

Dec. 9, 1941.

P. MODIGLIANI

2,265,186

METHOD OF PRODUCING STRANDS OF GLASS FIBERS

Filed March 3, 1939

2 Sheets-Sheet 1

Fig. 1.

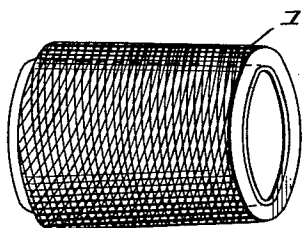


Fig. 2.

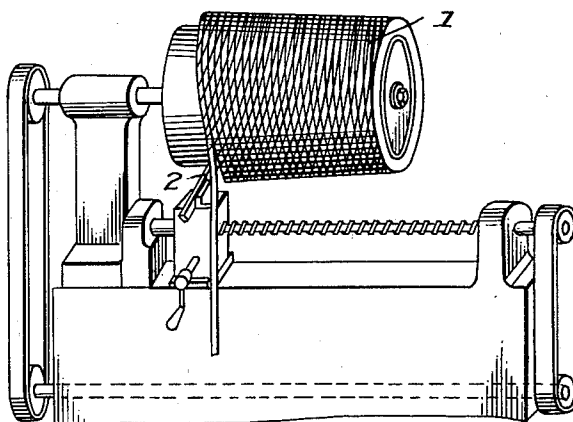


Fig. 3.

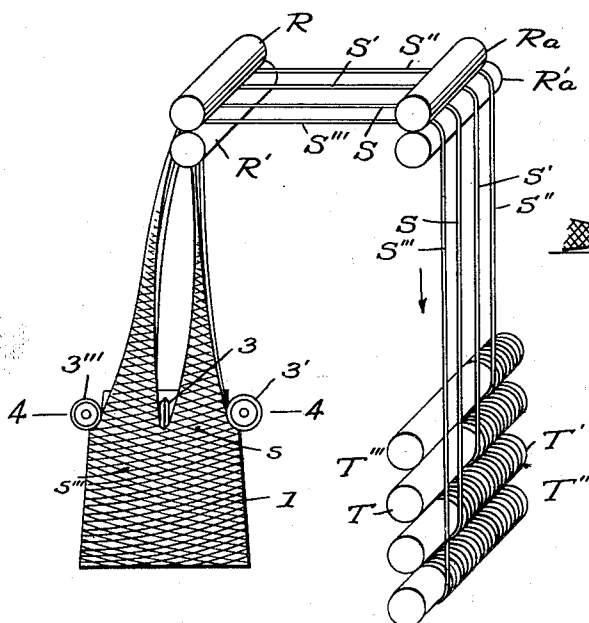


Fig. 7.

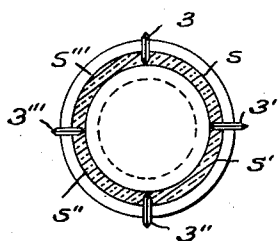
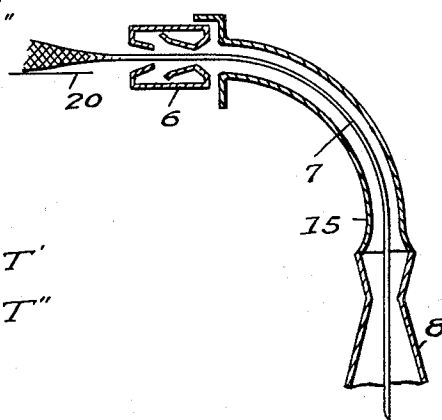


Fig. 4.

Inventor
PIERO MODIGLIANI

By *Dorsay, Cole & Garner*

Attorneys

Dec. 9, 1941.

