(No Model.)

J. E. TYNAN.

SPINDLE BEARING FOR SPINNING MACHINES.

No. 467,649. Patented Jan. 26, 1892.

Fig. 1.

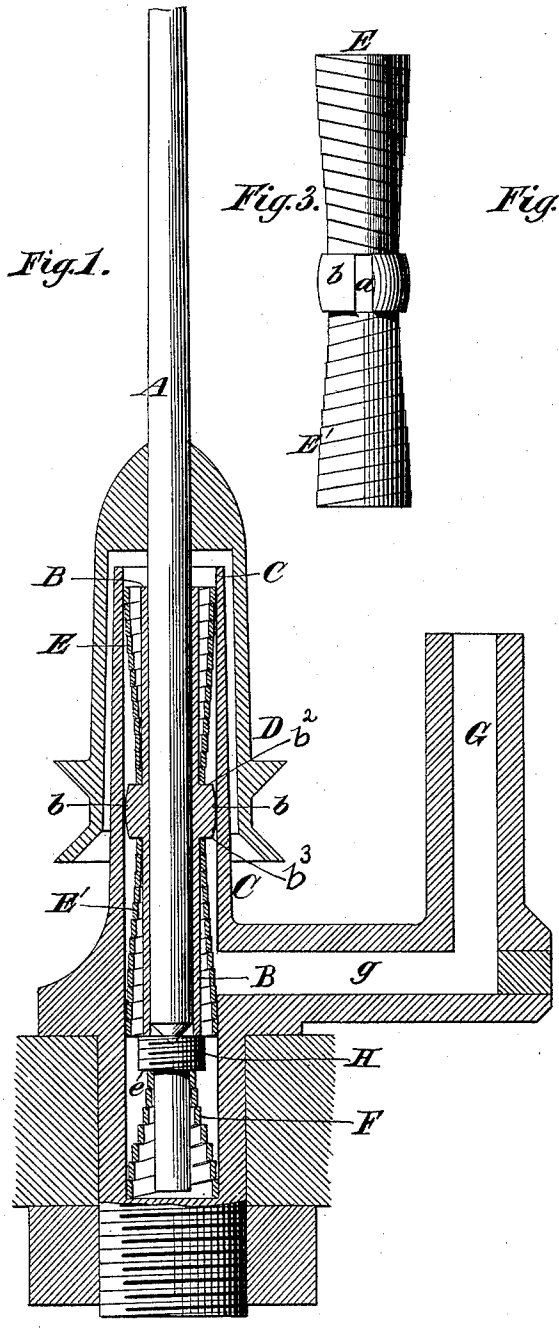


Fig. 3.

Fig. 2.

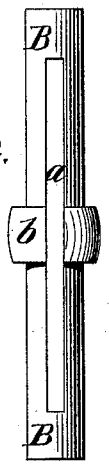
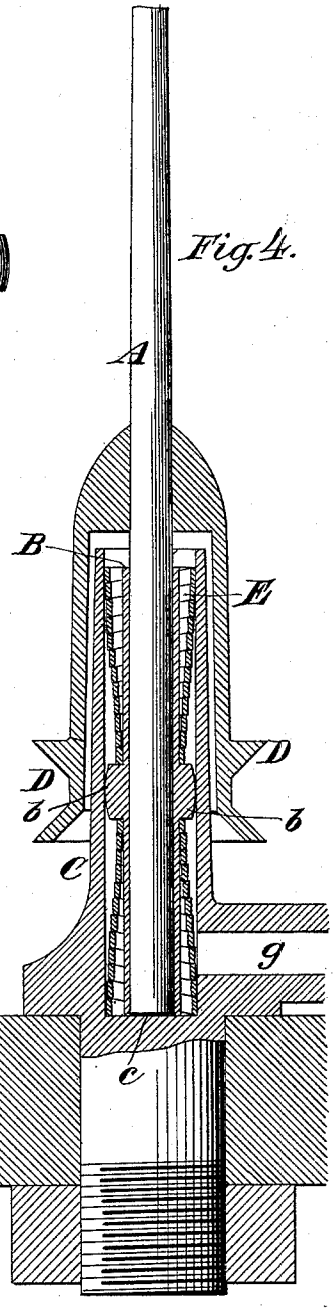


Fig. 4.



