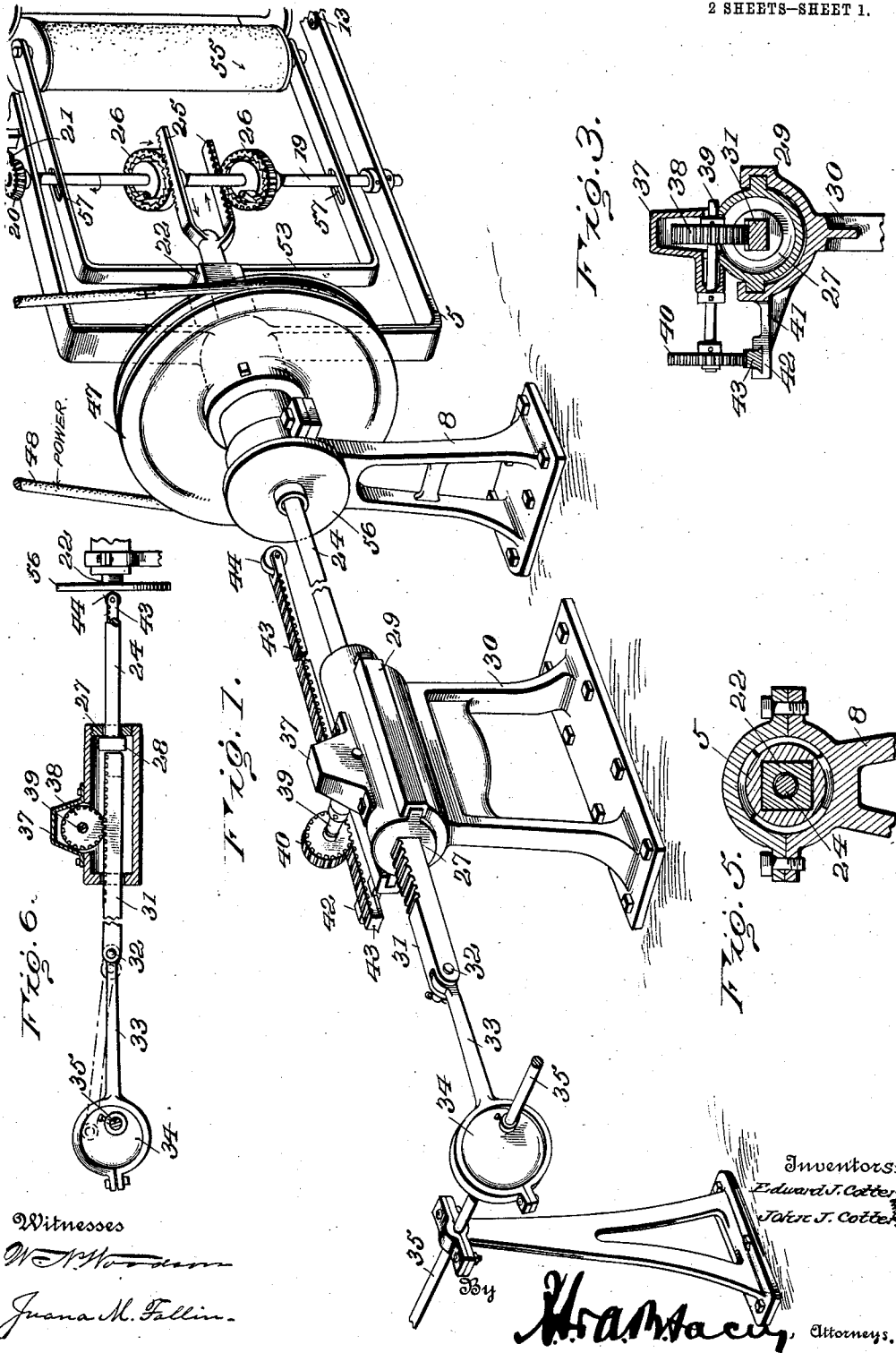


E. J. & J. J. COTTER.
SPINNING MACHINE.
APPLICATION FILED FEB. 7, 1911.

1,021,448.

