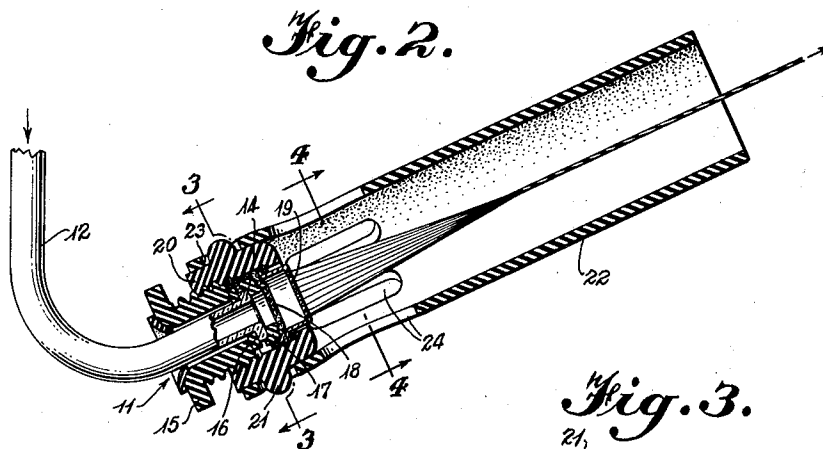
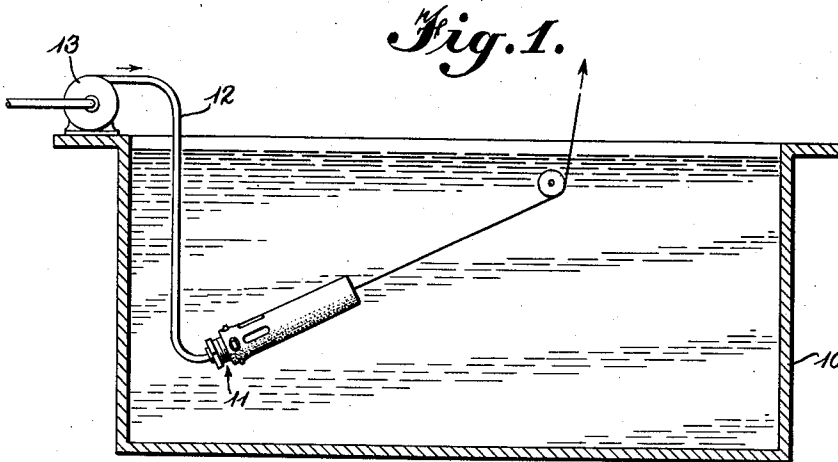


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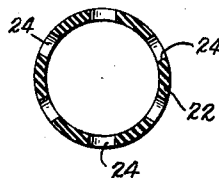
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VISCOSE SPINNING DEVICE

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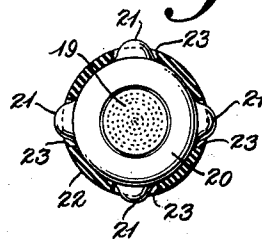
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*Fig. 4.*



*Fig. 3.*



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## VISCOSE SPINNING DEVICE

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2 Claims. (Cl. 18—8)

This invention relates to the production of high tenacity yarn and more particularly to an improvement in apparatus for spinning high tenacity viscose yarn whereby filament breakage is reduced and higher spinning speeds are achieved.

In the spinning of high tenacity rayon, the physical strength and form of the rayon is modified by spinning in the presence of retardants and thereafter imposing a high stretch. Spin bath retardants, as the name suggests, have the effect of slowing down the rate of regeneration of the viscose. This retardation, of course, prolongs the period during which the filaments of the freshly spun yarn are physically weak and susceptible to damage by the circulating spin bath.

In an attempt to prevent yarn damage during high tenacity spinning, shields have been associated with the spinnerets in a manner to protect the delicate freshly formed filaments until their regeneration is complete enough so that their mechanical strength is adequate to resist ordinary stretch and aftertreatment without damage.

The shields of the prior art are of two general types, those supported from the spinneret and those separately supported. One known type of separately supported shield is a glass tube located in accurately spaced registry with the spinneret. This construction has the disadvantage of being very hard to thread in and very hard to adjust as to the axial and radial registry of the spinneret with the tube.

Spinneret supported shields have the advantage of being self registering on the spinning axis but access to the spinneret is rendered difficult because the connections are somewhat complex. Many of the shields are of rigid, frangible material and hence are expensive to maintain on a plant basis.

It is an object of the present invention to provide an improved shield for the protection of newly spun filaments that is characterized by easy, accurate connection to and disconnection from the spinneret, unbreakability, easy adaptability to existing equipment with resulting low installation cost.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description of a preferred embodiment thereof in conjunction with the annexed drawings wherein:

Figure 1 is a schematic view partially in elevation and partly in transverse section showing a typical installation of a spinning unit in a spin bath, the spinneret assembly being provided with the improvement of the present invention;

Figure 2 is a view in vertical section of the spinneret assembly of the present invention showing the position of the filaments during spinning;

Figure 3 is a view in cross section taken on line 3—3 of Figure 2; and

Figure 4 is a view also in cross section taken on the line 4—4 of Figure 2.

