

[54] **CORE SUPPORTING AND LOCKING MEANS**

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[22] Filed: **Nov. 18, 1970**

[21] Appl. No.: **90,708**

[52] U.S. Cl. **242/68, 242/55.2, 242/68.3, 269/52, 279/1 B, 279/1 K**

[51] Int. Cl. **B65h 17/02**

[58] Field of Search.....**242/68, 68.1, 68.3, 46.6, 55, 242/55.2; 269/47-52; 279/1 K, 1 R, 1 ME, 1 T, 2, 5, 6, 77**

[56] **References Cited**

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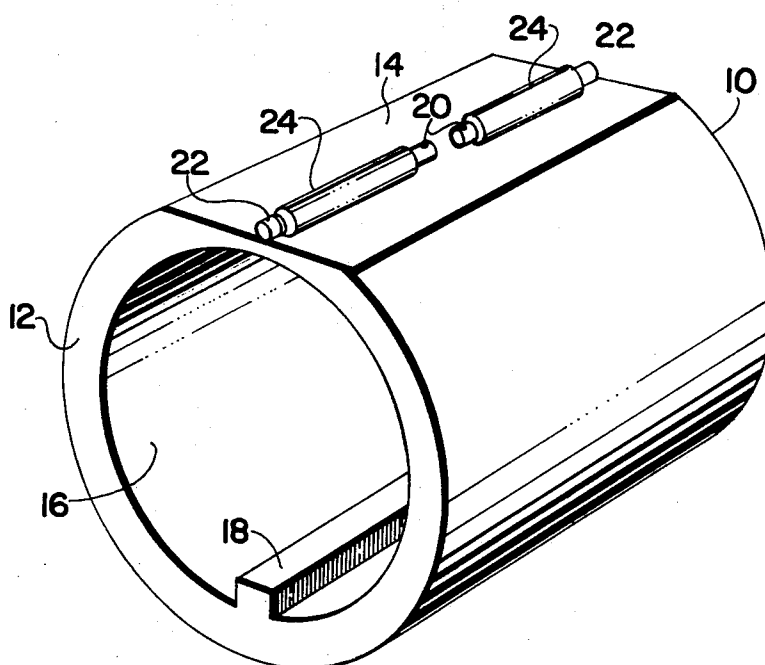
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[57] **ABSTRACT**

A substantially cylindrical mandrel for supporting a core upon which a roll of web material is to be wound has a flat portion over part of its peripheral surface. A plurality of locking members are pivotally mounted on the flat portion so that pivotal movement of these members transversely of the flattened area effects a locking relationship between the core and the mandrel.

