(No Model.)

W. G. MORRISON.

SPINNING SPINDLE.

No. 577,056. Patented Feb. 16, 1897.

Fig. 2

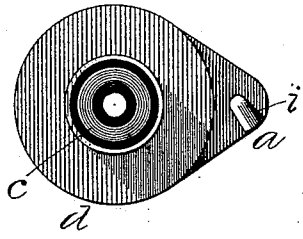

Fig. 1

Fig. 4

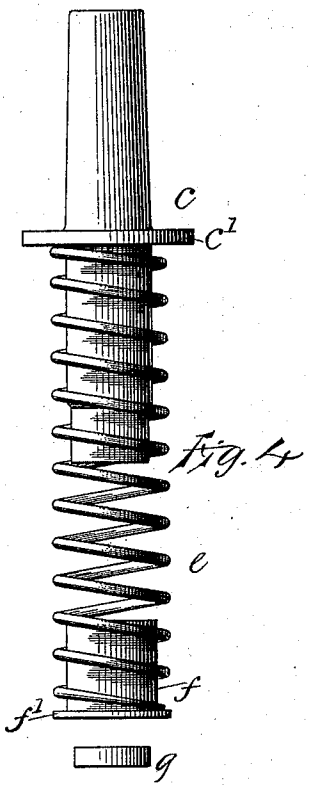

Fig. 3

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UNITED STATES PATENT OFFICE.

WALTER G. MORRISON, OF WILLIMANTIC, CONNECTICUT.

SPINNING-SPINDLE.

SPECIFICATION forming part of Letters Patent No. 577,056, dated February 16, 1897.

Application filed October 29, 1895. Serial No. 567,298. (No model.)

To all whom it may concern:

Be it known that I, WALTER G. MORRISON, a citizen of the United States, and a resident of Willimantic, in the county of Windham and State of Connecticut, have invented certain new and useful Improvements in Spinning-Spindles, of which the following is a full, clear, and exact specification, whereby any one skilled in the art can make and use the same.

My invention relates to that class of spinning-spindles known as "self-centering" and in which provision is made to enable the spindle in running to adapt itself automatically to an unbalanced load. In spindles of this class, while it is desirable that there should be some freedom of movement laterally of the axis in order to prevent jarring in running at high speeds when carrying an unbalanced bobbin the extent of this movement should be limited to secure the best results, and my improvement is directed to that end.

My invention consists in the details of the several parts making up the spindle and its mount and in the combination of such parts, as more particularly hereinafter described, and pointed out in the claims.

Referring to the drawings, Figure 1 is a detail view in elevation of a spindle with parts cut away to show construction. Fig. 2 is a detail top view of the mount with the spindle removed. Fig. 3 is a top or plan view of the step-bearing. Fig. 4 is a detail view of the bolster-bearing, socket-piece, step-bearing, and spring.

In the accompanying drawings the letter *a* denotes the base of the spindle, made, preferably, in cylindrical form and having the closed bottom, as illustrated in the drawings, but in any event consisting of that part which is adapted to be secured to a spindle-rail *b* to support the spindle as a whole. The base has preferably an exterior shoulder *a'*, which rests upon the top of the spindle-rail, and has also a socket, enlarged at the upper end, to receive the flange of the bolster-bearing tube.

The bolster-bearing tube *c*, having a flange *c'*, is located as to its lower portion within the socket in the base, the edges of the flange overlying the shoulder a^2, and while closely fitting the socket at the same time allowing a slight tilting movement of the bolster-bearing tube within the socket.

A cap *d*, which is perforated so as to fit loosely over the bolster-bearing tube, has a screw-thread engaging a screw-thread on the inside of the upper portion of the socket in the base-piece, the lower surface of this annular cap forming a bearing for the upper surface of the flange on the bolster-bearing tube. These two parts are held in contact by the upward pressure of a spiral spring *e*, which is located in the socket in the base-piece, one end coil of the spring resting against the under surface of the flange on the bolster-bearing tube and the coil at the other end resting on the flange of the socket-piece *f*.

The socket-piece *f* has a central socket into which the lower end of the bolster-bearing tube extends and within which it loosely fits, a flange *f'* at the bottom and on the outer surface of the socket-piece forming the shoulder on which the lower end of the spiral spring rests. A step-bearing *g* is provided within the socket-piece *f* for the end of the spindle *h* to rest upon.

The spindle is preferably of the form known as a "sleeve-whirl" spindle, the lower cylindrical portion being located within the bolster-bearing tube. This spindle *h* has a running fit within the bolster-bearing tube, so that its upright position is determined by the position of such tube, and the spindle is held against accidental removal from its socket and bearings by means of the ordinary form of hook *i*, which is attached to the base and has a hooked end adapted to be swung over the flange on the whirl.

