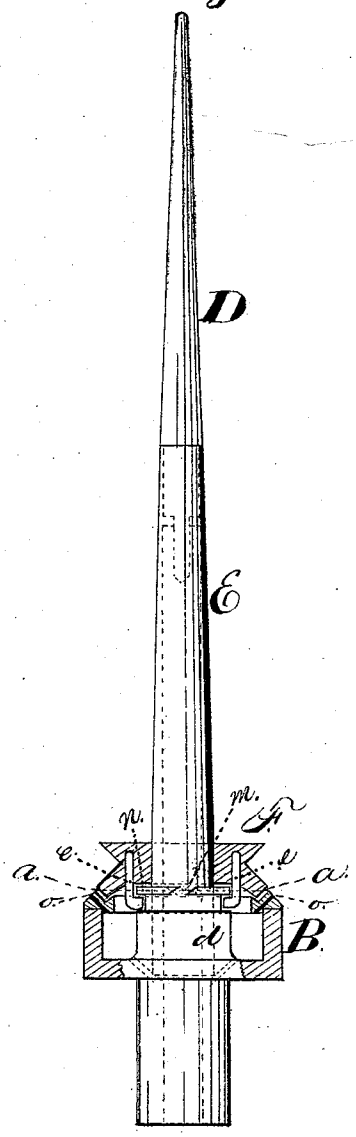
2 Sheets--Sheet 1.

D. H. RICE.

Spindles for Spinning-Machines.

No. 135,939. Patented Feb. 18, 1873.

Fig. 1



Geo. A. Wanderer
Henry S. Spalding

David Hall Rice

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS).

2 Sheets--Sheet 2.

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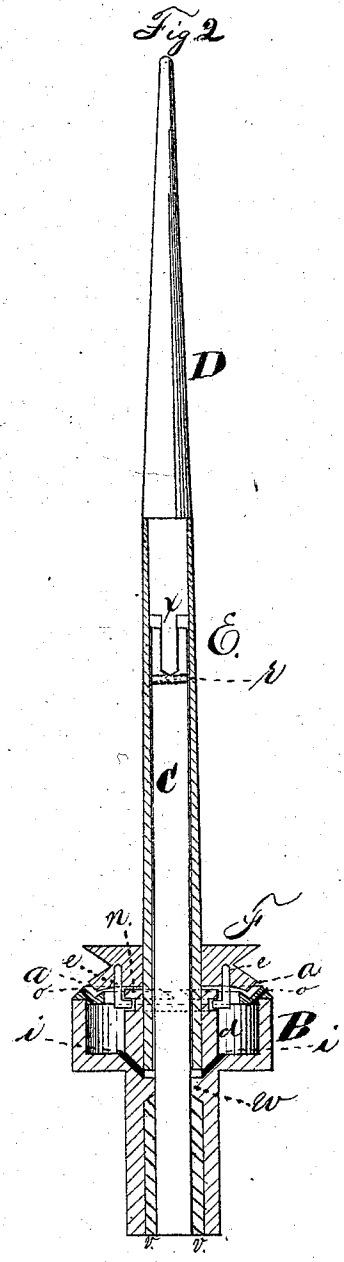
Fig 2



Witnesses:
Geo. A. Meander
Henry S. Spalding

Inventor:
David Hall Rice

AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

DAVID H. RICE, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN SPINDLES FOR SPINNING-MACHINES.

Specification forming part of Letters Patent No. **135,939**, dated February 18, 1873.

To all whom it may concern:

Be it known that I, DAVID HALL RICE, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Spindles for Spinning-Machines, of which the following is a specification:

My invention relates, first, to the employment of points or studs of metal, or other suitable material, attached to the spindle so as to revolve underneath and engage with a collar or ring attached to the oil-chamber or fixed bearing in which the spindle rotates, and the hereinafter-described means of disengaging the studs from said collar, and removing the spindle from its bearings easily and quickly at pleasure; the object of this part of this invention being to prevent the spindle from being raised off its bearings when the bobbin is removed or the spindle is running, and allow its removal when necessary, as described; second, to surrounding the dead-spindle where it is driven into the shank of the bolster with a tube or packing of India rubber or other suitable elastic material, as hereinafter described, the object of this part of the invention being to allow the dead-spindle to be secured firmly, easily, and cheaply in the bolster, to render the oil-reservoir oil-tight, and to cause the lower end of the dead-spindle to be held with an elastic gripe or compression, so that when made slender it will not vibrate at the top, where the upper spindle-bearing is supported; third, to the combination of the dead-spindle, secured in its bolster by elastic packing, as hereinafter described, with the live-spindle, supported at its lower end by the lower bearing secured to the bolster, so as not to touch the dead-spindle; the object of this part of the invention being to render the rotation of the spindle on its bearings steady by preventing either bearing of the spindle from communicating any vibration to the other, as would be the case if the dead-spindle, which is made slender, were secured rigidly in the bolster and the live-spindle bore against it.

Figure 1 is an elevation of a spindle and lower oil-reservoir and bolster, the latter partly sectioned to show the inside of the oil-chamber and the manner of securing the live-spindle to the bolster. Fig. 2 is a longitudinal sectional view of the reservoir and operating parts of the spindle with my improvements.

