C. T. ATHERTON.

SPINNING MACHINERY.

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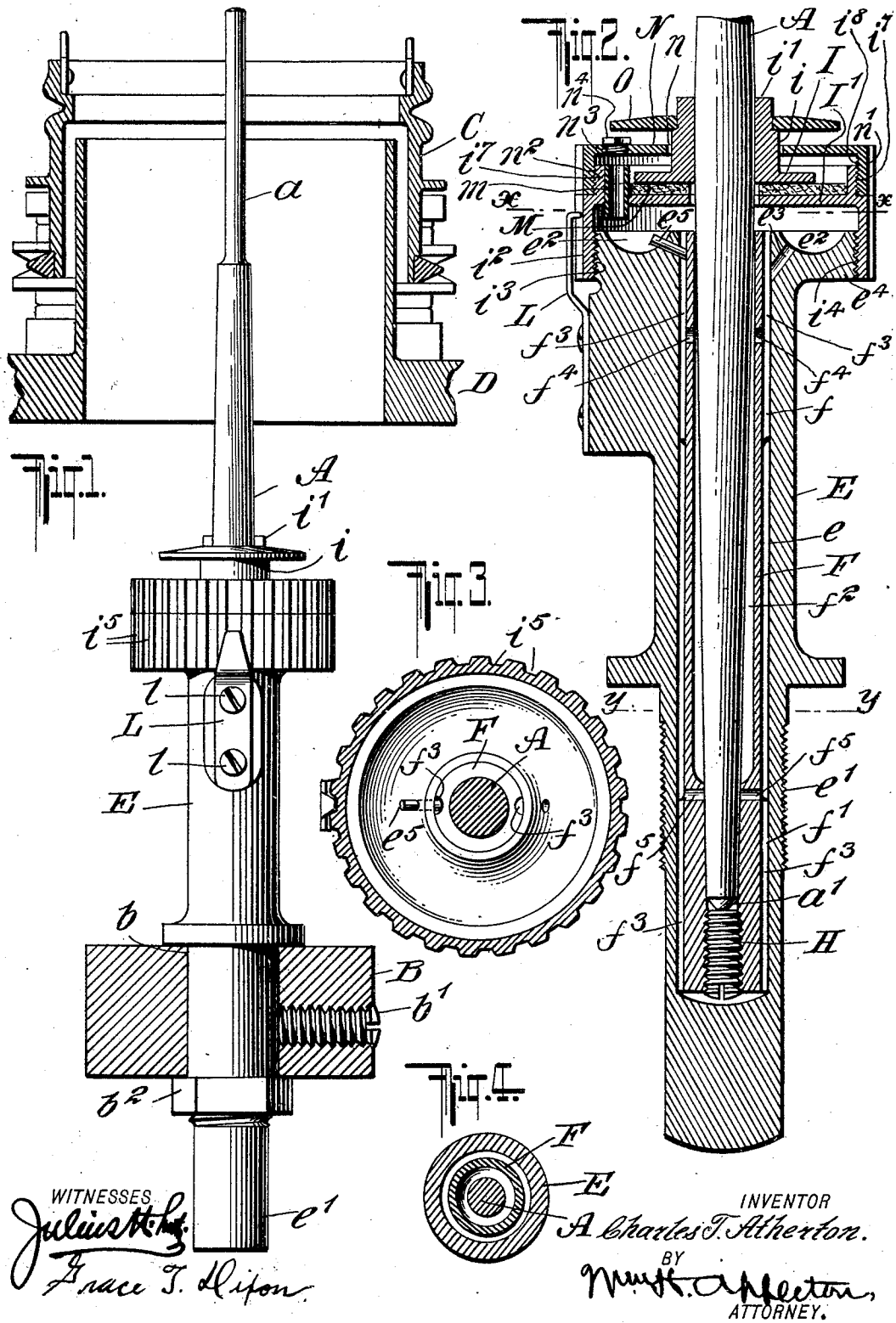
954,012. Patented Apr. 5, 1910.



UNITED STATES PATENT OFFICE.

