No. 736,544. PATENTED AUG. 18, 1903.

J. C. POTTER.

SPINNING SPINDLE.

APPLICATION FILED JULY 19, 1902.

NO MODEL.

Fig. 1.

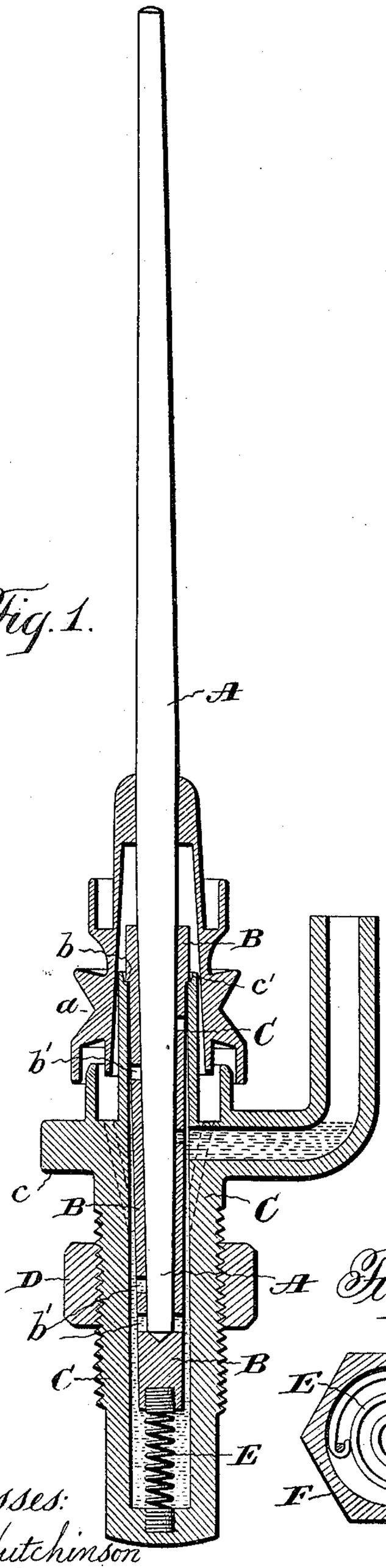

Fig. 2.

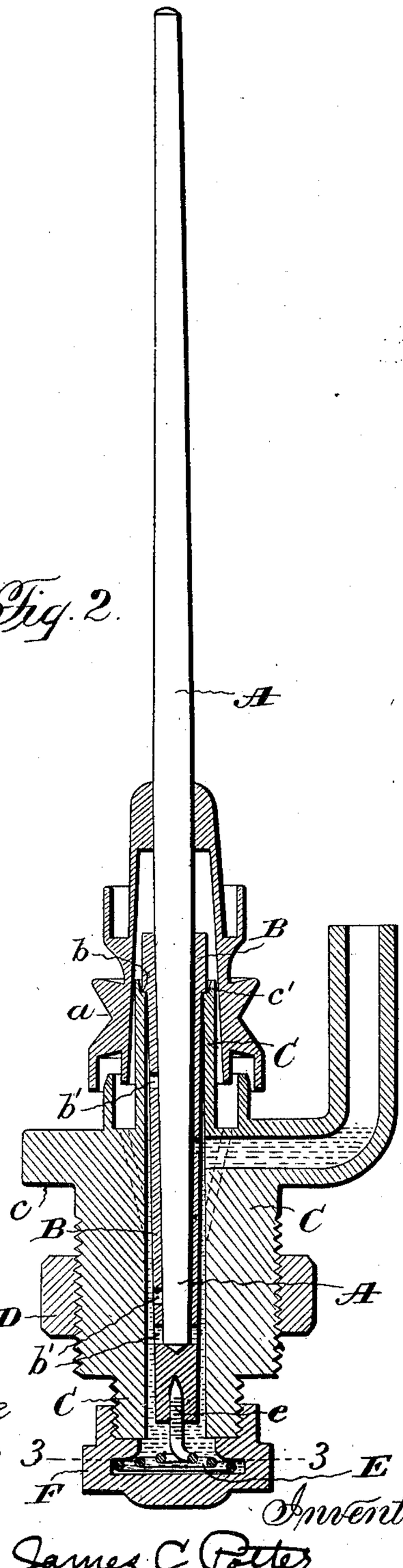

Fig. 3.

