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SPINNING OR TWISTING MACHINE.

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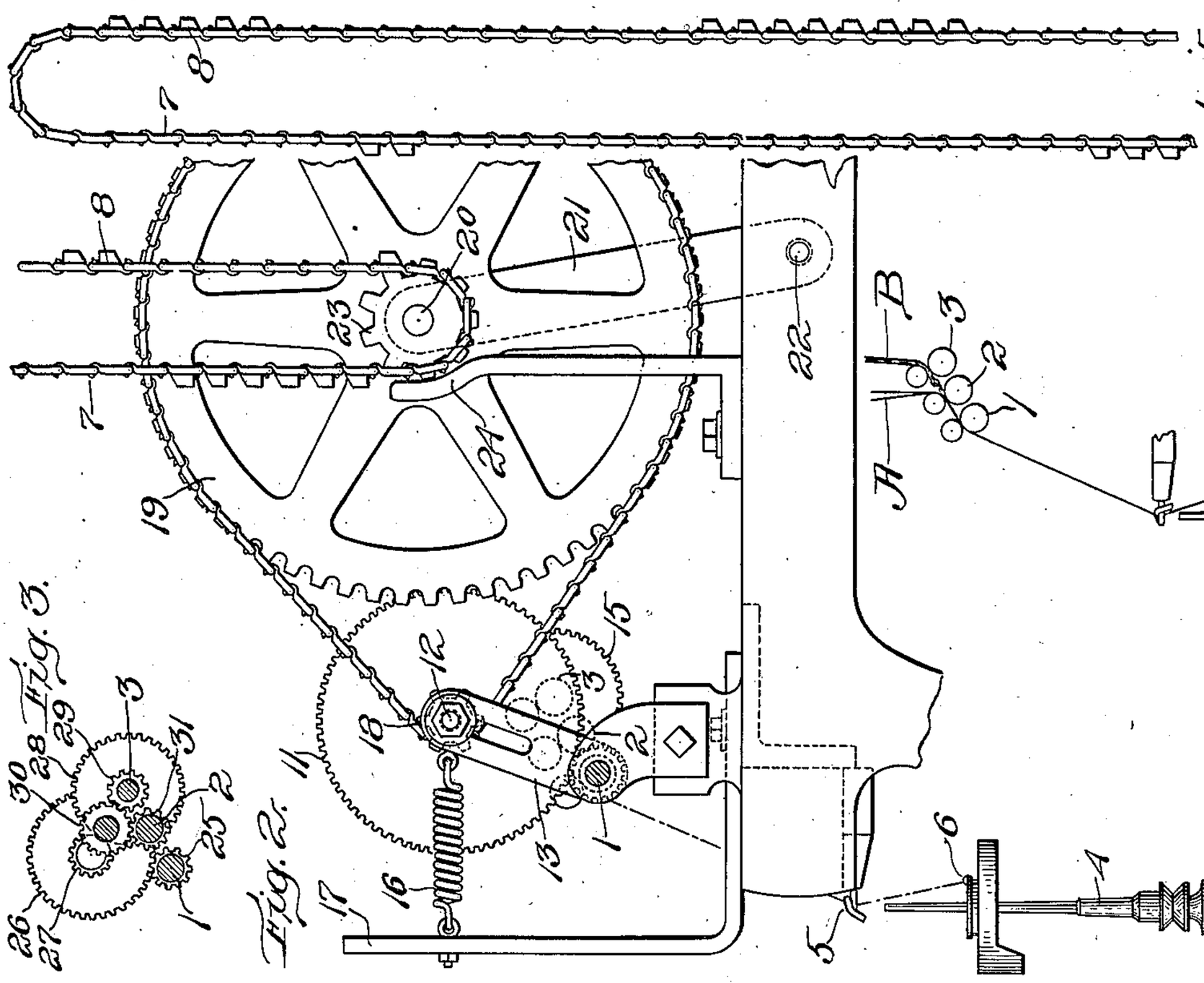
928,830. **Patented July 20, 1909.**



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UNITED STATES PATENT OFFICE.

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SPINNING OR TWISTING MACHINE.

No. 928,830. Specification of Letters Patent. Patented July 20, 1909.

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To all whom it may concern:

Be it known that I, WILLIAM P. WOOD, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Spinning or Twisting Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to spinning or twisting machines such as are used in the manufacture of yarn or roving.