CHARLES T. ATHERTON, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO ATHERTON SPINNING RING COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

SPINNING MACHINERY.

954,012. Specification of Letters Patent. Patented Apr. 5, 1910.

Application filed August 1, 1907. Serial No. 386,580.

To all whom it may concern:

Be it known that I, CHARLES T. ATHERTON, a citizen of the United States, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Spinning Machinery, of which the following is a specification.

My invention, while relating primarily to spinning machinery, has reference more particularly to the spindles and spindle supports made use of therein, and especially to those forms of such devices wherein the spindles are of the class which are known to the art as "dead spindles", and receive whatever rotation there is imparted to them through the strain of the yarn in being spun and wound into cops, or upon bobbins carried by them. In U. S. Letters Patent No. 749,470, dated January 12th, 1904, is shown and described a spindle of this character, with an appropriate support therefor, in which the spindle is provided with a "drag", or devices by which its rotation when in operation may be frictionally resisted and the amount of such resistance regulated and controlled to suit it to the requirements of the yarn being produced or wound. The construction shown and described in such Letters Patent, while efficient in operation when employed in the production and winding of yarns that are spun and wound in a dry state, is unprotected in its drag, or rotating resisting devices of the spindle, from the action of the water and other objectionable substances when the construction is employed in the spinning and winding of linen, jute or other materials that are spun and wound in a wet state, and such water or other substances enter it, with the result that the operative efficiency of the parts is more or less impaired. Moreover, with this construction no provision is made for preventing the rotation of the friction resisting surface that coöperates with the spindle to retard its rotation, and, under some conditions, this surface rotates with the spindle, causing thereby the part or parts upon which such surface is formed to wear unnecessarily.

My present invention is designed as an improvement upon this construction, and it has for its object the production of a spindle and the supports therefor, in which, among other things, not only is the drag upon the spindle, or the parts employed to oppose the frictional resistance to its rotation, inclosed and protected from the water contained in the yarn being spun and wound, as well as from the other objectionable substances that are present during those operations, but the part carrying the surface which coöperates with the spindle to frictionally retard its rotation, is held from rotary motion, and the lubrication of the spindle more efficiently accomplished.

To these ends, the invention consists in certain peculiarities of construction and combination of parts, all of which will be first described, and the distinguishing features of novelty then pointed out in the subjoined claims.

Referring to the accompanying drawing, which forms a part of this specification, Figure 1, is a side elevation of a spindle and the support therefor constructed in accordance with one form of my invention, showing their relationship with respect to a ring-rail, a rotating ring, and a supporting spindle-rail, which are severally shown in section; Fig. 2, a side view of a spindle, the support therefor, and the other accessories, the spindle, the step, the spring detent for coöperating with the adjusting devices for the drag, and the pin for preventing the rotation of the bolster and step in their holder, being shown in side elevation, and the remaining parts in axial section; Fig. 3, a transverse horizontal section, taken in the plane *x x* of Fig. 2, and looking downward, and Fig. 4, a like transverse horizontal section, taken in the plane *y y* of said Fig. 2, and similarly looking downward.

In all the figures, like letters of reference are employed to designate corresponding parts.

A indicates the spindle, and B the spindle rail upon which the spindle is supported. The spindle A is or may be of any ordinary or preferred construction, and, in practice, it is employed in connection with appropriate yarn twisting and winding devices C, and with a coöperating rail D. These twisting and winding devices, with the coöperating rail however, form no part of my present invention, but are illustrated in the drawing to more particularly show the relationship of the spindle with respect to them, and are or may be of any approved or well

known character and require no further description herein. In the form of the invention which I have selected for purposes of illustration however, the spindle is shown as gradually tapered in opposite direction from its middle portion toward its upper and lower ends, with its upper end provided with a reduced cylindrical section a, and its lower end equipped with a conical step a^1.

