2 Sheets—Sheet 1.

J. M. RYO-CATTEAU.

Spindle for Spinning Machines.

No. 64,800. Patented May 14, 1867.

Fig. 3.

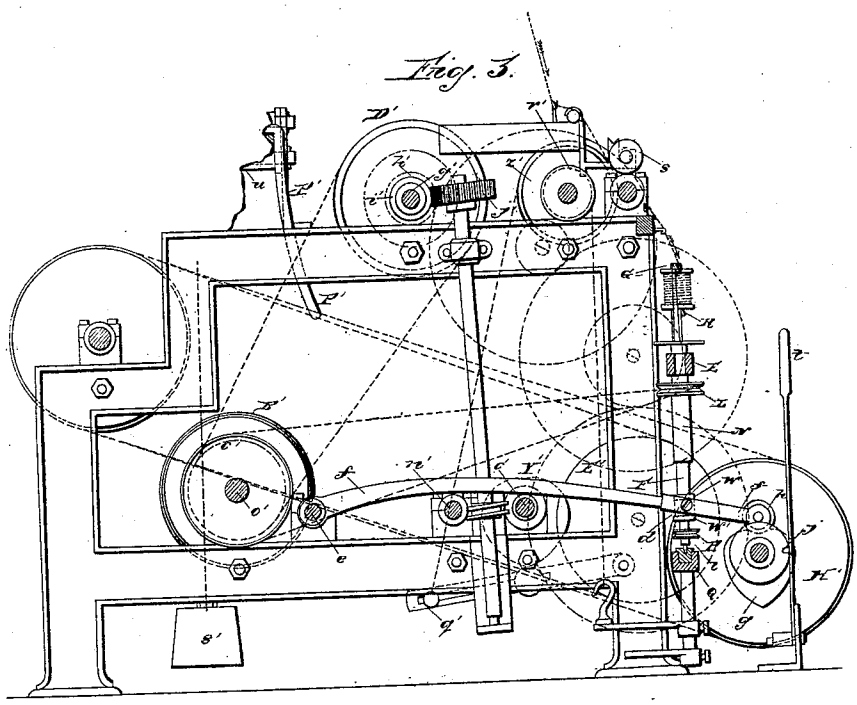
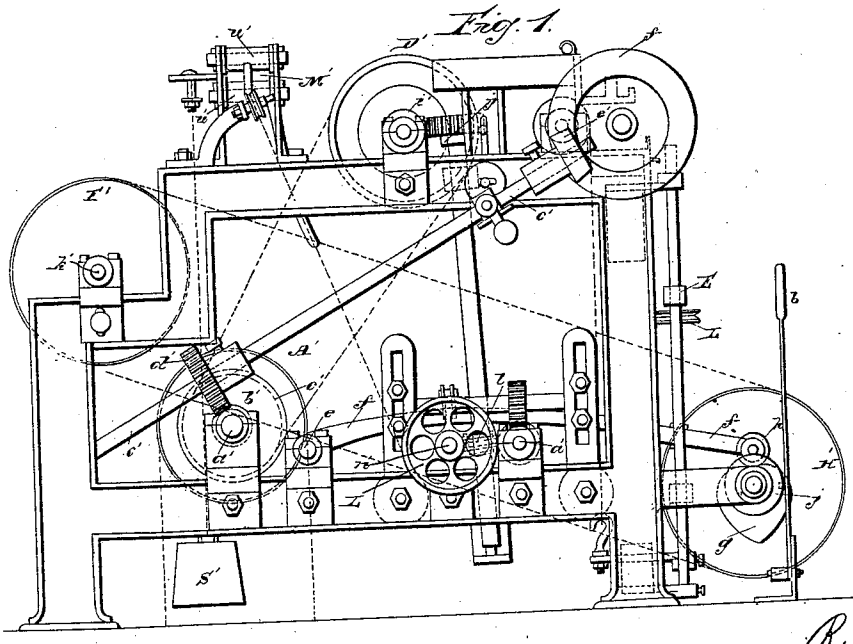


Fig. 1.



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2 Sheets—Sheet 2.

J. M. RYO-CATTEAU.

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Fig. 2.

