Feb. 17, 1942. H. FREY 2,273,752

YARN ABRADING APPARATUS

Filed Nov. 16, 1939

Fig. 1.

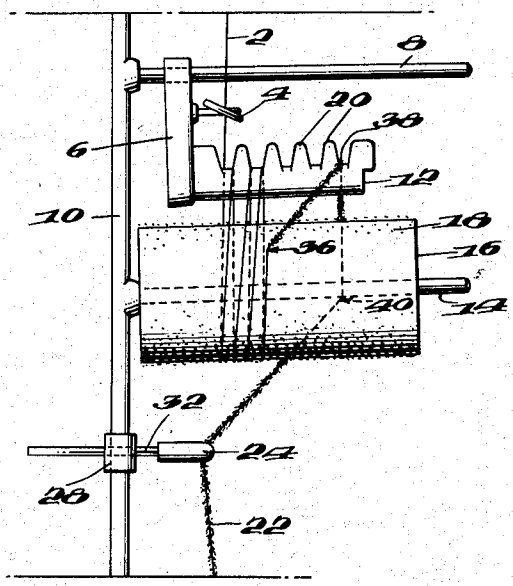


Fig. 2.

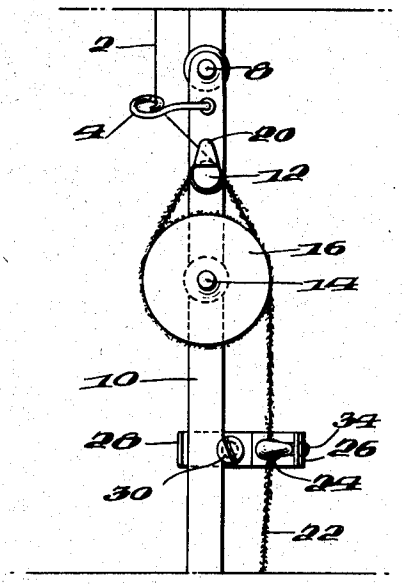


Fig. 3.

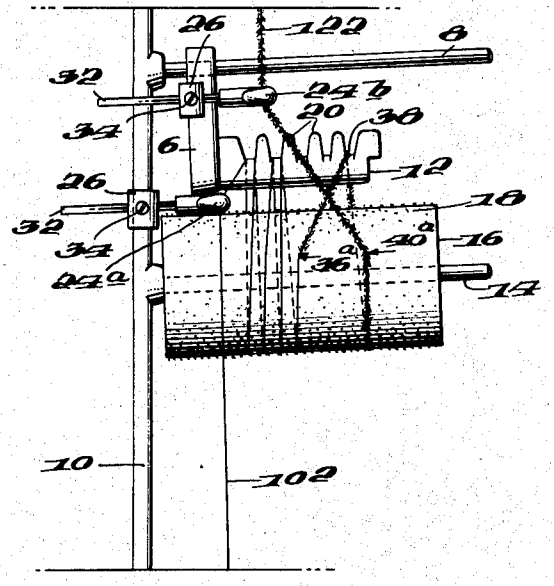
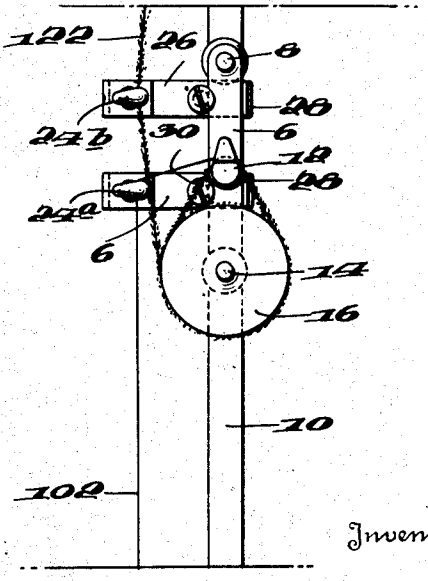


Fig. 4.



Inventor

Henry Frey

By Vernon E. Hodges and A. Hamlin Hodges his Attorneys

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YARN ABRADING APPARATUS

Henry Frey, Kingston, Pa.

Application November 16, 1939, Serial No. 304,864

4 Claims. (Cl. 28—1)

My invention relates to an improvement in yarn abrading apparatus and method of use.

Recently artificial yarns have been abraded to provide a roughened surface to the usually smooth surface of single filament yarns that are mechanically produced. Several devices have been made to provide a roughened or non-luster finish.

The object of my invention is to provide a simple abrading device which may be utilized to abrade a single filament yarn at the same time that it is being tensioned as it is pulled from a source of supply to be fed or presented to a doubling machine or a conventional winding or redraw machine.

A further object is to provide an abrading device which will evenly and thoroughly abrade a yarn without adding materially to the cost of producing the yarn.

The invention consists in an arrangement or system whereby it will be possible to draw directly from cones, spools, cakes, or any suitable source of supply, and properly tension and abrade yarn to any desired extent, both economically and efficiently.

