No. 666,251. Patented Jan. 15, 1901.

E. H. RYON.

SPINDLE BEARING.

(Application filed Nov. 15, 1897.)

(No Model.)

Fig. 1.

Fig. 2.

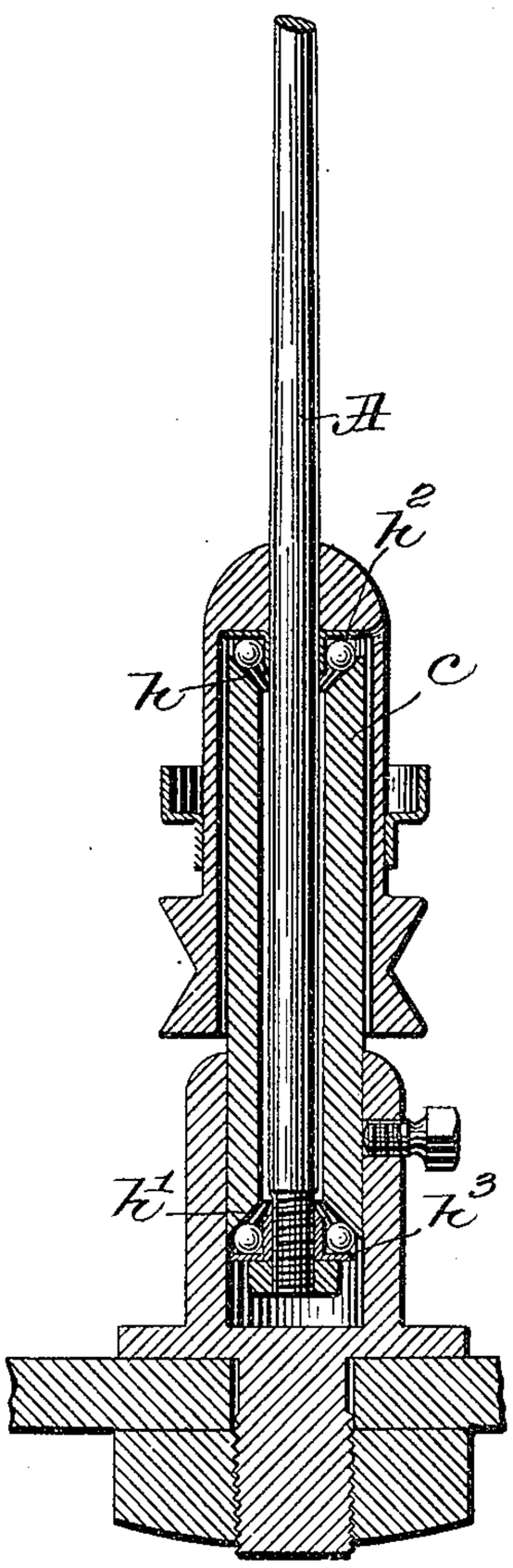


Fig. 4.

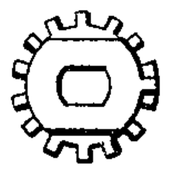


Fig. 5.

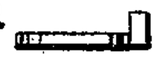
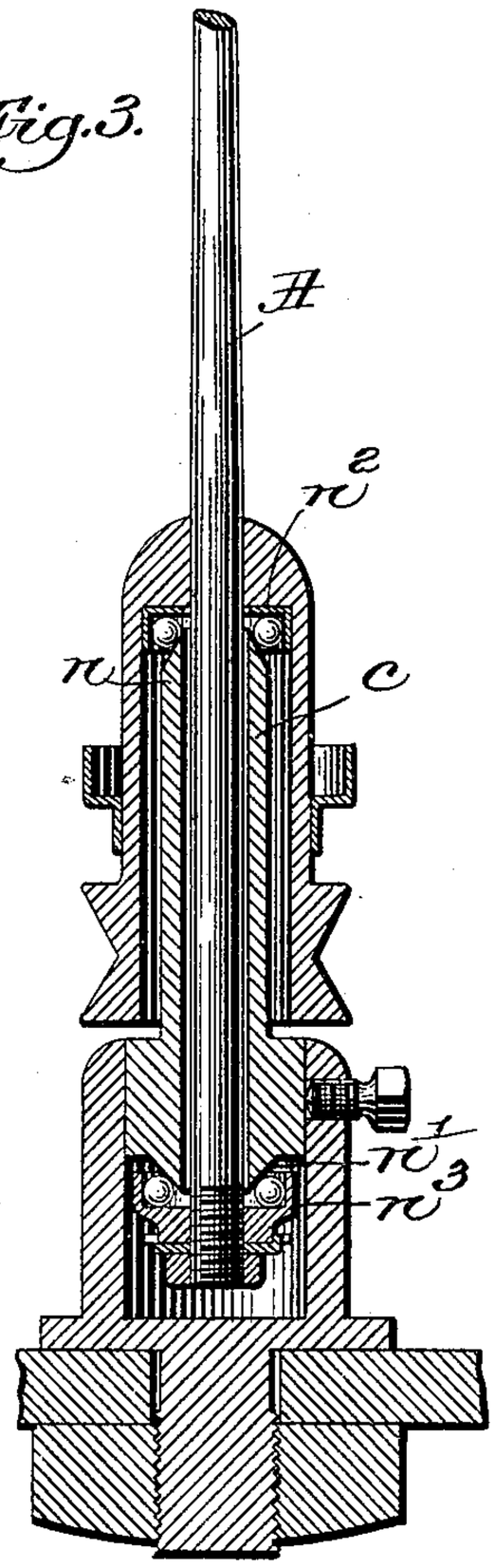