3 Claims, 3 Drawing Figures



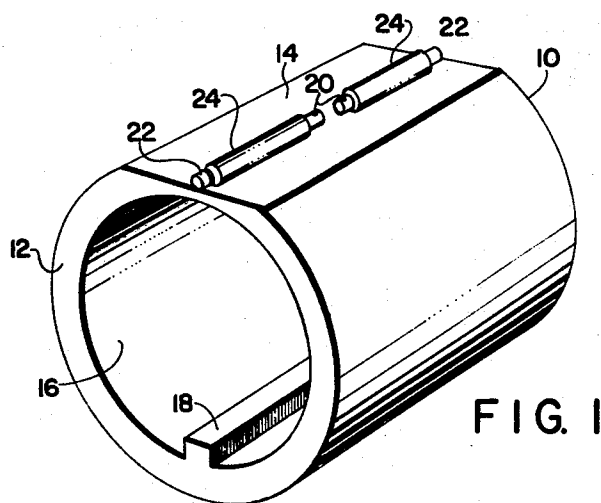


FIG. 1

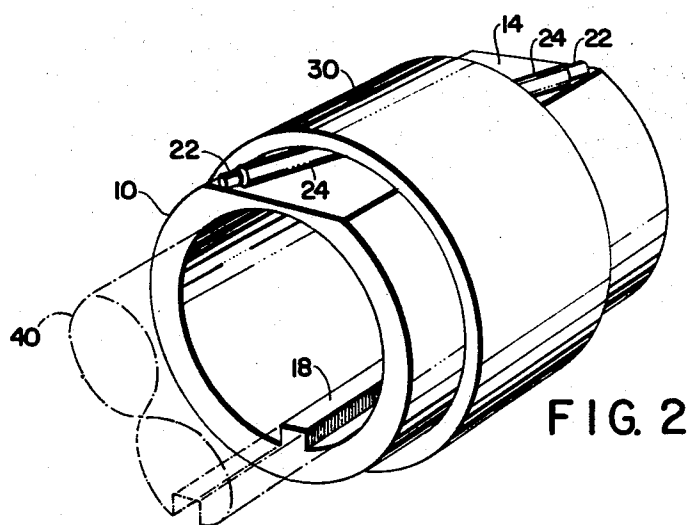


FIG. 2

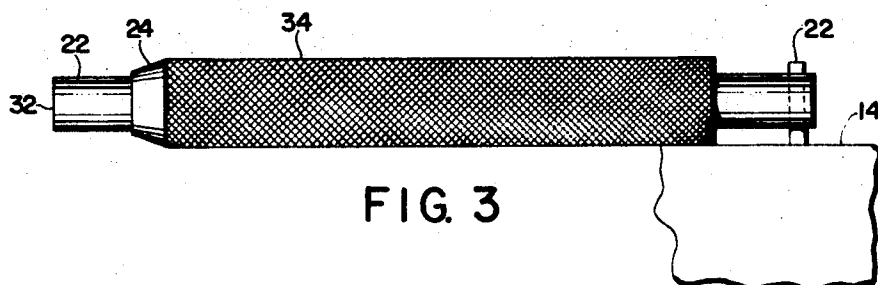


FIG. 3

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CORE SUPPORTING AND LOCKING MEANS

BACKGROUND OF THE INVENTION

Rolls of web material generally utilized in the coating industry, as, for example, in the printing of newspapers or the preparation of finished paper products, are usually secured in an environment which includes a mechanism for winding or unwinding such material from a tube or core member with high reliability. In the photographic industry, for example, synthetic plastic materials which are designed to be utilized as substrata for the deposition of various photographic layers must be capable of being wound and unwound with utmost precision. Typically, core members are fixed to mandrels which are generally held, in some fashion, to a shaft which is either removably positioned on axially spaced bearings or in a cantilevered configuration. In an unwind position, a fully loaded core member carried on a suitable mandrel is attached to the unwind shaft and a pellicle thereof is conducted therefrom through the machine which is to perform an operation on the material comprising such pellicle. At the other end of the machine, after the operation has been performed, the material is wound on a second core member similar to the first.

In numerous photographic applications, as, for example, conventional photographic film slitting, core members are axially aligned in close proximity to one another along a common shaft. Continuous sheets may be slit and the resultant cuts individually wound on discrete core members by winding adjacent cuts in two separate planes onto mandrel-carried core members which are positioned along rewind shafts to accommodate various cuts of material. It will be appreciated that with the extremely high precision necessitated by such operations, it is very desirable to facilitate intimate fixation between each core member and the mandrel on which it is supported.

OBJECTS OF THE INVENTION

The primary objective of the present invention is to provide an improved mandrel which provides intimate non-slipping contact between the periphery thereof and a core member contained thereon.

Another object of the present invention is to provide a mandrel of the above-denoted type which is economical to fabricate, reliable in use, and prevents not only radial slippage of a core member contained thereon but also prevents axial slippage.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the apparatus possessing the construction, combination of elements and arrangement of parts which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

SUMMARY OF THE INVENTION

In accomplishing the above-denoted objects of the present invention, there is provided a substantially cylindrical mandrel which includes an orifice for the axial insertion of a support shaft and means for controlling radial slippage between said mandrel and said shaft, as, for example, a conventional male-female keyed mechanical system. Axial slippage control may

be provided, if necessary, by conventional means, such as, for example, a set screw, etc.

The cylindrical mandrel of the present invention includes a flat area on the external periphery thereof, such flat area containing two pivotally mounted locking members depending from radial pivot means attached to said surface, said locking members being capable of being aligned to a substantially axial position. The pivotally mounted locking members' points of attachment to the body of the mandrel are generally located on the flat surface distal from the axial extremities thereof in order to provide that the unfixed extremity of each locking member depending therefrom is accessible to an operator when a core member is in place on the mandrel; that is to say, that each of the pivotally connected locking members are capable of pivoting in a radial direction and extend from their attachment points in an axial direction sufficiently to protrude from under each side of a seated core member toward the axial extremities of the mandrel. The two locking members which comprise the mandrel of the present invention pivot from points which may or may not be axially aligned according to the desires of the operator.

In the preferred embodiment of the present invention, the locking members comprise a pivotal shaft having mounted thereon a knurled rotatable sleeve. The shaft extends a sufficient distance beyond the periphery of any core member used therewith in order to allow its manual rotation about each pivot point in order to place the knurled sleeve member in intimate contact with the flat surface of the mandrel and the core member.