The present invention follows, generally, the teachings of my co-pending application, Serial No. 288,218, but adds to that disclosure the use of an additional clamp and guide to allocate a second point of abrasion.

In the accompanying drawing:

Fig. 1 is a fragmentary view in front elevation showing one of my devices mounted on a suitable support beneath a source of supply of yarn;

Fig. 2 is a fragmentary view in side elevation showing the device in Fig. 1;

Fig. 3 is a fragmentary view in front elevation showing a modified form of my invention in which the abrading roller is mounted on a suitable support above a source of supply of yarn; and

Fig. 4 is a fragmentary view in side elevation showing the device in Fig. 3.

In the form shown in Figs. 1 and 2, the yarn 2 is drawn from a suitable source of supply (not shown) and is passed through a conventional pigtail 4 secured on a bracket 6 which is supported on a pin 8 outstanding from the rail 10. A porcelain comb is also secured on the bracket 6 and extends therefrom in a position approximately parallel to the pin 8.

On the pin 14, outstanding from the rail 10, and approximately parallel to the pin 8, I place an idle roller 16, which is preferably made of maple, but which may be made of any suitable material, and which is provided with suitable bearings so that it may revolve freely on the pin 14.

To properly and conveniently abrade the yarn 2 I have placed on the outside surface of the roller 16 a suitable abrasive substance 18, such as "Aloxite," an aluminum oxide preparation which may be applied to provide any desired degree of roughness.

The porcelain comb 12 is provided with a plurality of teeth 20, in the instant case four, which are positioned to provide five spaces between the teeth and between the teeth and the ends of the comb. These spaces provide positions into which the yarn 2 may be guided and held (laterally of the comb 12 and abrading roller 16) so that a proper amount of abrading may be applied thereto to create the abraded yarn 22 when it is taken from the roller and pulled through the adjustable guide 24, which guide is adjustably secured to the rail 10 by the clamp 26.

The clamp 26 is preferably made of suitable sheet-metal and is provided at one end thereof with a substantially L-shaped bend to provide a foot 28 adapted to engage the rail 10. A screw 30 is screw-threaded to the clamp 26 in a position properly spaced apart from the foot 28 so that the screw 30 can also engage the rail 10 to hold the clamp in its adjusted position on the rail. The other end of the clamp 26 is folded over upon itself and is provided with the necessary holes through which the rod 32, attached to the guide 24, may pass. The rod 32 and guide 24 are held in adjusted position by a suitable set-screw 34.

The yarn 2 to be abraded is fed downwardly from the source of supply (not shown), passes through the pigtail 4, is wrapped around the roller 16 in contact with the abrasive surface 18, through predetermined spaces between the teeth 20 of the comb 12, and again around the roller 16 and through the same or other predetermined spaces between the teeth 20 a plurality of times, until such time that it is pulled sharply from the abrasive surface 18, at a sharp angle, as for example at the point 36, by being fed through a relatively distant space 38 in the comb between the last tooth 20 and the end. From the space 38 the yarn is again brought into contact with the abrasive surface 18 of the roller 16 and is again pulled sharply therefrom at the point 40 where another abrading or tearing action is effected. The yarn 22 which has thus been double abraded then passes through the guide 24, which was adjusted to determine the angle at the point 40,

and then to a conventional doubling machine (not shown).

In the modified form shown in Figs. 3 and 4 the wrapping of the yarn and the abrading is the same except for the fact that in this modified form the yarn 102 is pulled from a source of supply from beneath the roller 16, and is fed through an adjustable guide 24a before it is wrapped around the roller 16 and the comb 12 as described above.

In this form the first main point of abrasion of the yarn 102 is at the point marked by the arrow 36a where the yarn is pulled sharply from the abrasive surface 18 to pass through the space 38. From the space 38 the yarn 102 is again wrapped around the roller 16 and is pulled therefrom abruptly at the point marked by the arrow 40a before it passes through the adjustable guide 24b which is adjusted to allocate the point 40a. From the adjustable guide 24b the double abraded yarn 122 passes upwardly to a conventional winding or redraw machine.

I have found that the form disclosed in Figs. 3 and 4 can be used successfully to abrade a single filament yarn sufficiently to be used to produce a yarn of the "Angora" type. For example, yarn may be made into the "Angora" type by doubling together a plurality of single filament yarns after they have been abraded as described above. One satisfactory yarn of the "Angora" type has been produced by abrading nine threads of three hundred (300) denier separately and then twisting them together by using a conventional 5b doubler.

When the desired abrading can be done conveniently at the time of doubling, it is advisable to use abrasion apparatus and method disclosed in Figs. 1 and 2, this resulting in the most economical process as it combines abrading and doubling in one operation. Also it is possible to abrade more than one thread at a time, a plurality of threads being fed through the pigtail and around the roller as one thread. This, however, has its early limitations, particularly so when a heavy yarn is to be abraded. When heavier yarns are to be abraded, I have found it to be more practical to abrade the single threads first to insure a heavy, strong and uniform abrasion. After the heavy threads have been thus individually abraded, the desired number of threads may be passed on to a conventional doubler, such as a 5b doubler. Also, it is generally understood that yarn going through a 5b doubler will receive an additional and predetermined twist. Consequently, when an additional twist is desired, I use the form disclosed in Figs. 1 and 2, but when no such twist is desired, I use the form disclosed in Figs. 3 and 4.

