S. Z. DE FERRANTI.

SPINNING, TWISTING, AND DOUBLING MACHINE.

APPLICATION FILED NOV. 2, 1907.

903,965. Patented Nov. 17, 1908.

2 SHEETS—SHEET 1.

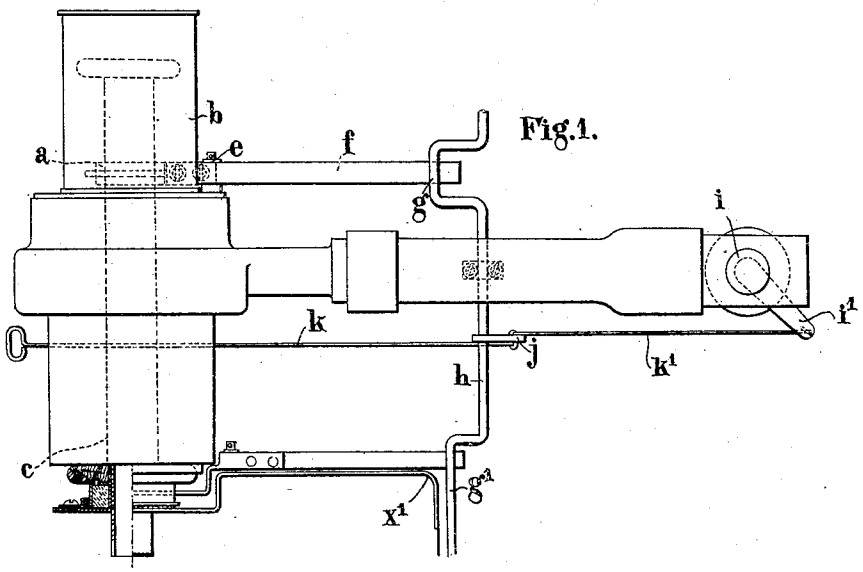


Fig. 1.

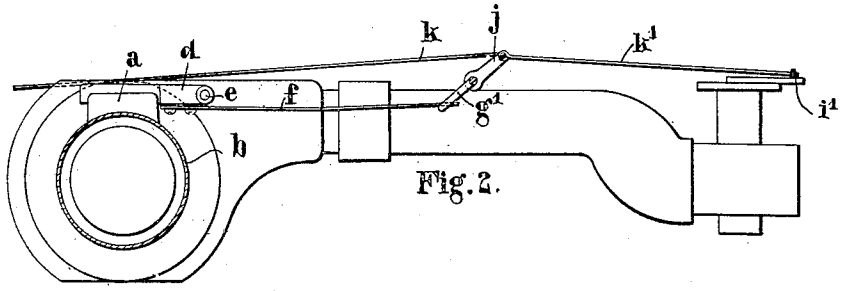
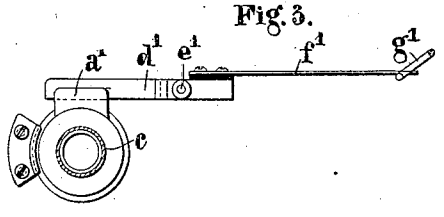


Fig. 2.

Fig. 3.



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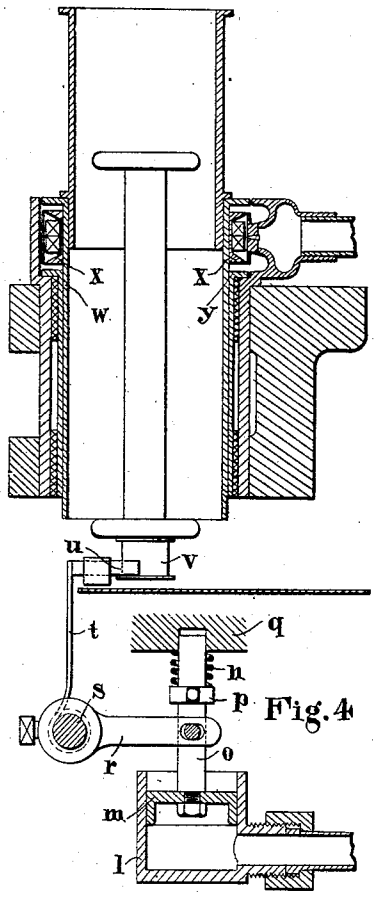


Fig. 4

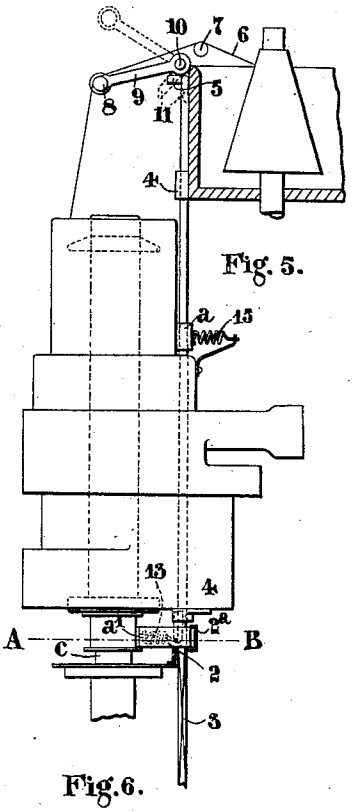


Fig. 5.

