

C. E. LOVEJOY.
 SPINNING MACHINE.
 APPLICATION FILED JULY 24, 1913.

1,167,169.

Patented Jan. 4, 1916.
 2 SHEETS—SHEET 1.

Fig. 1.

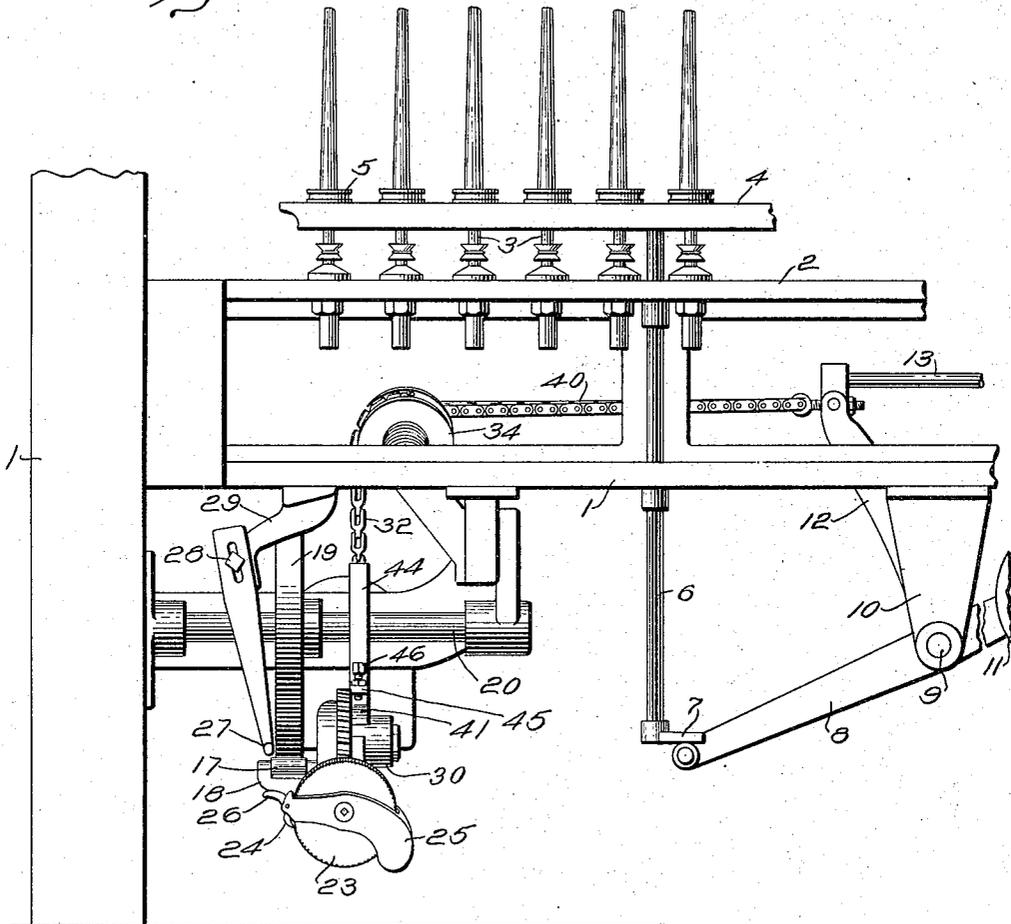
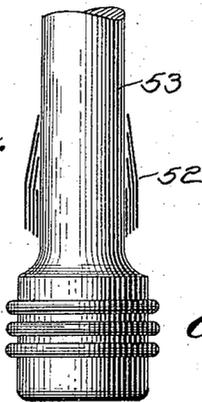


Fig. 2.



Witnesses,
Wm. H. F. Hatch
Beatrice J. Smith

Inventor
Charles E. Lovejoy
by Rob. H. Harris,
Atty.

C. E. LOVEJOY,
 SPINNING MACHINE.
 APPLICATION FILED JULY 24, 1913.

1,167,169.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 2.

