No. 802,161. PATENTED OCT. 17, 1905.

L. W. GILL.

SPINNING MACHINE.

APPLICATION FILED AUG. 24, 1904.

3 SHEETS—SHEET 1.

FIG. 1.

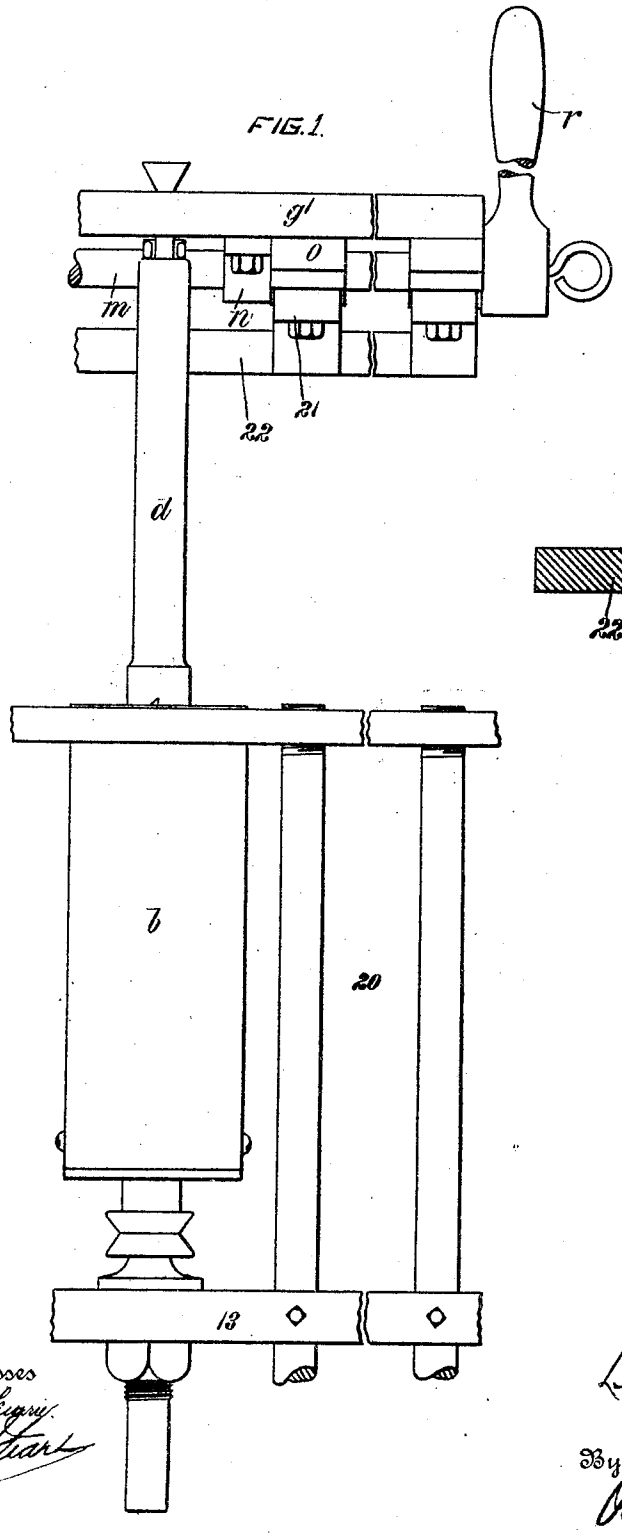
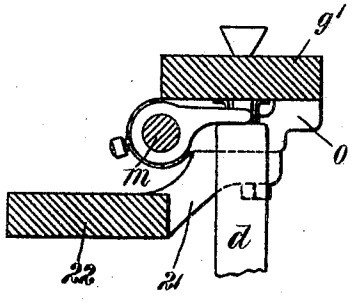


FIG. 2.



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3 SHEETS—SHEET 2.

FIG. 6.

