J. WEINBRENNER.

DRIVING MECHANISM OF RING SPINNING MACHINES.

APPLICATION FILED AUG. 12, 1911.

1,012,946. **Patented Dec. 26, 1911.**

2 SHEETS—SHEET 1.

Fig. 1

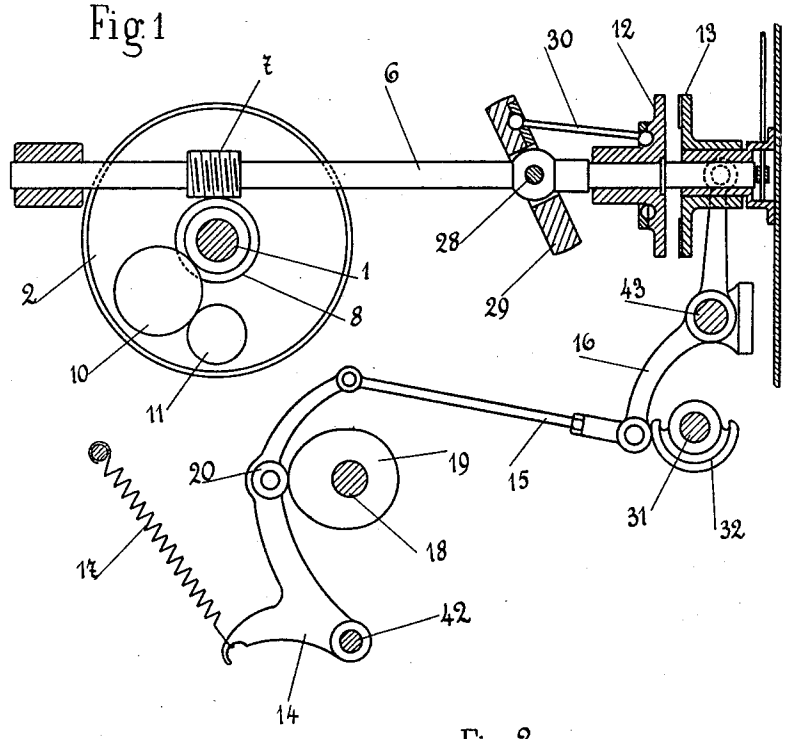


Fig. 2

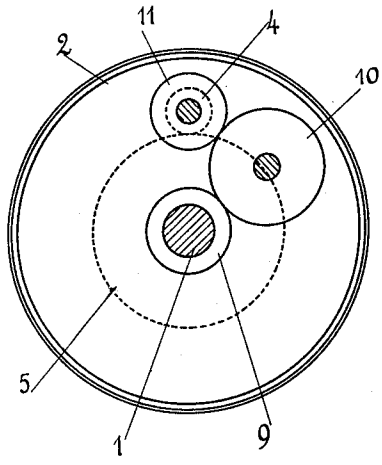
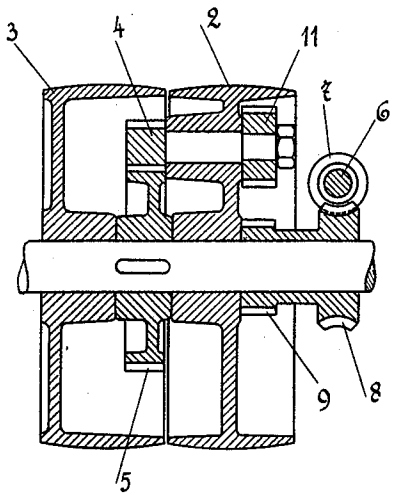


Fig. 3



Witnesses,
Edward F. Allen.
Thomas J. Drummond.

Inventor,
Julius Weinbrenner,
by Edmunds, Heard & Smith,
Attys.

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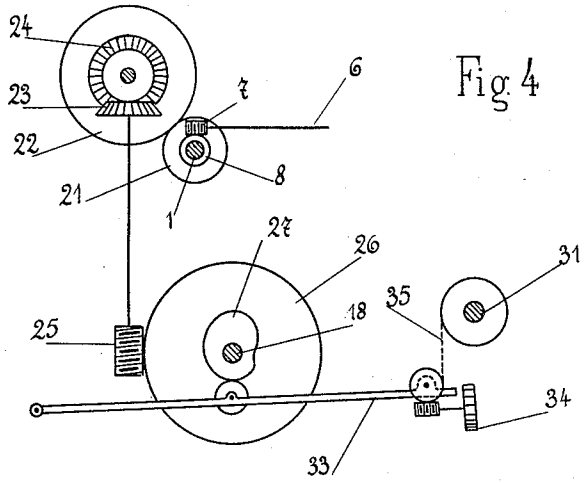