Patented Mar. 26, 1912.

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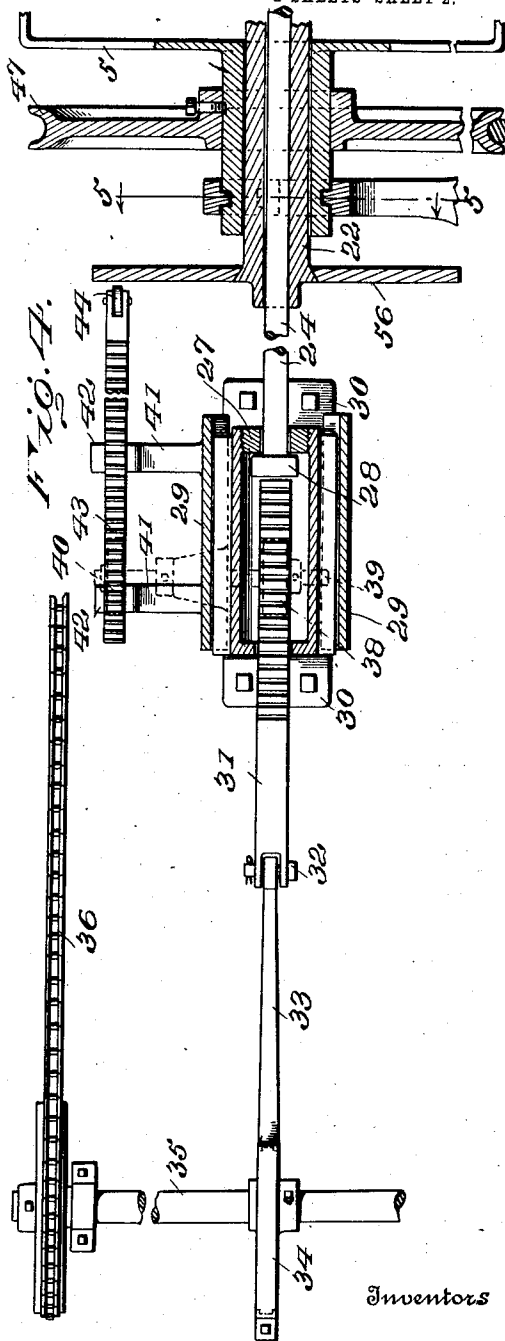
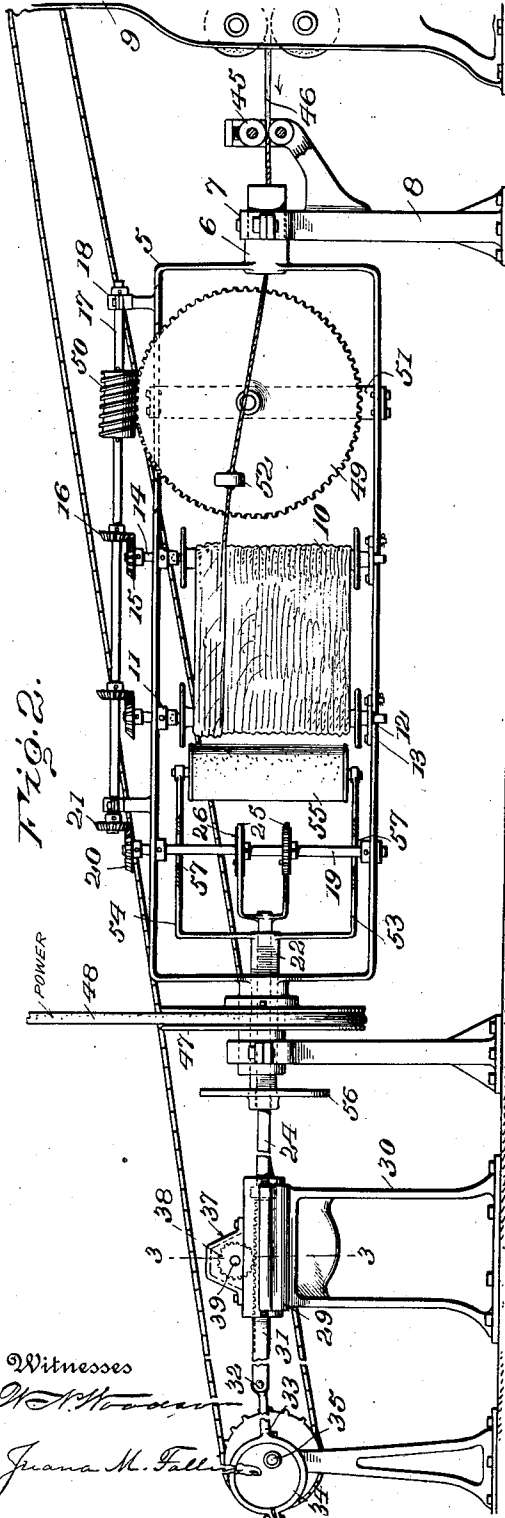


