No. 776,121. PATENTED NOV. 29, 1904.

G. O. DRAPER.

SPINNING SPINDLE.

APPLICATION FILED AUG. 1, 1904.

NO MODEL.

Fig. 1

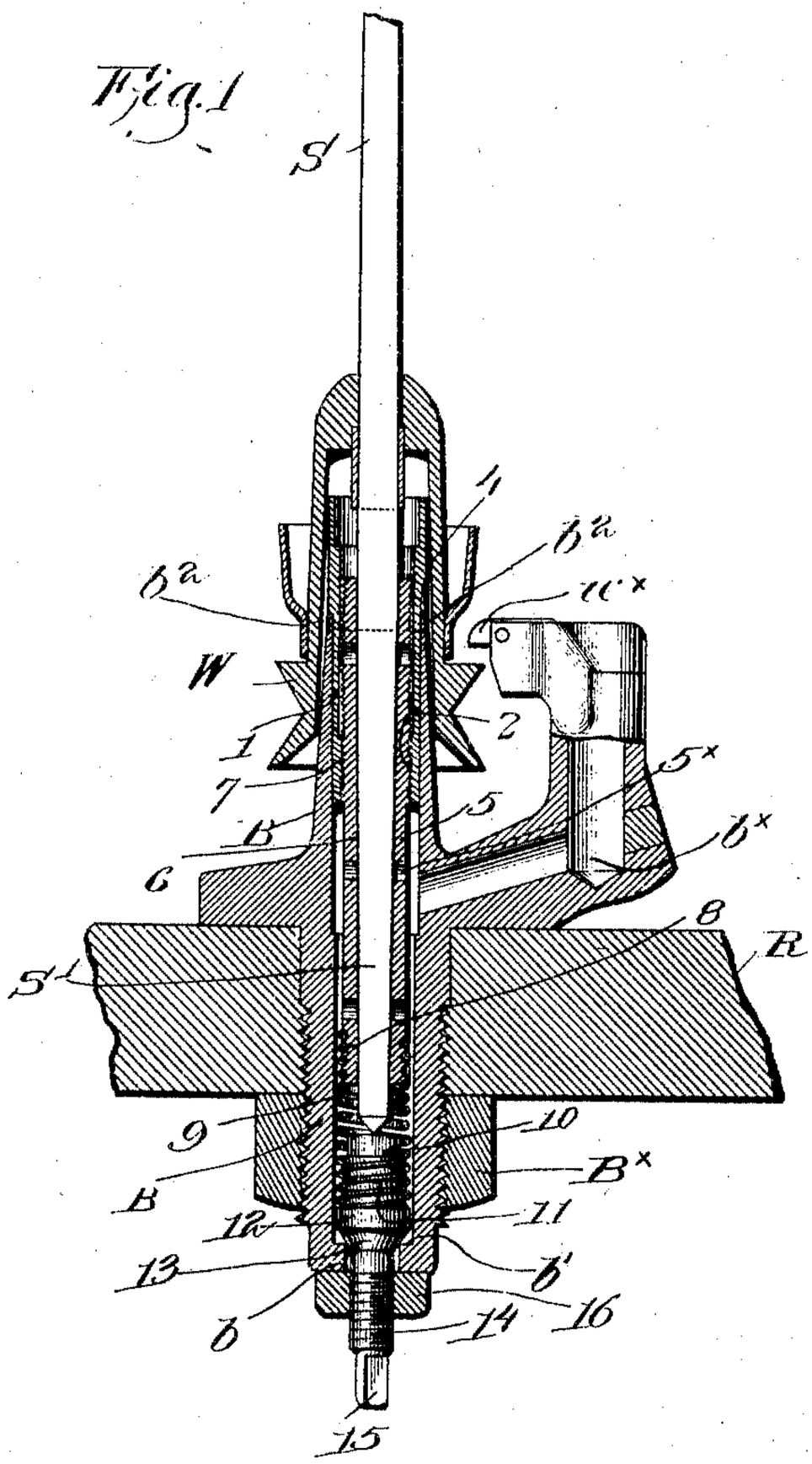


Fig. 3.

