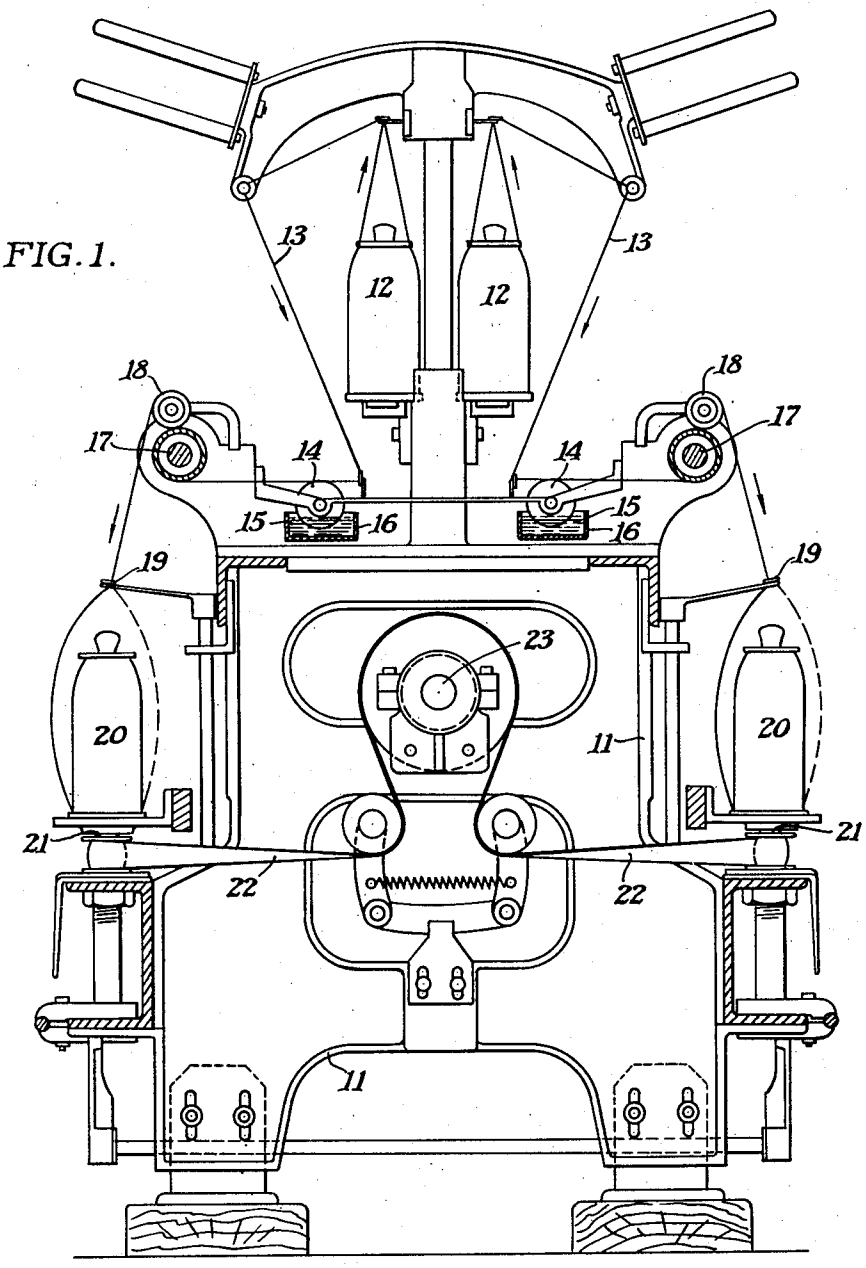
July 11, 1950 P. J. GALBREATH 2,514,634

MULTISECTION YARN FEEDING ROLL

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FIG. 1.



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Filed Oct. 26, 1948 2 Sheets-Sheet 2

