(No Model.)

R. GILL, W. H. BUTLER & S. SMITH.

SPINNING SPINDLE.

No. 386,810. Patented July 31, 1888.

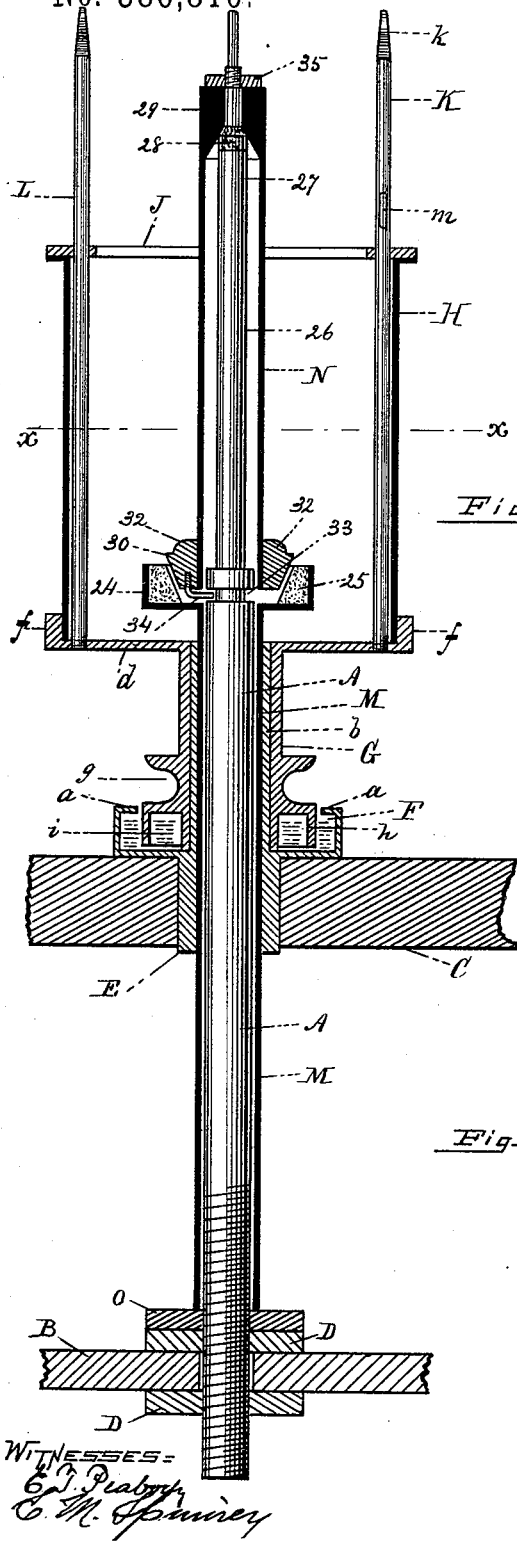

Fig. 1.

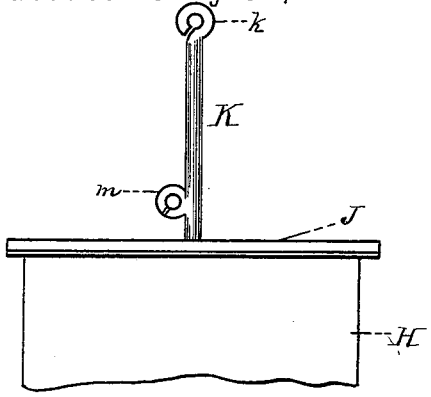

Fig. 4.

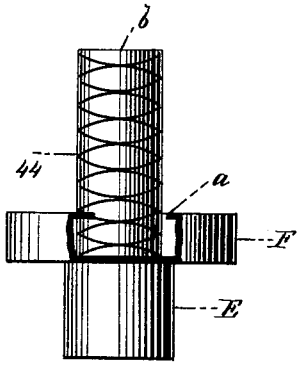

Fig. 3.

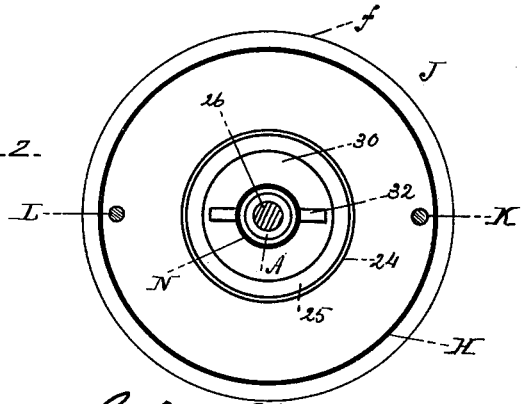

Fig. 2.

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UNITED STATES PATENT OFFICE.

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SPINNING-SPINDLE.

SPECIFICATION forming part of Letters Patent No. 386,810, dated July 31, 1888.

Application filed April 26, 1888. Serial No. 271,931. (No model.)

