A. K. MILLER.

YARN WINDING MACHINE.

APPLICATION FILED MAY 10, 1911.

1,019,173.

Patented Mar. 5, 1912.

2 SHEETS—SHEET 1.

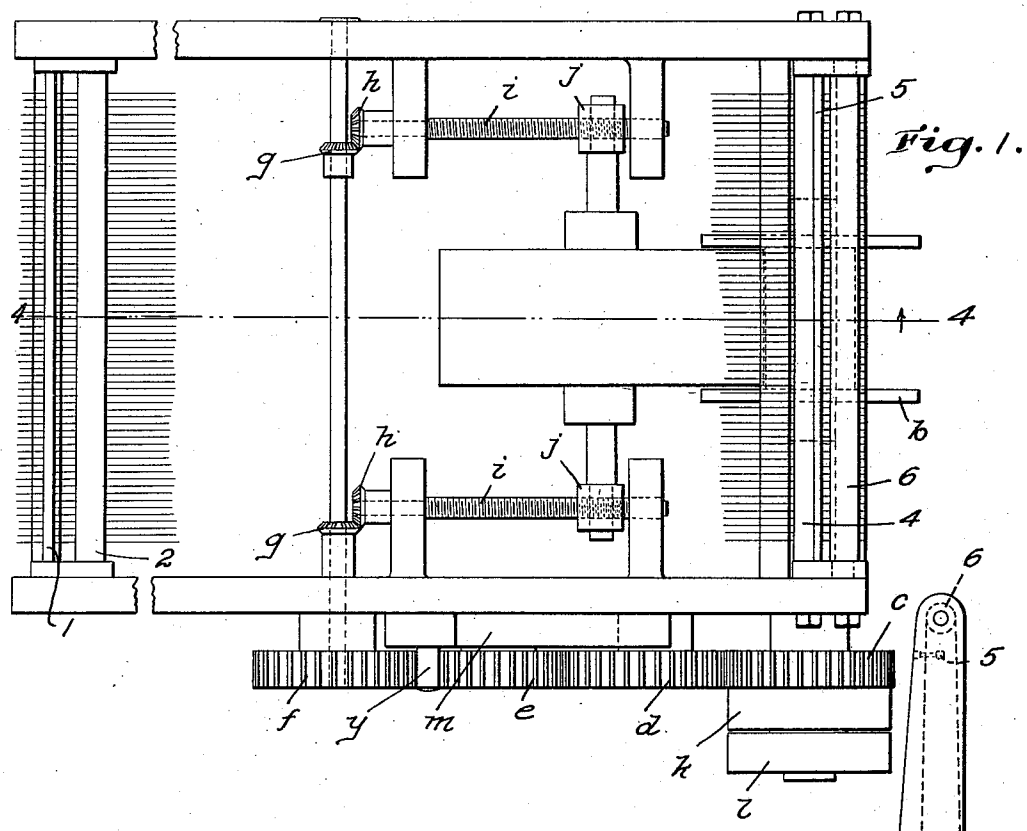

Fig. 1.

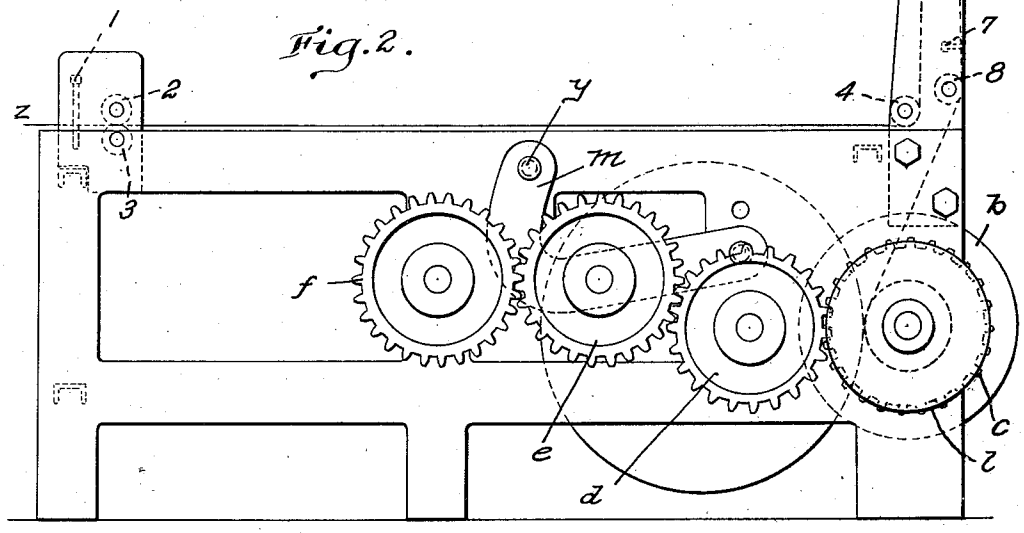

Fig. 2.

