No. 709,821. Patented Sept. 23, 1902.

J. KILBURN.

SPINDLE BEARING.

(Application filed Feb. 27, 1897.)

(No Model.)

FIG. 1.

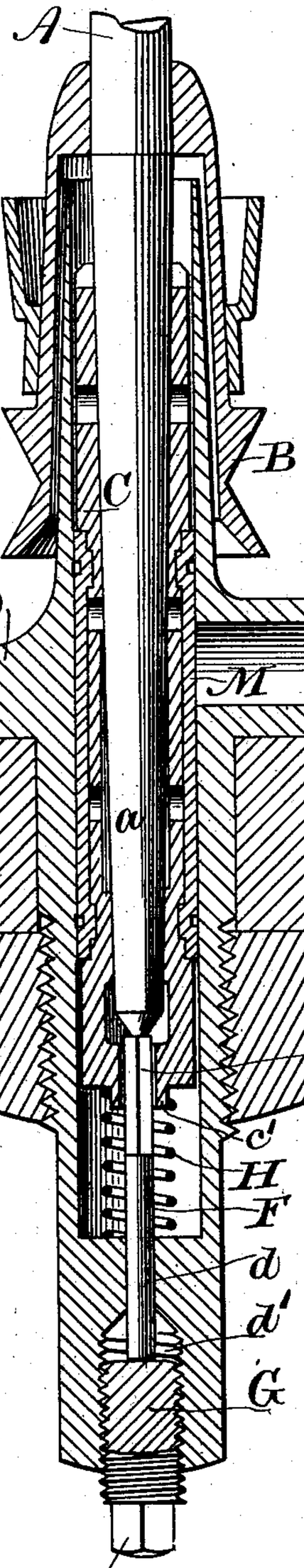


FIG. 2.

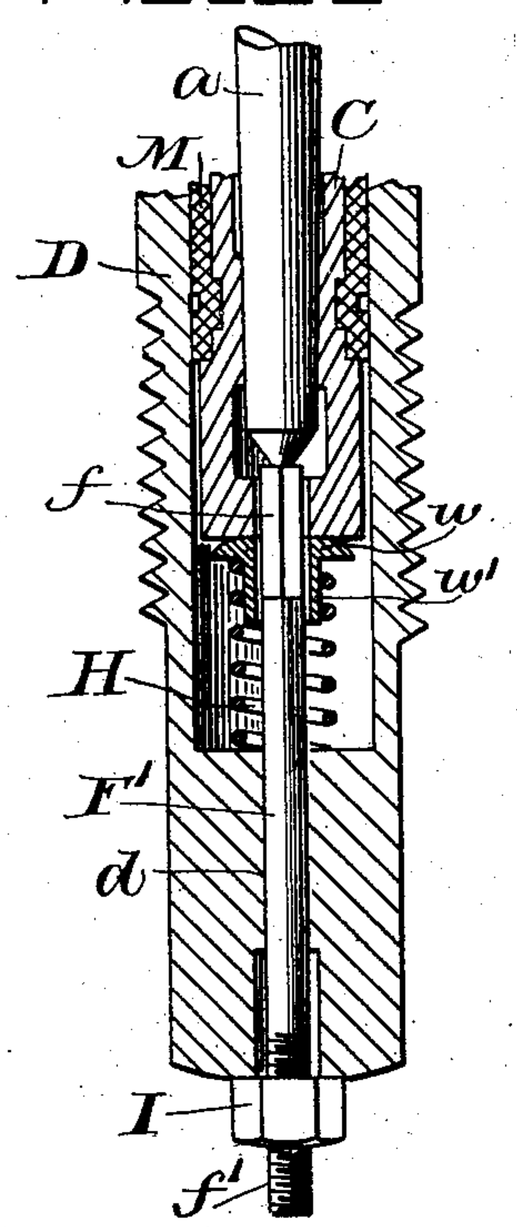
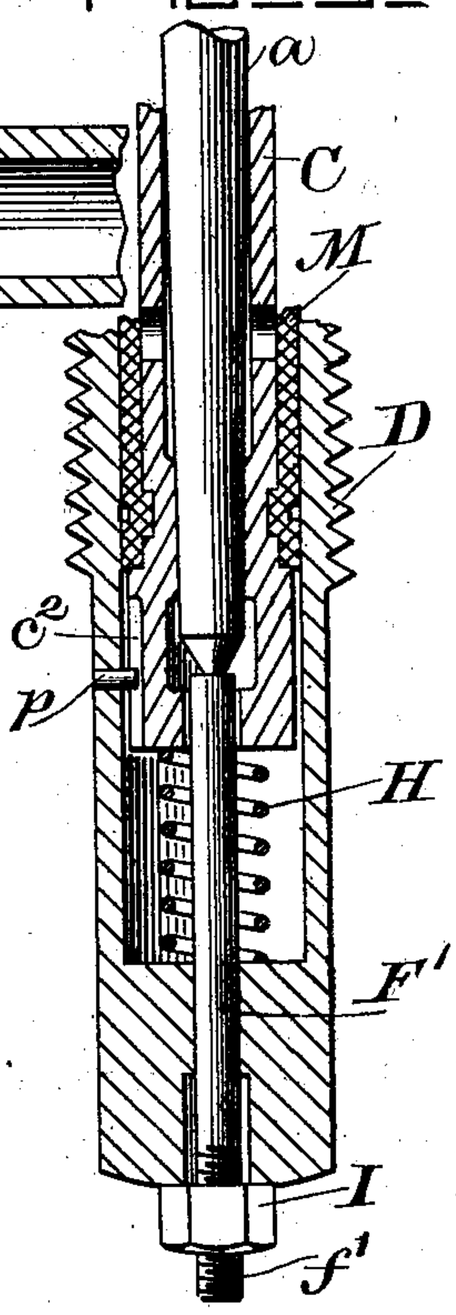


