(No Model.)

T. MAYOR.

SPINDLE SUPPORT FOR SPINNING AND TWISTING MACHINES.

No. 454,282. Patented June 16, 1891.

Fig. 3.

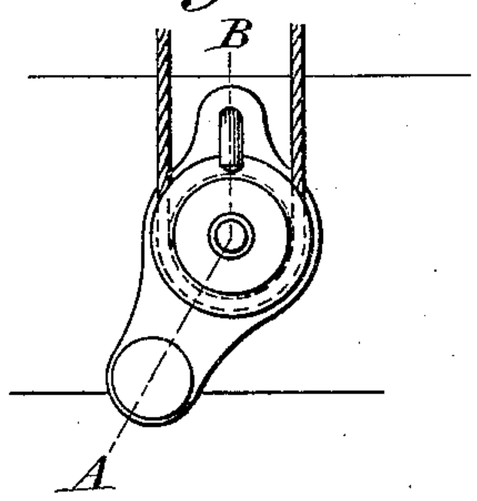


Fig. 1.

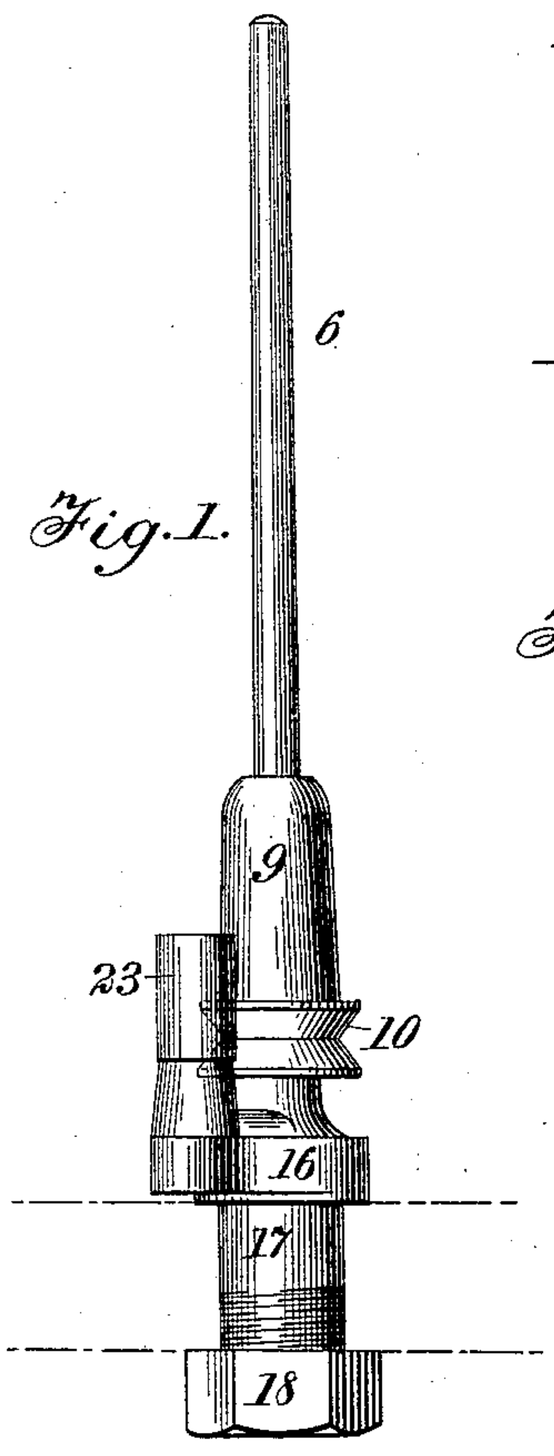
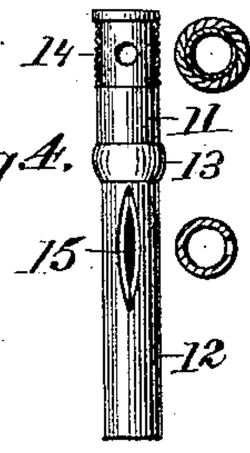


Fig 4.



