(No Model.)

J. KILBURN.

BEARING FOR SPINDLES.

No. 590,315. Patented Sept. 21. 1897.

FIG. 3.

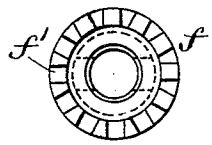

FIG. 4.

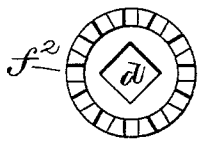

FIG. 2.

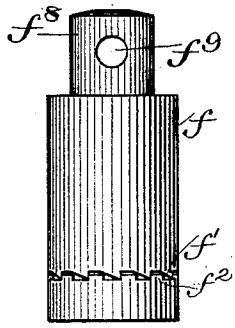

FIG. 1.

WITNESSES

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BEARING FOR SPINDLES.

SPECIFICATION forming part of Letters Patent No. 590,315, dated September 21, 1897.

Application filed December 2, 1896. Serial No. 614,251. (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 Bearings for Spindles; 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.

As spindles of the "self-centering" or "top" type are commonly constructed that portion of the spindle below the whirl, or, in the sleeve-whirl types, below the point of connection of the whirl and spindle, usually termed the "pintle" of spindle, is tapered toward its lower end, and the bolster or tubular support in which such pintle rotates is commonly constructed with inclined interior walls fitted to the taper of the spindle-pintle.

It has been found in practice that as the lower end of the spindle-pintle is worn away by the usual wear of the spindle or wears into its step the tapered spindle-pintle falling in the bolster is brought more tightly in contact with the inclined inner walls thereof, causing the spindle to bind or rotate with increased friction in the bolster.

The object of the present invention is to provide automatic means controlled by the rotation of the spindle whereby an excess of friction between the bolster and spindle produces a change in the relative longitudinal position of the step and bolster which effects a change in the position of the spindle in the bolster to diminish such friction, said bolster and step being thereafter retained in their adjusted position.

The present invention has for its further object to increase the durability and efficiency of the devices forming the spindle-support.

To the above ends the present invention consists of the several devices and combinations of devices hereinafter more fully set forth and claimed.

A preferred form of the present invention is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section through a spindle-support embodying the same, showing a portion of the spindle and other parts in elevation. Fig. 2 is a side view of what I have herein termed the "pintle-sleeve," showing the connection of the clutch members therewith. Fig. 3 is a reverse plan view of the upper clutch member, and Fig. 4 is a plan view of the lower clutch member.

Similar letters of reference refer to similar parts throughout the several views.

In the drawings, A represents the lower portion of a spindle, shown as having a sleeve-whirl B and the usual tapered pintle *a*.

C represents the bolster, shown as surrounded with the usual wicking or other elastic packing *c*.

D represents the bolster-case, and E the spindle-rail.

All of the above-named parts, except as hereinafter specified, may be of any usual or convenient form, and are shown merely to illustrate a convenient and practical application of the present invention.

In the form of my invention shown in the drawings the pintle *a* of the spindle A rests upon the top of a pintle F, which carries the step.

The pintle F is supported by what I have herein termed a "pintle-sleeve" *f*, which, as shown, carries the upper clutch member f' and rests upon the lower clutch member f^2, which preferably rests upon the bottom of the bolster-case D.

The lower portion f^3 of the bore of the pintle-sleeve *f* is threaded and is engaged by the threaded portion f^4 of the pintle F. The upper portion f^5 of the pintle F is cylindrical and fitted to the bore of the sleeve *f* and projects above said sleeve into the bore of the bolster C. The lower portion f^6 of the pintle F is polygonal in section (or of any convenient shape other than circular) and projects from the bore of the sleeve *f* through the lower clutch member f^2 into a recess f^7 in the bottom of the bolster-case D. The recess f^7 is similar in shape in section to the lower portion f^6 of the pintle F, which is free to reciprocate therein, but is held from rotation by its engagement therewith.

