Dec. 12, 1950 R. Q. HOLLINGSWORTH 2,533,669

BOBBIN GEAR ASSEMBLY FOR ROVING FRAMES

Filed May 3, 1949 3 Sheets-Sheet 1

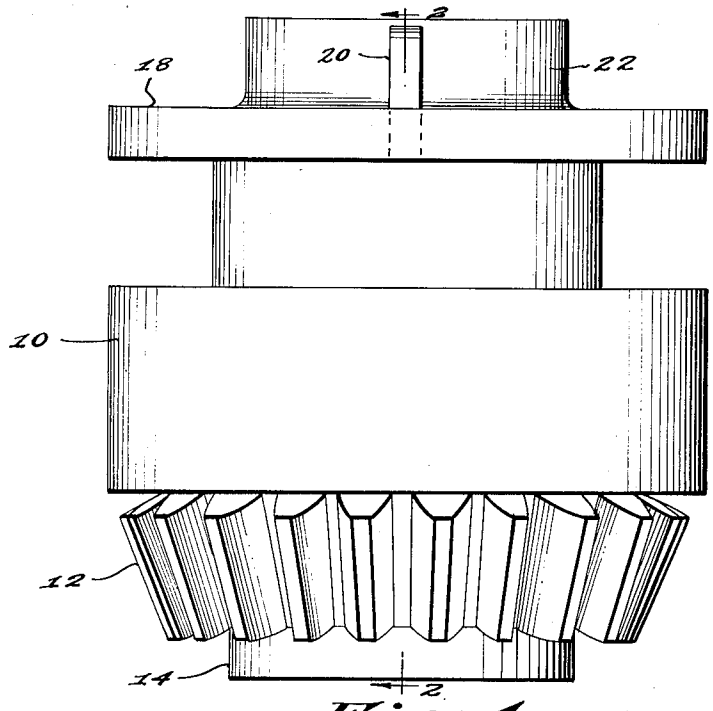

Fig. 1

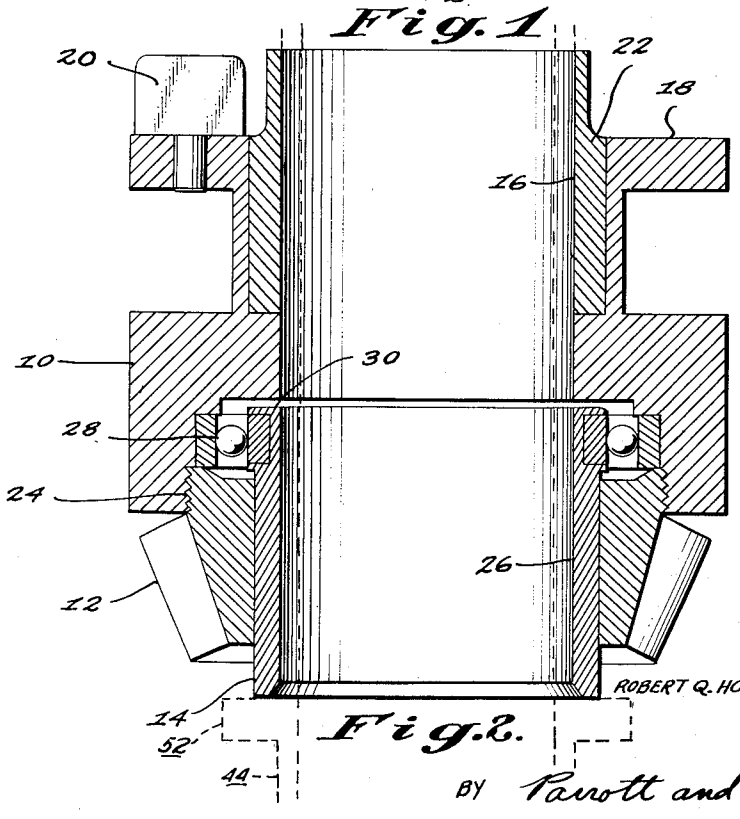

Fig. 2.

