

*Jacob H. Sawyer's Improvement in the construction of the Spindles and the Bearings for the Spindles of Ring-Spinning Frames; and of the Bobbins used thereon.*

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PATENTED APR 11 1871

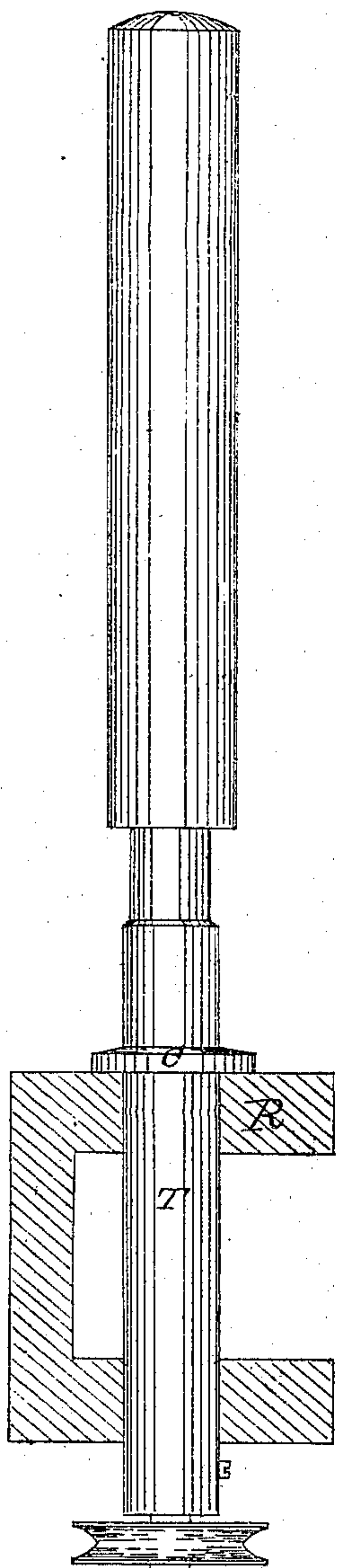


Fig. 1.

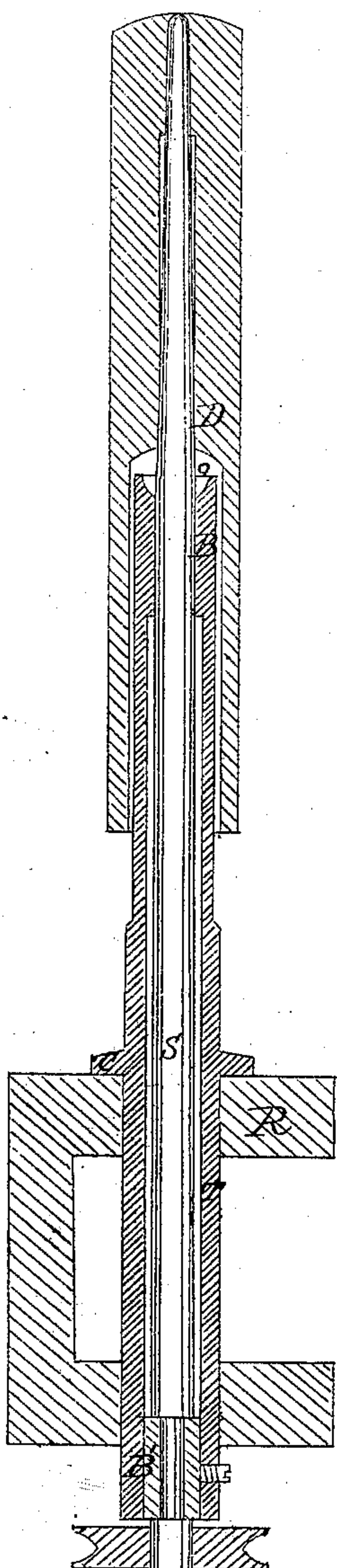


Fig. 2.