P. MODIGLIANI

2,265,186

METHOD OF PRODUCING STRANDS OF GLASS FIBERS

Filed March 3, 1939

2 Sheets-Sheet 2

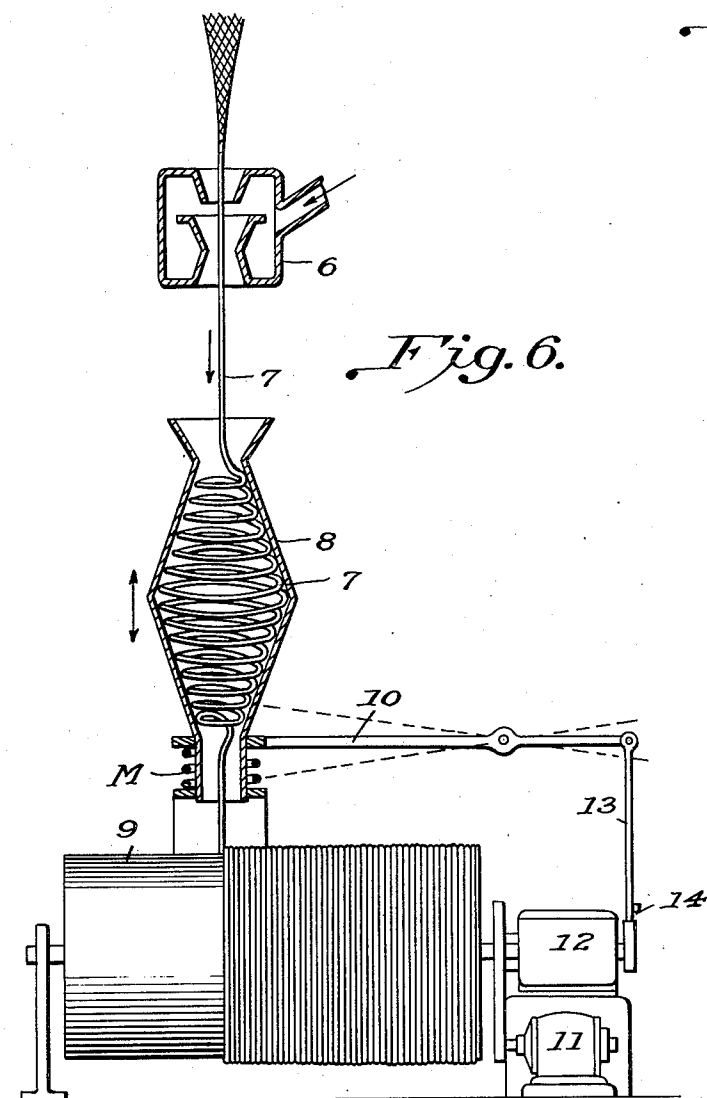
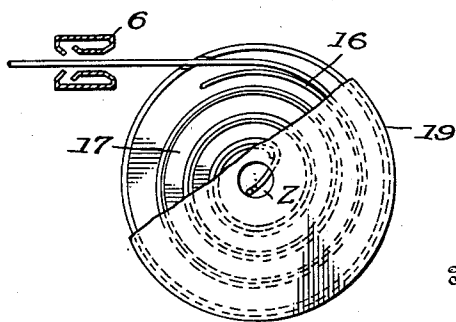
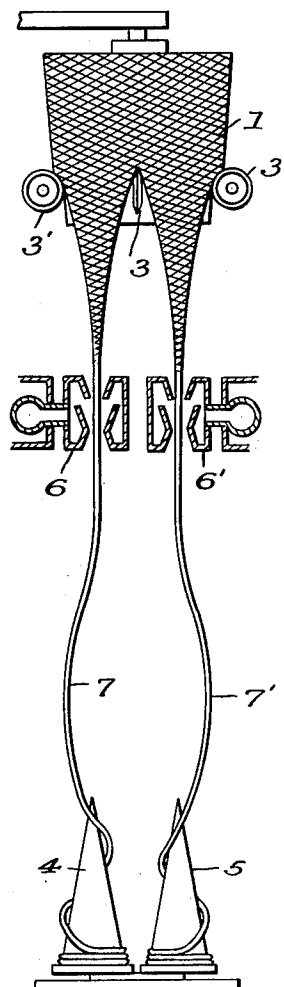


Fig. 5.



Inventor
PIERO MODIGLIANI

By Dorsey, Cole & Garner

Attorneys

UNITED STATES PATENT OFFICE

2,265,186

METHOD OF PRODUCING STRANDS OF
GLASS FIBERS

Piero Modigliani, Livorno, Italy, assignor to
Owens-Corning Fiberglas Corporation, Toledo,
Ohio, a corporation of Delaware

Application March 3, 1939, Serial No. 259,706
In Italy March 14, 1938

8 Claims. (Cl. 19—144)

The present invention relates to a method of drawing and spinning glass particularly wherein the glass fibers are accumulated on a sheathing independent of the cylinder of the drawing machine.

In previous methods of spinning glass fibers, as described by applicant, the drawing and winding cylinders from which the fiber mat or felt was obtained by cutting helicoidally or in the direction of a generatrix, formed an integral part of the machine. It was thus necessary to treat the layer or fiber deposited during the drawing on the machine, which caused loss of time and interruption of the drawing operation with the attendant inconveniences.

According to the invention the fibers are deposited in the drawing stage so as to be easily removed in the form of a tubular layer.