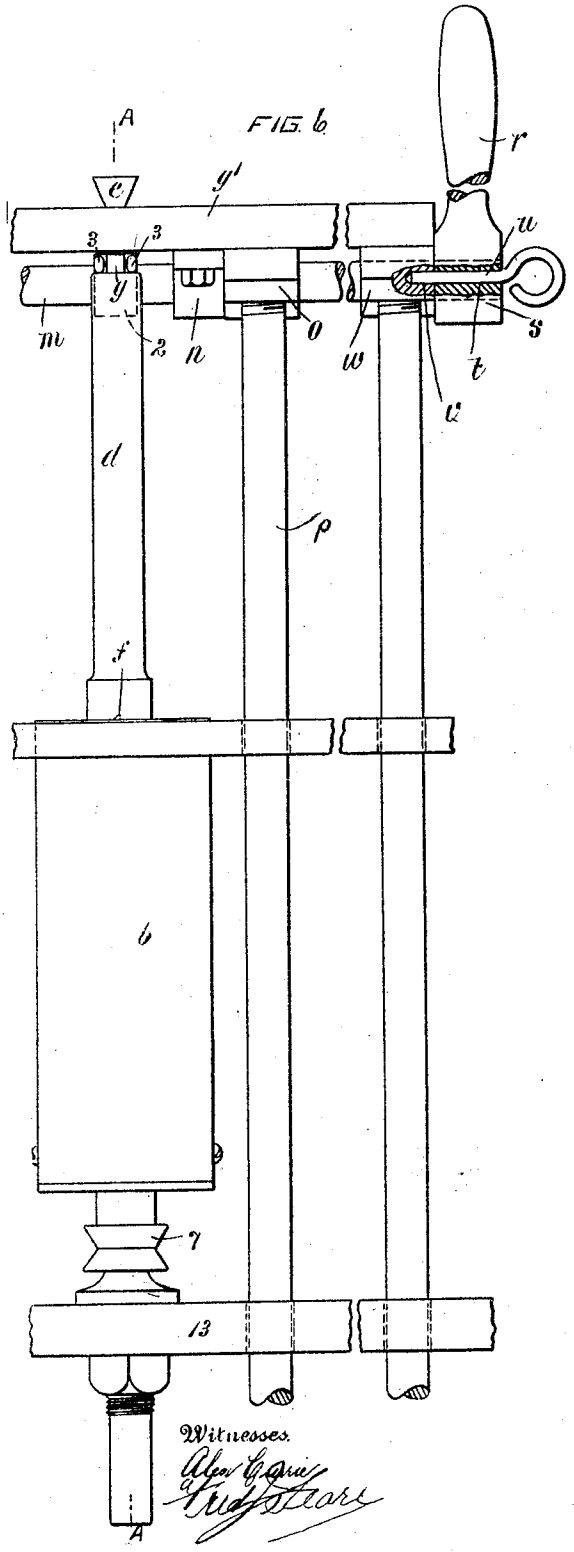
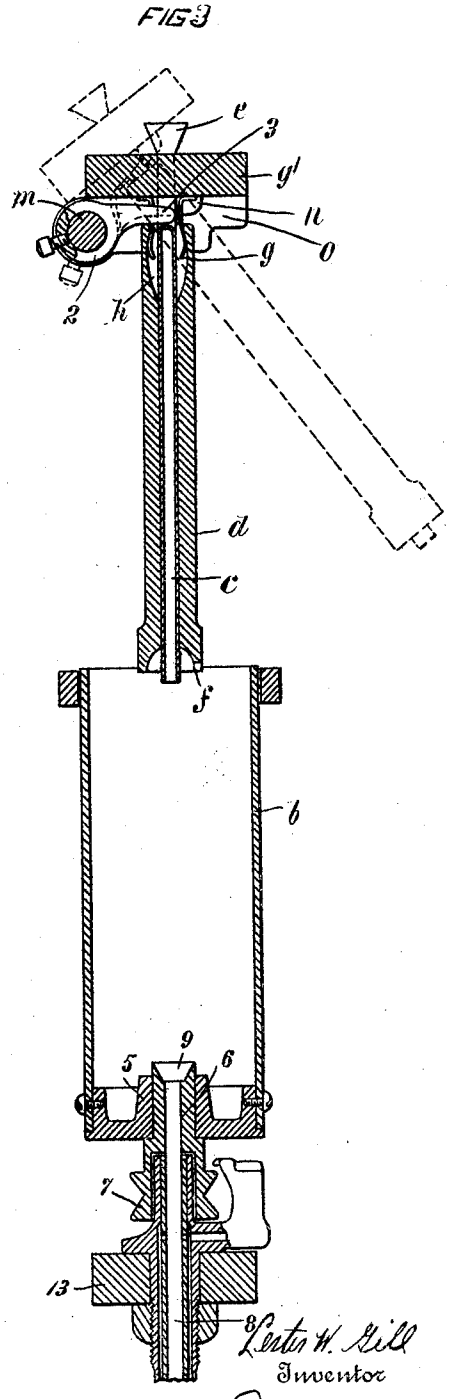


