(No Model.)

W. G. MORRISON.

SPINDLE AND BEARING THEREFOR.

No. 263,942. Patented Sept. 5, 1882.

Fig 3

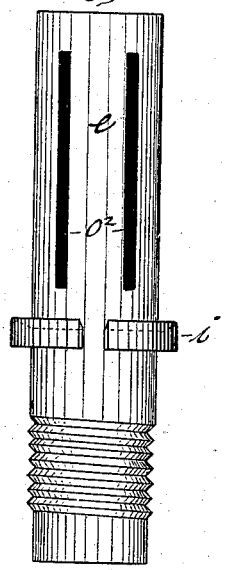


Fig 1

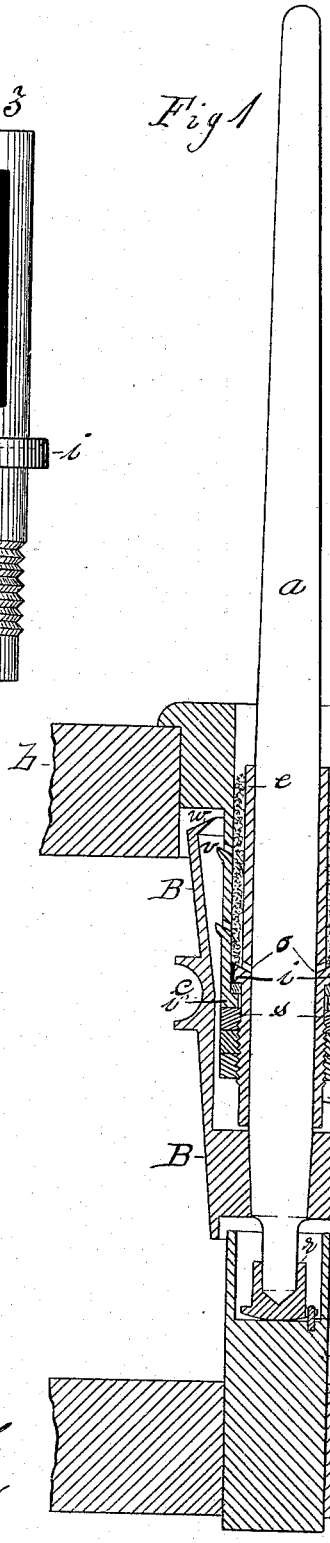


Fig 2

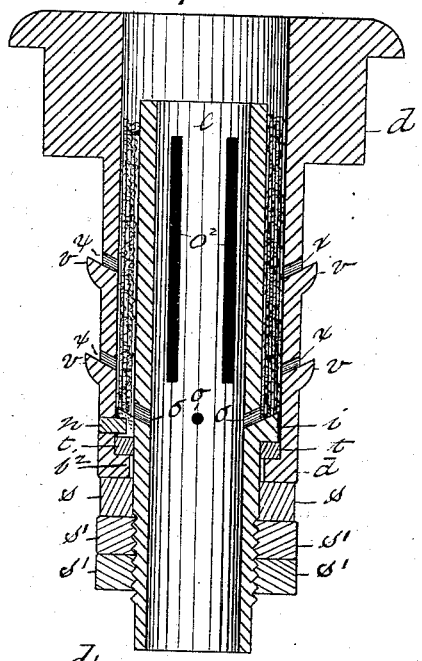


Fig 4

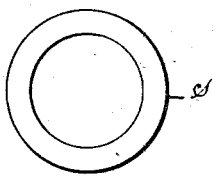
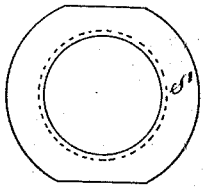


Fig 5



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UNITED STATES PATENT OFFICE.

WALTER G. MORRISON, OF WILLIMANTIC, CONNECTICUT.

SPINDLE AND BEARING THEREFOR.

SPECIFICATION forming part of Letters Patent No. 263,942, dated September 5, 1882.

Application filed December 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, WALTER G. MORRISON, a citizen of the United States, residing at Willimantic, in the county of Windham and State of Connecticut, have invented new and useful Improvements in Spindles and Bearings therefor, of which the following is a specification.

My invention relates to the construction of spinning-frame spindles and bearings therefor, the object being to provide a light-running spindle, a bolster-support permitting slight lateral vibrations of said spindle, and provided with a flexible bearing which acts to force said spindle back to an upright position when the cause of said lateral vibrations is removed, a spindle-step adapted to obey the said vibratory movements of the spindle, and self-oiling devices operating by the rotation of the spindle to convey the requisite amount of oil through the bolster automatically to every part requiring it above the spindle-step and effectually preventing any waste thereof.

In the drawings forming part of this specification, Figure 1 is a front elevation of the spindle proper, showing the bolster and oiling devices in vertical section and embodying my improvements. Fig. 2 is a view in vertical section of the bolster, bolster-bushing, and their uniting devices. Fig. 3 is a front elevation of the bolster-bushing. Fig. 4 is a plan view of an elastic washer. Fig. 5 is a plan view of one of the bolster-bushing nuts.

