

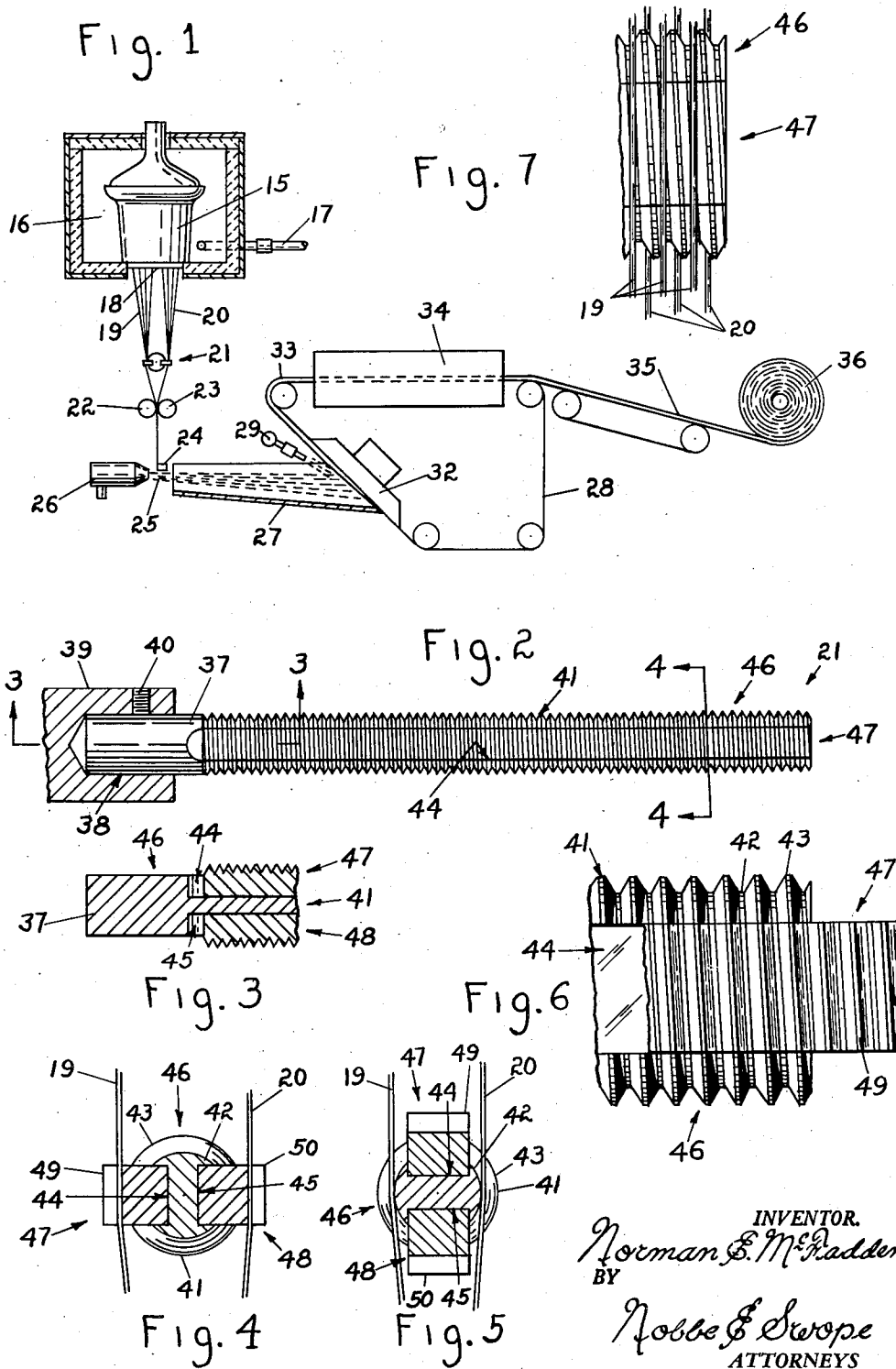
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FILAMENT GUIDE

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FILAMENT GUIDE

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2 Claims. (Cl. 242—157)

This invention relates broadly to a guide for spacing fibers. More specifically, the invention relates to a guide for spacing primary glass filaments in the attenuating zone, for the purpose of introducing the filaments into the blast area at regularly spaced intervals to provide an even deposition of fibers produced therefrom on a collection chain.

In the production of blown fiber mats, particularly of glass, it has been customary to draw primary filaments from a clay pot or bushing having concentric holes formed in the bottom. The filaments as they exude from the bushing are arranged in a circular pattern and to produce a mat having a uniform distribution of fibers it has been found advantageous to realign the filaments into a vertically descending plane with the individual filaments evenly spaced as they pass into the blast zone in front of the burners.

Many attempts have been made to effectively align the filaments, but none have been entirely satisfactory. Some are difficult to thread, some are not effective in maintaining alignment, and others wear out rapidly due to frictional contact with the filaments and frequently require halting the drawing operation while replacements are being made. It is evident to those skilled in the art that improvement of the filament aligning means to overcome the above objections will materially increase production and is a forward step in the art.

Although shown in conjunction with a glass fiber mat making machine, it is conceivable that the guide disclosed herein may be usefully employed in the manufacture of continuous filaments of glass or other material and also in further processing of filaments in which it is desirable to maintain equal spacing therebetween.

It is therefore an object of this invention to provide a filament guide which accurately spaces a plurality of filaments at regular intervals.

It is another object of this invention to provide a filament guide wherein the wearing surfaces are inherently high in lubricity.

