(No Model.)

B. N. GOODALE.

SUPPORT FOR SPINNING SPINDLES.

No. 414,042. Patented Oct. 29, 1889.

Fig. 1.

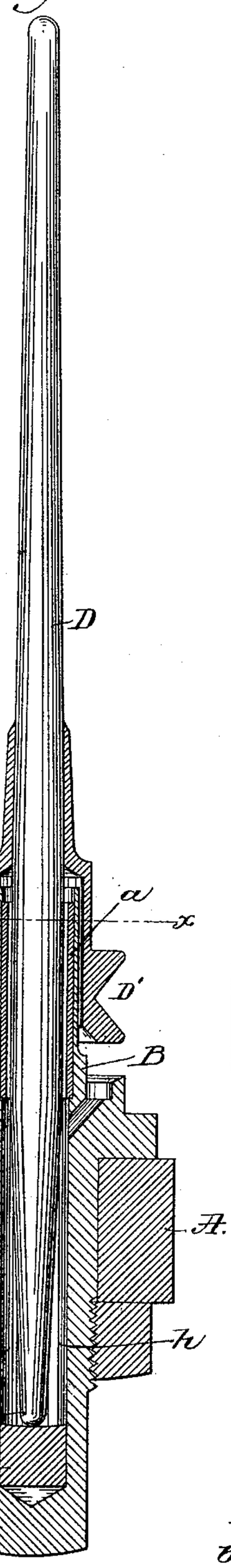

Fig. 2.

Fig. 3.

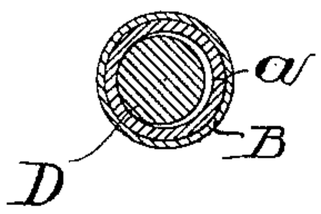

Fig. 4.

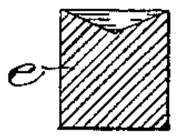

Fig. 5.

Witnesses.
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UNITED STATES PATENT OFFICE.

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SUPPORT FOR SPINNING-SPINDLES.

SPECIFICATION forming part of Letters Patent No. 414,042, dated October 29, 1889.

Application filed May 24, 1889. Serial No. 311,958. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN N. GOODALE, of Saco, county of York, State of Maine, have invented an Improvement in Supports for Spinning-Spindles, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In experiments carried on some years ago with a view to the production of spindles and bearings for spinning machinery which would enable the spindle to be run at high speed and yet properly retain the bobbins thereon, it was demonstrated that when the spindle had a loose bearing in a supporting case or rail that the vibration of the top of the spindle was greatly lessened, even at high speed; and from that time up to the present time many spindles and bearings have been devised and patented, all having for their object the production of the best form of spindle-support and loose lateral bearing for the spindle, and the said loose bearings have been placed both in the line of the band-pull and at the lower end of the spindle.

In my experiments, aiming at the production of the simplest, cheapest, and best form of support for the spindle of a ring-spinning frame—a support which would permit the spindle to be run at the maximum speed required and with but the minimum jar and vibration—I have discovered that the loose lateral bearing heretofore considered as necessary may be entirely dispensed with.

My experiments have demonstrated the fact that a sleeve-whirl spindle may have a fixed unyielding bearing in the line of the band-pull, and the said spindle when run at high speed properly retains the bobbins and properly spins the yarn, provided the portion of the spindle contained within the said rigid bolster-bearing be enough smaller in diameter than the interior diameter of the bolster-bearing as to permit the spindle to stand in and not touch the said bolster-bearing except when the spindle is borne against or aligned upon the said bearing by the pull of the band, the foot of the said spindle, however, being free to wander in the said supporting-case as required to enable it to find the center of gravity of the load.