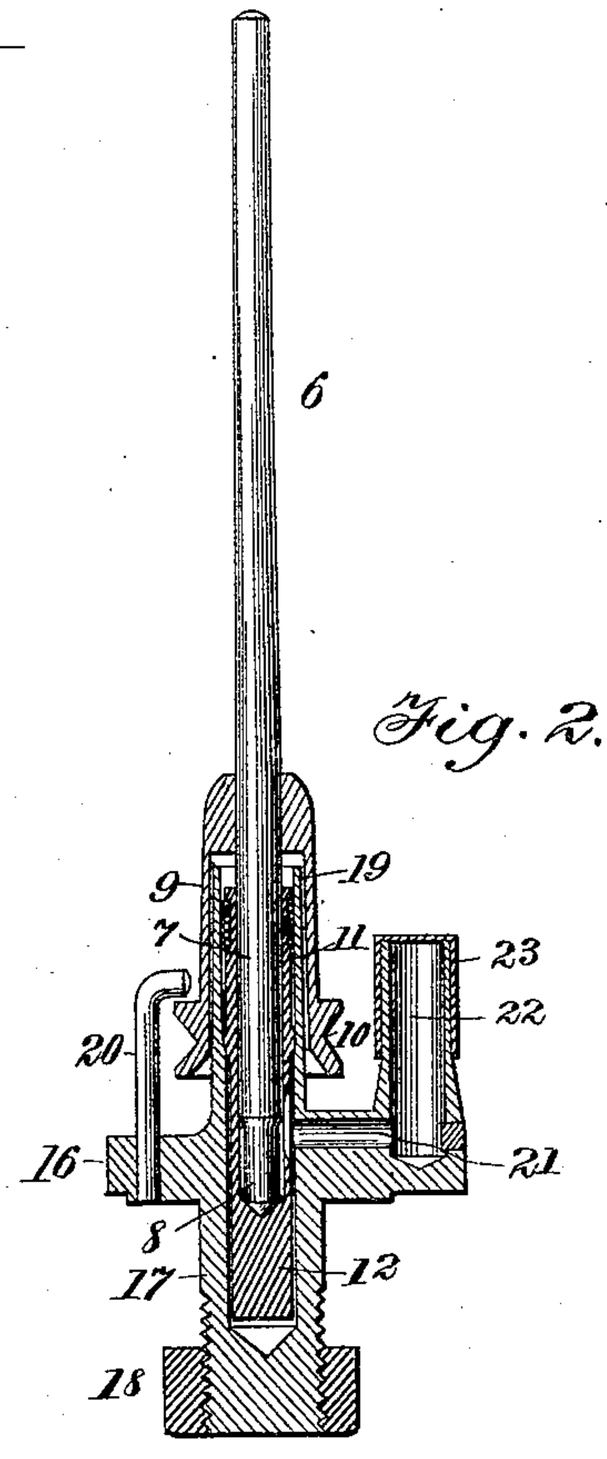


Fig. 2.

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SPINDLE-SUPPORT FOR SPINNING AND TWISTING MACHINES.

SPECIFICATION forming part of Letters Patent No. 454,282, dated June 16, 1891.

Application filed July 1, 1889. Serial No. 316,177. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MAYOR, of the city of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Spindle-Supports for Spinning and Twisting Machines; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to improvements in the bearings for spinning and twisting machine spindles adapted to single-rail machines.

It consists in a bolster-case provided with a socket, a combined bolster and step tube provided with an enlargement to fit the socket, the combined bolster and step tube outside the enlargement being of less diameter than the interior of the bolster-case to permit a slight oscillating motion, an elastic packing to resist or limit the oscillating motion of the bolster and step tube, and a sleeve-whirl secured to the spindle above the bolster-tube; also, in a socketed bolster-case, a combined bolster and step of less diameter at certain points than the interior of said case, thus forming an oil-chamber, and an elongated slit connecting the interior of the combined bolster and step tube with this oil-chamber.

Similar numbers of reference indicate corresponding parts in the drawings.

Figure 1 is a view of my improved spindle-support and spindle. Fig. 2 is a sectional view through the line A B of Fig. 3. Fig. 3 is a top view showing the driving-band. Fig. 4 is a view of the combined bolster and step tube, showing the packing and the elongated slit for lubricating the spindle.

Spinning and twisting machine spindles are required to revolve at such high speed that the slightest imperfection in the construction or lubrication of the bearings causes heating, binding, thumping, or wabbling of the spindle. At times all these defects are caused in spindles of the most careful construction; but any one of these defects impairs and often prevents the successful use of the spindle in spinning at the required high productive speed.