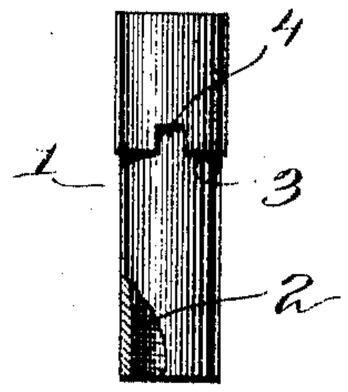
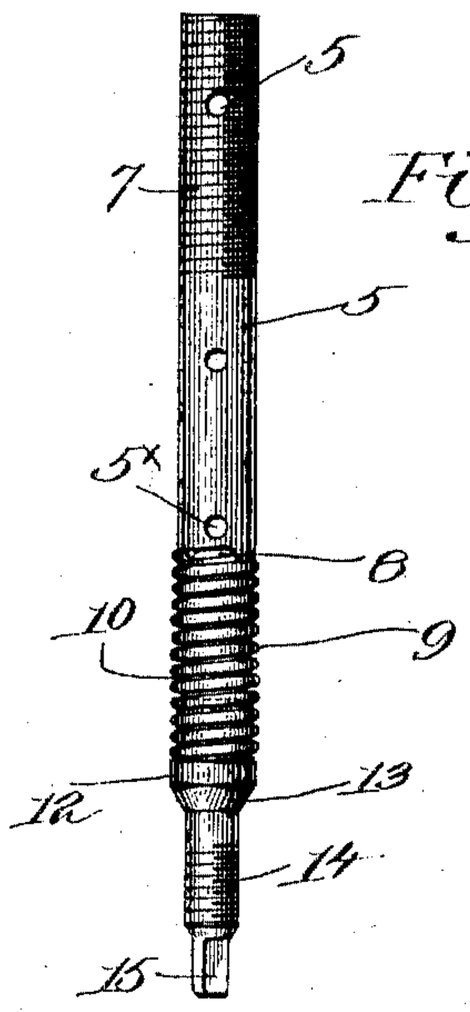


Fig. 2.



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No. 776,121. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

GEORGE OTIS DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO SAWYER SPINDLE COMPANY, A CORPORATION OF MAINE.

SPINNING-SPINDLE.

SPECIFICATION forming part of Letters Patent No. 776,121, dated November 29, 1904.

Application filed August 1, 1904. Serial No. 218,991. (No model.)

To all whom it may concern:

Be it known that I, GEORGE OTIS DRAPER, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Spinning-Spindles, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to spinning-spindles adapted to be rotated at high speeds; and it has for its object the production of means for supporting and controlling the spindle in such manner that it will run at high speed without jar or vibration and will be brought back to its proper center of rotation even when running with unbalanced loads and whereby the fit of the spindle in its bearing can be readily and quickly adjusted.

In the present embodiment of my invention the bolster-bearing of the spindle is under spring control, so that it is brought to a definite position when displaced temporarily by any cause, and as a result whatever the action of the spindle it will be returned to its proper and definite center of rotation. In connection with this structure I have combined means to adjust the fit of the spindle in the bolster, and, as herein shown, this adjustment can be effected while the spindle is in operation, both the capacity for adjustment and the adjustability while the spindle is running being of great importance.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a vertical sectional view of a spindle embodying one form of my invention, all the parts being assembled in coöperative relation. Fig. 2 is a side elevation of the bolster and spindle-step and the spring connection therebetween, and Fig. 3 is a similar view of the detachable connection between the bolster-case and the upper end or head of the bolster.

Referring to Fig. 1, a spindle S, of usual construction, having a tapering lower end or pintle S′, the attached whirl W, and bolster-case B, adapted to be clamped to the spindle-rail R by a nut $B^{\times}$, said bolster-case having an oil-reservoir $b^{\times}$ and a downhold $w^{\times}$ for the whirl, may be and are all substantially of well-known construction, save in certain portions of the bolster-case, to be pointed out hereinafter.

The bolster-case has a central opening b made in its lower end or bottom, leaving an annular seat b', and the upper end of the bolster-case has one or more upright lugs b^2, two being shown in Fig. 1 placed diametrically opposite each other. A suspension connection (shown separately in Fig. 3) is made as an elongated sleeve 1, having an internal screw-thread 2, Fig. 1, and with an external annular shoulder 3 to rest or seat upon the upper end of the bolster-case, said shoulder having notches 4 therein to receive the lugs b^2, whereby the connection is locked from rotation. The lower portion of the connection below the shoulder 3 is of such a diameter as will permit it to readily enter the bolster-case, as in Fig. 1, and extend downward thereinto for some distance.

The bolster 5, having oil-holes $5^{\times}$, is provided with a tapering bore 6 to receive the spindle-pintle S′, as is usual in bolster-bearing spindles, and at its upper end the bolster has an external screw-thread 7, adapted to be screwed into the suspension connection 1 with a loose fit. By means of the screw connection the bolster is longitudinally movable in the suspension connection when one part is rotated with relation to the other part, and by making the screw-threads of the parts fit loosely some slight lateral movement of the bolster is permitted with relation to the connection. The bolster is thus suspended from its upper end within the bolster-case, and by its vertical adjustment the fit of the spindle-pintle in the tapering bore is changed when necessary. At its lower end the bolster is reduced in diameter and a coarse spiral groove 8 is formed on the outside of the reduced portion, and one end of a spiral spring 9 is screwed into the groove, and thereby is positively connected with the bolster.

