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 SPEED CHANGING DEVICE FOR SPINNING MACHINES.
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941,645.

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Fig. 1.

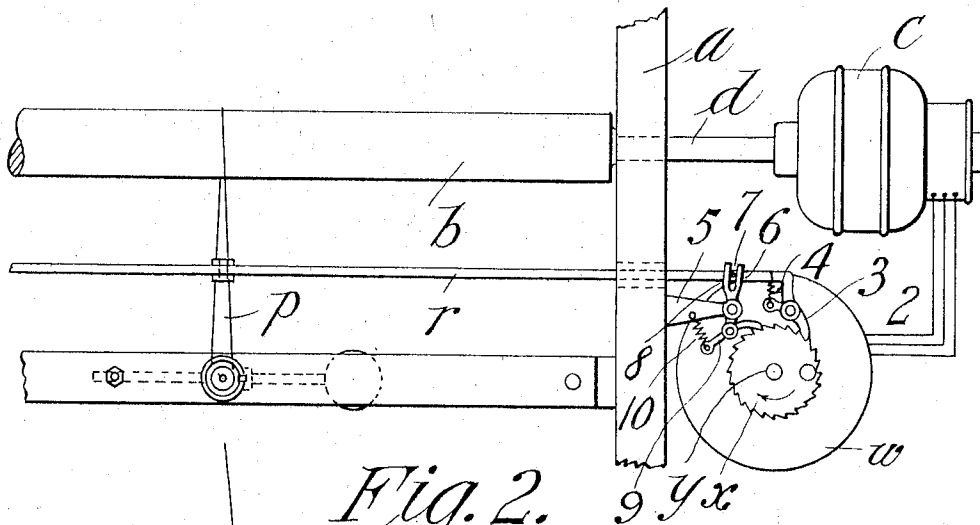
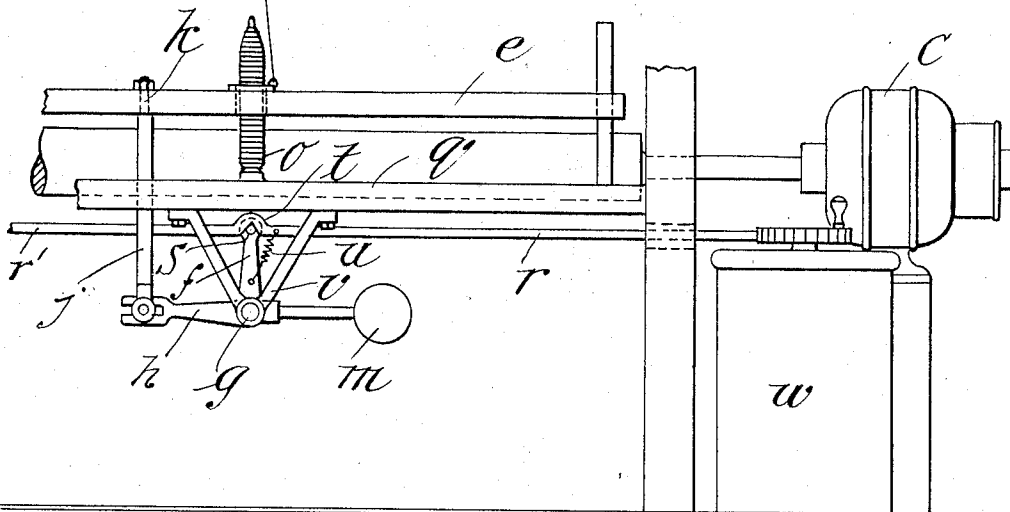


Fig. 2.



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SPEED-CHANGING DEVICE FOR SPINNING-MACHINES.

941,645.

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To all whom it may concern:

Be it known that we, FREDERICK H. McDEVITT, a citizen of the United States of America, residing at Easthampton, in the county of Hampshire and State of Massachusetts, and ALBERT WALTON, a citizen of the United States of America, residing at Charlotte, in the county of Mecklenburg, State of North Carolina, have jointly invented a new and useful Speed-Changing Device for Spinning-Frames, of which the following is a specification.

This invention relates to spinning and twisting machinery and specifically to means whereby the speed of rotation of the spindles for the entire frame may be regulated as determined by the diameter of the bobbin as it fills up with spun yarn, that is to say it is the diameter of the wound yarn which governs whether the yarn be spun onto a bobbin, cop, or spindle.

The object of the invention is to provide means whereby when a set is started on the frame, the spindles will have imparted thereto a relatively low speed of rotation which increases as the diameter of the yarn builds up on the spindle, it being a well known fact that the nearer the yarn runs to the center or axis of the spindle as it passes under the traveler the more liability there is of breakage, this liability decreasing as the diameter of the bobbin increases, and the line of delivery of the yarn moves gradually away from the center.

The preferred embodiment of the invention comprises an electric motor which is preferably axially and rigidly connected with the drum-shaft of the spinning or twisting frame, and associated with this motor is a controller, the mechanism of the controller being actuated by the movements of some part of the spinning frame; preferably, however, by the movement of the ring-rail, to the end that the resistance in the controller may be gradually cut out thus providing for a like gradual increase in the speed of rotation of the motor and consequently the drum and the spindles driven by the latter.

We do not limit ourselves to the rigid and axial connection of the motor-shaft and the drum-shaft but may, if desired, use a belt, gear, chain, or rope drive.

Heretofore it has been the common practice to vary the speed of the bobbins by means of a series of change gears similar to the back gears of an engine lathe. This change in the speed of the bobbins is at best only a make-shift, and is not a gradual increase in speed as the diameter of the bobbin increases. Our invention is designed to overcome this speed defect and make the change gradual from start to finish.