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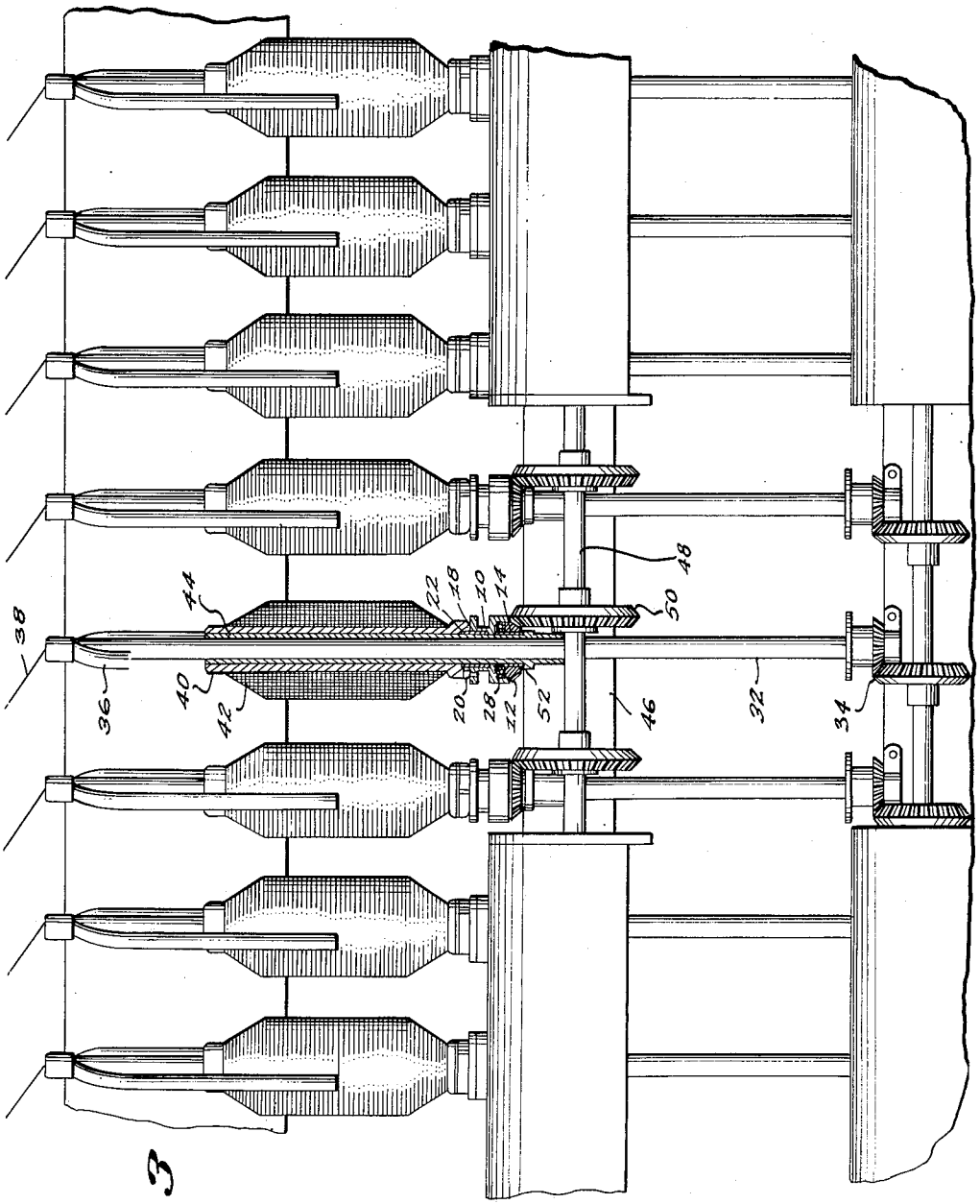