For supporting the spindle A upon the spindle rail B, I make use of a holder E, which is preferably constructed with a cylindrical chamber or socket e, formed in and extending downward within the same to near its lower end, and also with a downwardly extending shank e^1, which is adapted to enter and fit a suitable orifice b, formed in the spindle rail B, in which it may be held either by a set screw b^1, or by a nut b^2 threaded upon its lower end, as preferred. With the holder constructed as thus explained, it receives the lower portion of the spindle A, which is rotatively mounted therein through the intervention of a bolster bearing F and step bearing H. To permit of this mounting of the spindle therein, the bolster bearing F is preferably constructed in tubular form, with enlarged upper and lower end portions f and f^1, which are adapted to enter and closely fit the interior of the chamber or socket e, and also with an interior orifice f^2, which extends longitudinally through it, and is of a form and size to loosely fit the spindle at or near both its middle and lower end portions; while the step bearing H is constructed in the form of a screw plug, which is threaded in the lower end of the bolster tube, and supports on its upper flat end the spindle A, which rests thereon, through its step a^1. By this construction and arrangement of parts, as will be seen, not only is the spindle supported upon the spindle rail and lateral bearings afforded to it at or near its middle and lower end, but such spindle sustained against the action of gravity, and rendered capable of vertical adjustment when required. The spindle A, being thus mounted, is free to rotate in and upon its bearings, as the exigencies of its use may require; and, in order to provide for the lubrication of its bearings, the chamber or socket e in the holder E is preferably constructed with a closed bottom, whereby, in addition to serving as a holder for the bolster and step bearings, it also serves as a well or receptacle to receive and hold the lubricant, while the peripheries of both the enlarged end portions f and f^1 of the tube F are equipped with one or more longitudinal grooves f^3, which is or are connected with the interior of the tube near its or their respective upper and lower ends by ducts f^4 and f^5. As thus constructed and equipped, the lubricant may be supplied to the chamber or socket e by depositing it in the upper end of the groove f^3, or in any one of them when a plurality is employed, and allowing it to flow downward through the same into the socket, which may be filled to its top therewith if so desired. It is preferred however to supply it thereto from a reservoir e^2, with which one or more of the grooves f^3 may be connected by a duct e^3, and to locate this reservoir e^2 in the upper surface of an enlarged flange-like portion e^4 formed at the upper end of the holder E, as shown.

In some instances the enlarged end portions f and f^1 of the tube F will fit the chamber or socket e sufficiently tight to prevent the tube from rotating therein, and the relationship of the groove f^3 with the duct e^3 in that case will be maintained by friction alone. When however it is preferred to insure of this result being accomplished in a more positive manner, a locking pin e^5 may be employed, which, when used, extends inward from the walls of the chamber or socket e and engages at its inner end with any convenient depression formed in the tube F, as, for instance, with one of the grooves f^3, or otherwise.

While the mounting of the spindle, and lubrication of its bearings are thus effected, the rotation of the spindle is resisted and a drag imposed upon it by coöperating disks I and I^1, of which the former is rotatable and the latter stationary. The disk I, in the embodiment of the invention shown in the drawing, is preferably constructed on the lower end of a hub or collar i, and is fixedly secured upon the spindle, whereby to rotate with, and be held in a fixed relationship to, it, while the upper end of the hub or collar is or may be provided with dogs i^1 for engagement with the bobbin or spool when one is employed. The disk I^1, on the other hand, is constructed with a downwardly extending annular sleeve i^2 upon its back, with the interior of this sleeve provided with a screw thread i^3, for engagement with a corresponding screw thread i^4 formed on the exterior of the enlarged flange-like portion e^4 of the holder E, whereby to provide means for the adjustment of the disk I^1 toward and away from the disk I, to increase or decrease the resistance or drag opposed to the rotation of the spindle, as the exigencies of its rotation may require. With the parts thus employed the resistance of the drag opposed to the rotation of the spindle will be increased by simply rotating the disk I^1 in the proper direction on the flange-like portion e^4 to cause it to be forced against the disk I with greater pressure; while its decrease, on the contrary, will be accomplished by reducing the pressure with which the disk I^1 is forced against the disk I, by rotating the former disk on the flange-like portion e^4 in the opposite

direction. Thus, as will be seen, by the means described the resistance to the rotation of the spindle, or the drag thereon, may be regulated and controlled, by simply rotating the disk I^1 on the flange-like portion e^4 in the required direction; and in order to retain the disk in any of the positions to which it may be thus rotated and adjusted, a spring detent L is employed, which, secured to the holder E by suitable screws l, is adapted to engage at its free end with appropriate notches i^6 formed in the periphery of the disk, as shown.

