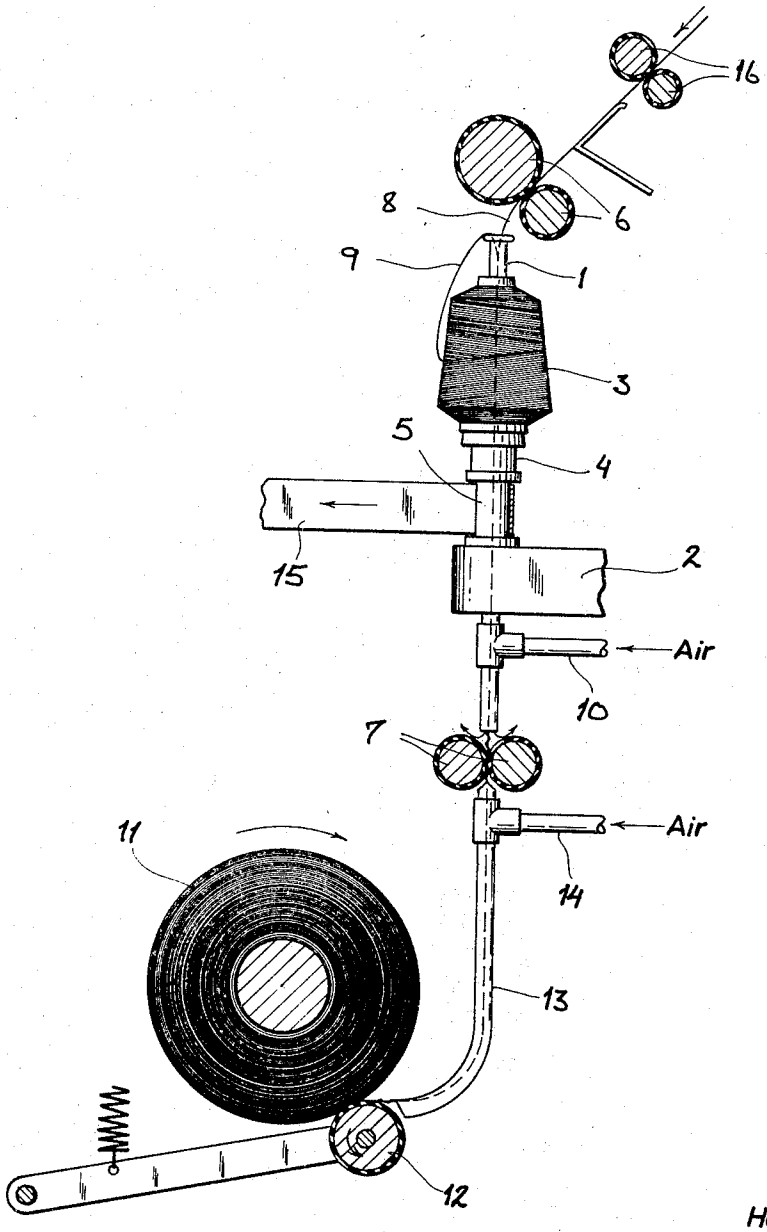
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APPARATUS FOR MAKING CORKSCREW-TYPE YARNS

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APPARATUS FOR MAKING CORKSCREW-TYPE YARNS

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Our present invention relates to an apparatus for making textile threads of the type sometimes referred to as corkscrew yarns or, less accurately, spiral yarns.

This type of yarn consists of an inner, substantially untwisted core thread around which an outer filament, often heavier than the core thread, is helically wound. The winding is conventionally accomplished with the aid of a stationary tube which receives the core thread from a supply mechanism therefor, such as a pair of co-operating feed rollers forming part of a drafting assembly, and to which the outer filament is admitted concurrently with the advancing core thread while being continuously wound around the latter. At the exit end of the tube, traction is imparted to the emerging corkscrew yarn by another set of feed rollers which advance the yarn toward a take-up reel or the like. The tension exerted by these rollers is mainly absorbed by the central core thread which, because of its untwisted state, is relatively weak. This frequently leads to thread ruptures which are wasteful of machine and personnel time.

The general object of our present invention, therefore, is to provide an improved apparatus for the purpose set forth which avoids the drawback just described.