FIG 3



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3 SHEETS—SHEET 3.

FIG. 4.

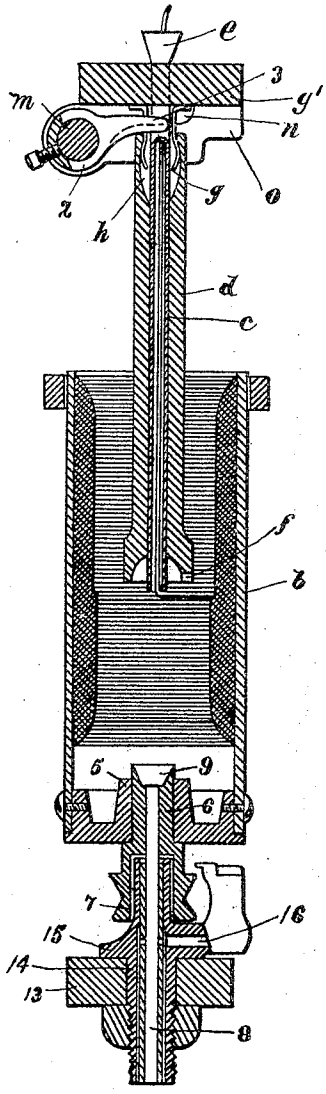
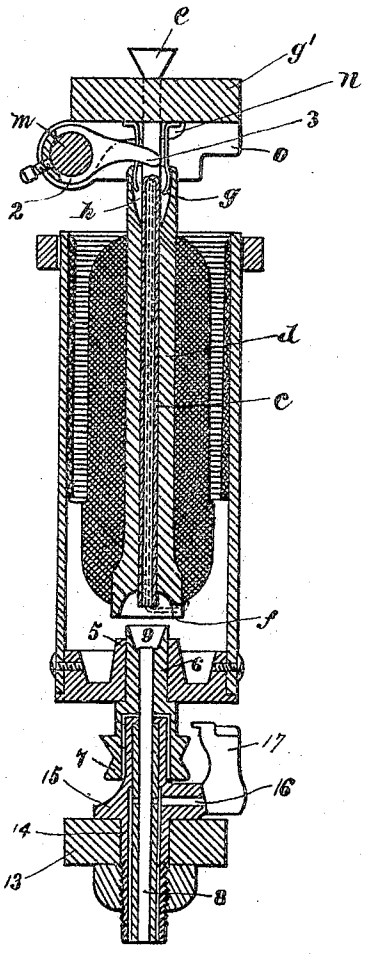


FIG. 5.



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UNITED STATES PATENT OFFICE.

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SPINNING-MACHINE.

No. 802,161. Specification of Letters Patent. Patented Oct. 17, 1905.

Application filed August 24, 1904. Serial No. 221,927.

To all whom it may concern:

Be it known that I, LESTER WILLIS GILL, of the city of Kingston, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Spinning-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to the yarn or thread twisting and bobbin-winding mechanism of spinning-machines, and has for its object to provide a simple and efficient machine of the class described, with which a superior twisting effect upon the yarn or thread may be obtained, the use of fliers may be avoided, and the speed of the machine increased with a minimum breakage of the yarn or thread. For this purpose I employ a hollow rotatable member, upon the interior of which the yarn or thread is spun or wound by reciprocating said member with relation to a guiding member, preferably made in the form of a tube of a length sufficient to support a bobbin, upon which the yarn or thread may be transferred from the hollow rotatable member, as will be described. The guiding member may and preferably will be made stationary with relation to the reciprocating hollow spinning member, being secured to a bobbin-supporting rail, which is preferably hinged or pivoted, so as to permit the guiding member to be moved into a position inclined with relation to the path of movement of the spinning member to facilitate putting on and taking off the bobbins. Provision may also be made for moving the bobbin longitudinally on the guiding member. These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a face view of a portion of the winding end of a spinning-machine embodying this invention; Fig. 2, a detail in section to be referred to; Fig. 3, a vertical sectional detail to be referred to; Figs. 4 and 5, sectional views to illustrate the winding and doffing of the yarn, and Fig. 6 a modification to be referred to.

