F. J. RABBETH.

Spindle for Spinning Machinery.

No. 210,357. Patented Nov. 26, 1878.

Fig. 1.

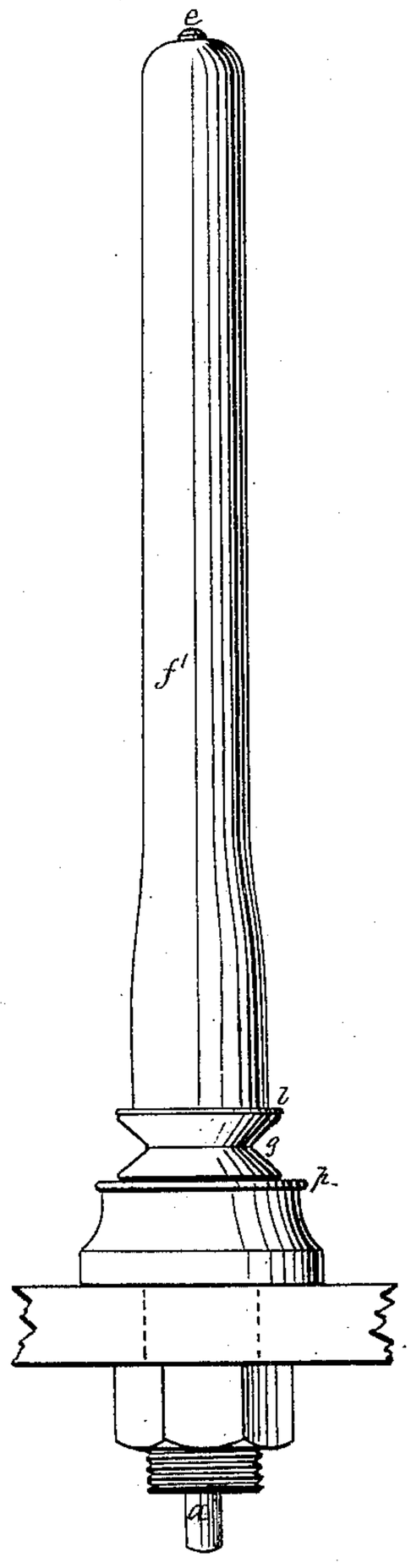


Fig. 2.

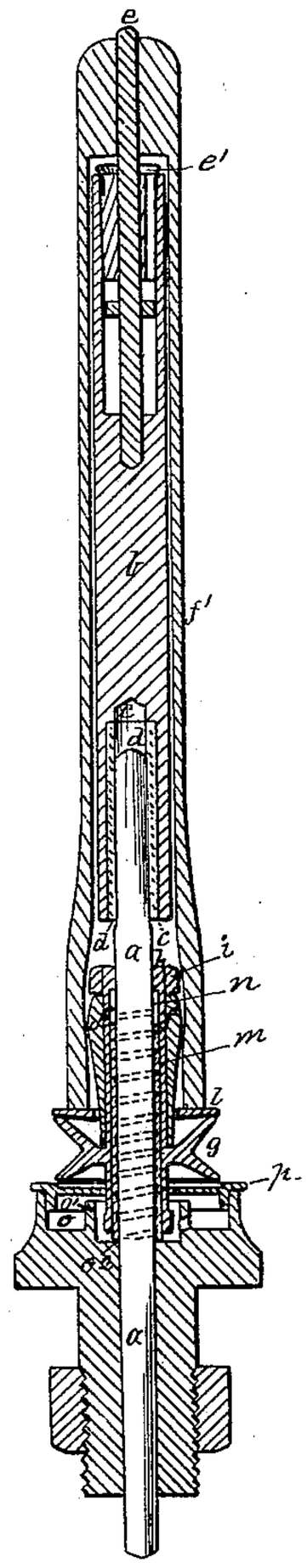


Fig. 5.

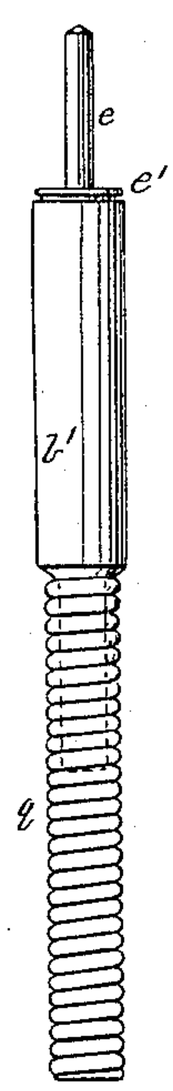


Fig. 6.