B is the bolster and oil-reservoir to be secured to the rail of the spinning-frame. C is the dead-spindle, which passes down through the bolster B. D E is the live-spindle, supported at the top of the dead-spindle upon the bearing X, and at its bottom end by the bearing *d* secured to the bolster B. The live-spindle does not touch the dead-spindle below the upper bearing X, but revolves near enough to the dead-spindle to carry up oil to the upper bearing by its rotation. The bearing X is kept at all times perfectly lubricated by means of the passage-way *r* made through the dead-spindle from side to side, and communicating with the extreme point of the bearing. This is necessary, because the oil will not pass downward on the bearing X, and keep it at all times perfectly lubricated when the spindle is running. The lower bearing *d* rises from the bottom of the oil-chamber around the live-spindle, and forms the support of the latter at its lower end. Through the sleeve or bearing *d* passage-ways *i i* lead from the outer compartment of the oil-chamber to the space within, below the live-spindle, and allow oil to be freely supplied to the bearings of the spindle. At the same time the sleeve prevents the oil from being thrown out of the oil-reservoir, or away from its bearings, by the rotation of the live-spindle D E. Small passage-ways *o o* are made in the top of the oil-reservoir to supply it with oil when necessary, and to admit air. F is the whirl of the spindle, having on its lower edge an annular projection, *a*, tapering downward and inward from the periphery of the whirl. The projection *a* extends below the upper surface of the cover of the oil-reservoir B, and revolves in an annular channel formed in the cover, and tapered to correspond with the projection *a*, as shown, the projection *a* and top of the oil-chamber having a space between them. This arrangement creates, by the rotation of the spindle and whirl, a constant current of air outward between it and the oil-reservoir from inside the latter, and this repels all floating fibers of dust and cotton from the reservoir. In the lower face of the whirl are firmly secured the studs *e e*, having their points projecting inward under the collar or ring *n*, which is formed on the upper end of the bearing or sleeve *d*. Through the collar *n* the diagonal groove *m* is cut, slanting

from the upper edge of the collar downward in the direction in which the spindle runs sufficiently to prevent the points of the studs *e e* from passing through when the spindle is lifted upward, having the studs opposite the lower end of the groove *m*, and another similar groove which is cut through the collar on the opposite side of the sleeve *d*. The groove *m* and similar one on the opposite side of the collar are made of sufficient size and depth to allow the points of the studs *e e* to pass through when the live-spindle D E is lifted and turned backward, and in this manner the live-spindle may be released from its bearings and taken off; but while it is running or stationary the studs *e e* and collar *n* will prevent it from being lifted by an upward pull in taking off the bobbin.

It will be noticed that when the spindle is running, the studs *e e* do not create any friction by coming in contact with any part of the bolster B. Instead of two studs one may be made to answer, if desired.

Within the shank of the bolster B, Fig. 2, and between it and the dead-spindle C, is placed a rubber packing or tube, *v*. The shank of the bolster fits closely to the dead-spindle a part of the way below the reservoir at *w*, to support the spindle, and the rubber packing is placed below.

To apply the packing *v*, I take a rubber tube which will fit within the part of the bolster-shank formed to receive it, and which has a central hole through it considerably smaller than the dead-spindle C. I then place the tube within the bolster-shank and force the dead-spindle through the central hole of the rubber by powerful pressure, and adjust the spindle to its proper position in the bolster. As it is very difficult and expensive to fit the dead-spindle to the hole in the bottom of an ordinary bolster so as to be solid and oil-tight when driven in, I am enabled to fit it to the bolster with the rubber packing cheaper, easier, and better, as described, so that no oil ever escapes from the reservoir. I have found that when the dead-spindle is driven in with the rubber packing *v* as described, and allowed to remain a short time, the rubber will hold the spindle firmly, it being impossible to move the dead-spindle but by great force. This result is of great value, as any movement of the dead-spindle in the bolster destroys that proper adjustment of the live-spindle to its bearings and the oil-reservoir which is necessary to its perfect operation. When the dead-spindle is made slender, as is desirable to enable the size of bobbins in common use to fit the spindle, I have also found that if it is driven firmly into the bolster in the ordinary way, it, being made of steel, will vibrate at the top under the jar of the revolving live-spindle. This vibration of the dead-spindle reacts upon the upper and lower spindle-bearings, and causes the live-spindle to run unsteadily. By the use of the elastic rubber packing, as described, however, the lower end of the dead-spindle is held by an elastic instead of a rigid pressure, and any jar upon its upper end will be absorbed or taken up by the elastic bearing. As before described, the lower spindle-bearing *d* is secured to the bolster B, so as to prevent any jar of the live-spindle at its lower end against the dead-spindle which will affect the upper spindle-bearing, while the application of the elastic packing *v*, as described, prevents any vibration of the dead-spindle at the top which will affect the live-spindle at its lower bearing, and the result of this adjustment and combination is to cause each bearing to run independently and smoothly without affecting the other—an effect long sought to be accomplished with this class of spindles.

What I claim as new and my invention is—

1. The combination of the live-spindle, provided with studs *e e*, with the bolster, provided with the collar *n* and slots *m*, substantially as described.

2. The dead-spindle secured to its bolster by elastic packing or support, substantially as described.

3. The combination of the dead-spindle, secured to its bolster by elastic packing or support, with the live-spindle, supported independently at its lower end by the bearing *d*, substantially as described.

DAVID HALL RICE.

Witnesses:

GEO. A. MARDEN,

HENRY S. SPALDING.