Feb. 17, 1953 G. M. ALLEN 2,628,406

THREAD STORAGE-THREAD ADVANCING DEVICE

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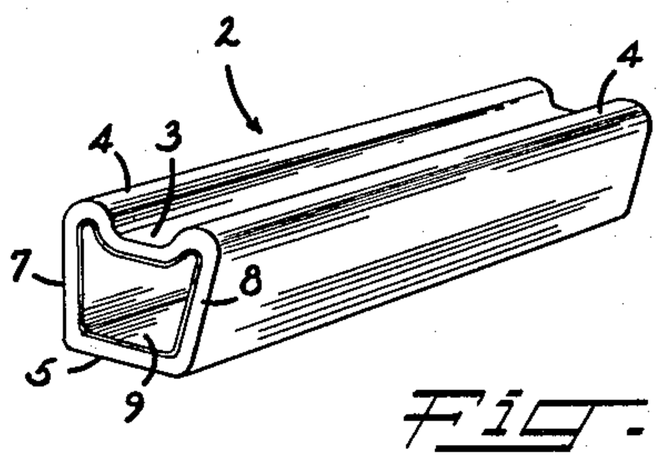


Fig. 1

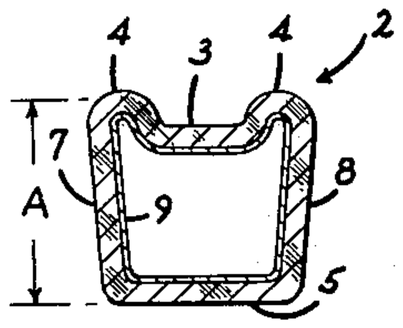


Fig. 2

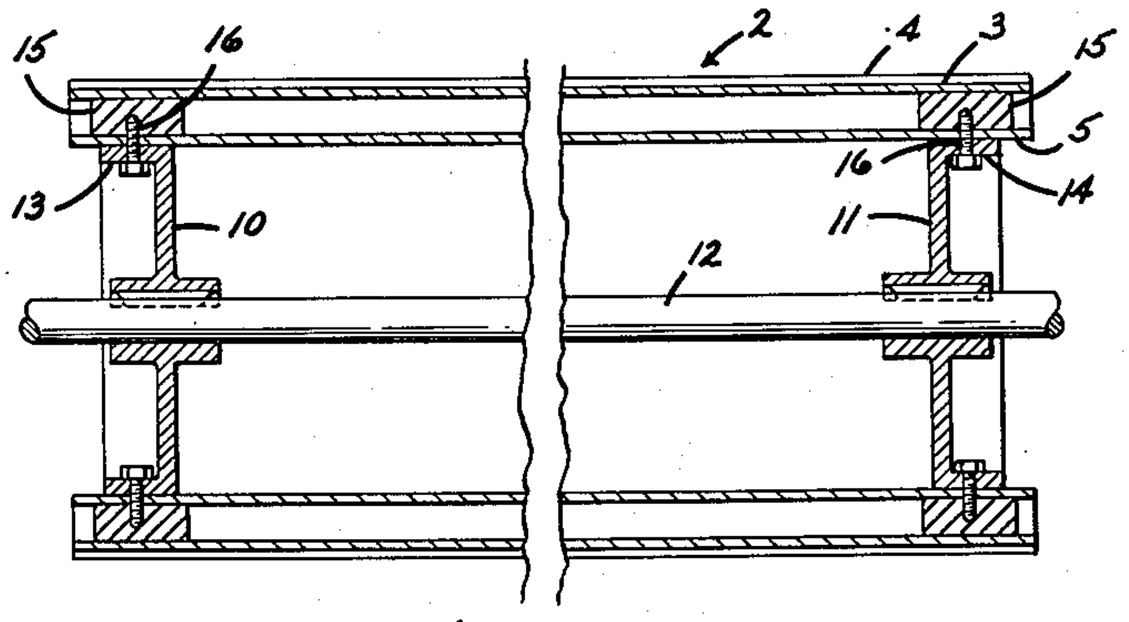


Fig. 4

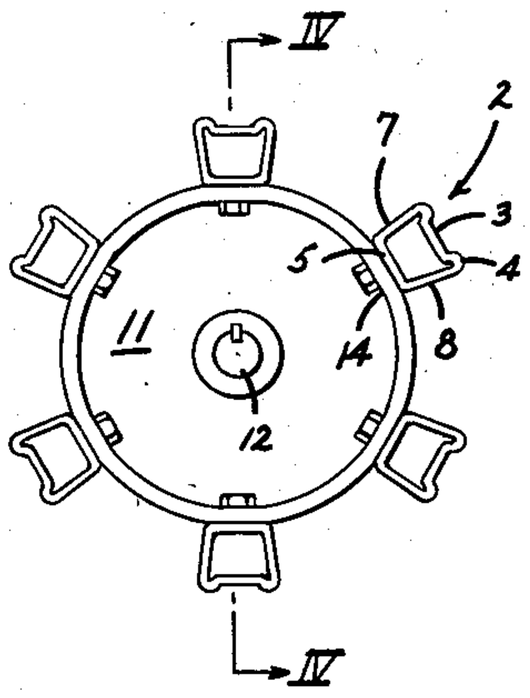


Fig. 3

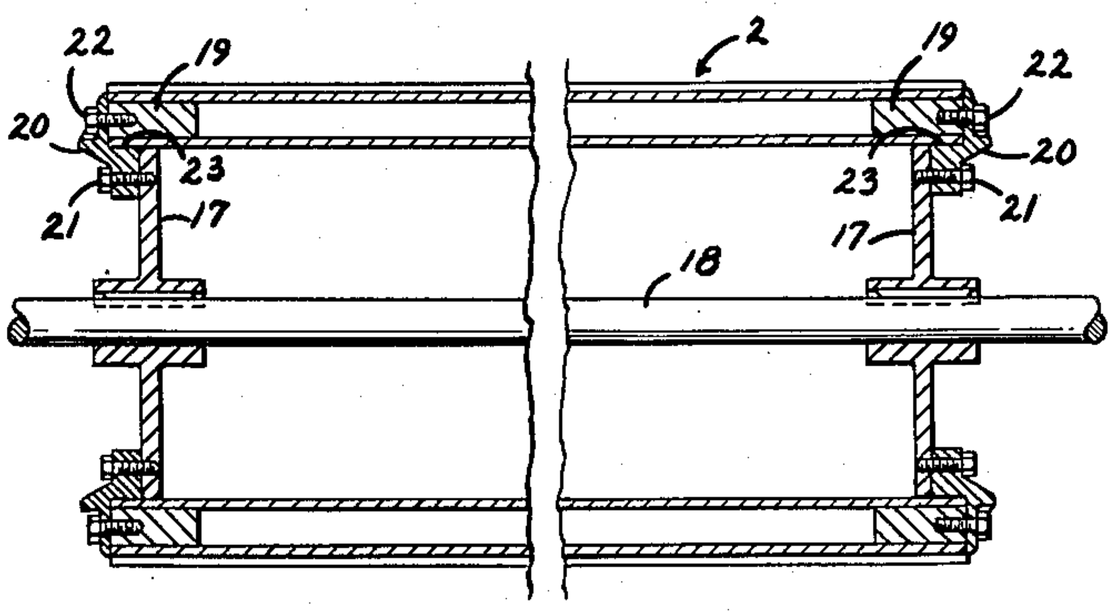


Fig. 5

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## THREAD STORAGE-THREAD ADVANCING DEVICE

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4 Claims. (Cl. 28—71.6)

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This invention relates to improvements in thread storage-thread advancing devices and to thread supporting bars for use in thread storage-thread advancing devices.