The sleeve *f* is connected with a clutch mechanism suitably formed and arranged to permit a rotation in one direction when suffi-

cient power is applied, as hereinafter explained, and to restrain the sleeve *f* from rotation in an opposite direction.

As shown in the drawings, the clutch mechanism above referred to consists of a series of teeth of unequal pitch preferably beveled upon one side and perpendicular upon the other, (see Fig. 2,) which are preferably projected from the bottom of the sleeve *f*, and which form the upper clutch member f'.

The lower clutch member f^2 may conveniently consist of a washer having a polygonal aperture *d* in its center through which the lower portion f^6 of the pintle F extends, the washer being held from rotation by its engagement with the polygonal portion of the pintle F. The washer forming the lower clutch member f^2 rests upon the bottom of the bolster-case D, and upon its upper surface are formed teeth, which may be rectangular, as shown, or oppositely beveled to the teeth upon sleeve *f*.

It will be noted from the foregoing that a rotation of the sleeve *f* in one direction by means of the threads f^3 and f^4 raises the pintle F and causes the step which is the top of said pintle to rise in the bolster C, and the arrangement of the teeth in the clutch members f' and f^2 is such that the clutch permits a rotation of the sleeve *f* in the direction above designated, the teeth on the upper member f' turning over those on the lower member f^2, but when the rotation of the sleeve *f* is attempted to be reversed the teeth upon the upper member f' engage the teeth upon the lower member f^2, and since the lower member f^2 is restrained from rotation such engagement restrains the sleeve *f* from rotation.

The bolster C is connected with the pintle-sleeve *f*, so as to rotate therewith and to be capable of a slight lateral movement independently thereof to allow the spindle A to center itself under an unbalanced load. As shown in the drawings, such connection is secured as follows: In the bottom of the bolster C is formed a recess C′, which receives a boss f^8, which is projected from the top of the sleeve *f*. The boss f^8 is loosely fitted to the recess C′, and in the boss f^8 are formed the holes f^9, which are loosely engaged by the pins C^2, driven tightly through apertures in the walls of the bolster C, the arrangement being such that the bolster C turns with the sleeve *f*, but has sufficient lateral play to allow the spindle to center itself under an unbalanced load. I may say in this connection that in assembling the parts of my invention as hereinbefore described I find it convenient in practice to first drop the lower clutch member f^2 into the spindle-case D and then unite the bolster C with the sleeve *f* and pintle F and drop such connected parts into the case D, when the lower end of the pintle F will fall through the lower clutch member f^2 into the recess f^7, and the device will be in position for operation.

The operation of my invention as applied to the device of the drawings is as follows: The spindle A being driven in the direction indicated by the arrow-head in Fig. 1, when the bottom of its pintle *a*, which rests upon the step, becomes worn or wears into the step the spindle A will fall in the bolster C and its tapered pintle *a* will wedge itself more tightly between the inclined walls of the bolster C and the spindle A will rotate with increased friction in the bolster C. When the friction developed as above stated is sufficient to raise the weight of the spindle A, bolster C, pintle F, and its sleeve *f*, it will cause the sleeve *f* to rotate, the teeth in the upper clutch member f' turning over those in the lower clutch member f^2 and by means of the threads f^3 and f^4 raise the pintle F and cause the step formed upon the top of the pintle F to rise in the bolster C, which will raise the tapered pintle *a* of the spindle A in the bolster C, and less friction will be developed by the rotation of the spindle A. When the friction developed by the rotation of the spindle A is so far decreased that the effort exerted to rotate the sleeve *f* is not sufficient to overcome the weight of the supported parts, as before stated, the teeth in the upper clutch member f' will fall into the next adjacent spaces between the teeth in the lower clutch member f^2, and the spindle A will continue to rotate, resting upon the step in its adjusted position until it has worn away or worn into the step sufficiently to cause a repetition of the operation hereinbefore described.

In case that the band should accidentally be adjusted upon the whirl B to rotate the spindle A in an opposite direction to that indicated by the arrow-head in Fig. 1 the engagement of the clutch members f' and f^2 positively holds the sleeve *f* from rotation and prevents a depression of the pintle F, which would cause the spindle A to drop in the bolster C and would be liable to lead to excessive strain or injury to the device.