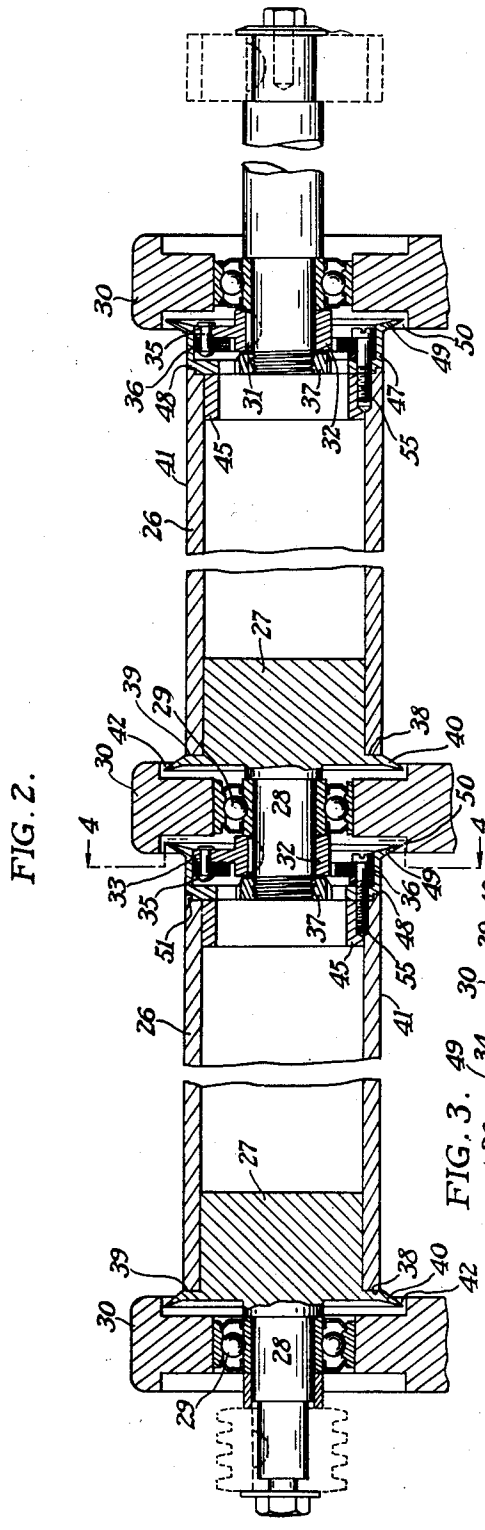


FIG. 2.

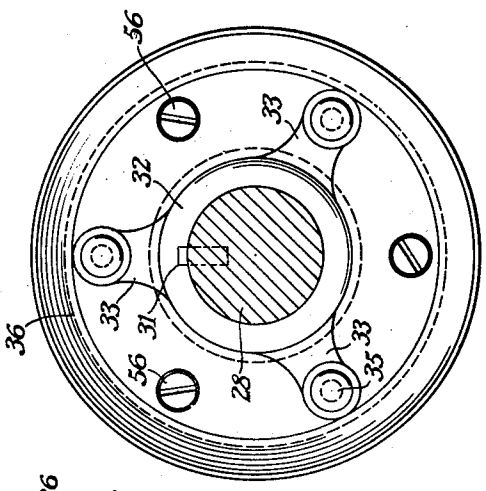


FIG. 4.

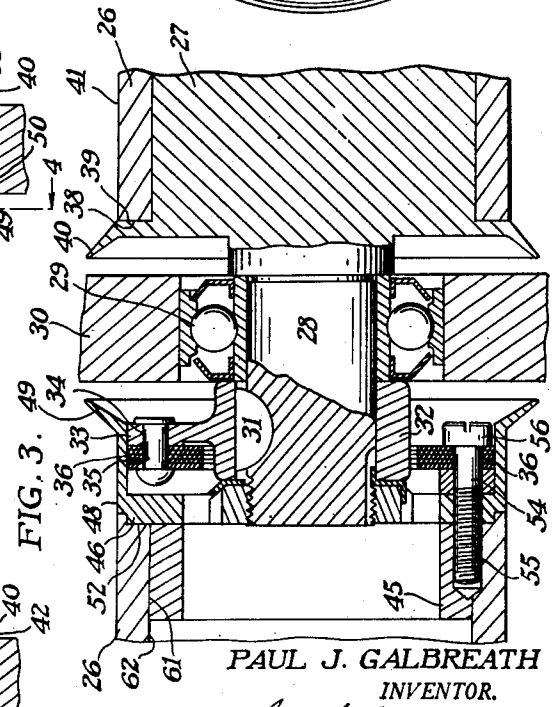


FIG. 3.

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MULTISECTION YARN FEEDING ROLL

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12 Claims. (Cl. 57—90)

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The present invention relates to textile machines, and more particularly to a yarn twisting machine.