Witnesses:
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No. 736,544. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

JAMES C. POTTER, OF PAWTUCKET, RHODE ISLAND, ASSIGNOR TO AMERICAN SPINDLE COMPANY, OF PAWTUCKET, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

SPINNING-SPINDLE.

SPECIFICATION forming part of Letters Patent No. 736,544, dated August 18, 1903.

Application filed July 19, 1902. Serial No. 116,204. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. POTTER, of Pawtucket, in the county of Providence, and in the State of Rhode Island, have invented certain new and useful Improvements in Spinning-Spindles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of a spindle embodying my invention; and Fig. 2, a like section of a spindle, exhibiting a different embodiment of my invention. Fig. 3 is a section upon line 3 3, Fig. 2.

The object of my invention is to provide a bearing for spinning-spindles which will permit the spindle to run without jar or vibration and which will be simple in construction and without liability to derangement; and to this end my invention consists in the spindle-bearing having the construction substantially as hereinafter specified and claimed.

Spinning-spindles as heretofore made running with unbalanced loads vibrate to such an extent as to cause breakage of the yarn, even when run at the usual speed, and it will therefore be seen that the elimination of vibration without any increase of speed of the spindle will result in a gain of product. As, however, the output of the mill is limited by the speed of the spindle, the importance and value of an increase in spindle speed will be evident, and the obstacle to a higher speed than that now common is the inability of the spindles to maintain their equilibrium or balance and to run free from vibration.

By my invention not only is there an absence of vibration when the spindle is run at the ordinary rate, but it can be run at any desired higher rate without vibration.

In the drawings, A designates a spindle of usual construction having a whirl *a*, B a bolster, and C a bolster-case adapted to be clamped, as usual, by a nut D and a flange *c* to the rail of the spinning-frame. The bolster at its upper end has a shoulder *b*, which rests on the upper end of the case C, on which the bolster may rock or swing laterally within the case, a sufficient space being left between the two to permit such movement. The bearing between the bolster and case may be of any suitable kind; but I prefer to use a shoulder in the form of an annulus or ring formed by turning down the bolster and seated in an annular cavity *c'* in the top of the bolster-case, the sides of which cavity flare outward and upward. With such a bearing when the bolster swings laterally the surfaces in contact will be reduced to a minimum.

Attached to the lower end of the bolster and to the bottom of the bolster-case is a coil-spring E, that is stretched or placed under tension, so that it pulls the bolster downward, and thus holds the upper end of the bolster yieldingly upon its seat. In the embodiment of my invention illustrated in Fig. 1 the spring is a helical coil, and threads are tapped in both bolster and bolster-case, into which the respective ends of the spring are screwed, the end that is screwed into the bolster being secured by a drop of solder. The spring when relaxed or compressed is too short to reach from the bolster when in its position to the bottom of the tapped hole in the bolster-case, and it therefore follows that when in assembling the parts by screwing the spring into the bolster-case hole the bolster-shoulder *b* reaches its seat. Continuation of the screwing of the spring will result in the spring being stretched or expanded in the portion thereof that is free between the bolster and bolster-case, the stretching or expanding being continued until the lower end of the spring abuts against the bottom of the hole in the bolster-case. It will be seen that the spring is thus automatically stretched or placed under tension in assembling the parts and that it cannot be placed under greater tension than is designed, since the limit of its tension is fixed by the coming of its lower end in contact with the bottom of the bolster-case holder. Besides affording this important advantage my manner of connecting the spring gives an exceedingly simple construction and one that is very efficient, for the rea-

son that the pull of the spring is in line with the axis of the spindle and is uniform in all directions radially, and there being no object or body within the spring the coils of the latter can be made of small diameter, so that the spring is very sensitive and easily and quickly responds to any tendency of the bolster to swing laterally in whatever direction that may be.

