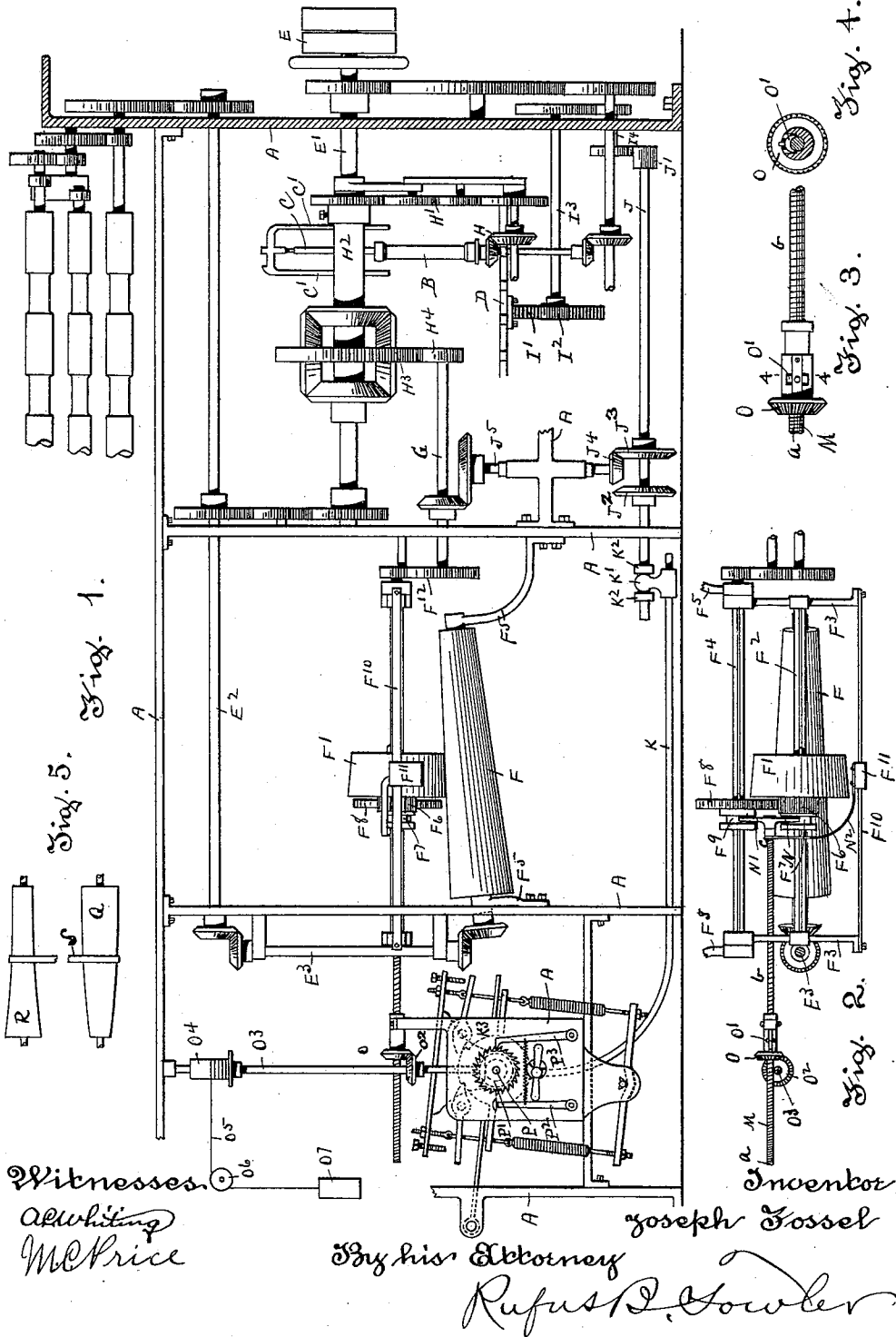


(No Model.)

J. FOSSEL.
SPINNING MACHINE.

No. 596,106.

Patented Dec. 28, 1897.



UNITED STATES PATENT OFFICE.