Thread storage-thread advancing devices are means common in the art for forming a thread store comprising a plurality of spaced turns of thread that are advanced along the device. Such devices have many uses, an important one being the manufacture and processing of rayon thread made by the viscose process during which, the thread is subjected to various chemical treatments such as washing, desulfurizing, bleaching and the like. Turns of thread are treated with the various liquids and at various temperatures while the turns of the thread are advanced in an axial direction along the thread storage-thread advancing device. The nature of the treating liquids used and the temperatures at which they are used presents a serious corrosion problem.

In order that the turns of thread may be kept separate and advanced along the thread storage-thread advancing device at a uniform rate, it is necessary that the device be made accurately and the dimensions maintained during its operation.

It is found in actual practice where the parts of thread storage-thread advancing devices are made of corrosion resistant plastic by molding or the like, the manufacture is expensive and it is difficult to make the parts accurately without some warping, and further it is difficult to maintain the dimensions of the parts during operation. As treating liquids are used at different temperatures, parts of the device are subjected to different degrees of expansion, which vary the dimensions of the device. Also, as in the production of rayon thread by the viscose process, the device may be subjected to a number of chemicals that are corrosive and some of which may react with plastic parts or form deposits thereon which are difficult to remove.

This invention has for its principal object to provide thread supporting bars for thread storage-thread advancing devices and mounting means for thread supporting bars that overcome objections and disadvantages found in devices and thread supporting bars in the prior art.

Another object of the invention is to provide thread supporting bars for thread storage-thread advancing devices that are relatively inexpensive to manufacture accurately that have thread supporting surfaces that are hard and smooth, that are non-corrosive to chemicals

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with which thread may be treated, and the dimensions of which may be maintained during operation.

A further object of the invention is to provide thread supporting bars for thread storage-thread advancing devices the lengths of which devices are several times their diameter, each bar being hollow and having a continuous unbroken thread supporting portion and a separate base portion spaced therefrom for securing the bar in position in the thread storage-thread advancing device.

Other objects and advantages of the invention will in part be obvious and others will be apparent from the following description and the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of a thread supporting bar embodying this invention;

Fig. 2 is a cross section of the thread supporting bar shown in Figure 1;

Fig. 3 is an end view of a cage-like member of a thread storage-thread advancing device embodying this invention;

Fig. 4 is a sectional view of the cage-like member of a thread storage-thread advancing device shown in Figure 3, the section being taken on the line IV—IV in Figure 3.

Fig. 5 is a sectional view of a cage-like member of a thread storage-thread advancing device that embodies another form of the invention.

The present invention comprises novel thread supporting bars and mounting means therefor, for use in a thread storage-thread advancing device comprising a pair of cage-like members each having a plurality of circumferentially spaced longitudinally extending thread supporting bars, the length of the thread supporting bars being several times the diameter of the cage-like members. The cage-like members are mounted to rotate together with the thread supporting bars of one positioned between the thread supporting bars of the other. The axis of one cage-like member is laterally spaced from the axis of the other and the axis of each cage-like member extends within the periphery of the other cage-like member. The thread supporting bars are supported adjacent one end or at spaced intervals to parts of the respective cage-like members and means are provided for moving the bars of one of the cage-like members in a longitudinal direction relative to the bars of the other cage-like members.

The thread storage-thread advancing device with which this invention may be embodied may

be either single end or double end supported of any of the types which are well known in the art such as that shown in the patent to Stanley et al. 2,403,031, July 2, 1946.

The thread supporting bars of this invention are hollow, rigid, longitudinally extending members of glass, noncorrosive, fused ceramic material or the like that is homogeneous throughout. The cross section of the bar is substantially uniform throughout its length. The bar comprises a hard smooth continuous unbroken top portion having one or more thread contacting portions and spaced therefrom a base portion by which the bar may be secured in position in the cage-like member. The top portion and the base portion are connected together by spaced apart side portions that are integral with the top and base portions. The bars are preferably made from preformed, hard smooth surfaced, uniform, hollow tubing of glass or the like that is homogeneous throughout. The bars may be formed by heating the tubing and expanding it against a mold or by heating the tubing and shrinking it on a mandrel of the desired cross section. The resulting bar is rigid and has a hard smooth continuous unbroken outer surface that is noncorrosive and resistant to abrasion.