Fig. 6.

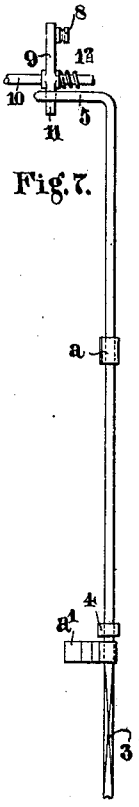
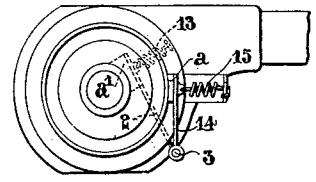


Fig. 7.



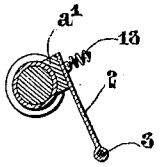


Fig. 5a

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UNITED STATES PATENT OFFICE.

SEBASTIAN ZIANI DE FERRANTI, OF SHEFFIELD, ENGLAND.

SPINNING, TWISTING, AND DOUBLING MACHINE.

No. 903,965. Specification of Letters Patent. Patented Nov. 17, 1908.

Application filed November 2, 1907. Serial No. 400,357.

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, Sheffield, England, have invented certain new and useful Improvements Relating to Spinning, Twisting, and Doubling Machines, of which the following is a specification.

In high speed spinning, doubling and twisting machines of the leading and lagging part type it is advisable in order to prevent breakage or fouling of the material when stopping the twisting element that both leading and lagging parts should be slowed down at the same rate and stopped without substantial overrunning of the parts and the present invention has for its object to provide an improved brake arrangement in which this result is obtained.

Referring now to the accompanying drawings which illustrate this invention and form part of this specification, Figure 1 is an elevation of a brake arrangement constructed according to my invention. Fig. 2 is a sectional plan of the view shown in Fig. 1, while Fig. 3 is a detail view of the brake on the bobbin carrier. Fig. 4 shows a modification of the arrangement shown in the preceding figures. Fig. 5 shows an elevation of a brake arrangement operated automatically by the material being twisted. Fig. 5[a] is a section on the line A B of Fig. 5. Fig. 6 shows a plan of the arrangement shown in Fig. 5, while Fig. 7 is a detail view of the mechanism for operating the brakes.

In carrying the invention into effect according to one form, I provide a brake block, *a*, to act on the ring flier, *b*, which may for the purpose of illustration be regarded as the leading part while the bobbin carrier, *c*, may be regarded as the lagging part. The brake block, *a*, is curved to correspond to the surface on which it acts and is carried by an arm, *d*, fulcrumed on a pin, *e*, conveniently disposed on the framework of the machine. To the arm, *d*, one end of a flat spring, *f*, is attached the other end resting on the crank, *g*, of a rod, *h*, rotatably mounted on the framework of the machine. The valve, *i*, for controlling the supply of motive fluid to the twisting element is connected by way of a lever *i'*, and a link *k'* to an arm, *j*, rigidly fixed to the rod, *h*, to which arm the operating rod, *k*, is also connected.

The brake on the bobbin carrier, *c*, is mounted on the bobbin rail, *x'* and is of somewhat similar construction to that above described, the corresponding details thereof being denoted by accentuated reference symbols.

The crank, *g'*, for operating the brake *a'* on the bobbin carrier *c* is made of sufficient length to correspond to the travel of the bobbin rail.

The strength or rigidity of the springs *f*, *f'* through which the pressure to the brake blocks *a*, *a'*, is transmitted is so chosen that the operation of the operating rod *k* causes the brake pressure to be adjusted so that retardation and stoppage of the parts take place without substantial overrunning thereof and simultaneously therewith cuts off the supply of motive fluid. In some cases instead of proportioning the strength or rigidity of the springs I may proportion the dimensions of the levers *j*, and cranks, *g*, *g'* through which the power is transmitted to obtain a similar result. In some cases the above arrangements are used without cutting off the motive power, the brake on the motor part being strong enough to effect the stoppage thereof.

In Fig. 4 an arrangement for controlling the supply of working fluid simultaneously with the operation of the brake is illustrated as applied in the type of machine having air supported leading or lagging parts. In this arrangement a cylinder, *l*, is connected with the working fluid supply of the air supported twisting elements, *w*, of the spinning machine. A piston, *m*, is disposed in the cylinder, *l*, and actuates a piston rod, *o*, against the action of a spring, *n*, situated between a collar, *p*, and a part, *q*, of the machine. An arm, *r*, is mounted on the shaft, *s*, in operative connection with the piston rod, *o*, and actuates the springs, *t*, through which pressure is transmitted to the brake blocks, *u*, acting on the bobbins, *v*. It will thus be evident that the operation of cutting off the supply of working fluid to the ring flier, *w*, causes the piston, *m*, to fall and the spring, *t*, to press the brake block, *u*, against the bobbins, *v*. As the motive fluid is also utilized to support the dead weight of the ring

flier, w, the operation of cutting off the supply of working fluid thereto causes the flange, x, to contact with the flange, y and the resulting friction quickly brings the ring flier to rest.