In the drawings forming part of this application,—Figure 1 is a detail plan view showing a portion of the drum-shaft and the motor rigidly connected thereto, also one spindle and the usual driving means between the spindle and the drum-shaft, and further showing the construction of the pawls for operating the controller in a step-by-step manner. Fig. 2 is a side elevation of Fig. 1 showing the connecting means between the controller or resistance box for the motor and the ring-rail.

Referring to these drawings in detail, *a* designates an end portion of the usual spinning frame in which is journaled or mounted for rotation the usual drum-shaft *b*. Connected to the shaft *b* is the electric motor *c* by means of the shaft *d* in any suitable manner.

The usual rising and falling ring-rail is designated by the letter *e*.

f designates a crank-arm rigidly connected to the shaft *g*, and secured to the shaft *g* is an arm *h* having a slot and pin connection with the rod *j* which is secured to the ring-rail *e*, as designated at *k*.

m designates a counterweight rigidly secured to the shaft *g* whereby the ring-rail *e* can be maintained in a balanced condition.

It is understood that the machine is provided throughout its length with a series of balancing means for the ring-rail *e* although only one is shown in the drawing.

The usual bobbin spindle or cop is designated at *o* and driven from the drum-shaft

δ in the usual manner, as by means of the belt p . The bobbin spindles or cops are mounted on the usual fixed rail q .

r designates a rod connected to the arm f , (as shown in Fig. 2) by means of the pin s which engages a V-shaped notch t in the end of the rod r , the notch and pin being held yieldingly together by means of the spring u , the purpose of this connection being to prevent breakage should any obstruction to the movement of rod r occur.

The shaft g is suitably supported on the fixed rail q by means of the depending bracket v , and the controller-box w is suitably located with relation to the rod r and motor c .

Mounted on the upper end of the controller-box w is a ratchet-wheel x that is rigidly secured to a shaft y which extends into the box w , and to which the usual contact fingers are attached that engage the resistance coils located therein, whereby the amount of current that may be allowed to operate the motor may be controlled. The details of the controller itself however, form no part of the invention.

The electrical connections between the motor and controller are indicated by 2.

Pivottally mounted in the outer end of the rod r is a pawl 3 that is normally drawn toward the ratchet-wheel x by means of the spring 4.

5 designates a bracket secured to the framework a of the spinning machine and in which is pivottally mounted the lever 6, one end of the same being slotted at 7 and engaging a pin in the rod r , as shown at 8, the opposite end of the lever carrying a trailing pawl 9 that is normally held toward the teeth of the wheel x for the purpose of preventing backward movement thereof.

By means of the extension r^1 of the rod r , a reciprocating motion is imparted thereto in the usual manner, which reciprocating motion serves to raise and lower the ring-rail e whereby the spun material is coiled or wound onto the bobbin o in the usual manner. At the same time, and in unison with the reciprocating movements of the ring-rail e , the rod r acts, by means of the pawl 3, to rotate the ratchet-wheel x in a step-by-step manner whereby the resistance is gradually cut out thus causing the speed of the motor to gradually increase, which increase in speed is determined by the increase in the diameter of the spindle or bobbin as the same builds up, thus permitting the formation of a spool that is much more compact and uniform than by the method heretofore used for varying the speed or rate of rotation of the spindle, which method has usually consisted in the employment of a change

of gears for varying the speed of the drum-shaft, as stated.

The employment of the pin s and notch t permits the rod r to become readily disengaged from the crank-arm f should any obstruction occur, as the ratchet-wheel refusing to operate, or when the traveling contact fingers on the shaft y have reached the end of their travel, thus preventing breakage.

It is not intended to limit the invention to the employment of any special kind of electric motor, as alternating or direct current may be employed, and either a single or polyphase motor may be employed, and the speed thereof may be controlled by any of the methods known in electrical practice as "field control" or by resistance in the armature or secondary. The field control system is, however, preferred. The controller may also be operated by hand independent of the action of the machine, if desired. The speeds may be increased or decreased according to the needs of the core as uniform from start to finish, or irregular, or they may continue for only a portion of the cycle running at constant speed the rest of the time.

What we claim, is:—

1. As an improvement in means for varying the rate of rotation of the drum-shaft of a spinning machine in proportion as the diameter of the bobbin increases or builds up in diameter during the winding process, said means including a suitable electric motor directly connected to the drum-shaft, a controller-box for varying the flow of current to said motor, and connecting means between the ring-rail of the spinning machine for operating the controller.

2. In combination with the drum-shaft of a spinning machine, an electric motor connected to said shaft, an electric current controller for said motor, and ratchet means on the controller for operating said controller from the ring-rail of the spinning machine, whereby the speed of the motor may be varied as the diameter of the bobbin increases or builds up.

3. In combination with the drum-shaft and ring-rail of a spinning machine, an electric motor for driving said shaft, a controller for varying the flow of current in said motor, a rod operable from the ring-rail of the machine and provided with means for operating said controller, said means including a pawl and ratchet mechanism, whereby as the spindle or bobbin increases in diameter the speed of rotation of said spindle will increase in direct proportion thereto.

4. A spinning machine provided with an electric motor for driving the drum-shaft of said machine, a controller for the motor for cutting out resistance in the motor circuit,

and means for operating the controller from a moving part of the machine as the diameter of the cop builds up, whereby the speed of the motor may be varied, as described.

- 5 5. In combination with the drum-shaft of a spinning machine, an electric motor connected thereto, a controller box for varying the resistance in the motor circuit, said box being provided with a ratchet-wheel, a rod
10 having a pawl for operating the ratchet, said rod and pawl being yieldingly connected to the ring-rail of the machine, whereby the speed of the motor may be varied as the cop

or bobbin increases in diameter, and whereby the rod may be detached from the ring-rail 15 when an undue strain is placed thereon, as described.

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