(No Model.)

J. H. NORTHROP.

LOAD EQUALIZER FOR SPINNING AND TWISTING SPINDLES.

No. 525,468. Patented Sept. 4, 1894.

Fig. 1.

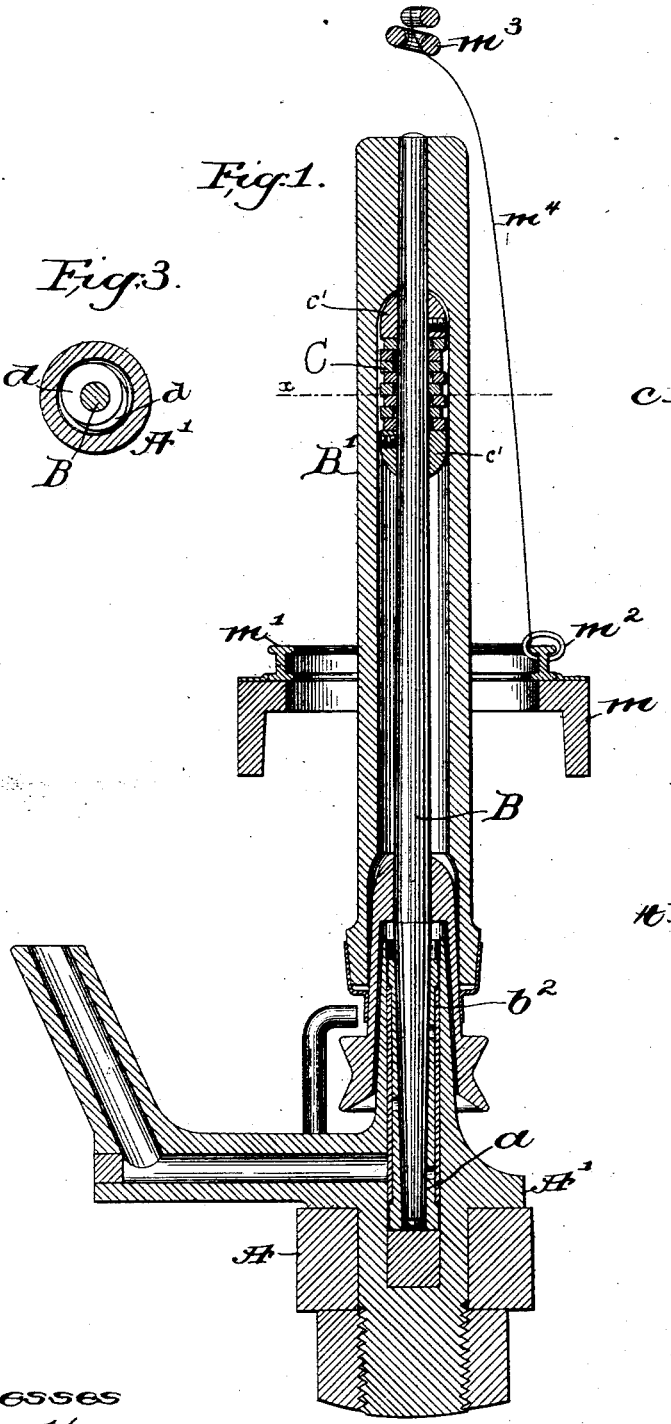


Fig. 3.

Fig. 2.

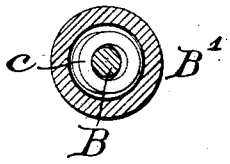
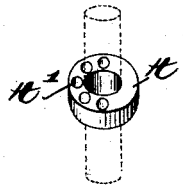


Fig. 4.



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UNITED STATES PATENT OFFICE.

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

LOAD-EQUALIZER FOR SPINNING AND TWISTING SPINDLES.

SPECIFICATION forming part of Letters Patent No. 525,468, dated September 4, 1894.