FIG. 3.



WITNESSES

A. C. Atherton.

John J. Collins.

INVENTOR

John Kilburn,

By his attorneys,

Phillips & Anderson.

UNITED STATES PATENT OFFICE.

JOHN KILBURN, OF BELMONT, MASSACHUSETTS, ASSIGNOR TO THE SAWYER SPINDLE COMPANY, OF MAINE, A CORPORATION OF MAINE.

SPINDLE-BEARING.

SPECIFICATION forming part of Letters Patent No. 709,821, dated September 23, 1902.

Application filed February 27, 1897. Serial No. 625,287. (No model.)

To all whom it may concern:

Be it known that I, JOHN KILBURN, a citizen of the United States, residing at Belmont, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Spindle-Bearings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In spindles of the self-centering or "top" type it is the usual practice to provide the spindle with a tapered end or pintle, which fits into a tapered bearing in the bolster, the end of the spindle-pintle resting upon a support or step, and to so support the bolster that the relative positions of the bolster and the step will insure a true fit of the spindle-pintle within the bolster with the proper degree of friction to permit a free and easy rotation of the spindle within the bolster and also to permit of a gyrating or lateral movement of the bolster from side to side in the bolster-case under the efforts of the spindle to seek its true center of rotation under an unbalanced load. The rapid rotation of the spindle acts in time to wear away the step or the end of the spindle-pintle, permitting the said pintle to fall farther within the bolster, and thus to cause the inclined faces thereof to bind, increasing the friction between the spindle and bolster, which results in a great wear of the parts and a waste of power employed to turn the spindle.

The object of the present invention is to produce a spindle support or bearing in which under normal conditions the fit of the bolster and spindle shall be of such a character that the proper amount of friction between them shall be developed to insure the proper action of the spindle while rotating and to so support the bolster that any slight wear of the spindle or step shall be compensated for, while at the same time any abnormal or excessive wear of these parts may also be compensated for and the normal fit of the spindle and bolster be restored by adjusting the step, said adjustment of the step being accomplished without the necessity of removing the parts from the bolster-case or, in fact, without the necessity of stopping the rotation of the spindle; and the object of the invention is to provide a step for a spindle which can be adjusted from the outside of the bolster-case and through the base thereof and to so construct the bolster-case and step that no oil will be permitted to escape from the base of the bolster-case.

A further object of the invention is to provide means in a spring-supported bolster for maintaining the true vertical position of said bolster should the spring yield unequally at its sides.

To the above end the present invention consists of the devices and combination of devices which will be hereinafter described and claimed.

The present invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section of the invention, parts being in elevation. Figs. 2 and 3 represent in longitudinal vertical section the lower portions of spindle-bearings, showing modified forms of the invention.

Similar letters of reference refer to corresponding parts throughout the following specification.