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W. H. H. H., Attorneys.

UNITED STATES PATENT OFFICE.

EDWARD J. COTTER AND JOHN J. COTTER, OF PHILADELPHIA, PENNSYLVANIA.

SPINNING-MACHINE.

1,021,448.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed February 7, 1911. Serial No. 607,134.

To all whom it may concern:

Be it known that we, EDWARD J. COTTER and JOHN J. COTTER, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Spinning-Machines, of which the following is a specification.

This invention relates to spinning machines and more particularly to a machine especially designed for twisting cotton, wool and other fibrous material and forming the same into cops or skeins.

Under the present method of manufacturing cotton yarn, the cotton from the carding machine is wound on a spool and the latter transferred to the mule room, where the cotton is twisted and spun into cops and subsequently removed to the reel room, and formed into skeins.

The primary object of the present invention is to provide a machine of simple and durable construction which shall take the cotton directly from the carding machine and twist and form the yarn into skeins or cops at one operation thereof, thus dispensing with the mule and reel mechanism employed for this purpose and consequently materially reducing the cost of manufacture.

A further object of the invention is to provide means for evenly distributing the yarn on the bobbins, thereby to produce a cop or skein of uniform size and thickness.

A further object is to provide a novel form of regulator for automatically varying the stroke of the bobbin actuating rod as the skein or cop increases in size so that the strands thereof will be of uniform thickness.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a perspective view of a combined twisting and winding machine con-

structed in accordance with our invention, the rear portion of the machine being broken away; Fig. 2 is a side elevation of the machine, showing the manner of receiving the cotton filaments or slivers from the carding machine; Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2; Fig. 4 is a top plan view partly in section, showing the position of the head of the actuating rod with respect to the adjacent end of the toothed bar when beginning to wind yarn on a bobbin; Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 4; Fig. 6 is a detail longitudinal sectional view, showing in full lines the inner end of the toothed bar in engagement with the head of the actuating rod, and in dotted lines the movement of the tooth bar to vary the stroke of the actuating rod.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The improved machine forming the subject matter of the present invention comprises an open-sided substantially rectangular frame 5 having its opposite ends provided with longitudinally disposed sleeves 6, the latter being journaled in suitable bearings 7 carried by spaced standards or pedestals 8, secured to the floor in front of a carding machine, indicated at 9.

Mounted for rotation on the frame 5, are spaced spools or bobbins 10, upon which the yarn is wound to form a skein. One end of each spool is seated in a collar 11, while the other end thereof passes through a slot 12 in the frame 5, and is held within said slot by a suitable locking member or catch 13, so that after the skein is formed, the bobbins may be readily detached from the skein by releasing the fastening device 13 and withdrawing the bobbins from the collars 11. The collars 11 are rigidly secured to spaced stub shafts 14 journaled in the frame 5, each stub shaft being provided with a bevel pinion 15 which meshes with a corresponding pinion 16 secured to a longitudinally disposed shaft 17, the latter being mounted for rotation in suitable bearings 18 adjacent one side of the frame 5, as shown.