The tubular fiber stratum is then carried to the machine from which, by helicoidally cutting, or pneumatic or mechanical stretching, or otherwise, the helicoidal or simply wound mat is transferred to an accumulating drum or cylinder.

According to one embodiment, the tubular strata of glass fiber are deposited, not on the cylinder of the machine but on a slightly conical tube or sleeve which can be easily slid on and withdrawn in the form of a sheath from the cylinder of the drawing machine, to be stored with its charge of fiber until it is passed to the machine for forming the mat.

In another embodiment, the tubular layer of glass fiber is formed on the cylinder of the drawing machine on a thin sheet, such as paper of any kind. On withdrawing the tubular stratum the thinner inner sheet follows the formation of the glass fiber and its function is merely to promote the sliding action between the surface of the cylinder and the tubular layer. The consistency or solidity of the tubular stratum is assured by the crossing of the fibers themselves. Thus a kind of cop or tubular mass of self-sustaining consistency is obtained. The same result may be obtained by forming the cylinder of the drawing machine of a plurality of segments having sectors adapted to be brought together or removed from each other by means of an expanding device operable, for example, by means of a head or the like. After the drawing is completed the system of segments or sectors is contracted and the cop or tubular mass is liberated, and can thus be carried to the spinning machine proper.

The form of the sleeves or baskets which carry the tubular fiber layer may be conical internally

and cylindrical externally. Also, the cop or tubular mass may be conical or cylindrical externally if desired, independently of the form of its internal bore which may be cylindrical or conical, for example.

The following spinning operation proper can be done in any desired manner from the tubular fiber layer thus mounted on a rigid sleeve of fiber, wood, metal or other material, after withdrawal of the latter.

A method consists in progressively and simultaneously cutting the tubular fiber stratum with knives which pass along its generatrices and which are located at regular distances, so as to form a number of strips which are subjected to a stretching operation. This stretching may be done mechanically and then the individual strips produce single wicks or strands which are wound individually on reels or drums. Or, the stretching may be done pneumatically, as described in application for Italian Patent No. 425/2652 of November 5, 1937, or U. S. application Serial No. 236,773, filed October 24, 1938, and the strands collected from the stretched strips with parallel fibers may pass onto straight cones externally, or into a hollow cone, or on a disc with spiral channels. When collected in a hollow cone of bi-conical form, the strand may be wound again and at once on a rotatable drum the velocity of which varies automatically according to the weight of the strand or wick accumulated in the bi-conical container.

These characteristics and advantages of the invention, and others, are explained by the description of a construction given by way of example only.

Figure 1 shows the new product obtained in the form of a cop or tubular mass.

Figure 2 shows the method of forming the strands on the machine provided successively with the spindles prepared by drawing on another machine, for example such as that of Italian Patent Reg. No. 428, No. 678, of March 9, 1938, corresponding to my U. S. application Serial No. 259,705, filed March 3, 1939.

Figure 3 shows a conical spindle or bobbin subject to the action of the knives to form strips which are mechanically drawn and wound.

Figure 4 is a horizontal sectional view along line 4—4 of Figure 3.

Figure 5 shows the same system of cutting the tubular mass or receiving drum of fiber which are stretched by means of injector nozzles and collected on straight solid cones.

Figure 6 shows diagrammatically a system for

collecting the strands produced by pneumatic stretching, with apparatus for automatically winding the collected strands.

Figure 7 shows the arrangement of the nozzle with its axis parallel with the table on which the mat cut from the spindle is deposited, for then passing the strand in the vertical direction, to be collected.

Figure 8 shows a disc with helicoidal channels and a cover, into which is passed the strand to be collected by means of the jet of air from the injectors, before being passed to a winding bobbin.

Referring specifically to the drawing:

In Figure 1, 1 is the tubular glass fiber stratum deposited on a hollow tubular member which is slightly conical so as to be easily slid on the cylinder, which also may be slightly conical, of the drawing machine, for example as shown in Figure 2. Each individual fiber or filament going to make up the glass fiber stratum is continuous and assuming that such fibers are unbroken their length will be dependent upon the thickness of the stratum deposited on the tubular member. The slightly conical tubular member 1, formed of wound glass fibers, need not be provided with the conical tubular core when its consistency is such as to assure complete stability or indeformability during the periods of production, storage and transport. A thin sheet of paper, cardboard or other material, or the expansion of the machine cylinders, is then sufficient to facilitate insertion and withdrawal.

Figure 2 shows the knife 2 which cuts the tubular mass 1 into a helicoidal strip which may then be drawn as described, for example, in Italian Patent No. 351,056, to which corresponds U. S. application Serial No. 204,444, filed April 26, 1938.

