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TWISTING DEVICE

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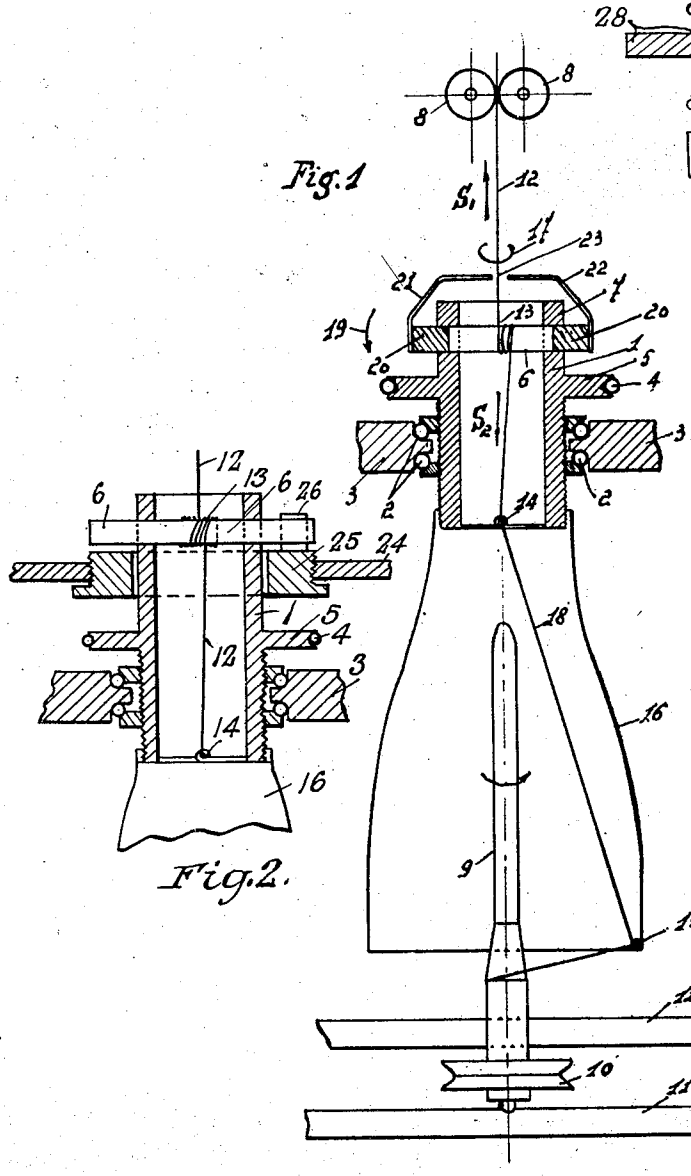


Fig. 1

Fig. 2.

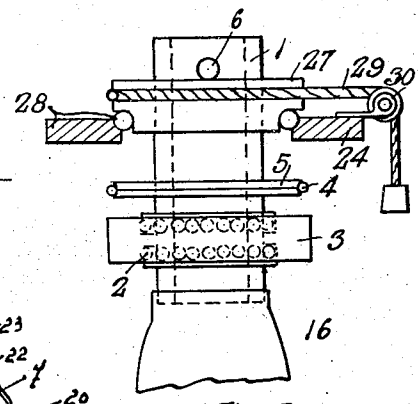


Fig. 3.

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TWISTING DEVICE.

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It has already been suggested in continuous spinning frames such as flyer spinning frames, cap and ring spinning frames, to mount between the spindle and the delivery rollers, twisting devices comprising a revolving member (a roller for instance, around which the yarn takes one or more turns) which rotates not only around its longitudinal axis but also in a plane which is normal to the yarn which is conducted to the spindle.

In all these devices this roller either freely rotates or is rotated around its longitudinal axis at a given speed by means of a suitable gearing. Neither these devices, nor the other twisting devices which are generally used in continuous spinning frames prevent the transmission of the tension, which is necessary for the winding of the yarn on the bobbin, to that part of the yarn which is not yet completely twisted. As a consequence the yarn breaks frequently, these breakages resulting from the great tension to which the roving is subjected and which is necessary for the winding of the twisted yarn on the spindle or on the bobbin which is mounted on it. The devices in which it is made use of rollers which are positively driven only allow a regulation of the drawing out and of the twisting and do not avoid the bad consequences resulting from the transmission of the tension which is necessary for the winding to that part of the roving which is submitted to the twisting operation.