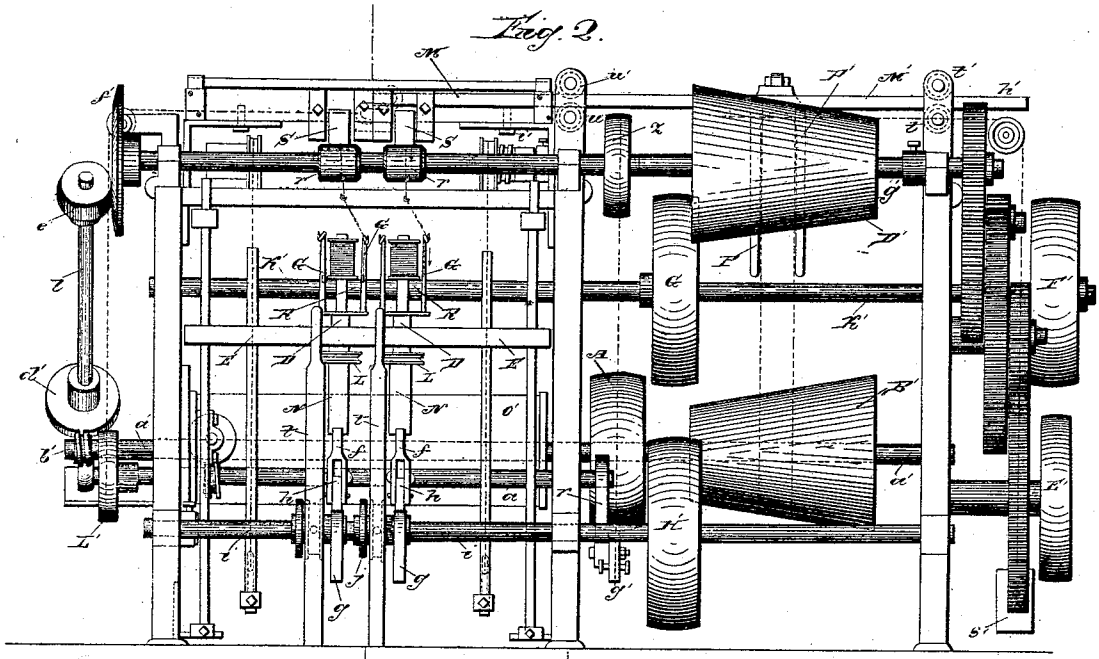


Fig. 4.

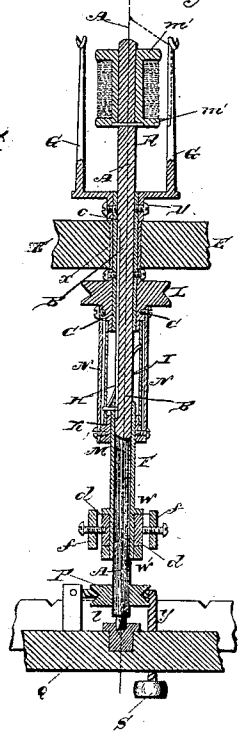


Fig. 6.

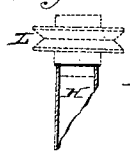


Fig. 8.

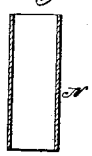


Fig. 7.

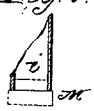


Fig. 9.

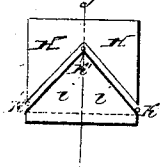
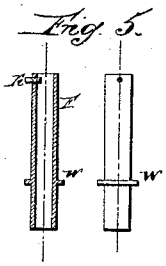


Fig. 4 bis.

Fig. 5.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

United States Patent Office.

JOSEPH MARIE RYO-CATTEAU, OF PARIS, FRANCE.

Letters Patent No. 64,800, *dated May* 14, 1867.

IMPROVEMENT IN SPINDLES FOR SPINNING MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that I, JOSEPH MARIE RYO-CATTEAU, of Paris, in the Empire of France, have invented certain new and useful improvements in Spindles for Spinning and other Machines; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of a spinning machine to which my improved spindles are applied.

Figure 2 is an elevation on the side of the spindles.

Figure 3 is a section made in front of one of the spindles; and

Figures 4 to 9 represent in detail the parts of which my improved spindle is composed.