Fig. 3

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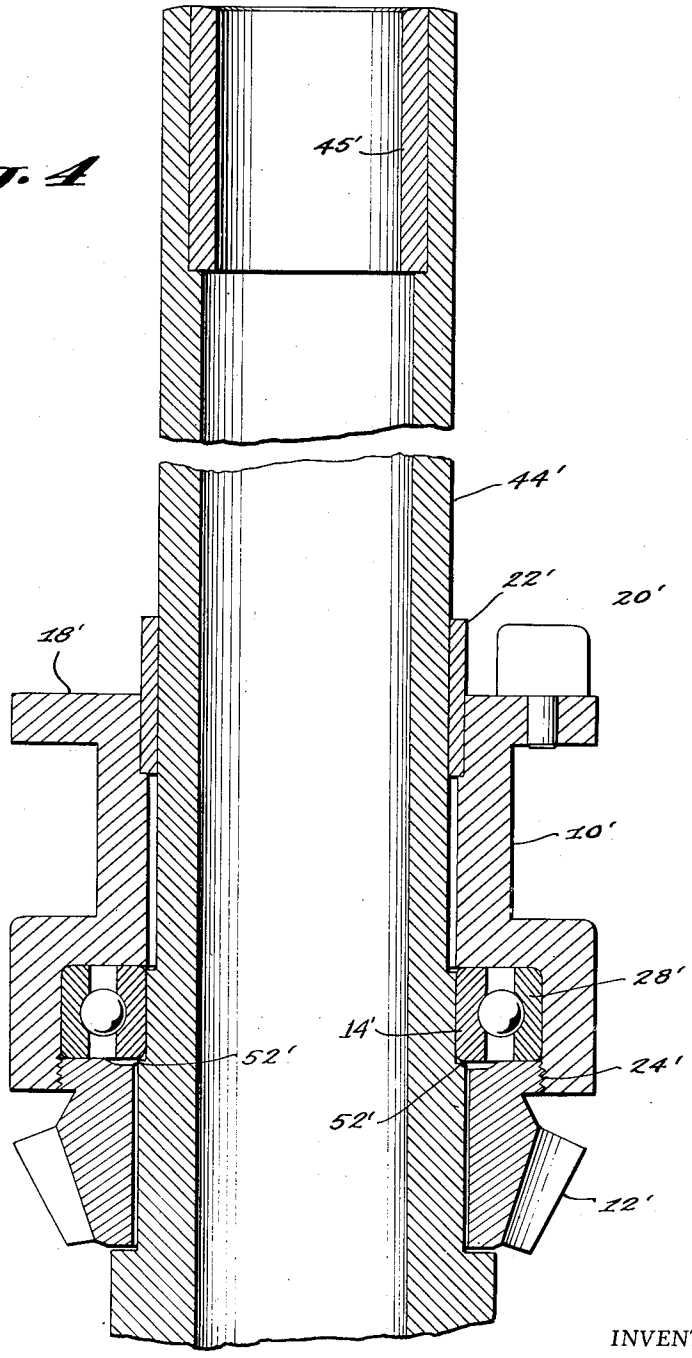
Fig. 4



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BOBBIN GEAR ASSEMBLY FOR ROVING FRAMES

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10 Claims. (Cl. 57—102)

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This invention relates to roving frames such as are used for processing cotton and other textile yarns, and more particularly to an improved bobbin gear assembly for use on roving frames.

As is well known, roving frames are used extensively in cotton textile operations for working the cotton from sliver form through one or more roving stages to a condition suitable for spinning into yarn. Roving frames are variously referred to as slubbers, intermediates, speeders, or jack frames, depending generally on the size of roving and resulting bobbin package handled on the frame. Similar equipment is also used in wool systems, and in the processing of other textile yarns, and the present invention is applicable for use on such roving frames generally.

A roving frame consists essentially of drafting means for working the textile fibers being processed through the roving stage, and a bobbin building mechanism by which the roving is received from the drafting means and built into a bobbin package for transfer to a subsequent processing operation. The bobbin building mechanism comprises an elongated spindle which is rotated continuously during operation of the roving frame, and which carries a flyer at its upper end for receiving the roving from the drafting means and directing it onto the bobbin. The bobbin provided for receiving the roving from the flyer is carried on a bolster which is slidingly arranged on the above mentioned spindle. This bolster is in turn fitted with a bobbin gear which provides a seat for the bobbin on the bolster, and which includes a gear element for driving connection to rotate the bobbin on the bolster during the bobbin building operation. Also, the supporting structure for the bolster and the driving means for the bobbin gear are arranged for reciprocating vertical movement during the bobbin building operation, so that the roving is directed onto the bobbin in a particular winding pattern to build the bobbin package.

