(No Model.)

J. H. NORTHROP.

SPINDLE BEARING.

No. 517,232. Patented Mar. 27, 1894.

Fig: 1.

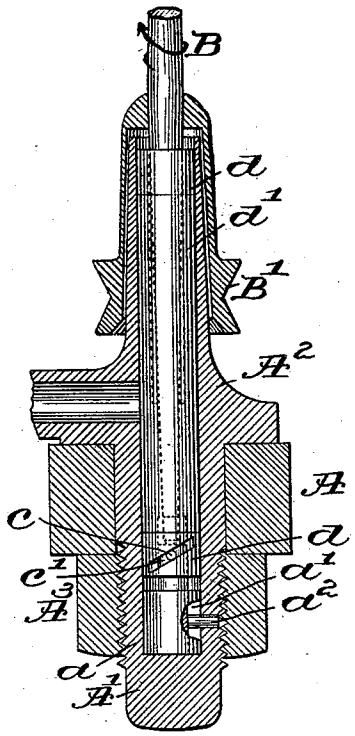
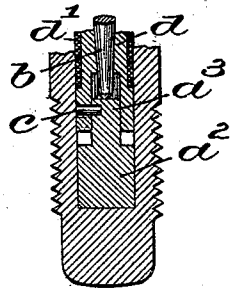


Fig: 2.



Witnesses.
Edward F. Allen.
Louis W. Sewell

Inventor:
James H. Northrop.
by Crosby & Gregory
Attys

THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES H. NORTHROP, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO GEORGE DRAPER & SONS, OF SAME PLACE.

SPINDLE-BEARING.

SPECIFICATION forming part of Letters Patent No. 517,232, dated March 27, 1894.

Application filed May 29, 1893. Serial No. 475,887. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. NORTHROP, a subject of the Queen of Great Britain, residing at Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Spindle-Bearings, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The tendency of an ordinary bolster or lateral bearing is to rotate with the spindle unless restrained. Experiments carried on as to the behavior of spindles when the bolster or lateral bearing is loose in its supporting case has developed the fact that while the bolster will rotate more or less with the spindle under but little inequality of load, yet when the lack of balance is excessive and the speed high, the bolster will rotate in an opposite direction from the spindle. A balanced spindle will run, I consider, with greater steadiness in a loose bolster, and when the load is light or but little out of balance, the looseness may be a little greater than when the spindle is heavily loaded or carries at high speed a greatly unbalanced load, for under these latter conditions the spindle needs bracing more closely, and a very small amount of looseness then suffices between the spindle and bolster. With this state of facts I have devised a spindle bearing which will automatically adjust itself to the requirements of the spindle under the load which may be applied to it, so as to brace the spindle a little more under excessive inequality of load, or great load and high speed. This I have been enabled to do by the employment of a loose bolster tapered internally to fit the taper of the pintle of the spindle, said bolster being loosely connected with a non-rotating step by a cam surface, the inclination or down-grade of the cam surface being in the direction of rotation of the spindle, said cam surface being preferably in the form of an inclined slot or edge co-operating with a stationary or non-rotating pin or projection.

My invention comprises a bolster or lateral bearing which is allowed freedom of revolution within certain fixed limits, combined with devices which shall automatically change the condition of fit between the spindle pintle and bolster or bearing according to the direction of rotation of the said bolster under varying conditions of load on the spindle, substantially as will be described.

Figure 1, in section shows a sleeve whirl spindle and bearing therefor embodying my invention, and Fig. 2 is a sectional detail through the lower end of the case, step and lower end of the bolster, part of the pintle of the spindle being shown as resting on the step.

In the drawings A represents a rail which receives the shank A′ of the supporting-case A^2, it being confined rigidly in place by a suitable nut A^3. The cavity or chamber in the supporting-case receives at its lower end a step block a, slotted at a' to be entered by a suitable pin or projection a^2 to thus restrain its rotation, said block having a step a^3 on which rests the lower end of the tapered pintle b of the spindle B shown as having a sleeve whirl B′, said step, as herein represented, having a pin or projection c with which coacts a cam surface c', shown in Figs. 1 and 2 as forming part of a diagonal slot in the bolster or lateral bearing d having a loose fit in the supporting-case, a cushion d' of usual construction being shown as interposed between the bolster and case.

In practice with an ordinary or normal load, the tendency of the bolster will be to turn with the spindle until the right-hand end of the slot, viewing Fig. 1,—the spindle rotating in the direction of the arrow on it,—meets the pin or projection c, and in such condition of the parts, the fit of the tapered interior surface of the bolster with the tapered pintle of the spindle will be such as to afford such a loose fit for the spindle as will allow it to run very free with the consumption of but the minimum of power. Now should the load be applied to the spindle so as to cause it to vibrate badly, then the bolster will start to turn in a direction opposite the rotation of the spindle, and in so doing the cam surface slides upwardly on the pin c and causes the taper surface of the bolster to rise and fit the pintle of the spindle a little closer, so that the pintle has a closer fit, but there will remain the proper looseness, and the bolster can vibrate and its cushion avoids jars. Why this bolster with an unbalanced load on the spin-

dle will rotate in direction opposite that of the spindle, I am at a loss to explain scientifically, but that such is a fact may be readily established by trial under the conditions stated.

I have found in practice that under varying conditions the bolster will act as above described.

The cam grade or slot may be made to afford any desired range or extent of movement, or be more or less steep.

I am aware that a spring has been attached at one end to a tapered bolster having screw threads to co-operate with screw threads of a step, but in such construction the normal tendency of the spring is to bring the bolster and step to one definite position with relation each to the other. In such construction the bolster may be moved either way with relation to the step under the the wabbling or gyration of the spindle and bolster, but the spring will always tend to bring it back. Such use of the spring presupposes that the operative can know what fit should be normal prior to connecting the spring to the bolster.

In the invention claimed the inventor considers that no one can tell just what fit shall be normal for the spindle, and in fact, in spinning the conditions are constantly changing, so that no particular position of the step and bolster united by the spring, could be practically considered as normal; consequently applicant has dispensed with a spring and depends upon a cam, thereby providing means whereby the spindle is enabled to effect for itself proper fit. With a screw thread connecting the bolster and step it might be possible for the spindle to rotate the bolster far enough in one direction to unscrew or disconnect the bolster from the step, which could not be the case in my construction.

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

1. A spindle having a tapered pintle; a supporting-case; a lateral bearing mounted loosely within the supporting case and tapered at its interior to co-operate with the tapered surface of the spindle, said bearing having a cam-slot; combined with a step provided with a pin to enter said cam-slot, to operate substantially as described.

2. The combination with an outside support; and a spindle having a tapered pintle, of a loose bearing having a tapered interior surface to co-operate with the tapered surface of the spindle, said bearing being loosely mounted in and so as to partially rotate in said support, means to automatically move said bearing endwise as the latter is rotated by the action of the spindle within it, comprising a stop to limit the extent of rotation of said bearing, substantially as described.

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

JAMES H. NORTHROP.

Witnesses:
C. E. LONGFELLOW,
S. F. SMITH.