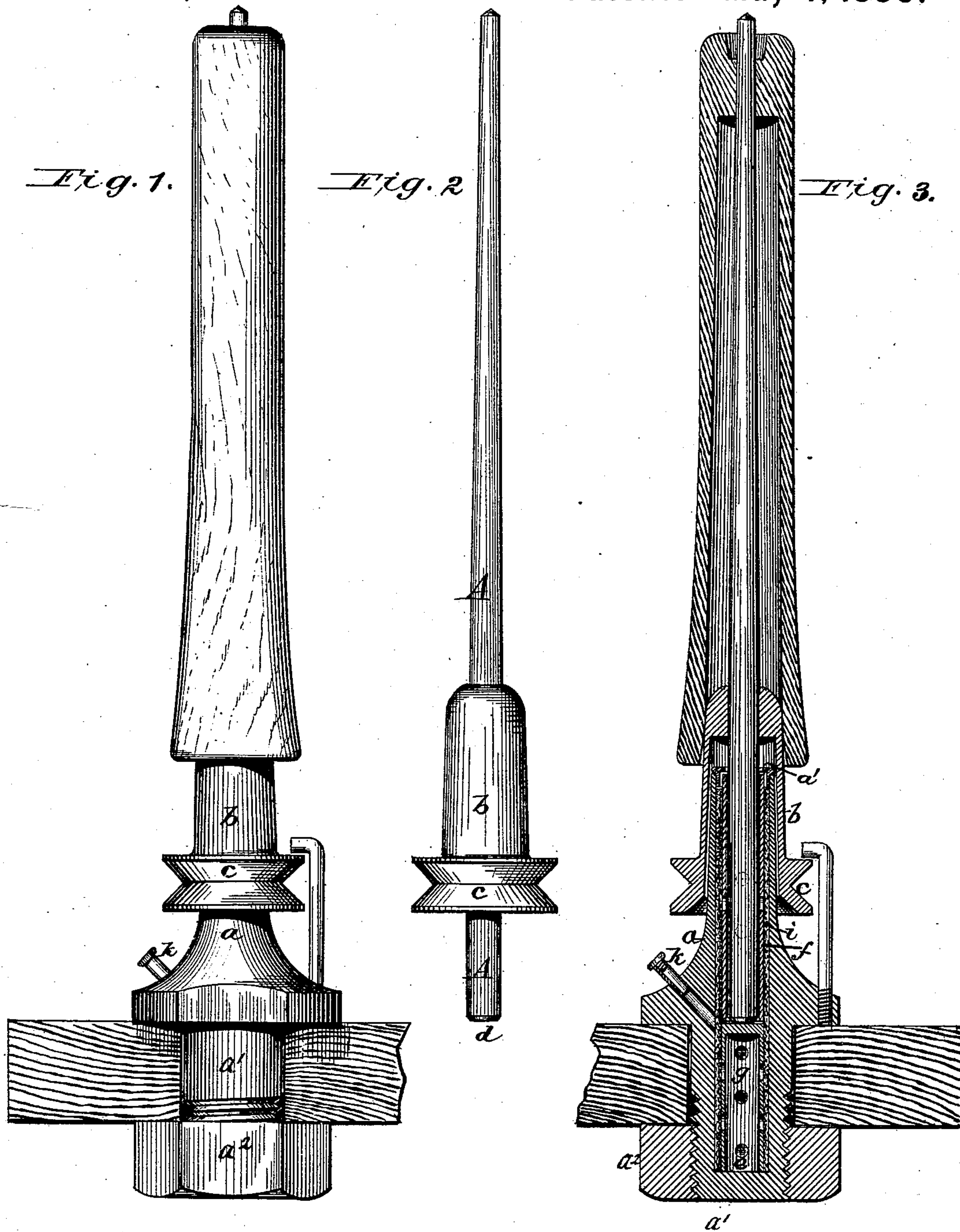


F. J. RABBETH.  
Spinning Spindle and Bearings.

No. 227,129.

Patented May 4, 1880.



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Inventor.  
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By. *Wm. C. Mott* Atty.