Whenever a bobbin having an unbalanced load, that is, one in which the center of gravity of the load is not in the axial line of the bobbin, is mounted on the spindle and run at a high rate of speed, the spindle tends to gyrate, and unless some freedom of movement is allowed, so that the load can adjust itself to the center of rotation, the spindle will cause a jarring motion to the frame that is detrimental to the work.

All of the several parts of the device which support the spindle are included in what I term the "spindle-mount," and in such mount the bolster-bearing tube is pressed upward by the spiral spring, as described, into close

contact with the under surface of the cap, a space below the flange on the tube and the shoulder a^2 being left, so that the spindle and the tube may rock laterally out of an upright position. As soon as this rocking of the bolster-bearing tube begins the lower end of the tube, which lies and fits loosely within the upper end of the socket-piece *f*, strikes the inner wall of the socket and tends to tilt the socket-piece on its lower edge. This sidewise tilting motion of the spindle is resisted by the spiral spring, which presses upward against the under surface of the flange on the bolster-bearing tube, and the sidewise tilting movement of the socket-piece is also resisted by the downward pressure of the spring against the shoulder or flange on the socket-piece. The result of this peculiar combination of parts is that the tendency of the spindle to tip sidewise from a vertical line is resisted by the compression of the spring resulting from the movement of both the flange on the bolster-piece and the shoulder or flange on the socket-piece toward each other, thus compressing the spring on one side. It will be seen from this that a comparatively weak spring, or one which will readily yield to a slight movement of the spindle out of its center, may be used as a yielding cushion, and thus provide a spindle which will be sensitive to slight inequalities of load, but that any extreme movement of the spindle will be resisted by the action of the socket-piece, which forms a species of brake, the socket-piece forming a species of bent lever with one arm in contact with the lower end of the bolster-bearing and the other pressed upon by the spring, while the lower edge of the socket-piece forms the fulcrum on which the socket-piece rocks. This construction and combination of the several parts enable all of the advantages of a flexible spindle which will yield to an unbalanced load to be provided, while the objectionable features of such a spindle are obviated and its movement kept within the desired limit of control in its efforts to adjust itself to the unbalanced load while running at high speeds.

The lower end of the spindle runs freely on the step-bearing, on which it wanders or moves laterally, the step-bearing having of necessity no lateral movement whatever. The bolster-bearing tube is the only part which has a lateral rocking movement with the lateral movements of the spindle, and the bolster and step bearing are entirely independent of each other.

A peculiar feature of my improvement resides in the production of a spinning-spindle which has the capacity of lateral movement to adjust itself to an unbalanced load, the parts immediately connected to the spindle or in contact with it operating to control the tilting action of the spindle as soon as it commences, and also automatically bringing into effect other restraining forces as soon as the lateral movement extends beyond a certain limit.

I claim as my invention—

1. In combination in a spinning-spindle, a base-piece having a socket, a bolster-bearing tube extending within the socket and having a flange, a collar overlying the flange and removably secured to the base-piece, a cushioning-spring located within the socket in the base-piece and thrusting upward against the flange on the bolster-bearing tube, a step-bearing within the base-piece, a spindle supported by the step and bolster bearings, and means for exerting an additional upward pressure upon the lower end of the cushioning-spring from the under side thereof on the tipping of the spindle, all substantially as described.

2. In combination in a spinning-spindle, a base-piece, a socket within the base-piece, a bolster-bearing tube having a flange and extending within the socket in the base-piece, a collar overlying the flange and secured to the base-piece, a cushioning-spring located in the socket in the base-piece and underlying the flange on the bolster-bearing tube, a socket-piece into which the lower end of the bolster-bearing tube extends and within which it loosely fits, an exterior flange or shoulder forming a support for the lower end of the cushioning-spring, and means for automatically raising the flange by pressure from underneath, all substantially as described.

3. In combination in a spinning-spindle, a socketed base-piece, a flanged bolster-bearing tube having its lower portion located within the socket in the base-piece, a cushioning-spring compressed below the flange on the bolster-bearing tube, a spindle having a bolster-bearing and a step-bearing within the mount, and a tilting socket-piece engaging the lower end of the bolster-bearing tube and held in normal position by the thrust of the cushioning-spring, all substantially as described.

4. In combination with a spinning-spindle, a mount comprising a base-piece, a tilting bolster-bearing tube, a tilting socket-piece in engagement with the bolster-bearing tube, and a cushioning-spring with one end underlying a shoulder on the bolster-bearing tube and the other overlying a shoulder on the tilting socket-piece whereby an automatic brake controlling the extreme tilting movement of the bolster-bearing piece by the action of the cushioning-spring is provided, all substantially as described.

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