J. A. MILLER.

Spindle for Spinning-Machines.

No. 212,725. Patented Feb. 25, 1879.

Fig. 1.

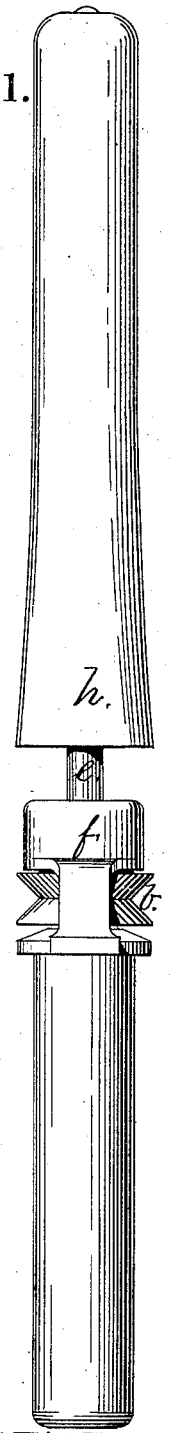


Fig. 3.

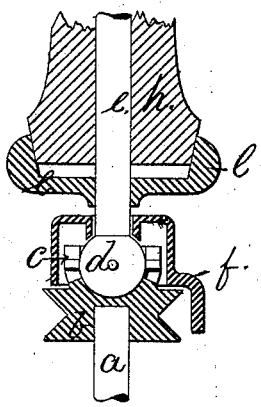


Fig. 2.

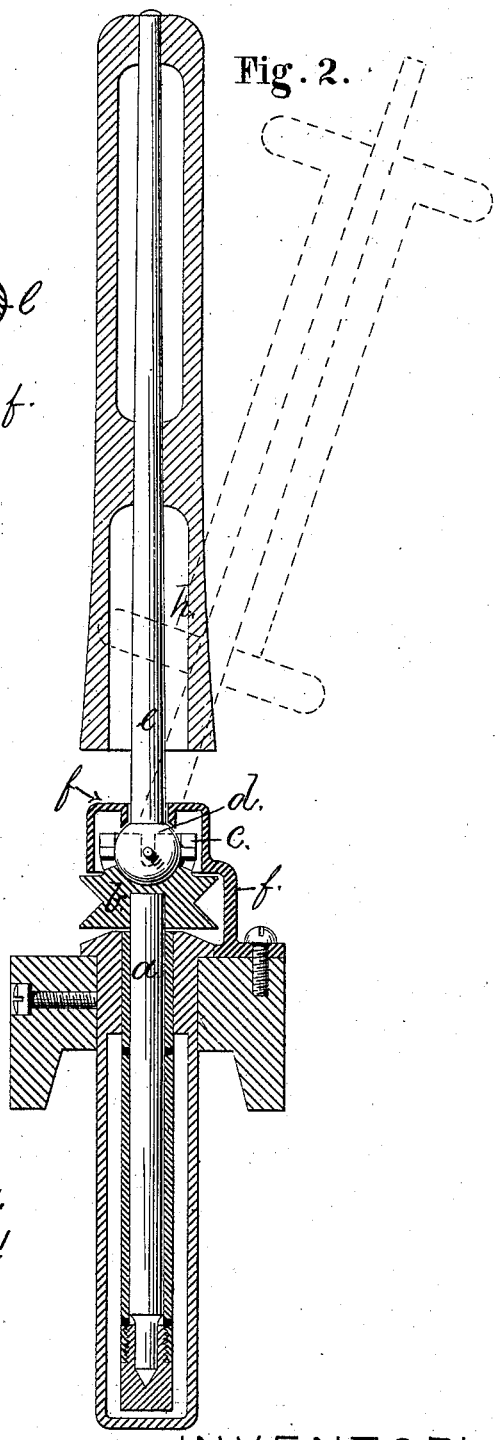
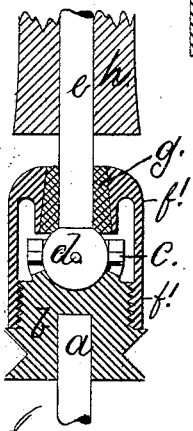


Fig. 4.



WITNESSES:

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IMPROVEMENT IN SPINDLES FOR SPINNING-MACHINES.

Specification forming part of Letters Patent No. **212,725**, dated February 25, 1879; application filed November 20, 1878.

To all whom it may concern:

Be it known that I, JOSEPH A. MILLER, of the city and county of Providence, State of Rhode Island, have invented a new and useful Improvement in Spindles for Spinning-Machines; and I hereby declare that the following is a full, clear, and exact description of the same, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to so construct a spindle for spinning-machines that the faster it revolves and the more it is loaded with yarn the steadier it will run.