I have illustrated and will describe in detail only the parts to which my invention has immediate relation, excepting the means for reciprocating the hollow spinning member or the bobbin-carrying rail, which may be of any well-known reciprocating means at present utilized as part of or in connection with spinning-machines.

My improved winding members consist of a series of cylindrical devices *b*, and preferably a series of tubes *c*, the latter being adapted to have a series of bobbins *d* slipped thereover. The cylindrical devices *b* are simultaneously rotated at a high rate of speed, preferably about twenty thousand (20,000) revolutions per minute, which may be effected in any suitable or preferred manner and, as represented, by providing a pulley 7 at the lower end of a bushing 6, set rigidly in a head 5, which closes the lower end of the cylindrical winding or spinning member *b*, the said bushing having its upper end in the form of a cup 9 and having rigidly secured in it a spindle 8, which extends downwardly into a suitable bearing carried by a rail 13, extending from end to end of the machine and connected with a reciprocating frame 20, which is reciprocated by any preferred means. (Not shown.)

The bearing referred to comprises the usual sleeve-bearing proper, 14, formed with an annular flange 15, which rests upon the rail 13, and is formed with an oil-duct 16, leading from an oil-cup 17, all of which is of ordinary and well-known construction.

The bobbins *d* may be frictionally held in place on the guide-tubes *c* by means of spring-fingers *g*, secured to the under side of the rail *g'*, and the upper ends of said bobbins may be interiorly enlarged, as at *h*, to allow of their being engaged by the said fingers, as shown in Fig. 3.

The bobbin-supporting member or rail *g'* extends from end to end of the machine and may be rotatably connected to a rod *m* by means of hinges *n*, and such rail rests when in its horizontal position upon a series of cross-pieces *o*, supported upon a bracket 21, secured rigidly to a rail 22, mounted rigidly in any usual way upon the frame of the machine. The rod *m* passes through and is freely supported by the cross-pieces *o*. Only one of the cylindrical winding devices *b*, tubes *c*, bobbins *d*, and cross-pieces *o* is shown, such being all that is necessary for purpose of illustration, although there are a multiplicity of them.

The rod *m*, and through it the rail *g'*, is tilted to different angular positions by a handle *r*, mounted rigidly upon one end of such rod

and having a tailpiece *s*, perforated, as at *t*, to enable a pin *u* to be inserted therethrough into either one of a series of holes *v* in the adjacent side of the cross-piece *w* and retain the rail in different angular positions. A series of sleeves 2 are clamped upon the rod *m*, and each has a pair of laterally-projecting fingers 3. Only one sleeve is shown, however, and its fingers straddle the tube *c* and spring-fingers *g*, and when the rod is rotated and these fingers depressed the bobbin is displaced and moved downwardly over the tube, as will be presently more fully set forth in the description of the operation, which is as follows: The yarn fed by the usual drawing-roll (not shown) is threaded downwardly through the distributing-tube and allowed to hang loosely in the winding member *b*. The latter is then rotated at a high rate of speed, (as by a belt running over the pulley 7,) thus causing the yarn to be thrown against the inside surface of the tube by centrifugal force, and it is thus wound upon such inside surface as fast as it passes the drawing-rolls and enters the tube. The high speed of the winding member, which is much greater than necessary to effect the winding, produces the required twist in the yarn, and the amount of twist can be regulated by altering the speed of such member or the speed of the drawing-rolls, or both. Twisting two or more threads together is effected in substantially the same way. The yarn is distributed vertically over the inner surface of the cylindrical winding member *b* by the vertical reciprocation of said member with relation to the guide-tube *c*. By reciprocating the cylindrical winding member *b* with relation to the fixed thread-guide a superior twisting effect upon the thread is obtained, inasmuch as the distance from the delivery-rolls to the point at which the thread or yarn is delivered to the cylindrical winding member is constant and remains the same irrespective of the position of the cylindrical winding member. By reciprocating the latter the machine in which the yarn or thread is wound upon the inner side of a cylinder and then doffed therefrom can be made of a minimum number of parts, and thereby materially simplified and cheapened in its cost.

