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COMPOSITE PIRN

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Fig. 1.

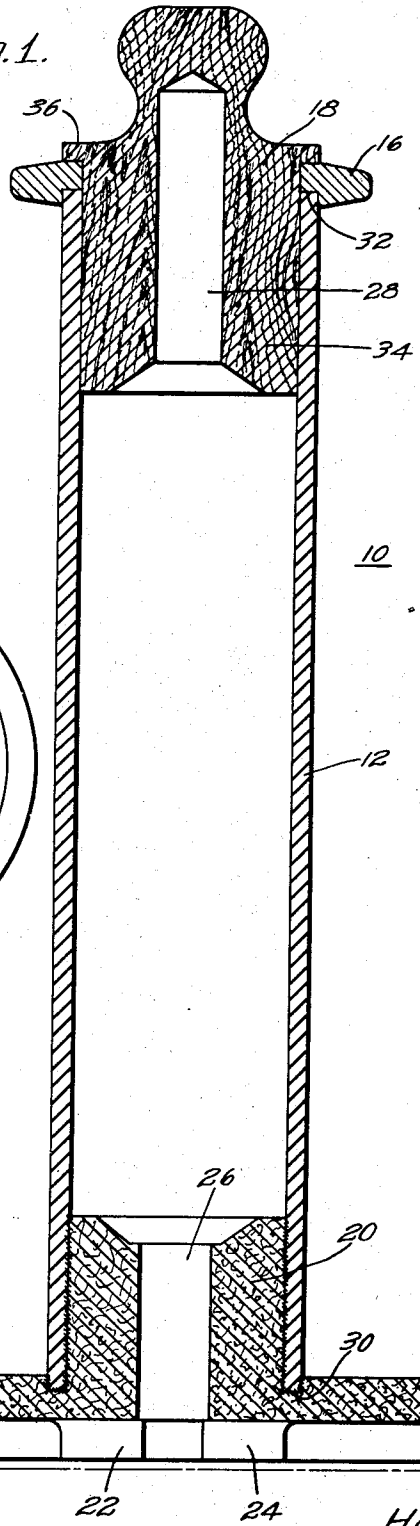
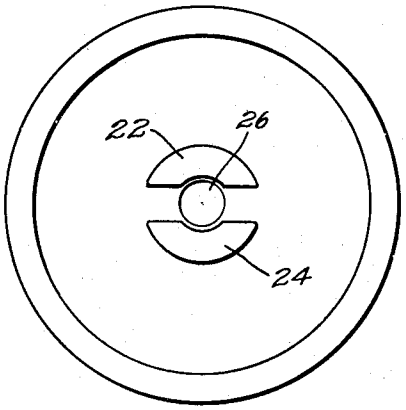


Fig. 2.



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COMPOSITE PIRN

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3 Claims. (Cl. 242—122)

This invention relates to pirns for spinning machines and particularly to composite pirns employed in the making of artificial silk or the like.

The pirns employed heretofore with spinning machines are formed of a plurality of elements assembled into the desired form and mechanically secured in assembled relation. These pirns are rotated at high speeds for winding artificial silk or the like thereon and it has been found that the elements of the pirn tend to work loose under the centrifugal forces encountered during the rotation. With these conditions, it is found that the driving force applied to the pirn is not efficiently transmitted to the spool of the pirn for winding the yarn or thread. Further, the joints between the mechanically secured elements of the pirn frequently catch or snag the yarn which is being wound, thereby often breaking it.

An object of this invention is to provide a pirn of molded material for spinning machines.

Another object of this invention is to provide a composite pirn in which the spool and its base flange are molded into an integral unit to give a smooth working surface and to provide for efficiently transmitting a driving force to the spool.

Other objects of this invention will become apparent from the following description when taken in conjunction with the accompanying drawing, in which

Figure 1 is an elevational view in section of the composite pirn constructed in accordance with this invention, and

Fig. 2 is an elevational end view of the pirn taken along the line II—II of Fig. 1 but drawn on a smaller scale.

Referring to the drawing and Figure 1 thereof in particular, a composite pirn 10 is illustrated constructed in accordance with this invention.

In the figure, a spool or tubular member 12 of fibrous material, such as cloth, paper, or the like, which is impregnated with a synthetic resin such as phenolic urea, or the like, is illustrated for receiving the artificial silk, rayon, or the like, as it is spun. In order to insure the winding of the thread on the spool 12, flange members 14 and 16 are disposed at the opposite ends of the spool projecting radially outward from the spool. The flange members are also of fibrous material impregnated with a synthetic resin and are assembled with the spool 12 in a manner to be described hereinafter. As illustrated, a handle 18 is also provided adjacent the flange 16 for manual manipulation of the composite pirn.

The flange 14 also carries as an integral part thereof a hub portion 20 which projects into the spool or tubular member 12 for supporting it and a plurality of protruding portions or flanges 22 and 24 disposed in spaced relation opposite the hub 20 for engaging a driving member, not shown, of the spinning machine. The protruding portions or flanges 22 and 24 are better illustrated in Fig. 2 as being disposed in spaced relation about an opening 26 which projects through the hub portion 20 for receiving a fixed spindle (not shown) of the spinning machine. The whorl of the spinning machine (not shown) usually carries a horizontal member disposed to fit between the opposed flat surfaces of the protruding portions 22 and 24 for engaging therewith to transmit a driving force to the pirn when it is positioned on the fixed spindle. As illustrated, a recess 28 is also provided in the handle 18 for receiving an end of the fixed spindle when the pirn is positioned on the spindle of the spinning machine. The surfaces of the opening 26 and the recess 28 function as bearing surfaces for cooperating with the fixed spindle as the pirn is rotated thereabout.

