S. Z. DE FERRANTI.

SPINNING, DOUBLING, AND TWISTING MACHINE.

APPLICATION FILED OCT. 15, 1910.

1,018,702. Patented Feb. 27, 1912.

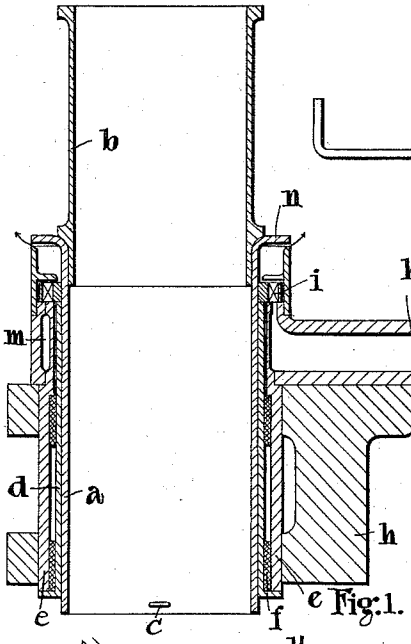

Fig. 1.

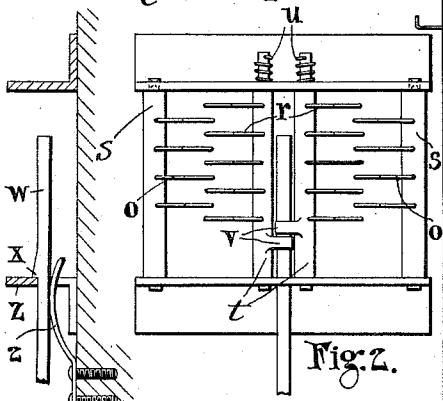

Fig. 2.

Fig. 4.

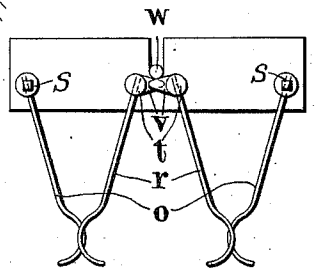

Fig. 3.

Fig. 5.

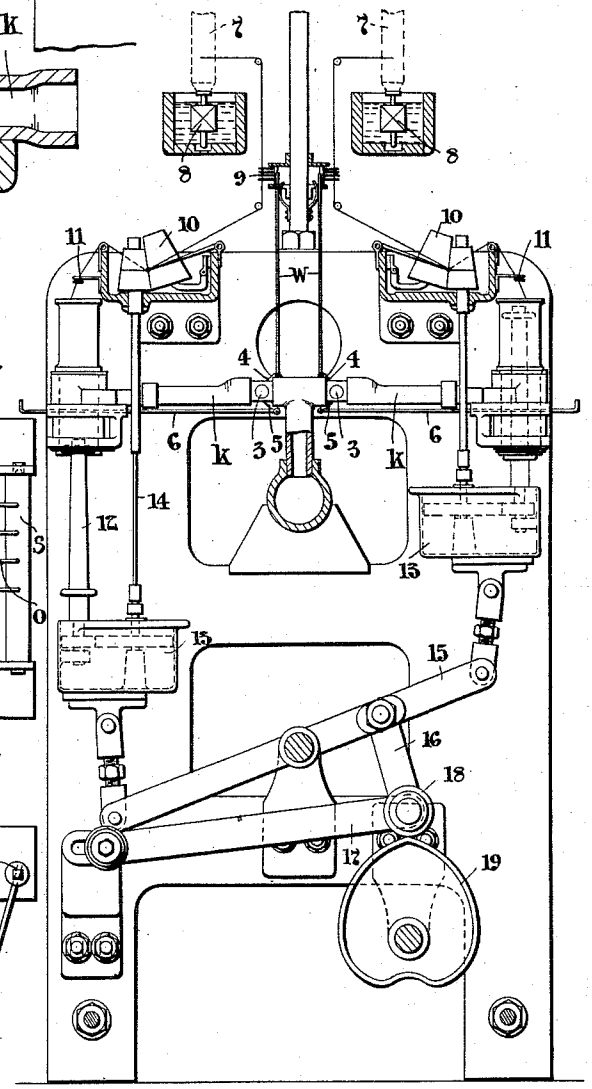

Fig. 6.