The spindle which I have invented may be applied to all spinning machines and twiners. In the spinning frame represented in the drawings I have only shown two of my spindles, but it will of course be understood that any desired number may be employed; the only object I have in so representing these being to illustrate the manner in which they may be employed.

In order not to complicate the drawings, I have represented in red lines, in fig. 3, the system of gearing and belting by which motion is transmitted to the different parts of the machine. The threads which are wound upon the bobbins are also represented in red lines.

It is not necessary to enter at present into the details of the construction of the different parts of the machine, which I have shown in illustration of my invention; its general arrangement will be readily understood by reference to the drawings, and I will therefore enter at once upon the description of the principal part of my invention, that is to say, the spindle, and the manner in which it operates.

Fig. 4 represents a vertical section of the spindle completely prepared and ready for work. Fig. 4 *bis* represents the shaft of the spindle. It consists of a cylindrical rod, A, in which a longitudinal groove, B, is formed. On the rod A is placed a tube, C, which traverses with a slight friction the stationary bar E, and to the top of the tube the socket of the flyer G is secured by screws. Below the tube C there is a second tube, F, shown in detail in fig. 5, provided with a pin, K, one end of which is inserted in the groove B, and the other is placed in the space left between the two helicoidal inclined planes H I. The plane H, figs. 4 and 6, fits upon the pulley L, the other, I, figs. 4 and 7, is placed on the socket M, and both are held firmly in place by means of the long ferrule or sleeve N, figs. 4 and 8, fastened likewise to the pulley L and socket M by screws, as shown in fig. 4. By means of the helicoidal curve of these inclined planes it results that their development will be rectilinear, and they will therefore appear as is represented in fig. 9, in which is shown the path traversed by the pin K, in order to pass from the lower to the upper helicoidal plane. The pin K should have a certain play or freedom of motion in the space between the two planes, as is indicated at K K′ K″, fig. 9. Near the base of the tube F is a shoulder, W, between which and a second shoulder, W′, lower down, is held a steel sleeve or ferrule, *d*, loosely adjusted on the tube. The sleeve is connected with the forked lever *f*, whose pivot or point of oscillation is at *e*, fig. 1, by means of screws diametrically opposite each other. The lever has mounted on its end a friction-roller, *h*, which presses constantly upon a heart-shaped eccentric or cam, *g*, mounted loosely on the shaft *i*, but capable of being solidly or rigidly connected therewith, if desired, by moving the lever *t* so as to cause a pin to penetrate a hole made in the plate *j*, rigidly secured to the shaft *i*. A fast pulley, P, is mounted near the lower end of the rod A, by means of which, when it is connected by a cord with the balance-weight S, fig. 4, a slight friction can be obtained, which will continually tend to retard the motion of the spindle carrying the bobbins R, which are rigidly secured to the shaft A. The lower end of the spindle is received in a socket, *l*, fig. 4, attached to the cross-beam Q, which is movable, so as to permit, by its vertical reciprocating movement, the thread to be distributed and wound regularly over the whole length of the bobbin. This reciprocating movement of the cross-beam is sufficiently indicated in the drawings. It may be varied to suit the different kinds of bobbins employed. As, for instance, if it be desired to spin or to double and twist on bobbins such as those represented in the drawings, it will be sufficient to give the cross-beam Q a vertical reciprocating movement which may be more or less rapid, but should equal in length the distance between the parts *m n* of the bobbin. The reciprocating movement of the cross-beam, therefore, depends entirely, in this respect, upon the length of the bobbin.

Having described the component parts of my improved spindle, I will now proceed to indicate the manner in which it operates, to effect at the same time both the winding and the twisting of the threads. These effects are produced by an arrangement of the spindle by which at a given moment the bobbins and flyer are rigidly connected with each other, and constitute, in fact, but one piece, thus effecting the twisting, while at the next moment the connection between the two is broken, and the flyer again resumes its independent movement. This result is obtained by the up-and-down movement of the pin K along the helicoidal planes H I.

