(No Model.) 2 Sheets—Sheet 1.

S. L. WIEGAND.

SUPPORT AND DRIVING MECHANISM FOR SPINNING SPINDLES.

No. 589,995. Patented Sept. 14, 1897.

Fig. 1.

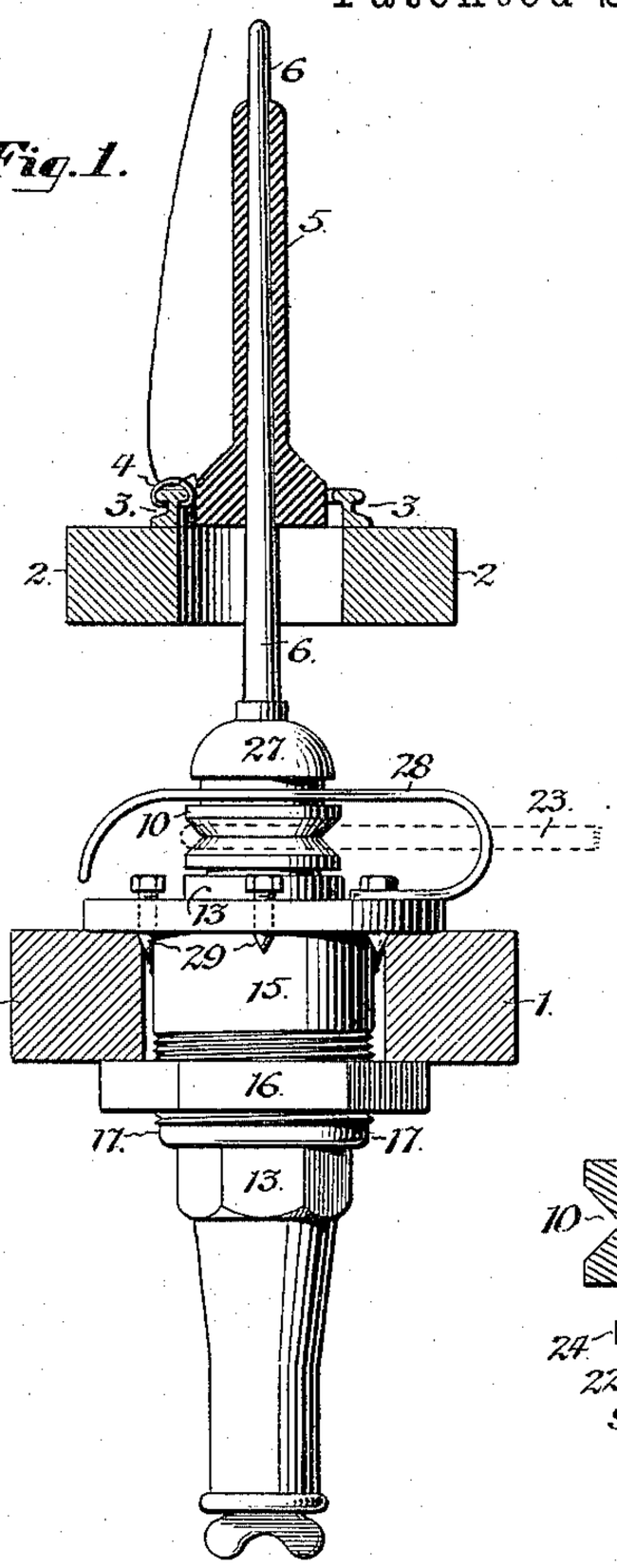


Fig. 4.

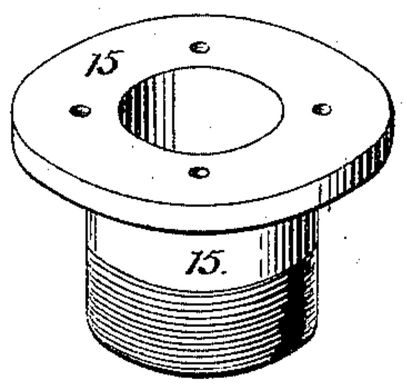


Fig. 11.