Extending transversely of the machine at one end of the frame 5, is a driving shaft 19 having a bevel pinion 20 which meshes with a corresponding pinion on the shaft 17 so that when the shaft 19 is rotated, motion

will be transmitted through the medium of the before mentioned gearing to rotate the bobbins, thus to effect the winding of the yarn thereon.

5 The forward sleeve 6 is provided with a square opening 21 in which is seated a correspondingly squared shank 22, the latter being provided with a cylindrical bore 23 for the reception of the adjacent end of an
10 actuating rod 24. Secured to the inner end of the rod 24, are spaced arms 25 which extend above and below the driving shaft 19 and are provided with teeth, which latter engage suitable pinions 26 secured to said
15 driving shaft. The pinions 26 are provided with pawl and ratchet mechanism, so that as the rod 24 is reciprocated, a continuous rotary movement in one direction will be imparted to the driving shaft, and thence
20 through the medium of the shaft 17 to the spools or bobbins to effect the rotation thereof.

The outer end of the rod 24 is extended within a cylindrical slide 27 and is provided with an enlarged head 28 which normally bears against the adjacent end of the slide 27, as best shown in Fig. 4 of the drawings. The slide 27 is mounted for reciprocation in suitable guides 29 mounted on a
30 standard or pedestal 30 at the front of the machine and in spaced relation to the adjacent standard 8 of the supporting frame.

Arranged within the slide 27 is a rack bar 31, to which is pivotally connected at 32, a
35 pitman 33, the latter being in turn connected with an eccentric 34 mounted on a shaft 35. The shaft 35 may be driven from any suitable source of power, but is preferably connected with the carding machine
40 through the medium of a belt or chain 36 so that when the carding machine is in operation, motion will be transmitted through said belt to operate the twisting and winding mechanism.

45 Secured to the top of the cylindrical slide 27, is a casing or housing 37, in which is mounted a pinion 38, the teeth of which normally mesh with the teeth on the rack 31. The pinion 38 is secured to a stub shaft 39,
50 one end of which is extended laterally beyond the casing 37 to form a support for a similar pinion 40.

Extending laterally from the standard or pedestal 30, are spaced brackets 41 having
55 their outer ends provided with dove-tailed recesses 42 in which is slidably mounted a rack bar 43, the teeth of which mesh with the teeth on the pinion 40, the inner end of said rack bar 43 being bifurcated and provided with an anti-friction roller 44 for the
60 purpose hereinafter referred to.

Arranged at the rear of the machine and supported on the adjacent pedestal 8, are co-acting twisting rolls 45, between which
65 the cotton 46 from the carding machine

passes on its way to the wheels or spools, said rolls serving as a means for supporting the cotton slivers or filaments during the twisting operation.

Secured to one of the sleeves 6, preferably
70 the forward sleeve, is a driving wheel or pulley 47, over which extends a belt 48 for connection with a line shaft, motor or other suitable source of power for rotating the
75 frame 5 and its associated parts to effect the twisting of the cotton filaments to produce the yarn. It will of course be understood that the line shaft or motor, (not shown), will be provided with suitable gearing so that the speed of rotation of the frame 5
80 may be regulated at will according to the nature of the material being acted upon, and the degree of twist desired to be imparted thereto. Thus it will be seen that as the
85 rod 24 is reciprocated by the eccentric 34, the bobbins 10 will be rotated to wind the yarn thereupon, and consequently draw the cotton from the carding machine through the rolls 45, the twisting of the cotton into
90 yarn being effected by the rotation of the frame 5, as before stated.

