

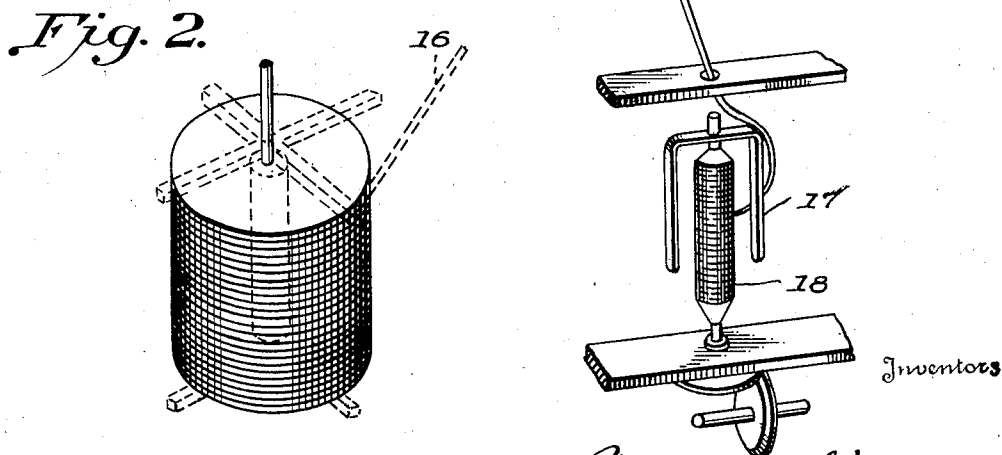
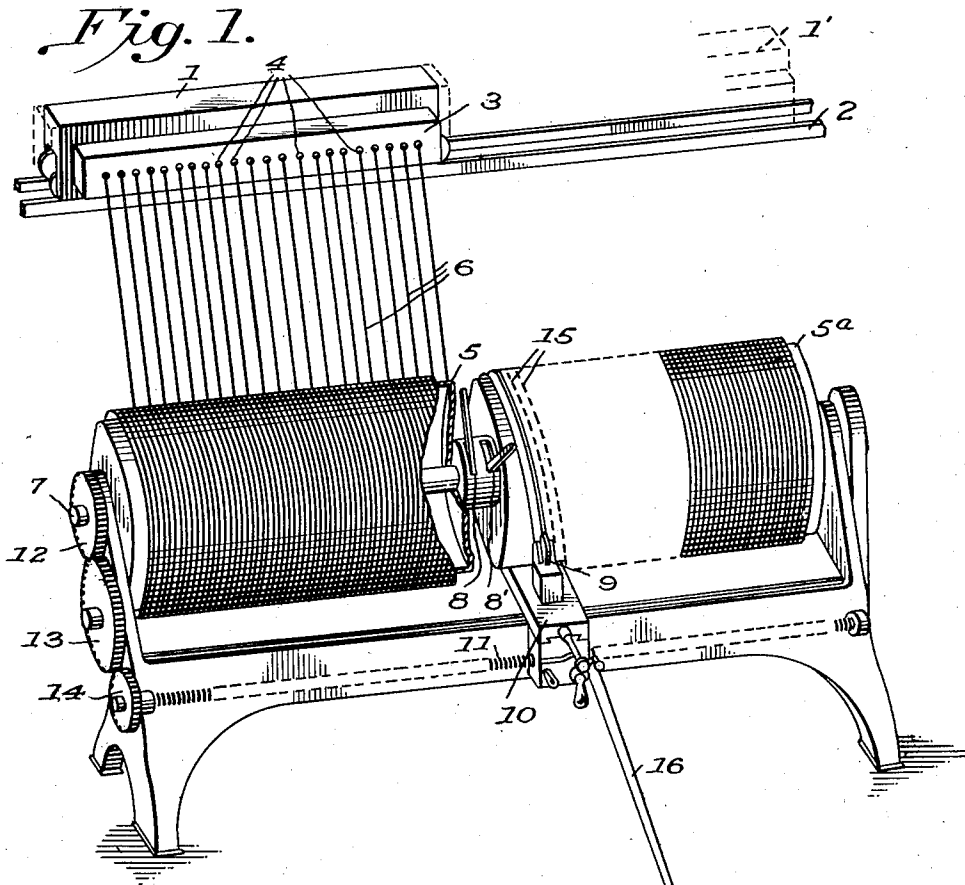
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P. MODIGLIANI ET AL