BRIEF DESCRIPTION OF THE DRAWING

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing wherein:

FIG. 1 is a perspective illustration of the mandrel of the present invention;

FIG. 2 is a perspective illustration of the mandrel depicted in FIG. 1 displaying a core member in locking engagement therewith; and

FIG. 3 is a preferred locking member comprising a knurled rotatable sleeve mounted on a pivotal shaft.

DETAILED DESCRIPTION OF THE INVENTION

A more complete understanding of the present invention may be appreciated with reference to the drawing wherein FIG. 1 illustrates the mandrel 10 of the instant invention comprising a cylindrical body 12 having on the outer periphery thereof a flat surface area 14. Integral with the internal periphery 16 of the mandrel 10 is a key element 18 which is capable of mating with a female member comprising a support shaft 40, shown in dotted lines in FIG. 2, of a diameter which will provide a tight fitting relationship between the external periphery of such shaft and the internal periphery 16 of mandrel 10. Radially depending from flat area 14 are fixed pins 20 from which are pivotally mounted locking members 22, each of which comprise rotatable sleeve members 24.

Referring now to FIG. 2, core member 30 is illustrated in locking engagement with mandrel 10. In ac-

tual operation, core member 30 is slipped onto mandrel 10 while locking members 22 are in a substantially axial position. When the core member 30 has been precisely positioned on the mandrel 10 according to the desires of the operator, the operator then pivots locking members 22 in opposite, substantially radial directions to provide a tight, intimate engagement of sleeve member 24 of each locking member 22 between the core member 30 and surface 14 of mandrel 10. The entire unit is then inserted on a shaft member, such as 40, which is placed in locking engagement either with key member 18, or any similarly functional conventional locking or clutching mechanism, and is positioned in either the unwind or rewind environment in which its use is intended. At this point, the operator may pivot locking members 22 toward the axial position in order to realign core member 30 if necessary and then relock core member 30 in place as described above.

Viewing FIG. 2 it will be appreciated that force components applied to core member 30 by a web material either wound thereon or unwound therefrom, of any conceivable vector, will not be capable of providing a relative motion between core member 30 and mandrel 10, and the rate of wind or unwind may be accurately controlled by the shaft upon which mandrel 10 is mounted or clutching mechanism, if utilized. For example, assuming that an unwinding web material provides an angular force component in a clockwise direction, the locking member 22 denoted on the right side of the mandrel would prevent any relative motion between the core member 30 and mandrel 10. Likewise, a counterclockwise force will be unable to induce relative motion between core 30 and mandrel 10 due to the restraining action of left locking member 22. In numerous instances it will be appreciated that applied forces may be encountered due to structural inaccuracies and power surges which induce force components on the rewind or unwind members in other than a radial direction. In such instances, it will be appreciated that substantially axial moments of force will be induced. The present invention, however, takes this into account and obviates the effects thereof. For example, in the event that a force component acts in an axial direction toward the left side of the mandrel 10, the locking member 22 on the right side of the mandrel will restrain any relative moment between core member 30 and

mandrel 10. If the axial force component acts in the other direction, the left locking member 22 will restrain any relative motion.

Referring now to FIG. 3, a preferred locking member 22 is depicted comprising a shaft 32 on which rides a rotatable sleeve member 24 having knurls 34 machined or forged into the outer periphery thereof. Shaft 32 extends from pivotal pin 20, which depends from flat surface area 14, partially shown.

While the preferred embodiment of the present invention has been described in detail, it must be appreciated that numerous alterations may be made according to the desires of the operator without departing from the ambit of the instant invention. As has been aforementioned, clutching means may be utilized in lieu of the depicted mechanical interlock. Furthermore, the denoted locking members may comprise units wherein the entire locking member rotates from a pivotal point which restrains only its axial movement. In addition, in the event flat surface 14 of the mandrel is of a substantially soft material which might be damaged by a knurled locking member of the preferred embodiment, it may be surfaced with a hard metallic or synthetic plastic material.

Since certain changes may be made in the above apparatus without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A mandrel comprising a substantially cylindrical core member support having a flat area in its outer periphery and having, depending from said flat area, pivotally mounted locking members disposed, upon rotation transverse to said flat area, to provide a locking relationship between said outer periphery and a core member mounted thereon.

2. The invention of claim 1 wherein said mandrel comprises an integral interlocking means for tightly associating with a shaft member upon which it may be mounted and preventing radial motion of the mandrel relative to the shaft.

3. The invention of claim 1 wherein said locking members comprise cylindrical shafts having knurled sleeve members rotatably mounted thereon.

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