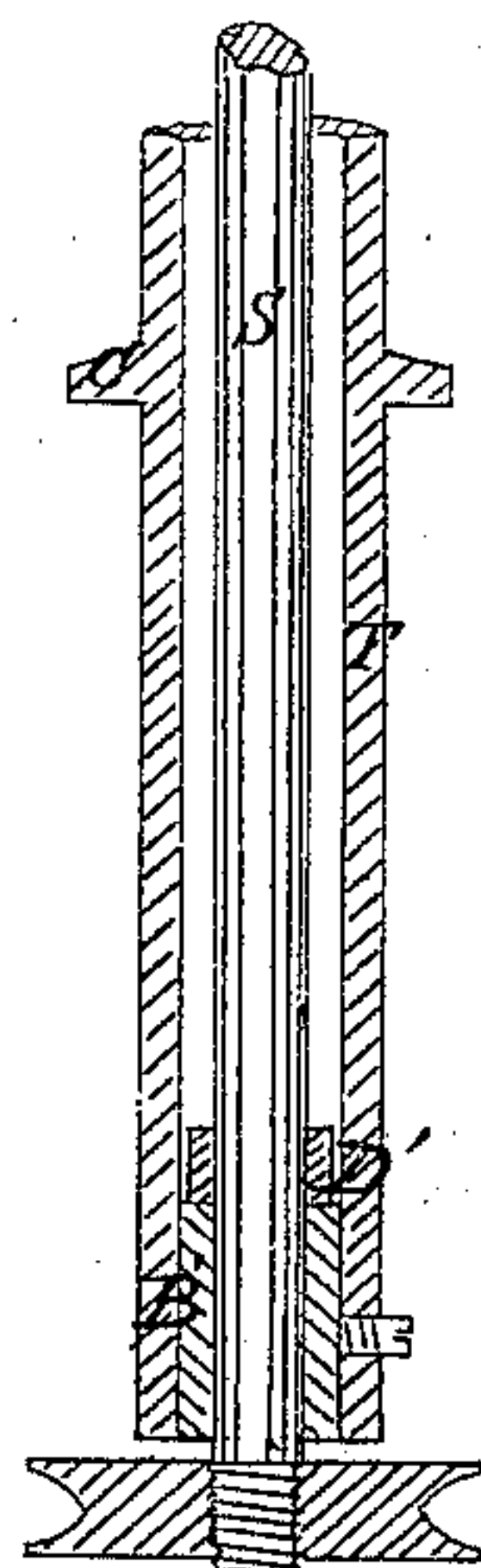


Fig. 3.

