(No Model.)

W. T. NOAH.

SPINDLE DRIVING MECHANISM.

No. 588,235. Patented Aug. 17, 1897.

FIG. 2.

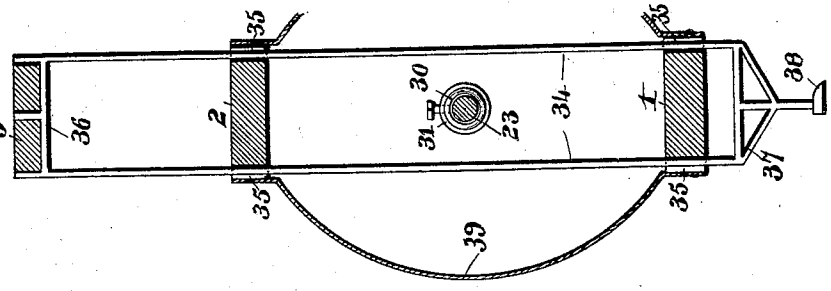


FIG. 3.

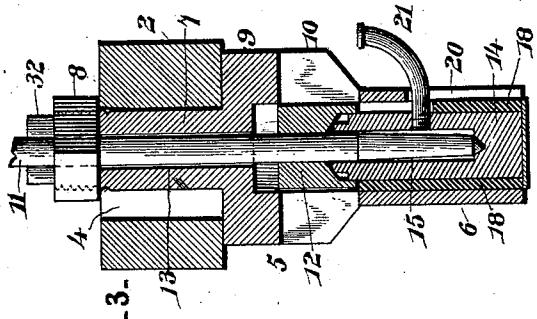


FIG. 4.

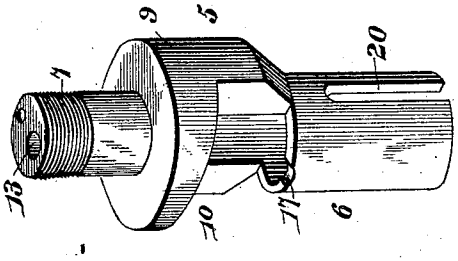


FIG. 5.

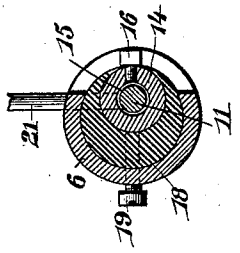
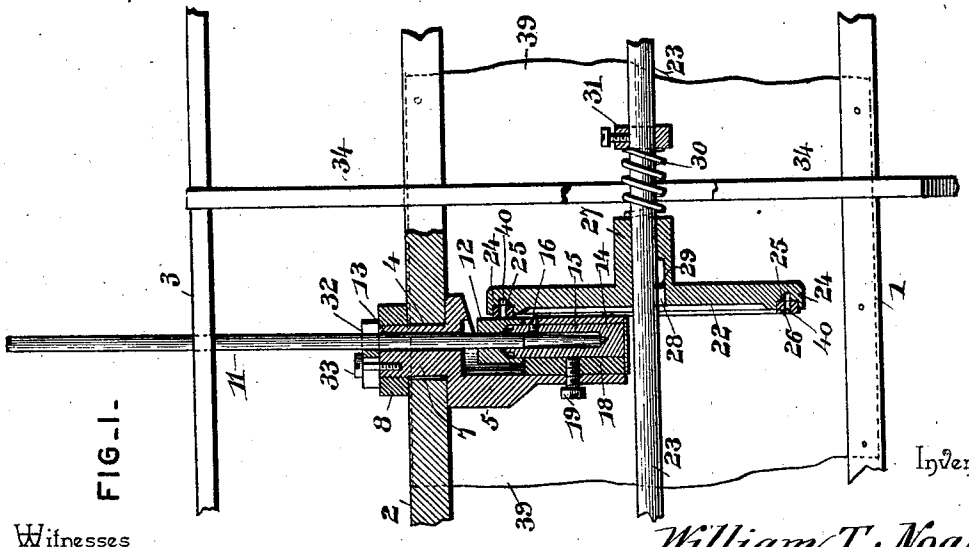


FIG. 6.



FIG. 1.



Inventor

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UNITED STATES PATENT OFFICE.

WILLIAM TAYLOR NOAH, OF DURHAM, NORTH CAROLINA.

SPINDLE-DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 588,235, dated August 17, 1897.

Application filed May 16, 1896. Serial No. 591,826. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM TAYLOR NOAH, a citizen of the United States, residing at Durham, in the county of Durham and State of North Carolina, have invented a new and useful Spindle-Driving Mechanism, of which the following is a specification.