In the drawings, *a* is the spindle. *d* is the bolster. *b* is the bolster-rail. D is the step-rail. *e* is the bolster-bushing. B is the oil-cup. *c* is the whirl. *s* is the lower elastic washer. *s'* is a bolster-bushing nut. *t* is the upper inside elastic washer. *n* is a stop-pin in bolster *d*. *i* is a collar on the bushing *e*. i^2 is a collar at the lower end of bolster *d*, on the inside thereof. *v* are oil-collars on bolster *d*. *x* are oil-holes through the sides of said bolster. *o* are oil-holes through the sides of the bushing *e*. o^2 are slots through the sides of the latter. *r* is the spindle-step. *m* is the step steady-pin. *h* is the step-cup. *w* is a cover-rim to oil-cup B.

Like letters refer to like parts in the several figures.

My spindle *a* is constructed with a short butt—that is to say, it is shorter than spindles ordinarily are from the top of the bolster to the step, and such length of the butt conduces to make the spindle an easy-running one.

The oil-cup B is rigidly secured to the spindle just above the step. The exterior form of said cup B from its lower end (which is chambered to allow the upper end of the step-cup to enter it, as shown) up to the whirl *c*, which is formed directly upon said oil-cup, is slightly conical, and from said whirl to the highest point of the sides of said cup said sides are slightly more divergent than they are below the whirl. Upon the upper edge of oil-cup B is formed an upwardly-inclined rim-cover, *w*, which extends from said edge of cup B inwardly toward and nearly touching the sides of the bolster *d*, and said rim-cover from its junction with the sides of said cup B to its edge surrounding bolster *d* is gradually reduced in thickness, so that said edge is quite thin and sharp. The interior of oil-cup B from the bottom of its oil-cavity up to the center of the whirl *c* is made with parallel sides; but from said center of the whirl up to the under side of the rim-cover *w* its sides diverge, as shown.

The bolster *d*, which is secured to the rail *b* in any suitable manner, extends much below said rail, its lower end reaching down opposite to the center of the whirl *c*, within the oil-cup B. Said bolster is bored out much larger than the spindle *a*, to form a bushing and oil-chamber therein, and an inwardly-projecting collar, i^2, is formed at the lower end of the passage through it. One or more upwardly-inclined oil-collars, *v*, are formed around said bolster, said collar or collars having their upper sides inclined toward the vertical sides of the bolster, and the latter having oil-holes *x* therethrough, leading from said upper sides of said collars to the interior of the bolster.

A bolster-bushing, *e*, is made of suitable bearing metal to fit properly on spindle *a*, and is adapted to be hung at the lower end of the bolster *d*, as herein described, and consists of a tube having a collar, *i*, around it, whose upper side is inclined toward the vertical side of the bushing, making a species of trough around the latter, and at the line of junction of said inclined side of collar *i* with said vertical side several oil-holes, *o*, are made, leading from said trough to the interior of said bushing. Bushing *e* is also provided

with several vertical slots, o^2, through its sides, and its lower end is screw-threaded to provide for placing thereon nuts s', one serving as a set-nut for the other.

Collar i on bushing e is notched, as shown, to receive the end of a pin, n, Fig. 2, in the side of bolster d, which prevents the bushing from turning in the latter. Said collar i is turned to such a diameter as compared with that of the bushing-chamber in bolster d as to make what is commonly termed a "loose fit" therein, and the interior diameter of collar i^2 in bolster d is slightly greater than the exterior diameter of the bushing e below its collar i. This permits a lateral play of the bushing within the bolster d.

The step-cup h is made with sufficient length below to provide for properly securing it in the rail D, and its upper cupped end receives therein the spindle-step r, the bottom of which is slightly convex, as shown, and through a notch in a flange around the bottom edge thereof a pin, m, set in the bottom of said cup projects to prevent step r from revolving with spindle a. Said step r is of less diameter than the interior of the cup h, to permit said step to be moved laterally within the latter.

If desired, the lower end of the spindle may be made of a slightly convex form and adapted to run directly upon the bottom of cup h, the latter being made of proper diameter to inclose said lower end and allow of a slight lateral play therein. In this case the step r would be dispensed with.

The bolster-bushing e and the bolster d are united as follows to constitute a compound bolster, as shown, and which is illustrated separate from the spindle in Fig. 2. Said compound bolster consists of a rigid and of a vibratory spindle-support in one, d being the former, and e the latter. The bolster-bushing e has a thin elastic washer, t, placed around it under collar i, and is then placed in the bolster d, said washer t being thus interposed between said collar i and the collar i^2 in the bolster d; and the elastic washer s is then placed around the lower end of the bolster d, and the nut s' is then screwed moderately against said washer s and there locked by a second nut, as shown. Said washer s may be of leather, fabric, or of metal properly formed to afford suitable elastic resistance between the lower end of bolster d and the nut s'. The bushing e, thus secured in bolster d, may be slightly vibrated in the latter, its fulcrum-point being about at the collar i^2 in bolster d, and when so vibrated a slight compression of the opposite sides of the two washers t and s takes place, that of the former being between collars i and i^2, and that of the latter between nut s', next to washer s, and the lower end of the bolster d.