My invention has for its object to avoid this disadvantage. Another object also is to secure simple and practical means for the control of the tension to which the roving may be subjected without inconvenience.

With these objects in view my invention consists in the special arrangements and combinations of parts hereinafter fully described and pointed out in the appended claims.

Referring to the annexed drawings, which show as an example the embodiments of my invention:

Fig. 1 is a vertical sectional view of the twisting device in its simplest form.

Figs. 2 and 3 show the combination of the twisting device with a braking mechanism the action of which can be adjusted at will.

On the drawing:

The twisting device comprises as usual a tube 1 mounted by means of ball-bearings 2 in a rail 3 of the frame.

This tube 1 which is rotated by means of a band 4 adapted to pass on a pulley or wharve 5, which is bodily connected to the tube carries at its upper end a little roller 6 adapted to rotate in bearings 7 formed by the tube 1. This device is mounted in the path of the roving between the delivery rollers 8 of the spinning frame and the spindle 9 which is rotated by the pulley 10 in the supporting rail 11. The roving 12, from the delivery rollers 8 is conducted on the roller 6 around which it takes one or more turns 13 and is then conducted in passing through an eyelet or thread guide 14 to the spindle 9 to which the yarn, is conducted by a suitable guide for instance by an eyelet 15 arranged at the lower end of the cap 16 which is bodily connected to the tube 1 in order to rotate with it.

The twisting device just described works as follows:

The tube 1 is rotated by means of the band 4 for instance in the direction shown by the arrow 17, so that the roller 6 which is rotated in the horizontal plane normal to the roving 12 causes the said roving 12 to be twisted in the part comprised between the turns 13 and the delivery rollers 8. Simultaneously the spindle 9, which is rotated at a suitable speed winds up the part 18 of the yarn which is comprised between the turns 13 and the thread guide 15. The winding of the yarn on the spindle or on the bobbin mounted on the said spindle causes the roller 6, to be rotated around its longitudinal axis in the direction shown by the arrow 19, simultaneously the turns 13 are unwound from the roller 6, in proportion to the winding up of a new twisted part.

If a device of this kind is considered from the point of view of the transmission of the winding up tension which must be supported by the yarn in order to be wound on the spindle 9 it is easily seen that in order to avoid the injurious consequences of this transmission to the part of the roving which is submitted to the twisting operation between the delivery rollers 8 and the roller 6, the tension S_2 supported by the yarn between the roller 6 and the spindle 9 must be greater than the tension S_1 supported by the roving 12 between the delivery rollers 8 and the roller 6. This condition can only be secured when a force $K=S_2-S_1$ is acting on the yarn in an inverted direction to the direction in which the yarn is moving. If r

is the radius of the twisting roller 6 and M the momentum exerted by the resulting of the forces on the roller 6 the following equilibrium equation can be written:

$$S_2 r - S_1 r \pm M = O$$

Whence:

$$1. \quad -\frac{M}{r} = S_1 - S_2$$

$$2. \quad +\frac{M}{r} = S_1 - S_2$$

In other words, if the tension S_2 must be greater than the tension S_1, it is necessary to exert on the roller 6 a negative momentum because with a positive momentum (equation 2) S_1 would be greater than S_2 ($S_1 > S_2$).

The said negative momentum is obtained according to the present invention, by means of a suitable braking action exerted on the rotation of the roller 6 around its longitudinal axis in order to release the part 12 of the roving comprised between the delivery rollers 8 and the roller 6 from the tension S_2 which is necessary for the winding of the thread on the spindle and to which the yarn 18 is submitted between the roller 6 and the spindle 9.

In the example shown in Fig. 1 the braking action is secured by friction surfaces 20 which are adapted to press upon the ends of the roller 6 and which are fixed to a spring 21—22 forming a strap above the tube 1. This spring 21—22 is held by the friction surfaces 20 engaged in the bearings 7 of the roller 6; it is provided with an opening 23 through which the roving 12 passes.

In these conditions the more the roller 6 is braked in its motion around its longitudinal axis, the greater is the tension in the part 18 of the yarn comprised between the roller 6 and the point of winding on the bobbin and this tension cannot be transmitted to the part 12 of the roving between the delivery rollers and the roller 6.