In my invention care should be taken that the interior of the fixed bolster-bearing and the exterior of the spindle within the said bearing be of such shape as to contact as substantially parallel surfaces when the axis of rotation of the spindle is vertical or plumb, when the spindle is pulled against one side of the fixed bearing by the band-pull. The diameter of the spindle is such with relation to the internal diameter of the bolster-bearing that when the band pulls the spindle against the said bearing the spindle and bearing touch only on a vertical line, the touch being tangent to the spindle, and as a result of these differing diameters of the spindle and bolster-bearing the spindle is free to move in every lateral direction except directly in the line of the band-pull to compensate for any inequalities of surface between the spindle and bolster and for any inequalities of load carried by the spindle, and at the same time, as the lower end of the spindle is unrestrained, it is free to move to find the center of rotation of the load.

My invention consists, essentially, in the combination, with a supporting-case, a rigid bolster-bearing therein in the line of the band-pull, and a step, of a sleeve-whirl spindle having a pintle of less diameter, as described, externally than the internal diameter of the said rigid bearing, against which bearing the said spindle is aligned by the band-pull, the foot of the spindle being free to wander on the said step, substantially as will be described.

Other features of my invention will be hereinafter described, and pointed out in the claims at the end of this specification.

Figure 1 represents a spindle support or bearing embodying my invention, the spindle-rail and sleeve-whirl being in vertical section, while the spindle is in elevation. Fig. 2 is a section below the dotted line *x*, Fig. 1, but with the spindle out of contact with the bolster-bearing. Fig. 3 is a like section with the spindle and bolster-bearing in contact in one vertical line, as when the band drives the spindle and aligns it against the bolster-

bearing; and Figs. 4 and 5 show modified shapes for the top of the step.

The rail A and the supporting-case B, held thereon by the nut C, are all as usual. The supporting-case B above the rail has a rigid bolster or lateral bearing *a*, and at its lower end the said case is supplied with a step *e*, on which stands and rotates the rounded or reduced lower end *f* of the spindle D, having a sleeve-whirl D′. The spindle (see Fig. 2) within the whirl is of less diameter externally than the internal diameter of the rigid bolster-bearing *a* within the whirl, the difference being such that the spindle, when exactly central in the supporting-case and exactly perpendicular, may stand and not touch the rigid bolster-bearing; but when the spindle is being rotated by the usual hand on the sleeve-whirl the band-pull acts to draw the spindle toward and firmly seat or align it against the interior of the said rigid bolster-bearing, the contact between the spindle and bearing being in a single vertical line, which I denominate a "tangential contact." The space *h* in the bolster-case surrounding the spindle below the said rigid bolster-bearing is preferably greater than the space between the spindle and the interior of the rigid bolster-bearing, so that the lower part of the spindle below the rigid bolster-bearing may have perfect freedom as to the extent of its vibration or lateral motion due to an unbalanced load.

To insure true perpendicular position for the spindle during its rotation and when aligned against the rigid bolster-bearing, the inner surface of the latter and the exterior of the spindle to contact with it should be so turned or shaped as to be substantially parallel. For the best results I prefer that the top of the step *e* be slightly concaved or countersunk, as in Figs. 1 and 4, but the step may have a plain top. I prefer the concaved or countersunk top, for the reason that the spindle, having a rounded end and running loosely in the larger concavity of the step, is normally kept central with relation to the step, the concavity of the latter offering, however, a slight resistance to the movement of the spindle away from the center of the step; but such concavity or countersink does not prevent the movement of the foot of the spindle to overcome inequalities of load.

I claim—

1. The combination, with a supporting-case, a rigid bolster or lateral bearing therein in the line of the band-pull, and a step for the lower end of the spindle, of a sleeve-whirl spindle having a pintle of less diameter, as described, externally than the internal diameter of the said bolster-bearing, whereby the foot of the spindle is free to wander in the supporting-case on the said step, substantially as described.

2. The combination, with a supporting-case, a bolster-bearing therein in the line of the band-pull, and a step having a concaved or countersunk top, of a sleeve-whirl spindle having a pintle of less diameter, as described, externally than the internal diameter of the said bolster-bearing, the foot of the spindle being free to wander in the supporting-case, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJ. N. GOODALE.

Witnesses:
GEORGE A. EMERY,
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