

Aug. 18, 1936.

G. H. MAGRATH

2,051,641

SPINNING SPINDLE

Filed May 24, 1934

2 Sheets-Sheet 1

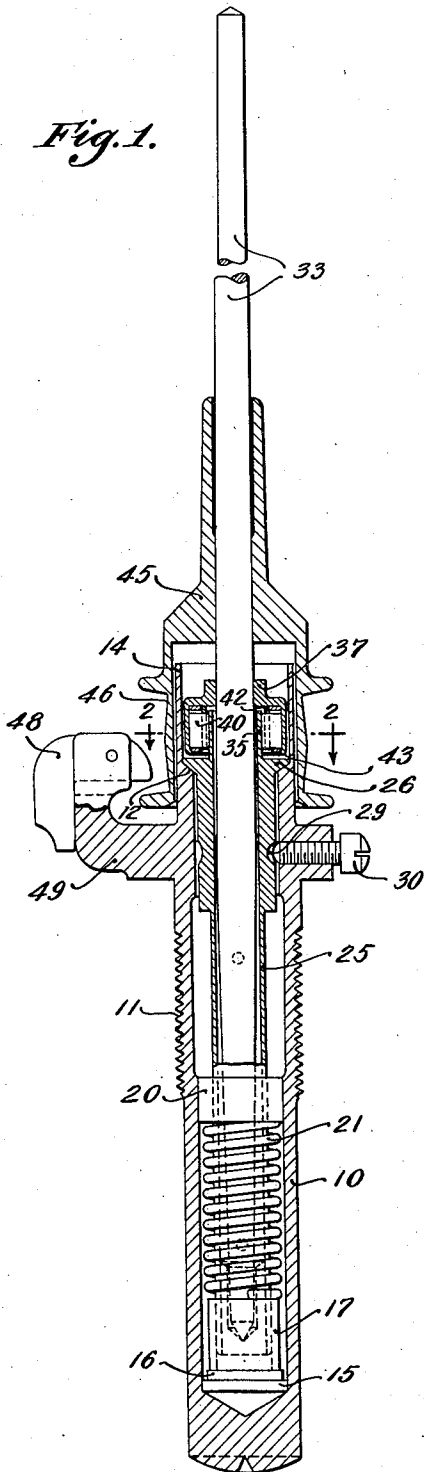


Fig. 2.

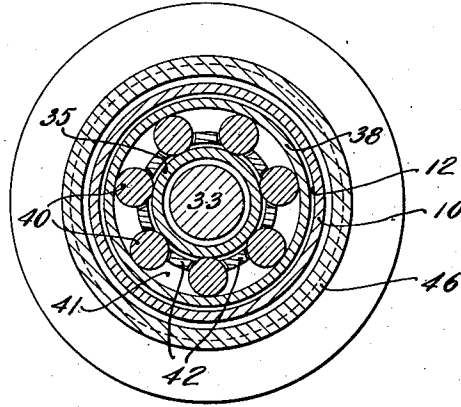
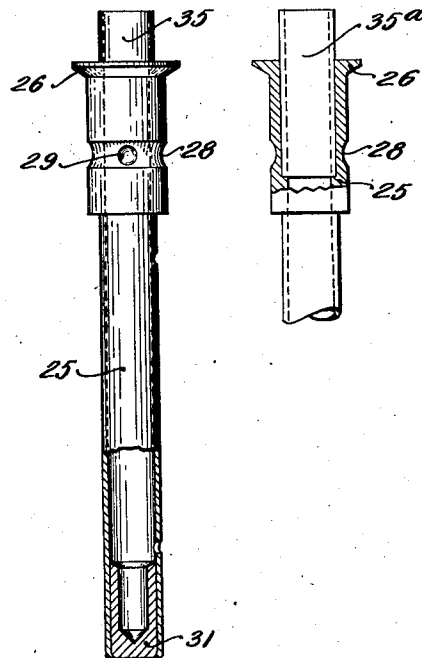


Fig. 3. Fig. 3a.



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Fig. 4.