In the form of my invention shown in Fig. 2 a spiral or volute spring is employed, the outermost or largest coil being confined in an annular cavity in a nut F, screwed on the lower end of the bolster-case, and a threaded shank or stem *e* being formed at its center for engagement by a threaded opening in the lower end of the bolster. By screwing the bolster upon said stem the bolster when its bearing-shoulder *b* is seated will draw the coils of the spring upward, causing the latter to take the form of a cone and producing the tension of the spring required to hold the bolster to its seat. The helical spring shown in Fig. 1 is permanently attached to and is removed with the bolster when the latter is taken from the case, while in the construction shown in Fig. 2 the spring and bolster are separably connected, and when the bolster is removed from the case it remains in the latter.

The bolster-case constitutes a receptacle or reservoir for oil which surrounds the bolster and which is supplied to the case through a passage or channel at the top thereof, the case being oil-tight at all points below the point of communication of said passage therewith.

Holes or passages *b'* in the bolster establish communication between the bolster-case and the interior of the bolster, so that oil may freely pass to the spindle within the bolster to lubricate the same, and a circulation of oil takes place when the spindle is in motion, the oil rising along the spindle and emerging at the top of the bolster and descending into the case again.

In the use of a spindle mounted in my bearing the bolster shifts or swings laterally in response to the movement of the spindle to place its axis of rotation in line with the center of gravity when the spindle has an unbalanced load, the spring permitting such movement, and by reason of its downward pull upon the bolster holding it yieldingly but steadily in the position to which the spindle may shift it. The space around the bolster being filled with oil, the oil will yieldingly oppose any sudden or violent movement of the bolster and, preventing the latter striking the side of the bolster-case, will obviate the vibration of the spindle which would ensue from knocks or blows of the bolster against the case. The spring yieldingly under the pressure or strain to which it is subjected when the spindle sways to find an axis of rotation coincident with its center of gravity and gently but efficiently holding the bolster to its seat in the position to which the spindle may carry it and the oil, supplementing the spring and preventing violent or sudden movement of the parts, combine to produce a bearing by which the spindle under an unbalanced load will run at an extremely high speed without vibration. Neither the spring alone nor the oil alone can give the results which the presence of both produce, as I have ascertained by experiment, and it is also essential, as I have discovered by test, that the bolster be held down to its seat, for in the absence of the spring to keep it to its seat the effect of an unbalanced condition of the spindle is to cause it to vibrate vertically. Because of the high speed of the spindle its constant lubrication is indispensable, and this is secured by the circulation of the oil from the reservoir.

Though I prefer to use oil as the yielding body to supplement the spring, other material can be used to answer the same purpose. The oil is desirable, however, as it also serves for lubrication.

Having thus described my invention, what I claim is—

1. In a spindle-bearing, the combination of a bolster, a bolster-case having a support for a bearing on the upper part of the bolster, and a spring under tension attached to the lower end of the bolster and to the lower end of the bolster-case, and holding the bolster-bearing on its support on the bolster-case, an annular space being provided between the bolster and the bolster-case for a yielding body.

2. In a spindle-bearing, the combination of a bolster, a bolster-case having a support for a bearing on the bolster, and forming an oil-reservoir into which the bolster projects below said bearing, and in which it is laterally movable, and a spring under tension attached to and extending between the lower end of the bolster and the bolster-case and holding the bolster-bearing on its support on the bolster-case.

3. In a spindle-bearing, the combination of a bolster, a bolster-case, a shoulder on the upper end of the bolster engaging the bolster-case, the latter below the shoulder forming an oil-reservoir into which the bolster projects and in which it is laterally movable, and a spring under tension attached to and extending between the bolster and the bolster-case.

4. In a spindle-bearing, the combination of a bolster, a bolster-case, and a spring under tension attached to and extending between said parts, with one of which it has a screw connection.

5. In a spindle-bearing, the combination of a bolster, a bolster-case, and a spring under tension extending between said parts, into one of which it is screwed.

6. In a spindle-bearing, the combination of a bolster, a bolster-case forming an oil-reservoir into which the bolster extends, and a spring in line with the spindle-axis, and extending from the bottom of the bolster to the bottom of the case, and screwed into one of said parts by its coils.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of July, 1902.

JAMES C. POTTER.

Witnesses:
A. W. NORTHEND,
E. S. KENDRICK.