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Fig. 4

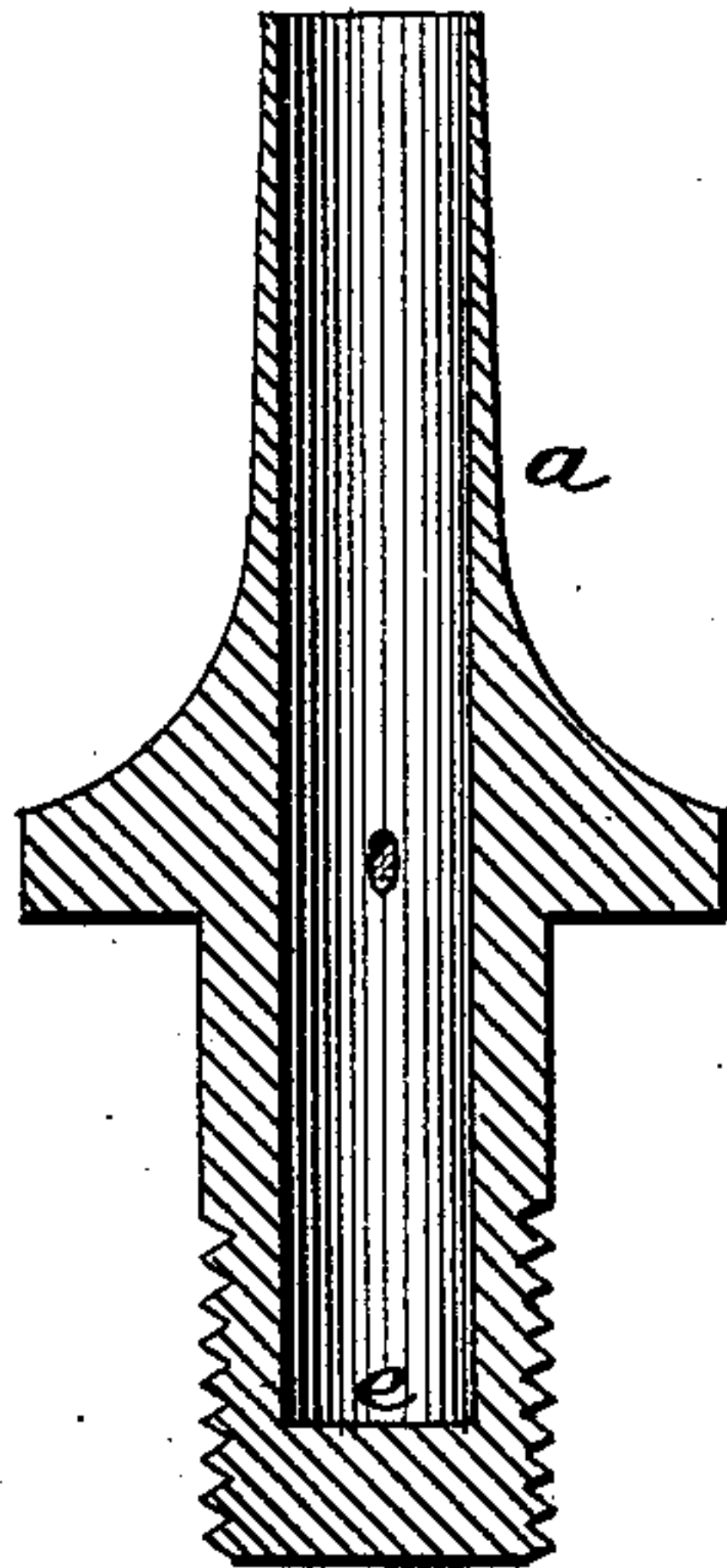


Fig. 7 Fig. 5. Fig. 6.