The primary object of the invention is to provide mechanism for manufacturing roving or yarn of varying size in which varying lengths of comparatively fine size alternate with widely varying lengths of larger size. Accordingly one feature of the invention contemplates the provision in a spinning or twisting machine of means coöperating with the twisting mechanism to increase the size of the yarn or roving being produced at varying intervals and during widely varying periods. By a mechanism of this character, yarn or roving may be produced in which varying lengths of fine size alternate with widely varying lengths of coarser size, and the variations in the lengths of the successive fine and coarser parts may be predetermined and controlled to secure the desired results. By embodying a mechanism of this character in a spinning frame, and properly varying the lengths of the fine and coarse parts and their distribution along the yarn, yarn may be produced which when used as filling for a woven fabric will give to the fabric the uneven and irregular appearance of the rough pongee fabrics. In producing a yarn to be used as a filling in the manufacture of fabric having the irregular and uneven appearance of rough pongee, it is important that there should be a wide variation of the different lengths of fine yarn and also a wide variation in the different lengths of coarser yarn. It is also important there should be a sufficient number of successive variations in the lengths of each size to avoid the production of pattern repeats in the fabric. The invention accordingly further contemplates the provision of mechanism which is adapted to secure the numerous and wide variations in the fine and coarser lengths of yarn requisite for reproducing the apearance of rough pongee fabrics. These features of the invention in their broader aspects contemplate the provision of any suitable mechanism which will coöperate with the twisting mechanism to vary the size of the yarn at the desired, widely varying intervals, and the specific construction and arrangement, and the specific mode of operation of such mechanism may be varied without departing from the broader features of the invention.

More specifically considered, the invention contemplates the provision in a spinning or twisting machine, of mechanism for actuating the rolls which supply the roving or yarn to the twisting spindles or bobbins to increase the material delivered to the spindles at irregularly recurring intervals, and during widely varying periods. This increase in the material delivered to the spindles may be provided for in different ways, but is preferably secured by supplying additional roving during varying periods and at irregularly varying intervals During the periods when the feed of the additional roving is discontinued, fine yarn or roving will be produced, while during the periods that the additional roving is fed to the spindles, yarn or roving of large size will be produced, and the production of this large size yarn or roving will continue until the feed of additional roving is again discontinued. The supply of additional roving during the periods in which the coarser yarn or roving is being produced is preferably effected by means of rolls which are arranged and operated to supply roving during irregularly varying intervals to the rolls which act to continuously supply yarn or roving to the spindles. Any suitable mechanism may be employed for operating the intermittently driven rolls which will actuate the rolls at the irregular intervals and during the varying periods, requisite for the production of yarn having the desired variations in the lengths of the different fine and coarser parts.

Further features of the invention contemplate the provision in a machine for spinning yarn or roving, of rolls for intermittently feeding additional roving to the feed and drawing rolls which act to continually draw roving and feed it to the twisting spindles. Broadly considered, these features are not limited to operating the addi-

tional rolls at varying intervals and during varying periods.

In adapting spinning or twisting machines for use in the manufacture of yarn to be used in reproducing the appearance of rough pongee fabrics, it is preferred to control the operation of the rolls for supplying the additional roving by means of a series of cams of varying length which are brought successively into action at varying intervals, and this construction constitutes a further feature of the invention.

The invention also includes certain further features and combinations referred to in the claims, the advantages of which will be readily appreciated by those skilled in the art.

The various features of the invention will be readily understood from the foregoing, and from an inspection of the accompanying drawings.

In the drawings Figure 1 is a front elevation of so much of a spinning frame as is necessary to illustrate the application of the present invention thereto; Fig. 2 is an end elevation looking toward the left in Fig. 1; Fig. 3 is an end elevation of the gearing at the left-hand end of the frame for driving the middle rolls; Fig. 4 is a sectional elevation through the feed rolls; and Fig. 5 is a view showing the upper part of the cam chain which is not shown in Fig. 2.

The spinning machine shown in the drawing is a machine for spinning closely twisted yarn, and commonly known as a spinning frame. This spinning frame is provided with three sets of rolls 1, 2 and 3 which operate to supply the roving which is to be spun. The roving delivered from between the front rolls 1 passes through a guide 5 and traveler 6, and is twisted by and wound upon the twisting spindle 4 in the usual manner. The roving A from which the fine yarn is spun is led to the middle rolls 2 and thence to the front rolls 1, and is drawn between the rolls 1 and 2 to give the yarn the desired predetermined size. An additional roving B is led through the rear rolls 3, and these rolls are rotated at predetermined and varying intervals, and when rotated continue in rotation for varying lengths of time. During the periods when the rolls 3 are rotated, the roving B is supplied to the middle rolls 2 with the roving A, and thus increases the size of the roving drawn between the rolls 1 and 2, and correspondingly increases the size of the yarn being spun during this interval. When the rotation of the rolls 3 ceases, the roving B is drawn apart at the bight of the rolls 2, so that the size of the yarn being spun is decreased, and a fine yarn is spun during the interval that the rolls 3 remain stationary.