Fig. 3.



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UNITED STATES PATENT OFFICE.

EPPA H. RYON, OF WALTHAM, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ALFRED M. GOODALE, OF SAME PLACE.

SPINDLE-BEARING.

SPECIFICATION forming part of Letters Patent No. 666,251, dated January 15, 1901.

Application filed November 15, 1897. Serial No. 658,531. (No model.)

To all whom it may concern:

Be it known that I, EPPA H. RYON, of Waltham, county of Middlesex, 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.

This invention has for its object to improve the construction of spindles and their bearings.

Spindles now most commonly used are provided with sleeve-whirls, and the lower end of the spindle below its junction with the whirl is made to enter a bolster or lateral bearing placed loosely in a supporting-case, said bolster yielding to a limited extent, the yielding of the said bolster-bearing enabling the top of the spindle to be run steadily. In such usual structures the weight of the spindle is sustained by a step, on which the lower extremity of the spindle stands and turns the extremity of the spindle.

In my invention I dispense with the usual bolster which fits the exterior of the lower end of the spindle and instead I employ a supporting-case, which may and preferably will be made in two parts, one part resting on or in a hole in the usual spindle-rail, the other part being a sleeve extended upwardly therefrom, the interior of said supporting-case having a bore of a diameter considerably in excess of the diameter of the lower part of the spindle, said case presenting two seats, against which may bear a set of balls or rolls, which constitute a rolling-surface to obviate friction, the set of said rolling-surfaces at the upper end of said supporting-case receiving on it a collar carried by or rotating with the spindle. In this invention, consequently, the upper end of the supporting-case extends into the whirl and the balls on it constitute a step to sustain the weight of the spindle and its load within the sleeve of the whirl. The balls or rolling-surface inside the whirl at the upper end of the supporting-case have a dual function—that is, they constitute a lateral bearing for the spindle and also support the weight of the spindle. The spindle also has a second lateral bearing composed of a second set of rolls to constitute a second rolling-surface, it surrounding the extremity of the spindle at a point below the whirl. Preferably the two rolling-surfaces which constitute the lateral bearing for the spindle will be located at opposite sides of the band-pull to thereby insure the greatest amount of steadiness in running the spindle, yet this invention is not in all cases to be limited to such location of said rolling-surfaces, as I consider that the location of said rolling-surfaces between the lower extremity of the spindle and the point of junction of the whirl with the spindle would be within the scope of this invention, so long as the weight of the spindle is carried by any suitable step located above the lower extremity of the spindle. The lower extremity of the spindle is also provided with a projecting surface, which for the best results and for facility of construction is made adjustable on or with relation to the spindle, said surface taking a seat, preferably an upward seat, on the rolling-surface located immediately at or about the lower extremity of the spindle, said lowermost rolling-surface acting to steady the running of the spindle, and by the adjustment of the said projecting surface a limited amount of looseness may be provided for to insure the steady running of the spindle at its top at very high speed. The adjustment of the surface, carried by and moving with the lower end of the spindle, controls the extent to which the spindle may rise in running.

Figure 1 shows, partially in elevation and section, a spindle and its bearings embodying my invention. Figs. 2 and 3 show modified forms of spindle and bearing. Fig. 4 shows the lower side of the projection carried by the lower extremity of the spindle, Fig. 1, and the locking device coöperating with its lower end to hold the said projection in its adjusted position; and Fig. 5, an edge view of the locking device or washer interposed between said surface and a nut screwed onto the lower end of the spindle.