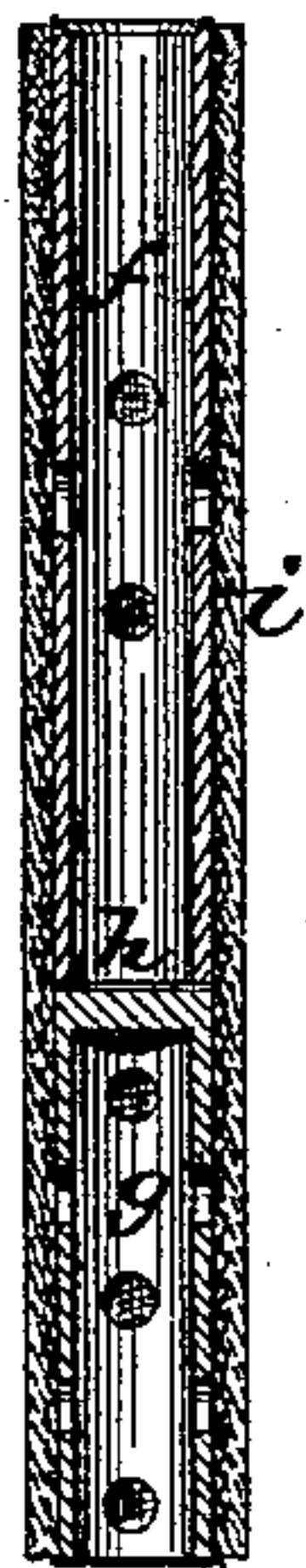
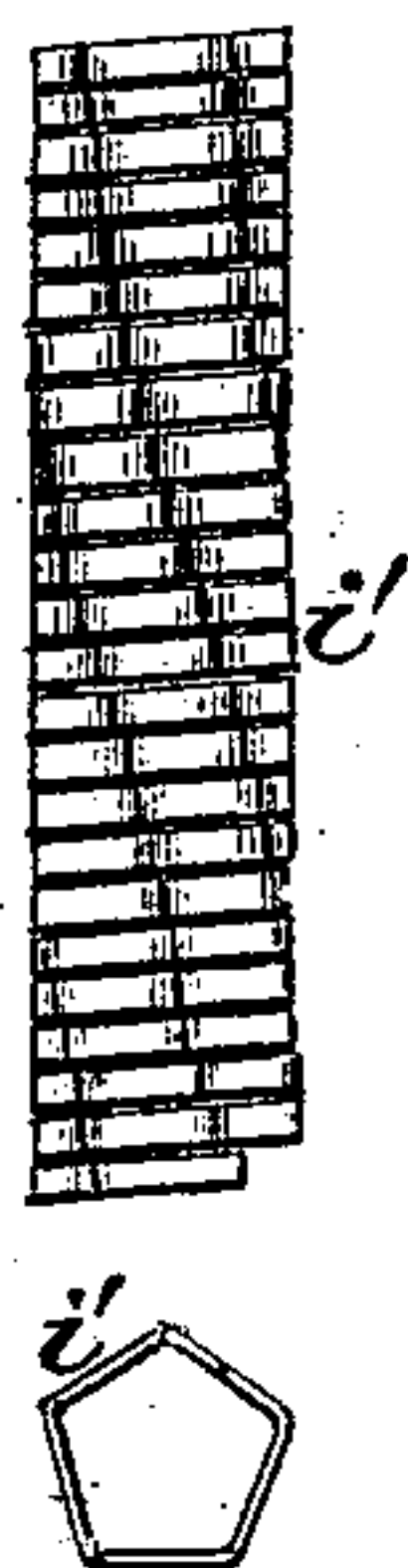


Fig. 8.



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# UNITED STATES PATENT OFFICE.

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## SPINNING SPINDLE AND BEARING.

SPECIFICATION forming part of Letters Patent No. 227,129, dated May 4, 1880.

Application filed July 13, 1878

*To all whom it may concern:*

Be it known that I, FRANCIS J. RABBETH, of the city and county of Providence, and State of Rhode Island, have invented a certain new and useful Improvement in Spinning-Spindles and their Bearings; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part thereof, is a full, true, and clear description of my invention.

My said improvement relates to live-spindles both for twisting and spinning, and is specially valuable in that class of live-spindles in which the bearings for the spindle are contained wholly within a supporting-tube, which is variably applied to or mounted upon the spindle-rail of a spinning-machine.

The objects of my invention are to obviate the evil effects incident to such vibration as is common to spindles of the class referred to by so constructing the spindles and bearings or supports that the spindles and any bobbins and yarn loads thereon, if unbalanced, may be free to find and revolve around a common center of gravity, and thus be rendered capable of producing more perfect yarn, while at the same time they can be run at higher speed with a less consumption of power than any other spindles of which I have knowledge.

My invention consists of certain organizations of elements for spinning, hereinafter specified in the claims hereunto annexed. An essential element in each of said organizations is a bolster-bearing which is capable of yielding laterally with equal freedom in all directions and is mounted within a supporting-tube.