A spindle-step 10, shown as a cylindrical

block, usually made of hardened steel, has an external spiral groove 11 formed thereon, similar to the groove 8 but reversed, said groove 11 extending down to an annular enlargement or base 12 of the step, the base having a conical or tapered lower portion 13. The lower end of the spiral spring 9 is screwed into the groove 11, and as the grooves 8 and 11 are reversed and the spring fits very tightly therein the bolster and step will turn together when the step is rotated without any slipping of the spring. An expansible spring connection between the bolster and step is thus provided positively attached to each. By reference to Fig. 1 it will be seen that when the parts are assembled the spindle-step is in a definite position with relation to the suspension connection 1, so that vertical movement of the bolster therein affects the fit of the pintle in the bore of the bolster.

A cylindrical threaded extension 14 projects beyond the base of the spindle-step and is long enough to pass through the hole *b* in the bottom of the bolster-case, said extension having a flattened or non-cylindrical extremity 15 for a purpose to be described. When the parts are in position, a nut 16 is screwed upon the extension and bears against the bottom of the bolster-case, as shown in Fig. 1.

In assembling the bolster having the connected spindle-step is screwed into the suspension connection 1 and the several parts are pushed down into the bolster-case until the shoulder 3 rests upon its upper edge, as in Fig. 1, the step extension 14 projecting through the bottom of the bolster-case. The nut 16 is then screwed up by the fingers until the conical portion 13 of the step is seated upon the annular seat *b'* in the bolster-case, thereby stretching the spring 9 and putting the bolster under the control of the spring under tension. The base portion 13 fits so tightly on the annular seat *b'* that an oil-tight closure of the lower end of the bolster-case is secured, no packing or other closing means being required. The flattened end 15 of the step extension 14 is now turned by the fingers or a wrench until the fit of the spindle-pintle in the bolster is correct, after which the nut 16 is set up firmly by a wrench locking the parts.

It will be noted that the fit of the spindle in the bolster can be adjusted while the spindle is running, (a feature of importance,) so that spindle vibration can be absolutely governed or controlled unless due to imperfect parts of the apparatus. The pull of the spring 9 is in the direction of the axis of rotation of the spindle and is uniform in all lateral directions, it responding quickly and easily to any tendency of the bolster to swing laterally within the suspension connection. The bolster will shift or swing laterally in response to the movement of the spindle when running with an unbalanced load, the spring permitting such movement and by its downward pull bringing the bolster and spindle yieldingly but steadily to the proper and definite center of rotation of the latter. The coils of the spring within the bolster-case and around the bolster act to prevent any sudden or violent movement of the bolster, serving as a species of lateral cushion therefor.

Various changes or modifications may be made by those skilled in the art in the details of the construction and arrangement herein shown and described without departing from the spirit and scope of my invention.

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

1. In a spindle-bearing, in combination, a bolster-case, a bolster therein having a tapering bore to receive the pintle of the spindle, a spring under longitudinal tension or elongation attached to and controlling the bolster, and means to move the bolster longitudinally to change the fit of the spindle-pintle therein.

2. In a spindle-bearing, the combination with a bolster-case, of a bolster suspended from its upper end therein and having a tapering bore to receive the pintle of the spindle, a spindle, and means to raise and lower the bolster relatively to and while the spindle is running, to change the relative fit of such parts.

3. In a spindle-bearing, in combination, a bolster-case, a bolster suspended therein and having a tapering bore to receive the pintle of the spindle, a spring under tension connected with and acting upon the bolster, and means to vertically adjust the bolster while under spring tension, to regulate the fit of the spindle-pintle in the bolster.

4. In a spindle-bearing, the combination with a bolster-case, of a bolster therein having a tapering bore to receive the pintle of the spindle, a suspension connection between the bolster-case and the upper end of the bolster, a spring under tension connected with the lower end of the latter, and means to effect longitudinal movement of the bolster with relation to the suspension connection.

5. A spindle having a tapered pintle, a bolster having a tapering bore to receive it, a bolster-case, a spring under tension operatively connected with the bolster and bolster-case, and means accessible from the exterior of the bolster-case to raise or lower the bolster with relation to the spindle, to change the relative fit of the pintle and bolster.

6. The combination, in a spindle-bearing, of a bolster-case, a bolster therein, a connection between it and the bolster-case and with relation to which the bolster is longitudinally adjustable, and a spring acting upon the bolster in opposition to said connection.

7. The combination, in a spindle-bearing, of a bolster-case, a bolster therein, a suspension connection between it and the bolster-case,

non-rotatively held on the latter, the bolster being longitudinally movable in said connection, a spring attached to the bolster and acting through it against the connection, and means to effect longitudinal movement of the bolster in the suspension connection, to vary the vertical position of the bolster in the bolster-case.