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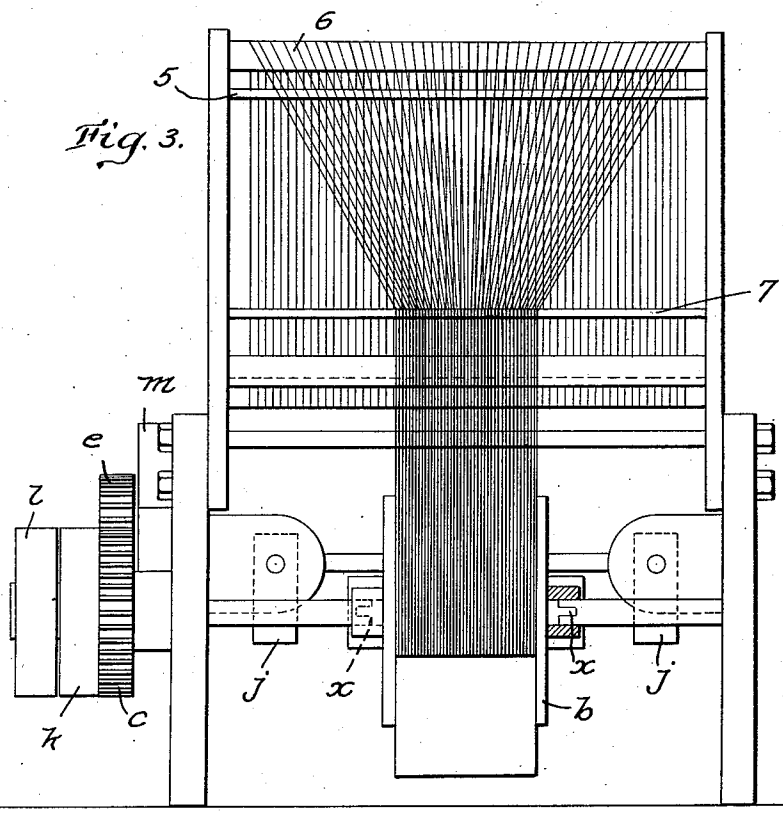
Fig. 3.



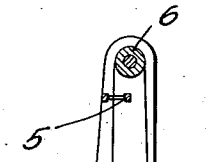
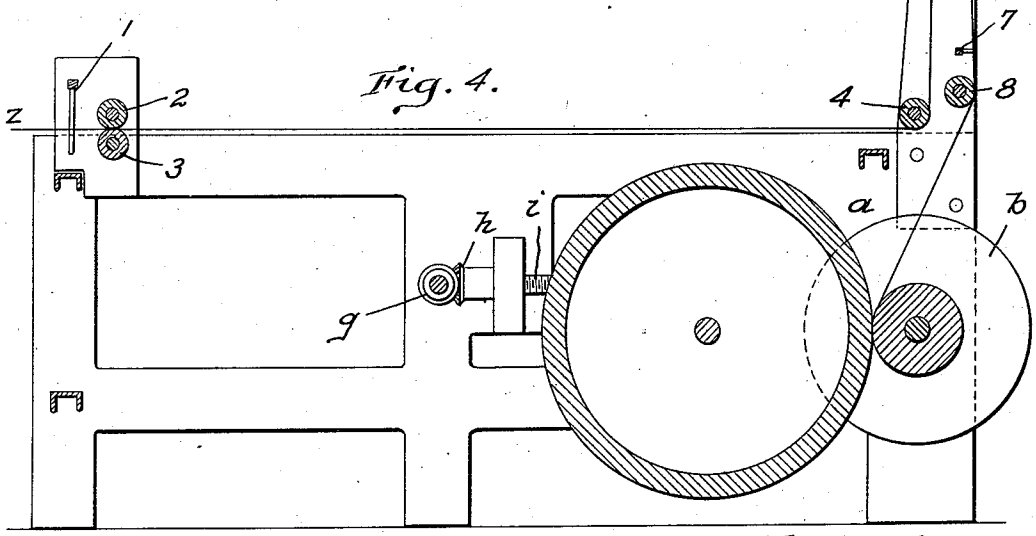


Fig. 4.