In the manufacture of yarns, the latter may be unwound from a supply spool, passed over a feed roll, twisted and finally wound upon a bobbin. The feed roll is usually in the form of a rapidly rotating shaft around which the yarn passes on its way to the bobbin. In prior machines, this shaft comprised a single solid member which ran the full length of the machine, which often exceeded forty feet in length. When such a machine is set up initially, the shaft, as well as the other parts of the machine, is lined up as perfectly as is humanly possible. After a period of time, however, it is often found that the shaft may be out of alignment. This misalignment may result from uneven floor settling, as is well known, and will cause uneven wear on the bearings. The result is that small particles of metal from the worn bearings will work their way along the shaft, and will be picked up by the moving yarn to contaminate the latter, the disadvantages of which are apparent.

In order to overcome the difficulties due to such misalignment, the present invention provides a feed roll or shaft which is made up of a plurality of separate sections which are connected together by flexible or yieldable couplings which permit slight misalignments of the sections without interfering with the proper operation of the shaft. Thus, the sections may move separately and independently while maintaining the sections in connected relation to provide a unitary rotating feed shaft. It must be remembered, however, that such misalignments are quite small so that the various shaft sections may adjust themselves to cooperate for such misalignments to thus reduce or eliminate wear on the bearings. However, in order to reduce still further any possible wear on the bearings, the present invention provides an arrangement by which only one end of each shaft section is supported by a bearing. The other end of each section is connected to and supported by the flexible coupling which connects the sections. In the preferred arrangement, the feeding shaft of the present invention is made of stainless steel. While the section may be made solid, in order to cut down the weight and expense of such a shaft, the shaft sections are preferably made in the form of tubular members, as will be hereinafter fully described.

The invention has as its principal object the provision in a yarn feeding machine of a yarn feeding shaft made up of a plurality of separate

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sections connected by flexible couplings which accommodate slight misalignments of the sections.

Still another object of the invention is the provision of a shaft of the class described in which each section has only one end thereof supported by a bearing, the other end of each shaft section being supported by the flexible coupling.

Yet another object of the invention is the provision of a multi-section yarn feeding shaft which is simple in construction, easy to assemble and take apart and highly effective in use.

To these and other ends, the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is an end elevation view of a yarn feeding machine, with parts in sections, showing the relation thereto of a multi-section yarn feeding shaft constructed in accordance with the present invention;

Fig. 2 is a longitudinal sectional view through the multi-section shaft of the present invention showing the relation of the various parts;

Fig. 3 is a longitudinal sectional view through the feeding shaft at one of the bearings and on a larger scale than Fig. 2, showing the arrangement for connecting the shaft sections and for supporting the ends of adjacent sections; and

Fig. 4 is a horizontal sectional view taken substantially on line 4—4, Fig. 2, on a larger scale than the latter, showing the arrangement of the coupling parts.

Similar reference numerals throughout the various views indicate the same parts.

Fig. 1 of the drawing shows a yarn twisting machine of standard construction which comprises a base or frame 11, on the upper part of which a pair of spools 12 of untwisted yarn are mounted. The untwisted yarn 13 is unwound from each spool 12 and, after passing over or through thread guides, engages a roller 14 which dips into a bath of treating liquid 15 positioned in a tray 16 to apply liquid to the yarn 13. The moistened or treated yarn is then wrapped partly around a rapidly rotating yarn feeding roller or shaft, broadly designated by the numeral 17 and later to be more fully described, which serves to feed the yarn. The feeding roller 17 may be driven in any suitable and well-known manner for the main driving means of the machine. The feeding yarn is then guided over the roller 18 and passed through yarn guides 19 to a bobbin 20

mounted on a shaft 21 driven by a belt 22 from the main drive shaft 23. With the exception of the feeding shaft 17 above-described, the above-described machine and the various drives therefor may be of any standard or suitable construction and do not constitute a part of the present invention. Accordingly, further details are not deemed necessary as the above brief description sets forth the relation to the mechanism of the multi-section yarn feeding shaft of the present invention.