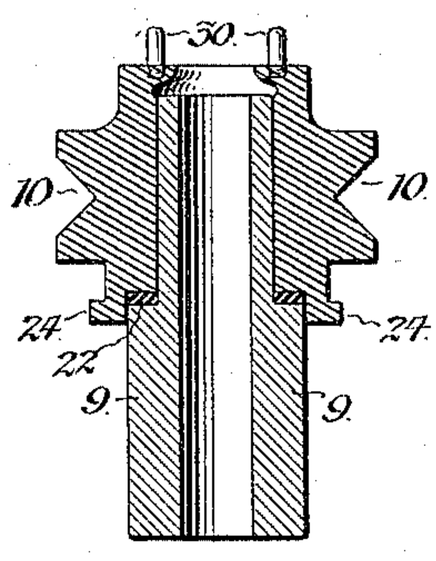
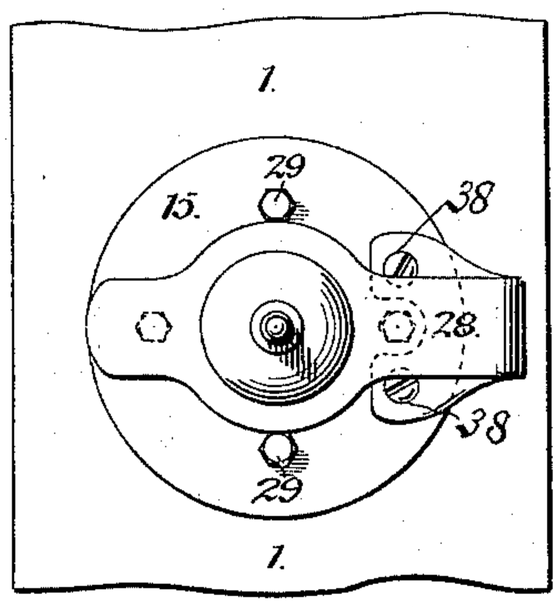


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

S. L. WIEGAND.

SUPPORT AND DRIVING MECHANISM FOR SPINNING SPINDLES.

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Fig. 7.

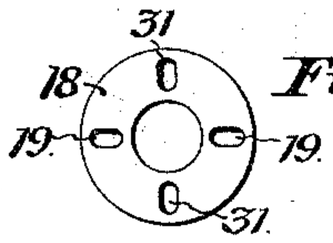


Fig. 6.

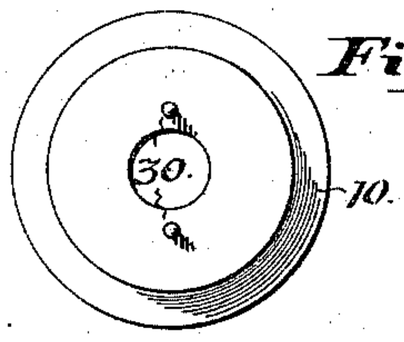


Fig. 5.

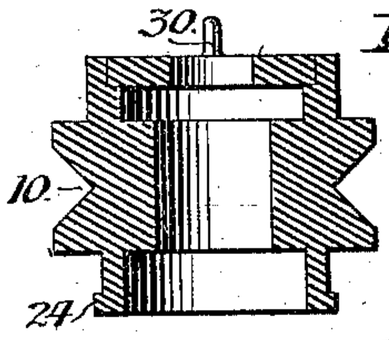


Fig. 2.

Fig. 9.

Fig. 8.

Fig. 10.

Fig. 12.