In the drawings, A represents the spindle, carrying the usual sleeve-whirl B and provided with a tapered end or pintle *a*. C represents the bolster, D the bolster-case, and E the spindle-rail, all of which parts except as hereinafter specified may be of any usual or preferred form and arrangement.

The end of the spindle A or its pintle *a* rests upon a step *f*, and in order to adjust said step *f* to compensate for the wear of the spindle-pintle *a* or said step *f* without the necessity of removing the parts from the bolster-case, as shown in Fig. 1, said step *f* is carried by a step-pintle F, which is projected with a driving fit through a bearing *d* in the bottom of the bolster-case D, the end of said step-pintle F resting upon an adjustable support G, shown as a threaded plug which engages a threaded bearing *d'* formed in the end of the bolster-case D, said support being provided with any suitable means, such as the square head *g*, whereby it may be engaged and turned in its bearing *d'* to raise

the pintle *f* and the step *f'* in the bolster-case, thus causing said step *f* to project farther into the aperture *c*, formed in the bolster C.

In another application filed of even date herewith, Serial No. 625,286, I have shown, described, and broadly claimed the construction above described; but the present construction differs from that in that the bolster is so supported that under normal conditions a true fit between the bolster and spindle-pintle is maintained, and any slight wear of the spindle-pintle or step will be compensated for by the yielding of the spring upon which the bolster rests.

In the present invention the bolster C is preferably supported upon a spring H, which rests upon the bottom of the bore of the bolster-case D, surrounding the step-pintle F, the upper end of the spring bearing against the lower end of the bolster C, whereby said bolster is yieldingly supported, and any slight wear of the spindle-pintle or step will be compensated for by the yielding of said spring, and therefore the bolster C will be held to its true fit upon the spindle-pintle *a* when said pintle is resting upon the step *f*.

As shown in Fig. 1, the bolster C is restrained from rotation with the spindle A by forming the step *f* and the aperture *c* in the bolster C polygonal in cross-section or any other suitable shape other than round, whereby the bolster is prevented from turning upon said step *f*. The fit of the step *f* in the aperture *c* is a loose fit in order that said step *f* may move freely along said bearing and at the same time permit the bolster to have a slight lateral or gyrating movement under the efforts of the spindle to center itself under an unbalanced load. In order to lengthen the bearing *c*, and thus insure the guiding of the bolster C in a true vertical line and at the same time hold the spring H in proper position, a projection or boss *c'* is formed upon the end of bolster C, which projection fits within the upper coil of spring H, as shown in Fig. 1.

The operation of the invention as above described is as follows: The parts being in the position as shown in Fig. 1 it will be seen that the position of step *f* and bolster C is such that spring H will hold said bolster with a true and easy fit to the spindle-pintle *a* and that said spring will compensate for any slight wear of the step *f* or spindle-pintle *a* without permitting an abnormal increase of the friction between the tapered spindle-pintle and the bolster C. Should the wear of the parts (step and spindle-pintle) be of such a character as to greatly increase the friction between the spindle-pintle and bolster by the dropping of the spindle-pintle in the bolster, the step *f* may be adjusted to restore the normal condition of the several elements by turning the support G and raising the step-pintle F, thus projecting the step *f* farther into the aperture *c* in the bolster C, and thus positioning the end of said step *f*, upon which the spindle-pintle rests, in such position relative to the bearing in the bolster C that the true and easy fit between the bolster and spindle-pintle will be restored.

In the construction shown in Figs. 2 and 3 the step-pintle F' is extended through and projects below the end of the bolster-case D, the projecting end being threaded, as shown at *f'*, and is engaged by a threaded nut I. The pintle F is fitted with a driving fit in the bearing *d*, as in the construction hereinbefore described. The adjustment with this form of my invention is obtained by turning nut I so as to move it along the projecting end *f'* and away from the end of the bolster-case D, after which a slight blow upon the end of pintle F' will drive said pintle into the bolster-case D, thus raising the step *f* in the bolster C. Should the step-pintle F be driven up too far, and thus raise the step *f* higher than would be desirable, by turning the nut I in a reverse direction and causing it to bear against the end of the bolster-case, and thereafter imparting a slight turn of the nut I as it bears against the end of the bolster-case D, will draw down said step-pintle and with it the step *f*, by which means said step *f* can be accurately positioned.