According to Figure 3, the tubular mass 1 is cut progressively by the knives 3, 3', 3'', 3''' (Figure 4), forming four strips s, s', s'', s''', each about one-fourth as wide as the periphery of the tubular mass. Each strip forms a wick or strand S'', S', S, S'''. The stretching and paralleling of the crossed fibers on the tubular mass 1 is realized mechanically by pairs of rollers R, R'; and Ra, R'a. The strands S'', S', S and S''' are wound on drums T'', T', T, T''', respectively.

Corresponding to this mechanical stretching arrangement shown in Figures 3 and 4, is shown a pneumatic stretching arrangement in Figure 5, in which a battery of four injector nozzles such as 6, 6', etc. take from the tubular mass 1 the strips formed by the knives 3, 3', 3'', 3''' which provide the strands 7', 7''... deposited on straight cones 4, 5, etc.

To obtain an accumulation of the strands, use may be made of the system shown in Figure 6 wherein the strand 7 is passed into a vessel 8 in the form of a bi-conical amphora, which presses on a spring M and actuates a lever 10 which acts through a rod 13 on the crank 14 of an internal change speed system 12 acting on the transmission shaft actuated by a motor 11 which sets a winding drum 9 in movement. This diagram shows that the greater the weight of the mat deposited in the vessel 8, which is provided with an upper inlet and a lower outlet, the greater is the speed at which the winding drum 9 rotates, for the purpose of establishing equilibrium between the source of continuous production of the strand in the nozzle 6 and the apparatus for collecting the strand on the drum 9.

Figure 7 shows the nozzle 6 arranged on its horizontal axis to collect the strand deposited on a table 20. The passage 15 serves to pass the strand 7 into the bi-conical vessel disposed on its vertical axis. A rapid rotational movement may also be imparted to the member 8 to apply the strip 7 along its interior walls by means of centrifugal force.

Figure 8 shows that the nozzle 6 may pass the strip or strand into a spiral passage formed in the receiving drum 16 adapted to be covered with the lid 19. The air passing through the spiral passages 17 carries the strand therein to the centre Z from which it can be withdrawn. The receiving drum 16 may also serve as a storage reservoir for the collected strip or mat, like the bi-conical member 8.

Summarizing: The cops or tubular mass mounted on a light core are adapted for an infinite variety of uses, for spinning on a machine independent of the drawing machine and by methods entirely independent of difficult and imperative conditions prevailing during the production of the fiber. The slightly conical form of the tubular mass permits it to be easily inserted by stretching the narrowest part of the cop or tubular mass.

The materials used for the light hollow core forming the support of the tubular mass may be of the most widely varied kind, but those which are lighter and stronger are, of course, preferable.

The invention is described and shown by way of example only, it being understood that numerous modifications may be provided without departing from the scope of the invention, which is also applicable to the handling of other artificial fibers having physical characteristics similar to glass.

What is claimed is:

1. The steps in the method of drawing and spinning threads of artificial fibers which consists of accumulating the drawn fibers in a self-sustaining body in the form of a mat and detachable from the drawing machine, transferring the body bearing the mat of artificial fibers to the spinning machine, cutting the mat of artificial fibers into strips, and spinning the fibrous threads therefrom.

2. The method of drawing and spinning strands of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine in the form of a mat, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip form, and stretching the strips into fibrous strands.

3. The method of drawing and spinning strands of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine in the form of a mat, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip form, mechanically stretching the strips into fibrous strands, and collecting the strands on drums.

4. The method of drawing and spinning strands of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine in the form of a mat, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip

form, pneumatically stretching the strips into fibrous strands, and collecting the strands.

5. The method of drawing and spinning strands of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine in the form of a mat, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip form, stretching the strips into fibrous strands, and collecting the strands on drums at a rate corresponding to the rate of formation of the strands.

6. The method of drawing and spinning a strand of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine in the form of a mat, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip form, pneumatically stretching the strip into a fibrous strand, and collecting the strand on the exterior of a conical body.

7. The method of drawing and spinning

strands of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip form, stretching the strip into a fibrous strand, collecting the strand in a hollow bi-conically shaped space, and withdrawing the stored strand from the storage space for winding upon a drum at a rate conforming to the rate of collection of the strand in the storage space.

8. The method of drawing and spinning threads of artificial fibers which comprises accumulating the drawn fibers on a detachable member on the drum of a winding machine in the form of a mat, stripping the member from the drum of the winding machine and mounting it on a spinning drum, cutting the mat into strip form, pneumatically stretching the strip into a fibrous strand, and collecting the strand in a spiral passage formed by complementary disc elements.

PIERO MODIGLIANI.