(No Model.) 2 Sheets—Sheet 1.

H. THRASHER.

SUPPORT FOR SPINNING SPINDLES.

No. 408,330. Patented Aug. 6, 1889.

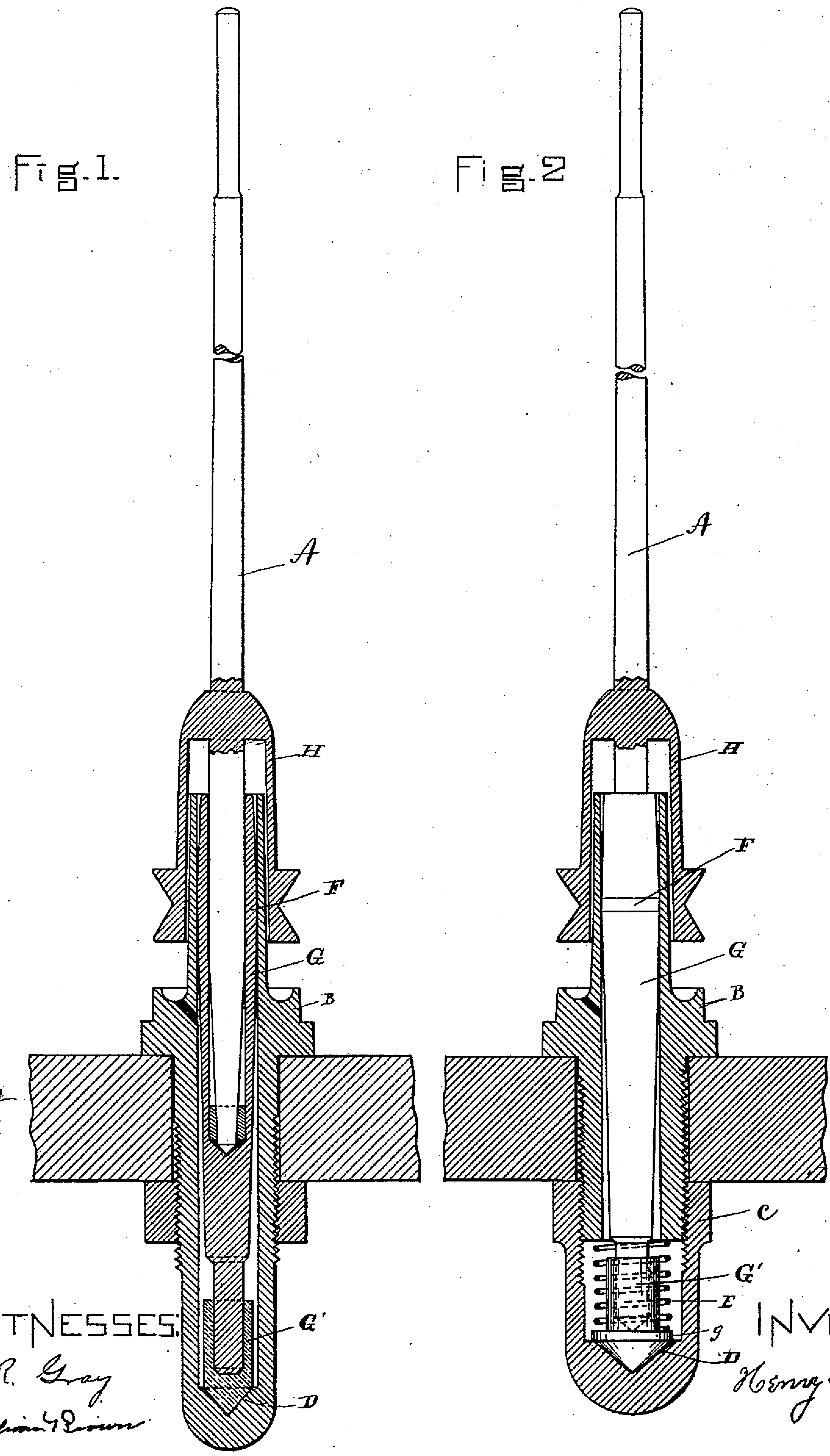

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Fig. 3.