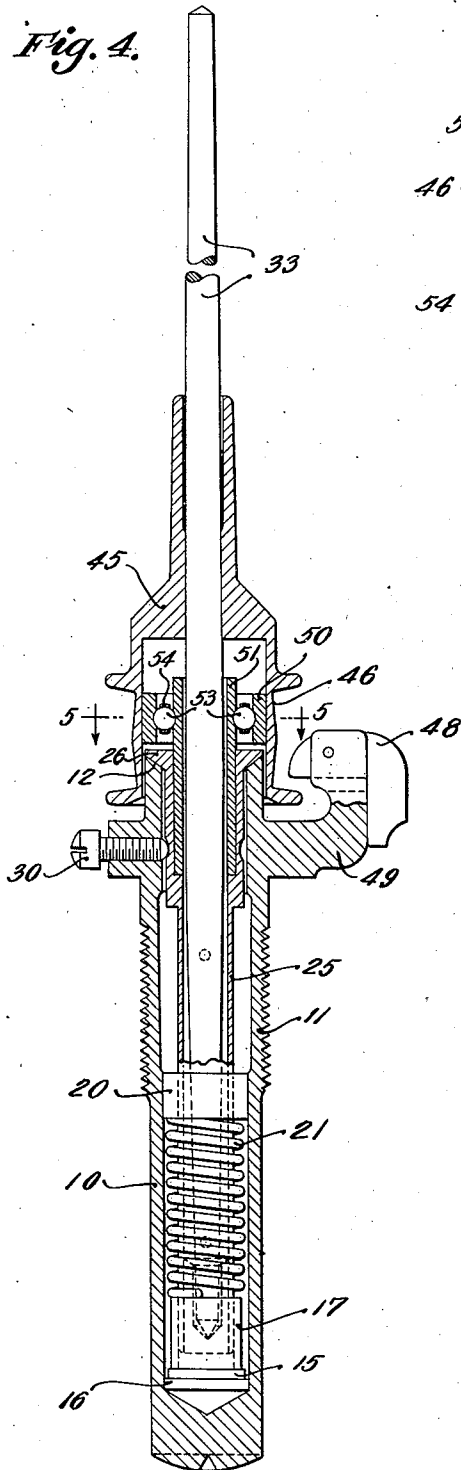


Fig. 5.

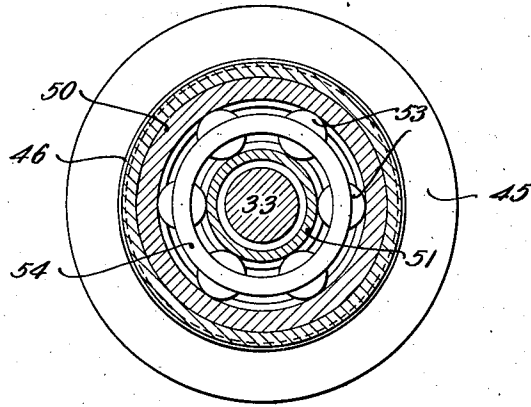
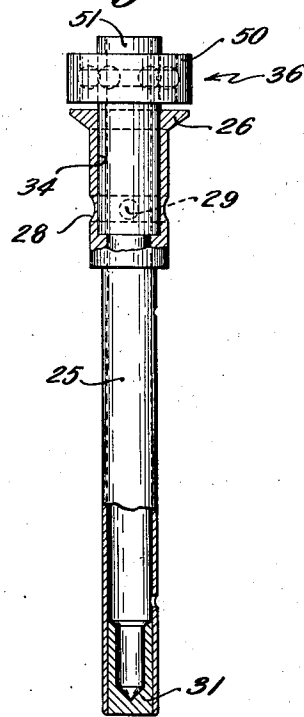


Fig. 6.



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UNITED STATES PATENT OFFICE

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SPINNING SPINDLE

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Application May 24, 1934, Serial No. 727,299

5 Claims. (Cl. 118—66)

This invention relates to spinning machines and more particularly to a spindle bolster and associated mechanism.

The principal objects of the invention are to provide a spindle mounting which is of simple design and of strong and durable construction and which is reliable and efficient in operation; to provide a spindle mounting which is inexpensive to manufacture and assemble, and which embodies a minimum number of parts which may be easily dismembered so that repairs and replacements may be quickly made at a slight expense; and to provide a spindle which is supported on anti-friction bearing members which permit the spindle to center itself when in operation and which are constructed and arranged so that the spindle may be readily removed and replaced without dismembering or deranging the associated parts.

Further objects relate to various features of construction and to the operation of my improved spindle and will be apparent from a consideration of the following description and accompanying drawings which show different embodiments of the invention chosen for the purpose of illustration.

In the drawings:

Fig. 1 is a sectional elevation of one embodiment of the invention;

Fig. 2 is an enlarged section on the line 2—2 of Fig. 1;

Fig. 3 is an elevation, with parts broken away and shown in section, of a bolster constructed in accordance with the present invention;

Fig. 3^a is a fragmentary sectional view showing the upper end of a bolster of modified construction;

Fig. 4 is a sectional elevation of another embodiment of the invention;

Fig. 5 is an enlarged section on the line 5—5 of Fig. 4; and

Fig. 6 is an elevation, with parts broken away and shown in section, of a modified form of bolster.