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UNITED STATES PATENT OFFICE.

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YARN-WINDING MACHINE.

1,019,173. Specification of Letters Patent. Patented Mar. 5, 1912.

Application filed May 10, 1911. Serial No. 626,149.

To all whom it may concern:

Be it known that I, ALFRED K. MILLER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Yarn-Winding Machines, of which the following is a specification.

This invention relates to a machine to control and regulate the winding of woolen, worsted, cotton, or other yarn, on a bobbin, section, beam or other container.

The object of the invention is to provide a machine which will make each strand of yarn in each layer that is wound upon any such bobbin or container occupy the same space thereon as every other strand and to make the diameter of the growing bobbin or other container uniform at every point at any given number of revolutions. A practical result of establishing such a uniform diameter is that when the strands of yarn are taken from the bobbin or other container on which they been wound by the operation of this machine, to a second bobbin or other container, each strand thus taken off is delivered at the same tension and at the same rate and is equal in yardage to every other strand. This machine produces such a uniformity of diameter in the growing bobbin, section, beam or other container, in the following manner. A gage device having a lateral surface equal in length to the winding surface of the bobbin or other container is placed adjacent to such winding surface at such a point as to leave a fixed space between this gage surface and the bobbin or other container for the first layer of yarn to be wound thereon. As the yarn is wound on the bobbin or other container this gage surface moves backward through the operation of a mechanical device later described, the speed of such retreat being always proportional to the revolution of the bobbin or other container, so that the space between the moving gage surface and the winding surface of the bobbin or other container in which each succeeding layer of yarn must run is always the same.

Referring to the drawings, Figure 1, is a top plan, Fig. 2 is a side elevation, Fig. 3, an end elevation, and Fig. 4, a sectional view on line indicated by 4—4.

Referring to Fig. 4, "*a*" indicates the gage surface above referred to, said gage being shown as a drum or roller; "*b*" indicates the bobbin or other container. Referring now to Figs. 1 and 2 it will be seen that this gage, drum or roller is connected to the shaft on which the bobbin or other container is revolved by a series of gears and by beveled gears and by a threaded shaft. These gears are shown at "*c*", "*d*" and "*e*" "*f*", and the beveled gears are shown at "*g*" and "*h*" in Fig. 1, and the threaded shafts at "*i*" in Fig. 1. This gage surface, drum or roller is suspended from the threaded shaft being supported by two blocks shown at "*j*" in Fig. 1, the inside of the blocks through which the shaft passes being threaded to correspond with the threads on the shaft. The bobbin or other container is driven by power connecting with a double pulley shown at "*k*", "*l*" in Fig. 1. As the bobbin or other container revolves the gears, beveled gears and threaded shaft also revolve and the gage surface, drum or roller resting on such shaft through the operation of the threaded shafts "*i*" in blocks "*j*", travels backward along the threads on the shafts, the rapidity of such retreat being always proportional to the revolutions of the bobbin or other container, thus leaving for each layer of yarn wound on such bobbin or other container a space between the gage surface, and winding surface equal to that occupied by each previous layer. The relation between the revolution of the bobbin or other container and the retreat of the gage surface can be varied by changing the gears shown at "*d*" and "*f*" in Fig. 2, and the given space which is allowed for each layer of yarn can thus be varied in accordance with the size of the yarn to be wound on such bobbin or other container or the number of strands to be wound thereon. This change of gears is facilitated by lifting the lever "*m*" shown in Figs. 1 and 2, which throws the gears out of mesh, so that they can be easily removed. This lever, when the gears are in place, is secured by a pin shown at "*y*."

The machine as illustrated in the drawing is shown in connection with an examining frame, so that the yarn before passing on to the bobbin can be inspected and imperfections taken out. The strands of yarn on first reaching the machine at the point "*z*"

Figs. 2 and 4, pass through a comb #1, and two rollers 2, 3, and then pass along the top of the machine where the inspection takes place, to roller 4, then upward through a second comb 5, and over the roller 6 and downward through a reducing reed 7 to another roller 8, passing from there direct to the winding surface of the bobbin or other container, on which they are wound under the conditions produced by the adjacent gage surface, as before set forth. After the bobbin or other container has the desired amount of yarn wound thereon, it can be removed from the machine and another empty one substituted, the shaft on which the bobbin or other container revolves being constructed to allow this to be done. Couplings to enable the bobbin or other container to be removed are indicated at "*x*" in Fig. 3.

