To all whom it may concern:

Be it known that I, Henry F. Woodmancy, of Whitinsville, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Spinning and Twisting Machine Spindles; 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.

In spinning and twisting machines the yarn is wound on bobbins in concentric spirals from end to end or in conical spirals. The yarn-load constantly varies, and when laid in conical spirals the load gradually extends more and more upward from the base of the bobbin until it reaches the top of the bobbin. The ever-changing yarn-load on the bobbin when rotating at the high speed usual in the modern mills causes trembling or vibration in the bobbin and the spindle supporting the same. It has been found in practice that a slight yielding of the bobbin laterally causes the bobbin to rotate without jar or tremble. Spindles have therefore been supported loosely in their bolster or the bolster loosely in the holder, and it has been found that a slight looseness of fit of one thousandth of an inch will materially reduce the jarring and uneasy motion of the bobbin, the accepted theory being that the bobbin will rotate on the ever-changing center of gravity of the revolving yarn-load.

In the class of spindles as herefore constructed to permit of the lateral movement of the bobbin and yarn-load the bobbin was supported on a sleeve rigidly secured to or forming part of the band or driving-whirl or partly on such a sleeve and partly on a spindle rigidly secured to the band or driving-whirl, so that the bobbin could rotate only around the axial center on which the bobbin-support rotated, and any lateral freedom of motion in the spindle or the bobbin-support did not permit the variation of the yarn-load to change the axis of rotation of the bobbin and the bobbin could not rotate around the ever-changing center of gravity of the yarn-load because the bobbin was secured to a rigid structure, and no matter what the change in the axis of rotation of the supporting structure the bobbin and yarn-load had to turn with the structure and always with the axis of rotation of the structure. I find that when the bobbin is supported at opposite ends by two supports which are disconnected from each other sufficiently loose to allow of independent slight lateral adjustment and one of these two parts is driven, then the varying yarn-load will automatically adjust the bobbin and cause it to run perfectly true at high speed without jar or tremble.

My invention consists in the peculiar and novel construction of the spindle whereby the bobbin is supported at the upper and the lower ends by two supports having capacity for independent lateral adjustment, as will be more fully set forth hereinafter.

Figure 1 is a vertical sectional view of my improved spindle, showing the parts in their operative positions. Fig. 2 is a side view, and Fig. 3 a sectional view, of the bolster, which is supported in the bolster-case and held against rotation in the same. Fig. 4 is a side view, and Fig. 5 a sectional view, of the bolster secured to the sleeve-whirl. Fig. 6 is a side view of the lower end of the spindle. Fig. 7 is a vertical sectional view of the sleeve-whirl.

Similar marks of reference indicate corresponding parts in all the figures.

In the drawings, A indicates the bolster-case, adapted to be secured to the rail of a spinning and twisting machine and preferably provided with the laterally-extending oiling-tube A' and the doffer-guard A". The bolster-case A has the central bore in which the bolster A‴ is inserted, fitting the bore with a sliding fit and held against rotation by the projection A‴, which enters a groove in the bolster-case. The lower end of the bore is tapered and supports a conical steel plug forming the step A‴.

The sleeve-whirl B extends around the upper part A‴ of the bolster-case and has the driving-whirl B″. The cup B‴, forming part of the sleeve-whirl B, may be used to secure the bobbin C to the sleeve-whirl, as shown in Fig. 1; but the bobbin may be secured to the sleeve-whirl in any other manner. In pr
tice I prefer the use of the cup B, as it prevents the splitting of the bobbin and holds the bobbin at its lower end.

The sleeve-whirl B is secured to the tapering upper end B of the tube B, the bearings B and B of which fit the bolster-tube A with a sliding fit. The spindle D is vertically supported on the flat surface of the step A. The foot of the spindle has the conical enlargement D, forming the shoulder D at its junction with the spindle, the lower end tapering to the small bearing-surface D.

The spindle D extends through the tube B. It is normally free to rotate independently of the tube B and is free to adjust itself laterally in all directions. The lower end of the tube B extends to or nearly to the shoulder D. The blade D of the spindle D forms the lateral support of the upper end of the bobbin C and is preferably in frictional contact with that part of the bobbin. The bolster A and the tube B are provided with openings for the admission and free circulation of oil to the bearings. The deflector A prevents the lifting of the sleeve-whirl in doffing the bobbin, and the tube B prevents the lifting of the spindle.

In my improved structure the foot of the spindle is free to move laterally in all directions on the flat surface of the step A. The spindle is also free to move laterally in all directions within the limit of looseness of the fit in the tube B. The spindle may, within this limit, move laterally without changing the vertical position of the axis of rotation, and it may assume an inclined position, so as to rotate on an axis inclined to the normal vertical axis of rotation. As the spindle con-

50 rolls the upper end of the bobbin, this end moves with every movement of the spindle or when the centrifugal force of the rotating yarn-load acts to change the axis of rotation of the bobbin. The spindle is free to yield to this force and allow the upper end of the bobbin to assume its true position.

