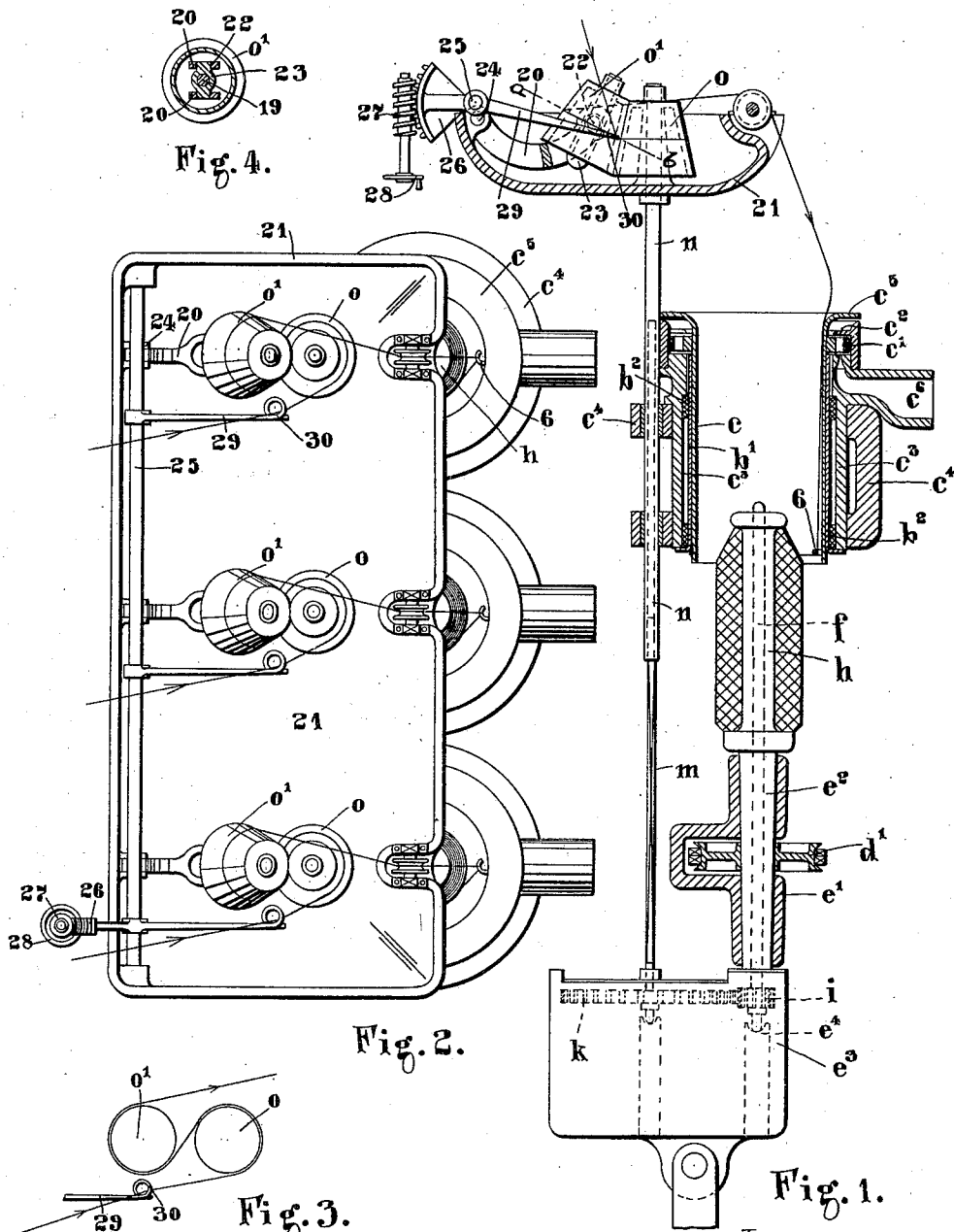


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SPINNING, DOUBLING, AND TWISTING MACHINE.
APPLICATION FILED MAY 20, 1909.