A more particular object of this invention is to provide means in such apparatus for imparting to the composite yarn a forwardly directed force adapted to exert traction not only upon the inner core but upon the surrounding filament as well.

A further object, allied with the preceding one, is to provide means for creating a force of this character which also has a smoothing effect upon the yarn.

The aforementioned objects are realized, in conformity with our present invention, by the provision of suction means connected with the stationary feed tube of an otherwise conventional yarn-forming apparatus in such manner as to create a partial vacuum throughout a substantial part of the length of this tube. The suction means advantageously may take the form of a nozzle communicating with the tube at an intermediate location thereof for injecting into same a fluid stream, preferably air, directed toward the tube exit.

Such a fluid stream generates within the inlet end of the tube a moving air column which, without tending to lengthen the turns of the helical filament, is uniformly effective upon all surface portions of the corkscrew yarn to advance it toward the tube exit where additional traction is imparted by feed rollers operating under reduced tension as compared with conventional systems. We have found that the fluid stream also helps orient the fibers of the core thread in a direction parallel to the thread axis so that a smoother, more homogeneous and more attractive yarn results.

The invention will be described in greater detail with reference to the accompanying drawing whose sole figure diagrammatically illustrates an apparatus embodying the present improvement.

As shown in the drawing, a stationary tube **1** is supported in upright position on a fixed base **2** and serves as an axle for a spool **3** having a spindle **4**. A pulley **5** forms an integral downward extension of spindle **4** and is engaged by a belt **15** driven at constant speed by a motor not shown.

A core thread **8** is delivered to the upper or entrance end of tube **1** by supply means here shown as pairs of rollers **6**, **16** which may form part of a conventional drafting mechanism. A filament **9** is continuously drawn from spool **3** and, together with thread **8**, is gripped by a pair of feed rollers **7** disposed below the lower or exit end of tube **1**. Rollers **7** deliver the composite yarn **8**, **9** to another stationary tube **13** which opens onto a supply reel **11** co-operating with a pressure roller **12**.

The filament **9**, payed out by the spool **3**, is rotated about the core thread **8** at a rate determined by the rotary speed of pulley **5** and by the speed of advance imparted to the yarn by the feed rollers **7**. Since the filament **9** is helically coiled about the thread **8**, the tension exerted upon the yarn by the rollers **7** is absorbed almost exclusively by the central thread **8**. In order to reduce this tension, and to minimize the danger of thread breaks, our invention provides for the admission of a downwardly directed air stream into the tube **1** with the aid of an injection nozzle **10** which is disposed a short distance above the exit end of the tube. A similar nozzle **14** generates a like air stream within tube **13** for the purpose of reducing the traction exerted by roller **12**.

Owing to the fact that ruptures of the thread **8** are unlikely to occur with our improved yarn-forming apparatus, the supply rollers **6** may be moved quite close to the entrance end of tube **1**, advantageously to such an extent that the distance between the upper tube end and the nip of the rollers **6** is substantially equal to the mean sliver length of the thread **8**. This dimensioning further reduces the strain of the thread due to the stress imparted to it by the rollers **7**.

Modifications of the specific structure described and illustrated are, of course, possible without departing from the spirit and scope of our invention as defined in the appending claims.

We claim:

1. An apparatus for making corkscrew-type yarns wherein an outer filament is helically wound around a substantially untwisted core thread, comprising a stationary tube; supply means for continuously delivering core thread to said tube; a source of supply for the filament to be wound around said core thread upon passing jointly with the latter through said tube; feed means beyond said tube for imparting traction to said core thread and filament; winding means at the entrance of said tube for continuously rotating said filament around the advancing core thread; and suction means connected with said tube for creating a partial vacuum throughout a substantial part of the tube length.

2. An apparatus as defined in claim **1** wherein said suction means comprises nozzle means communicating with said tube at an intermediate location thereof for injecting into said tube a fluid stream directed toward the tube exit.

3. An apparatus as defined in claim **2** wherein said location is substantially closer to said exit than to said entrance.

4. An apparatus as defined in claim **1** wherein said sup-

ply means comprises a pair of co-operating rollers disposed ahead of the entrance of said tube.

5. An apparatus as defined in claim 4 wherein the distance between said entrance and the nip of said rollers is substantially equal to the mean sliver length of said core thread.

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