In practical use two elements operate to deflect the spindle from the true axial line, which, to secure perfect yarn, must be at all times and at all points of the length of the spindle-blade exactly in the center of the ring on the reciprocating ring-rail, so that the traveler is at all times and at all places at the same distance from the axis of the spindle. One of these elements is the lateral strain exerted by the driving-band and the other the strain of the yarn between the traveler on the ring and the spindle or bobbin, particularly when laying the yarn near the upper end of the spindle or bobbin. Other disturbing elements are incident to unavoidable imperfections in the construction and operation of the spindle in practical spinning. A spindle constructed with the best tools is not perfectly round. Neither is its bearing-surface perfectly straight. The bolster and step bearings are only approximately perfect. The spindle-blade, if perfectly true when made, is liable to be strained in doffing. The bobbin is continually changing by use and the varying atmospheric conditions. The strain of the driving-band is continually changing, and so is the strain of the yarn on the spindle.

The object of this invention is to so construct a spindle that the strain of the driving-band and the ever-varying strain in all directions of the yarn will be resisted, while the spindle-bearing may adjust itself automatically to the imperfections of the structure, so as to produce a spindle running perfectly steady without a blur at high speed.

Another object of this invention is to secure perfect lubrication of the spindle, as well as the bearing of the bolster and step tube in the bolster-case.

The spindle consists of the blade 6, the shaft or journal 7, and the pintle 8. To this is secured the sleeve 9, on the lower end of which the whirl 10 is formed. The spindle is supported in the tube shown in Fig. 4. The upper portion 11 forms the journal-box in which the shaft 7 of the spindle revolves, and is usually termed the "bolster-bearing." The lower end of the tube is closed and forms the step-bearing for the spindle. The projection 13 on this combined bolster and step tube is preferably placed so that when the spindle rests

on the step-bearing in the tube the center of the groove in the whirl 10 or the line of the band-pull is on a line with the projection or enlargement 13 of the combined bolster and step tube.

14 indicates a yielding ring surrounding a portion of the combined bolster and step tube.

15 indicates an elongated slit in the wall of the combined bolster and step tube.

The bolster-case consists in the base 16, having a downward-cylindrical projection 17, the lower end of which is screw-threaded. The projection 17 extends through a hole in the spindle-rail slightly larger than the projection, the base 16 rests on the bolster-rail, and the whole is firmly secured to the rail by the nut 18. From the base 16 extends upwardly the tube 19. This tube is bored out to receive the combined bolster and step tube and forms the bolster-case. The lower portion of the bore is of slightly greater diameter than the diameter of the part 12 of the combined bolster and step tube, while the upper diameter of the bore, as shown, is sufficiently greater than the lower to form a shoulder, preferably slightly concaved, so as to form a seat for the enlargement 13 on the combined bolster and step tube. The yielding ring fits tightly in the bolster-case and forms a yielding packing between the inner wall of the bolster-case and the combined bolster and step-tube. The pin 20 holds the sleeve-whirl in place when the bobbin is doffed or withdrawn. It can be readily turned to allow of the withdrawing of the spindle from the bolster.

The thorough lubrication of the bearings is of the highest importance. To this end the interior of the bolster-case is connected by the duct 21 with the oil-reservoir 22, closed by the cap 23. The oil surrounds the combined bolster and step tube and enters through the elongated slit 15 to supply the necessary oil to the spindle-bearings. The oil-reservoir may be made of any desired diameter, so as to insure lubrication for a long time, and as the height of the reservoir is nearly on a line with the upper bearing of the spindle thorough lubrication is secured, as the oil at the bearings will be on a line with the oil in the reservoir.