JOSEPH FOSSEL, OF BOSTON, MASSACHUSETTS.

SPINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 596,106, dated December 28, 1897.

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To all whom it may concern:

Be it known that I, JOSEPH FOSSEL, a subject of the Emperor of Germany, and a resident of Boston, county of Suffolk, State of Massachusetts, have invented a new and useful Improvement in Spinning-Machines, of which the following is a specification, accompanied by drawings, forming a part of the same, in which—

10 Figure 1 represents in front elevation so much of the operative portion of a spinning-machine as is necessary to illustrate the nature of my invention and in what manner the same is performed, the greater portion of the framework having been omitted from the drawings in order to disclose more clearly the relative portions of the operating parts of the mechanism. Fig. 2 is a top view of the conical driving-drum and conical wheel 20 driven thereby, together with a differential actuating-screw by which said conical wheel is moved along the periphery of the conical driving-drum. Fig. 3 represents a portion of the differential screw on a larger scale. 25 Fig. 4 represents a transverse sectional view of the differential screw on line 4 4, Fig. 3, the plane of the section being taken through the hub of the beveled gear inclosing the screw in order to disclose the mechanism by 30 which the beveled gear is operatively connected with the differential screw; and Fig. 5 represents a pair of conical drums having a belt connection, one of said drums having a concave periphery and the other a convex 35 periphery, showing a frame of the driving and driven drums now employed in spinning-machines for the purpose of varying the speed of the bobbin.

Similar letters refer to similar parts in the 40 different figures.

My present invention relates to that portion of a spinning-machine by which a variable rotative motion is given to the bobbin or cop and a variable traversing motion is 45 given to the rail upon which the bobbins are carried.

The machine embodying my present invention is designed to take the place of the two conical drums having a belt connection which 50 are now generally employed in spinning-machines for the same purpose.

I attain the objects specified by means of the mechanism hereinafter described.

Referring to the drawings, A denotes portions of the framework of the machine. 55

B denotes the bobbin, C the spindle having flier-arms C', and D denotes a portion of the traversing rail by which the bobbin is raised or lowered in the usual and well-known manner. The rail D in practice extends 60 throughout the length of the machine and carries a series of bobbins, only one of which is shown, however, in the present drawings.

E denotes the belt-pulley by which the machine is driven. The pulley E is attached to 65 a shaft E', by which rotary motion is communicated to the upper horizontal shaft E² and from the shaft E², through the intermediate vertical shaft E³, to the conical drum F, which drives the conical pulley F' by frictional contact. The conical pulley F' has a 70 spline connection with the shaft F², journaled in the framework F³, which is pivoted upon a shaft F⁴, journaled in the brackets F⁵ F⁶, Fig. 2, attached to the fixed framework 75 of the machine. The hub of the conical pulley F' carries a pinion F⁶, having its hub provided with a groove F⁷.

The pinion F⁶ engages a gear-wheel F⁸, having a splined connection with the shaft F⁴ 80 and provided with a hub having a groove F⁹. The frame F³ comprises a bar F¹⁰, upon which is placed a sliding weight F¹¹, which serves to draw the frame F³ down and hold the conical pulley F' in operative contact with the 85 driving-drum F. Rotary motion is thereby conveyed from the conical drum F to the shaft F⁴ and over the shaft F⁴, through the gears F¹², to the shaft G.

The bobbin B is driven through the beveled 90 gears H and by gearing H' from a sleeve H², which turns loosely on the shaft E. The sleeve H² is driven from the shaft G through a differential gear H³ and a pinion H⁴, attached to the shaft G. The bobbin B has a 95 rising-and-falling motion between the flier-arms C', by which the yarn is traversed or laid evenly upon the barrel of the bobbin, and the rising-and-falling movement of the bobbin is secured by mounting it upon a movable 100 rail D, to which an up-and-down motion is given by a rack I' and pinion I² on a shaft I³,

which is driven through the intermediate shaft I⁴ and connected gearing from the shaft J, which carries the elongated spur-gear J' and the beveled gears J² and J³, which are alternately brought into engagement with the beveled pinion J⁴ on the vertical shaft J⁵, which is driven from the horizontal shaft G.