To all whom it may concern:

Be it known that we, RICHARD GILL, of Methuen, in the county of Essex, and WILLIAM H. BUTLER and SAMUEL SMITH, both of Lawrence, in the county of Essex, State of Massachusetts, have invented a certain new and useful Improvement in Spindles, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of our improved spindle, including portions of the rails, certain parts being shown in side elevation; Fig. 2, a horizontal section taken on line *x x* in Fig. 1; Fig. 3, a side elevation of the bushing detached, a portion of the oil-cup being represented as broken away to show the spirally-grooved body; and Fig. 4, a side elevation of one of the fliers, the flier-ring, and a portion of the guard.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

Our invention relates to that class of spindles which are provided with fliers and designed principally for worsted-spinning; and it consists in certain novel features, as hereinafter fully set forth and claimed, the object being to produce a more effective and otherwise desirable device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

In the drawings, A represents the spindle proper, B the movable or lifting rail, and C the stationary or step rail.

The spindle A is threaded at its lower end and screwed into the lifting-rail B, where it is secured in any desired position by the check-nuts D.

A vertically-arranged bushing, E, is inserted in the rail C, said bushing being centrally provided with an annular oil-cup, F, which rests on the upper side of said rail and has a narrow inwardly-projecting annular flange, *a*, at its top.

The body *b* of the bushing is extended upwardly above the cup F, and exteriorly provided with two spirally-arranged grooves, 44, running in opposite directions, one to the left and the other to the right, said grooves crossing and recrossing each other, as shown in Fig. 3.

A vertically-arranged sleeve, G, is fitted to revolve on the body *b* of the bushing E, the lower end of said sleeve having its bearing on the bottom of the oil-cup F. This sleeve is provided at its upper end with a large horizontally-arranged disk, *d*, having a peripherally-disposed upwardly-projecting flange, *f*, and near its lower end with a whirl or pulley, *g*; from the lower side of which a vertically-arranged annular flange, *h*, projects in the oil-cup F, thereby forming the annular oil-chamber *i*.

A cylindrical metallic guard, H, provided with a ring, J, at its upper end, is secured to the disk *d* within the flange *f*, said guard serving to a great extent to overcome the resistance of the atmosphere to the revolutions of the bobbin, and thereby prevent it from interfering with the proper laying of the fibers of the yarn as the bobbin is revolved. It also enables the spinner or operator of the frame to readily stop the revolutions of the fliers, when desired, by grasping said guard with the hand.

A vertically-arranged flier-arm, K, provided with a slotted eyelet, *k*, through which the yarn passes from the rolls, and also with a slotted eyelet, *m*, for guiding the yarn to the bobbin, is inserted in a hole in the ring J, and has its lower end firmly secured to the disk *d*, a counterbalancing flier-arm, L, being secured in like manner at the opposite side of said ring and disk, as shown in Fig. 1.

Fitted to slide vertically in the bushing E, around the spindle proper, A, there is a tube, M, which extends upwardly above the disk *d*, and is provided at its top with a cup-shaped rest, 24, in which a friction-ring, 25, composed of felt, leather, or any other suitable material, is placed, said ring being inclined outwardly on its inner side, as shown in Fig. 1. The upper portion of the spindle A is turned down or reduced, as shown at 26, and the upper end of this portion still further reduced to form

the shoulder 27, on which is disposed a rawhide ring or bearing, 28.

A bobbin-tube, N, provided with a cap, 29, having a vertical hole at its center, is mounted on the upper portion of the spindle A, the reduced upper end of the spindle above the ring 28 being inserted in the hole in said cap, which cap rests on said ring and thereby suspends the tube. The tube N is provided at its lower end with a boss, 30, having its sides inclined inwardly to correspond approximately with the outward incline or angle of the inner side of the friction-ring 25, said boss being provided on its upper side with studs or projections 32, adapted to enter corresponding recesses in the lower end of the bobbin. (Not shown.)

An annular groove, 33, is cut in the body of the spindle proper near the bottom of its reduced portion 26, and secured in the lower side of the boss 30 there is a bent pin, 34, the free end of which is inserted in said groove, said pin preventing the tube N from being accidentally withdrawn from the spindle in doffing. As an additional precaution to prevent the bobbin-tube from being accidentally withdrawn, as described, a nut, 35, is placed on the upper end of the spindle, said nut being turned down into close proximity to the cap 29, but not sufficiently to bear thereon. The nut may, however, be omitted when the pin 34 is used, and vice versa, if desired.

A tension-nut, O, is placed on the lower portion of the body of the spindle A, between the lower end of the tube M and uppermost check-nut, D, said tension-nut being adapted to raise said tube and force the friction-ring 25 in the rest 24 against the boss 30 on the lower end of the bobbin-tube N, thereby enabling any desired degree of tension to be readily placed on the bobbin. The ring J serves to brace the fliers K L, and when the cylindrical guard H is not used said ring is attached directly to the fliers. The flange *h* on the whirl *g* does not extend quite to the bottom of the oil-cup F, thereby permitting the oil in said cup to pass into the chamber *i*, where it will be held and delivered gradually as the whirl revolves, thus largely preventing the oil from being thrown from the cup by the revolutions of the sleeve G, a sufficient quantity of oil being taken up by capillary and centrifugal action to lubricate the bearing-surfaces of said sleeve.

