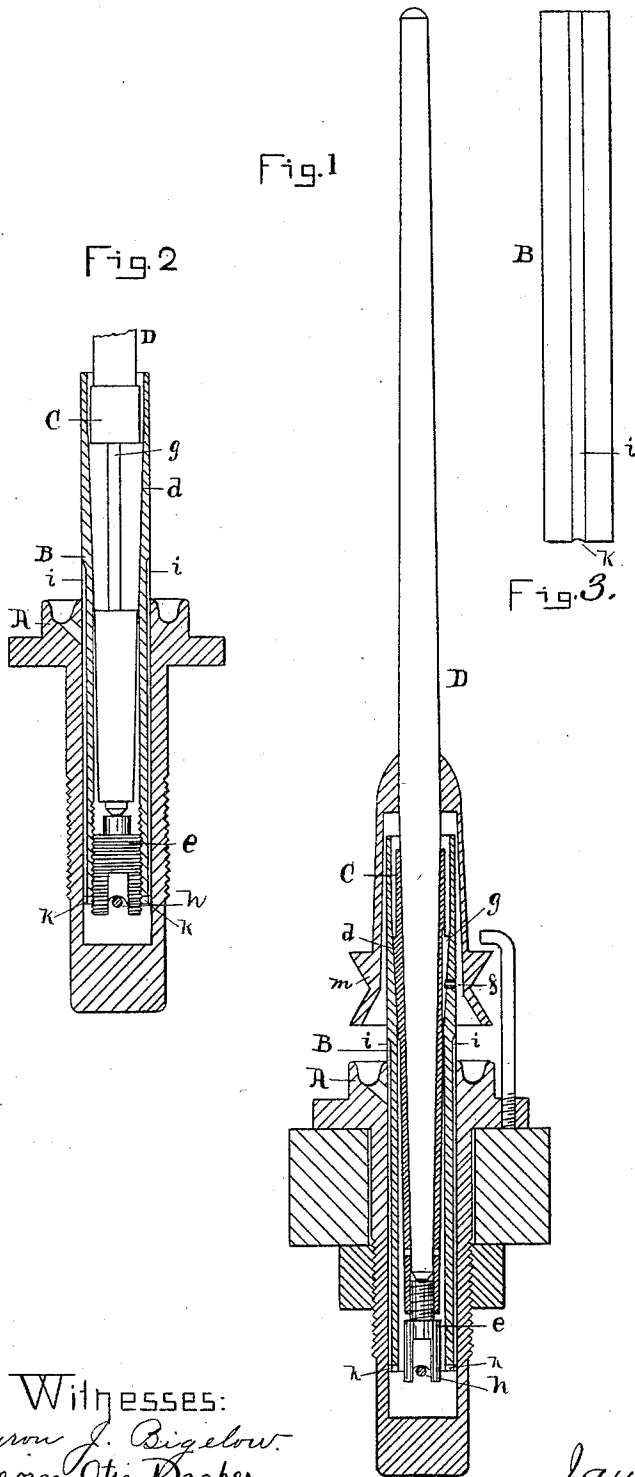


(No Model.)

J. R. GRAY.
SUPPORT FOR SPINNING SPINDLES.

No. 461,882.

Patented Oct. 27, 1891.



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UNITED STATES PATENT OFFICE.

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SUPPORT FOR SPINNING-SPINDLES.

SPECIFICATION forming part of Letters Patent No. 461,882, dated October 27, 1891.

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To all whom it may concern:

Be it known that I, JAMES R. GRAY, a citizen of the United States, and a resident of Ayer, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Supports for Spinning-Spindles, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to that class of spindles commonly known as "self-centering," in which the bearing-tube which supports the spindle is loosely fitted within the bolster case or support. It is a well-known fact that in the ordinary course of manufacture of this class of spindle-bearings as now constructed the degree or extent of looseness of the bearing-tube within the bolster-case will vary to such an extent that when the parts are assembled it is found that some of the bearings have an excess of movement, while others have too little. The evil effects of this variation are well understood. It is also well understood that different spindles and different bobbin-loads require different degrees of looseness or freedom of movement of the bearing in order to best accommodate the spindle and its load when rotating at high speed. As heretofore constructed, the extent of looseness of the bearing having been fixed, no means has been provided by which the bearing could automatically take on a greater or less degree of movement as the variations of the spindle and bobbin-load might from time to time require. Certain forms of self-centering spindles also have been provided with means whereby the tapering pintle of the spindle can be brought to a fit within the tapering bearing-surfaces of the bearing-tube; but such adjustment can only be secured by stopping the spindle and removing it from its bearing, and in no case within my knowledge has it been possible to effect such adjustment while the spindle was in operation. To provide for these requirements, and thereby secure a construction which shall not be subject to the variations of manufacture, which shall have an automatic regulation of the extent of movement of the bearing, and which shall have a more convenient means for adjusting the fit of the spindle within its bearing, are the several objects of my invention.

My invention consists in suspending the bearing-tube within its bolster case or support by means of a taper shoulder of proper length and taper, located, preferably, within the plane of the band-pull, the bearing having no contact within the case except at the point of such tapering support, and by means of which the bearing-tube shall always come to an exact normal fit within its support, but yet may automatically relieve itself from such fit by rising in its support and take on such an extent of movement as may be required in case of vibration due to the disturbing effect of an unbalanced bobbin-load rotating at high speed.

My invention further consists in forming the bolster-case in two parts, the lower part or base being adapted to be secured to the rail, as usual, and the upper part or supporting-tube, which extends upward within the sleeve-whirl and supports the spindle-bearings, being formed as a detached tube fitted within the base and adapted to be rotated therein, and being combined with a threaded step-support for the spindle, which is restrained from rotation and adapted to be moved vertically with relation to the taper bearing-surfaces above it when the supporting-tube is rotated.

My invention also consists in providing suitable locking devices by means of which the several parts shall be restrained from rotation.

Referring to the accompanying drawings, Figure 1 is a central vertical section of a spindle and support, with the spindle and its step-support in elevation. Fig. 2 is a sectional elevation showing a modification in the arrangement of the bearing-tube and step-support. Fig. 3 is an elevation of the detached supporting-tube.

In Fig. 1 it will be seen that the bolster-base A is constructed to be attached to the bolster-rail, as usual. The supporting-tube B, however, instead of being made as an integral part of the base, is formed as a detached tube fitted within the base, so that it will be supported in a fixed vertical position, but adapted to be rotated within the base, as hereinafter set forth. The bearing-tube C is suspended within the supporting-tube B by means of the tapering shoulder *d*, received

by and resting upon a corresponding shoulder or contraction formed in the interior bore of the supporting-tube. The other diameters of these two parts are such that the bearing-tube C is suspended within the supporting-tube without contact, except at the point of tapering support. This point of support is preferably located within the sleeve-whirl, and the length and degree of taper are such that the bearing-tube will not become wedged in its support when surrounded with oil. By means of the tapering support the bearing-tube will always tend to come to an exact normal fit within the supporting-tube and the spindle will be brought to a proper vertical position, thus practically eliminating the variations in fit which occur in the ordinary course of manufacture. In the event, however, of an unequally-distributed bobbin-load being applied to the spindle the spindle will tend to vibrate from the effect of such unbalanced load, and the bearing-tube having no contact within its support above or below the tapering support the vibration of the spindle will be communicated to the bearing-tube and will cause it to rise in its tapering support until it has secured a sufficient freedom of movement to accommodate the unbalanced load and enable the spindle to run steadily. The movement of the bearing-tube in this class of spindles when carrying an unbalanced load is mainly an axial one, having its center of motion at or near the plane of the band-pull. In common practice it is rare that a movement of the lower end of the bearing-tube exceeding one one-hundredth of an inch is required to accommodate the spindle and its load. It is obvious, therefore, that a very slight amount of freedom at the point of taper-support will be sufficient to allow of the necessary extent of lateral movement at the lower end of the tube.