The embodiment shown in Figs. 1 to 3 comprises a bolster case 10 which may be of generally cylindrical shape having an exteriorly threaded portion 11, or other suitable means by which it may be secured to the frame of a spinning machine (not shown). Adjacent to its upper end the inside of the case is provided with an annular shoulder 12 which may be beveled or rounded, and a cylindrical collar or sleeve 14 projects upwardly beyond the shoulder as shown in Fig. 1. A pair of washers or disks 15 and 16 is

disposed in the bottom of the bolster case and a socket member 17, loosely fitting within the case, is mounted on these disks. An annular collar or abutment member 20 is secured to the inner wall of the case by a press fit or in any other suitable manner and a coiled compression spring 21 is interposed between the socket 17 and collar 20, the spring 21 being under sufficient compression yieldingly to hold the socket member in place and restrain movement thereof.

A bolster 25 loosely fits within the bolster case with its lower end projecting into the socket 17. Adjacent to its upper end the bolster is provided with an annular shoulder 26 having a beveled or rounded surface conforming to that of the shoulder 12 on the inside of the case. The bolster is supported by the shoulder 12 so that it may have a slight rocking movement within the case. In order to prevent rotation or longitudinal movement, the bolster may be provided with a circumferential groove 28 having a recessed portion 29 for the reception of the end of a set screw 30 carried by the bolster case. The inner diameter of the bolster is appreciably greater than the diameter of the spindle blade 33 so as to provide a clearance between these parts and its lower end is provided with a step bearing 31 (Fig. 3) which supports the lower end of the spindle blade 33.

The upper end of the bolster is provided with a coaxial collar or sleeve 35 which loosely fits about the blade 33 and which has a hardened outer periphery providing the inner race of an anti-friction bearing which supports the central part of the blade 33. The collar 35 may form an integral part of the bolster proper, as shown in Fig. 3, in which case it may be first machined to the proper dimensions subjected to a heat treating operation or other suitable treatment for imparting the desired hardness to its outer surface, or if desired, the collar may consist of a separate part such as a bushing 35^a (Fig. 3^a) which has previously been subjected to a suitable heat treating operation for hardening its upper end portion or its entire outer surface. In the latter case the upper end of the bolster is preferably drilled or reamed to provide an enlarged bore for the reception of the lower end of the collar 35^a, the collar being retained in the bore by a press fit or in any other suitable manner which integrally joins the parts and provides a strong and durable construction capable of withstanding the stresses and strains imposed during high speed operations.

The anti-friction bearing member is carried by the blade 33 and comprises a collar portion

37 having a press fit about the blade, and a depending cylindrical flange or skirt portion 38 which constitutes the outer race of the bearing elements or rollers 40. Retaining rings 41 and spacing elements 42 (Fig. 2) hold the rollers 40 in circumferentially spaced relation within the skirt 38, the lower retaining ring being firmly held in position by the inwardly bent ends 43 of the skirt 38. These parts are constructed and arranged so that the rollers 40 snugly fit about the collar 35 which constitutes the inner race of the bearing member, and the outer periphery of the skirt 38 is spaced from the sleeve 14 of the bolster case as shown in Fig. 1. The bearing member is so positioned on the blade that when the blade is inserted in the bolster with its lower end supported by the bearing 31, the lower end of the skirt 38 is held in spaced relation to the shoulder 26 of the bolster and its upper end is disposed below the top of the sleeve 14. As shown in Fig. 1, the whirl 45 is mounted on the blade in the usual manner with its depending driving flange 46 circumposed about and in spaced relation to the sleeve 14 of the bolster. A latch member 48 is pivotally mounted on an arm 49 integral with the bolster case and is operative to prevent accidental removal of the blade and whirl when in assembled relation with the bolster.

It will be noted that the bearing 31 and collar 35 provide the only supports for the blade and whirl members and that with the exception of the rollers 40 and the end of the blade all parts of these members are held out of contact with the bolster and case, thus minimizing the frictional resistance and wear, and insuring a smooth and vibrationless operation. Furthermore, the parts are so constructed and arranged that when the spindle is operated at high speeds the bolster is permitted sufficient freedom of movement to allow the blade to center itself and thus relieve the bearings from the stresses and strains to which they would otherwise be subjected. It will be further noted that the construction and arrangement of the parts are such that the blade and whirl may be removed from the bolster and replaced without dismembering any of the parts or making any adjustments.

In the construction shown in Figs. 4 to 6 the general arrangement of parts is quite similar to that of the previously described embodiment, the blade and whirl members and certain parts of the bolster and case being substantially identical, and the same numerals are used to designate the corresponding parts. In this embodiment, however, the sleeve on the upper part of the case 10 is dispensed with and the upper end of the bolster is provided with an enlarged bore 34 as in the modification shown in Fig. 3^a.