1,030,395.

Patented June 25, 1912.



ATTEST.

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SPINNING, DOUBLING, AND TWISTING MACHINE.

1,030,395.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, SEBASTIAN ZIANI DE FERRANTI, a subject of the King of Great Britain and Ireland, and residing at Grindleford Bridge, near Sheffield, in the county of Derby, England, have invented certain new and useful Improvements in and Relating to Spinning, Doubling, and Twisting Machines, of which the following is a specification.

The invention relates generally to improvements in machines for spinning, doubling, twisting and the like (operations referred to generically hereinafter as "twisting"). The constituent elements of such machines differ greatly in form, but in those machines in which the twisting is continuous instead of intermittent as in a mule, the following essential elements are present, viz., a rotatable twisting element proper, from which or to which the material to be twisted is transferred, and suitable rolls hereinafter referred to as "thread-transfer rolls" for effecting such transference.

The present invention relates to improvements in the thread-transfer rolls the nature of such improvements being described hereinafter and particularly pointed out in the appendant claims.

I will now describe one application by way of example of my invention as applied to a twisting machine having leading and lagging parts.

Where in the following description and claims I refer to "thread," I intend this term to cover broadly the material being operated upon, no matter what may be its precise nature.

Referring to the accompanying drawings: Figure 1 shows an end elevation partly in section of such parts of the complete machine as are necessary for a proper understanding of the present invention, Fig. 2 being a plan of the same, while Fig. 3 shows diagrammatically a method of passing the thread between the transfer rolls, and Fig. 4 a cross-section on the line *a-b* of Fig. 1 of the movable transfer roll.

In carrying the invention into effect according to the form shown in the drawings, a number of separate spindles, *f*, are provided each carrying a bobbin, *h*, on which the material to be twisted is wound. An ex-

tension, *e*², of this spindle runs in a bearing, *e*¹, preferably with a small clearance suitable for air lubrication, a rotor of a turbine, *d*¹, being mounted on this extension, *e*², at about the middle of its length. The bottom of the spindle rests on a foot-step, *e*⁴, carried by a roller *e*³, and has mounted on it a gear wheel, *i*, meshing with a second gear wheel, *k*, the spindle of which, *m*, is adapted to slide telescopically in the spindle, *n*, of the feed roll, *o*. The above spindle forms the lagging part of the twisting unit, the turbine, *d*¹, being added, particularly when dealing with fine counts, so as to minimize the strain on the thread.

The leading part of the twisting unit consists in a ring flier, *c*, mounted in a sleeve, *b*¹, with the clearance of about 1½ ten-thousandths of an inch per side, suitable for air lubrication. The sleeve *b*¹, is in turn mounted with the interposition of rubber rings, *b*², in a socket, *c*³, which fits into the framework, *c*⁴, of the machine. At the upper part of the ring flier a turbine, *c*¹, is mounted supplied with working fluid from the duct, *c*⁶. The exhaust from this turbine impinges on the flange, *c*⁵, of the ring flier, and so tends to support a proportion of its dead weight. To avoid fanning actions of the turbine blades as far as possible, a ring having an inwardly turned flange, *c*², fits over the turbine a part of this flange as shown on the left hand side of the figure, being cut away in order to allow a free exhaust. The ring flier also carries a thread-engaging device, such as the hook, 6. In order to lay the thread evenly on the bobbin, the rail, *e*³, is moved up and down by any of the well-known traverse mechanisms, such mechanism forming no part of the present invention, and therefore not being illustrated in the accompanying drawings.

Turning now to the transfer rolls, the first of these, *o*, of conical shape, is mounted on the spindle, *n*, already referred to, and is conveniently arranged in a trough, 21, which may be filled as desired with water for the purpose of moistening the thread. The second roll, *o*¹, also of conical shape, has its axis inclined to the axis of the first roll, *o*, and is carried by an arm, 20, pivotally mounted at 24, so that the weight of the arm and roll, *o*¹, automatically acts to keep

the two rolls in operative engagement. The free end of the arm, 20, is bifurcated and carries a hollow socket-piece, 23, pivotally mounted at, 22, in the jaws of the arm, 20.