The bearing is composed of any suitable metal, and it is rendered capable of yielding by the interposition between its exterior surface and the interior surface of the supporting-tube of any suitable elastic medium to operate as a cushion or metal when the latter is properly disposed or arranged so as to insulate the bearing from the tube and afford the desired capacity for yielding in all directions laterally with more or less spring action. With this yielding bearing and a step within

the tube which permits the foot of the spindle to move with equal freedom in all directions, the spindle is not confined in its movement to any precise vertical line, and it is therefore self-adjustable to any unbalanced load thereon, for the reason that the vertical bearing is not positively fixed with relation to the supporting-tube containing it, and the foot of the spindle is not confined laterally, so that both the top and the base of the spindle while revolving are equally free to move within the supporting-tube in all directions radial to the bearing, and therefore can describe circles greater in diameter than that of the spindle at either of the points referred to. On a spindle thus mounted an unequally-balanced bobbin will, with its yarn load, be revolved around an axis which corresponds as nearly as is possible with a line drawn through its center of gravity, instead of revolving upon its geometrical axis, as is the case when the spindle is fixed in its upper or lower point of bearing, or in either of them.

The interposition of the yielding medium between the vertical bearing of the spindle and the supporting-tube contributes greatly to the durability of the bearing, and there being no necessity for a nicely-fitted step for the spindle, as has heretofore been deemed essential, practical economy is attainable in the construction of my spindles, because only a flat or slightly-rounded lower end is required thereon for contact with a plain flat step-bearing provided therefor either at and upon the bottom of the supporting-tube or at the bottom of the vertical bearing with its lower end located above the bottom of the tube, as will be hereinafter shown.

In the construction and operation of spindles and bearings containing my improvement, the location of the whirl relatively to the yielding vertical bearing becomes a matter of much greater importance than it is in the case of spindles of this class having non-yielding bearings. In the best form of the latter class of spindles it has been customary to so locate the whirl that the pull of the band will be principally borne by the step-bearing, with a view to sav-



ing friction in consequence of the small diameter of this bearing as compared with the upper or bolster bearing.

It is indispensable for the successful use of spindles containing my invention that the whirl should be located so that the pull of the driving-band will be applied in the direction of a plane which passes through the center of resistance of the yielding bearings, to prevent the spindle, when in operation, from being deflected by its band from the perpendicular or put out of proper relation to its ring when used in ring-spinning.

To more particularly describe my invention, I will refer to the accompanying drawings, in which—

Figure 1, Sheet 1, represents one of my spindles complete with a whirl-sleeve and bobbin applied thereto and attached to a spindle-rail, the latter being shown in section. Fig. 2 represents, in side view, the spindle detached. Fig. 3 represents the complete spindle and bobbin, Fig. 1, all but the spindle being in central vertical section. Fig. 4, Sheet 2, represents, in central vertical section, the supporting-tube and its screw-neck, by which it is attached to the spindle-rail. Fig. 5 represents the vertical or bolster bearing detached. Fig. 6 represents the same in side view, surrounded by a cylinder of felt, such as I prefer to use for a cushion. Fig. 7 represents, in central vertical section, a bolster-bearing, its felt, and a special base therefor detached from the supporting-tube. Fig. 8 represents, in side and top view, a metallic cushion composed of coiled flat wire.

The spindle A, Figs. 1, 2, and 3, mounted within the supporting-tube *a*, which admits of a continuous vertical bearing, is provided with a sleeve, *b*, and whirl *c*.

The supporting-tube is provided with means whereby it may be properly mounted upon the spindle-rail of a spinning-machine, and the means preferred by me for that purpose consist of a flanged base, a threaded neck, *a'*, and nut *a''*, as fully shown.

Instead of being provided with a step-journal which is fitted to a step, which not only supports the weight of the spindle, but also confines it as against any lateral movement, as heretofore, my spindle, at its lower end, *d*, may be squared off, but preferably slightly rounded, so that when it rests upon a flat plain-surface bearing, as at *e*, at the bottom of the supporting-tube *a*, Fig. 4, it will be supported, but free to move laterally in all directions, more or less, on said horizontal bearing.

The portion of the spindle which is inclosed by the supporting-tube is preferably straight, although, if it be tapered, it will not materially affect its operation.

The tubular vertical bolster-bearing *f* is composed of sheet or cast metal of any kind which will afford good journal contact with the steel spindle, and is fitted to receive the

spindle like the bolster-tubes heretofore used in similar connections.

When the bottom of the supporting-tube is fitted, as at *e*, Fig. 4, for a plain step-bearing for the foot of the spindle, the vertical bearing *f* is open at its bottom. When it is desired that the bottom of the spindle be elevated above the bottom of the supporting-tube, the bearing *f* is mounted upon a base-tube, *g*, as in Figs. 3 and 7, which rests upon the bottom of the supporting-tube. The horizontal or step bearing for the foot of the spindle is provided for either by means of a head, *h*, inserted in the bottom of the vertical bearing *f* or in the top of the base-tube *g*.