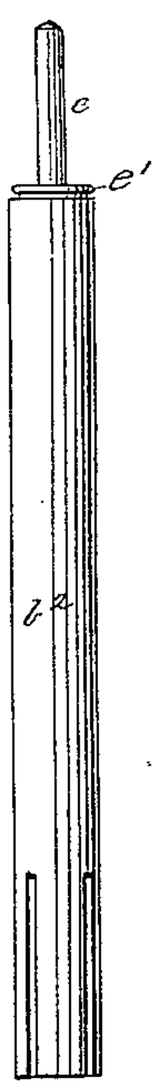


Fig. 3.

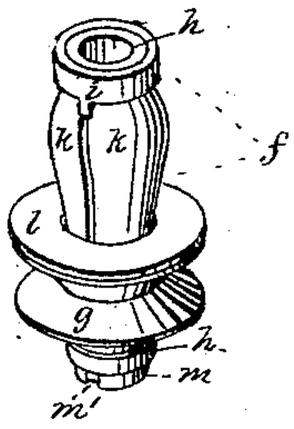
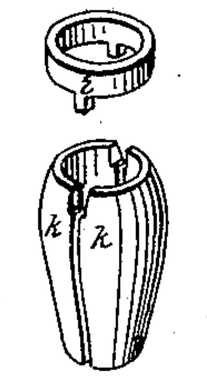


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANCIS J. RABBETH, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN SPINDLES FOR SPINNING MACHINERY.

Specification forming part of Letters Patent No. **210,357,** dated November 26, 1878; application filed April 20, 1878.

To all whom it may concern:

Be it known that I, FRANCIS J. RABBETH, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Spindles for Spinning Machinery; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of thereof, is a clear, true, and complete description of my invention.

One portion of my invention relates, solely, to what are known as "dead-spindles;" and it consists in a dead-spindle composed of two or more longitudinal sections socket-jointed together. If in a dead-spindle thus constructed the section-joints be fitted with metal to metal, there will be much less jar or vibration than when constructed solidly in one piece, as formerly.

For reducing the jar or vibration to a minimum, my invention further consists in a dead-spindle composed of two or more longitudinal sections which are flexibly jointed, thereby rendering it practically impossible for undue vibration or jar to be communicated from any one section to another. This flexibly joining of the sections may be largely varied as to construction and the material employed therein.

Metal may be used in forming the connection—as, for instance, in the form of a spiral spring or in the form of a steel or iron bushing within a socket-joint provided with inwardly-projecting spring-tongues, which afford a sufficiently firm but yielding packing for the joint; or the sections may be united by means of pintles, dowels, or sleeves composed of any sufficiently strong material which is slightly flexible.

Another portion of my invention consists in the combination, with a flexibly-jointed dead-spindle, of a bobbin-carrier, arranged to support a bobbin at a point below the joint or joints of the spindle, whereby the bobbin is enabled to readily find its true axis.

Another portion of my invention consists in the combination, with a flexibly-jointed dead-spindle, of a bobbin-carrier and whirl-sleeve rotating on a spindle-shank which is rigidly mounted in a base fitted for rigid attachment to the rail of a spinning-machine, whereby the shank, whirl-sleeve, and bobbin-carrier are maintained in a truly vertical position, while permitting freedom to the jointed portion of the spindle to adapt itself to unequally-balanced bobbins.

Another portion of my invention also relates to dead-spindles, and has for its object the efficient lubrication of the bearings of the whirl and the bobbin-driver which is rotated by and with the whirl; and it consists in the combination, with an oil-reservoir below the whirl, of a dead-spindle and a sleeve or tube connected with or forming a part of the whirl, provided with an interior annular recess at its upper end, and an interior bushing, which is scored spirally on its inner surface, for conveying oil upward from the reservoir, and is grooved longitudinally externally, for returning the oil from the annular recess to the reservoir, so that oil will be continuously circulated within the whirl and its tube or sleeve without exposure to the air, dust, or dirt. The reservoir is provided with a flanged cap, which securely covers it.

Another portion of my invention is applicable not only to dead-spindles, but to live-spindles, whether of the simple or the sleeved varieties; and it consists of the combination, with a bobbin-driver, whether it be a whirl-sleeve or a live-spindle, of a bobbin-holder constructed in solid sections, which are separately jointed at one end thereof to the whirl-sleeve or the spindle, as the case may be, so that when revolved the free ends of these solid sections will be forced outward centrifugally and made to engage with and properly drive a bobbin. These solid sections constitute, when a bobbin is in position, a friction-clutch which is extremely sensitive and promptly operated at low speed, so as to secure early rotation of the bobbin at starting, and one which is also, when revolving at high speed, powerful in its rotative control of the bobbin. When at rest this clutch has no hold whatever upon the bobbin, and therefore doffing is easily accomplished, requiring no pulling in the removal of or pressure in mounting the bobbins.

