary material having a guiding surface open laterally with respect to the path of the material therethrough and comprising two lateral surfaces corresponding to portions of adjacent sides of pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface joining the two lateral surfaces.

2. A guide for filamentary material having a guiding surface open laterally with respect to the path of the material therethrough and comprising two lateral surfaces corresponding to portions of adjacent sides of a pyramid frustum, each having a long gradual slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces.

3. A guide for filamentary material having a guiding surface open laterally with respect to the path of the material therethrough and comprising two lateral surfaces corresponding to portions of adjacent sides of a substantially rectangular pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces.

4. A guide for filamentary material having a guiding surface open laterally with respect to the path of the material therethrough and comprising two lateral surfaces corresponding to portions of adjacent sides of a substantially rectangular pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces, the arcuate surface comprising a conical portion along the approach side of the guide.

5. A guide for filamentary material having a guiding surface open laterally with respect to the path of the material therethrough and comprising two lateral surfaces corresponding to portions of adjacent sides of a substantially rectangular pyramid frustum, each having a long constant slope at the approach side of the guide

merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces throughout the approach side, the mouth and a substantial distance beyond the mouth.

6. A guide for filamentary material having a guiding surface open laterally with respect to the path of the material therethrough and comprising two lateral surfaces corresponding to portions of adjacent sides of a substantially rectangular pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces throughout the approach side, the mouth and a substantial distance beyond the mouth, the arcuate surface comprising a conical portion along the approach side of the guide, and means on at least one of the lateral surfaces away from the arcuate surface and extending along the mouth portion of the guide to retain the filamentary material on the guide.

7. In combination, a liquid treating bath for filamentary material, a support in the bath, a guide for the material mounted on the support and having a guiding surface open laterally with respect to the path of the material therethrough, said guide comprising two lateral surfaces corresponding to portions of adjacent sides of a pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface joining the two lateral surfaces, said guide being arranged on the support with at least one lateral surface extending upwardly.

8. In combination, a liquid treating bath for filamentary material, a support in the bath, a guide for the material mounted on the support and having a guiding surface open laterally with respect to the path of the material therethrough, said guide comprising two lateral surfaces corresponding to portions of adjacent sides of a substantially rectangular pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces, said guide being arranged on the support with one lateral surface having transverse lines therein approximately horizontal and with the other lateral surface extending upwardly therefrom.

9. In combination, a liquid treating bath for filamentary material, a support in the bath, a guide for the material mounted on the support and having a guiding surface open laterally with respect to the path of the material therethrough, said guide comprising two lateral surfaces corresponding to portions of adjacent sides of a substantially rectangular pyramid frustum, each having a long constant slope at the approach side of the guide merging into a gently curved portion arcing through and opening out from the mouth of the guide, and an arcuate surface substantially tangentially joining the two lateral surfaces, said guide being arranged on the support with one lateral surface having transverse lines therein approximately horizontal and with the other lateral surface extending upwardly therefrom to a point above the liquid level in the bath.

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