The invention consists in the combination, with a spindle, spindle-step, or equivalent means for supporting a whirl, of a spool or bobbin carrier, and means by which rotative motion is imparted to the spindle, spool, or bobbin carrier, while the same is free to adjust itself to its own center of magnitude or the center of gravity and revolve around the same unaffected by the pull of the band or other means by which rotation is imparted to the same.

All spindles for spinning-machines may be divided into two parts, common to all. The first is that portion of the spindle supported in the step and bolster, to which the whirl or equivalent is secured, and by which it is rotated. The second is that portion of the spindle to which the bobbin, the spool, or cop-tube is secured, and by which they are driven. All spindles are, therefore, driven by same motive force, and they drive the cop-tube, spool, or bobbin on which the yarn is spun; and the two portions of the spindles heretofore made were rigidly secured together, no matter how much they differed in their details of construction. In all spindles where a whirl is used to rotate the spindle, the pull of the band acts as a disturbing force, no matter how elastic or yielding the bolster or free the step. To relieve the spindle and cop, spool, or bobbin from the effect of this disturbing element, and allow them to balance themselves on their true central axes at high speed, is the object of this invention.

In the drawings, Figure 1 is a view of one form of my improved spindle provided with a bobbin. Fig. 2 is a sectional view, showing the spindle-step with its whirl, the ball and socket connecting the bobbin-carrier with the whirl, and the stop or shield by which the ball is prevented from rising and the lateral motion thereof limited, so as to prevent the bobbin from coming in contact with the spinning-ring. A problematic position of a spindle with a spool is shown in broken lines. Such a spool would describe a spiral line at its upper part until the true center of gravity was reached, when it would run on its true central axis as long as the speed was maintained, such as is now used for spinning. Fig. 3 is a sectional view of a flanged disk for the reception and retention of the lower end of the bobbin, and the lower end of the spindle connected with the whirl by a universal joint, which allows the bobbin to adjust itself to its true center.

Fig. 4 shows the cap or guard secured to the whirl, and rotating with the same, as also an elastic packing, by which the spindle is held to, or nearly to, its true axis, but free to yield and adjust itself accurately to the same.

When the bobbins or spools are light and of small diameter, or when the yarn is wound on a cop-tube or the bare spindle, a disk, similar to the bobbin-holder shown in Fig. 3, firmly secured to the spindle, may be used.

In the drawings similar letters of reference indicate corresponding parts in all the figures.

a represents a spindle-step having a bearing in a suitable bolster. *b* is a whirl, to the upper part of which a socket, *c*, is fixed, arranged to receive a ball, and provided with two or more slits, in which the pins secured to the ball loosely fit. *d* is the ball secured to the spindle *e*, and provided with two or more pins radiating from the center of the ball and fitting loosely in the slits of the cup *c*. The spindle *e* is connected with the step *a*, so as to rotate with the same, but may rotate at an angle from the axis of the step *a*. *h* represents the bobbin.

While it is desirable that the spindle *e* and bobbin *h* shall be free to rotate on their true axes instead of their mechanical axes, it is necessary to prevent the bobbin or spindle from coming in contact with the ring and traveler. The guard *f* is therefore placed around the spindle, and a tube, the top thereof being

larger than the spindle, limits the angle to which the spindle can lean out of the perpendicular axis of the step *a*. The guard is secured to the bolster-rail, and also prevents the ball *d* from rising out of the cup *c*.

In Fig. 4, the guard *f'* is secured to the whirl, and an elastic packing, *g*, is placed between the spindle and the guard, so that the spindle is held at or near its mechanical axis, but is free to adjust itself to the true axis of the spindle, bobbin, and the load.

The guard and whirl shown in Fig. 4 rotate together with the step and spindle.

l, Fig. 3, is a circular disk, with a projecting conical flange, into which the bobbin may be secured by frictional contact, or it may be held by pins. The disk *l* acts as a balance-wheel, being secured to the spindle, and may be used in a modified form when the bobbin is secured in any other manner.

In place of the ball-and-socket joint any other connection may be used that imparts rotation to the spindle and leaves it free to find its true center. The device shown in Fig. 4 may be used without the pins, and the spindle may be driven by the frictional contact of the elastic material *g* on the spindle by screwing the guard *f'* down sufficient to secure proper frictional contact. While at the usual high speed of from five to ten thousand turns the spindle and its load will be sufficiently free to find their center of gravity and run true.

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

1. The combination, with a spindle-step and whirl, of a spindle connected with the spindle-step by means of a ball-and-socket joint, as and for the purpose described.

2. The combination, with a driven spindle, of a spindle step or support connected with the driven spindle by an elastic or yielding joint, whereby the axes of the spindle-step and driven spindle are brought in line solely by the rotary movement of said parts, substantially as set forth.

3. The combination, with the spindle *a*, whirl *b*, and cup *c*, provided with slits, of the spindle *e* and ball *d*, provided with pins, substantially as and for the purpose set forth.

4. The combination, with the whirl *b*, cup *c*, spindle *e*, and ball *d*, of the guard *f'* and elastic packing *g*.

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