In order to doff or transfer the yarn to the bobbin *d* and wind the same thereon, the reciprocating movement of the cup or cylindrical winding member *b* is stopped when the latter is in its uppermost position, and the drawing-rolls are also stopped. The rod *m* is then rotated to force the fingers 3 downwardly, thereby moving the bobbin down the tube until the yarn catches in the notch *f*, whereupon the cylinder *b* is again set in motion, and the yarn will at once wind from the cylinder upon the bobbin, and while this transfer is taking place if the bobbin is forced down a little farther the inside wall of the recess 18 will strike the rim of the cup 9, and the yarn will be cut close to the guide-tube. When the transfer is complete, the reciprocating cylindrically-winding member is caused to resume its lowest position, and the rod *m* is then rotated to raise the fingers 3, thereby moving the rail *g'* and bobbin to bring the latter to a position out of alinement with the cylindrical winding member. (See dotted position, Fig. 2.) This throws the bobbin, full of yarn, into a position where it can be easily removed from the tube *c* and an empty one put on. When this is done, the rail is returned to its first position and the operation repeated.

I prefer to reciprocate the hollow winding member and to use in conjunction therewith a thread or yarn guide in the form of a tube, upon which the bobbin may be mounted; but it is obvious that the guiding-tube may be used to advantage in machines in which the bobbin-rail, with the guide-tube attached thereto, is reciprocated with relation to the the winding-cylinder, which construction is represented in Fig. 6, wherein the cross-pieces *o*, which support the rail *g'*, are carried upon the upper ends of vertical rods *p*, which are reciprocated by any preferred means. (Not shown.)

What I claim is as follows:

1. In a spinning and twisting machine, in combination, a hollow rotatable member upon the interior of which the yarn or thread is wound, a guiding member coöperating with said hollow rotatable member to deliver the yarn or thread within the same, means to rotate said hollow member, and means to reciprocate said hollow member, substantially as described.

2. In a spinning-machine the combination with a bobbin-support, of a rotatable member adapted to inclose a bobbin upon the support, a yarn guiding and distributing member carried by the bobbin-support and extending into the rotatable inclosing member and adapted to have the bobbin slipped thereon, means whereby a reciprocatory movement is imparted to one of such members, means detachably securing the bobbin to its support, and means whereby the yarn is transferred from the rotatable member to the bobbin.

3. In a spinning-machine the combination with a bobbin-support, of a rotatable member adapted to inclose a bobbin upon the support; a tubular yarn guiding and distributing member carried by and extending through the bobbin-support into the rotatable inclosing member and adapted to have the bobbin slipped thereon, means whereby a reciprocatory movement is imparted to one of such members, means detachably securing the bobbin to its support and means whereby the yarn is transferred from the rotatable member to the bobbin.

4. In a spinning-machine the combination with a bobbin-support, of a rotatable member adapted to inclose a bobbin upon the support, a tubular yarn guiding and distributing member carried by the bobbin-support and extending into the rotatable inclosing member and adapted to have the bobbin slipped thereon, means whereby a reciprocatory movement is imparted to one of such members, means detachably securing the bobbin to its support, and the bobbin having a radial notch cut in one end whereby the yarn is transferred from the rotatable member to the bobbin.

5. In a spinning-machine the combination with hinged bobbin-supporting rail having an aperture therethrough, of a pair of resilient fingers carried by the rail one at each side of the aperture, a tubular yarn guiding and distributing member having one end projecting through the aperture and secured rigidly therein, a bobbin adapted to be slipped upon such tubular member and having the interior of one end recessed and adapted to be engaged by the resilient fingers and retained thereby yieldingly against displacement the opposite end of the bobbin having a radial notch, a vertically-arranged rotatable spindle, a cylindrical member secured rigidly upon the upper end of the spindle and adapted to inclose the bobbin, means whereby a reciprocatory movement is imparted to the bobbin-support and means whereby the spindle is rotated, substantially as described and for the purpose set forth.