My bobbin-holder may be so applied to a spindle that it will engage with the bobbin at either end thereof, or at any intermediate point.

I am well aware that a slitted metal tube

has heretofore been combined with a whirl and dead-spindle for driving a bobbin, when said tube was expanded by centrifugal force, and also that expansive springs of various kinds have also been employed in a similar connection. My bobbin-holder differs in its construction from any of these pre-existing devices, and it is more sensitive and prompt in its operation, because the centrifugal force has only to throw outward the free ends of the sections, instead of being obliged to exercise a bending force, as with a slitted tube, and it is much more easily doffed than is possible with expansive springs as heretofore used, because such springs are compressed by the bobbin when in position for spinning and at rest.

To more particularly describe my invention I will refer to the accompanying drawings, in which—

Figure 1 is a side view of one of my spindles complete, with a bobbin mounted thereon. Fig. 2 represents the same in vertical central section. Fig. 3 represents, in perspective, the whirl-sleeve and bobbin-holder detached from the spindle. Fig. 4 represents, in perspective, in detail, the several parts of the bobbin-holder detached from the whirl and its sleeve. Figs. 5 and 6 represent, in side view, two forms of flexible metallic connections by which the bodies of the spindles are united to their shanks.

The dead-spindle or standard is in this instance composed of two pieces jointed together. Spindles of more than ordinary length are sometimes constructed by me in three or even a greater number of sections. The shank of the spindle *a* is made of fine iron or steel, is tapered at its lower end, and snugly fitted to a base provided with a screw-shank and nut, by which it may be firmly mounted on a rail in a spinning-machine. The shank, from a point above where it enters the base, is slightly tapered to its upper end. The body of the spindle *b* is composed, preferably, of cast-iron, and varies in its height and diameter according to the service intended and the character of bobbin to be used therewith. In this instance the shank and body are united by means of a socket, *c*, in the lower end of the body, which is occupied by the upper end of the shank. The two may, however, be joined by providing a head for the shank with a socket therein and a stem on the body fitted thereto; but I prefer the joint shown. The socket *c* is in this instance provided with a vulcanized-rubber bushing, *d*, which serves as a yielding packing for securing a connection of the shank with the body of the spindle, possessed of the requisite flexibility.

Various other materials may be employed instead of rubber—as, for instance, leather, cork, or metal, if the latter be in such a form as to afford flexibility after the manner of a spring or springs. The presence of the joint alone, if the metal of the sections be directly in contact, will to some extent lessen the degree of vibration which would inevitably occur if the spindle were made in one piece, as heretofore; but it is preferable that special means be employed to attain actual flexibility. As a means for steadying the bobbin on the spindle, I provide, as heretofore, a tip, *e*, at its upper end. This tip may be mounted in a step, as shown, so that it will be free to revolve; or it may in some cases be rigidly fixed in the body of the spindle, as it is not always necessary that the bobbin should be in frictional or close contact with the tip. The step for the tip is shown to be located in an oil-chamber at the top of the body of the spindle, and the tip is provided with a bushing, which is cut away externally from end to end on one or more sides, to afford oiling-inducts and space for oil. A flanged cap, *e'*, protects the oiling-inducts. The tip is prevented from undue longitudinal movement by means of a collar secured thereto below the bushing.

The bobbin carrier or holder *f* is, as usual, provided with a whirl, *g*, and sleeve *h*, fitted to the shank of the spindle above the base, these constituting the bobbin-driver on a dead-spindle; but in the case of a live-spindle the latter would be the driver, on which the bobbin-holder would be mounted. The upper end of the sleeve is provided with a cap-ring, *i*, which has at opposite sides thereof downwardly-projecting ears or lugs. The solid sections *k*, of which two or more may be used, are composed of metal, and are concavo-convex in form, so as to inclose the sleeve and present a circular exterior, and they rest with their lower ends on top of the whirl, close to the sleeve. These sections may be hinge-jointed to the whirl or sleeve; but, as a simpler and quite as effective mode of connection, I employ a loose washer, *l*, which rests upon the whirl, and by loosely confining the lower ends of the sections *k* permits them to operate within certain limits, as if hinge-jointed to the whirl or to its sleeve. Instead of the washer, an annular recess of proper depth in the top of the whirl may be relied upon for performing the same function. The cap-ring *i* serves to prevent the sections from undue movement longitudinally, while the ears or lugs on said ring prevent the sections from undue movement around the sleeve. It will be seen that these sections, being perfectly loose within certain prescribed limits, are practically hinged or jointed at their lower ends, and offer no resistance whatever to the putting on or taking off of bobbins when at rest, and that as soon as the holder is rotated the sections promptly expand at their upper ends, and snugly engage with the bobbin *f'*. The edges of the sections are smooth and somewhat rounded, so as to not unduly wear or cut the bobbin during any slight movement of the carrier independently of the bobbin. The carrier-sections are also rounded vertically, as shown, so that when expanded within a bobbin properly chambered to receive them the latter will be held firmly by the carrier against any tendency to rise on the spindle. When on the holder the bobbin is supported at a

point below the joints of the spindle, which enables it to readily find its true axis when in operation.