The strength of the spring, t, should be so chosen that the stoppage of both the ring flier and the bobbin carrier takes place without substantial overrunning of each other. On turning on the supply of working fluid to the cylinder, l, on the piston, m, causes the rod, o, to rise and withdraw the brake block, u, from contact with the bobbins, v, and simultaneously therewith the flange, x, is raised from contact with the flange, y, by the action of the supporting air so that both ring flier and bobbin carrier are now free to rotate.

According to another modification of the invention, I may cause alterations in tension of the thread to operate a brake automatically so as to maintain this tension substantially constant and I may combine such an arrangement with a second brake so that it may form a stop motion causing both the leading and lagging parts to stop simultaneously. Thus referring to Figs. 5, 6 and 7 which show one form of this modification, the bobbin carrier c, which as before may be regarded as the lagging part for the purpose of describing a specific example of this part of my invention, is provided with a brake block, a', carried at one end of a spring arm, 2, the other end having a square hole through which passes a correspondingly shaped rod, 3. The arm, 2, by means of a clip, 2^a, or the like attached to the movable rail, is caused to follow the movements of the bobbin carrier, as it rises and falls.

The rod, 3, which is squared at its lower end for a sufficient distance as above stated to allow for the movement of the bobbin carrier is of round cross section above where it is supported by suitable bearings, 4, 4, while its upper end is bent over at right angles to form an arm, 5. The thread, 6, from the feed rolls passes preferably by way of a fixed guide, 7, to a movable guide, 8, mounted at the end of one arm, 9, of a bell crank, pivotally mounted at 10, the other arm or tail piece 11 being so disposed as to bear against the arm, 5, of the rod 3. The bell crank is pressed by a spring, 12, which tends to lift the arm, 9, carrying the thread guide towards the position shown in dotted lines in Fig. 5, the spring thus acting in opposition to the force due to the tension of the thread. Further, a spring, 13, tends to withdraw the brake block, a', from contact with the bobbin carrier.

The operation of the specific example of this part of my invention just described is as follows:—Assuming the tension of the thread to be normal, the bell-crank will assume the position shown by full lines in Fig. 5, the brake block a', carried on its spring arm bearing lightly against the lagging part so as to supply the necessary retarding force. If the tension of the thread should increase from any cause, the arm, 9, carrying the thread guide will be depressed and so by allowing the rod 3, to rotate slightly in response to the recoil of the spring arm, 2, will lessen the braking effect or in the limit allow the spring, 13, to withdraw the brake block, a', entirely. If on the other hand, the tension of the thread should decrease, the bell crank arm, 9, will rise and by way of the tail-piece, 11, and rod, 3, increase the braking effect. In some cases I may combine with such an automatic brake, a second brake having a block, a, mounted on a spring arm, 14, pinned or otherwise rigidly secured to the rod, 3. A spring, 15, may be added, if necessary to effect the withdrawal of this brake block, a, but generally the springs already mentioned above in connection with the lagging part are sufficient. The brake block, a, should be arranged to be just clear of the ring flier during the normal operation of the brake on the bobbin carrier. With this duplicate brake device in the event of a thread breaking, the bell-crank arm, 9, will fly upwards under the action of the spring, 12, and thus apply both brakes, the spring arms on which they are respectively mounted being so proportioned as regards strength, length and so forth as to stop the leading and lagging parts substantially simultaneously.

Although I have shown turbines as the motors for the individual units it will be obvious that my invention is equally applicable to any other form of motor.

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

1. In a spinning, twisting or doubling machine, the combination of independently rotatable leading and lagging parts; separate means for retarding the rotation of each of said parts together with actuating means common to both said retarding means.

2. In a spinning, twisting or doubling machine, the combination of co-acting leading and lagging parts, separate means for retarding the rotation of each of said parts together with a single instrumentality for mechanically actuating both said retarding means.

3. In a spinning, twisting or doubling machine, the combination of co-acting leading and lagging parts; separate means for retarding the rotation of each of said parts together with mechanical means for simultaneously actuating said retarding means.

4. In a machine for spinning, twisting or doubling fibrous material, the combination

of co-acting leading and lagging parts; separate means for retarding the rotation of each of said parts; together with means for controlling the action of said retarding means, said controlling means being subject to the tension of said material.

5. In a machine for spinning, twisting or doubling fibrous material, the combination of co-acting leading and lagging parts together with means for maintaining the tension of said material being treated substantially constant, said means including retarding means acting on both said leading and said lagging parts.

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

SEBASTIAN ZIANI DE FERRANTI.

Witnesses:

DANIEL EDWARD DARK,

WILLIAM DUNCAN DAVIDSON.