While I have shown particular wrappings of the yarn around the abrading-wheel and comb, it will be understood that under varying circumstances other wrappings may be made, dependent on the yarn being abraded and the amount of abrasion desired.

For example, in Figs. 3 and 4, I have shown the yarn going around the roller four times, and then skipping two openings in the comb to provide for sufficient abrasion, but it will be obvious that three openings could be skipped to provide more abrasion, if it were desired. In the use of a four toothed comb as disclosed, more wrappings could probably not be conveniently made, but with a porcelain comb having five teeth it will be entirely possible to skip three openings, thereby causing a more sharp angle for the abrasion.

It has been found in actual practice that the wrappings disclosed have given very satisfactory results, and that practically any desired amount of abrasion can be accomplished.

In the form of wrappings which I have disclosed in Figs. 3 and 4, it will be noted that the yarn to be abraded is fed from beneath the abrading roller and porcelain comb, and subsequently is fed upwardly to a winding or redraw machine. When a winding or redraw machine is used, the speed at which the yarn is pulled over the abrading roller is greater than the speed at which it is pulled with the method as disclosed in Figs. 1 and 2 in the use of a conventional 5b doubler, and, consequently, there is a greater drag on the yarn, and a proper tension may be obtained without requiring as many wrappings around the abrasion roller. In many cases, the number of wrappings around the abrading roller can be reduced, but, as shown in Figs. 3 and 4, the wrappings may be considered as probably the maximum number required so that proper tensioning and abrasion will result. Obviously, the speed of the winding or redraw machine may be controlled. Consequently the number of wrappings would be changed to compensate for such change in speed.

It will be understood that yarn being treated by the use of my new method may be wrapped in many other combinations of spacings without departing from the spirit of the invention. Generally speaking, however, I have found that the exact wrappings which are disclosed in the drawing have given very satisfactory abrasion which is proven to be both economically and efficiently produced.

It has been found in actual practice that the coarseness of the Aloxite used for covering the abrading roller may be varied to produce different extent of abrasion as desired. For example, in abrading 450 denier yarn to produce a heavy yarn of the Angora type, a coarser grade of Aloxite may be used to result in the long broken filament. I have used as low as #80 Aloxite for covering the roller under these circumstances, and have successfully used 100 Aloxite on 300 denier yarn, but for abrading finel yarns 150 Aloxite has given the best results.

I claim:

1. The combination of a rail, a pin outstanding therefrom and unsupported at its outer end, an abrasive roller loosely mounted thereon and removable therefrom, a comb in proximity to the roller, yarn wrapped around the roller and between the teeth of the comb a plurality of times first in an approximately straight direction and finally in a diagonal direction, whereby when the yarn is pulled from the roller the latter is turned by and at the speed of the traveling yarn which is abraded at the point where it leaves the roller.

2. The combination of a rail, a pin outstanding therefrom and unsupported at its outer end, an abrasive roller loosely mounted thereon and removable therefrom, a comb in proximity to the roller, yarn wrapped around the roller and between the teeth of the comb a plurality of times, first in an approximately straight direction and finally in a diagonal direction, and a guide in addition to the comb through which the yarn is passed located on the side of the roller approximately remote from the comb and between the rail and the point where the yarn last leaves the comb, whereby when the yarn is pulled from the roller the latter is turned by and

at the speed of the traveling yarn which is abraded as it leaves the roller.

3. The combination of a rail, a pin outstanding therefrom and unsupported at its outer end, an abrasive roller loosely mounted thereon and removable therefrom, a comb in proximity to the roller, yarn wrapped around the roller and between the teeth of the comb a plurality of times, first in an approximately straight direction and finally in a diagonal direction, and a guide in addition to the comb through which the yarn is passed located on the side of the roller approximately remote from the comb and between the rail and the point where the yarn last leaves the comb, whereby when the yarn is pulled from the roller the latter is turned by and at the speed of the traveling yarn which is simultaneously abraded at two points on the roller.

4. The combination of a rail, a pin outstanding therefrom and unsupported at its outer end, an abrasive roller loosely mounted thereon and removable therefrom, a comb in proximity to the roller, yarn wrapped around the roller and between the teeth of the comb a plurality of times, first in an approximately straight direction and finally in a diagonal direction, and an adjustable guide in addition to the comb through which the yarn is passed located on the side of the roller approximately remote from the comb and between the rail and the point where the yarn last leaves the comb, whereby when the yarn is pulled from the roller the latter is turned by and at the speed of the traveling yarn which is abraded as it leaves the roller.

HENRY FREY.