In order to insure the uniform distribution of the yarn on the bobbins 10 during the winding operation, there is provided a distributing member 49, preferably in the form
95 of a relatively large worm wheel or disk which meshes with a corresponding worm 50 secured to the longitudinal shaft 17. The distributing member or disk 49 is journaled on a transverse bar 51 secured to the sup-
100 porting frame 5 and is provided on one side thereof with a laterally extending guiding loop or eye 52, through which the yarn passes on its way to the bobbin or bobbins. The guiding eye 52 is swiveled in the dis-
105 tributing member 49 so as to permit free rotation of said eye or loop and thus prevent twisting or tangling of the yarn during the winding operation.

As a means for regulating the speed of rotation
110 of the bobbins 10 according to the amount of yarn wound thereon, and thus prevent unequal twisting of the yarn, and the formation of lumps or thickened portions in said yarn, there is provided a regu-
115 lator 53, preferably in the form of a substantially U-shaped bail or yoke 54, having its closed end rigidly secured to the square shank 22 and its open end provided with a roller 55 adapted to bear against the yarn
120 comprising the skein or cop.

The shank 22 extends longitudinally through the adjacent sleeve 6 and is provided with a terminal impact plate or disk
125 56, which latter extends in the path of movement of the roller 44 on the rack 31, so that as the skein or cop increases in size, the yarn will bear against the roller 55 and force the disk 56 against the roller 44, and through the medium of the pinion and rack 40 and
130

43, cause the pinion 38 to move the rack 31 a tooth at a time, thus to vary the stroke of the actuating rod 24 and consequently impart an intermittent rotary movement to the bobbins or spools 10.

Under normal conditions, that is to say, when just starting to wind the yarn on the bobbin or bobbins 10 to produce a cop or skein, the inner end of the rack 31 is in engagement with the head 28, as best shown in Fig. 4 of the drawings. As the skein increases in size, however, the yarn will bear against the roller 55 and move the yoke 54 longitudinally of the supporting frame 5 and separate the inner end of the rack 31 from the head 28, thereby shifting the eccentric and cause a slight lost motion at the head 28, which lost motion is increased as the size of the skein or cop increases. As a result of this lost motion between the actuating rod 24 and slide 27, the speed of rotation of the bobbins 10 will gradually decrease according to the amount of yarn wound thereon, as will be readily understood.

Suitable slots 57 are formed in the side bars of the regulator yoke 54 in order to permit free longitudinal movement of said yoke within the frame without interfering with the rotation of the driving shaft 19.

It will here be noted that the frame 5 and its associated parts revolve continuously in one direction in a horizontal plane to effect the twisting operation, while the bobbins 10 rotate independently of the frame, thus permitting twisting and winding of the yarn in a single machine.

In operation, the sliver from the carding machine is fed between the rolls 45 and through the guiding loop 52 to the spools or bobbins 10, the yarn being wrapped one or more times around said bobbins in order to afford a firm initial anchorage for the same. Power is then applied to the driving wheel or pulley 47 and shaft 35, which causes the frame 5 to rotate to effect the twisting operation and the bobbins 10 to wind the twisted yarn on said bobbins to form a skein, the rotation of the bobbins being controlled by the regulator 54, as before stated. After the skein is formed, the latch members 13 are released and the bobbins removed from the supporting frame and the skein detached. By substituting a single bobbin or spool for the mating bobbins shown in the drawings, a cop may be formed with equally good results.

It will be understood that while but a single twisting and winding machine is shown and described, a gang or set of said machines may be used in connection with each carding device, it being preferred to use twenty-four of the twisting and winding machines with each carding device. It will also be understood that the supporting frame and

its associated parts may be arranged to rotate in a vertical plane, instead of a horizontal plane, without departing from the spirit of the invention.