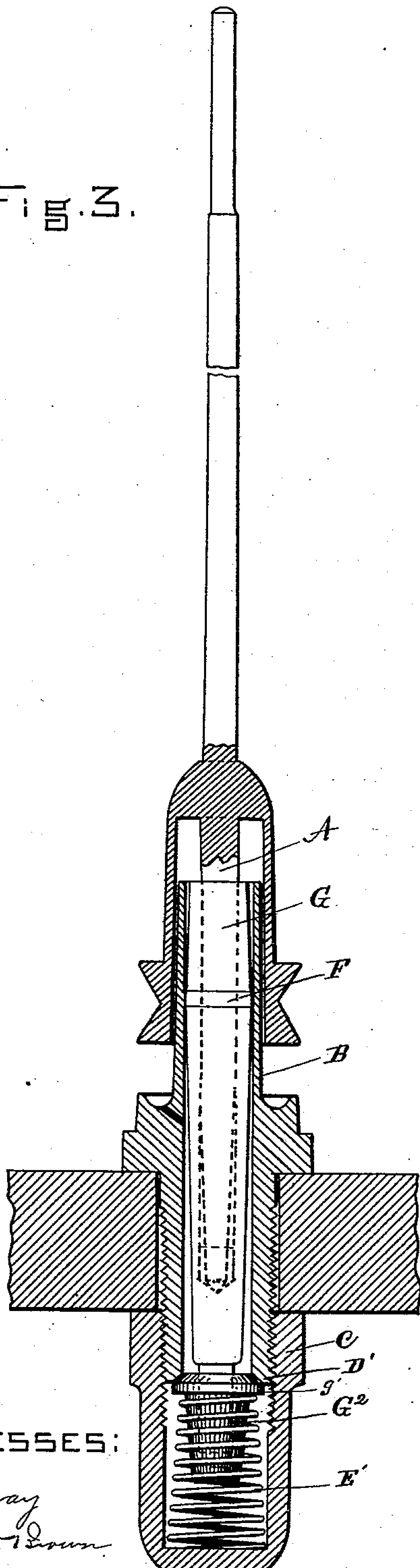
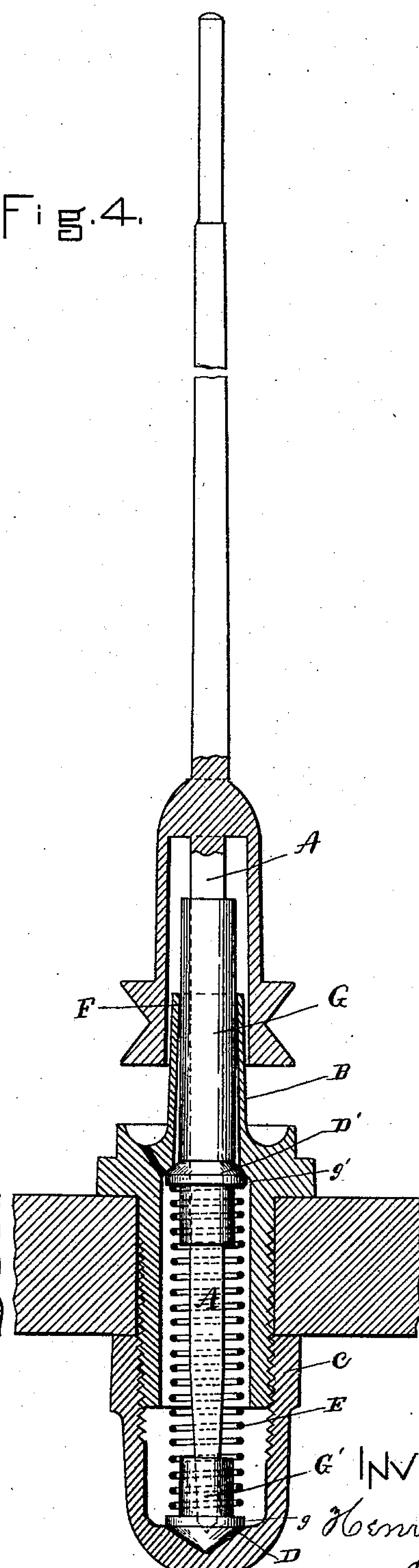


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY THRASHER, OF FITCHBURG, MASSACHUSETTS.

SUPPORT FOR SPINNING-SPINDLES.

SPECIFICATION forming part of Letters Patent No. 408,330, dated August 6, 1889.

Application filed January 10, 1889. Serial No. 295,982. (No model.)

To all whom it may concern:

Be it known that I, HENRY THRASHER, a citizen of the United States, residing at Fitchburg, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Supports for Spinning-Spindles, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to that class of spindles commonly known as "top" or "self-centering" spindles, in which one or both of the bearings have a capacity to yield laterally, in order to permit the spindle to accommodate itself to an unbalanced bobbin-load and run steadily at high speed; and it has for its object to provide a construction in which the spindle shall not be drawn from its concentric position by the pull of the driving-band, and also to provide means whereby the bearing-tube, which receives and supports the spindle, and which has lateral motion at its two extremes, shall have the proper degree of resistance to such lateral motion, and shall be promptly returned to its true and normal position after having been moved out of such normal position by the action of the centrifugal forces developed by an unbalanced bobbin-load rotating at high speed.