Fig. 4

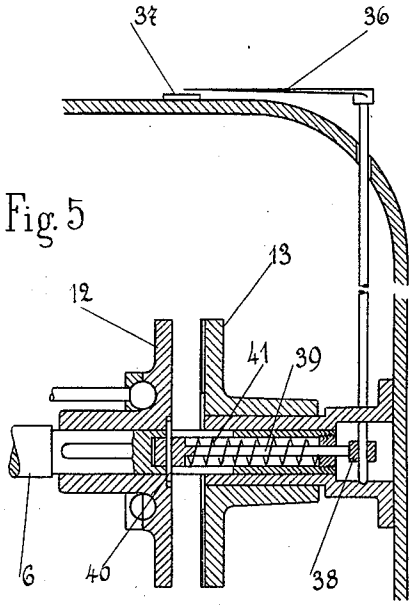
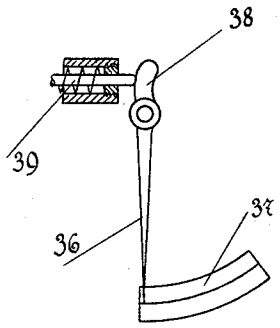


Fig. 5

Fig. 6



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Julius Weinbrenner,
by Edwards, Heard & Smith,
Attys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JULIUS WEINBRENNER, OF THANN, GERMANY.

DRIVING MECHANISM OF RING-SPINNING MACHINES.

1,012,946. Specification of Letters Patent. Patented Dec. 26, 1911.

Application filed August 12, 1911. Serial No. 643,669.

To all whom it may concern:

Be it known that I, JULIUS WEINBRENNER, a subject of the Emperor of Germany, residing at Thann, Elsass, Germany, have invented new and useful Improvements in the Driving Mechanism of Ring-Spinning Machines, of which the following is a specification.

This invention has reference to improvements in the driving mechanism of ring-spinning machines of the type in which differential gearing controlled by an automatically acting governor is employed.

During the winding of a bobbin on the ring-spinning machine, there are a series of points at which the danger of the thread breaking is especially great. Such critical points are, on the one hand at the commencement and the finish of a bobbin, and, on the other hand, in the case of a bobbin which is built up in conical stages, all those points which are near to the axis of the spindle, as at these points, owing to the greater distance from the traveler, the tension on the thread is greater. If the driving shaft of a ring-spinning machine is rotated at a constant speed during the whole period of winding the bobbin, the speed must be limited to that permissible at the critical points, and the output of a machine driven in such a way must necessarily be considerably below the highest possible as a much higher speed is permissible at the points nearer to the traveler. The device which constitutes the subject-matter of this invention remedies this drawback. It permits a ring-spinning machine to be driven at the highest possible speed during certain periods of the winding as the driving mechanism automatically reduces the speed of the driving shaft to what is permissible at all critical points, and the machine therefore works during the whole period of winding a bobbin at the highest speed permissible for the time being, so that its capacity in comparison with machines with the ordinary driving mechanism is increased by 25% and even more.

Devices having the same object as the present invention are known and in common with such my device comprises a differential gearing which is interposed between a pulley that is driven at the highest permissible speed and the driving shaft, the differential gearing being controlled from the ring frame.

The particular construction and arrangement of the governing mechanism constitutes the essential feature of the present invention. This mechanism varies automatically the speed of rotation of the regulating or controlling shaft from its highest possible to a complete standstill and always as is necessary for maintaining the tension on the thread constant and without any jerking during the braking operation, so that excessive tension and breaking of the thread such as occur with the known devices cannot take place.

I have illustrated my invention in the accompanying drawings, in which:—

Figure 1 is a side elevation of the main portion of my improved mechanism, partly in section; Figs. 2 and 3 show on a larger scale details of same hereinafter referred to. Fig. 4 shows how the shafts 1 and 18 represented in Fig. 1 are geared together, and the means employed for raising and lowering the carriage, and Figs. 5 and 6 an arrangement of a speed indicator.