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MANUFACTURE OF SPUN ARTIFICIAL FIBERS

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*Piero Modigliani
Valentin Biquel
by Dorsey Cole & Garver Attorneys*

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MANUFACTURE OF SPUN ARTIFICIAL FIBERS

Piero Modigliani and Valentino Wiquel, Leghorn, Italy, assignors, by mesne assignments, to Owens-Corning Fiberglas Corporation, Toledo, Ohio, a corporation of Delaware

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8 Claims. (Cl. 57—157)

The present invention relates to the manufacture of an intermediate spinning product in the form of a strip of artificial fibers such as glass, rayon, artificial wool or the like, obtained in a single piece of constant width taken previously from a large cylinder of thread by an uninterrupted helicoidal separation.

The thread cylinder may suitably be one on which the filaments are drawn directly from the nozzles of the spinneret associated with the container for the base material. The latter is substantially stationary and its length is equal to that of the winding and storage drum. The thread cylinder is in the form of a thick layer of all the filaments delivered and collected together in approximately parallel arrangement on the drum, except for a slight crossing which can be imparted by a short and slow oscillatory rectilinear movement of the storage material for the artificial fibers or the furnace in the case of glass and the respective feed opening. Instead of moving the source of supply the winding drum may be reciprocated to occasion a crossing of the fibres.

In a subsequent operative step, and at any desired time or place a helicoidal incision is made in the thread cylinder which influences the entire depth of the layer stored on the drum, thus producing a strip having a width which may be proportional to its depth or height. This strip or strand is formed of long parallel filaments, of a length corresponding to the sum of all the spirals formed from the body of the thread cylinder.

This strand, strip, twist or roving is by this time ready to be spun and twisted to obtain a yarn composed of a plurality of filaments of uniform state and not requiring substantial drawing to have its fibers parallel. This strip or roving may be unwound from the drum of original production and then re-wound on large reels, or spools, or on normal reels with a preliminary twisting.

The helicoidal or spirally cut strand may be obtained preferably on the same machine producing the thread covering on the drum, by means of a knife cutting into the thread covering which advances by means of a worm and threaded spindle device of the type which is commonly used to advance uniformly a cutting or shaping tool in the field of metal working machines.

In a preferred operative form of the apparatus there are provided on the same horizontal shaft two rotary drums. Each of the two may be integrally connected to the shaft, which is set in rotary movement by means of a coupling which

may be removed as desired when the winding of the filaments is completed, whereupon the spinneret or openings in the container for the base material may be passed in front of the other drum for laying the fiber cylinder thereupon. In such manner, during the winding on one drum, the drum previously charged may be disconnected from its rotary shaft and is ready for the helicoidal incision of the wound fiber mat to obtain the strand or strip for storage or for additional handling. If desired, suitable variable speed transmissions between the two drums working simultaneously may be provided.

The invention may be understood from the following description relative to an embodiment given by way of example only, wherein:

Fig. 1 shows an arrangement for converting the filament into a twisted yarn by the production of a strip taken spirally or helicoidally from a drum on which the filaments are spun and drawn originally.

Fig. 2 shows said strip wound on a large reel, without twisting, in position for subsequent working.

Referring specifically to said figures:

In Figure 1 is shown a movable source of supply furnace 1 for the base material travelling on a rail 2 and carrying a spinneret 3 with openings 4 for discharging the filaments arranged in a long row. The filaments are laterally displaced along a line which is as long as the drum 5 therebelow for collecting and drawing the filaments 6, corresponding in number to that of the nozzles 4. The drum 5 is suitably set in rotation through the coupling thereof with the shaft 7 actuated by a suitable motive force (not shown), which may be applied to an end thereof. The coupling is effected by means of a connection 8. A layer or mat of glass filaments is disposed on the drum, the thickness of which may be regulated as desired. The furnace 1 and the spinneret 3 are preferably given a short rectilinear movement in opposite and alternate directions, to produce an imperceptible but appreciable crossing of the fibers, which prevents agglomeration. Mounted at the right of the drum 5, and on the same shaft, is a drum 5a, which may likewise be coupled with the shaft by means of the connection 8'. The drum 5a may be set in rotation when the winding of the drum 5 is completed. At this time, the furnace 1 is shifted to the position 1', indicated in dotted lines within the field of operation of drum 5'.

