Nov. 23, 1954 W. V. HENRY 2,694,915

STRIPPING GUIDE

Filed Feb. 20, 1952

Fig. 1.

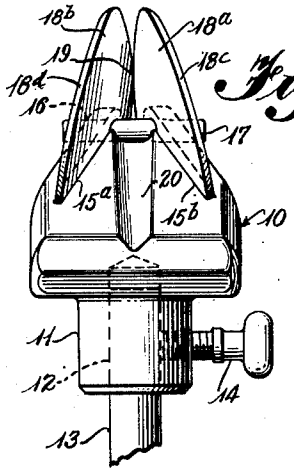


Fig. 2.

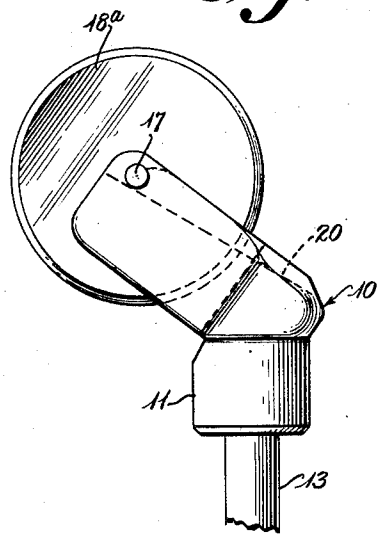
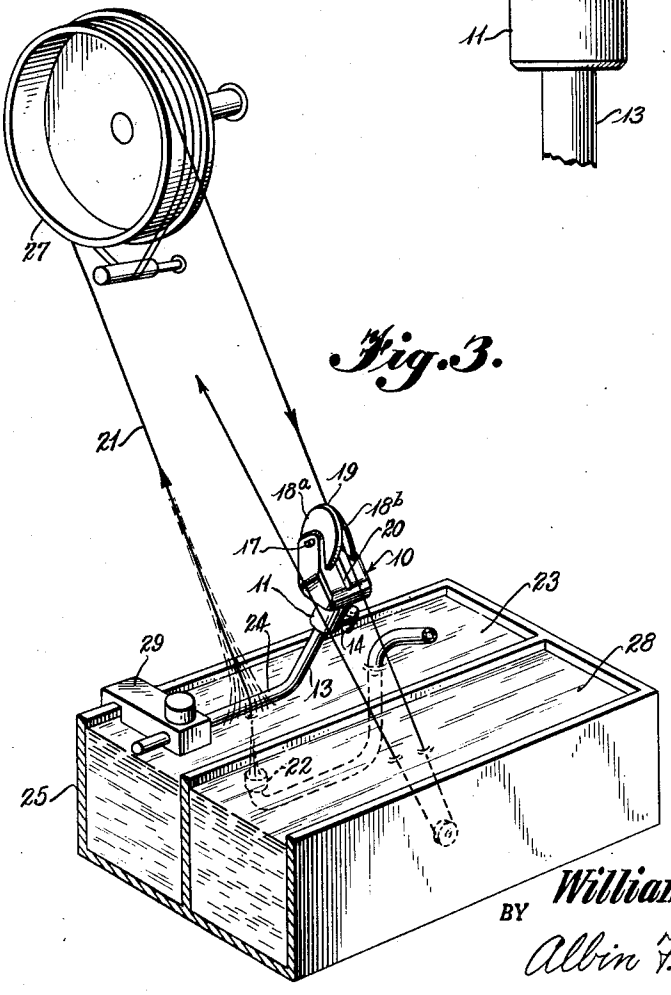


Fig. 3.



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STRIPPING GUIDE

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10 Claims. (Cl. 68—241)

This present invention relates to apparatus for stripping liquids from moving threads, and more particularly, the invention contemplates the use of thread stripping guides either in wet spinning processes for the manufacture of regenerated cellulose threads, or in the wet aftertreatments of various types of threads of natural or synthetic origin.

The guides of the present invention have particular utility in the manufacture of high denier viscose rayon, wherein a viscose solution is extruded through spinnerets into an acid spinbath to form threads consisting of a multiplicity of filaments. These threads are then stretched in a second hot water bath and thereafter subjected to various other aftertreatments. When the threads pass out of the spinbath, a considerable amount of bath liquid tends to adhere to them in the form of a sheath and is carried away and lost in the later steps of the process. This not only results in acid loss, but also unduly contaminates the various other baths used in the aftertreatments. This problem has been recognized for some time, and although attempts have been proposed to overcome it, none, thus far, has proved to be effective in removing liquid, particularly from the heavier denier yarns such as tire yarn without immediately showing wear or abrasion on the guides and/or deleteriously affecting the characteristics of the yarn.