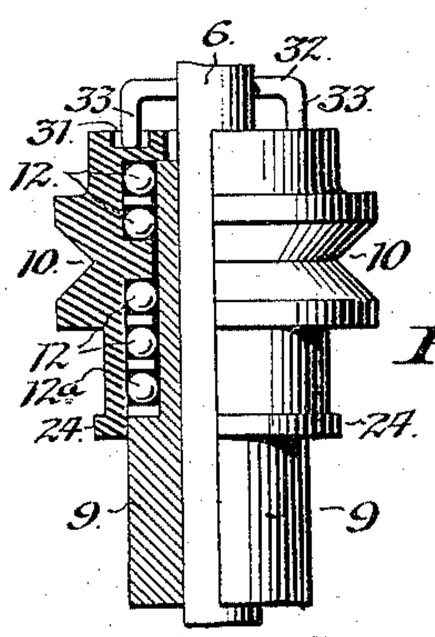
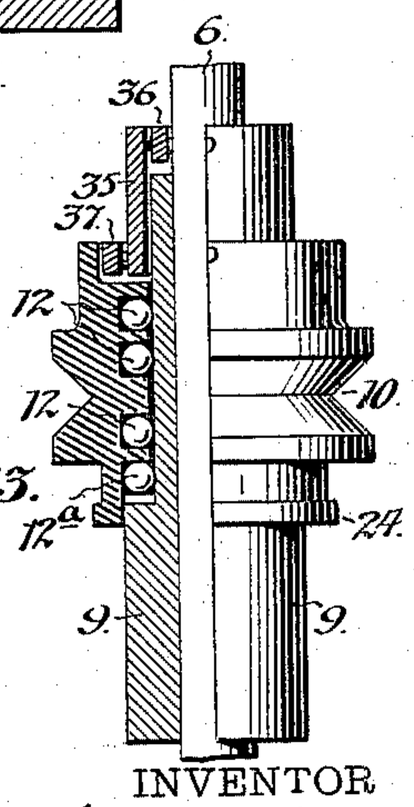


Fig. 13.



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UNITED STATES PATENT OFFICE.

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SUPPORT AND DRIVING MECHANISM FOR SPINNING-SPINDLES.

SPECIFICATION forming part of Letters Patent No. 589,995, dated September 14, 1897.

Application filed August 1, 1890. Renewed October 6, 1893. Serial No. 487,389. (No model.)

To all whom it may concern:

Be it known that I, S. LLOYD WIEGAND, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Supports and Driving Mechanisms for Spinning-Spindles; and I do hereby declare the following to be a sufficiently full, clear, and exact description thereof as to enable others skilled in the art to make and use the said invention.

This invention relates to spindles for spinning slivers of fibrous materials into yarns, and has for its object the avoidance of friction in such spindles and the reduction of wear between the spindles and their supporting-bearings, and the prevention of vibration from inequalities in the driving-band, and to facilitate adjustment of the bearings in frames and the renewal of worn parts without the labor of readjustment.

The nature of this invention to effect these desiderata consists in a bushing provided with a shoulder and nut for holding the same in the rail of a spinning-machine frame, adjusting-screws to center the same into alinement with the other parts of the spinning mechanism, a shell or body fitted to screw into the bushing in central alinement and containing a hollow sleeve upon which the whirl or pulley turns with devices for avoiding friction and within which the spindle is fitted concentrically, a lower bearing and lubricating-supply and waste-lubricant receptacle, and an equalizing or balancing carrier for transmitting rotary motion from the whirl to the spindle without imparting any lateral strain thereto.

The construction and operation of this invention are illustrated in the accompanying drawings, in which—

Figure 1 shows an elevation of the spindle containing this invention as applied in the rail of a ring-spinning machine; Fig. 2, a central vertical section thereof; Fig. 3, a plan view; Fig. 4, a detached view of the bushing for holding the spindle-support in the frame; Fig. 5, a vertical sectional view of the whirl; Fig. 6, a plan view of the whirl; Fig. 7, a plan view of the carrier; Fig. 8, a detached perspective view of the bushing supporting the spindle and whirl; Fig. 9, a detached perspective view of the collar or washer supporting the whirl; Fig. 10, a detached view of one of the balls upon which the whirl rolls; Fig. 11, a central vertical section of a modified form of the whirl and bushing on which it rotates, and Figs. 12 and 13 modifications of the same parts and of the carrier with the left side drawn in section.

1 represents a portion of the spindle-supporting rail of a spinning-frame; 2, the ring-rail; 3, the ring; 4, the traveler; 5, the cop-tube; 6, the spindle; 7, the lower bushing or bearing of the spindle; 8, the step under the bottom end of the spindle; 9, a bushing, preferably of hardened steel, in which the spindle rotates, and 10 a whirl or grooved pulley receiving motion from an endless cord or band 23. The whirl 10 rotates around the upper part of the bushing 9 and, as shown in all of the figures of the drawings excepting only Fig. 11, is fitted with two or more series of spherical rollers 12, preferably of hardened steel, upon which it rolls around the bushing 9 with scarcely appreciable friction.