Having thus described the invention, 70 what is claimed as new is:

1. In a machine of the class described, means for twisting yarn, a bobbin, means for positively rotating the bobbin to wind the yarn thereon, and means actuated by engagement with the yarn on said bobbin for retarding the movement thereof as the amount of yarn on the bobbin increases. 75

2. In a machine of the class described, means for twisting yarn, a bobbin, means for positively rotating the bobbin to wind the yarn thereon, means for evenly distributing the yarn on said bobbin, and means actuated by engagement with the yarn on the bobbin for retarding the movement of said bobbin as the amount of yarn on the bobbin increases. 80

3. In a machine of the class described, means for twisting yarn, a rotary bobbin having a fixed center of movement, means for positively rotating the bobbin to wind the twisted yarn thereon to form a skein, and means operable by engagement with the skein for automatically retarding the movement of said bobbin as the skein increases in size. 85

4. In a machine of the class described, means for twisting yarn, a bobbin upon which the yarn is wound, a reciprocating actuating member operatively connected with the bobbin for rotating the latter, and means actuated by engagement with the yarn on said bobbin for varying the stroke of the actuating member as the amount of yarn on the bobbin increases. 90

5. In a machine of the class described, a frame, a bobbin journaled on the frame, means for delivering material to the frame, means for positively rotating the bobbin to wind the material thereon, means for rotating the frame to effect the twisting of the material, and means for retarding the movement of the bobbin winding mechanism as the amount of material on the bobbin increases. 95

6. In a machine of the class described, a frame, a bobbin journaled on the frame, means for positively rotating the bobbin to wind yarn thereon, means for uniformly distributing yarn on the bobbin during the winding operation, means for rotating the frame and distributing means to effect the twisting of the yarn, and means operatively connected with said bobbin and actuated by contact with the yarn on the bobbin for automatically retarding the rotary movement of the winding mechanism as the amount of yarn on the bobbin increases. 100

7. In a machine of the class described, a frame, a bobbin journaled on the frame, a 105

power shaft, an actuating rod operatively connected with the power shaft and bobbin respectively, for rotating the latter, means for rotating the frame, and a regulator operatively connected with the actuating rod and operable by engagement with the yarn on said bobbin to vary the speed of rotation of the bobbin as the amount of yarn thereon increases.

8. In a machine of the class described, a frame, bobbins journaled in the frame, a driving shaft operatively connected with the bobbins and provided with a ratchet wheel, a power shaft, a rod operatively connected with the power shaft and provided with a rack adapted to engage the ratchet wheel for rotating the bobbins to wind yarn thereon, means for rotating the frame, and a regulator operatively connected with the rod and actuated by engagement with the yarn on said bobbins to retard the speed of rotation of the bobbins as the yarn is wound thereon.

9. In a machine of the class described, a revolving frame, a bobbin journaled on the frame, means for feeding yarn to the bobbin, means for rotating the frame to effect the twisting of the yarn, a driving shaft operatively connected with the bobbin and provided with a ratchet wheel, a power shaft, means operatively connected with the power shaft and engaging the ratchet wheel for rotating the bobbin, and means operable by engagement with the yarn on the bobbin for changing the speed of rotation of said bobbin as the amount of yarn thereon increases.

10. In a machine of the class described, a frame, a bobbin journaled on the frame, a driving shaft operatively connected with the bobbin, means for feeding material to the frame, means for rotating said frame to effect the twisting of said material, a power shaft, a rod operatively connected with the power shaft and engaging the driving shaft for rotating the bobbin, rack and pinion mechanism operatively connected with the rod, and a regulator having a disk secured thereto and movable into engagement with the rack, said regulator being actuated by contact with the yarn on the bobbin to vary the speed of rotation of said bobbin.

11. In a machine of the class described, a frame, a bobbin mounted for rotation on the frame, a driving shaft operatively connected with the bobbin, ratchet wheels mounted on the driving shaft, a slide, a rod having one end thereof extending within the slide and its other end provided with toothed arms adapted to engage the ratchet wheels for rotating the bobbin, means for rotating the frame to effect the twisting of the yarn, a power shaft, a toothed bar having one end thereof operatively connected with the power shaft and its other end ex-

tending within the slide, rack and pinion mechanism operatively connected with the toothed bar, and a regulator mounted on the frame and provided with a disk extending in the path of movement of the rack, said regulator being actuated by engagement with the yarn on the bobbin to vary the speed of rotation of said bobbin as the amount of yarn thereon increases.