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JOSEPH E. TYNAN, OF PATERSON, NEW JERSEY.

SPINDLE-BEARING FOR SPINNING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 467,649, dated January 26, 1892.

Application filed June 14, 1888. Serial No. 277,096. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. TYNAN, of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Spindle-Bearings for Spinning-Machines, of which the following is a specification.

The object of this invention is to enable a spindle to accommodate itself in its rotation to an unbalanced load, so that an untrue bobbin may find its proper center of rotation.

I will first proceed to describe my invention with reference to the drawings, and afterward point out its novelty by claims.

In the accompanying drawings, Figure 1 represents an elevation of the lower part of a spindle and a central vertical section of its bolster and bolster-supporting tube and their appurtenances and of the whirl or driving-pulley with a portion of the spindle-rail of the spinning-machine. Fig. 2 represents a side view of the bolster. Fig. 3 represents a side view of the bolster and the springs or lateral elastic bearings which are applied thereto and which constitute parts of my invention. Fig. 4 represents an elevation of the lower part of a spindle with a central section of the bolster and its supporting-tube and adjacent parts illustrating a modification of my invention.

Similar letters of reference designate corresponding parts in all the figures.

I will first describe my invention with reference to Figs. 1, 2, and 3.

A designates the spindle; B, the bolster; C, the bolster-supporting tube; D, the whirl or driving-pulley on the spindle, and H the spindle-step. The bolster B is represented as consisting of a tube bored to fit the spindle and having a portion of its exterior at about the middle of its length swelled with a rounded axial profile, as shown at *b*, to fit the bore of the supporting-tube and having parts of its exterior above and below said swelled portion *b* considerably smaller, so that a considerable space will be left between them and the bore of the supporting-tube C. The swelled portion *b* is constructed to form shoulders b^2 b^3 at its top and bottom.

E E′ designate tubular springs represented as made of coiled flat wire of substantially conical form. The interiors of the smaller ends of these springs fit tightly around the bolster, one above and the other below the shouldered and swelled portion B, and the exteriors of the larger ends fit tightly within the bore of the bolster-supporting tube C, so that the said springs form between the bolster and the supporting-tube elastic bearings, which are capable of yielding laterally in all directions, but which in their normal condition keep the bolster and the spindle, with their axis, coincident with the axis of the supporting-tube.

H designates the spindle-step, which in the example of my invention illustrated in Fig. 1 consists of a piece separate both from the bolster and the supporting-tube and occupying a position within the lower part of the bore of the supporting-tube, the said bore being for the purpose of receiving the said step prolonged downward below the position to be occupied by the lower ends of the spindle and bolster. The said step is here represented as a pin, the upper part of which is large enough to support the spindle and bolster, and the lower part of which is reduced in size to form a shoulder *e* for the support of the step upon the spring F, which rests upon the bottom of the bore of the supporting-tube. This spring is represented as tubular and formed of a conical coil of flat wire, the upper part of the interior of which is of a size to fit tightly to the portion of the step below the shoulder *e*, and the lower part of which is of a size externally to fit tightly within the lower part of the bore of the supporting-tube. This spring forms a vertically and laterally yielding bearing for the step, and in its normal condition it supports the said step with its axis coincident with that of the bore of the supporting-tube and in line with the axis of the spindle in the normal position of the latter, the bottom of the step-bearing being then at a very short distance above the bottom of the bore of the supporting-tube, as shown in Fig. 1, and at a proper height to support the spindle in its normal position. The whirl D, which is fast to the spindle above the supporting-tube, overhangs the outside of the said supporting-tube and has its band-groove about opposite the swelled portion *b* of the bolster.