The feeding shaft 17 of the present invention is of a length suitable to the machine on which it is operated; and compromises, as is best shown in Fig. 2, a plurality of identical stainless steel tubes 26 which are arranged in substantial horizontal alignment. The number of such sections will, of course, depend on the length of the shaft used. However, with a 40-foot shaft fourteen such sections are employed. As all of the sections 26 are identical in construction, only one will be described in detail, and corresponding parts of the other sections will be designated by the same numerals. Each section 26 is in the form of a cylindrical tube, in one end of which is positioned a tightly fitting plug 27 having an axially extending portion 28 of reduced diameter which extends through and is supported in a ball or roller bearing 29 mounted in a bearing housing 30. The portion 28 extends beyond the bearing 29 and has secured thereto, by a key 31 a hub 32 formed with a spider comprising three equally spaced radially extending arms 33 as best shown in Fig. 4. The end of each arm 33 is formed with an aperture 34 for receiving rivets 35 which extend through registering apertures in a plurality of annular discs 36 to connect the latter to the arms 33 and hence to the plug 27 and also to the left end of the shaft section 26, as is apparent from inspection of Figs. 2 and 3. Hub 32, arms 33 and disc 36 thus constitute part of a flexible coupling connected to the left end of each section 26. A lock nut 37 threadably engages the free end of the section 28 to retain the coupling parts in position thereon as best shown in Figs. 2 and 3. The plug 27 is formed with the shoulder portion 38 which engages the left end 39 of the section 26 to position the plug in proper relation thereon. This shoulder terminates in a flared portion 40 which extends over the outer surface 41 of section 26 and is received in a slot 42 in the bearing housing 30 to prevent the yarn from riding off the left end of the shaft section and getting into the bearings. Thus, one end of each shaft section 26 is supported by the bearing 29 and carries part of the flexible coupling which connects the adjacent shaft sections.

The opposite or right end of each shaft section 26 has positioned therein a ring 45 which abuts a radial leg 46 of an L-shaped flange, the other or axial leg 47 of which has the outer surface 48 thereof in substantial alignment with the outer surface 41 of the section 26, as shown in Figs. 2 and 3. The leg 47 extends toward the housing 30 and overlies the arms 33 and disc 36 and terminates in a flared end 49 which is receivable in a recess 50 in the bearing housing 30 to prevent the yarn from riding off the right end of the section 26 and getting into the bearing. The legs 46 and 47 are provided with a cutout 51, as best shown in Figs. 2 and 3, which cooperates with a similarly shaped cutout on the right end 52 of each section 26 to position the L-shaped flange accurately thereon, as will be

apparent from an inspection of Figs. 2 and 3. The ring 45 gives sufficient thickness to the hollow tube section for providing areas in which fastening screws, to be later described, may be secured. Of course, the tube may be made thicker at the position of the ring and the latter eliminated. However, such an arrangement would add weight to the tube section. Accordingly, the hollow tube and ring arrangement are preferred.

Intermediate the arms 33, the discs 36 are formed with aligned equally spaced openings or apertures through which the shanks 54 of bolts 55 extend. The heads 56 of the bolts face the bearings 30 and engage the right faces of the discs 36, as best shown in Figs. 2 and 3. The free end of the shanks of each bolt is threaded, and extends through a clearance opening in the leg 46 and into a registering tapped hole formed partly in the outer surface 61 of the ring 45 and partly in the inner surface 62 of section 26. Thus, when the bolt 55 is screwed in, the threaded portion will engage in the tapped holes and will draw the ring 45 and the L-shaped flange toward each other until the cutout 51 engages the similar shaped cutout on the end 52 of the section 26. Thus, the two parts are drawn tightly together to form in effect a single unit to which the discs 36 of the flexible couplings are connected by means of the bolts 55. Also, the engagement of the threaded end of the bolts 55 in the tapped hole serves to connect the L-shaped flange to the right end of the shaft 26. The L-shaped flange constitutes a plug which is connectible to the right end of the shaft section 26, by bolts 55, and which, in turn, connects the section, by reason of bolts 55 to the flexible coupling so as to be supported thereby. Thus, while the left end of each tube section 26 is supported on the bearing 29, the right end of each shaft section is supported on the flexible coupling by which the shafts are connected to accommodate slight misalignment of the sections. The bolts thus provide a single means both for connecting the plug to the right end of the shaft section, and for connecting the plug and hence the right end of the section to the flexible coupling.

By taking off the cap of the bearing housing 30, access may be had to bolts 55 to disconnect the latter so that the couplings may be disconnected to permit removal and/or replacement of a section 26. The ring 45 is press fitted into the section 26, but the L-shaped flange is removable upon disconnecting the bolts 55. The ring 45 and the L-shaped flange are secured to the right end of the section 26 by reasons of the three spaced bolts 55 which also serve to connect the plug to the flexible coupling. This arrangement may be broadly considered as a three-arm spider connectible to the right end of each shaft section for connecting the latter detachably to the flexible coupling by which the right end of each section is supported. In addition to supporting the right end of each section 26, the flexible couplings accommodate slight misalignments between the shaft sections and permit the sections to rotate as a unit to provide, in effect, a single feeding shaft over which the yarn is moved.