When the beveled gear J² is in engagement with the pinion J⁴, the traversing rail I will be moved in one direction, and when the beveled gear J³ is in engagement with the pinion J⁴ the rail D will be moved in an opposite direction, and the alternate engagement of the beveled gears J² and J³ with the pinion J⁴ is accomplished by longitudinally sliding the shaft J backward and forward in its bearings by means of a sliding bar K and forks K', engaging collars K², attached to the shaft J. The sliding bar K is moved by a reversing mechanism (represented at K³) by which the movement of the bar K is automatically reversed when the rail I has reached the limit of its highest or lowest movement. Reversing mechanisms of various kinds are in common use in spinning-machines of this class, and as the traversing mechanism forms no part of my present invention I have not deemed it necessary to illustrate or describe the same in detail.

As yarn is wound upon the bobbin B its size is increased and it becomes necessary to correspondingly decrease the speed of the bobbin, so that the yarn will not be wound upon the bobbin any faster on account of its increase in size, as the sliver which is delivered by the drawing-rolls L is delivered at a uniform speed, and therefore the yarn must be wound upon the bobbin at a uniform speed in order to maintain a uniform tension in the twisted yarn, and the necessary reduction in the speed of the bobbin is accomplished by moving the conical pulley F' from the larger to the smaller end of the conical drum F. The conical pulley F', together with the connected gear F⁸, is moved by means of a screw M, which is provided at one end with the forks N and N', engaging the grooves F⁷ and F⁹, and also having an arm N², connecting the screw M with the sliding weight F¹¹, so that the longitudinal movement of the screw will also slide the weight F¹¹ on the bar F¹⁶. The screw M is inclosed by a beveled pinion O, held from longitudinal movement by the framework of the machine and carrying in its hub a latch O', Fig. 4, to engage the thread of the screw M. The beveled pinion O is rotated at intervals by a beveled pinion O², attached to the vertical shaft O³, which carries a drum O⁴ at its upper end, upon which is wound a cord O⁵, which passes over a pulley O⁶ and carries a weight O⁷, which exerts a constant strain tending to rotate the vertical shaft O³. The vertical shaft O³ is connected by beveled gearing (not shown) with a horizontal shaft P, to which is attached an escapement-wheel P', alternately engaged by pawls P² and P³, by which the escapement-

wheel P' is intermittently released and held so that the vertical shaft O³ can be intermittently acted upon by the weight O⁷ in order to impart a rotary motion to the beveled pinion O and a longitudinal movement to the screw M. The escapement mechanism is intermittently released by action of the reversing mechanism, so as to allow the weight O⁷ to move the shaft O³, and both the reversing and escapement mechanisms are in common use in spinning-machines, and they are therefore not described herein in detail, as they form no part of my present invention.

All the operative mechanism between the bobbin B and the splined shaft F⁴, together with the reversing mechanism by which the shaft J is moved back and forth in order to reverse the motion of the traversing rail D, the vertical shaft O³, carrying a drum O⁴, acted upon by the weight O⁷ and the escapement mechanism connected therewith, are already in common use and well known, and their construction and operation will be clearly understood by all who are conversant with machines of this class.

The reduction of the speed of the bobbin as its diameter increases has heretofore been accomplished by the employment of two conical drums connected by a belt which is moved along the drums by means of a rack-and-pinion mechanism actuated by the vertical shaft O³, so that the rotation of the shaft O³ by means of the weight O⁷ will cause the belt which connects the two conical drums to be pushed along from the larger to the smaller end of the driving-drum. It has been found necessary in practice to make one of the drums with its periphery slightly concave and the other drum with its periphery slightly convex, as represented in Fig. 5, in order to secure the requisite variation in the speed of the driven drum. In my improved device for varying the speed of the bobbin I make the drum F and the pulley F' conical, with straight sides, and I journal the driving-drum F, so as to bring its sides parallel with the shaft F², on which the conical pulley F' slides, and I secure the same variation in the speed of the driven pulley F' as are now secured by the concave and convex conical drums by varying the pitch of the thread on the screw M, as represented in Fig. 3. The variation in the thread of the screw M consists in increasing the pitch of the screw-thread from one end of the screw M to the middle, and correspondingly decreasing the pitch of the screw-thread from the middle of the screw to the opposite end.