One of the most troublesome operating problems encountered with roving frames is the problem of maintaining the bobbin gears in condition for satisfactory operation. Due to the fact that the bobbin gear provides the bobbin seat and accordingly supports the bobbin during the building operation, there is a substantial thrust load imposed on this element during operation. As a result the wear on the bobbin gear is severe, and it is subject to frequent breakage as well. Consequently, roving frame operation necessarily requires constant attention to lubrication of the bobbin gears, and involves a heavy

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maintenance load in replacing the bobbin gears as they are broken.

According to the present invention, these difficulties are eliminated entirely by providing a bobbin gear assembly incorporating means assembled with the bobbin gear for relative rotation and adapted for positioning and supporting the bobbin gear for free rotation on the bolster despite the thrust load imposed by the bobbin as it is built. The bobbin gear assembly of the present invention may be arranged in this manner so that it requires no attendance whatever for lubrication during use; and because it maintains the bobbin gear for free rotation on the bolster even under the thrust load from the bobbin, it provides particularly smooth operation and thereby reduces substantially the power requirements in operation of the roving frame. Also, the bobbin gear assembly of the present invention is adapted for incorporating a gear element as a separate member which may be removed and replaced easily whenever it is broken, thereby not only reducing the time required for the replacement but also substantially reducing the cost involved.

The improved bobbin gear assembly of the present invention is described further below in connection with the accompanying drawings, in which:

Fig. 1 is an elevation of a bobbin gear assembly constructed in accordance with the present invention;

Fig. 2 is a vertical section detail taken on the line 2—2 in Fig. 1;

Fig. 3 is a fragmentary elevation illustrating the operating arrangement of the bobbin gear assembly of the present invention on a roving frame; and,

Fig. 4 is a vertical section detail illustrating a modification in which a bolster is fitted as a composite unit with a bobbin gear assembly constructed in accordance with the present invention.

Referring now to the drawings in detail, the bobbin gear assembly, as shown in Figs. 1 and 2, comprises generally a sleeve member 10, a gear element 12 carried on the sleeve member 10, and a second sleeve member 14 assembled with the first sleeve member 10 for relative rotation.

The first sleeve member 10 is formed with a central bore as at 16 adapting it for disposition on a bolster, as will appear more in detail below, and is further formed at one end face 18 to provide a bobbin seat, a key 20 being secured on the sleeve member 10 at this end face 18 to en-

gage the usual slot provided in the base of the bobbins (compare Fig. 3). Also, the sleeve member 10 may, if desired, be fitted at its upper end with a bushing insert 22 formed of some suitable bearing material, such as one of the oil impregnated sintered metal materials now commonly in use. The advantage of using a bushing 22 of this sort is that it allows a close fit for the bobbin gear assembly on a bolster at this point and thereby provides increased stability for the bobbin gear assembly by eliminating slap on the bolster with resulting smoother operation at the bearing unit described further below.

The gear element 12 is carried on the sleeve member 10 at its lower end, the sleeve member 10 being threaded at this end to engage a correspondingly threaded portion on the gear element 12 as indicated at 24 in Fig. 2. This gear element 12 provides for driving connection to rotate the sleeve member 10 on the bolster, as will be explained in further detail presently.

The second sleeve member 14 is likewise formed with a central bore 26 adapting it for disposition on a bolster, and is assembled with the first sleeve member 10 for relative rotation with the central bores 16 and 26 aligned. The assembly of the second sleeve member 14 with the first sleeve member 10 for relative rotation may be effected by means of any suitable bearing unit of the type including inner and outer races and which is adapted for supporting a thrust load. It will be found most advantageous in the usual case to use for this purpose an anti-friction bearing unit of the ball bearing type, as indicated at 28 in Fig. 2. Ball bearing units of this type can be obtained which are sealed and which therefore provide the advantage of protection against the accumulations of lint which are always encountered in textile processing equipment.

In employing the bearing unit 28 for assemblying the second sleeve member 14 with the first sleeve member 10, the second sleeve member 14 is fixed on the inner race of the bearing unit 28, while the outer race of the bearing unit 28 is mounted on the first sleeve member 10. The second sleeve member 14 may be fixed on the inner race of the bearing unit 28 by forming it in a reduced diameter at one end and then forming the sleeve member 14 over at this end so that the inner race of the bearing unit 28 is in effect secured in an annular groove in the sleeve member 14, as illustrated at 30 in Fig. 2. The outer race of the bearing unit 28 may be suitably received in a recess formed in the first sleeve member 10, and secured in place by the gear element 12 when it is mounted on the sleeve member 10 by means of the threaded engagement at 24, as previously noted, the bore of the gear element 12 being proportioned for a running fit over the second sleeve member 14 in assembled position.