In some instances the disk I^1 may contact directly with the disk I, without the employment of an intermediate medium between them. I prefer however to interpose between them one or more layers of felt or other frictional material M, made in the shape of a washer, or washers, as thereby more efficient results are accomplished; and, with a view to preventing any rotation of these layers, or any of them, I make use of an abutment m, which, in the form of the invention shown in the drawing, is constructed in the shape of a tube, and extends downward through the disk I^1, outside the periphery of the disk I, with its upper end extending upward through an orifice formed in the layer or layers of felt to some distance, and with its lower end projecting downward below the under surface of the disk, in proper relationship to the reservoir e^2, whereby, in addition to serving as a means to prevent the rotation of the layer or layers of felt, it may also serve as a means through which the lubricant may be supplied to such reservoir.

For excluding water and other objectionable substances from the layer or layers of felt and from the bearings of the spindle, the upper surface of the disk I^1 is provided near its outer edge with an upwardly extending annular sleeve-like flange i^7, and, in connection therewith, is employed a cover N, which is constructed with an orifice n through its center of a size to receive and fit the spindle, or the hub or collar i, when one is employed, and also with a downwardly extending annular flange n^1 around its outer edge, which, provided in its interior with a screw thread n^2, engages with a corresponding screw thread i^8 formed on the outer surface of the upwardly extending flange i^7. As thus constructed and arranged, not only is a chamber formed upon the disk I^1 for the reception of the layer or layers of felt, but a cover therefor as well; and in order to allow for the lubricant being supplied to the reservoir e^2 when required, the cover N is or may be provided at a point over the tubular abutment m with an orifice n^3, which, when the lubricant is not being supplied, may be closed by an appropriate screw or plug n^4.

In most instances the cover N will exclude all water or other objectionable substances from the felt and bearings, but in order to more thoroughly prevent it from working downward around the hub or collar i, I find it convenient to employ a disk O, which is fitted upon the hub or collar near its upper end, and extends outward over the cover to such a distance as to deflect all water and other objectionable substances falling upon it outward away from the hub or collar, and prevent them from entering the space in the cap around it.

With the parts constructed and arranged as above explained, a spindle, with means for supporting it in operative position when in use, is provided, which, in addition to answering the various objects before pointed out, possesses other and further advantages in points of construction and operation, not necessary to mention herein.

While, in the foregoing I have described the best means contemplated by me for carrying my invention into practice, I wish it distinctly understood that I do not limit myself strictly thereto, as it is obvious that the same may be modified in various ways without departing from the spirit of the invention.

Having now described the invention and specified certain of the ways in which it is or may be carried into effect, I claim and desire to secure by Letters Patent of the United States,—

1. The combination, with a spindle provided with a disk fixedly secured thereto, and a holder in which the spindle is supported, of a second disk threaded upon the upper end of the holder so as to be adjustable toward and away from the first mentioned disk and provided with an upwardly extending annular flange-like portion, and a cap or cover provided with a downwardly extending flange-like portion for coöperation with the upwardly extending annular flange-like portion of the adjustable disk, substantially as described.

2. The combination, with a spindle provided with a disk fixedly secured thereto, and a holder in which the spindle is supported, of a second disk threaded upon the upper end of the holder so as to be adjustable toward and away from the first mentioned disk and provided with an upwardly extending annular flange-like portion, and a cap or cover provided with a downwardly extending flange-like portion threaded upon the upwardly extending annular flange-like portion on the adjustable disk, substantially as described.

3. The combination, with a spindle provided with a disk fixedly secured to it, a holder in which the spindle is supported, a second disk constructed with a downwardly extending flange-like portion that is threaded upon the upper end of the holder, where-

by the said disk is adjustable toward and away from the first mentioned disk, and is provided with an upwardly extending annular flange-like portion, of a layer or layers of felt interposed between the said disks, a cap or cover provided with a downwardly extending flange-like portion threaded upon the upwardly extending annular flange-like portion of the adjustable disk, and a deflecting disk carried by the spindle and extending outward over the cap or cover, substantially as described.