The interior of the sleeve *h* is provided with a bushing, *m*, which is fitted to the shank of the spindle and internally scored spirally for conveying oil upward. The outside of the bushing is scored longitudinally, as at *m'*, for returning the oil downward. The whirl-sleeve *h*, above the bushing, is chambered internally at *n;* but the chamber is in this instance formed by the interior surface of the sleeve and the top of the bushing. The supporting-base of the spindle is recessed on top, as at *o*, for forming a receptacle or reservoir for oil. Within the reservoir is a central annular wall, o^1, which surrounds the lower end of sleeve *h* when in position, and forms a chamber or socket, containing at the bottom thereof the bearing o^2 for the lower end of sleeve *h* and bushing *m*. The annular wall o^1 is perforated at its bottom for permitting oil to enter from the reservoir. A flanged cap or cover, *p*, is fitted to the top of the base, and has a central aperture slightly larger than the sleeve below the whirl.

Oil may be applied to the reservoir by lifting the cap, or the latter may be provided with an oil-hole.

In Fig. 5 I show a metallic flexible connection, which consists of a socket, *q*, composed of steel, iron, or brass wire, tightly coiled on an arbor, thus affording a socket for the reception of the top of the shank, and a stem formed on the lower end of the body b^1. In Fig. 6 the lower end of the body b^2 has a socket, as previously described; but instead of having an elastic bushing, a flexible connection is attained by longitudinally slitting the socket at several points, as shown, so that each of the portions between the slots may operate as springs when the tip of the shank is snugly inserted in the socket.

It will be seen that the flexibly-jointed spindle, by obviating vibration, renders it possible for the base to be rigidly mounted on its rail, instead of being held thereon by springs or other yielding clamps, as has heretofore in many cases been deemed necessary. By having the shank of the spindle rigidly mounted in a base which is rigidly attached to the rail, there is no liability of deflection by the strain on the whirl-band, as is the case when the base is mounted on cushions, or when the spindle is braced by springs below the whirl, as heretofore.

My flexibly-jointed dead-spindles are well adapted to light spinning with long bobbins, and they can also be successfully operated with heavy brass bobbins of more than the usual length, suitable for use in wet-twisting, and in whatever service they may be engaged their practical operation is in no manner injuriously affected by vibration. In working with irregular or imperfect bobbins the flexible joint and the centrifugally-expanding bobbin-holder enable the bobbin to adjust itself axially, because the flexible joints of the spindle and the bobbin-holder are all within the bobbin.

I do not limit my invention to the precise construction of parts herein shown and described.

What I claim as new, and desire to secure by Letters Patent, is—

1. A dead-spindle constructed in two or more longitudinal sections jointed together, substantially as described.

2. A dead-spindle composed of two or more sections flexibly jointed together, substantially as described.

3. A dead-spindle constructed in two or more longitudinal sections socket-jointed together, and provided at the joints with yielding packing for preventing undue vibration, substantially as described.

4. The combination, with a dead-spindle, an oil-reservoir at its base, and a whirl having a sleeve provided with an interior annular recess near its upper end, of a bushing within the sleeve, which is spirally scored internally and vertically scored externally, substantially as described, whereby oil is conveyed upward next the spindle to the annular recess, and thence downward outside the bushing to the reservoir, as set forth.

5. The combination, with a flexibly-jointed dead-spindle, of a bobbin-carrier arranged to support a bobbin at a point below the joints of the spindle, substantially as described, whereby the bobbin is enabled to readily find its true axis when in operation, as set forth.

6. The combination, with a flexibly-jointed dead-spindle, of a bobbin-carrier and whirl-sleeve rotating on the shank of the spindle, which is rigidly mounted in a base fitted for rigid attachment to the rail of a spinning-machine, substantially as described, whereby the shank, bobbin-carrier, and whirl-sleeve are maintained in a truly vertical position while permitting the jointed portion of the spindle to adapt itself to unequally-balanced bobbins, as set forth.

7. The combination, with a bobbin-driver, of a centrifugal bobbin-holder composed of solid sections, which are separately jointed at one end to a revolving sleeve or a spindle, substantially as described.

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