A knife 9 is carried by a support 10 and may be made to pass all the way toward the left or the

right from one of the ends of the drum 5 or the drum 5a, and then be advanced progressively and continuously from said position by means of the threaded spindle 11 receiving rotational movement through a gear train 12, 13, 14. The advance of the knife according to the rotational velocity of the drum causes the formation of a helicoidal incision 15 of constant pitch, through the thickness of the glass filament covering on the drum, which pitch is a function of the peripheral velocity of the thread covering and of the angular rotational velocity of the threaded spindle 11. It is apparent that the width of the strip 16 determined by the distance or spacing of two adjacent grooves or the like in its total development and length, corresponds exactly to the area of the thread cylinder.

Figure 1 shows at the lower end thereof, the reel 18 with the wing twister 17 by means of which the strip 16 derived from thread cylinder on drum cylinder 5a is wound and twisted, which can be done suitably while forming the covering of the drum 5.

The helicoidal incision 15, which forms an uninterrupted strip, the total area of which is equal to the total area of the thread covering produced or collected on the drum, may be made in any other convenient manner. The incision or separation may be made shortly before the winding and twisting or shortly before winding the strip on a spindle, drum or reel (Fig. 2) for subsequent operation, to obtain the yarn on large scale production. Of course the cutting operation may be executed on a machine other than one connected with the fiber laying apparatus.

The dimensions of the thread is constant and depends on the thickness of the thread layer on the drum and on the pitch of the helicoidal incision, which pitch may be varied by changing the gear ratio of the train 12, 13, 14, that is, varying the angular speed of the shaft 11 relative to that of the drum.

During the entire operation the new product is the parallel fiber strip, obtained by helicoidal incision, whose fibres have a total length equal to the sum of the spirals which can be obtained from a drum.

This strip can be spun and twisted immediately or may be spun at a remote time and place, thus representing a semi-fabricated product.

The invention is described and illustrated by way of example only, and numerous modifications can be provided therefor without departing from the scope of the invention.

What we claim is:

1. The method of producing strips of artificial fibers which comprises drawing artificial fibers, helically winding the fibers on the surface of a support to form a mat thereof, and progressively cutting a continuous spiral strip of predetermined width from said mat.

2. The method of producing strands of artificial fibers which comprises continuously drawing artificial fibers, winding the fibers in a cylindrical mat formation with the fibers in approximately parallel disposition, and cutting the cylindrical mat of fibers in the form of a continuous spiral strand.

3. The method of producing strips of artificial fibers which comprises forming a plurality of individually spaced artificial fibers, winding the fibers into a cylindrical mat formation, and progressively cutting a continuous spiral strip of predetermined width from said mat corresponding to the thickness thereof.

4. The method of producing strands of artificial fibers which comprises forming a plurality of individually spaced artificial fibers, winding the fibers into a cylindrical mat formation, progressively cutting a continuous spiral strand of predetermined width from said mat, and reeling the strand.

5. The method of producing strips of artificial fibers which comprises forming a plurality of individually spaced artificial fibers, winding the fibers into a cylindrical mat formation, progressively cutting a continuous spiral strip of predetermined width from said mat corresponding to the thickness thereof, and spooling said strand while simultaneously twisting it.

6. The method of forming a strip or strand of artificial fibers such as glass, rayon, artificial wool and the like, composed of slightly crossed fibers which consists in accumulating a plurality of fibers upon a cylinder to form a felt or mat of slightly crossed fibers and cutting such mat into strips by a single helicoidal incision through the thickness of the accumulated fibers upon the drum.

7. The method of forming a strip of glass fibers which consists of simultaneously producing a multiplicity of single fibers, winding a plurality of layers of said fibers on a drum, the fibers of each layer crossing the fibers of an adjacent layer whereby a mat of crossed fibers is formed on the drum and cutting helically the mat so formed so as to produce a single continuous strip.

8. The method of forming a strip of glass fibers which consists of simultaneously producing a multiplicity of single fibers, helically winding said fibers simultaneously on a drum in one direction to form a single layer of fibers and thereafter helically winding said fibers simultaneously in a reverse direction to form a superposed layer of fibers upon the first named layer whereby a mat of crossed fibers is formed on the drum and cutting helically the mat so formed so as to produce a single continuous strip.

PIERO MODIGLIANI
VALENTINO WIQUEL