The operating arrangement on a roving frame of a bobbin gear assembly as just described above is illustrated in Fig. 3 of the drawing. The fragmentary illustration of the roving frame structure in Fig. 3 shows the previously noted elongated spindles at 32 arranged for rotation through gear sets 34 at their lower end and extending to carry flyers 36 at their upper end, to which the processed roving, as indicated at 38, is led for directing onto a bobbin 40 to build a bobbin package 42. The bobbin 40 is shown disposed on a bolster 44 which extends downwardly for mounting on a bolster rail 46 by any suitable arrangement (not shown) which may include a hook element (not shown) resting on the drive

shaft 48 according to the arrangement commonly in use. The drive shaft 48 carries gears arranged as at 50 to engage the gear elements 12 of the bobbin gear assemblies and thereby drive them to rotate the bobbins 40 on the bolster 44 during the bobbin building operation as previously mentioned. Also, as previously mentioned, the bolster rail 46, together with the drive shaft 48 which it carries, is reciprocated vertically during the bobbin building operation, so that the vertical position of the bobbin 40 with respect to the spindle 32 is shifted in a controlled manner to provide a winding traverse in building the bobbin package.

It will be noted that the bolster 44 is formed with a shoulder 52 adjacent its lower end to provide a seat for the bobbin gear assembly (compare the dotted line outline in Fig. 2), and that the second sleeve member 14 extends below the gear element 12 to rest on this seat and support the bobbin gear assembly for free rotation on the bolster 44. Also, it will be seen that the second sleeve member 14 positions the bobbin gear assembly on the bolster in relation to the shoulder 52 so that the gear element 12 is disposed for driving connection to rotate the first sleeve member 10 and thereby drive the bobbin 40. The arrangement of the bobbin gear assembly in this manner makes it possible to absorb all of the thrust load imposed by the bobbin package 42 entirely at the bearing unit 28, due to the fact that the second sleeve member 14 may be definitely positioned by the shoulder at 52 on the bolster 44, and as the construction of the assembly is thereby such that the wear resulting from the thrust load is substantially eliminated, the gear element 12 may be positioned nicely for driving engagement with the gear 50 carried on the drive shaft 48 and accordingly obtain exceptionally smooth operation which results in considerably less wear and less frequent breakage of the gear element 12 than has been common in bobbin gear arrangements heretofore in use.

The bobbin gear assembly of the present invention is also adapted to be fitted with a bolster as a composite unit, as illustrated in Fig. 4 of the drawing. In Fig. 4, the bolster is shown at 44' fitted with a bobbin gear assembly comprising a sleeve member 10', a gear element 12' and a bearing unit 28'. In this case, the inner race (as at 14') of the bearing unit 28' is employed directly as a second or inner sleeve member for mounting the bobbin gear assembly on the bolster 44', the bolster being formed with a shoulder as at 52' to provide a seat for the inner race 14' of the bearing unit 28', and the inner race 14' of the bearing unit 28' being pressed over the bolster at this point to position the bobbin gear assembly in place.

Otherwise, the construction is substantially identical with the arrangement heretofore described, the gear element 12' being assembled with the sleeve member 10' by threaded engagement as at 24', and the upper end face 18' of the sleeve member 10' being formed to provide a bobbin seat and being fitted with a driving key 20'. Also, a bearing bushing 22' may be arranged in the upper end of the bobbin gear assembly, as previously noted, and a similar bushing 45' may be arranged in the upper end of the bolster 44' to provide a closer fit on the roving frame spindle as well as on the bolster and thereby obtain increased stability and smoother operation as mentioned above.

Bobbin gear assemblies constructed in accordance with the present invention may be fitted on conventional roving frames easily without requiring any substantial modification of any other operating element, and have been found in tests under actual operating conditions to provide a great reduction in the attendance and maintenance required in operating a roving frame.