This invention relates to spinning machinery, and has for its object to provide improved mechanism for driving high-speed spinning-spindles for manufacturing cotton, woolen, or other yarns on either ring or mule frames. The usual method of driving spindles is by a yarn-band running around a drum and also around a grooved whirl or pulley on the spindle.

The present invention has for its object to provide a driver in the form of a friction-disk which is slidingly and yieldingly mounted on the driving-shaft and forced with a pressure that may be adjusted against the whirl on the spindle, thus obviating the possibility of the slightest binding between the disk and the whirl.

Another object is to provide a bolster of improved construction which will admit of the ready removal and insertion of the spindle.

Other objects and advantages of the invention will appear in the course of the subjoined description.

The invention consists in certain novel features and details of construction and arrangement of parts, as hereinafter fully described, illustrated in the drawings, and embodied in the claims.

In the accompanying drawings, Figure 1 is a sectional view of the improved driving mechanism, taken longitudinally of the driving-shaft and through the bolster. Fig. 2 is a transverse vertical section through the bottom rail, bolster-rail, and ring-rail, showing the improved ring-rail lifter. Fig. 3 is a detail transverse section through the bolster-rail, showing the manner of adjusting the bolster laterally and providing for the removal and insertion thereof. Fig. 4 is a detail perspective view of the bolster. Fig. 5 is a detail horizontal section through the lower portion of the bolster and the step, &c. Fig. 6 is a detail perspective view of the upper spindle-bearing.

Similar numerals of reference designate corresponding parts in the several figures of the drawings.

Referring to the accompanying drawings, 1 designates the bottom rail, 2 the bolster-rail, and 3 the ring-rail, the same being constructed in the usual manner and arranged one above the other. For the purpose of carrying out the present invention the bolster-rail is provided at numerous points with transverse slots or oblong openings 4 at the points where the spindles are located and through which the upper end of the improved bolster may be inserted from the under side of said rail.

The bolster (indicated at 5) comprises a hollow cylindrical lower portion 6, a threaded upper portion 7, adapted to be inserted through the opening 4 from underneath and held by means of a threaded nut 8, screwed on its upper end and bearing against the upper surface of the bolster-rail. The bolster also comprises an enlarged central portion 9, forming a broad annular shoulder which seats itself against the lower surface of the bolster-rail for holding the bolster accurately in its proper position, and said enlarged portion is cut away upon one side, as indicated at 10, for the purpose of allowing the whirl on the spindle to be engaged by the friction-driver hereinafter described.

11 indicates the spindle, and 12 the whirl or pulley fast thereon. The spindle extends through an eccentric bore 13 in the upper threaded portion 7 of the bolster, and the bore of the lower cylindrical portion 6 of the bolster is sufficiently large to permit the whirl 12 to pass therethrough. After the spindle has been inserted the step 14 is introduced into the lower end of the bolster. This step is of cylindrical form, having a central bore 15, terminating at its lower end in a conical seat for the reception of the conical lower end or bearing-point of the spindle. The upper end of the step is extended upward sufficiently to enter the recessed lower end of the whirl, said recess having a conical inner surface which covers the upper end of the step. The step is further provided near its upper end with a laterally-projecting pin or stud 16, which forms an additional rest for the step and is also adapted to rest upon a shoulder

17, formed by cutting away the bolster at one side, this construction serving to support the step within the bolster at the proper elevation. The external diameter of the step is less than the internal diameter of the lower portion of the bolster, and a crescent-shaped space is left between these parts when the step is moved to one side and caused to occupy an eccentric position relatively to the bolster. This space is filled by a key 18 of crescent shape in horizontal cross-section, which is inserted in the lower end of the bolster and held in place by means of a binding-screw 19, which passes through an opening in the bolster and through the key and bears against the step for holding the latter stationary. This arrangement serves to locate the peripheral surface of the whirl 12 as far to one side as is practicable for adapting the same to be engaged by the friction-driver. By loosening the binding-screw 19 the key 18 may be removed, thus allowing the removal also of the step and spindle. The lower portion of the bolster is provided at one side with a slot 20, and the key 18 and the step are formed in alinement therewith with openings into which the end of an oil duct or tube 21 may be inserted for supplying lubricant to the spindle.

The spindles are driven by means of a series of friction disks or drivers 22, mounted on a common horizontal shaft 23, located immediately under all of the spindles. This shaft may be driven in any convenient manner from any other moving part of the machine. Each of the driving-disks 22 is provided with a laterally-projecting flange or rim at its periphery, and this rim 24 is provided with a facial groove 25, forming a seat in which is arranged an annular cushion 26, of leather, rubber, or other soft and suitable material, which will afford the necessary frictional engagement between the driving-disk and the whirl. This annular cushion is secured in its seat in any convenient manner and revolves in contact with the whirl 12, thus imparting motion to the spindle. The disk 22 is also provided with an extended hub or sleeve 27, which is provided internally with a longitudinal groove 28, adapted to be engaged by a pin or feather 29 on the driving-shaft.