The device may, if desired, be arranged for the rotation of the spindle A in an opposite direction to that indicated by the arrow-head in Fig. 1, it merely being necessary to change the threads f^3 and f^4 to left-hand threads and to reverse the inclination of the teeth upon the upper clutch member f'.

When it is desired to lower the step to adapt the device to a spindle with a longer pintle, as when a worn spindle is replaced by a new one, the operator by means of the usual instrument for adjusting bolsters or by any convenient or suitable means raises the bolster C until the teeth upon the upper clutch member f' clear the teeth on the lower clutch member f^2, and then by rotating the bolster C turns the sleeve *f* until the pintle F, the top which forms the step, has been sufficiently depressed.

Having thus described my invention and its mode of operation, I desire to say that I

am aware that it has been heretofore proposed in the art to provide a threaded step which loosely engages interior threads in the lower end of the bolster, so that a rotation of the bolster lowers the bolster upon the step, and to connect the bolster and step by a resilient connection—as, for example, a coiled spring—but such device differs essentially from the present invention in that no means is provided whereby when the bolster and step are adjusted as above stated they are held in their adjusted positions; but on the contrary the spring above referred to exercises a constant effort to return the bolster and step to their original position and to increase the friction between the bolster and spindle.

I therefore claim as broadly novel and desire to secure by Letters Patent of the United States—

1. The combination with a spindle, its bolster and step, of means actuated by an increase of the friction developed between the spindle and its bolster, acting to adjust the relative longitudinal position of the bolster and step, and mechanism independent of the adjusting means to retain the bolster and step in their adjusted position, substantially as described.

2. The combination with a spindle, its bolster and step, of automatic means for changing the relative longitudinal position of the bolster and step, and mechanism independent of the adjusting means controlled by the weight of supported parts for retaining the bolster and its step in their adjusted position, substantially as described.

3. The combination with a spindle, its bolster and step, of automatic means for effecting a relative movement of the step and bolster to raise the step relatively to the bolster, independent mechanism controlled by the weight of the supported parts to retain the bolster and step in their adjusted position, and actuated by a rotation of the bolster under the control of the operator for lowering the step relatively to the bolster, substantially as described.

4. The combination with the bolster and its support, of a threaded bearing in the support, a threaded pintle engaging said bearing, and connections between said bolster and its support, whereby a rotation of the bolster effects a longitudinal movement of the pintle within the support, substantially as described.

5. The combination with a bolster, and its support, of a movable pintle in the support, a recess formed in the base of the bolster, a boss formed on the top of the support, loosely fitted to said recess, and a loose pin connection between said boss and the bolster, substantially as described.

6. The combination with a bolster, of a support therefor arranged to rotate therewith, and a clutch mechanism connected with said support arranged to permit its rotation in one direction and to restrain its rotation in an opposite direction, substantially as described.

7. The combination with a bolster and a bolster-support upon which the lower end of the bolster rests, of a pintle arranged to reciprocate in the support, and connections between the support and pintle, whereby a rotation of the support effects a longitudinal movement of the pintle, substantially as described.

8. The combination with a bolster and its case, of a pintle-sleeve below the bolster, a threaded bearing in said sleeve, a threaded pintle engaging said bearing and capable of longitudinal movement in the sleeve, and a recess in the bolster-case engaged by the lower portion of said pintle, arranged to restrain the pintle from rotation, substantially as described.

9. The combination with a spindle, its bolster and case, of a pintle supporting the spindle, a sleeve surrounding the pintle and free to turn thereon and a recess in the bottom of the bolster-case engaging the pintle and restraining it from rotation, substantially as described.

10. The combination with a bolster and a bolster-support upon which the lower end of the bolster rests, of a step-bearing pintle movable in said support, means to restrain the pintle from rotation, and means to rotate the support to impart a longitudinal movement to the pintle, substantially as described.

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

JOHN KILBURN.

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