The spindle A has applied to it a sleeve-whirl B, having an oil-hole *b* and a cover *b'*. Below the junction of the whirl with the spindle I have provided the spindle with a projecting surface *a*, it turning with the spindle, said surface coöperating with a rolling-surface composed of a series of balls *a'*, located

within the whirl and resting on the upper end of the supporting-case, to be described, extended into said whirl, said balls lying between the point of junction of the whirl with the spindle and the line of band-pull.

The supporting-case, on which rests the rolling-surface a', is composed of a sleeve c and a shoulder part c' to enter a hole in and rest on the spindle-rail D, and the upper end of the said part c and the rolling-surface thereon constitute the step by which the weight of the spindle is sustained at a point above its lower extremity, said step being, as shown, within the whirl and preferably above the line of band-pull.

The rolling-surface b, however constructed, is interposed between the upper end of the supporting-case and the rotating spindle and reduces to the minimum the friction due to the weight of the spindle and its load, and said rolling-surface performs the dual capacity of a lateral bearing for the spindle and a support for the weight of the spindle and its load.

At and about the lower extremity of the spindle I provide a surface d', which supports a second rolling-surface d, composed of a series of balls, said balls contacting also with the lower end of the part c of the supporting-case. The surface d' may be made adjustable vertically on or with relation to the lower part of the spindle to compensate for any wear due to running the spindle.

The part c' of the supporting-case may be secured to the spindle-rail in any usual manner, as by a nut c^2, and the part c of said case may be adjusted vertically in the part c'.

The bore in the part c is considerably larger in cross-section than the diameter of the lower end of the spindle, so that that part of the spindle may be turned freely in the bore of said sleeve without contact therewith, leaving as contact-surfaces only the projections carried by the spindle, they running against the rolling-surfaces before described.

The upper end of the sleeve c presents a seat c^4 to sustain the upper rolling-surfaces a', and at or near the lower extremity of said sleeve, outside the vertical walls of the lower end of said spindle, is a track f for the second rolling-surface d.

The sleeve c is shown as held in an adjustable manner in the part c' by a suitable set-screw c^8.

In the modification Fig. 1 the upper and lower ends of the part c of the supporting-case are beveled, as at h h', and the balls at their sides opposite said inclines are acted upon by projections h^2 h^3, carried by and moving with the spindle A, and in the modification Fig. 3 the upper and lower ends of the part c of the supporting-case are beveled at n n', opposite to that shown in Fig. 2, the balls running on said beveled surfaces contacting with projections n^2 n^3, carried by said spindle.

It will be noticed in my invention that by reason of the tapering surface connected with the lower end of the pintle, it acting against the lower rolling-surface sustained by the lower end of the support, the spindle at high speed has no tendency whatever to rise in the support, and consequently the tapering surface and rolling-surface located inside the whirl are always kept in proper operative contact, which would not be the case if the spindle were free to rise, for in such case the rolling-surface d' might contact with a portion of the pintle of the spindle which was cylindrical rather than conical in shape.

The tapering adjustable shoulder d' is applied to the threaded portion of the spindle, so that by turning said tapering portion on said threaded part its position may be adjusted with relation to the fixed projection a to thus compensate for any wearing of the rolling-surface or the portions on which they move.

The lower end of the projection d' is toothed, as represented in Fig. 4, at d^3, and the spindle has applied to it, below said projection d', a locking device, as d^4, it having a projection 10, which may enter the space between any of the teeth at the lower end of the surface d'.

The locking device is held in its adjusted position by a suitable nut, as d^6, applied to the lower or threaded end of the pintle of the spindle. This locking device holds the projection d' in any position in which it may be adjusted.

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

A supporting-case composed of two parts, one part being contained detachably in and projecting from the other, the detachable part having its lower end adapted to receive against it a series of balls, a spindle having an attached sleeve-whirl, and a projection attached to the pintle of said spindle within said whirl and between the line of band-pull on said whirl and the junction of the said whirl with said spindle, a second projection made adjustable on the lower end of the pintle and located thereon at a point below the lower end of said support, combined with two rolling-surfaces interposed between said projections and said support, the lowermost of said projections preventing the rising of the spindle in said support while the uppermost of said projections sustains the weight of the spindle, its whirl and yarn load on the rolling-surface located inside of the said whirl between its band-pull and the junction of the whirl with the spindle, substantially as described.

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

EPPA H. RYON.

Witnesses:
GEO. W. GREGORY,
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