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SEBASTIAN ZIANI DE FERRANTI, OF GRINDLEFORD BRIDGE, ENGLAND.

SPINNING, DOUBLING, AND TWISTING MACHINE.

1,018,702. Specification of Letters Patent. Patented Feb. 27, 1912.

Application filed October 15, 1910. Serial No. 587,247.

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, 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 to spinning, doubling and twisting machines and especially to high speed machines of the type, for example, shown in the specification of my Patent No. 927343.

In machines of the class to which the present invention relates, it is very important that automatic stop gear of an efficient kind should be provided so that upon breakage of the thread, waste may not be made.

The present invention thus consists in the features of novelty hereinafter indicated, and particularly pointed out in the claims.

In the following specification I shall refer to the spinning, twisting, doubling or the like operations generically as "twisting," and for convenience I shall refer to the material being operated upon as "thread," no matter what the particular form or nature of the material may be.

Referring to the accompanying drawings which illustrate my invention: Figure 1 shows a section through a turbine driven ring-flier. Fig. 2 shows a front view of certain operative parts of a stop motion, Fig. 3 being a plan, and Fig. 4 a side elevation of the same respectively. Fig. 5 shows the connection between the stop motion and the valve controlling the supply of working fluid, while finally Fig. 6 shows a general view of a complete machine embodying my invention.

I wish it to be understood that to avoid complication, the drawings are to a certain extent of a diagrammatic nature, while corresponding parts in the different figures are denoted by the same reference symbols.

I will now describe the main constituent elements of the machine embodying my invention, and will thereafter describe a complete organization in which such constituent parts are assembled.

Turning now to Fig. 1, the twisting element proper consists of a ring-flier, *a*, having an extension, *b*, and provided at its lower end with a thread-engaging device, *c*. The outside of the ring-flier is accurately formed to a true cylindrical surface, and runs with a very small clearance inside a similarly formed cylindrical sleeve or bearing *d*, so that the ring-flier runs with no other lubricant than that supplied by the air film between the adjacent surfaces. The sleeve, *d*, itself is flexibly held in a socket, *e*, rubber rings, *f*, being interposed, while the socket, *e*, itself fits into a rail or the like, *h*. To the ring-flier is secured a turbine, *i*, to which working fluid which may very conveniently be compressed air, is led through the inlet pipe, *k*, and annulus, *m*. The upper part of the ring-flier is provided with an outwardly turned flange, *n*, against the underside of which the exhaust from the turbine bears, so that the weight of the rotating parts is taken by the escaping working fluid.

Turning now to Figs. 2 to 4, a special form of stop motion which depends for its action on the maintenance of tension in the thread, is shown. The threads to be twisted pass between the series of wire clips, *o*, *r*, the coöperative sets of which are reversely curved at their ends as shown. One set, *o*, of these clips for each thread is fixed to a non-rotatable spindle, *s*, while the other set, *r*, for each thread is fixed to a rotatably mounted spindle, *t*. Each of the spindles, *t*, is provided with a light spring, *u*, the torsion of which serves to clip the thread, and is also provided with a projecting lug, *v*. A rod, *w*, having a hook, *x*, or the like at its upper end resting on the bracket *z*, and held in position under normal circumstances by the light spring, 2, is arranged within the operative range of the lugs, *v*, in such a way that if the tension of the thread fails by reason of breakage, a corresponding lug presses the rod so as to unhook it. The rod thereupon falls and acts according to the present invention to control the supply of motive agent to the motor driving or twisting element. This action can be effected in a variety of ways, one of which will now be described. According to this form of the invention, a valve, 3, is inserted in the air inlet pipe, *k*, of the turbine, this valve being operated by means of a bell crank, one arm, 4, of which is connected to the rod *w*, of the stop motion, while the other arm, 5, is connected to a pull rod, 6, leading to the front of the machine.

