Nov. 15, 1966 L. J. BEINDORF 3,285,528

MANDREL

Filed Aug. 30, 1965

FIG-1

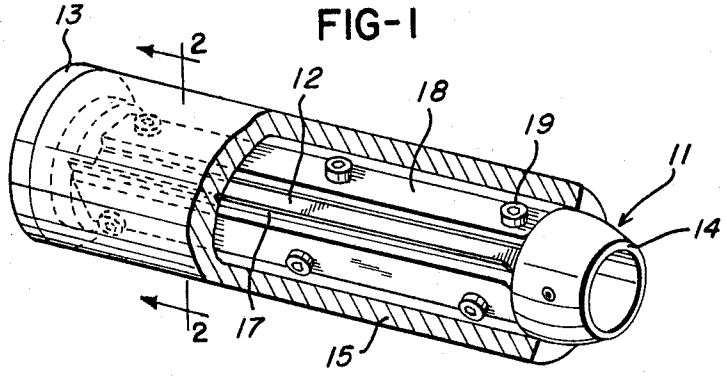


FIG-2

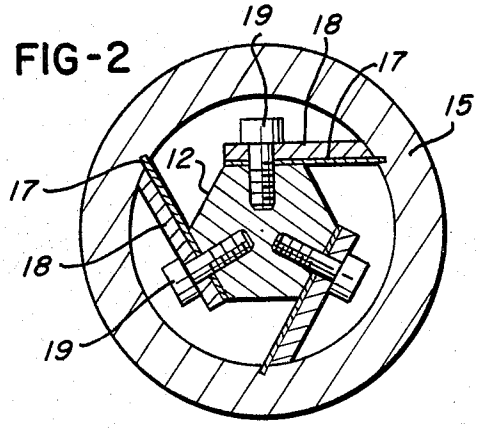


FIG-3

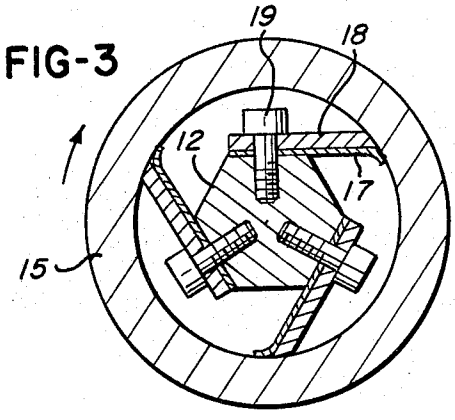
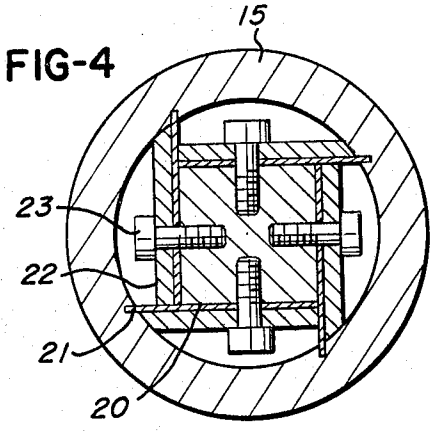


FIG-4



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MANDREL

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This invention relates to a mandrel used for mounting textile spools. More specifically, the present invention is used for supporting the cores for spools and cops used in the textile industry for carrying cord or fabric. The invention greatly simplifies insertion of the mandrel within the core, and removal therefrom.

Cops and spools are conventionally mounted on cardboard cores which must be placed over a holding mandrel when the fabric or cord is removed or placed on the core. In the prior art such mannrels, in order to make them fit tightly, are driven into the core and are subsequently very difficult to remove. In accordance with the present invention a mandrel has been devised which is simple to install, equally simple to remove, and yet grips the interior of the core tightly during operation. This is accomplished in the present invention by mounting a series of flexible spring steel strips longitudinally of the mandrel so that these strips dig into the cardboard interior of the core and yet are sufficiently flexible so that when rotated in the proper direction the digging action is nullified. Suitable structure of the remainder of the mandrel makes this feasible.