The bushing 9 is fitted into a bearing formed within and concentric with the axis of a tube 13, closed at the lower end, fitting exactly with a screw-thread 14 into a corresponding screw-thread in the interior of a bushing 15, and secured by a nut 16 in the bearing-rail 1 of the spinning-frame.

The tube 13 is provided with a shoulder 17, which fits against the under surface of the bushing 15, the parts being so fitted or finished that the tube 13 is always, when screwed tightly into the bushing 15, coincident in axis therewith.

The bushings 15 are of sufficiently less diameter than the openings in the ring-rail in which they are placed as to permit of adjustment to line them concentrically with the rings 3 in the ring-rail 2.

In order to facilitate the centering of the bushing 15 in the rail, screws 29, with tapering points, are fitted equidistantly in them, which screws pressing against the sides of the holes in the spindle-supporting rail serve to set it toward the opposite side.

The central openings in the bushings 15 are of such size as to permit the spindle 6 and whirl 10 to pass downwardly through them, so that any spindle with its bearing and whirl can be withdrawn at any time without inter-

rupting the working of contiguous spindles and without waiting for the ring-rail 2 to reach the upper end of its stroke.

Upon the upper side of the whirl 10 are formed two diametrically opposite projections 30, which engage in slots 31 in a plate 18, having two other slots 19 at right angles thereto, each of which engages one of two projections 20, diametrically opposite to each other, secured to the spindle 6 and transmitting the rotary motion from the whirl 10 through the projections 30, slotted plate 18, and projections 20 to the spindle 6.

The whirl 10 is supported upon the outer surface of the bushing 9 and has no other connection with the spindle than through the slotted plate 18.

The slots in the plate 18 permit a sliding motion of the projections 30 and 20 in directions at right angles to each other, so that equal force is transmitted upon opposite sides of the spindle 6, and the spindle is thus protected from the effects of any concussions upon the whirl 10 from inequality of the driving-bands.

In the form shown in Fig. 12 a fork 32, fitting pivotally through the spindle with prongs 33 turned downward, engages in opposite radial slots 31 in the whirl 10, and in the form shown in Fig. 13 a tube 35, connected pivotally by gimbal-rings 36 and 37 to the spindle and whirl, respectively, transmits rotative motion from the whirl to the spindle without transmitting any vibratory motion between the parts. The balls 12 roll between the inner surfaces of the whirl 10 and the outer surfaces of the bushing 9, so that a minimum of friction is preserved. The balls 12 are kept in their proper planes of rotation by a collar 22 and shoulder 21, formed in the whirl 10, and a like shoulder upon the bushing 9. (See Fig. 2.) In this form the weight of the whirl and the downward pressure resulting from the strain of the driving-band 23 are sustained by the balls 12^a between the shoulder 21 and the shoulder of the said bushing, avoiding the friction otherwise incident to surfaces moving in sliding contact with each other.

As shown in Figs. 12 and 13, there are several series of balls interposed between the bushing 9 and whirl 10. It should be observed that the lower series of balls 12^a, which support the weight of the whirl 10 and the downward thrust or draft of the driving-band 23, do not touch the cylindric surface of the bushing, but are free to roll with the velocity acquired from the shoulder 21 on the whirl 10.

