No. 733,299. PATENTED JULY 7, 1903.

DING CIE SUI.

SPINNING MACHINE.

APPLICATION FILED FEB. 19, 1900.

NO MODEL. 2 SHEETS—SHEET 1.

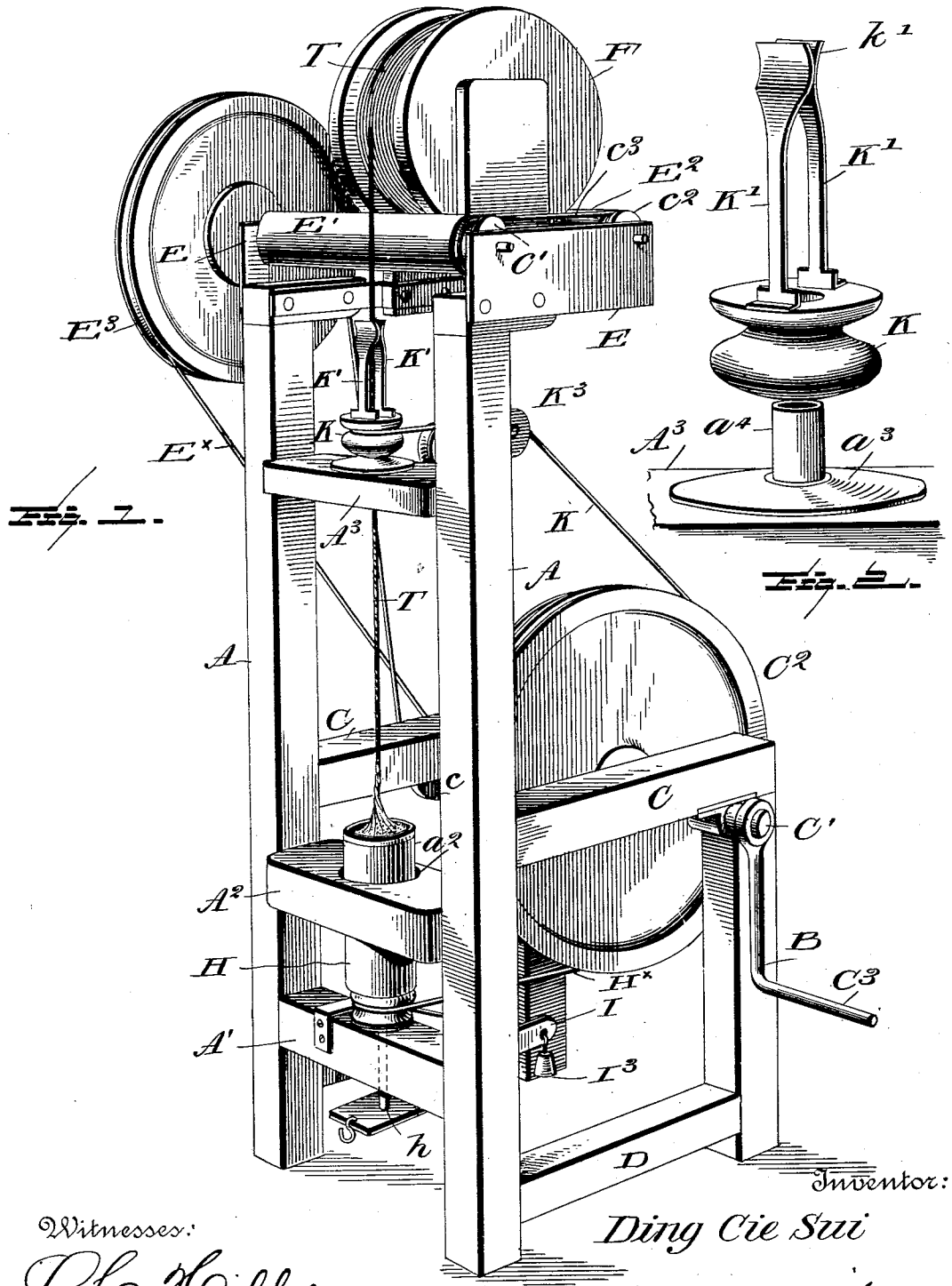


Fig. 1.