In making the pirn, the spool or tubular member 12 is usually rolled upon a mandrel of suitable size from a continuous sheet of the impregnated fibrous material to a desired thickness and then subjected to sufficient heat and pressure to at least partially cure it. By at least partially curing the spool, it is sufficiently rigid to prevent bowing or distortion of the side walls when the flange base 14 is molded thereto.

After the treatment of the spool, it is placed in a suitable mold and the flange base 14 comprising the hub portion 20 and protruded portions 22 and 24 are molded integrally therewith forming a recess 30 for receiving the end of the spool 12. The flange, hub and protruding portions or flanges 22 and 24 are molded from fibrous material, preferably of a comminuted nature, or cotton flock impregnated with a synthetic resin or binder such as phenolic resin, urea resin or cellulose acetate, and when molded under sufficient heat and pressure are found to form an integral unit with the spool member 12, the spool, hub and flange being securely bonded together throughout their contacting and cooperating meeting surfaces.

If the spool is only partially cured prior to the molding of the flange base thereon, the heat and pressure is also applied to the spool to cure it. Where the spool has previously been completely cured, the inner surface of the end of the spool adjacent the hub 20 is suitably knurled or

roughened for interlocking with the resin of the flange base when the base is molded integrally therewith.

In practice, because of molding limitations, it has been found desirable to preform and mold the oppositely disposed flange 16 prior to its assembly with the spool and flange base assembly. The flange 16 may be of any suitable fibrous material impregnated with the synthetic resin, either of a different nature or of the same nature as that in forming the flange base 14. In preforming the flange 16, it is molded under sufficient heat and pressure to the desired form of the flange having a recess 32 molded therein for receiving an end of the spool 12 when disposed thereabout.

In order to maintain the flange 16 in position about the end of the spool 12, the handle 18 having the hub portion 34 for projecting into the end of the spool to support it, is provided with an outwardly extending flange 36 for abutting the flange 16. The handle 18 may be of fibrous material impregnated with synthetic resin similar to the spool 12 or the flange base 14 or, as illustrated, where it is desired to lighten the weight of the assembled pirn, may be of any suitable wood. In order to maintain the handle 18, flange 16 and spool 10 integrally united, the outer surface of the inwardly projecting portion 34 of the handle is suitably coated with an air drying thermoplastic resin so that when disposed with the flange 36 abutting the flange 16 when the flange 16 is in position about the end of the tubular member 12, the thermoplastic resin will dry and securely bond the elements together.

With a composite pirn constructed in accordance with this invention, it is found that the joint between the spool 12 and the flange base 14 is very smooth, thereby preventing the catching or snagging of the thread or yarn by such joint as the yarn is being wound on the pirn. Further, because of the integral bonded junction between the spool 12 and the flange base 14, it is found that the driving force applied to the protruding portion of flanges 22 and 24 even at 8,000 revolutions per minute, is efficiently transmitted to the spool 12, the bond being so secure that the assembled elements may be considered as one unit. Further, because of the strength of the composite molded material, a lighter weight pirn results since the spool 12 may be constructed of extremely thin side walls. The molded material is also substantially unaffected by moisture so that there is less tendency for the formation of surface imperfections such as cracks or roughness as compared to the prior art pirns constructed of wood.

Although this invention has been described with reference to a particular embodiment thereof, it is, of course, not to be limited thereto except insofar as is necessitated by the scope of the appended claims.

I claim as my invention:

1. A composite pirn for spinning machines comprising, in combination, an elongated tubular member formed from lamina fibrous material impregnated with a synthetic resin, flange members disposed at opposite ends of the tubular member and extending outwardly therefrom, one of the flange members consisting of fibrous material impregnated with a binder, a hub portion of the impregnated fibrous material carried by said one of the flange members as an integral part thereof and disposed to project into the tubular member, means carried by said one of the flange members disposed for engagement with a driving member of the spinning machine, said one of the flange members and hub portion thereof and tubular member being consolidated under heat and pressure into an integral unit having a smooth outer surface, the tubular member being integrally united with the projecting hub portion along substantially the entire length of the hub, the other of the flange members being preformed from fibrous material impregnated with a binder and disposed about the other end of the tubular member, means disposed to project into the other end of the tubular member to support it and to form a handle for the assembly, a flange carried by said handle means projecting outwardly to abut said other flange member to retain the flange member positioned about said other end of the tubular member, and means comprising a resinous material associated with the inwardly projecting portion of the handle to bond the handle in assembled relation with the tubular member.

2. A composite pirn for spinning machines as set forth in claim 1 in which the impregnating binder of the fibrous material of the flange members is a synthetic resin.

3. A composite pirn for spinning machines as set forth in claim 1 in which the impregnating binder of the fibrous material of the flange members is a cellulosic binder material.

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