Referring to the drawing: A pulley 2 which is driven at a constant speed by means of a belt from the engine or motor is mounted so that it can rotate freely on the driving shaft 1. Another loose pulley 3 is mounted on the said shaft alongside the pulley 2, to which the belt can be transferred to put the mechanism hereinafter described out of gear. These pulleys are shown in section in Fig. 3. Motion is transmitted from the pulley 2 to the shaft 1 through a pinion 4 which gears with a toothed wheel 5 that is fixed on the said shaft. The pinion 4 is fixed on a spindle which is mounted in bearings in the pulley 2 and carries at its other end a pinion 11. The rotation of the pinion 4 is controlled from the shaft 6 through the intermediary of a worm 7, worm wheel 8 and the spur wheels 9, 10 and 11, Figs. 1, 2 and 3. The worm wheel 8 and spur wheel 9 are loose on shaft 1, and the spur wheel 10 is carried by the pulley 2 and is rotatable relatively thereto. If the pinion 4 be prevented from rotating relatively to the pulley 2, the gear wheel 5 will be rotated at the maximum speed. The greater the speed of rotation of the pinion 4 relatively to the pulley 2, the greater will be the reduction in the number of rotations of the wheel 5 and of the shaft 1. A reduction in the number of rotations of the shaft 6 for a given period

of time results accordingly in an increase in the number of rotations of the shaft 1 in the same period.

The speed of rotation of the shaft 6 is varied by means of a brake device which consists of a disk 12 Figs. 1 and 5 that participates in the rotation of the shaft 6 and a nonrotatable disk 13 which is faced with leather and is slidable longitudinally of said shaft toward and from the disk 12. This brake device is actuated by means of a system of levers 14, 16, and a connecting rod 15. The two-armed levers 14 and 16 are pivoted respectively at 42, and 43, and are connected to each other by means of the rod 15, the length of which is adjustable. A spring 17 which engages one arm of the lever 14 tends to move the disk 13 toward the disk 12 and to press them together and thus brake the shaft 6, simultaneously increasing the speed of the driving shaft 1. The brake is released by means of the eccentric 19 which is mounted on the shaft 18 and acts upon a roller 20, carried by the lever 14, to force back the system of levers. This shaft 18 is rotated from the shaft 1 as shown in Fig. 4 through the intermediary of spur wheels 21, 22, bevel gears 23, 24, a worm 25 and a worm wheel 26. A cam 27 is also mounted on the shaft 18 for the purpose of bringing about the raising and lowering of the ring rail and the shaft 18 therefore makes one rotation for each up-and-down movement of the ring rail. The eccentric 19 is so adjusted that at the critical points the brake is out of action.

A fly-wheel 29 is mounted on the shaft 6 on a transverse pin 28 on which it can swing, and it is coupled to the brake disk 12 by means of a rod 30 and ball-and-socket joints. The greater the number of rotations of the shaft 6 the more nearly vertical to the axis of the shaft will be the position taken up by the fly-wheel 29; simultaneously the brake disk 12 will be pushed toward the right by the rod 30. If now the brake disk 13 is brought into contact with the disk 12 under the influence of the spring 17, the shaft 6 is braked and its speed of rotation reduced, and the fly-wheel 29 again assumes a position correspondingly more inclined to the vertical the lower the speed of rotation, and it will only require in this position a very slight braking to bring the shaft 6 to a complete standstill.

To obtain the low rate of rotation of the driving shaft 1 that is necessary at the commencement and the finish of a bobbin, an eccentric 32 is so mounted on the shaft 31 that it prevents movement of the brake lever 16 toward the right during these working periods and consequently prevents braking of the shaft 6. As this shaft rotates at its highest speed at the beginning and the finish of the bobbin, the speed of the driving shaft 1 is reduced at those points to the minimum. The shaft 31 makes only one rotation during the whole time taken to wind a bobbin, being actuated in the known manner. A ratchet wheel 34 which is mounted at the end of the lever beam 33 is rotated backward one tooth for each up-and-down movement of the ring rail, the driving chain being wound up and shortened by the transmission of this movement. As each displacement by one tooth of the cog wheel corresponds to a particular position of the thread, one revolution of the shaft 31—corresponding to the total shortening of the chain—takes place during the time taken to wind a complete bobbin.

The greater or less inclination of the fly-wheel 29 to the vertical and the position of the disk 12 which is dependent thereon is a measure of the speed of rotation of the shaft 6 and also of the shaft 1. The various positions of the disk 12 are therefore indicated on a scale 37 by means of a pointer 36 (Figs. 5 and 6) having an arm 38 which is actuated by a slidable rod 39 that bears through a shoulder 40 and under the action of a spring 41 against the disk 12. The pointer 36 is returned to its zero position by means of a small spring (not shown) that acts on the arm 38.

The whole of the mechanism is designed so that it can be fitted in ring-spinning machines of ordinary construction without having to alter existing parts.