Fig. 2.

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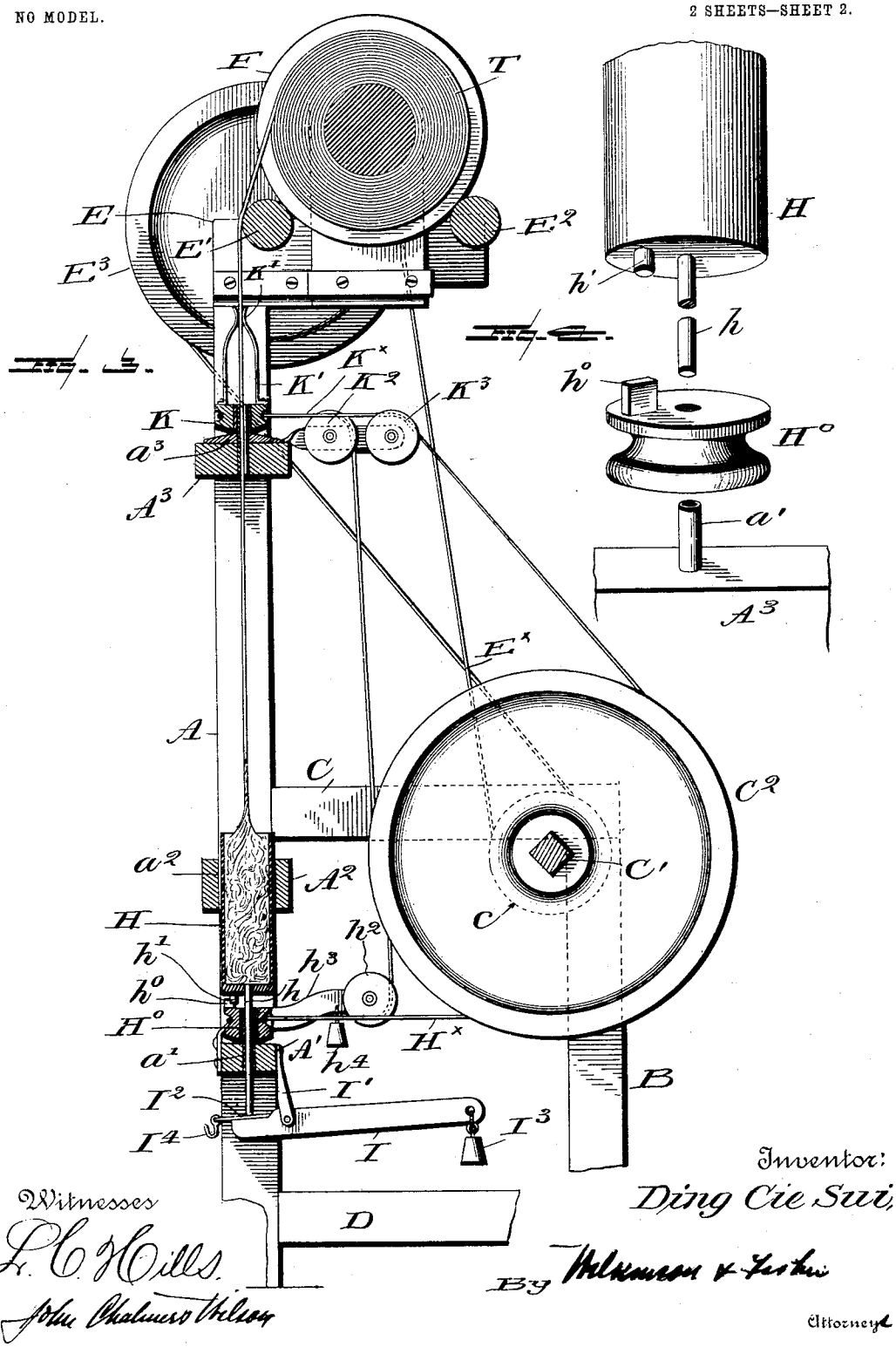
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UNITED STATES PATENT OFFICE.