If desired the braking of the rotation of the roller 6 around its axis can be adjusted at will. In the example of Fig. 2 the intensity of the braking can be adjusted by the displacement in a supplementary rail 24 of a screwed ring 25 adapted to exert a variable pressure against the end of the roller 6 which is provided for this object, with a friction ring 26. The intensity of the braking can be modified in this case at will by the variation of the pressure of the ring 25 against the ring 26.

In the example shown in Fig. 3, the same effect is obtained whilst maintaining constant pressure on the roller 6 by means of a ring 27 which is supported by a ball-bearing 28 on the supporting rail 24. In this arrangement, the tube 1 when it is rotated by the pulley 5 carries with it the twisting roller 6 the ends of which resting upon the ring 27, tend to cause the ring 27 to be rotated at a given speed. If the rotation of the ring 27 is then braked for instance by a cord 29 passing on a guide 30 and loaded with a variable weight 31 the rotation of the roller 6 will be braked also by the increased resistance which will be opposed to the rotation of the cord roller when causing the rotation of the ring 27. This latter arrangement has the advantage of reducing to a minimum the wear and tear of the end of the roller 6 through which this latter causes the ring 27 to be rotated.

The device just described allows as usually by the choice of a suitable speed of rotation for the tube 1 to vary the amount of twist in the yarn and by adjusting the resistance opposed to the rotation of the roller 6 around its axis, to vary the tension in this part of the roving.

What I claim is:

1. In a twisting device for continuous spinning frames, in combination, a tubular supporting member, means for rotating said member, a revolving spindle member mounted with its axis transverse to the axis of said supporting member and adapted to have turns of yarn about it, and braking means cooperating with said spindle for absorbing part of the tension applied to yarn in said supporting member, in absence of slippage thereon.

2. In a twisting device for continuous spinning frames in combination a tube, means whereby this tube is caused to be rotated a revolving member mounted on the said tube and around which the yarn takes one or more turns, the said revolving member being rotated around its longitudinal axis and in a plane normal to the yarn passing around the revolving member, means whereby the rotation of the said revolving member around its longitudinal axis can be braked means for applying a tension on the yarn, which tension is partially absorbed by said friction device without slippage of the yarn on said revolving member.

3. In a twisting device for continuous spinning frames in combination, a tube, means whereby this tube is caused to be rotated, a revolving member mounted on the said tube and around which the yarn takes one or more turns, the said revolving member being rotated around its longitudinal axis and in a plane normal to the yarn passing around the revolving member and friction members pressing against the revolving member whereby the rotation of the revolving member around its longitudinal axis is braked.

4. In a twisting device for continuous spinning frames in combination a tubular supporting member, means whereby the said supporting member is caused to be rotated, a revolving member mounted on the sup-

porting member and around which the yarn takes one or more turns, the said revolving member being rotated around its longitudinal axis and in a plane normal to the yarn passing around the revolving member and means whereby an adjustable braking action is exerted against the revolving member whereby a portion of the tension upon the yarn is absorbed without slippage of the yarn thereon.

5. In a twisting device for continuous spinning frames in combination a tube, ball-bearings supporting the tube, a rail in which the said ball-bearings and tube are mounted means whereby the said tube is caused to be rotated, a revolving member mounted on the said tube around which the yarn takes one or more turns, the said revolving member being rotated around its longitudinal axis and in a plane normal to the yarn passing around the revolving member, a supplementary rail, a ring screwed in the said supplementary rail, a friction ring mounted on the said revolving member and against which the screwed ring is adapted to exert a variable pressure.

6. In a continuous spinning frame, in combination, a yarn conducted from the delivery roller to a spindle, a tube, a supporting rail for the said tube, means whereby this tube is caused to be rotated in the said supporting rail, a revolving member mounted on the said tube and around which the yarn takes one or more turns, the said revolving member rotating around its longitudinal axis and in a plane normal to the yarn in its path from the delivery rollers to the spindle, friction surfaces pressing upon the revolving member, means for producing friction upon the friction surfaces, a cap bodily connected to the tube, and a thread guide at the lower end of the tube.

In testimony whereof I have affixed my signature.

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