G. DRAPER.

SPINDLES AND BOBBINS.

No. 192,493. Patented June 26, 1877.

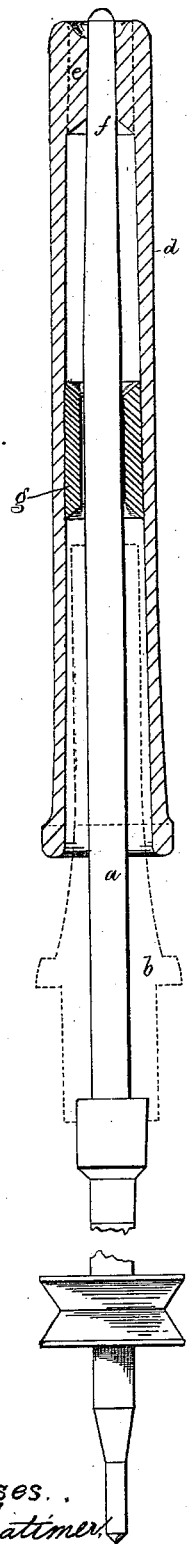

Fig. 1.

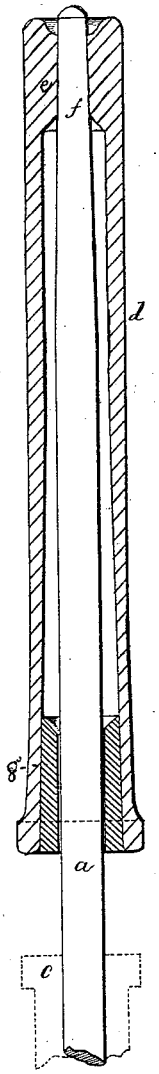

Fig. 2.

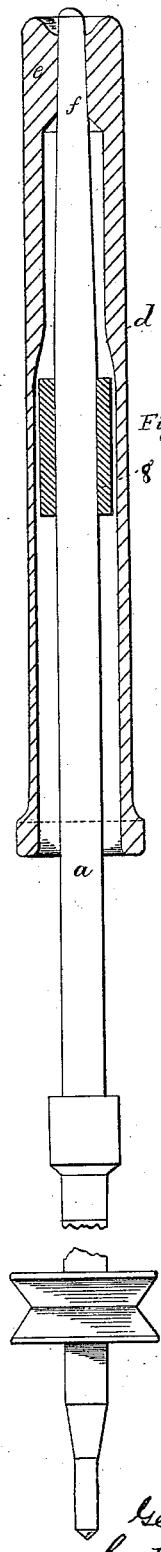

Fig. 3.

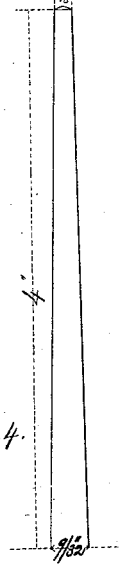

Fig. 4.

Witnesses.
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Inventor.
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per Crosby & Gregory. Attys.

UNITED STATES PATENT OFFICE.

GEORGE DRAPER, OF HOPEDALE, MASSACHUSETTS.

IMPROVEMENT IN SPINDLES AND BOBBINS.

Specification forming part of Letters Patent No. **192,493**, dated June 26, 1877; application filed March 21, 1877.

To all whom it may concern:

Be it known that I, GEORGE DRAPER, of Hopedale, county of Worcester and State of Massachusetts, have invented Improvements in Spindles and Bobbins, of which the following is a specification:

This invention relates to improvements in spindles and bobbins for use in connection with spinning-machines wherein the bobbins are driven by frictional adhesion on the spindles, and specially to that class of machines known as "ring-spinners."

One object of the invention is to strengthen the spindle between the bolster-bearing and its top without enlarging the size of the bolster-bearing, to practically prevent it from being deflected or bent between these two points when running at high speed.

Another object of the invention is the construction of a bobbin with a frictional adhesive bearing at or near its top, and at no other point, it being combined with an internal re-enforce, adapted to leave a space or form a loose fit opposite the re-enforce, to permit the bobbin to have a slight lateral movement, whereby it may center itself, but yet not permit extreme vibration.

In spinning, it is of the utmost importance that the top of the bobbin should run as steadily as possible, and, to accomplish this most desirable result, I have found by experiment that a single bearing at or near the extreme top is better than two bearings such as have been heretofore generally used, one of such bearings being substantially central, or at the bottom of the bobbin.

With one bearing only, located at the top, the bobbin is more certain, when dropped upon the spindle, to come into, and remain seated in, driving-contact with the tapering surface of the spindle during its rapid rotation.

I combine this strengthened spindle with the bobbin having but one frictional bearing, located at or near the top, and am thereby enabled to obtain a spindle and bobbin which may be run steadily at a speed much greater than that of any spindle heretofore to my knowledge used, this increased speed being so great that were the spindle and bobbin constructed as heretofore common the bobbin could not be retained upon the spindle.

This increased steadiness of the top of the bobbin results in the production of better yarn with less expenditure of power, and reduces the wear of the spindle step and bolster.

In the manufacture of spindles for ring-spinning frames, a certain taper has been adopted as the proper taper to correctly drive the bobbin, and yet permit its easy removal.

It has been found by experiment that a quill-bobbin of ordinary size, with its load applied, requires that the portion of the spindle which drives the bobbin by frictional adhesion should be at least three-sixteenths of an inch in diameter.