It is well-known that spindles of this class as now constructed, having bearings which yield laterally throughout their entire length, are defective, in that the pull of the driving-band, which is a constant force operating in one direction, draws the spindle out of its concentric position with relation to the surrounding parts and holds it in a variable position, which makes it impossible to maintain the spindle in constant concentric position with relation to the ring. It is also a well-known fact that in this class of spindles the bearings, while yielding laterally, must have a proper degree of resistance to such lateral motion, from the fact that if such resistance is too small the top of the spindle will gyrate, while if it is too great the spindle will chatter. Such resistance should also be of such a quality that when the forces which tend to cause the spindle and its bearings to move laterally are no longer developed the spindle will be returned to its true and normal position in relation to the surrounding parts. Numerous devices have been shown to accomplish these results; but none of them have embodied the features necessary to their successful operation in practical use. To accomplish these results I have provided a construction in which the bearing-tube, which receives and supports the spindle, and is surrounded by a sleeve-whirl, is adapted to fill the bolster-case, which surrounds and supports it at or near the plane of the band-pull only; but is given lateral motion above and below such plane. The spindle and bearing-tube, therefore, have no lateral motion at such plane and the spindle is not drawn from its concentric position by the band-pull.

I further provide a conical surface against which the bearing-tube rests, and which is adopted, by reason of its inclined surface, to permit the tube to move laterally thereon, and which will for the same reason operate to return the tube to its normal position either by means of the effect of gravity co-operating with such conical surface or by means of the force of a spring, or by both of such means co-operating together and with the conical surface. By this arrangement the bearing-tube, in order to move laterally, must slide up or down on the conical surface, and such movement is resisted by the gravity of the spindle and its load or by the spring, or by both, as the case may be. The conical surface, therefore, performs the double function of resisting lateral motion and of returning the bearing-tube and spindle to their normal position after such motion has taken place, and the force of gravity is utilized to co-operate with such conical surface in producing both of such results. In the case of heavy spinning, where these two elements are insufficient to control the lateral movement of the spindle and bearing-tube, the spring is added to co-operate with one or both of the first-named elements.

Referring to the accompanying drawings, Figure 1 is a central vertical section of the several parts of my device, the spindle being shown in elevation. Fig. 2 is a similar view showing the application of a spring to co-operate with the conical surface and gravity of the spindle to resist the movement of the foot of the bearing-tube and return it to its normal position. Fig. 3 is a central vertical sectional view of a modification of my improvement, in which the position of the conical surface is reversed. Fig. 4 is a modification, in which the arrangements of the parts, as shown in Figs. 2 and 3, are combined.

In Fig. 1 the spindle A and its sleeve-whirl H are of the usual form. The spindle is received and supported by the bearing-tube G, which is received and supported within the bolster-case B, which is adapted to be attached to the bolster-rail, as usual. The bearing-tube G rests on the conical surface D, located at the lower end of the bolster-case. The lower end of the bearing-tube is preferably made of a separate piece G′, and of wood or other non-metallic material, although it may be made of metal and integral with the tube, if preferred. The tube G fills the bolster-case at the point F only, which point is at or near the plane of the band-pull, and the tube is tapered or reduced above and below such point, so that it may have a rocking motion from that point as a center and the two extremes of the tube be enabled to move laterally in all radial directions within the bolster-case. By this arrangement the lower end of the bearing-tube may move laterally upon the conical surface D; but as it must rise up the inclined surface in order to move, such movement is resisted by the weight of the tube, spindle, and bobbin load, which weight also operates constantly to return the lower end of the tube to its normal and concentric position. Should this weight be insufficient of itself to offer the necessary resistance to the the lateral movement described, as would be the case in some kinds of heavy spinning or twisting, then the spring E, Fig. 2, may be applied to co-operate with the weight of the above-mentioned parts. This spring is preferably located below the bolster-case and within a cup-nut C, as shown in Fig. 2; but it may be located within the bolster-case, as in Fig. 4, if preferred. Being interposed between the shoulder g, formed on the lower end of the bearing-tube and the lower end of or a shoulder within the bolster-case, the rise of the shoulder g, when moving laterally up the conical surface D, compresses the spring, and such compression resists such combined rising and lateral movement and operates to return the lower end of the tube to its normal position. I do not limit myself to the arrangement of the conical surface and spring as shown in Fig. 2, as such arrangement of parts may be reversed, as shown in Fig. 3, and the spring placed below the conical surface instead of above. In this arrangement of parts the conical surface D′ is held up against the lower end of the bolster-case B by the pressure of the spring E′, the lower end of the bolster-case being preferably countersunk to receive the conical surface D′, and any lateral movement of the lower end of the bearing-tube is resisted by the pressure of the spring acting in co-operation with the conical surface in the same manner as when the parts are arranged as in Fig. 2, and the spring and conical surface also co-operate in the same manner to return the foot of the bearing-tube and spindle to their concentric position in the bolster-case.