Let it be supposed that the machine is arranged for only twisting the threads already spun and twisted in two strands, in which case one series of feed cylinders, *r s*, will suffice. (See figs. 1, 2, 3.) In the first place, the velocity of the reciprocating movement of the tube F, which carries the pin K, should be in direct proportion to that of the feed cylinders *r s*. The pulley L, flyer G, and the sleeve N, which surrounds the two helicoidal planes H I, being fast to the tube C, all these pieces will make the same number of revolutions as the tube. The spindle A, and, consequently, the bobbins R and the tube F, which carries the pin K, will also make the same number of revolutions. When the tube F is at rest, (*i. e.*, so far as its upward and downward movement is concerned,) all the parts of the spindle, without exception, will revolve together. When, however, the tube F is elevated or lowered by the action of the lever *f*, which is actuated by the heart-shaped cam *g*, it and the shaft A slacken their movement; and the diminution in the number of revolutions made by the spindle which carries the bobbins and the tube to which the pin K is attached is just equal to the number of times the tube F has been raised or lowered. For instance, suppose that the pulley L makes six thousand revolutions in two minutes, then the sleeve or box which surrounds the helicoidal planes and the flyer, will also make six thousand revolutions. If during the same time the tube F, which carries the pin K, has completed three entire up-and-down or reciprocating movements, the spindle A and the bobbin R, as well as the tube F, will have made six thousand revolutions less three; that is to say, five thousand nine hundred and ninety-seven revolutions. And these three revolutions will have been used for winding upon the bobbin thread furnished from the feed cylinders *r s*. It is therefore necessary to regulate the velocity of these cylinders in such manner that the length of thread furnished by them should equal the length of the thread taken up by the bobbin. In this way the thread will be subjected to no strain in winding around its bobbin.

The experiments which have been made leave no doubt as to the good results of my invention, since I have been able, without breaking them, to double-twist and wind woollen threads of little tenacity; and I may here add that if by any mischance a thread should break, it can be reattached with perfect facility by unlocking the spindle by means of the lever *t*. The up-and-down movement will then cease, and by seizing with the hand the sleeve N, the rotation of the flyer will be arrested. Nothing then prevents the re-attaching of the broken thread, which is done without interfering with the continued operation of the machine.

The machine receives the action of the motor power upon a pulley, A′, mounted on the shaft *a′* of the lower cone B′. Upon this shaft is secured the long tin drum O′, around which pass the cords or bands which actuate the spindles, and it is provided at one of its ends with an endless screw, *b′*, engaging with the pinion *d′* of the inclined shaft *l′*, upon whose other end a pinion, *e′*, is mounted, which, by friction of contact, actuates the wheel *f′* on the shaft of the feed cylinder *r*. At one of the extremities of the shaft *g′* of the upper cone D′ is placed a pinion, *h′*, and by the combination of the wheels and pinions indicated in red lines, the desired degree of velocity is imparted to the pulley E′, which transmits it by means of belting to the pulley F′, mounted on the shaft K′ and the pulley G′, which is secured on the latter, transmits the movement to the pulley H′, which causes the rotation of the shaft *i*, and, consequently, all the heart-shaped eccentrics *g*, which cause the oscillation of the levers *f*, impart to the mechanism of the spindle the vertical reciprocating movement which effects the winding up of the thread as above described. The up-and-down motion of the cross-beam Q which carries the spindle is communicated from the shaft *g′*, and, through the intermediary of the gearing and endless screws indicated in the drawing, the shafts *o′* and *n′* are revolved. The heart-shaped eccentric *r′*, figs. 2 and 3, in actuating the lever *q′*, causes it to produce a reciprocating movement, which is transmitted by means of chains, which pass over the rollers *v v′* and the drum *z′* to the cross-beam Q. In order to preserve at all times the same velocity at the circumference of the bobbins, or, in other words, a uniform winding, the belting is made to slide upon the two cones B′ D′; to this effect the movement is taken from the shaft *g′*, and through the intermediary of the balance-weights *s s′*, and of the chain which is wound and unwound on the drum or pulley L′, the bar M, which carries the forked arm *p′*, is caused to slide between the rollers *t u*.

Having described my invention, and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is as follows:

1. The method of effecting the automatic retardment of the rotation of the spindle which carries the bobbin, substantially as shown and set forth.

2. The combination, with the spindle which carries the bobbin, of the reciprocating tube and helicoidal inclined planes, under such an arrangement that the reciprocating movement of the said tube shall effect the automatic retarding of the rotation of the bobbins, substantially as herein shown and described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

RYO-CATTEAU.

Witnesses:

F. E. J'B AMOUREUX.

F. F. RANDOLPH.