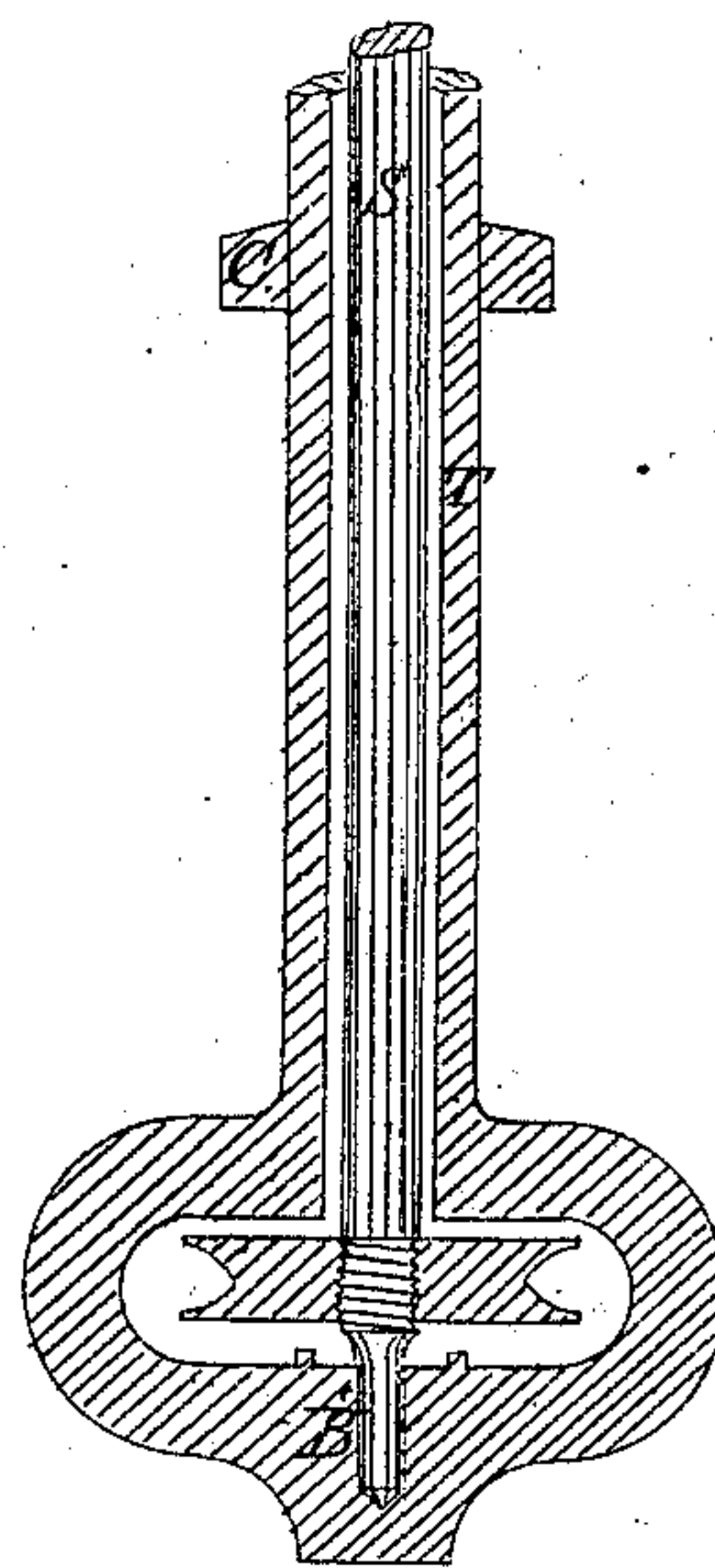


Fig. 4.

Witnesses  
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JACOB H. SAWYER, OF LOWELL, MASSACHUSETTS.

## IMPROVEMENT IN RING-SPINNING MACHINES.

Specification forming part of Letters Patent No. 113,575, dated April 11, 1871.

*To all whom it may concern:*

Be it known that I, JACOB H. SAWYER, of Lowell, in the county of Middlesex, in the State of Massachusetts, have invented a new and useful Improvement in the Construction of the Spindles and the Bearings for the Spindles of Ring-Spinning Frames, and in the Bobbins used thereon; and I do hereby declare that the following is a full and clear description thereof, reference being had to the annexed drawing making a part of this specification, in which—

Figure 1 is an elevation, and Fig. 2 is a vertical section of the various parts; and Figs. 3 and 4 illustrate variations which may be made, if preferred, in the construction of the parts.

The objects of my invention are, first, to reduce the weight of, and consequently the power required for driving, the spindles; second, to secure greater steadiness of rotation for the spindle, thus enabling it to be run at a higher speed than is customary, or to run more satisfactorily at any speed; and, third, to reduce the cost of construction of the machines.

The upper bearings of spindles as now generally constructed extend but a short distance above the bolster-rails in which they are fixed. Now, as this rail must be placed far enough below the lowest point at which yarn is wound upon the bobbin to allow the ring-rail to pass below that point, a large part of the spindle must necessarily extend upward beyond its upper bearing, and is, consequently, even when made of large size, subject to considerable vibration when running. It is also necessary in the ordinary construction, in order to secure a proper distance between the two bearings of the spindles, to extend the spindle downward for a considerable distance below where it might otherwise terminate; and this increase in length requires a corresponding increase in diameter beyond what would be required were a shorter spindle used.

My improvements consist in certain details of construction and arrangement, whereby I am enabled to remove most of that part of the spindle which ordinarily extends below the whorl, and to leave only a small part of the spindle exposed above its upper bearing, so that it is rendered possible to reduce its di-

ameter, and consequently its weight, and at the same time to insure for it greater steadiness of rotation.

In the accompanying drawing, R represents a rail occupying the place of that known as the bolster-rail on frames of the ordinary construction. T is a tube inserted in the rail, and fastened thereto by set-screws or by other convenient means. This tube extends above the rail and into the bobbin when the latter is in its place on the spindle, leaving only so much of the spindle extending above its upper bearing as is required for properly holding, supporting, and turning the bobbin. Within this tube, at its upper end, is the bearing B, and at its lower end the bearing B'. The former may be conveniently made a part of the tube, or it may be made so as to be taken out and renewed when worn. The latter should be made so that it can be taken out, so as to allow the spindles to be put into and removed from the tube when desired. In Fig. 2 the spindle is necked down at its lower bearing to prevent it from falling from the tube; but it may be made as shown in Fig. 3, where the collar D' answers the same purpose. Or the lower end of the tube may be made as shown in Fig. 4, where the sides of the tube are extended below and around the whorl in the form of a yoke, so as to allow the lower bearing of the spindle to be located immediately below the whorl. An oil-chamber, O, should be made at the upper end of the tube.