It is, therefore, a principal object of this invention to provide a mandrel for cores which is easy to insert and remove.

It is a further object to lock the core in place during operation.

These and other objects of the invention will be more readily understood in accordance with the following specification, claims, and drawings, in which:

FIGURE 1 is a perspective view of the novel mandrel in partial section.

FIGURE 2 is a sectional view of the mandrel taken along lines 2—2 of FIGURE 1.

FIGURE 3 is a view similar to FIGURE 2 illustrating the mandrel in a different position.

FIGURE 4 is a view similar to FIGURES 2 and 3 illustrating a modified form of the invention.

Referring now to the drawings, mandrel **11** consists essentially of a central supporting member **12** in the shape of a bar having a hexagonal cross section. This member is preferably made of steel, aluminum, or other suitable metal, but may also be made of any of the various high-impact plastic materials. At one end of the mandrel is a collar **13** and at the other end is a tapered nose member **14**. In use, this mandrel is inserted within a paper or cardboard tube **15** which serves as a spool upon which is wound cord or thread of the type used in various textile processes. Mounted on alternate flat faces of the central member **12** are three spring steel strips **17** which extend longitudinally of the mandrel. These strips are preferably very thin, about .010 inch, and are retained on the central member **12** by means of three backing plates **18** which are mounted directly on the steel strips, both of which are fastened to the central member by means of bolts **19** or other suitable fastening means. As is noted in FIGURE 2, the plates **18** are somewhat thicker and stiffer than the strips **17** and are also shorter and tapered at their free ends so that they just barely ride within the inner surface of the core **15**. The strips **17** extend about $\frac{3}{32}$ inch beyond the backing plates. This is sufficient to permit the extended portions to dig into core **15** when the

mandrel is inserted. The plates and strips both extend beyond the central member in a radial direction, and thus the plate prevents the extended portions from bending in one radial direction, but permits them to bend in the other direction. The edges of these strips will dig slightly into the cardboard when the mandrel is inserted longitudinally of the core, and thus lock the core tightly on the mandrel, and keep it locked during normal operation. During this normal operation the nose **14** and the collar **13** are usually held by conventional retaining members so that the main body of the mandrel is free to rotate and permit removal of the cord.

FIGURE 3 illustrates the relative position of the mandrel and core when it is desired to remove the core **15** from the mandrel. When this removal is desired, it is only necessary to rotate the core clockwise as shown, which places a force against the protruding portions of the strips **17**, causing them to bend away from the retaining strips **18**. This frees the core, since the strips are no longer digging into it, and a simultaneously clockwise rotation and pull is all that is required for simple removal of the core. This type of simple action is in contrast to the holding action of FIGURE 2. As seen in FIGURE 1, the forward corners of the strips **17** are rounded to permit easier mounting of the mandrel in the core. The rear corners are sharp in order to further resist any tendency of the core to be accidentally removed until rotation of the mandrel to permit the desired removal.

FIGURE 4 illustrates a modified form of the invention in which the central member **20** of the mandrel has a square cross section rather than a hexagonal one. In this instance there are four flexible strips **21** and four backing plates **22** all held in place by the screws **23**. This assembly is inserted within the core **15** as before and a similar action occurs; namely, the digging in of the strips into the core. In this case, however, four strips provide the locking action which may have certain advantages for heavy duty mandrels. In addition, a square cross section bar may have economical advantages over other sections. It should be noted that the true square cross section of member **20** may be modified by slightly relieving the sharp edges, in order to permit further bending of the strips **21** away from the backing plates **22**.

Other modifications may be made in the design while still falling within the scope of the invention.

What is claimed is:

1. A mandrel for supporting a textile spool having a resilient hollow tubular core, comprising a longitudinally extending support member, a plurality of radially spaced flexible members mounted on said support member, and backing plates mounted on said flexible members, said plates and said flexible members extending beyond said support member in a radial direction.

2. The mandrel of claim **1** in which a portion of said flexible members extends beyond said backing plates into the inner surface of said core.

3. The mandrel of claim **2** in which said support member has a hexagonal cross section.

4. The mandrel of claim **2** in which said support member has a square cross section.

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