The disk 22 is pressed against the whirl by means of a spiral spring 30, which surrounds the driving-shaft in rear of the disk 22, being interposed between the same and an adjustable collar 31, held on the shaft by a binding-screw, provision being thus made for increasing or diminishing the tension of the spring and correspondingly regulating the pressure between the disk and the whirl. This construction also enables the disk to yield relatively to the whirl for avoiding any binding or cramping of the latter, thus insuring the easy running of the mechanism.

The bore in the upper portion of the bolster in which the spindle revolves is appreciably larger than the spindle, and a special upper bearing is provided for the spindle, such bearing consisting of a block of wood 32, slotted at one end to embrace the spindle and at its opposite end to be engaged by a set-screw 33, entering the upper end of the bolster. This wooden block is first soaked in oil and then applied in its proper position upon the upper end of the bolster, said block serving to hold the spindle free from the inner surface of the bore in the bolster.

From the foregoing description it will be seen that very simple and convenient mechanism is provided for driving the spindle, that the driving-disk is capable of yielding to relieve any binding or cramping of its respective spindle, and that the spindles are easily accessible and capable of being removed quickly from their bolsters. In lieu of the ordinary central vertical rod for raising and lowering the ring-rail a rectangular open frame 34 is provided, the side bars of which work in grooves 35 in the side edges of the bottom rail and bolster-rail. This frame is provided at its upper end with a cross-bar 36, forming a rest for the ring-rail, and is provided at its lower end with suitable bracing 37, terminating in a central foot 38, which may be connected to the crank-shaft in the usual manner. It will be understood that a series of these frames are employed and that they each and all straddle the driving-shaft 23, so as not to interfere in any way therewith. The gearing or driving mechanism may be incased between suitable casing-plates 39, secured at their top and bottom edges to the bolster-rail and bottom rail, respectively, as shown in Figs. 1 and 2.

Cavities 40 are formed near the periphery of the friction-disk 22, said cavities preferably extending through the cushion 26 and into the body of the disk. Owing to the very high velocity of the parts, air will be drawn in between the two frictional surfaces and prevent proper frictional engagement between them. By providing the friction-disk with the sockets or cavities 40 this air, which would normally prevent the frictional engagement of the surfaces, is permitted to flow into the cavities, thereby accomplishing the desired result—namely, the proper frictional engagement of the contacting surfaces.

It will be understood that the mechanism is susceptible of changes in the form, proportion, and minor details of construction, which may accordingly be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. The combination of a bolster having means for attachment to the bolster-rail, an eccentric bore in its upper portion, and a cut-away portion in one side at a point intermediate its ends, an eccentrically-arranged step removably fitted in the bolster, and the spindle having its whirl working in the cut-away

portion of the bolster and removable through the bottom of the latter, substantially as set forth.

2. The combination with the bolster having provision for attachment to the bolster-rail, of the spindle and its whirl, the step arranged eccentrically within the bolster, and the crescent-shaped key interposed between the step and the inner surface of the bolster and removable for permitting the spindle and whirl to be removed through the bottom of the bolster, substantially as described.

3. The combination with the bolster cut away at one side as described, of the step removably fitted therein, the lateral pin or stud on the step for preventing longitudinal movement thereof, and a key for preventing lateral movement of the step, whereby the step is held in place but made removable, substantially as described.

4. The combination with the bolster having its upper portion threaded and extended through the bolster-rail and secured as described, of the spindle working in said bolster, the adjustable bearing-block seated upon the upper end of the bolster, and the set-screw for adjusting and holding said bearing-block, substantially as described.

5. The combination with the ring-rail, and the spindle-driving shaft, of a ring-rail lift made in the form of an open rectangular frame which straddles the spindle-driving shaft and the bolster and bottom rails and slides up and down relatively thereto, the ring-rail being rigidly attached to and adapted to be raised and lowered by said lift, substantially as described.

6. The combination with the spindle-whirl, of a friction driving-disk provided at its periphery with a laterally-projecting flange or rim 24, having a facial annular groove 25, forming a seat, said disk being provided in the base of said groove with a series of air-cavities, and an annular cushion secured in the seat formed by the groove 25 and projecting beyond the plane of one side of the disk, said cushion being formed with cavities or openings communicating with the air-cavities formed in the body of the disk, substantially as set forth.

In testimony that I claim the foregoing as own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM TAYLOR NOAH.

Witnesses:
R. P. HACKNEY,
W. A. NEESE.