The bolster is represented as having a longitudinal slot *a* in one side, through which a passage is formed for oil, which is supplied to the interior of the supporting-tube C from a reservoir G, attached to the said tube, through a lateral passage *g*, the oil passing freely between the coils of the several springs or lateral elastic bearings. Any oil which overflows the bolster will pass down through the interior of the spiral spring E and through the slot *a* to the reservoir. In case of the load on the spindle A (shown in Fig. 1) being unbalanced, the said spindle will be enabled to assume a slight inclination sufficient to enable the bobbin or load upon it to find its true center of rotation. This inclination is permitted by the bolster being only fitted to the supporting-tube at its swelled and slightly-rounded portion *b* and by the springs or lateral elastic bearings F′ above and below the said swelled portion. In the above-described movement of the spindle and bolster from the normal position concentric and in alignment with the bore of the supporting-tube C the lower end of the spindle must necessarily have a lateral movement, and this lateral movement is provided for by the step H being supported in the lateral elastic bearing constituted by the spring F. It will be observed that the step in its normal position is supported only at a very short distance above the bottom of the bore of the bolster-supporting tube. It is necessary that it should be held out of contact with the bottom of the said tube to permit its free lateral movement to accommodate itself to the inclination of the spindle; but it is also desirable that in placing a bobbin upon the spindle, when the downward pressure applied to the bobbin to bring it to its place will overcome the upward pressure of the spring, that the step should have a more firm upward support than that afforded by the spring, and the bottom of the step being so near the bottom of the bore of the supporting-tube in its normal position the bottom of the tube serves as a stop to prevent any considerable downward movement of the step in placing the bobbin on the spindle.

The example of my invention represented in Fig. 4 differs in no respect from that illustrated in Fig. 1, except that the bore of the supporting-tube is not prolonged downward beyond where the bottom of the spindle is to be supported and that there is no movable step. The step for the spindle is represented as a simple flat surface *c* at the bottom of the bore of the supporting-tube, the said step also serving to support the bolster. In this case, in case of any inclination or vibration of the spindle and bolster, the bottom of the spindle and bolster move upon the surface of this step. The springs E E′ fit so tightly to the inside of the supporting-tube C and the outside of the bolster as to prevent the bolster from turning with the spindle.

When it is desired to remove the bolster from the supporting-tube, it is done by inserting into the bolster after the removal of the spindle a tool that will engage with the slot *a*. The springs will be withdrawn with the bolster if the bolster is turned in such a direction that its friction on the springs will tend to coil up the latter and so loosen them in the supporting-tube. In order that both springs E E′ may turn together in the direction to thus coil them up, it is obvious that the inclination of their spiral coils must be reversed, and it is for this purpose that they are shown reversed in the drawings.

The spring F is removed with the step H in the same manner that the springs E E′ are removed with the bolster by turning the step and drawing it upward. In order to provide for this removal of the step, I have shown its head as externally screw-threaded for the purpose of receiving the lower end of a screw-threaded socket which is to be used for its removal.

The elastically-supported step will make any spindle run more quietly than one having a solid step.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a sleeve-whirl spindle and a supporting-case, of a rocking or swiveled bolster, an independent laterally-movable step, and a spring to support the step, the said spring being capable of yielding both vertically and laterally, substantially as described.

2. The combination, with the bolster-supporting tube and spindle, of a bolster having a part of its exterior surface of cylindrical shape to receive a spiral spring and another part of the exterior surface swelled to fit the interior of the supporting-tube, said swelled portion terminating in a shoulder, and a spiral spring, one end of which abuts against the shoulder and fits tightly the cylindrical part of the bolster, and the other end of which is enlarged to fit the interior of the supporting-tube, substantially as herein described.

3. The combination, with a spindle and bolster therefor and a supporting-tube for said bolster and a laterally-elastic bearing between the bolster and supporting-tube, of a spindle-step separate from the bolster, and a laterally-elastic bearing for said step, whereby it may have a lateral movement distinct from that of the bolster, substantially as herein described.

4. The combination, with a spindle, a bolster-supporting tube, and a bolster having one portion of its exterior swelled to fit the bore of said tube, but in other portions smaller externally than said bore, of a step for the spindle separate from the bolster, arranged within said tube to be capable of lateral and longitudinal movement therein independent of the bolster, and a conical spiral spring, the base of which fits the supporting-tube only and the truncated end of which fits the step only, the said spring supporting

said step and preventing it from touching the bottom and sides of said tube, substantially as herein set forth.

5. The combination of a spindle, a bolster-supporting tube, and a bolster having one portion of its exterior swelled to fit the bore of said tube, but in other portions smaller externally than said bore, of a step separate from the bolster, arranged within said tube and supporting both the spindle and the bottom of the bolster, a laterally-yielding bearing for the bolster within the supporting-tube, and a laterally-yielding bearing for the said step, whereby the lower part of the bolster and the spindle may move together laterally with their axes out of line, substantially as herein described.

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