In the most approved form of ring-spinning machines—as, for instance, the Sawyer—two bearings have been used, the diameter of the spindle at the lower bearing being about one-fourth and at the top bearing about one-eighth of an inch.

If the lower bearing in the Sawyer plan were omitted, the spindle would fail to drive the bobbin by its upper bearing alone, and if the top bearing were omitted, the center bearing only being used, the bobbin would not run as steadily at the top.

This my improved spindle, at the top of the bolster, is substantially of the diameter of the Sawyer spindle, or from one-fourth to five-sixteenths of an inch, as I have demonstrated by experiment that a spindle of that size will run at high speed without objectional heat and consequent consumption of power.

A spindle above five-sixteenths of an inch in diameter would be too heavy for the best results as to speed and power, when used with suitable bobbins for the production of medium and fine yarn.

I make the top of such a spindle substantially three-sixteenths of an inch in diameter, and, commencing at that diameter at the top, I give to the surface of the spindle below it the usual taper, the lower prolongation of which terminates at a point upon the spindle above the bolster, the size of the bolster-bearing in the bobbin being unchanged, whereby the spindle is made to present a proper extent of adhesive surface for contact with the bobbin-bearing to drive it without slip, and at the same time permit its ready application or removal.

This established taper, prolonged from the

spindle top, of sufficient diameter to drive the bobbin by a single frictional adhesive bearing upon such top, terminates in a spindle of suitable size for ordinary ring spinning-frames, at a portion of the spindle above the top of bolster, ordinarily about midway between the top of the bolster and the top of the spindle, and the latter is consequently materially strengthened above the bolster.

The bending of the spindle between the bolster and its top, when running at high speed, has been a source of great annoyance, frequently resulting in throwing the bobbin up from its seat, or completely off from the spindle at any sudden increase of speed caused by stopping part of the machinery, or otherwise.

This I entirely prevent at any practical speed, having run it successfully at a speed of sixteen thousand turns per minute.

Figure 1 represents one of my improved spindles and bobbins in connection with an extended bolster. Fig. 2 represents the invention applied in connection with an ordinary short bolster; Fig. 3, a modification of Fig. 1; and Fig. 4, a detail of the upper part of an ordinary Sawyer spindle.

The spindle *a* is supported in an ordinary foot-step, and driven as usual.

The bolster *b* is of the ordinary Sawyer class, and of the usual size at its bearing, and the bolster *c* is a form common before Sawyer, and need not be further described.

The bobbin *d* is a quill-bobbin. It has a top bearing or bushing, *e*, made integral with or separated from it, and adapted to bear at one or more points between its extreme ends upon the upper portion or top of the spindle, of the usual taper, and of proper diameter, as described, to operate to move the bobbin and its yarn-load at full speed.

In Fig. 1 the bobbin has a central re-enforce or stop to control the extent of the lateral vibration of the bobbin with reference to the spindle, a space being left opposite the re-enforce or stop to permit some movement of such bobbin away from the spindle, to enable the bobbin to center inself.

In this figure the re-enforce *g* is substantially central, and is attached to the bobbin, and the space is between the re-enforce and spindle.

In Fig. 3 the re-enforce is attached to the spindle, and the space is between the re-enforce and bobbin.

In Fig. 2, wherein the invention is applied to a frame having a common short bolster, the re-enforce is at the lower end of the bobbin, and attached to it, leaving a space between it and the spindle.

It is obvious that the re-enforce of Fig. 3 might be applied to Fig. 2.

In my invention, as shown in the drawing, it will be noticed that the spindle is made substantially cylindrical, and of the size of the bolster-bearing to a point above the bolster-bearing where the proper taper prolonged from the top of the spindle (it there being of sufficient diameter to drive the bobbin and its load without slip) would terminate.

In Fig. 4, which represents part of an ordinary Sawyer spindle above its bolster, (the spindles of all the drawings being of the same taper,) it will be noticed that the spindle, between its top and the bolster, has materially less stock and strength.

In the Sawyer and in all other spindles heretofore made, so far as I am aware, the uniform taper before described, and considered necessary, is prolonged from the top of the bolster to the top of the spindle, making it too small at the top to properly drive the bobbin and its load.

This improved spindle is made strong enough above the top of the bolster without increasing its size at the bolster-bearing, so as to run substantially without being bent out of vertical position above the bolster, by reason of its vibrations below the bolster or within it during the rapid rotation of the spindle, which is not the case with tapering spindles as ordinarily constructed.

In United States Letters Patent No. 127,159 and 127,748, heretofore granted to me, I have described that a bobbin may be driven by means of a single adhesive bearing, a second cylindrical bearing acting to steady the bobbin.

In this application I therefore do not broadly claim driving the bobbin by a single adhesive bearing, irrespective of its location with reference to the spindle, as hereinbefore described. It is obvious that the bobbin cannot take an adhesive bearing upon a cylindrical portion of a spindle.

I claim—

1. The combination, with the bolster, of a spindle constructed substantially as hereinbefore described, it being cylindrical above the top of the bolster for such a distance as to co-operate with the stop, as described, to prevent the bobbin adhering thereto, and it being also of such size and taper at or near its top as to carry the bobbin and its load at full speed, as set forth.

2. A bobbin provided with an internal adhesive bearing at or near its upper end, and an internal re-enforce or stop, substantially as described, adapted to co-operate with the cylindrical portion of the spindle, to prevent extreme lateral movement of the bobbin with relation to the spindle, as and for the purpose set forth.

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

GEORGE DRAPER.

Witnesses:

G. W. GREGORY,

W. J. PRATT.