In Fig. 5 the screw-thread upon the screw M is represented as increased in pitch from the end *a* to the center of the screw at *b*, and then decreased in pitch from the center *b* to the end *c*, so that the uniform rotation of the beveled pinion O will produce a varying movement of the screw M.

By my improved device, as shown and described, I am enabled to secure an absolute

rolling contact between the periphery of the conical pulley and the periphery of the drum in contact therewith for the reason that the ratio between the diameter of the larger end of the pulley and the diameter of the drum in contact therewith is always the same as the ratio between the diameter of the smaller end of the pulley and the diameter of the drum in contact therewith, whatever the position of the pulley with reference to the driving-drum may be. I have described my invention as an improvement in spinning-machines; but it will be obvious to those conversant with this class of machines that the device for varying the speed of the bobbin is particularly adapted to speeders and flier-frames. I have shown and described a weight carried by the pivoted frame which supports the conical pulley for the purpose of holding the pulley in contact with the driving-drum, and such a weight I have made to slide along a bar attached to the pivoted frame in order that it may be applied directly opposite the conical pulley and prevent any injurious strain upon the pivoted frame. It will, however, be obvious that the pulley itself can be made heavy enough to serve as a weight to bear upon the surface of the driving-drum.

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

1. In a spinning-machine the mechanism for driving the bobbins with a variable speed and consisting of a conical driving-drum, a conical pulley in frictional contact with said drum, said conical pulley having the ratio between the diameter of its larger end and the diameter of the drum at its contact therewith substantially the same as the ratio between the diameter of the smaller end of the pulley and the diameter of the drum at its contact therewith, independently of its relative position to the driving-drum, means for moving said conical pulley longitudinally on said drum and intermediate connecting mechanism whereby the rotation of said pulley is communicated to the bobbins of the machine, substantially as described.

2. In a spinning-frame the combination of a conical driving-drum, a conical pulley in frictional contact therewith, a pivoted weighted framework carrying said pulley, means for moving said conical pulley longitudinally on said drum and intermediate connecting mechanism, whereby said conical pulley is

operatively connected with the bobbins of the machine, substantially as described.

3. In a spinning-machine the combination of a conical driving-drum; a pivoted framework; a shaft journaled in said pivoted framework; a conical pulley carried by said shaft and having a spline connection therewith; a weight carried by said pivoted framework, and applied to hold said pulley in frictional contact with said driving-drum; a rotating shaft parallel with the sides of said drum and operatively connected with the bobbins of the machine; a gear carried on said shaft and having a spline connection therewith; a pinion attached to said conical pulley and engaging said gear; and means by which said gear and said pulley are simultaneously moved longitudinally on said driving-drum, substantially as described.

4. In a spinning-machine the combination with the bobbins of the machine, of a driving mechanism consisting of a rotating conical drum, a pulley in frictional contact with said drum, intermediate connecting mechanism between said pulley and the bobbins of the machine, and means for imparting a variable traversing movement to said pulley longitudinally on said drum, substantially as described.

5. In a spinning-machine the combination with the bobbins of the machine and a variable driving mechanism, comprising a conical driving-drum and conical pulley held in frictional contact therewith, of an actuating-screw by which said pulley is moved along said drum, said screw having a screw-thread of varying pitch in different sections of its length, substantially as described.

6. In a spinning-frame the combination of a conical driving-drum, a swinging frame, a conical pulley supported by said swinging frame and in contact with said conical driving-drum, means for moving said conical pulley longitudinally on said drum and intermediate connecting mechanism, whereby said conical pulley is operatively connected with the bobbins of the machine, substantially as described.

Dated this 14th day of December, 1896.

JOSEPH FOSSEL.

Witnesses:

RUFUS B. FOWLER,
HENRY W. FOWLER.