The mechanism for driving the rolls 3 at varying intervals, and during varying lengths of time, is so constructed that the periods during which the rolls are driven, and the periods during which the rolls remain inactive, may vary widely, and is also so constructed that the variations may continue in an irregular manner through numerous periods without a repeat in the length of a period of action or inaction. Such form of mechanism is of importance in securing the numerous and wide variations in the lengths of fine and coarse yarn requisite for reproducing the appearance of rough pongee fabrics. In the construction shown, the periods during which the rolls 3 are driven are controlled by a series of cams 8 of varying length carried by a chain 7, and arranged at varying distances apart, so that they are brought into action at varying intervals. The driving mechanism for the rolls is so constructed and arranged that it is thrown into and out of action by the cams.

The gearing for driving the rolls 3 is clearly shown in Figs. 1 and 2. As here shown, the lower front roll 1 is driven through a gear 9 by the mechanism usually employed for driving the front rolls in spinning frames. A pinion 10 is secured to the shaft of the front roll, and engages and drives a large gear 11 which is mounted upon a stud 12 adjustably secured in the upper end of an arm 13, the lower end of which is pivotally supported upon the front roll shaft. A pinion 14 is secured to the gear 11, and is arranged to engage and disengage a gear 15 secured to the shaft which carries the lower rolls 3. The upper end of the arm 13 is connected by a spring 16 with a fixed arm 17, so that the spring tends to hold the arm 13 in such position that the gear 14 is disengaged from the gear 15. A sprocket wheel 18 is secured to the gear 11, and a sprocket chain passes over this wheel and over a large sprocket wheel 19. The sprocket wheel 19 is mounted upon a shaft 20 carried in the upper end of a frame 21, the lower end of which is pivotally supported at 22. The shaft 20 also carries a second sprocket wheel 23 which engages and drives the cam chain 8 A stationary cam or abutment 24 is arranged to be engaged by the cams 7 as they pass around the sprocket wheel 23. Through the gearing described, the cam chain is slowly advanced during the operation of the spinning frame, and the cams carried by the chain are brought in succession and at comparatively infrequent intervals into engagement with the fixed abutment 24. When one of the cams engages the abutment 24 it acts to force the shaft 20 and sprocket wheel 19 carried thereby toward the right in Fig. 2, so that the arm 13 is also swung toward the right against the tension of the spring 16, thus bringing the continuously running pinion 14 into engagement with the gear 15 on the

shaft of the rolls 3. The rolls 3 are now driven to supply the roving B to the rolls 2, and the driving of the rolls continues until the cam 7 passes out of engagement with the abutment 24 when the spring 16 acts to swing the arms 13 and 21 toward the left, thus disengaging the pinion 14 from the gear 15 and arresting the rotation of the rolls 3. The supply of roving B to the rolls 2 now ceases, the roving breaking off close to the bight of the rolls 2. The rolls 3 will now remain out of action until another of the cams 7 engages the abutment 24, when they will be again rotated, the length of time during which they are rotated depending upon the length of the cam 7. By providing the chain 7 with a number of cams of varying length, and spacing these cams at varying distances apart, the rolls 3 may be so operated that any predetermined lengths of either fine or coarse yarn may be spun, and as wide variations in the lengths of different fine and coarse parts may be secured as is desired. By varying the number of cams carried by the chain and the length of the chain, any desired number of variations in either the fine or coarse lengths of yarn may be secured, and any desired length of yarn may be spun without repeat. This mechanism not only enables a large amount of yarn to be spun without repeat in the lengths and distribution of the fine and coarse portions of the yarn, but is also of advantage in that it enables comparatively long lengths of either fine or coarse yarn to be spun.