While one embodiment of the invention has been disclosed, it is to be understood the inventive idea may be carried out any number of ways. This application is, therefore, not to be limited to the precise details described but is intended to cover all variates of the modifications thereof falling within the scope of the appended claims.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of separate substantially aligned shaft sections, yieldable couplings connecting said sections, spaced bearings carried by said frame for supporting separately one end only of each of each section, and means for securing the other end of each section to one of said couplings so as to be supported thereby and for connecting said other end to the one end of an adjacent section.

2. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of separate substantially aligned shaft sections, spaced bearings carried by said frame for supporting one end only of each of said sections separately on said frame, flexible coupling positioned between said sections, means for connecting said couplings to said one end of said sections, and means for connecting the other end of each of said sections to one of said couplings so that the latter will support said other ends, each coupling connecting the other end of one section to the one end of an adjacent section.

3. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned shaft sections, yieldable couplings connecting said sections, spaced bearings carried by said frame for supporting separately one end only of each of said sections, and means for supporting the other ends of said sections on said couplings, each coupling connecting the said other end of one section to the said one end of an adjacent section.

4. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned sections, spaced bearings carried by said frame for supporting one end only of said sections thereon, and yieldable means connecting said sections and for supporting the other ends thereof.

5. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug positioned in one end of each of said sections. a ring positioned in the other end of each of said sections, spaced bearings carried by said frame, means for mounting the plugs in one end of said sections in said bearings so that the latter will support said one end only of said sections, flexible couplings positioned between said sections, and means for connecting the rings of each section to said couplings to support the other ends of said sections on said couplings, each coupling connecting the ring of one section to the plug of an adjacent section.

6. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each of said sections, spaced bearings carried by said frame and receiving said plugs to support separately one end of each section, a second plug secured to the opposite end of each of said sections, flexible couplings positioned between said sections, means for securing adjacent plugs to said coupling to connect said sections, and means for connecting said second plugs detachably to said opposite ends of said sections.

7. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each of said sections, spaced bearings carried by said frame and receiving said plugs to support separately one end of each section, a second plug secured to the opposite end of each of said sections, flexible couplings positioned between said sections, means for connecting said coupling to said first plugs, and means for connecting said couplings to said second plugs and for securing the latter releasably to said opposite ends of said sections.

8. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each of said sections, spaced bearings carried by said frame and receiving said plugs to support separately one end of each section, a second plug secured to the opposite end of each of said sections, flexible couplings positioned between said sections, means for connecting said coupling to said first plugs, and bolts carried by said coupling and engaging said second plug and an adjacent portion of said section to connect said coupling to said opposite end and to secure said second plug detachably thereto.

9. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each of said sections, spaced bearings carried by said frame and receiving said plugs to support separately one end of each section, a spider carried by each of said plugs, a second plug connectable to the opposite ends of each of said sections, a second spider associated with each of said second plugs, a yieldable member positioned between said spiders, means for connecting said members to said first spiders, means for connecting said second spiders to said members, means to connect said second spiders to said second plugs, and means to connect said second plugs releasable to the opposite ends of said sections.

10. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each of said sections, spaced bearings carried by said frame and receiving a part of said plugs to support separately one end of each section, a second plug removably secured to the opposite end of each of said sections, a spider carried by each of said plugs, a second plug connectable to the opposite ends of each of said sections, a second spider associated with each of said second plugs, a yieldable member positioned between said spiders, means for connecting said members to said first spiders, means for connecting said second spiders to said members, and a single means both for connecting said second spider to said second plug and for releasably connecting the latter to the opposite end of said section.

11. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each section, a reduced portion on said plug projecting axially from said one end, a bearing carried by said frame for receiving said portion to support said one end, a second plug associated with the other end of each section, a flexible coupling positioned between said plugs, means for securing said coupling to said first plug, means to secure said coupling to said second plug, and means for securing said second plug releasable to said other end to support the latter on said coupling.

12. In a textile machine, the combination with a supporting frame, of a yarn-feeding shaft mounted for rotation on said frame, said shaft comprising a plurality of substantially aligned tubular sections, a plug secured to one end of each section, a reduced portion on said plug projecting axially from said one end, a bearing

carried by said frame for receiving said portion to support said one end, a second plug associated with the other end of each section, a flexible coupling positioned between said plugs, means for securing said coupling to said first plug, and a plurality of bolts carried by said coupling and engaging said section and said second plug both to connect the latter to said coupling and to connect the second plug releasable to said other end of said section to support the other end of said section on said coupling.

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