For example, an attempt has been made to remove acid from heavy denier yarn by passing it through a stripping guide provided with opposing surfaces made of sponge rubber and felt. This device was found to operate satisfactorily for a limited time but it was necessary to replace the device frequently, as often as two or three times each week, due to the accumulation of salts and other solids on the contacting surfaces. Stripping guides have also been constructed of glass, but these were found to be unsatisfactory due to the abrasive action of the heavy denier yarn as it was rapidly passed in contact with the glass surfaces. Similar devices constructed of rubber have proved to be unsatisfactory due to the abrasive action of the yarn on the rubber surface.

This invention has as an object to provide a thread stripping guide which will effectively remove liquid from rapidly moving thread and with a minimum of friction.

A further object is to provide an abrasion-resistant stripping guide which will remove acid from freshly formed viscose rayon thread without adversely affecting the guide or the thread.

Another object is to provide a thread stripping guide which will remove acid from a rapidly moving thread of heavy denier viscose rayon and return the acid to the spinbath.

A still further object is to provide a thread stripping guide having thread-engaging surfaces that are capable of being moved to different positions with respect to the thread to reduce replacement due to the accumulation of solids thereon.

Other objects and advantages of this invention will be apparent from the following detailed description when considered in conjunction with the annexed drawings; wherein

Figure 1 is an elevation of one embodiment of a device constructed in accordance with the present invention;

Figure 2 is an end view of the device shown in Figure 1; and

Figure 3 is a fragmentary perspective view of the device shown in Figures 1 and 2 in position for use in a spinning system.

Referring in particular to Figures 1 and 2, a thread guide assembly is indicated generally by the numeral **10**. The base **11** of the assembly has a bore **12** extending up through the bottom to receive a rod **13** which supports the assembly in the desired position (see Figure 3), and this position may be changed at will by means of an adjustable set screw **14**.

The assembly **10** is provided with two upwardly convergent oblique slots **15***a* and **15***b* which terminate near the apex formed by the inner sides of the slots. An interrupted channel **16** is provided near the top of the assembly to receive a pin **17** which protrudes a short distance from the sides of the assembly and passes through the upper portion of slots **15***a* and **15***b*.

Two thin flexible discs **18***a* and **18***b* are mounted and retained in slots **15***a* and **15***b* by means of pin **17**. The convergence of the slots causes the discs to abut each other at point **19**, above the theoretical apex of the slots. As a result of such construction there is a slight wedging action at point **19** between the two discs, and this retains the discs in a fixed position when they are in use. However, when it is desired to rotate either of the discs about pin **17** in order to present fresh surfaces to the thread, this can be readily effected manually because due to the flexibility of the material used, the discs will yield slightly in the region of the pin **17** when they are rotated.

The peripheries of discs **18***a* and **18***b* are beveled on their sides opposite the side at which they contact at point **19**, namely, on their outside peripheries at **18***c* and **18***d*, respectively.

A shallow trough **20** is formed in the center of the upper surface of the thread guide assembly **10** and extends from pin **17** to a point adjacent the base **11**, which provides clearance for the thread.

Figure 3 shows the thread stripping guide of the present invention in a typical spinning installation. Thread **21** is formed when a viscose solution is extruded through spinneret **22** into an aqueous acid bath **23**. The thread guide assembly **10** is mounted over spinbath **23** by means of an L-shaped rod **24**, one end of which is fixed to the spinbath trough **25** by means of clamp **29** and the other end **13** is clamped to the assembly by set screw **14**. The thread **21** is passed up through the spinbath **23**, around rod **24**, thence to and around godet **27** and then back down between the stripping discs **18***a* and **18***b*. The stripping guide discs **18***a* and **18***b*, mounted directly above spinbath **23** is so positioned with respect to godet **27** and the second hot bath **28** that the discs exert a squeezing action on the thread between their abutting surfaces. This results in the removal of a large part of the acid from the moving thread. The stripped acid immediately passes over the bevelled edges of the discs and after running down the sides of the discs falls into the spinbath below. The bevelled edges effectively prevent any tendency on the part of the stripped liquid to "well-up" or be taken up by other portions of the moving thread and insure that the liquid is returned to the acid spinbath.

After passing between the discs the thread is propelled through the second hot bath **28** and finally stretched the desired extent.

As stated above, if the discs tend to become covered with incrustations deposited around the portions where the thread is contacted, they may be rotated manually to provide fresh contact area.

It has been found that the present stripping guide effectively removes practically all of the sulphuric acid from freshly spun heavy denier viscose rayon yarn, making possible a substantial reduction in acid consumption. Furthermore, this stripping guide may be used virtually continuously over long periods of time with no interruptions for replacements and with no adverse effect on the characteristics of the yarn.