The hollow bar may be reinforced from the inside by a layer of cellulose acetate, vinyl resin or the like plastic, adhered to the inner wall of the bar. Natural fibers or synthetic fibers such as rayon, glass, or the like, or fine wire may be incorporated in the plastic to further reinforce the glass. Additional reinforcing may be provided such as a tubing or solid rod positioned within the bar and extending substantially the length of the bar. The cross section of the outer periphery of the reinforcing may be substantially that of the inner periphery of the bar to closely fit therewith. The reinforcing may be fixed to the interior of the bar by plastic or other adhesive. A pigment may be added to the plastic, such as black, or other dark color or white, so that the threads supported by the bar may be readily seen.

Each bar is attached to parts of the cage-like member by longitudinally extending spaced anchoring blocks or by a single anchoring block positioned in the bar against the base portion of the bar. The base portion of the bar is secured to parts in the cage-like member by screws that extend through the base portion and into the blocks or by screws that extend into the ends of blocks positioned adjacent the ends of the bar. With this attaching arrangement only the base portion of the bar is pressed against the supporting means in the cage-like member. The bars being hollow are relatively light in weight, but are sufficiently rigid due to their cross section that they are practically free from distortion during operation.

Thread storage-thread advancing devices embodying the present invention may be used in handling thread, yarn, ribbon, bands, tow and the like, and wherever the term thread is used herein before or hereinafter it is intended to be inclusive.

Referring to Figures 1 and 2 of the drawing, reference character 2 indicates generally a form of thread supporting bar embodying this invention. The thread supporting bar is a hollow, rigid, longitudinally extending member of glass, noncorrosive fused ceramic ware, or the like that is homogeneous throughout with a continuous smooth, hard outer surface and a cross section



that is uniform. The perpendicular distance between the bottom of the base portion and the thread contacting surfaces of the top portion indicated by reference character A in Figure 2 is practically constant throughout the length of the bar. The bar comprises a smooth, continuous unbroken top portion 3 having thread contacting portions 4 and spaced therefrom a base portion 5 by which the bar may be secured in position in the cage-like member. The top portion and the base portion are connected together by flat, spaced apart side portions 7 and 8 that are integral with the top and base portions. In order to further reinforce the thread supporting bar for safety purposes, a rigid metal tube or rod, or a layer of tough elastic plastic 9 is firmly anchored to the interior surfaces of the bar by an adhesive or the like. The plastic layer may be of cellulose acetate, vinyl resin or the like. The plastic layer may be preformed and adhered to the inner surface of the bar by cement or by chemical adhesive properties of the plastic, or the plastic either molten or in a solvent may be uniformly applied to the inner surfaces of the bar and dried or otherwise allowed to solidify. The bar may be further reinforced by the addition of natural or artificial fibers or filaments or fine wire to the plastic. In the event the bar is cracked or broken during operation, the reinforcing adhering to the bar throughout its interior will prevent pieces of the bar from being thrown out. In order to make the portions of the thread supported on the bar clearly visible, pigment, such as carbon black, titanium dioxide, or other pigment of a color contrasting to the color of the thread to be supported may be added to the plastic or adhesive. The reinforcing being applied to the interior of the bar does not contact the thread and is not subject to wear or corrosion. Also, the reinforcing does not interfere with the mounting means for the bar. The bars are mounted and fixed in position on supporting members of the cage-like members of the device by means of the base potrions.

In Figure 4 of the drawing is shown a cage-like member of a thread storage-thread advancing device embodying the invention. The longitudinally spaced circular disk-like supporting members 10 and 11 are keyed to the rotatable shaft 12 that is mounted in suitable supporting bearings that are not shown. The disk-like members are formed at their peripheries with axially extending generally circular flanges 13 and 14. The bar members are circularly spaced apart and are supported on the flange members with the lower surface of the bottom portion of the bars in engagement with the outer periphery of the flanges. The portions of the flanges in engagement with the lower surface of the bars are flattened to engage the entire width of the bars throughout the length of the flange members. Anchoring blocks 15 of durable plastic, metal or the like that closely conform to the inner cross section of the bars are fitted into the bars in regions adjacent the flanges. Bolts 16 that pass through aligned holes in the bottom portions of the bars and the flange members are screwed into tapped holes in the blocks firmly anchor the bars to the flange members. With this arrangement the top portions of the bars are continuous and are unbroken by any drilled holes or other means for securing the bars to supporting means which would weaken the bars and interfere with the thread supported on the bar.