In the spinning frame shown, the lower middle rolls 2 are driven from the front roll shaft through the gearing indicated in Fig. 3, the gearing being so proportioned that the middle rolls 2 are driven at a sufficiently slower speed to secure the desired amount of draw between the front and middle rolls. As shown, the lower front roll shaft is provided at its left-hand end with a pinion 25 engaging a large gear 26 which is mounted upon a stud 27. The gear 26 is connected with the pinion 27 which engages a gear 28 loosely mounted on the shaft of the lower rolls 3. This gear is connected with a pinion 29 which is connected through an intermediate gear 30 with a pinion 31 secured to the shaft on which the lower middle rolls 2 are mounted.

While the invention has been explained as applied to a spinning frame, it will be understood that various features of the invention may be embodied in other spinning machines such as are used in spinning closely twisted yarn, or such as are used in spinning loosely twisted yarn or roving. It will also be understood that certain features of the invention may also be embodied in machines such as are commonly known as twisting frames.

Plain or noil roving may be supplied to either the feed rolls or to the rolls which feed the additional roving, and in case noil roving is supplied, irregular bunches will occur at irregular intervals in the yarn or roving being spun. The presence of these irregularly distributed bunches along the yarn will add to the rough and irregular appearance of the fabric in which the yarn may be used as a filling, and will give to the fabric an appearance more closely resembling the appearance of rough pongee fabrics.

While certain features of the invention relate especially to the production of a yarn or roving in which varying lengths of one size alternate with varying lengths of a larger size, and the invention has therefore been specifically explained as applied to the production of such a yarn, certain features of the invention relating more particularly to spinning mechanisms are not limited to constructions adapted to spin such a yarn or roving.

Having explained the nature and object of the invention, and specially described forms of mechanism in which the invention may be embodied, what I claim is:—

1. A machine of the character described, having, in combination, a twisting spindle, rolls for feeding roving or yarn to the twisting spindle, and mechanism for actuating the rolls to continuously feed roving or yarn to the spindle and to increase the material fed to the spindle at irregularly recurring intervals and during widely varying periods, substantially as described.

2. A machine of the character described, having, in combination, a twisting spindle, feeding and drawing rolls, supplemental rolls arranged to feed roving to the feeding and drawing rolls, and mechanism for driving said latter rolls at irregular intervals and during widely varying periods, substantially as described.

3. A machine of the character described, having, in combination, a twisting spindle, feed rolls for feeding yarn or roving continuously to the spindle, a supplemental pair of rolls, and mechanism for actuating the supplemental rolls to supply roving to the feed rolls during irregularly and widely varying intervals, substantially as described.

4. A machine of the character described, having, in combination, twisting mechanism, feed rolls for feeding yarn or roving to the twisting mechanism, supplemental rolls for feeding roving to the feed rolls, a cam carrier, a series of cams thereon of varying lengths and arranged at varying distances apart, and connections for controlling the rotation of the supplemental rolls by the cams, substantially as described.

5. A machine of the character described, having, in combination, a twisting spindle,

feed rolls for feeding yarn or roving to the spindle, supplemental rolls for feeding roving to the feed rolls, and driving mechanism for the supplemental rolls including a series of controlling cams of varying length and mechanism for bringing the cams successively into action, substantially as described.

6. A machine of the character described, having, in combination, a twisting spindle, feed rolls for feeding yarn or roving to the spindle, supplemental rolls for feeding roving to the feed rolls, and driving mechanism for the supplemental rolls including a series of controlling devices of irregularly varying length for determining the periods during which the supplemental rolls are driven, substantially as described.

7. A spinning machine, having, in combination, a twisting spindle, a pair of feeding rolls, a pair of drawing rolls, mechanism for continuously driving the respective pairs of rolls at unequal speed, a third pair of rolls, and mechanism for intermittently driving the third pair of rolls to periodically supply additional roving to the feed and drawing rolls during the spinning, substantially as described.

8. A spinning machine, having, in combination, a twisting spindle, feeding and drawing rolls for continuously drawing roving and feeding it to the spindle, supplemental rolls for feeding additional roving to the feeding and drawing rolls, and mechanism for driving the supplemental rolls at varying intervals and during varying periods, substantially as described.

9. A spinning machine, having, in combination, a twisting spindle, feeding and drawing rolls for continuously drawing roving and feeding it to the spindle, supplemental rolls for feeding additional roving to the feeding and drawing rolls, a cam chain provided with a series of cams of varying length arranged at varying distances apart, and connections between the cam chain and supplemental rolls for controlling the rotation of the supplemental rolls by the cams, substantially as described

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

WILLIAM P. WOOD.

Witnesses:
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