The anti-friction bearing member 36 comprises an outer race ring 50 having a circumferential groove on its inner periphery, an inner race consisting of an elongate sleeve or bushing 51 having a circumferential groove on its outer periphery adjacent to one end, and a plurality of ball bearing elements 53 and a retaining cage 54 interposed between the inner and outer races. The inner race or bushing 51 has a press fit within the bore 34 of the bolster and is thus rigidly secured thereto, constituting in effect an integral part of the bolster. The outer race ring 50 has a sliding fit against the inner periphery of the driving flange 46, thus permitting the whirl and blade to be removed and replaced without the necessity of dismembering parts or making adjustments.

In this embodiment, as in the previously described embodiment, the construction and arrangement is such that the bolster is permitted sufficient freedom of movement to allow the blade to center itself when operating at high speeds, and these parts are likewise held out of contact with the case and bolster except at their two points of support. A further feature of this construction resides in a construction and arrangement of the anti-friction bearing and associated parts, it being noted that the entire bearing may be easily removed and another replaced merely by expanding with heat the upper end of the bolster.

While I have shown and described different embodiments of the invention it is to be understood that the present disclosure is for the purpose of illustration only and that various changes in shape, proportion and arrangement of parts, as well as the substitution of equivalent elements for those herein shown and described, may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A spindle construction comprising a bolster case, a bolster mounted to rock within said case, said bolster having an enlarged bore at its upper end, a removable blade mounted within said bolster, a whirl secured to said blade, said whirl having a depending driving flange surrounding the upper end of said bolster, a cylindrical sleeve fitting within said bore, said sleeve having a hardened upper end projecting upwardly beyond the end of said bolster and loosely fitting about said blade, a plurality of anti-friction bearing members circumposed about the end of said sleeve, said sleeve constituting the inner race for said bearing members, and an outer race ring and retaining cage circumposed about said bearing members, said outer race ring fitting against the inner periphery of said driving flange and supporting the center of said blade for rotation.
2. A spindle construction comprising a bolster case, a bolster mounted to rock within said case, said bolster having an enlarged bore at its upper end, a blade rotatably mounted within said bolster and in spaced relation to its inner periphery, a whirl secured to said blade and having a depending driving flange surrounding the upper end of said bolster case, and an anti-friction bearing member interposed between said blade and driving flange, said bearing member comprising an outer race fitting against the inner periphery of said flange, a cylindrical sleeve loosely fitting about said blade and having a press fit within the bore at the upper end of said bolster, the upper end of said sleeve projecting upwardly beyond the end of said bolster and having a hardened circumferential grooved part on its outer periphery adjacent to its end providing the inner race of said bearing member, and a plurality of ball bearings disposed in said groove.
3. A spindle construction comprising blade and whirl members, a tubular member, anti-friction bearing means carried by the upper end of said tubular member and arranged rotatably to support said blade and whirl members at a point between the ends of the blade member, a bearing in the lower end of said tubular member for rotatably supporting the lower end of said blade member, and centralizing means for restraining gyratory movement of the lower end of said blade member when rotating at high speeds, said means including a socket-like member fitting about said

bearing, said socket-like member being freely movable in paths which extend substantially at right angles to the axis of rotation of said blade member, and a coiled compression spring interposed between said socket-like member and one end of said tubular member, said spring yieldingly restraining the freedom of movement of said socket-like member and being operative yieldingly to urge said socket-like member to a position substantially coaxial with said tubular member when said socket-like member is in a position eccentric to said tubular member.

4. A spindle construction comprising blade and whirl members, a bolster case, a bolster mounted to rock within said case, the lower end of said bolster having a bearing rotatably supporting the lower end of the blade member, anti-friction bearing member carried by the upper end of said bolster and arranged rotatably to support said blade and whirl members at a point between the ends of the blade member, and centralizing means for restraining rocking movement of the lower end of said bolster, said means including a socket-like member loosely fitting within said bolster case and surrounding the lower end of said bolster, and a coiled compression spring inter-

posed between said socket-like member and one end of said bolster case, said spring yieldingly restraining the freedom of movement of said socket-like member and being operative yieldingly to urge said bolster to a position coaxial with said case when said bolster is rocked to a position eccentric to said case.

5. A spindle construction comprising a bolster case having an annular shoulder at its upper end, a bolster mounted within said case, the bolster having a flange seated on said shoulder so as to support the bolster for rocking movement within the case and an upper end provided with a cylindrical collar having a hardened outer periphery, a removable blade rotatably supported at its lower end in said bolster, a plurality of bearing elements circumposed about said collar, said collar loosely fitting about said blade and providing an inner race for said bearing elements, retaining means including an outer race ring for said bearing elements, said retaining means embracing said blade and rotatably supporting its intermediate portion, and centralizing means at the end of said bolster operative to restrain rocking movement of said bolster.

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