It is still another object of this invention to provide a filament guide wherein the wearing surfaces have a relatively extended life.

It is yet another object of this invention to provide a principal filament guide and an auxiliary filament guide to hold the filaments in alignment while the principal guide is being replaced.

It is a further object of this invention to provide means for disengaging the principal guide from the filaments and engaging the auxiliary guide therewith or vice-versa, without displacing the alignment or spacing of the filaments.

Other objects and advantages of the invention will become more apparent during the course of the following description, when taken in connection with the accompanying drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

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Fig. 1 is a schematic drawing of apparatus for making a bound mat of blown glass fibers;

Fig. 2 is a side elevation of the filament guide;

Fig. 3 is a section of the guide taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged cross section of the guide taken on the line 4—4 of Fig. 2;

Fig. 5 is an enlarged cross section of the guide similar to Fig. 4, wherein the guide has been revolved a quarter turn to the right into the replacement position;

Fig. 6 is an enlargement of the right end of Fig. 2 showing a fragment of a primary guide block in partially withdrawn position; and

Fig. 7 is a fragmentary enlarged elevation of the right end of Fig. 2 showing the displacement of the filaments in each bank.

Referring to Fig. 1 of the drawings, the numeral 15 designates a bushing for melting glass which is contained in an insulated chamber 16. The glass is heated by a flame fueled through the conduit 17 which is in communication with the interior of the chamber 16 and with a source of fuel (not shown).

The glass, upon becoming fluid, exudes from holes formed in the bottom 18 of the bushing in the form of fine filaments which are divided into two banks of filaments 19 and 20, each bank forming a semi-circular pattern at the base 18 of the bushing 15. The filaments contained in each bank are directed into contact with the guide 21 on opposite sides thereof spaced at regular intervals one from the other, which spacing is maintained through the attenuating rolls 22 and 23 and over the face of the filament guide block 24. At this point a hot, gaseous blast 25 emanating from one or more burners 26 forcefully impinges upon the filaments to further attenuate the filaments and to direct them in a horizontal direction through a U-shaped trough 27 onto a moving, endless, foraminous collection belt 28.

A thermosetting binder 29 is applied to the fibers during their passage through the trough 27. A vacuum is applied to the back side of the belt 28 through the chamber 32 to assist in drawing the fibers into entangling engagement on the belt.

After the mat 33 is formed, the belt advances it through an oven 34 for setting the binder and the cured mat 35 is wound into a package 36.

Referring to Fig. 2, the filament guide 21 has a cylindrical shank portion 37 which is held in a bore 38 entering one side of a support 39 and is retained therein by one or more set screws 40. The body portion 41 of the guide 21 is singly threaded according to the American Standard Form wherein the roots 42 and crests 43 of the thread 41 are flat or may be slightly rounded as shown in Fig. 6. Diametrically opposed slots 44 and 45 are milled longitudinally of the body 41 terminating at the shank 37. The depth of each slot is approximately one-third the major diameter of the body 41 as shown in Figs. 4 and 5. The portion of the filament guide 21 described above will be hereinafter designated as the auxiliary guide 46.

The principal guides 47 and 48 are made of substantially square graphite bar stock adapted to be received and frictionally retained by the slots 44 and 45 with the outer surface extending beyond the crests 43 by approximately the depth of the thread on the body 41. Threads 49 and 50 are machined into the exposed faces of the primary guides 47 and 48 in register with and having identical dimensional characteristics with the threads on the body 41.

Referring to Fig. 7, it will be noted that the threads on the body 41 and faces of the guides 47 and 48 form a continuous helix with the root of the guide threads and the crest of the body threads coaxial. By dividing

the filaments into two bands and guiding a filament of each bank into the threads of oppositely disposed guides 47 and 48 adjacent filaments of opposite banks are spaced from each other one-half the lead of the thread and adjacent filaments in the same bank are spaced apart the lead of the thread. This arrangement permits closer spacing of the filaments than heretofore possible without entanglement of adjacent filaments.

Even though the principal guides 47 and 48 are made of carbon because of its inherent lubricating and wearing qualities, the constant sliding movement of the glass filaments will eventually wear the roots and adjacent flanks of the thread to a point where replacement is required. This may be accomplished by loosening the set-screw 40 and rotating the guide 21 a quarter turn in either direction, or in other words, from the normal operating position of Fig. 4 to the replacement position of Fig. 5. As shown in the aforementioned figures, the filaments 19 and 20 follow along in the helical grooves from a position in which they contact the principal guides 47 and 48 into contact with the thread roots 42 of the auxiliary guide 46.

The principal guides 47 and 48 may then be withdrawn from the retaining slots 44 and 45 and replaced with new guides. The guide 21 is then rotated a quarter turn in either direction and the filaments 19 and 20 reoccupy the Fig. 4 position. Tightening the set screws 40 maintains the guide 21 in this position.

It is to be understood that the form of the invention herewith shown and described is to be taken as a pre-

ferred embodiment of the same, but that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A filament guide comprising a helically threaded rod, a slot formed in said rod and extending the threaded length thereof, an insert positioned in said slot and extending outwardly beyond the thread line of said rod, said insert having thread portions on the peripheral surfaces thereof corresponding to the thread of said rod.

2. A filament guide comprising a helically threaded rod, oppositely located slots formed in said rod and extending the threaded length thereof, inserts positioned in said slots, the peripheral surfaces of said inserts having diameters different from the diameters of said threaded rod and having thread portions on the peripheral surfaces thereof corresponding to the thread of said rod.

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