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W. A. DICKIE ET AL

2,002,078

TEXTILE APPARATUS

Filed Aug. 30, 1932

FIG. 1

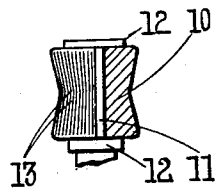


FIG. 2

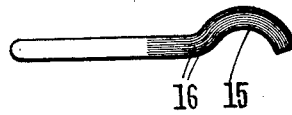


FIG. 3

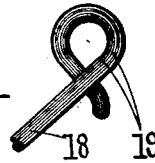


FIG. 4

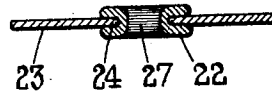
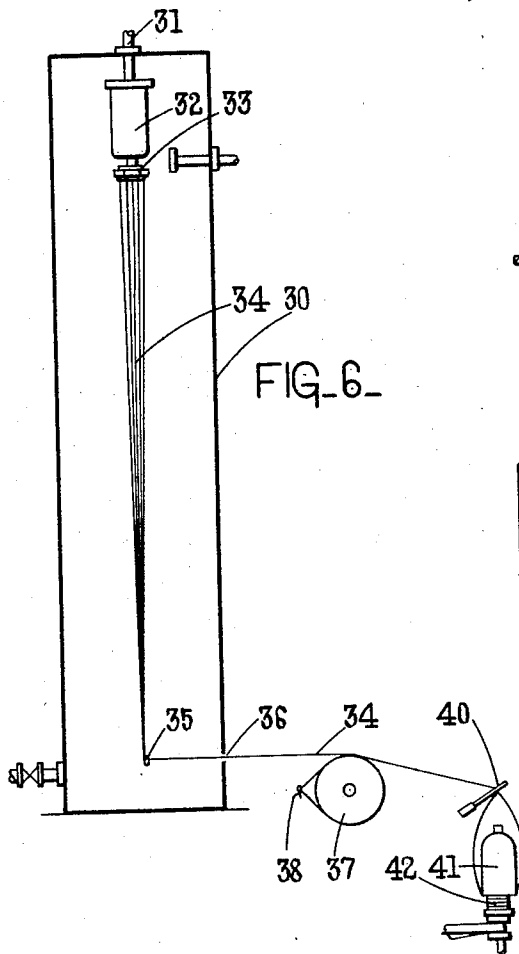
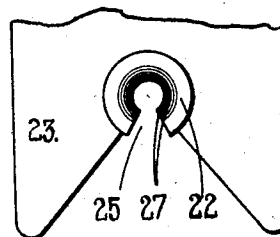


FIG. 5



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## UNITED STATES PATENT OFFICE

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## TEXTILE APPARATUS

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In Great Britain September 24, 1931

4 Claims. (Cl. 242-157)

This invention relates to textile apparatus and in particular to yarn guides, especially such guides as are used for yarns likely to suffer damage if subjected to excessive tension.

As is well known, the tension imparted to a yarn in its passage over a curved guide surface is dependent both on the length of contact the yarn makes with the surface, and on the curvature of the surface, both of which factors are directly related to the angle through which the yarn turns in passing round the curved surface. The speed at which the yarn passes over the surface, and the nature of the yarn, i. e. the material of which the yarn consists and the structure of the yarn, and the nature of the guide surface are also factors determining the amount of tension.

It has now been found that the tension exerted upon yarns in passing over guides can be reduced in an astonishing manner if the surface of the yarn guide has very fine scores or furrows which run in a direction transverse to the direction of movement of the yarn over the guide surface. By transverse is meant any direction not parallel or substantially parallel to the direction movement of the yarn. This reduction of tension obtained by replacing a smooth surface of the yarn guide by transverse furrows is evident whatever the materials employed for the guide.

The guides according to the present invention may be used in connection with all kinds of natural staple fibres, such as cotton or wool, or of continuous filaments, such as silk, especially degummed silk, or artificial filaments of cellulose acetate or other cellulose derivatives, or of reconstituted cellulose such as viscose, nitrocellulose or cuprammonium silk. The guides may also be used in connection with spun yarns made from continuous natural or artificial filaments. The guides, however, are of particular advantage in the case of relatively low-twist or untwisted threads of continuous filaments, which yarns are more prone than others to the disadvantage of excessive tension, probably owing to the tendency of the filaments to spread over the guide surface, and are more susceptible to the effects of excessive tension.

It is important that the furrows should be small in depth and fairly close together. In practice, furrows so fine as only to be apparent under a microscope have been found to be very effective, reductions of tension of 70-95% having been obtained in the case of low-twist ar-

tificial yarns after providing guides of different materials with such furrows.

Guides of the character to which the furrows may be applied with advantage are found in all classes of textile machinery.