The flexible or yielding medium *i* between the vertical bearing and the supporting-tube is shown in two forms. In Fig. 6 it is a cylindrical length of felt, which will receive the bearing, and then, with it, enter fully into the supporting-tube. The felt may be cut from a sheet in strips of suitable width, jointed vertically on one side and secured by winding-threads, or it may be cut in longer narrower widths and applied in one thickness spirally; or the cushion may be composed of a tubular woven or closely-braided woolen fabric, more or less fulled or felted.

When the base-tube *g* is employed, the felt cushion is long enough to receive said tube and the vertical bearing.

In Fig. 8 the cushion is shown to be composed of flat wire. It is formed by coiling the wire upon a square arbor, and on being released therefrom it partially uncoils and becomes a five or more sided tubular structure, according to the extent to which it is uncoiled. This metallic cushion receives the bearing *f* and enters the supporting-tube. The outer angles of the cushion occupy spiral lines, and will be in contact with the supporting-tube, while the outside of the vertical bearing *f* will be in contact with the inside of the cushion at each coil between the angles.

It will be observed that the construction described in Fig. 3 involves an interior bolster-bearing, an exterior supporting-tube, and an intermediate annular chamber for a lubricant, closed at the bottom, but communicating with the spindle-bearing, and supplied with a fibrous cushion which is capable of yielding laterally with equal freedom in all directions. The advantage which results from this construction of compound bolster and supporting-tube when used with an encompassing sleeve-whirl in combination therewith is very marked.

The oil or lubricant which is supplied to the intermediate chamber is taken up by the fibrous cushion to full saturation, and gives to the cushion that proper degree of uniform stiffness which, without materially affecting its yielding capacity, affords a better vertical support for the bolster. With a sleeved spindle an oil-duct, as at *k*, may be employed, as heretofore, or the well-known elevated oil-tube, as



in the so-called "Rabbeth spindle," may be applied.

A flanged cap, *a'*, is fitted into the top of tube *a*, and is provided with a central aperture much larger than the spindle, so as not to interfere with the movement thereof, which is rendered possible by the cushioned bearing. This cap in a measure controls the undue upward movement of oil, and serves to prevent the bearing from working upward.

In operation it will be seen that, the entire bearing *f* being capable of more or less lateral movement in all directions, and the foot of the spindle being also equally free to move in all directions, the spindle can readily assume any position which an unevenly-balanced bobbin would cause it to assume.

I am aware that a bolster used with a step of the usual character has been connected to its bolster-rail by means of a leather diaphragm, as set forth in the English Letters Patent of Wright, A. D. 1836, No. 7,127, and that also before my invention both the upper and lower bearings of spindles have been so mounted as to be capable of yielding laterally in all directions with more or less freedom. I wish it therefore to be understood that I do not claim, broadly, to have invented the combination of a spindle with bearings which are cushioned laterally in all directions.

I am well aware that my bearing may be made so as to perform the function of a cushion by being provided with laterally-projecting tongues cut therefrom, which will operate as cushioning-springs, although I prefer the separate cushion, and especially cushions made of wool.

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

1. The combination, substantially as herein-before described, of a live-spindle for spinning, a supporting-tube, and suitable means for mounting said tube on the spindle-rail of a spinning-machine, a bolster-bearing within the supporting-tube which is capable of yielding laterally with equal freedom in all directions, a step within said tube which supports the spindle and permits its foot to move laterally with equal freedom in all directions, and a whirl located substantially as described, for applying the pull on the band in a plane passing through the spindle midway of the yielding bearing, for the purposes set forth.

2. The combination of a live-spindle constructed with a sleeve for encompassing the supporting-tube, and provided with a whirl, a supporting-tube, a bolster-bearing within the supporting-tube which is capable of yielding laterally with equal freedom in all directions, and a step or foot-rest within said tube which supports the spindle and permits its foot to move laterally with equal freedom in all directions, substantially as described.

3. The combination of a live-spindle constructed with a sleeve for encompassing the supporting-tube, and provided with a whirl, an interior bolster-bearing, an exterior supporting-tube, an intermediate annular chamber for a lubricant, closed at the bottom but communicating with the spindle-bearing, and capable of yielding laterally with equal freedom in all directions, substantially as described.

FRANCIS J. RABBETH.

Witnesses:

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WM. P. GRIFFIN.