The advantage of diminution of friction which some builders of spinning machinery have derived from placing the whorl near the small bearing at the end, instead of near the large one, not at the end of the spindle, is made available by my invention, together with that derived from placing the upper bearing of the spindle at a sufficient distance from the lower to secure a proper ratio between that part of the spindle between its two bearings and that part which extends above its upper bearing.

The construction of the spindles is clearly shown by the drawing. The bobbin may be externally of any convenient form; but its interior should be as shown at D in the drawing. When in its place on the spindle it should be in contact with it near its upper end, and also at a point rather more than half the length of the bobbin from its upper end, or it might



be in contact therewith for the entire distance between the two points named; and the bobbin is bored out at its lower end for a little less than half of its length, so as to allow it to pass down over and outside of the upper part of the tube T; but it should fit loosely, so as not to be in contact therewith. The bobbin might be driven by a much shorter part of the spindle than has been described, in which case the tube could extend further into the bobbin; but I consider the proportions named as the best.

It is evident that, when the lower bearing is made as shown in Fig. 2, it must be divided in halves vertically; otherwise it could not be put onto the spindle.

Careful experiments have shown a great saving of the power required to drive ring-spinning frames by the substitution of my improvements in place of the ordinary spindles and their appurtenances. My invention applies to that class of ring-spinning frames in which the spindle turns in bearings exterior to itself, but is otherwise stationary—that is, it does not reciprocate vertically with reference to its upper bearing or to the bobbin which is used thereon—and which spindle is herein described as a stationary live spindle. It will be seen that my invention does not necessarily change the relative position of the whorl to the bolster-rail or its distance from the floor, but that it renders it practicable to change the position of the lower bearing relatively to the whorl, while the location of the whorl remains unchanged.

I am aware that chambered bobbins have heretofore been used on throstle or flier-spinning, and on ring-spinning frames having dead-spindles; and I do not, therefore, claim broadly a chambered bobbin without reference to the particular application of the same to a ring-spinning frame having stationary live spindles, as herein limited, in which application I believe it to be new; nor do I claim, broadly, the use of a tube or sleeve-bearing, except when used and applied on a stationary live spindle, ring-spinning, or twisting-frame wherein the tube is stationary and extends upward through the bolster-rail and into the lower end of the bobbin, but does not touch the inner periphery of the latter. I am aware that a

chambered bobbin combined with a tube for supporting the spindle has been used on speeders and fly-frames; but in all these cases the bobbin has not received its entire support from the spindle, but has been (for the purpose of securing steady rotation) in contact at its lower end either with the tube or the hub of a gear running on the tube, which contact would be a serious objection to its use on spindles running at the velocity at which they run on spinning-frames.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the stationary live spindle S, of a chambered bobbin, having such a conformation of the chamber as to allow the bobbin to receive and constantly retain the stationary upper bearing of the spindle within the body thereof, but without being in contact therewith, substantially in the manner and for the purpose specified.

2. The combination, with a stationary live spindle, of a stationary tube or standard, T, extending above the rail, and containing or supporting the upper bearing of the spindle at a fixed point within the bobbin, when the latter is in place on the spindle, substantially as described.

3. The stationary live spindle, having its bearing nearest the whorl of a less diameter than the other, in combination with the stationary tubular bearing T and the chambered bobbin D, the latter surrounding but not touching the tubular bearing, all substantially as and for the purposes specified.

4. The arrangement of the bearings of stationary live spindles of ring-spinning frames in the manner substantially as described, whereby the lower bearing is placed in a fixed position nearer to the whorl than the upper bearing without changing the relative position of the whorl to the bolster-rail, when such spindles are used in combination with the stationary tubular bearing T and the chambered bobbin D, as set forth, the bobbin surrounding but not touching the bearing.

JACOB H. SAWYER.

Witnesses:

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