5 The roll, *o'*, is provided with an internal pin, 19, which fits rotatably into the socket-piece, 23. The roll, *o'*, is thus not only rotated on its own axis, but can rock about the pivot, 22, to adjust its position in relation to the second roll, *o*. The thread passes to the rolls by way of a guide eye, 30, which may consist of a twist of wire as shown in Fig. 3, its course through the rolls being indicated diagrammatically in the same figure, the rolls being shown somewhat separated for clearness of drawing. The guide eye, 30, is carried by an arm, 29, mounted on a spindle, 25, pivotally mounted on any fixed part of the machine, the spindle, 25, having attached to it a toothed sector, 26, which meshes with a worm, 27, actuated by a handle, 28. The spindle, 25, as shown in Fig. 2, is common to a number of the twisting units, so that operation of the hand-wheel, 28, acts to move all the arms, 29, one to each unit, and so lead the thread longitudinally of the rolls to different diameters, thereby altering the amount of feed, or in other words, since the rolls are driven directly from the twisting elements, altering the number of twists per unit length imparted to the material.

It will be seen that in the arrangement shown, the rolls are supported from one end only, and are free at the other end, such rolls both open at the same end being particularly convenient when passing the thread around and between them in the S-shaped course indicated in Fig. 3.

40 Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In combination in a machine for twisting fibrous material, a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material together with means co-acting with said conical thread-transferring means for varying said degree of twist.

2. In combination in a machine for twisting fibrous material, a rotatable twisting element; conical thread-transferring means; a driving connection between said element and said transferring means; together with means co-acting with said conical thread-transferring means for varying the degree of twist imparted to the material.

3. In combination in a machine for twisting fibrous material, a plurality of twisting units, each including a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material together with means co-acting with said conical

thread-transferring means for simultaneously varying said degree of twist in said units.

4. In combination in a machine for twisting fibrous material, a plurality of twisting units each including a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material, means co-acting with said conical thread-transferring means for varying said degree of twist, together with means common to a plurality of said units for actuating said twist-varying means.

5. In combination in a machine for twisting fibrous material, a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material together with means co-acting with said conical thread-transferring means for varying said degree of twist, said means comprising guiding means disposed in operative relationship to said thread-transferring means and means for varying the position of said guiding means longitudinally of said transferring means.

6. In combination in a machine for twisting fibrous material, a rotatable twisting element, conical thread-transferring means; a driving connection between said element and said transferring means; together with means co-acting with said conical thread-transferring means for varying the degree of twist imparted to said material, said means comprising thread-guiding means disposed in operative relationship to said thread-transferring means and means for varying the position of said guiding means longitudinally of said transferring means.

7. In combination in a machine for twisting fibrous material, a plurality of twisting units, each including a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material together with means co-acting with said conical thread-transferring means for simultaneously varying said degree of twist in said units, said means comprising thread-guiding means disposed in operative relationship to said thread-transferring means and means for varying the position of said guiding means longitudinally of said transferring means.

8. In combination in a machine for twisting fibrous material, a plurality of twisting units each including a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material together with means co-acting with said conical thread-transferring means for varying said degree of twist, said means comprising thread-guiding means disposed in operative relationship to said thread-transferring means

and actuating means common to all said units for varying the position of said guiding means longitudinally of said transferring means.

- 5 9. In combination in a machine for twisting fibrous material, a plurality of twisting units each including a rotatable twisting element and conical thread-transferring means co-acting therewith to impart a certain degree of twist to said material together with
10 means co-acting with said conical thread-transferring means for varying said degree

of twist in said units said means comprising thread-guiding means disposed in operative relationship to said thread-transferring 15 means, a common spindle on which said guiding means are mounted and means for rocking said spindle.

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

SEBASTIAN ZIANI DE FERRANTI.

Witnesses:

ALBERT HALL,

WILLIAM DUNCAN DAVIDSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