6. In a spinning-machine the combination with a bobbin-support of a rotatable cylindrical member adapted to inclose a bobbin upon the support, a tubular yarn guiding and distributing member carried by and extending through the bobbin-support into the rotatable inclosing member and adapted to have the bobbin slipped thereon, means whereby a reciprocatory movement is imparted to the yarn guiding and distributing member, means detachably securing the bobbin to its support, and the bobbin having a radial notch cut in one end whereby the yarn is transferred from the rotatable member to the bobbin.

7. In a spinning-machine the combination with a bobbin-supporting rail having an aperture therethrough, of a pair of resilient fingers carried by the rail one at each side of the aperture, a tubular yarn guiding and distributing member having one end projecting through the aperture and secured rigidly therein, a bobbin adapted to be slipped upon such tubular member and having the interior of one end recessed and adapted to be engaged by the resilient fingers and retained thereby yieldingly against displacement the opposite end of the bobbin having a radial notch, a rotatable cylindrical member adapted to inclose the bobbin, a yarn-cutting device within such cylindrical member, means whereby a reciprocatory movement is imparted to the bobbin-support and means whereby the bobbin is displaced along such tubular member, substantially as described and for the purpose set forth.

8. In a spinning-machine the combination with hinged bobbin-supporting rail having an aperture therethrough, of a pair of resilient fingers carried by the rail one at each side of the aperture, a tubular yarn guiding and distributing member having one end projecting through the aperture and secured rigidly therein, a bobbin adapted to be slipped upon such tubular member and having the interior of one end recessed and adapted to be engaged by the resilient fingers and retained thereby yieldingly against displacement the opposite end of the bobbin having a radial notch, a rotatable cylindrical member adapted to inclose the bobbin, a yarn-cutting device within such cylindrical member, means whereby a reciprocatory movement is imparted to the bobbin-support and oscillatory fingers whereby the bobbin is displaced along such tubular member, substantially as described and for the purpose set forth.

9. In a spinning-machine the combination with a rotatable member, of a guiding member whereby the yarn is guided to the interior of the rotatable member, and means whereby a reciprocatory movement is imparted to such rotatable member for the purpose set forth.

10. In a spinning-machine the combination with a bobbin-support, of a rotatable member adapted to inclose a bobbin upon the support, a yarn guiding and distributing member carried by the bobbin-support and extending into the rotatable inclosing member and adapted to have the bobbin slipped thereon, means whereby a reciprocatory movement is imparted to the rotatable member for the purpose set forth.

11. In a spinning-machine the combination with a bobbin-support, of a rotatable member adapted to inclose a bobbin upon the support, a tubular yarn guiding and distributing member carried by the bobbin-support and extending into the rotatable inclosing member and adapted to have the bobbin slipped thereon, means whereby a reciprocatory movement is imparted to the rotatable member for the purpose set forth.

12. In a spinning and twisting machine, in combination, a hollow rotatable member upon the interior of which the yarn or thread is wound, a tubular guiding member constituting a support for a bobbin and coöperating with the said hollow rotatable member to deliver the yarn or thread within the same, a bobbin mounted upon said guiding member, and means whereby reciprocating movement is imparted to one of such members, for the purpose set forth.

13. In a spinning and twisting machine, in combination, a hollow rotatable member upon the interior of which the yarn or thread is wound, a tubular guiding member constituting a support for a bobbin and coöperating with the said hollow rotatable member to deliver the yarn or thread within the same, a bobbin mounted upon said guiding member, means whereby reciprocating movement is imparted to one of such members, and means within said hollow rotatable member coöperating with said bobbin to sever the thread or yarn within said hollow rotatable member, for the purpose specified.

In testimony whereof I have affixed my signature in presence of two witnesses.

LESTER WILLIS GILL.

Witnesses:

G. M. MACDONNELL,

GEO. LATURNEY.