In Fig. 11 of the drawings is shown a form of this invention, in which the whirl 10 is fitted directly upon the bushing 9, and consequently requires lubrication more frequently. On the lower part of the whirl 10 there is formed a rim 24, having its greatest external diameter at the lower edge. The function of the rim 24 is to convey any surplus oil from the whirl 10 downwardly within a surrounding rim 25, formed on the upper end of the tube 13, in which rim 25 such oil is whirled from the rim 24 and collected, whence it is conducted downwardly, as hereinafter described, and utilized in lubricating the lower wearing parts. The tube 13 is bored out accurately in line with the axis of the screwed portion and exactly true with the shoulder 17, so that the bushing 9 and bearing 7 and step 8 are always accurately in line. Chambers 26 are formed between the bearings of the bushings 9 and bearing 7 and step 8, and channels 31 are cut lengthwise through these bearings to permit oil to flow down from the top to lubricate them and to flow below the step 8 and deposit any sediment or heavier foreign substances in the oil below the bearing-surfaces, thus protecting the wearing parts from injury and affording a space for the subsidence of the oil after its lubricating properties are exhausted or impaired. A spring-plate 28, attached by screws 38 (shown in Fig. 3) to the bushing 15, projects over the whirl 10 and serves to prevent the whirl 10 and spindle 6 being accidentally lifted from the bearing, and by being pressed downwardly at the free end into contact with the whirl 10 serves as a brake to arrest its rotation.

To remove any of the spindles and bearings, it is merely requisite to unscrew them from the bushing 15 and withdraw them downwardly, which can be done with the ring-bearing rail in any position and without the least interference with the work of contiguous spindles. A cap 27 serves to cover and protect the carrier and whirl from dust.

I am aware that spinning-spindles have been made elastically connected with driving-whirls, and that spinning-spindles connected by frictional surfaces with their driving-whirls have been used; also, that spinning-spindles supported to gyrate upon axes other than that of their geometric form have been connected with their driving-whirls by a cross-pin passing through the spindle loosely and secured in the whirl, none of which devices do I claim; but,

Having described my invention, what I claim is—

1. In a spinning-spindle supporting and driving mechanism a stationary bushing or bearing sleeve, the spindle having a journal bearing in said bushing or bearing sleeve, a whirl concentric with said spindle and supported upon said bushing or bearing sleeve independently of the spindle, in combination with a rotative driving mechanism, consisting of a pair of projections attached to the spindle, a pair of projections attached to the whirl, and the connecting-plate 18 engaged on said projections for transmitting rotary motion and permitting motion of each pair of projections in a direction at right angles to the motion of the other pair of projections substantially as set forth.

2. In a spinning-spindle supporting and driving mechanism, the independently-sup-

ported whirl 10 and series of rollers 12 located within the whirl in two or more planes, in combination with the spindle 6 and bushing 9 arranged to centrally support the spindle 6 independently of the whirl 10, and the yielding connection between the spindle and whirl, substantially as set forth.

3. In a spindle-driving mechanism the bushing 9, whirl 10 provided with the rim 24 formed therein, and balls 12 located within the whirl, in combination with the bushing-support 13 provided with the rim 25 surrounding the rim 24, and arranged to operate substantially as described.

4. In a spindle support and driving mechanism, the spindle 6, bushing 9, lower bearing 7, and step 8, in combination with the whirl, supported independently of the spindle, projections 20 attached to the spindle 6, projections 30 attached to the whirl 10, and the slotted plate 18 connecting said projections 20 and 30 and free to assume automatic adjustment in direction transverse to each other upon said projections substantially as and for the purpose set forth.

5. The tube 13, the nut 16, and flanged bushing 15, having a central threaded opening adapted to pass the whirl 10, and to fit and hold the tube 13 in central position, in combination with the tapering pointed screws 29 adapted to center the bushing and tube in axial alinement with the traveler-ring of a spinning-frame substantially as set forth.

6. The spindle 6 bushing 9 and whirl 10 supported on said bushing independently of the spindle 6, in combination with the spring-plate 28 arranged to operate alternately to prevent lifting of the whirl 10 and as a brake on the whirl, substantially as set forth.

7. In a spinning-spindle support and driving mechanism, a spinning-spindle, a whirl-support surrounding said spinning-spindle, a whirl fitted to rotate thereon provided with angularly-equidistant projections, in combination with angularly-equidistant projections on the spindle, and mechanism connecting the projections on the whirl with the projections on the spindle, positively as to angular or rotative motion, and free to slide in transverse radial directions, substantially as set forth.

S. LLOYD WIEGAND.

Witnesses:
J. DANIEL EBY,
ALEX. H. SIEGEL.