Application filed December 13, 1893. Serial No. 493,560. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. NORTHROP, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Load-Equalizers for Spinning and Twisting Spindles, 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 the production of a novel spindle adapted in practical use to carry all required loads at the high rate of speed required in modern spinning, said spindle standing at all times perpendicular in the center of the usual ring and being capable of running without jarring. To effect these results never before attained so far as I am aware in the art of spinning, I have combined with the spindle a shifting load-equalizer which operates automatically during the rotation of the spindle, said load-equalizer acting to maintain the spindle in vertical position, it working against and neutralizing forces, which, proceeding from an unbalanced load on the spindle, seek to deflect the spindle from its perpendicular position while spinning or twisting yarn.

The two most important requirements for the successful operation of spindles used in spinning and twisting are, first, they should be able to carry their bobbins and yarn loads always more or less out of balance, at a high rate of speed, a speed not less than nine or ten thousand revolutions per minute, for upon high speed depends directly the amount of yarn produced; and second, the spindle should at all times stand substantially perpendicular and run without vibration or gyration in the center of the spinning ring on which runs the traveler which winds the yarn on the bobbins, for it will be understood that each deflection of the spindle from perpendicular position tends to strain the yarn between the traveler and bobbins, and thus produce uneven yarn or break it; and so also such strain causes undue gyration.

Prior to my invention no spindle known to me has practically met these two requirements, and the second requirement has had to be sacrificed more or less to the requirement of high speed.

Since the introduction of the so-called self-centering or high speed spindle, of which the Rabbeth spindle may be named as the leading type, various forms of spindle have been produced in which provision has been made to allow the spindle to move laterally or radially under the influence of an unbalanced load, but while practically unlimited speed might be attained, and while the spindles would not pound or jar like those rigidly held, yet when the load was unbalanced, which is almost always the fact to a greater or less degree, the spindle necessarily runs more or less out of its central relation to the ring.

My improved spindle devised after long study and experiment meets both the foregoing requirements, and it can be run even faster than any spindle known to me without pounding in its bearings, and it will run in substantially perpendicular position notwithstanding an unbalanced load and will rotate at the center of rather than at one side of the center of the ring, thus insuring better yarn and less breaking of ends in spinning and twisting, and this too accompanied by a very considerable saving in power.

My spindle may either be held rigidly in its bearings, in which case it will be found to run under unbalanced loads at high speed without the jar or pounding incident to all previous rigidly mounted spindles; or it may be held in bearings which permit it to have slight lateral motion (as in the well known Rabbeth and Sherman spindles) in which case it will run without departing from its position in the center of the ring, thus differing from all previous loosely mounted spindles. I believe the latter form of mounting my spindle to be somewhat preferable, but either method may be used with great advantage.

One part of my invention, therefore, consists in a spindle provided with a shifting load-equalizer, said equalizer resisting and overcoming harmful tendencies and disturbing influences arising from unbalanced bobbins or yarn loads or other usual causes tending to deflect spindles from substantially perpendicular positions.

I have devised several different forms of load equalizers, and after having described

the same it will be apparent to those skilled in the art of spinning that yet many other varities and types of equalizers might be devised and yet they would be within the scope of my invention, and therefore my invention in spinning and twisting spindles is not limited to the precise forms of equalizers shown, but I include any equivalent contrivance having the same principle of operation.

Figure 1 shows a spindle with my improvements added in one practical desirable form, together with my rail and ring. Fig. 2 is a section in the line x of Fig. 1; Fig. 3, a like section of a modification of my invention; and Fig. 4 shows yet another modification.

Referring first to Fig. 1, A, represents a rail, on which is erected a suitable supporting-case A′ having a suitable loose bolster or lateral bearing a, and B is a sleeve whirl spindle adapted to receive and carry a chambered bobbin B′, the bearing being surrounded by a cushion b^2.

In accordance with my invention the blade of the spindle, or the part of the spindle above the junction with it of the whirl, is provided with my improved load equalizer.