The invention will now be described in greater detail with reference to the accompanying drawing, but it is to be understood that this description is given by way of example only and is in no respect limitative.

Figure 1 shows in part section a capstan shaped guide according to the invention;

Figure 2 shows a bent hook guide in elevation;

Figure 3 shows a pigtail guide in elevation;

Figure 4 is a sectional elevation of a split guide eye;

Figure 5 is a plan of the guide eye shown in Figure 4; and

Figure 6 shows the application of some of these thread guides in an apparatus for the dry spinning of artificial silk.

In Figure 1 a thread guide of the capstan type is shown, the body 10 of the guide being mounted on a spindle 11 and retained thereon by flanges 12. As will be seen the body 10 which is made of glazed or unglazed porcelain or glass is constricted towards the middle to retain the thread on the surface thereof, and as shown on the left-hand side of the figure, is provided with frequently occurring shallow grooves 13 running across the path of the thread which proceeds round the guide. This guide is of a type which may be employed in connection with the drawing of loops of thread in shuttleless looms as described for example in U. S. application Serial No. 484,785 filed September 16, 1930.

It has been found that although the guide 10 may move on its spindle 11 because of the movement of the yarn there is still some slippage of the thread over the guide surface and the provision of the grooves 13 actually assists in reducing the tension created by the passage of the yarn.

Figure 2 shows a hook-shaped guide which may be used in the wet spinning process for the manufacture of artificial filaments, the guide serving to guide the filament from the spinning orifice through the bath and also to guide the filament on to and over the godet roller from which the filament passes to the twisting mechanism. The guide may be made of glass or of metal, for example stainless steel, mild steel or chromium plated steel. The part 15 of the guide over which the thread or filament passes is provided on its

surface with grooves 16 running across the path of the thread, these grooves preferably being formed after the formation of the guide when vitreous materials such as porcelain, glass or the like are employed.

In Figure 3 a pigtail guide is illustrated, constructed of a metal or glass rod 18 provided with frequently occurring grooves 19 and bent into the required shape after the provision of such grooves. The grooves may of course be provided after the formation of the guide as in Figure 2, but where a metal rod is employed it is generally more convenient to form the grooves on the rod before forming the guide.

The grooves or furrows in the guide surface may be produced in any convenient manner, depending of course on the nature of the guide material. For example a metal guide surface may be grooved or furrowed by rubbing in the direction to be taken by the furrows by means of fine emery paper or other abrasive or by means of a file or wheel having sufficiently fine teeth. In the case of a rod-like guide of small diameter emery or other paper or cloth may be rubbed longitudinally of the guide, or emery, carborundum or other abrasive powder may be applied by means of a cloth as a simple means of scoring the surface, whereas in the case of larger surfaces draw filing may be employed with advantage to produce the grooves or furrows in a simple manner. In the case of harder guide surfaces such as glass abrasive cloths or powder having appropriate hardness may be employed.

Figures 4 and 5 show a sectional view, a plan view respectively of an eye guide. The horse-shoe shaped portion 22 of the guide is constructed of porcelain and is mounted in a metal plate 23 fitting into a groove 24. The horseshoe piece 22 is broken away as at 25 in order to permit a thread to be passed laterally into the guide eye. The surface of the guide over which the thread

passes is provided with grooves 27 which are shallow in depth and frequent in occurrence.

In Figure 6 a side elevation in section of an apparatus for the dry spinning of artificial silk is illustrated. A dry spinning cell 30 is provided with a supply pipe 31 for the spinning solution, which leads the solution through a filter candle 32 to the spinning jet 33. The filaments 34 extruded from the jet 33 pass down the cell 30 and are deflected by means of a guide 35 which is of the kind illustrated in Figure 2, to an opening 36 in the wall of the cell 30. The filaments 34 pass round a feed roller 37, and at the back of the feed roller they are caused to pass through a pigtail guide 38 of the kind described with reference to Figure 3, this guide facilitating manipulation of the filaments and ensuring that they do not adhere to the roller 37. On leaving the roller 37 the filaments pass to the thread guide 40 of a cap spinning device 41 by means of which they are twisted and wound on to a bobbin 42. The thread guide 40 is of the kind described with reference to Figures 4 and 5.

What we claim and desire to secure by Letters Patent is:—

1. Yarn guide in which the surface of the guide over which the yarn is to pass has very fine scores or furrows in a direction transverse to the direction of movement of the yarn over such surface.

2. Yarn guide according to claim 1, wherein the yarn guide has a very finely scored or furrowed surface of a hard material such as glass.

3. Yarn guide according to claim 1, wherein the guide has a very finely scored or furrowed surface of porcelain.

4. Yarn guide according to claim 1, wherein the yarn guide has a very finely scored or furrowed metal surface.

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