The sleeve-whirl, supporting the lower end of the bobbin and driving the same, is in my structure also free to adjust itself and yield to the unbalanced bobbin or the varying yarn-load in the same manner as the spindle and independent of the same, so that the yarn-load revolving at high speed can control the position of the bobbin and cause the bobbin and its load to rotate around the changing vertical center of gravity of the mass during the process of building the bobbin. By this construction the spindle may remain stationary or rotate slowly when the bobbin is removed, and when a new bobbin is placed in the bobbin will commence to rotate only when its lower end is connected with the whirl, thereby facilitating the doffing and replacing of the bobbin and preventing the throwing off of the bobbin.

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

1. In a device of the nature described for supporting and rotating the bobbins of spinning and twisting machines, in combination, a bolster-case containing an oil-chamber, an upwardly-extending tube on the bolster-case, a sleeve-whirl surrounding the upwardly-extending tube on the bolster-case, a tube secured to the sleeve-whirl and extending into the bolster below the whirl and the bolster, whereby the sleeve-whirl is supported against the lateral strain of the driving-band, as described.

2. In a bobbin-support for spinning or similar machines, in combination, a bolster-case, an upwardly-extending tube on the bolster-case, a bolster-tube in the bolster-case of less external diameter than the bore of the bolster-case, a sleeve-whirl surrounding the tubular upper part of the bolster-case, and a tube secured to the sleeve-whirl and extending into the bolster-tube to a point below the whirl, as described.

3. In a bobbin-support for spinning or twisting machines, a sleeve-whirl having a central tube extending from the sleeve above the whirl to a point below the whirl and the bolster; whereby the sleeve-whirl may be supported against the pull of the driving-band above and below the whirl, as described.

4. In a bobbin-support for spinning or twisting machines, a sleeve-whirl forming the upper support of the bobbin, a whirl loose on the spindle, a support for the lower end of the bobbin on the whirl, and a bolster-case containing an oil-chamber, forming the support of the steps of the spindle end of the whirl; whereby the whirl may rotate independent of the spindle when the bobbin is removed, as described.

5. In a bobbin-support, in combination, a bolster-case having an oil-chamber, a spindle supported on a step-bearing on the lower part of the bolster-case, the step-bearing, the blade of the spindle extending to and forming the upper support of the bobbin, the bolster, a tube surrounding the spindle below the bobbin, said tube fitting the bolster with a loose fit, a whirl secured to the tube surrounding the spindle, and a bobbin-support on the whirl for the lower end of the bobbin, whereby the bobbin may adjust itself to variations in the yarn-load, as described.

6. In a bobbin-support, the combination with the bolster-case, an oil-chamber in the bolster-case, a step-bearing, and a bolster-tube loose in the bolster-case, of a sleeve-whirl surrounding the tubular end of the bolster-tube, a tube loosely fitting the bolster and secured to the whirl, a spindle supported on the step-bearing, extending through the tube secured to the sleeve-whirl with a loose fit, a shoulder on the spindle forming the vertical
support for the sleeve-whirl, and a blade on the spindle extending to the upper part of the bobbin, whereby the bobbin-supports on the sleeve-whirl and on the spindle may adjust themselves laterally to the revolving varying yarn-load on the bobbins, as described.

7. In a bobbin-support, in combination with the bolster-case, the tubular upward extension of the bolster-case, the oil-chamber in the bolster-case, and the flat step-bearing, of a spindle having an enlarged head, forming a shoulder, at its junction with the spindle, said head tapering to a small point resting on the flat top of the step-bearing, a tube surrounding the lower part of the spindle with a loose fit and supported on the shoulder formed by the tube inclosing the spindle but disconnected from the spindle, and a bolster-tube fitting the bore of the bolster-case with a loose fit and held against rotation, whereby the bearing-surfaces of the spindle forming the support for the upper end of the bobbin and the tube supporting the sleeve-whirl may be supplied with lubricant from the oil-chamber and the upper and lower supports for the bobbin may adjust themselves laterally and independent of each other to a varying yarn-load, as described.

8. The combination in a spinning or twisting machine spindle with the bolster-case A, the bolster A² and the step A³ in the bolster-case, of the spindle D having the enlarged conical foot D¹ and the blade D², the sleeve-whirl B, the tube B² secured to and rotating with the sleeve-whirl and a bobbin the upper end of which embraces the blade of the spindle and the lower end engages with the sleeve-whirl, the spindle and the sleeve-whirl having capacity for lateral adjustment produced by the looseness of the fit of their bearings; whereby the sleeve-whirl and the spindle may yield each independent of the other to any unbalanced load on the bobbin, as described.

In witness whereof I have hereunto set my hand.

HENRY F. WOODMANGCY.

Witnesses:

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