4. The combination, with a spindle provided with a disk fixedly secured thereto, and a holder in which the spindle is supported, of a second disk for coöperating with the first mentioned disk, a layer or layers of frictional material interposed between such disks, and an abutment for engaging with such layer or layers of frictional material to prevent it or them from rotation, substantially as described.

5. The combination, with a spindle having a friction disk fixedly secured thereto, and a holder in which the spindle is supported provided with a chamber or socket formed therein and having a closed bottom, of a bolster tube carrying the step bearing at its lower end and closely fitted to such chamber or socket at or near both its upper and lower ends, ducts leading through such bolster tube at or near the bolster and step bearings therein, means through which the lubricant may be supplied to said chamber or socket and thence conducted directly to the spindle through such bolster tube at or near both the bolster and step bearings, and a friction disk adjustably supported upon the holder for coöperation with the friction disk on the spindle to apply a drag or resistance to the rotation of the spindle, substantially as described.

6. The combination, with a spindle having a friction disk fixedly secured thereto, and a holder in which it is supported provided with a cylindrical chamber or socket closed at its lower end, of a bolster tube provided with a step bearing at its lower end closely fitted to such chamber or socket at or near its upper and lower ends and constructed with longitudinal grooves formed along its exterior, ducts leading through such bolster tube near its upper and lower ends with the upper of these ducts connecting with the grooves, means through which the lubricant may be supplied to said chamber or socket, and a second friction disk adjustably mounted on said holder for coöperation with the friction disk on the spindle, whereby to apply a drag or resistance to the rotation of such spindle, substantially as described.

7. The combination, with a spindle having a friction disk thereon, and a holder in which the spindle is supported provided with a closed bottom cylindrical chamber or socket e, a reservoir e^2, and a connecting duct e^3, of a tubular bolster bearing F, carrying the step bearing H at its lower end, arranged in such chamber or socket and closely fitting the same at its upper and lower ends, with longitudinal grooves f^3 and connecting ducts f^4 and f^5 formed at or near the bolster and step bearings therein, and a second friction disk adjustably supported on said holder for coöperation with the friction disk on the spindle whereby to apply a drag or resistance to the rotation of such spindle, substantially as described.

8. The combination, with a spindle having a friction disk thereon, and a holder in which the spindle is supported provided with a chamber or socket having a closed lower end, a reservoir in its upper end, and a duct leading from such reservoir to the chamber or socket, of a bolster tube arranged in such chamber or socket with its upper and under end portions closely fitted thereto and provided with longitudinal grooves f^3, ducts f^4 and f^5 leading through such tube with the duct f^4 connecting with one of the grooves f^3, a step bearing arranged in its lower end for supporting the spindle against the action of gravity, and a second friction disk adjustably supported on said holder for coöperation with the friction disk on the spindle to apply a drag or resistance to the rotation of such spindle, substantially as described.

9. The combination, with a spindle, and a holder in which it is supported provided with a cylindrical chamber or socket closed at its lower end, a reservoir e^2 at its upper end, and a duct e^3 for connecting the reservoir with the chamber or socket, of a bolster tube F closely fitted to such chamber or socket at its upper and lower ends and provided with longitudinal grooves f^3, ducts f^4 and f^5 respectively located near its upper and its lower ends, with the ducts f^4 connected with the grooves f^3, a disk I^1 adjustably supported upon the upper end of the holder and provided with a tubular abutment m extending through such disk in proper relationship to the reservoir e^2, and a cap or cover N fitted to said disk and provided with an orifice n^3, whereby the lubrication for the spindle may be supplied to the reservoir e^2 without removing the cap or the disk I^1, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses this 27th day of July, 1907.

CHARLES T. ATHERTON.

Witnesses:
ABEL T. ATHERTON,
WILLIAM K. ATWOOD.