12. In a machine of the class described, a frame, a bobbin journaled on the frame, means for feeding yarn to the bobbin, means for rotating the frame to effect the twisting of the yarn, a driving shaft operatively connected with the bobbin, a slide, an actuating rod having one end thereof extending within the slide and its other end operatively connected with the driving shaft, a power shaft, a reciprocating toothed bar driven from the power shaft and extending within the slide, a rack, a stub shaft provided with spaced pinions, one of which engages the rack and the other the teeth on said reciprocating bar, and a regulator actuated by contact with the yarn on said bobbin to engage the rack and move the toothed bar with a step by step movement as the amount of yarn on the bobbin increases.

13. In a machine of the class described, a frame, spaced skein receiving bobbins journaled on the frame, a driving shaft operatively connected with said bobbins, means for rotating the frame to effect the twisting of the yarn, a slide, a rod having one end thereof extended within the slide and its other end operatively connected with the driving shaft for rotating the latter, a power shaft, a reciprocating toothed bar driven from the power shaft and extending within the slide, a movable rack bar, a stub shaft having spaced pinions mounted thereon, one of which is adapted to engage the toothed bar and the other the rack bar, a regulator actuated by contact with the yarn on the bobbin to engage the rack bar and move the toothed bar with a step by step movement as the amount of yarn on the bobbin increases, and means for distributing the yarn uniformly on the bobbin.

14. In a machine of the class described, spaced standards, a frame having oppositely disposed sleeves journaled in said standards, one of said sleeves having an angular opening formed therein, a bobbin journaled on the frame, a winding shaft operatively connected with the bobbin, a slide, an angular shank mounted for reciprocation in the opening in the adjacent sleeve and provided with a cylindrical bore, a rod mounted for reciprocation in said bore and having one end thereof extended within the slide and its other end operatively connected with the winding shaft for rotating the latter, a power shaft, a toothed

bar seated in the slide and operatively connected with the power shaft, a reciprocating rack bar, a stub shaft having spaced pinions, one of which engages the rack bar and the other the toothed bar, a yoke secured to the inner end of the angular shank and provided with a roller for contact with the yarn on the bobbin, a disk secured to the outer end of said shank and movable into engagement with the rack bar, said roller being actuated by engagement with the yarn on the bobbin to move the rack bar longitudinally with a step by step movement and vary the stroke of the toothed bar as the amount of yarn on the bobbin increases.

15. In a machine of the class described, spaced standards, a frame having spaced sleeves mounted for rotation in said standards, a bobbin journaled on the frame, a longitudinal shaft operatively connected with the bobbin, a driving shaft operatively connected with the longitudinal shaft, a worm secured to the longitudinal shaft, a distributing wheel meshing with the worm, a guiding eye swiveled on the distributing wheel and adapted to receive the cotton from a

carding machine, a power shaft, a rod extending through one of the sleeves and having its outer end operatively connected with the power shaft and its inner end operatively connected with the driving shaft, and a regulator actuated by engagement with the yarn to vary the stroke of the rod as the amount of yarn on the bobbin increases.

16. The combination with a carding machine, of a rotary frame, a bobbin mounted for rotation on said frame and adapted to receive filaments directly from the carding machine, means for rotating the frame to twist the filaments into yarn, means for positively rotating the bobbin independently of the frame to wind the yarn thereon, and means for retarding the movement of the winding mechanism as the amount of yarn on the bobbin increases.

In testimony whereof, we affix our signatures in presence of two witnesses.

EDWARD J. COTTER. [L. S.]

JOHN J. COTTER. [L. S.]

Witnesses:

JOHN J. FORAN,

JAMES A. McNELIS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."