DING CIE SUI, OF FOOCHOW, CHINA, ASSIGNOR TO GEORGE S. MINER, OF FOOCHOW, CHINA, AND WILLIAM N. BREWSTER, OF HING-HUA, CHINA.

SPINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 733,299, dated July 7, 1903.

Application filed February 19, 1900. Serial No. 5,799. (No model.)

To all whom it may concern:

Be it known that I, DING CIE SUI, a subject of the Emperor of China, residing at Foochow, in the Empire of China, have invented certain new and useful Improvements in Spinning-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for spinning fibrous material, and is intended to provide certain improvements and simplifications in the machine patented to me May 30, 1899, No. 626,195, in the United States of America.

My present improvements will be understood by reference to the accompanying drawings, wherein the same parts are indicated by the same letters throughout the several views.

Figure 1 represents a perspective view of a spinning-machine embodying my improvements. Fig. 2 is a detail perspective view, enlarged, of the device for giving a tension to the thread as it is wound upon the drum. Fig. 3 is a vertical sectional view of the machine; and Fig. 4 is a perspective view of the receptacle for holding the mass of fibrous material and its operating supports, enlarged, and parts being broken away.

The several working parts of the machine are supported upon a suitable frame conveniently composed of a pair of uprights A A and B B, connected by horizontal beams C C and D D. Between the longer uprights A A are fixed a series of cross-pieces A′, A^2, and A^3, which serve as supports and guides for various of the working parts, as hereinafter more fully described. A driving-shaft C′ is mounted transversely of the frame in journal-bearings supported by the horizontal beams C C. Upon this driving-shaft C′ is fixed a small grooved pulley *c* for driving one belt or cord, and a larger double-grooved pulley C^2 is also fixed upon the shaft C′ for driving two other belts or cords. The grooves in the larger pulley C^2 may be of the same diameter, but are herein shown as of different diameters for producing the desired relative speed of the parts driven by the respective cords.

A hand-crank C^3 may be mounted upon the end of the driving-shaft C′, as shown in Fig. 1, for rotating the same; but it is obvious that a pulley for the attachment of a driving-belt may be substituted for the crank.

On the upper part of the main uprights A A is mounted a frame E, in which is journaled a pair of rollers or drums E′ E^2. Upon the shaft of one of these drums or rollers is fixed a driving-pulley E^3, and upon the opposite corresponding ends of the two said rollers are fixed small pulleys c' c^2, over which runs a cord c^3 for driving the same. A spool F for receiving the spun thread T rests upon the rollers C′ C^2 and is given rotary motion by the said rollers when the machine is in operation.

The pulley E^3 is driven from the small pulley *c* on the driving-shaft C′ by means of the cord $E^\times$, as seen most clearly in Fig. 3.

H represents the tubular receptacle for holding the mass of unspun material. This tubular receptacle rests in a circular opening a^2 in the cross-piece A^2, which acts as a guide therefor, and the said receptacle has a rigid elongated spindle *h* fixed centrally in its bottom, which projects through an opening in the cross-beam A′, which opening is fitted with a bearing-sleeve *a*′ and extends when the receptacle is in its operative position a short distance below the cross-piece A′, as seen in Fig. 3.

A grooved pulley H^0, provided with a central axial opening through which passes the spindle *h* of the fiber-tube H, is interposed between the bottom of the fiber-tube and the top of the cross-piece A′ and preferably provided with a convex bearing-surface which rests upon the said cross-piece.

Upon the upper face of the pulley H^0 is a fixed projection h^0, and upon the bottom of the fiber-tube is a fixed projection *h*′, the two projections h^0 and *h*′ being so arranged as to engage each other, and consequently when the pulley is rotated to cause the rotation of the tube when the latter is resting upon the pulley. The pulley H^0 is driven by means of a cord $H^\times$, which passes around the large driving-pulley C^2 and engages in one of the peripheral grooves thereof. A small idle pulley h^2, carried upon a bracket h^3, is arranged to hold the cord $H^\times$ in proper position for running around the pulley H^0 and for giving the necessary tension to the cord, provision for ad-

ditional tension being provided, if desired, by suspending a weight h^4 from the arm h^3, which should preferably be more or less flexible.