I claim:

1. A bobbin gear assembly for roving frame bolsters comprising a sleeve member adapted for disposition as a bobbin seat on a bolster, a gear element carried on said sleeve member for driving connection to rotate said sleeve member on said bolster, and a second sleeve member assembled with said first sleeve member for relative rotation and thereby adapted for positioning and supporting said first sleeve member and gear element for free rotation on said bolster.

2. A bobbin gear assembly for roving frame bolsters comprising a sleeve member formed with a central bore adapting it for disposition on a bolster and formed at one end face to provide a bobbin seat, a gear element carried on said sleeve member at its other end for driving connection to rotate said sleeve member on said bolster, and a second sleeve member likewise formed with a central bore adapting it for disposition on said bolster, said second sleeve member being assembled with said first sleeve member for relative rotation with said central bores aligned, whereby said bobbin gear assembly may be positioned on said bolster by said second sleeve member with said first sleeve member and said gear element freely rotatable for supporting and driving a bobbin on said bolster.

3. A bobbin gear assembly for roving frame bolsters comprising a sleeve member adapted for disposition as a bobbin seat on a bolster, a gear element carried on said sleeve member for driving connection to rotate said sleeve member on said bolster, and a bearing unit of the type including inner and outer races and adapted for supporting a thrust load, the outer race of said bearing unit being assembled with said sleeve member and the inner race of said bearing unit thereby being disposed for positioning said bobbin gear assembly on said bolster with said first sleeve member and said gear element freely rotatable for supporting and driving a bobbin on said bolster.

4. A bobbin gear assembly for roving frames as defined in claim 3 and further characterized in that said bearing unit is an anti-friction bearing unit of the ball bearing type.

5. A bobbin gear assembly for roving frames as defined in claim 3 and further characterized in that said first sleeve member is fitted with a bearing bushing providing a close fit on said bolster and thereby providing increased stability for said bobbin gear assembly during operation with resulting improved balance at said bearing unit.

6. A bobbin gear assembly for roving frame bolsters comprising a sleeve member formed with a central bore adapting it for disposition on a bolster and formed at one end face to provide a bobbin seat, a gear element carried on said sleeve member at its other end for driving connection to rotate said sleeve member on said bolster, a bearing unit of the type including inner and outer races and adapted for supporting a thrust load, the outer race of said bearing unit being assembled with said sleeve member, and a second sleeve member likewise formed with a central bore adapting it for disposition on said bolster, said second sleeve member being assembled with the inner race of said bearing unit with said central bores aligned, whereby said bobbin gear assembly may be positioned on said bolster by said second sleeve member with said first sleeve member and said gear element freely rotatable for supporting and driving a bobbin on said bolster.

7. A bearing mounting for a roving frame bobbin gear assembly of the type carried on a roving frame bolster comprising a bearing unit of the type including inner and outer races and adapted for supporting a thrust load, and a sleeve member formed with a central bore adapting it for disposition on a bolster, said sleeve member being assembled with the inner race of said bearing unit, and the outer race of said bearing unit being assembled with said bobbin gear assembly, whereby said bobbin gear assembly may be positioned for free rotation on said bolster by said sleeve member for supporting and driving a bobbin.

8. A bolster and bobbin gear assembly for roving frames comprising a bolster, a sleeve member adapted for disposition as a bobbin seat on said bolster, a gear element carried on said sleeve member for driving connection to rotate said sleeve member on said bolster, and a bearing unit of the type including inner and outer races and adapted for supporting a thrust load, the outer race of said bearing unit being assembled with said sleeve member and the inner race of said bearing unit being assembled with said bolster, whereby said sleeve member and said gear element are positioned for free rotation on said bolster for supporting and driving a bobbin.

9. A bolster and bobbin gear assembly for roving frames as defined in claim 8 and further characterized in that said bolster is formed with a shoulder providing a seat for the inner race of said bearing unit and thereby determining the position of said bobbin gear assembly on said bolster.

10. A bolster and bobbin gear assembly for roving frames as defined in claim 8 and further characterized in that said bolster and said sleeve member are each fitted with bearing bushings providing a close fit on the roving frame spindle and the bolster, respectively, and thereby providing increased stability for said bolster and bobbin gear assembly during operation.

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The following references are of record in the file of this patent:

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