In Fig. 2 the bolster C is restrained from rotation by the polygonal step *f*, as in Fig. 1; but, as shown in Fig. 3, the step may be cylindrical, like the pintle F, and the aperture *c* in the bolster C be round, in which case the bolster C may be restrained from rotation with the spindle by any suitable means, as by a pin *p*, driven into the bolster-case D, engaging a slot c^2, cut in the side of bolster C.

As shown in Fig. 2, the bolster rests upon the rounded convex flange *w* of a short tubular eyelet *w'*, said eyelet extending into the coils of the spring H, and acting to lengthen the bearing of the bolster C on the step *f*, and thus to guide said bolster and hold it truly vertical should said spring have a tendency to yield more upon one side than upon the other.

The bolster C may be surrounded by any usual form of wicking M or be surrounded by a film of oil only, as is common in such devices.

Having fully described the construction and mode of operation of my invention, I claim as new and desire to protect by Letters Patent of the United States—

1. In a spindle-bearing, the combination with a bolster-case having an interiorly smooth aperture in its base, of a step-pintle tightly fitted in said aperture, a tapered spindle-pintle, a bolster provided with a tapered bearing for the spindle-pintle, and with an aperture in its base to receive the step-pintle, and means for yieldingly supporting said bolster in said bolster-case independently of, and so as to be capable of freely moving vertically with relation to, the step-pintle, substantially as described.

2. In a spindle-bearing, the combination with a bolster-case having an interiorly smooth aperture in its base, of a step-pintle tightly fitted in said aperture and projected through the bottom of the bolster-case, a tapered spindle-pintle, a bolster provided with a tapered bearing for the spindle-pintle and with an aperture in its base to receive the step-pintle, and means for yieldingly supporting said bolster independently of, and so as to be capable of freely moving vertically with relation to, the step-pintle, substantially as described.

3. In a spindle-bearing, the combination with a spring-supported bolster having an aperture in its lower end, of a step-pintle free to reciprocate in said aperture, and means to adjust said step-pintle extending below and outside of the bolster-case, substantially as described.

4. In a spindle-bearing the combination with a spring-supported bolster provided with an aperture in its lower end, of a step-pintle projecting into said aperture, and means engaging said step-pintle to guide said bolster as it moves downwardly thereon against the tension of its spring-support, substantially as described.

5. In a spindle-bearing, the combination with a tapered spindle-pintle, a bolster provided with a tapered bearing therefor and a bolster-case, of a step-pintle fitted with a driving fit in the lower end of the bolster-case to prevent the escape of oil therethrough and to hold said pintle in adjusted position, said step-pintle being projected beyond the end of the bolster-case, an adjusting device carried by said projecting end and means for yieldingly supporting said bolster independently of the step-pintle, substantially as described.

6. In a spindle-bearing the combination with the bolster, step-pintle and step carried by said step-pintle, of a spring surrounding said step-pintle, and a flanged tube free to move along said step-pintle and interposed between said spring and bolster, substantially as described.

7. In a spindle-bearing, the combination with the bolster-case, spring, bolster supported by said spring, and step, of means projected through the bottom of the bolster-case to adjust the relative longitudinal positions of the bolster and step, to adjust the tension of the spring, substantially as described.

8. In a spindle-bearing, the combination with a bolster-case having an interiorly smooth aperture in its base, of a step-pintle tightly fitted in said aperture capable of vertical movement therein, and having a polygonal upper end, a bolster loosely supported in said case, said bolster having a polygonal aperture in its lower end loosely engaging the upper end of said pintle and capable of vertical movement thereon, substantially as described.

9. In a spindle-bearing, the combination with a bolster-case, of a tapered spindle-pintle, a step-pintle supported by the bolster-case, a bolster provided with a tapered bearing for the spindle-pintle having an aperture in its lower end to receive the step-pintle, and means for yieldingly supporting said bolster independently of the step-pintle and so as to be capable of freely moving vertically with relation to said step-pintle, substantially as described.

10. In a spindle-bearing, the combination with a bolster-case having an interiorly smooth aperture in its base, of a step-pintle tightly fitted in said aperture, a loosely-supported bolster located in the bolster-case provided with an aperture in its base to loosely receive the upper end of the step-pintle, a yielding support for the bolster independent of the step-pintle capable of freely moving vertically in the bolster-case and permitting the bolster freely to move vertically with relation to the step-pintle, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN KILBURN.

Witnesses:
A. E. WHYTE,
A. O. ORME.