The operation of the spindle when in use spinning yarn at the now usual high speed is as follows: As the spindle is accurately adjusted in the exact center of the spinning-ring, it is essential that this position be maintained. When the ring-rail is raised and yarn is spun on the upper end of the spindle, the draft of the yarn must be resisted, and as the direction of this draft is continually changing by the traveler moving around the ring the yielding packing continually resists this lateral motion of the blade of the spindle, so as to slightly yield to this draft, resist it, and restore the true axial center of the spindle. The yielding packing acts exactly in the same manner to resist the centrifugal tendency of an unbalanced bobbin or yarn load. Every blow caused by the revolution at high speed of an imperfectly round or an otherwise imperfect spindle is cushioned by the yielding packing, the action of which is independent of its own resilience, for as every imperfection of construction in the spindle, the strain on the yarn being wound on the spindle or bobbin or an unbalanced bobbin, all revolve with the spindle, the yielding of the packing at one instant at any point indents the same, so that in the rotation of this centrifugal effort the normal packing is always in front of the effort, causing a rolling action on the packing. In a well-constructed spindle these lateral motions are infinitely small; but without a cushion they repeat themselves so often that the spindle will shake and tremble, so as to frequently throw off the bobbin from the blade of the spindle. By permitting a slight oscillating motion to the combined bolster and step tube and resisting the same by a yielding packing placed between the bolster and step tube and the bolster-case at any point as far as possible from the center of oscillation a spindle can be run perfectly steady at higher speed with less power than spindles as heretofore constructed.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A spindle-support consisting of a combined bolster and step, the bolster-case supporting and inclosing it and forming an oil-chamber and having a rigid lateral bearing for the combined bolster and step at or near the line of the band-pull, and a yielding packing, the combined bolster and step being constructed to oscillate, resisted by the yielding packing, in combination with a spindle and whirl, as described.

2. A combined bolster and step bearing for a spindle provided with a projection, and a bolster-case closed at the bottom to form an oil-chamber and provided with a socket forming the support for the projection on the combined bolster and step, in combination with a spindle provided with a sleeve-whirl surrounding the bolster-case, and a yielding packing placed intermediate the bolster-case and the combined bolster and step, as described.

3. A bolster-case closed at the bottom to form an oil-chamber, a combined bolster and step tube of less diameter than the interior of the bolster-case, an annular projection formed on the combined bolster and step, and a yielding packing placed between the bolster-tube and step-tube and the bolster-case, in combination with a spindle provided with a sleeve-whirl, the horizontal line of the band on the whirl being substantially on a line with the annular projection on the combined bolster and step tube, as described.

4. The combination, with a spindle provided with a sleeve-whirl, of a combined bolster and step tube provided with an annular projec-

tion and a bolster-case closed at the bottom, constructed to closely fit the annular projection and hold the combined bolster and step tube against lateral motion and permit axial oscillating motion of the bolster and step bearing, as described.

5. The combination, with the bolster-case closed at the bottom to form an oil-chamber, and a sleeve-whirl spindle, of a combined bolster and step bearing for the spindle supported in the bolster-case within the whirl to resist the band-pull and extending above and below the said support, and an elastic annular packing constructed to permit of slight oscillating motion of the combined bolster and step tube, as described.

6. The combination of a spindle and whirl with a spindle-support consisting of a bolster-case constructed to be secured to a spinning-machine and forming an oil-reservoir, from which oil is supplied to the spindle-bearings, a bolster and step bearing contained in said case, and a packing placed between the bolster bearing and the case, the bolster-bearing being firmly held in the bolster-case against lateral motion within the whirl, the upper end of the bolster-bearing and the lower or step bearing having capacity of slight lateral motion resisted by the yielding packing, as described.

7. The combination, with a sleeve-whirl spindle, of a bolster-case forming an oil-distributing chamber connected with an oil-reservoir, a bolster-tube containing the bolster and step bearing held in the bolster-case firmly against lateral motion at or near the line of the band-pull, the upper and lower portion being of less diameter than the interior of the bolster-case, and an elastic or yielding packing interposed between the bolster-tube and the bolster-case, as described.

8. In a support for a spindle, the combination, with the bolster-case having an oil-chamber and the bolster-tube containing the bolster and step bearing and provided with the annular projection 13 and the elongated slit 15, of the oil-reservoir 22, connected with the oil-chamber of the bolster-case by the duct 21 and extending above the bearing of the bolster-tube in the bolster-case, as described.

9. The combination, with the bolster-case forming an oil-chamber, and a spindle having a sleeve-whirl surrounding the bolster-case, of a yielding packing and a combined bolster and step tube supported at or about midway between the step-bearing and the upper end of the bolster and bearing firmly against lateral motion in the bolster-case, the upper and lower ends of said combined bolster and step-tube having capacity for lateral motion yieldingly resisted by the packing interposed between the bolster-case and the bolster and step tube, as described.

10. A combined bolster and step tube provibed with an annular projection and an annular yielding packing, in combination with a bolster-case adapted to be secured to a spinning-machine closed at the bottom to form an oil-chamber, and constructed to hold the combined bolster and step tube firmly against lateral motion and permit of slight oscillating motion, as described.

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