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

1. In driving mechanism for ring-spinning mechanism having a driving shaft, and differential gearing to actuate it at different speeds, in combination, a controlling shaft rotatable by or through said gearing at a speed inverse to the speed of the driving shaft, a brake device to govern and reduce the speed of the controlling shaft, diminution of the speed of the latter acting through the differential gearing to increase the speed of the driving shaft, means, acting only at the beginning and the end of the winding, to maintain said brake device inoperative, and other means to throw the brake device into and out of action at predetermined intervals during the winding, to thereby cause corresponding increases and decreases in the speed of the driving shaft.

2. In driving mechanism for ring-spinning mechanism having a driving shaft, and differential gearing to actuate it at different speeds, in combination, a controlling shaft rotatable by or through said gearing at a speed inverse to the speed of the driving shaft, a brake device to reduce the speed of the controlling shaft, whereby the latter acts through the gearing to increase the speed of the driving shaft, said brake de-

vice comprising a rotatable friction disk and an opposed, non-rotatable friction disk, means, acting only at the beginning and the end of the winding, to prevent coöperation of said disks, spring operated levers to effect movement of the disks toward each other, to brake the controlling shaft, and means acting at predetermined intervals during the winding to move said levers positively and effect relative separation of the disks and thereby release the controlling shaft from the braking influence thereof.

3. In driving mechanism for ring-spinning machines having a driving shaft, and differential gearing through which it is actuated at different speeds, in combination, a controlling shaft rotatable by or through said gearing at a speed inverse to the speed of the driving shaft, a brake device comprising a friction disk rotatable with said controlling shaft, a second non-rotatable friction disk movable axially into and out of engagement with the first named disk, spring actuated levers coöperating with the non-rotatable disk to effect axial movement thereof toward the rotating disk, and separate eccentrics to coöperate independently with and control the movement of said levers at different stages of the winding of a bobbin, each eccentric when operative preventing coöperation of the disks.

4. In driving mechanism for ring-spinning machines having a driving shaft, and differential gearing to actuate it at different speeds, in combination, a controlling shaft rotatable by or through said gearing at a speed inverse to the speed of the driving shaft, a friction disk rotatable with and movable axially upon the controlling shaft, a non-rotatable friction disk co-axial with and movable toward and from the rotatable disk, spring-actuated levers to effect axial movement of the non-rotatable disk toward its fellow, to thereby brake and diminish the speed of the controlling shaft, separate eccentrics coöperating independently with said levers at different stages of the winding of a bobbin, to prevent braking action of the disks upon the controlling shaft, and a fly-wheel governor mounted on the controlling shaft and operatively connected with the disk thereon, variations in the speed of such shaft acting through said governor to move the rotatable friction disk axially on the controlling shaft toward and from braking position.

5. In a driving mechanism for ring-spinning machines having a driving shaft, and differential gearing to actuate it at different speeds, in combination, a controlling shaft rotatable by or through said gearing at a speed inverse to the speed of the driving shaft, a brake device to reduce the speed of the controlling shaft, whereby the latter acts through the differential gearing to increase the speed of the driving shaft, said brake device comprising two friction disks, one of which is mounted to rotate with the controlling shaft, the other, non-rotatable disk, being movable axially toward and from the rotatable disk, spring-actuated means to move the non-rotatable disk into coöperation with the rotatable disk to brake the controlling shaft and diminish its speed, a cam acting only at the beginning and the end of the winding, to at such time prevent cooperation of the said disks, and a second cam acting at regular intervals during the winding to prevent spring-induced axial movement of the non-rotatable disk into cooperation with its fellow, the resultant action of the spring-actuated means and the second cam causing alternating increases and decreases in the speed of the driving shaft during the winding.

6. In driving mechanism for ring-spinning machines having a driving shaft, and differential gearing to actuate it at different speeds, in combination, a controlling shaft rotatable by or through said gearing at a speed inverse to the speed of the driving shaft, a brake device to govern and reduce the speed of the controlling shaft, diminution of the speed of the latter acting through the differential gearing to increase the speed of the driving shaft, said braking device comprising a friction disk rotatable with and axially movable upon the controlling shaft, and a non-rotatable coöperating disk movable axially toward and from the rotatable disk, a centrifugally-acting governor to move the rotatable disk into and out of operative position as the speed of the controlling shaft increases and decreases, respectively, spring-actuated means to move the non-rotatable disk axially into coöperation with the rotatable disk, and other means operating against such spring-actuated means to move positively the non-rotatable disk out of engagement with the rotatable disk at predetermined times.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS WEINBRENNER.

Witnesses:
GEORGE GIFFORD,
LEO WAGNER.