No mechanism is shown in the accompanying drawings for returning the gage surface to its primary situation preparatory to winding a second and successive bobbins or other containers, but this can be accomplished by reversing the running of the machine, the speed of such return being accelerated by a separate set of gears or other mechanical device.

By using the same gears "*d*" and "*f*" shown in Fig. 2, and the same adjustment in winding two or more bobbins, or other containers, and by revolving the winding surfaces of all, the same number of revolutions, it is thus possible to insure equal yardage and equal conditions in the winding on the several bobbins thus wound. They can afterward be unwound together from a common shaft without variation in the length or tension in the strands of yarn on the several bobbins, sections, or other containers.

Having thus described my invention I declare that what I claim as new, is,—

1. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage mounted adjacent to the winding surface of such container, and mechanism for moving the gage away from the container as the yarn accumulates, to establish a given space into which each layer of yarn must wind.

2. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage device mounted adjacent to the winding surface of the container, to allow a given space for the first layer of yarn, means for moving the gage device away from the winding surface at a predetermined speed to give each accumulating layer of yarn a fixed amount of space in which to wind, and means whereby the size of such space may be regulated.

3. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage device with a lateral surface mounted adjacent to the winding surface of the container, and means to move such gage device away from the winding surface, to establish a predetermined space between the winding surface and the lateral surface of the gage in which each layer of yarn must wind.

4. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage device with a lateral surface mounted adjacent to the winding surface of the container, means to move such gage device away from the winding surface at a predetermined rate to establish a diameter on the winding surface of the container equal at all points at any given number of revolutions of the container, and means for regulating such diameter.

5. In a machine for regulating and controlling the winding of wollen, worsted, cotton or other yarn upon a container, a gage placed adjacent to the winding surface of such container, a threaded shaft having threaded engagement with said gage, a device to revolve such shaft and move such gage device away from the container at a predetermined speed, to establish a fixed amount of space between the gage and the winding surface of the container in which each layer of yarn must wind, with means whereby the size of such space may be regulated.

6. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container a gage placed adjacent to the winding surface of such container, threaded shafts from which such gage is suspended, blocks through which the threaded shafts pass with corresponding threads inside traveling on such threaded shafts and supporting such gage, gears connecting such threaded shafts to the shaft revolving the container, to move the gage backward from the winding surface of the container as the yarn accumulates, removable gears in such gear connection to establish the rate at which such gage shall move backward from the container and regulate the space between the container and the gage into which each layer of yarn must wind.

7. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage placed adjacent to the winding surface of such container, threaded shafts passing through blocks attached to such gage with threads inside the blocks to correspond with the threads on the shafts, gears connecting such threaded shafts with the shaft revolving the container, to move the gage backward on the threaded shaft from the winding surface of the container as the yarn accumulates thereon, with removable gears in

such gear connection to regulate the rate at which such gage shall move away from the container and establish a fixed amount of space between the container and the gage in which each layer of yarn must wind.

8. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage placed adjacent to the winding surface of such container, threaded shafts, with corresponding threads in holes in the gage or connected parts thereof, through which the shafts pass, gears connecting such threaded shafts with the shaft revolving the container, to move the gage backward on the threaded shaft from the winding surface of the container as the yarn accumulates thereon, with removable gears in such gear connection to regulate the rate at which such gage shall move away from the container and establish a predetermined space between the container and the gage in which each layer of yarn must wind.

9. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage placed adjacent to the winding surface of such container, threaded shafts, with corresponding threads in holes in the gage, or connected parts thereof, through which the shafts pass, gears connecting such threaded shafts with the shaft revolving the container, to move the gage backward on the threaded shaft from the winding surface of the container as the yarn accumulates thereon, with removable gears in such gear connection to regulate the rate at which such gage shall move away from the container and establish a diameter in the winding surface of the container equal at all points at any given number of revolutions of the container.

10. In a machine for regulating and controlling the winding of woolen, worsted, cotton or other yarn upon a container, a gage placed adjacent to the winding surface of such container, threaded shafts, with corresponding threads in holes in the gage or connected parts thereof, through which the shafts pass, gears connecting such threaded shafts with the shaft revolving the container, to move the gage backward on the threaded shaft from the winding surface of the container as the yarn accumulates thereon, with removable gears in such gear connection to regulate the rate at which such gage shall move away from the container and establish a predetermined space between the container and the gage in which each layer of yarn must wind, with an examining frame for the yarn to pass over for inspection before being wound on the container.

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

ALFRED K. MILLER.

Witnesses:
HENRY A. LOTHROP,
MILAN F. STEVENS.