Referring first to Figure 1, the numeral 10 represents a spin bath container having therein a spin bath of known

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composition provided with a retardant for the purpose of retarding the regeneration of the cellulose xanthate as in the spinning of high tenacity yarns. The spinneret assembly is generally designated by 11 and viscose solution is supplied to it through a tube 12 from a pump 13. The pump 13 and the tube 12 are shown only schematically, it being customary to provide in the line a candle filter and some arrangement for pivoting the whole assembly about a point outside of the bath, so that an individual spinneret assembly can be removed from the bath and to discharge to waste in the event of local spinning difficulties. It is intended that these conventional arrangements be present when the invention is used but, since they form no part of the invention, they have not been illustrated.

The viscose supply tube 12 terminates in a flared mouth or flange 14. It supports the spinneret through a threaded sleeve 15 which bears upon the flange 14 through an intermediate rubber washer 16. Axially beyond the mouth of the tube there is a heavy, rubber washer 17 of annular form which supports a filter fabric 18 in spaced relation to the face of the spinneret 19. The spinneret 19 is held by another sleeve 20 in threaded engagement with the sleeve 15, all as can be seen by reference to Figure 2.

It can be seen that the spinneret is assembled and disassembled by screwing the inner and outer sleeves 15 and 20, respectively in relation to one another and that these parts are suspended in the bath from the tube 12.

The internally threaded sleeve 20 is provided with four external protuberances 21, the spacing and shape of which is most readily apparent in Figure 3. These protuberances can be used as grips for rotating the sleeve 20 to assemble or disassemble the spinneret assembly as is necessary, for example, in the replacement of the filter. In the present invention the protuberances perform another function in the location of the hollow, tubular, soft rubber shield 22 which constitutes the improvement of the present invention. This shield is provided near one end with four spaced, round apertures 23 of a size, shape and location to receive therethrough the protuberances 21 thereby to position the shield as shown in Figure 2. In other words, one end of the shield fits over the outer surface of the sleeve 20 and the protuberances 21 project through apertures in the sleeve. It can be seen that the protuberances orient the sleeve on the spinneret both axially and circumferentially. Since the sleeve is circumferentially symmetrical, it is the axis orientation that is important for, in addition to the holes at 23, the sleeve has six elongated slots 24 through which the spin bath liquid obtains access to the freshly spun yarn issuing from the spinneret. As can be seen in Figure 4, these slots 24 are symmetrically, circumferentially spaced and extend axially of the sleeve for less than one-half or, as shown, about one-quarter of its length beyond the face of the spinneret. It is also to be noted that these slots begin substantially in the same plane as the face of the spinneret.

The sleeve 22 is conveniently made of soft rubber, either natural or synthetic, which permits this member to be readily attached to or removed from the spinneret assembly in the confined spaces occupied by the bath. The resilient material of which the sleeve 22 is constructed must be resistant to the action of the hot dilute sulphuric acid usually used in the spin baths. Temperatures of 70° C. or more are conventional. One satisfactory sleeve has been made of soft gum rubber 7/4 inches long, 1 1/2 inches inside diameter with a 1/8 inch wall thickness. Of the 7/4 inches of length an inch overlies the sleeve 20. The slots 24 are slightly over 1 1/4 inches long so that the slots constitute just a little less than one-quarter of the length of the tube that projects beyond the face of the spinneret. The slots are 1/4 inch wide. It was found

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that with a sleeve of the described construction, filament breakage in the spinning of high tenacity yarn was very much reduced.

Example

A number of spinning positions on a conventional production-scale pot spinning machine were equipped for spinning with the tube of the present invention and an equal number of spinning positions were equipped for spinning without the tube. The same viscose solution and spin bath were used in both instances. The results, as reflected in the percentage of "good" cakes, or cakes without broken ends, are reported in the following table. Physical properties of the yarn spun with the tube and without the tube were substantially the same.

Davs spun	Percentage good cakes/ with tube	Percentage good cakes/ without tube
4.....	97% at 51.4 m./m.....	92% at 51.4 m./m.
10.....	98% at 55 m./m.....	93% at 51.4 m./m.
7.....	94% at 60 m./m.....	93% at 51.4 m./m.

The above results illustrate that, with the present invention, a larger percentage of good cakes may be spun at higher spinning speeds.

What is claimed is:

1. An assembly for spinning viscose yarn comprising a spinneret, a sleeve for securing said spinneret in spinning position, an elongated tubular shield formed from resilient, self-supporting material having one end adapted to be supported by said sleeve in operative position, co-operating means on said sleeve and said one end of said shield for attaching the shield to the sleeve, and means defining a plurality of symmetrically arranged, circumferentially spaced and longitudinally extending slots in

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said shield, said slots in said operative position beginning substantially at the plane of the face of said spinneret and extending away from the spinneret face about one-quarter the length of said shield.

2. An assembly for spinning viscose yarn comprising a spinneret, a sleeve for securing said spinneret in spinning position, said sleeve having a plurality of circumferentially spaced protuberances extending therefrom, an elongated tubular shield formed from resilient, self-supporting material having one end adapted to be supported by said sleeve in operative position, means defining a plurality of circumferentially spaced apertures in said shield near one end thereof, said apertures in said operative position being adapted to receive said protuberances, and means defining a plurality of symmetrically arranged, circumferentially spaced and longitudinally extending slots in said shield adjacent to said apertures, said slots in said operative position beginning substantially at the plane of the face of said spinneret and extending away from the spinneret face about one-quarter the length of said shield.

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