As shown in Figs. 1 and 2, my load equalizer C is composed of one or more rings or weights c, having holes through them enough larger in diameter than the blade of the spindle to enable them to move laterally to a limited extent, said rings being sustained vertically between suitable stops or collars c', c', and held loosely enough so that they may change position immediately to counterbalance the smallest variation in the balance of the yarn load or the pull of the thread. The collars c', c', are of sufficiently larger diameter than the rings or weights c, to constitute guards to protect the rings or weights when applying or removing a bobbin from the spindle which rotates it.

In the modification Fig. 3, the load equalizer is shown as composed of rings or weights d, having holes which are eccentric to their peripheries, so that the said rings instead of only sliding laterally to accommodate the spindle to its unbalanced load, may also turn partially about the said spindle as a center and in such way distribute their weight as required.

Fig. 4 shows a modified form of ring or weight t for the load equalizer, the said ring having holes t' at one side so that one side is heavier than the other to thus enable centrifugal action to take place, as in the forms of my invention shown in Figs. 1 to 3. In all these modifications there is a weight which may assume different positions with relation to the spindle and its load as occasion demands.

From the foregoing it will be understood that this invention in spinning and twisting spindles is not limited to the particular shape or construction of the load equalizer, or to the particular shape or construction of the pintle of the spindle, or its bolster or lateral bearing, or its step, or whether the bearing is loose or rigid, although in some cases the loose bearing is considered best, and my invention is intended to include any usual or proper equivalents of any or all said devices.

The best form of my invention now known to me is that shown in Fig. 1, and by its use I have met with most favorable results in connection with spindles having greatly unbalanced loads.

In Fig. 1, m designates a ring-rail; m' a ring; m^2 a traveler to run on the ring; and m^3 a guide wire or eye, all of usual construction for the yarn m^4.

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

1. A rotary spinning or twisting spindle provided with a load equalizer adapted to automatically counterbalance in all directions any unbalanced load carried by the spindle and thus restrain jar or gyration, substantially as described.

2. In a spinning or twisting machine, a supporting-case having a lateral bearing, and a rotary spinning or twisting spindle mounted in said bearing and provided with an automatically operating load equalizer adapted to counterbalance in all directions any unbalanced load carried by the spindle and enable the spindle to run and remain in perpendicular position, substantially as described.

3. A supporting-case having a loose lateral bearing, and a rotary spinning or twisting spindle mounted in said bearing and provided with an automatically operating load equalizer adapted to counterbalance in all directions any unbalanced load carried by the spindle and enable the spindle to run and remain in perpendicular position, substantially as described.

4. A rotary spinning and twisting spindle provided with one or more weights adapted to move thereon under the influence of the centrifugal force developed by the revolution of the spindle and thereby to counterbalance in all directions the tendency of the spindle to spring or jar under the influence of the unbalanced load, substantially as described.

5. A spinning or twisting spindle provided with a load equalizer adapted to be moved automatically under the influence of centrifugal force, in combination with a bobbin chambered to surround said equalizer and yet permit it to move as required, substantially as described.

6. A ring rail and ring, and a supporting-case having a lateral bearing, combined with a rotary spindle provided with an automatically operating load equalizer made movable by or through centrifugal force to counterbalance in all directions any unbalanced load, and keep the spindle upright, and central with relation to the ring, substantially as described.

7. A spinning or twisting spindle provided

with one or more rings loosely held upon the shaft of the spindle, substantially as described.

8. A spinning or twisting spindle provided with one or more loose rings held in position upon the shaft of the spindle between two guards of sufficient diameter to protect the rings in removing or replacing the chambered bobbin, substantially as described.

9. A rotary spindle having a weight arranged to revolve upon its blade, combined with a support for said weight attached to the spindle.

10. A spindle having a whirl, and an attached bobbin having an interior bore for part of its length of larger diameter than the diameter of the spindle to thus leave an open space between the bobbin and spindle, combined with a weight surrounding the spindle above the whirl and inside the said chamber, to operate, 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:
E. D. BANCROFT,
GEORGE OTIS DRAPER.