8. In a spindle-bearing, in combination, a vertically-adjustable bolster having a tapering bore to receive the pintle of the spindle, and means to maintain the bolster continuously under spring tension, exerted in the direction of the length of the bolster.

9. In a spindle-bearing, a bolster-case, a bolster therein having a tapering bore and an externally-threaded upper end, an internally-threaded connection to receive the threaded end of the bolster and adapted to seat on the upper end of the bolster-case, and means to prevent rotation of said connection, combined with a spring under tension between and connecting the lower end of the bolster and the bolster-case, and means to rotate the bolster to effect longitudinal movement thereof in the bolster-case, the spring controlling the bolster and acting therethrough to maintain the connection seated.

10. In a spindle-bearing, a bolster-case, a bolster having a tapering bore within and vertically adjustable with relation to the bolster-case, and means including a member extended through the bottom of the bolster-case, and a spring fixedly connected with said member and with the bolster, to effect vertical adjustment of the bolster while the spindle is running.

11. In a spindle-bearing, a bolster having a tapering bore to receive the pintle of the spindle, and having an external spiral groove on its lower end, a spindle-step having a reverse groove, and a spiral spring coöperating at its opposite ends with said grooves and positively connecting the bolster and step.

12. In a spindle-bearing, in combination, a bolster-case, a bolster suspended therein and having a tapering bore, a spindle-step, a spring connecting and positively attached to the bolster and step, means to stretch the spring and exert a downward pull upon the bolster, and means to act through the step and effect vertical adjustment of the bolster while under spring control.

13. In a spindle-bearing, in combination, a bolster-case, a vertically-adjustable bolster suspended therein and having a tapering bore, a spindle-step, a spring connecting and positively attached to the bolster and step, and means externally accessible at the bottom of the bolster-case to stretch the spring and exert a downward pull upon and maintain the bolster under spring tension.

14. In a spindle-bearing, in combination, a bolster-case having an annular seat at its lower end, a vertically-adjustable bolster suspended in the bolster-case and having a tapering bore, a spindle-step having a conical base to rest on the annular seat, and close the lower end of the bolster-case, and provided with a threaded extension to project through said seat, a spring connecting and positively attached to the bolster and step, and a nut adapted to be screwed upon the step extension outside of the bolster-case, to thereby stretch the spring and bring the conical base of the spindle-step firmly upon the annular seat.

15. In a spindle-bearing, in combination, a bolster-case having an annular seat at its lower end, a bolster within the bolster-case and having a tapering bore, a suspension connection between the upper end of the bolster and the bolster-case and in which connection the bolster is rotatably and longitudinally movable, a spindle-step adapted to seat upon and close the central opening of the annular seat, a threaded extension on the seat, to project through the seat beyond the bottom of the bolster-case, a spring connecting and positively attached to the bolster and step, and a nut adapted to be screwed on the projecting end of the extension to stretch the spring and seat the spindle-step upon the annular seat, rotation of said extension acting through the step and spring to rotate and vertically adjust the bolster in its suspension connection.

16. In a spindle-bearing, a bolster-case, a tubular, internally-threaded suspension connection adapted to be supported thereby, means to lock said connection from rotation, and a bolster threaded at its upper end to engage loosely and be held in vertical position by said connection while permitting slight lateral movement of the bolster.

17. In a spindle-bearing, a bolster-case, a bolster therein, having a tapering bore, a suspension connection between the bolster and the bolster-case, and means to vertically adjust the bolster by rotation of the same relatively to the suspension connection.

18. The combination, with a rotatable spindle, and a bolster therefor under spring tension exerted in the direction of the length of the bolster, of means to adjust the fit of the spindle in the bolster.

19. In a spindle-bearing, in combination, a bolster, a bolster-case, a spring under tension attached to and extending between said parts, and means acting through the spring to vertically adjust the bolster.

20. In a spindle-bearing, in combination, a bolster, a bolster-case, a spring under tension positively attached to the bolster and rotatably connected with the bolster-case, bodily rotation of the spring acting to rotate and vertically adjust the bolster, and means to maintain said spring under tension and also to lock it from bodily rotation.

21. In a spindle-bearing, in combination, a bolster, a bolster-case, a spring under tension attached to and extending between said parts,

a connection between the bolster-case and bolster and in which the latter is rotatable to effect vertical adjustment thereof, and means to effect rotation of the bolster by or through the spring.

22. In a spindle-bearing, in combination, a bolster-case, a vertically-adjustable bolster mounted therein, and means, including a spring under tension and acting upon the bolster, to effect vertical adjustment of the bolster.

23. In a spindle-bearing, in combination, a bolster-case, a vertically-adjustable bolster mounted therein, a spindle-step connected with the bolster, and means, including a spring under tension and acting upon the bolster, to effect vertical adjustment of the latter.

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

GEORGE OTIS DRAPER.

Witnesses:
JOHN C. EDWARDS,
MABEL PARTELOW.