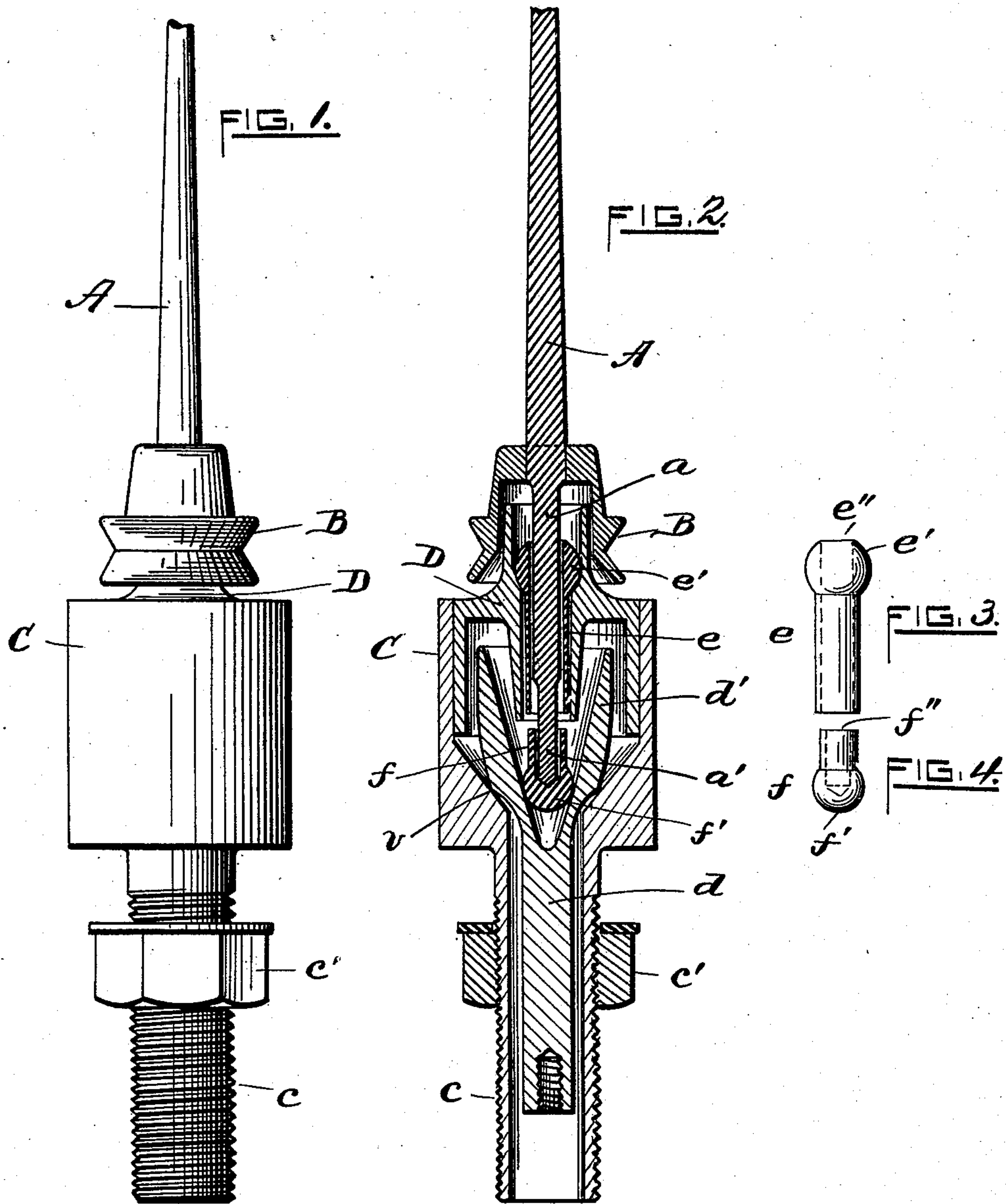


(No Model.)

H. E. HUGHES.  
SPINDLE.

No. 570,997.

Patented Nov. 10, 1896.



Witnesses.

*Charles T. Rammigan*  
*Lellan J. Truck*

Inventor.

*Henry E. Hughes*  
*by James L. Jenkins*  
*Atty.*



# UNITED STATES PATENT OFFICE.

HENRY E. HUGHES, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR OF ONE-HALF TO THOMAS J. RISK, OF CENTRAL FALLS, RHODE ISLAND.