The bushing e may be united to bolster d, as above described, and made to operate nearly as advantageously without employing the washer t between collars i and i^2, letting the former collar rest directly upon the latter; but by using both of said washers the bushing e is much better cushioned and better adapted to very high spindle-speeds. The bolster d and the bolster-bushing e, both united as above described, are secured to the bolster-rail b, as in Fig. 1, the lower end of said bolster, against which all of the lateral force of the spindle is exerted, hanging much below the bolster-rail and within the rotating oil-cup B on the spindle a, the latter, with said oil-cup, being held up to the position under the bolster (shown in Fig. 1) by the step-cup h, set in rail D.

In practice the oil-cup B is supplied only with as much oil as will, when the spindle is at its maximum or normal speed, dispose of itself by centrifugal force over the interior surface of said cup, rising up thereon clear of the sides of the bolster to the under side of the rim-cover w, which it follows to the thin edge thereof, whence it is thrown in fine spray against the sides of said bolster above both of the collars v and the oil-holes x. The movement of the oil upon the under side of the rim-cover w toward said bolster is due to the upward movement of the oil upon the outwardly-inclined walls of cup B against the upwardly-inclined inner surface of said rim-cover. The whirl c, which receives the spindle-driving band, is located on oil-cup B, directly opposite the collar i^2 on the bolster, which is, as above stated, about the fulcrum-point of the bushing e as it vibrates, as stated. When the oil in cup B has been carried up and thrown against the sides of bolster d, above collars v, as described, it runs down upon the latter, and thence through holes x into the bushing-chamber therein, in which it flows downward upon collar i on bushing e, whence it is conducted by holes o through the latter to its interior and against the sides of spindle a, which it thus thoroughly lubricates, and any excess of said oil runs down between said bushing and spindle into the oil-cup, and the oil is thus reused as long as a supply remains in the oil-cup.

In adapting the within-described compound bushing to heavy spindles, or to those carrying rather heavy bobbins, it is sometimes desirable to supply oil thereto at points higher than the oil-holes o through bushing e, and under such circumstances I insert a light packing of loose wool or other similar material into the bushing-chamber in the bolster, between the latter and the bushing e, and by that means some of the oil which enters said chamber, as above stated, becomes absorbed by said loose packing, and the latter serves to introduce oil to the spindle through the slots o^2 in said bushing. Said packing between the bolster and the bushing is always left sufficiently loose and soft to prevent it from interfering with the aforesaid lateral vibrations of said bushing and spindle.

The within-described flexible-bolster construction permits of a slight variation of the

spindle *a* from a vertical line while carrying a load not perfectly in balance, and thus preventing the rattle and resistance appertaining to a spindle running in a rigid bolster. The elastic resistance (consisting of the washers *t* and *s*) to the lateral vibration of said spindle is so interposed between said bolster and bolster-bushing as to promptly act to return the spindle to a vertical position the moment the cause of any vibratory action is removed.

What I claim as my invention is—

1. The spindle *a*, step *r*, the oil-cup B, having the whirl *c* thereon, secured to said spindle near the lower end of the latter, and extending upward around the same, and having formed upon its upper end an upwardly and inwardly inclined cover-rim, *w*, terminating in a thin edge, the bolster *d*, adapted to project downward from the bolster-rail within said oil-cup to a point nearly opposite to said whirl, and provided with the collar i^2, one or more collars, *v*, and the oil-holes *x* through the sides thereof, the bolster-bushing *e*, having the collar *i* thereon, and the oil-holes *o* through the sides thereof, the elastic washer *s*, and one or more nuts, *s'*, all combined and operating substantially as set forth.

2. The combination, in a spinning-frame, and with the bolster-rail thereof, of a hollow bolster, *d*, supported by and extending below the bolster-rail, the spindle *a*, extending through the bolster, a step supporting the same, and a bushing, *e*, supported by and within the bolster, and provided with bearings constructed to permit a limited lateral play of the entire bushing, for the purpose set forth.

3. The bolster *d*, adapted to be extended downward below the bolster-rail, and having oil-holes through its sides, the bolster-bushing *e*, also having oil-holes through its sides and suspended at the lower end of said bolster, and means whereby lateral vibrations of said bolster-bushing are permitted within said bolster, the spindle *a*, having the oil-cup B secured thereto, extending up outside of said bolster, and having the whirl *c* thereon, and the step *r*, substantially as described, capable of lateral and rocking movements, all combined and operating substantially as set forth.

4. The within-described compound bolster, consisting of the bolster *d*, having a bushing-chamber of greater diameter than that of the bolster-bushing *e*, and provided with a collar, i^2, at the lower end of said chamber, the bolster-bushing *e* having a collar, *i*, thereon, and oil-holes through its sides, in combination with the elastic washer *s* and nut *s'*, substantially as set forth.

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Witnesses:
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