Turning now to the complete machine

shown in Fig. 6, the thread passes from the bobbin, 7, retarded to a certain extent by box-like floats, 8, immersed in a trough of water, by way of the stop motion, 9, which is indicated diagrammatically, to the feed rolls, 10, and thence through the guide eye, 11, to the engaging device, *c*, on the ring-flier. The bobbin, 12, on which the material is to be wound is carried by a rail, 13, and by gearing also carried by those rolls transmits its motion to a telescopic spindle, 14, driving the feed rolls. The rail, 13, is given a reciprocating motion for laying the twisted material evenly by any convenient mechanism. According to that shown, two rails placed one at the back and one at the front of the machine are carried by a lever, 15, which is operated by links, 16 and 17, carrying a roller, 18, at their junction in contact with a heart-shaped cam, 19, driven by any suitable means. Air is supplied to the turbines of the ring-fliers through a main trunk, 20, with branch pipes controlled by valves, 3, as shown.

The operation of the stop motion and its adjuncts is as follows:—Supposing a thread breaks owing to removal of the restraint imposed upon one of the clips, *r*, the corresponding spring, *u*, will act and through the instrumentality of the lug, *v*, will press the rod, *w*, against the action of the spring, 2, and therefore release its hook, *x*, from the bracket, *z*. The rod will thereupon fall by its own weight and operate the corresponding valve supplying air to the turbine in question. The pull rod, 6, is provided in order that after piecing up, the valve 3, may be again opened and the stop motion re-set by engaging the hook, *x*, with its bracket, *z*.

I wish it to be understood that although I have described one particular example of my invention in considerable detail, nevertheless I do not restrict myself thereto, as it will be evident that the principles of action involved can be embodied by those skilled in the art in a variety of different structural forms.

It will be understood that the stop motion will come into action not only on the breakage of a thread, but upon failure of the thread for any cause whether this be due to breakage or due to the thread running out owing to the bobbin becoming empty.

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

1. In combination in a thread-twisting machine, a rotatable twisting element; a fluid motor driving the same; a duct conveying working fluid to said motor; a valve controlling said duct and automatic means for closing said valve on failure of a thread.

2. In combination in a thread-twisting machine, a plurality of twisting units; motors driving the same individually, and automatic means including means for controlling supply of motive agent to said motors for stopping the twisting action of any particular unit alone on failure of a corresponding thread.

3. In combination in a thread-twisting machine, a plurality of twisting elements; motors driving the same individually; thread-transfer means driven by said twisting elements and automatic means including means for controlling supply of motive agent to said motors for stopping any particular transfer means alone on failure of a corresponding thread.

4. In combination in a thread-twisting machine, a plurality of twisting elements; fluid motors driving the same individually; a main fluid supply; branch pipes leading therefrom to said individual motors; valve means on each of said branch pipes and automatic means for closing any particular valve means on failure of a corresponding thread.

5. In combination in a thread-twisting machine, a twisting unit comprising a leading and a lagging part; turbine means driving said unit, said turbine means being the sole twisting motor agent of said unit; a duct supplying working fluid to said turbine means; a valve controlling said duct and automatic means for closing said valve on failure of a corresponding thread.

6. In combination in a thread-twisting machine, a plurality of twisting units; motor means driving the same individually; automatic means including means for controlling supply of motive agent to said motor means for stopping any particular twisting unit alone on failure of a corresponding thread, together with movable means non-responsive to thread-failure for evenly laying the material twisted by said units.

7. In combination in a thread-twisting machine, a plurality of twisting units; motor means driving the same individually; automatic means including means for controlling supply of motive agent to said motor means for stopping any particular twisting unit alone on failure of a corresponding thread, together with movable means non-responsive to thread-failure for evenly laying the material twisted by said units, said laying means including motor means other than those first-mentioned and common to said plurality of units.

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."

Correction in Letters Patent No. 1,018,702

It is hereby certified that in Letters Patent No. 1,018,702, granted February 27, 1912, upon the application of Sebastian Ziani de Ferranti, of Grindleford Bridge, England, for an improvement in "Spinning, Doubling, and Twisting Machines," an error appears in the printed specification requiring correction as follows: Page 1, in heading, date of filing application, for the words and numerals "Application filed October 15, 1910. Serial No. 587,247," read *Original application filed August 3, 1905. Serial No. 272,560. Divided and this application filed October 15, 1910. Serial No. 587,247;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 29th day of October, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.