It will be understood that the spindle A is raised and lowered vertically with the rail B, producing corresponding reciprocating movements of the bobbin on the tube N, and that the sleeve G and flier-arms K L are revolved in horizontal planes around the spindle, but do not move vertically. The grooves 44 serve to retard the oil as it passes upward from the cup F between the sleeve and bushing, thereby preventing it from being carried above the bushing and wasted.

If preferred, the upper end of the spindle above the portion 26 may be inserted in a socket in the cap 29 without being reduced. The flier-arm L being employed for counterbalancing the flier-arm K, any other suitable means for that purpose may be used, if desired. The green-hide bearing 28 may also be omitted, if preferred, or a bearing of some other suitable material substituted therefor.

Having thus explained our invention, what we claim is—

1. The combination of a spindle proper, having its upper portion reduced, a tube disposed on the lower portion or body of said spindle, a bushing disposed on said tube and provided with an oil-cup, a sleeve disposed on said bushing and carrying a flier arm or arms, said sleeve being provided with a whirl and adapted to bear in said oil-cup, a bobbin-tube journaled at its upper end on the upper end of the spindle and provided at its lower end with a bearing or boss for supporting the bobbin, and means for securing the bobbin-tube on the spindle, substantially as set forth.

2. The combination of a spindle proper, having its upper portion reduced, a tube disposed on the lower portion or body of said spindle, a bushing disposed on said tube and provided with an oil-cup, a sleeve disposed on said bushing and carrying a flier arm or arms, said sleeve being provided with a whirl and adapted to bear in said oil-cup, a bobbin-tube journaled at its upper end on the upper end of the spindle and provided at its lower end with a bearing or boss for supporting the bobbin, means for securing the bobbin-tube on the spindle, and a guard surrounding the bobbin-tube and adapted to overcome or partially overcome the atmospheric resistance to laying the fibers of the yarn as the bobbin is revolved, substantially as described.

3. The combination of a spindle proper, having its upper portion reduced, a tube disposed on the lower portion of said spindle, said tube being provided at its upper end with a cup-shaped friction-ring, a bobbin-tube journaled at its upper end on the upper end of said spindle and provided at its lower end with a conical boss adapted to fit said cup-shaped ring, and means for raising said tube to increase the tension on said bobbin-tube, substantially as described.

4. The combination of a spindle proper, having its upper portion reduced, a tube disposed on the lower portion of said spindle and provided at its upper end with a flaring friction-ring, a bushing disposed on said tube and provided with an oil-cup, a sleeve disposed on said bushing and carrying a flier arm or arms, said sleeve being adapted to bear in said oil-cup and provided with a whirl above said cup, a bobbin-tube journaled at its upper end on the upper end of the spindle and provided at its lower end with a conical boss adapted to fit the flaring ring of said tube, means for raising said tube to increase the tension of the bobbin-tube, and means for securing the bobbin-tube on the spindle.

5. The combination of a spindle proper, a bushing provided with an oil-cup, and a sleeve surrounding said bushing and having its lower

end resting on the bottom of said oil-cup, said sleeve being provided with a whirl and below said whirl with an annular flange depending from the outer lower edge of said whirl and terminating above the bottom of said oil-cup, substantially as described.

6. The spindle A, provided with the nut O, reduced portion 26, and shoulder 27, the tube M, disposed on said spindle and provided with the rest 24 and friction-ring 25, the bobbin-tube N, journaled on said spindle and having the boss or support 30, provided with the projection 32, the bushing E, provided with the oil-cup F, the sleeve G, provided with the whirl *g* and disk *d*, the guard H, flier-arms K L, ring J, and means for securing the bobbin-tube on the spindle, all being combined and arranged to operate substantially as described.

7. The lifting-rail B and stationary rail C, the spindle A, secured in the rail B and provided with nuts O D, reduced portion 26, and shoulder 27, the tube M, provided with the rest 24 and friction-ring 25, the bushing E, mounted in the rail C and provided with the oil-cup F, having the flange *a*, the sleeve G, provided with the whirl *g*, disk *d*, and oil-chamber *i*, the guard H, mounted on the disk *d*, the ring J, mounted on the guard H, the flier-arms K L, inserted in the ring J and secured to the disk *d*, the bobbin-tube N, journaled on the spindle A and provided with the cap 29 and boss 30, and the pin 34, connected with said boss and inserted in a groove in said spindle, all combined and arranged to operate substantially as described.

8. The spindle A, nuts O D, rails B C, bushing E, tube M, sleeve G, guard H, ring J, flier-arms K L, tube N, cap 29, boss 30, pin 34, and ring 25, all constructed, combined, and arranged to operate substantially as set forth.

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