In the arrangement of parts as shown in Fig. 1 the step-support *e* is attached to the lower end of the bearing-tube C, thus bringing the weight of the spindle and its load upon the taper shoulder *d*. This arrangement of parts is preferable for some kinds of spinning, while for others I prefer to separate the step-support from the bearing-tube, as shown, for instance, in Fig. 2, so that the bearing-tube shall have only its own weight to sustain. When so arranged, I usually prefer also to make the taper shoulder somewhat longer and straighter, as shown in the said figure. The bearing-tube C is restrained from rotation by means of the locking-pin *f*, attached to the supporting-tube and projecting into one of the slots *g*, formed in the bearing-tube. These slots also serve as a channel to return oil which may be carried up by the rotation of the spindle. The pintle of the spindle D is tapered, as usual, and the internal bearing-surfaces of the bearing-tube are correspondingly tapered to receive the pintle. The spindle is vertically supported upon the step-support *e*, which is itself supported by a

screw-thread, and by means of which the step-support may have its vertical position changed with relation to the taper bearing-surfaces above it in order to bring the spindle to a proper fit within its bearing.

In Fig. 1 the step-support is shown as suspended from the bearing-tube C and without vertical connection with the supporting-tube B. In Fig. 2 this arrangement is reversed and the step-support is suspended from the supporting-tube without vertical connection with the bearing-tube. In either case the step-support is locked by means of the pin *h*, which restrains its rotation, but does not prevent its vertical or lateral movement.

When it is desired to adjust the fit of the spindle within the bearing-tube, the detached supporting-tube is rotated by means of a proper tool, which engages one of the oil-grooves *i*, formed in the exterior walls of the tube. The rotation of the supporting-tube causes the bearing-tube to rotate in relation to the threaded step-support, and the step-support is thereby moved up or down with relation to the taper bearing-surfaces above it. This operation of adjustment can be readily performed while the spindle is in operation and without the necessity of stopping the spindle or removing it from its bearings.

The supporting-tube B rests vertically upon the locking-pin *h*, and is prevented from being rotated with the spindle by means of the shallow notches *k*, Fig. 3, formed in its lower edge, and which engage the pin *h* sufficiently to prevent the rotation of the tube from the effect of the spindle, but will not prevent its rotation when the tool is applied for the purpose of adjusting the fit of the spindle.

Having thus described my invention, what I claim is—

1. The combination, with a sleeve-whirl spindle, of a bolster-case having an upward extension or supporting-tube adapted to be received within the sleeve-whirl and provided with an internal tapering shoulder or contraction located within the plane of the band-pull, and a bearing-tube having an external tapering shoulder fitting within the said internal taper and operating to suspend the bearing-tube within the supporting-tube without contact therewith, except at the said tapering shoulder, substantially as set forth.

2. The combination, with a sleeve-whirl spindle, of a bolster-case having an upward extension or supporting-tube adapted to be received within the sleeve-whirl and provided with an internal tapering shoulder or contraction located within the plane of the band-pull, and a bearing-tube having an external tapering shoulder fitting within the said internal taper and operating to suspend the bearing-tube within the supporting-tube without contact therewith, except at the said tapering shoulder, and adapted to permit the bearing-tube to rise and automatically relieve itself in case of vibration, substantially as set forth.

3. A sleeve-whirl spindle having a tapering
pintle, a compound bolster-case consisting of
a lower part or base adapted to be secured to
the rail, as usual, and an upper part or sup-
5 porting-tube fitted within the base and adapt-
ed to be rotated therein and extending up-
ward to support the spindle-bearings, com-
bined with a step-support for the foot of the
spindle, such support being restrained from
10 rotation and adapted to be vertically adjusted
with relation to the spindle-bearings by the
rotation of the supporting-tube, substantially
as set forth.

4. A spindle having a tapering pintle, a
15 bolster-base, a detached supporting-tube fit-

ted within the said base and adapted to be
rotated therein, a bearing-tube within the
supporting-tube, provided with taper bear-
ing surfaces to receive the said pintle, and a
step-support for the foot of the spindle, such 20
support being restrained from rotation and
adapted to be vertically adjusted with relation
to the said taper bearing-surfaces by the ro-
tation of the supporting-tube, substantially as
described.

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