I represents an arm fulcrumed to a bracket I′ and having at its shorter end a rest I^2 for the lower end of the spindle h of the fiber-tube H. The longer end of the arm I carries a weight I^3, which may be made adjustable along the said arm. The shorter end of the arm I may also be provided with a hook I^4, from which a weight may be suspended. The provision of this hook I^4 upon the shorter end of the arm I renders it an easy matter to suspend a weight from the short end of the arm to counterbalance the weight upon the longer end of the said arm when the mass of fiber in the tube becomes sufficiently reduced to make it necessary or advisable to diminish the upward pressure upon the lower end of the spindle h.

The object and intent of the pivoted arm and its weight I^3 is to reduce the strain upon the thread being spun necessary to cause the lifting of the fiber-tube and the consequent disengagement of the latter from the pulley H^0 to cause the rotation of the tube to cease when the tension upon the thread exceeds its strength.

The spun thread T is held and given the desired tension as it is wound upon the spool F by means of the devices shown in Fig. 2. Upon the cross-beam A^3 is mounted a bearing-plate a^3, preferably convex, as shown, and to this plate is attached a bearing-sleeve a^4, which extends through an opening in the said cross-beam A^3. A grooved pulley K, provided with an enlarged axial opening, fits over the upper projecting end of the sleeve a^4, which forms an axis for the said pulley, upon which the latter rotates. The spun thread T is carried upward through the sleeve a^4, and consequently through the surrounding pulley K, and above is wound upon the spool F. As the thread passes through the said sleeve and pulley it is grasped between two spring-arms K′ K′, having convex gripping-jaws k'. The pulley K should have a rotation equal to or very slightly greater than but never less than that of the fiber-tube, so that as the thread is drawn through between the jaws k' of the spring-arms K′ the twist given thereto by the rotation of the fiber-tube will be maintained uniformly throughout the length of the thread. These jaws k' grip the thread very easily and give to the same a delicate tension.

The pulley K is driven by means of a cord $K^\times$, which reeves over guide-pulleys k^2 k^3 and over the large driving-pulley C^2, running in one of the peripheral grooves thereof. The comparative size of pulleys H^0 and K with relation to the size of the periphery of the driving-pulley C^2 should be so regulated that, as hereinbefore stated, the speed of the pulley K should never be less than the speed of the pulley H^0, while it may be desirable to have its speed slightly exceed that of the pulley H^0.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for spinning fibrous material, the combination with a receptacle for the unspun material, of means for rotating the same, means for drawing a thread or strand of yarn from said receptacle, and a tension device having spring-jaws, comprising elongated shank portions rigidly secured at one end and provided at their outer free ends with enlarged surfaces of convex conformation adapted to engage the thread or yarn as it is drawn from said receptacle.

2. In a machine for spinning fibrous material, the combination with a receptacle for the unspun material, of means for rotating the same, means for drawing a thread or strand of yarn from said receptacle, and a revolubly-mounted tension device having spring-jaws, located above said receptacle, comprising elongated shank portions rigidly secured at one end and provided at their outer free ends with enlarged surfaces of convex conformation adapted to engage the thread or yarn as it is drawn from said receptacle.

3. In a machine for spinning fibrous material, the combination with a revolubly-mounted receptacle for the unspun material, of means for drawing a thread or strand of yarn from said receptacle, a revolubly-mounted tension device having spring-jaws, located above said receptacle, comprising elongated shank portions rigidly secured at one end and provided at their outer free ends with enlarged surfaces of convex conformation adapted to engage the thread or yarn as it is drawn from said receptacle, and means for rotating said tension device at a speed equal to or slightly greater than the speed of rotation of said receptacle for the unspun material.

In testimony whereof I affix my signature in presence of two witnesses.

DING CIE SUI.

Witnesses:
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GEO. S. MINER.