In Figure 5 of the drawing a portion of a section

of a cage-like member of a thread storage-thread advancing device is shown having mounting means for the thread supporting bars that embody another form of the invention. Reference character 2 indicates the thread supporting bar which is of the same type as that shown in Figures 1 to 3 inclusive. The cage-like member comprises a plurality of the thread supporting bars that are circularly spaced and are fixed adjacent each end to the circular disk like members 17 are keyed to the shaft 18. The shaft is rotatably supported in suitable bearings that are not shown. Anchoring blocks 19 of durable plastic, metal or the like that closely conform to the inner cross section of the bars are fitted into the ends of the bars. The bars are clamped to the periphery of the disk-like members through the anchoring blocks by means of the L-shaped brackets 20. The brackets are bolted to the disk-like members adjacent the peripheries thereof and to the anchoring blocks by bolts 21 and 22. The bars are supported through the base portions of the bars which are clamped against the peripheries of the disk members and the inner surfaces 23 of the laterally extending portion of the brackets. With this arrangement no holes need be bored in any portion of the bar members so that all outer portions of the bar have a continuous unbroken surface throughout.

If desired, such as in a single end supported thread storage-thread advancing device, the bars may be supported in the cage-like member at only one end to a disk-like member positioned adjacent that end.

While preferred embodiments of the invention have been shown and described, it is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A thread supporting bar for a thread storage-thread advancing device comprising a hollow longitudinal extending member of glass having a smooth continuous unbroken top portion provided with a thread contacting portion thereon, a base portion spaced from the top portion by which the bar may be supported, spaced apart side portions connecting the top portion and the base portion that are integral with the top and base portions, and a reinforcing layer of tough elastic plastic material adhered to the inner surfaces of the top, bottom, and side portions of the bar said plastic material having reinforcing fibers therein.

2. A thread storage-thread advancing device comprising a hollow longitudinally extending thread supporting bar of glass having a smooth continuous unbroken top portion provided with a thread contacting portion thereon, a base portion spaced from the top portion, and spaced apart side portions connecting the top portion and the base portion that are integral with the top and base portions, a supporting member, means for mounting the bar in the device on the supporting member comprising an anchoring member extending within the bar and in engagement with the base portion, and means for securing the anchoring member to the supporting member with the base portion of the bar clamped between the anchoring member and the supporting member.



3. A thread storage-thread advancing device comprising a hollow longitudinally extending thread supporting bar of glass having a smooth continuous unbroken top portion provided with a thread contacting portion thereon, a base portion spaced from the top portion, and spaced apart side portions connecting the top portion and the base portion that are integral with the top and base portions, a supporting member, means for mounting the bar in the device on the supporting member comprising an anchoring member extending within the bar and in engagement with the base portion, and means extending through the base portion of the bar for securing the anchoring member to the supporting member with the base portion of the bar clamped between the anchoring member and the supporting member.

4. A thread storage-thread advancing device comprising a hollow longitudinally extending thread supporting bar of glass having a smooth continuous unbroken top portion provided with a thread contacting portion thereon, a base portion spaced from the top portion and spaced apart side portions connecting the top portion and the base portions that are integral with the top and base portions, a supporting member, means for mounting the bar in the device on the supporting member comprising an anchoring member extending within the bar and in engagement with the base portion and means for securing the anchoring member to the supporting member with the base portion of the bar clamped between the anchoring member and the supporting member comprising a bracket member having a portion secured to the supporting member and an offset portion positioned at the end of the bar and secured to the anchoring member.

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