Should it be desired to still further increase the resistance to lateral movement and of the combined forces operating to return the bearing-tube to its concentric position, the arrangement of the conical surfaces, as shown in Figs. 2 and 3, may be combined, as shown in Fig. 4, in which case the bearing-tube G is cut in two parts, and the spring E is interposed between such parts, and is received against the shoulders g g', by means of which it operates simultaneously upon both sections of the bearing-tube to hold them against the conical surfaces D D′.

I do not limit myself to the particular location of the conical surface or spring, as they may be varied with relation to the point F, as circumstances may require. Neither do I limit myself to the exact location of the point F in relation to the plane of the band-pull, as it may be somewhat above or below such plane, as shown in Fig. 4, without departing from the spirit of my invention.

In certain applications it is very desirable to locate the point F outside of and above or below the plane of the band-pull, as shown, for instance, in one form in said figure. It has not been practical to do this with bearings as heretofore constructed, for the reason that no means were provided to resist the pull of the band and prevent the deflection of the spindle if the point F were outside the plane of such pull. With my construction, however, the point F may be located entirely below the sleeve-whirl, if desired, and by a proper adjustment of the spring and conical surface the resistance which they offer, multiplied by the leverage presented, will exceed the deflecting pull of the band, and the spindle will not be drawn from its concentric position by such pull. A new and useful result is thereby secured from the co-operation of the spring and conical surface.

The rocking motion of the bearing-tube within the bolster-case may also be secured by means of the construction shown in Fig. 4, in which the bearing-tube G is made straight, and the bore of the bolster-case B is made tapering upward until it closes upon the bearing-tube at or near the plane of the band-pull.

It is to be observed that in no case does the bearing-tube in my device have a rocking motion on the conical surface as a center, such rocking motion always having its center at that point, at or near the plane of the band-pull, where the bearing-tube fills the bore of the bolster-case. The motion of the tube at the point where it rests against the conical surface is a compound lateral and longitudinal one. By this arrangement the band tension does not operate to draw the bearing-tube from its normal and concentric position in the bolster-case or to deflect it from the perpendicular.

It will be observed that in each of the constructions which I have shown I have provided two conical surfaces—one a concave and the other a convex surface—and fitted to rest one within the other, and one being formed as a part of the bearing-tube and the other as a part of the bolster-case. While this arrangement gives the best results, it is not essential that two such surfaces be used together. Neither is it essential that the bearing-tube G be made in one continuous piece, as shown in Figs. 1, 2, and 3, as it is obvious that it may be made in two sections and more or less separated, as shown in Fig. 4. In practice, however, it is more convenient to have both the bolster and the step-bearings located in one piece.

I am aware that bearing-tubes for spindles have heretofore been supported upon tapering surfaces. I wish it understood, therefore, that I do not claim, broadly, the use of a tapering seat on which to support the bearing-tube.

What I claim is—

1. A sleeve-whirl spindle, a bolster-case adapted to be attached to the bolster-rail, and a bearing-tube which receives the spindle and which fills the bolster-case at or near the plane of the band-pull only, and which rests against a conical surface adapted to permit the foot of the bearing-tube to move laterally thereon, and operating to return the tube to its normal position, substantially as described.

2. A sleeve-whirl spindle, a bolster-case adapted to be attached to the bolster-rail, and a bearing-tube which receives the spindle and which fills the bolster-case at or near the plane of the band-pull only and rests against a conical surface adapted to permit the bearing-tube to move laterally thereon, combined with a spring adapted to co-operate with the conical surface to return the bearing-tube to its normal position, substantially as set forth.

3. A sleeve-whirl spindle, a bolster-case adapted to be attached to the bolster-rail, a bolster-bearing for the spindle, which fills the bolster-case at or near the plane of the band-pull only and adapted to be held against a conical surface, a step-bearing for the foot of the spindle resting against a conical surface, and a spring interposed between the said bearings and adapted to operate upon each of the bearings and to co-operate with the conical surfaces to return the bearings to their normal position, substantially as set forth.

4. A sleeve-whirl spindle, a bolster-case adapted to be attached to the bolster-rail, as usual, a bolster-bearing which fills the bolster-case at one point only, and a step-bearing which permits the foot of the spindle to move laterally, one or both of such bearings resting against a conical surface, which permits the bearing to move laterally thereon, combined with a spring to co-operate with the conical surface to resist deflection of the spindle and to return it to its normal and concentric position, substantially as set forth.

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

HENRY THRASHER.

Witnesses:

WILLIAM BROWN,
JAMES R. GRAY.