It is believed that both the peculiar construction of the stripping guide and the material of which the discs **18***a* and **18***b* are made, contribute to the efficiency of the device in operation. The fact that the stripping portion of the guide consists of two discs which converge to a point where a portion of their peripheries abut, appears to facilitate the removal of the liquid and return the same to the desired place for recovery. Mounting

the discs for limited rotation permits changing the point of contact between the discs and the thread which in turn lengthens the period of use of the guides because the deposits that form at the point of thread contact can continue to build up around the entire perimeter of the discs before cleaning.

Therefore it is conceivable that a number of plastics which are flexible and corrosion and abrasion resistant can be employed with signal success. Among this group the polysubstituted ethylenes such as polytetrafluoroethylene known as "Teflon" or polychlorotrifluoroethylene known as "Kel F" are particularly well suited for this purpose as well as some of the plastics made from the superpolyamides. On the other hand, materials such as glass or stainless steel will not withstand the abrasive action of thread moving rapidly in contact with a stripping guide made of these materials. It is obvious that any material that is not substantially abrasion resistant must be replaced over short intervals which would contribute to an inefficient system, whereas Teflon may be used for indefinite periods without any signs of wear, and even when the discs are mounted so that there is substantial pressure at the point where they abut, apparently there is no detrimental action on the threads passing between the discs. This particular type of material, while not particularly hard, is highly abrasion resistant and appears to be of a sufficient soapy or waxy nature to enhance the passage of the thread between the discs under a squeezing action which will remove substantially all of the liquids.

As mentioned above, probably the most efficient stripping guide should be in the form of that hereinbefore described, the discs being made of Teflon. However, utilizing the properties of these polysubstituted ethylenes, forms other than round may be employed.

It is to be understood that this invention is not limited to the embodiment described herein or illustrated in the drawing, since many modifications may be made without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. A thread stripping guide comprising an axle member, a flexible disc rotatably mounted on said axle member, a second flexible disc rotatably mounted on said axle member, and means urging a portion of the periphery of one of said discs into abutting relationship with a corresponding peripheral portion on the other of said discs.

2. A thread stripping guide comprising an axle member, a flexible disc rotatably mounted on said axle member, a second flexible disc rotatably mounted on said axle member, and means urging a portion of the periphery of one of said discs into abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs.

3. A thread stripping guide comprising an axle member, a flexible polysubstituted ethylene disc rotatably mounted on said axle member, a second flexible polysubstituted ethylene disc rotatably mounted on said axle member, means urging a portion of the periphery of one of said discs into abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said flexible discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs.

4. A thread stripping guide comprising an axle member, a flexible superpolyamide disc rotatably mounted on said axle member, a second flexible superpolyamide disc rotatably mounted on said axle member, means urging a portion of the periphery of one of said discs into abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said flexible discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs.

5. A thread stripping guide comprising an axle, a flexible disc rotatably mounted on said axle at an oblique angle, a second flexible disc rotatably mounted on said axle at an oblique angle, a portion of the periphery of one of said discs being disposed in abutting relationship with a corresponding peripheral portion on the other of said discs.

6. A thread stripping guide comprising an axle, a flexible disc rotatably mounted on said axle at an oblique angle, a second flexible disc rotatably mounted on said axle at an oblique angle, a portion of the periphery of one of said discs being disposed in abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs.

7. A polytetrafluoroethylene thread stripping guide comprising an axle, a flexible disc rotatably mounted on said axle at an oblique angle, a second flexible disc rotatably mounted on said axle at an oblique angle, a portion of the periphery of one of said discs being disposed in abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs.

8. A device for stripping liquid from thread comprising a housing provided with two slots, an axle secured to said housing and traversing said slots, said slots being disposed at an oblique angle with respect to said axle, a flexible disc mounted on said axle for rotatable movement in one of said slots, a second flexible disc mounted on said axle for rotatable movement in the other of said slots, a portion of the periphery of one of said discs being disposed exterior of said slots in abutting relationship with a corresponding peripheral portion on the other of said discs.

9. A device for stripping liquid from a thread comprising a housing provided with two slots, an axle secured to said housing and traversing said slots, said slots being disposed at an oblique angle with respect to said axle, a flexible disc mounted on said axle for rotatable movement in one of said slots, a second flexible disc mounted on said axle for rotatable movement in the other of said slots, a portion of the periphery of one of said discs being disposed exterior of said slots in abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs.

10. A device for stripping liquid from a thread comprising a housing provided with two slots, an axle secured to said housing and traversing said slots, said slots being disposed at an oblique angle with respect to said axle, a flexible disc mounted on said axle for rotatable movement in one of said slots, a second flexible disc mounted on said axle for rotatable movement in the other of said slots, a portion of the periphery of one of said discs being disposed exterior of said slots in abutting relationship with a corresponding peripheral portion on the other of said discs, the edges of said discs being bevelled away from the abutting side of said discs toward the non-abutting side of said discs, and means for guiding the path of travel of said thread after it has passed in contact between the abutting portions of said discs.

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