## SPINDLE.

SPECIFICATION forming part of Letters Patent No. 570,997, dated November 10, 1896.

Application filed July 22, 1896. Serial No. 600,141. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY E. HUGHES, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Spindles; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in spindles for spinning or twisting cotton or other yarns, in which a step having its lower extremity shaped like a ball or sphere is combined with a bolster, the upper extremity of which is similarly shaped like a ball or sphere, both step and bolster being supported upon conical or nearly conical shaped beds; and the purpose of my invention is to provide a spindle which will yield readily to any change of tension in the yarn which is being spun or twisted thereon, and at the same time to provide an oil-reservoir which will keep the parts of said spindle which are exposed to friction or wear constantly lubricated, and I accomplish these objects by the device shown in the accompanying drawings, in which—

Figure 1 is an exterior view of my spindle; Fig. 2, a vertical section through the middle thereof, and Figs. 3 and 4 the ball-terminated bolster and step, respectively.

The same parts are represented by the same letters throughout the various views.

In Fig. 1 A is the shaft of the spindle, B the whirl, D the cap over which the whirl is placed and which itself slides into the outer jacket C. *c* is the base of the spindle integral with C, and *c'* is a nut for fastening the spindle to its support upon the spinning-frame or other machine.

C is coned at the bottom interiorly, as shown in Fig. 2, D fitting therein in such a manner as to be easily removed, but without any play between the two. Within C is placed the support *d'* *d*, having also a conical interior, as shown in Fig. 2.

*d'* is made exteriorly with an angle or ring

*v* running around the same, said ring forming the line of contact and support upon the conical interior of C, as shown in Fig. 2. The angle *v* is not sharp, but somewhat rounded, so as to allow some oscillation of the shank *d*, there being considerable play between the shank *d* and the interior of the lower part *c* of the case C.

*f* is the step of the spindle bored out for the admission of *a'* and the lower end of the spindle-shaft A.

As shown in Fig. 4, the lower extremity of *f'* is spherical in shape and rests in the coned interior of *d'* in such a manner that the upper portion of *f* will easily oscillate under any lateral pressure.

*e* is a tubular bolster terminating at its upper portion in the spherical head *e'*.

D is bored out so as to admit the introduction of *e*, the upper portion or neck of D having a larger bore than the lower portion for the purpose of accommodating the spherical head *e'* of the bolster, and the seat on which *e'* rests being of rounded or conical form. There is also left considerable space between the tubular portion of the step and the surrounding wall of D, and the spherical head *e'* also admits of considerable oscillation in the lower portion of the bolster upon the application of any lateral pressure or force.

The conical depression in *d'* serves not only for a support for the step *f'*, but also as an oil-reservoir, and the neck of the bolster *e* projects downwardly into this oil-reservoir, so that the portion of the spindle in contact with the bolster is always amply lubricated.

It will be seen that by reason of the conical interior of C and the angular projection or ring *v* in contact with said conical exterior, together with the space about the shank *d* in the tube *c*, any change in the tension of the yarn, either by increase or decrease, will cause the upper portion of the shaft A to give or yield quickly and readily, being aided thereto by the spherical forms of the upper part of the bolster *e'* and the lower part of the step *f'*, and that the projecting shank *d* will by force of gravity restore the shaft A to a perpendicular position as soon as the increase or decrease of tension disappears. This appears also from the fact that the

spherical extremities  $e'$  and  $f'$  of the bolster and step, respectively, constitute in effect a species of universal joint or bearing.

Another advantage of my invention is that  
5 the bolster and step are simply dropped into their respective places and are not fastened there by any means whatever, so that they can be removed at any time without any appreciable labor and exchanged for new ones  
10 in case they are worn out or in any way injured.

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

15 In a spindle for cotton-spinning and the

like, a case  $C$   $c$ , coned interiorly to furnish a seat for the step-support  $d$   $d'$ , in combination with said step-support  $d$   $d'$ , a ball-ended step and bolster, a shaft and whirl; and a cap  $D$  perforated for the admission of said shaft, 20 and having a depression in the upper portion thereof, with a conical bottom for the support of said ball-topped bolster, all substantially as shown and specified.

In testimony whereof I affix my signature 25 in presence of two witnesses.

HENRY E. HUGHES.

Witnesses:

HERBERT R. GATES,  
ROSE E. DORRINGTON.