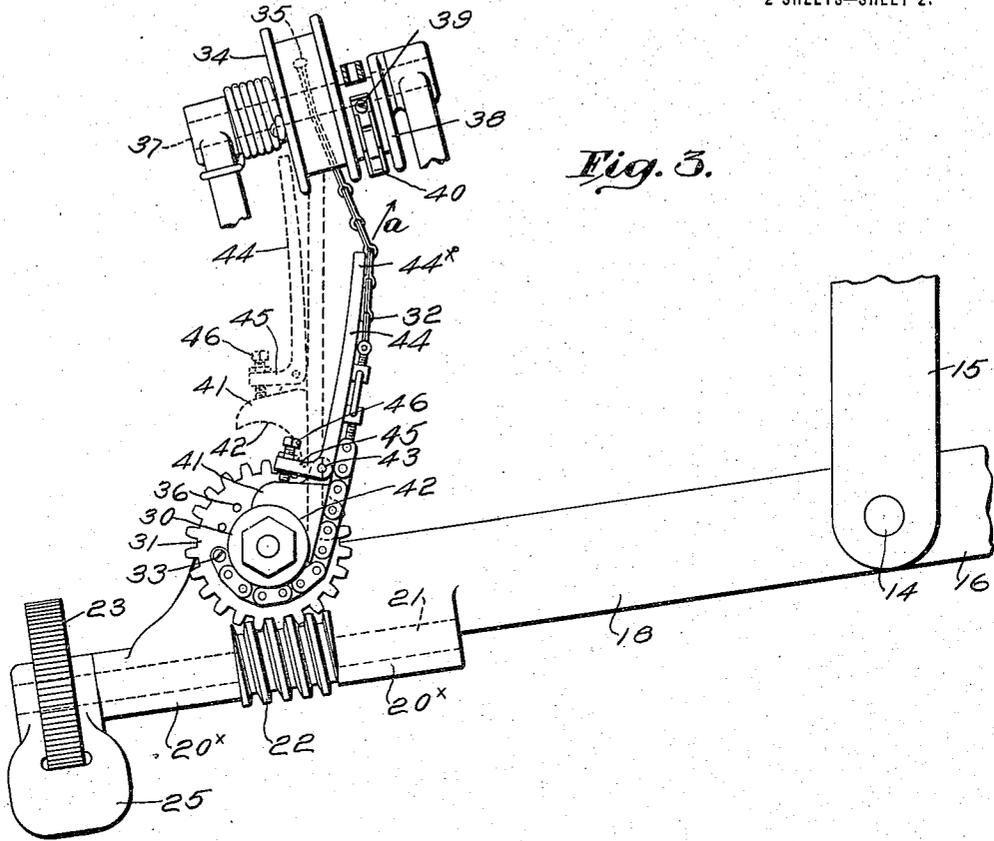


Fig. 3.

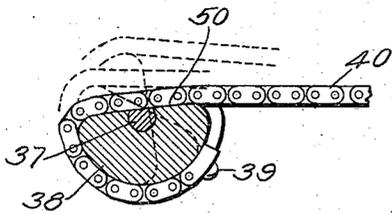


Fig. 4.

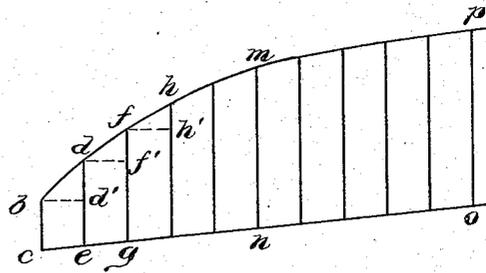


Fig. 5.

Witnesses,
Russell F. Hatch
Beatrice F. Smith

Inventor,
Charles E. Lovejoy
 by *Robt. P. Harris,*
Atty.

UNITED STATES PATENT OFFICE.

CHARLES E. LOVEJOY, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY,
OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

SPINNING-MACHINE.

1,167,169.

Specification of Letters Patent.

Patented Jan. 4, 1916.

Application filed July 24, 1913. Serial No. 780,863.

To all whom it may concern:

Be it known that I, CHARLES E. LOVEJOY, a citizen of the United States, residing at Lowell, county of Middlesex, and State of Massachusetts, have invented an Improvement in Spinning-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention to be hereinafter described relates to spinning machines, and more particularly to the mechanism for controlling the manner in which the yarn shall be wound upon the carriers or bobbins employed in such machines.

As well understood by those skilled in the art, some filling carriers or bobbins now largely used in filling replenishing looms, require preliminary or initial windings to be placed thereon for cooperation with the feeler mechanism of such looms, so that after the regular or service windings have become practically exhausted, the feeler mechanism may act upon such preliminary or initial windings to cause filling replenishing prior to complete exhaustion of the filling in a running shuttle.

The yarn that remains upon the ejected carrier or bobbin following the action of the filling replenishing mechanism constitutes waste and must be removed from such carrier or bobbin before such carrier or bobbin can be again loaded with yarn. It is, therefore, desirable that the preliminary or initial winding—sometimes called the “bunch”—with which the feeler mechanism cooperates to cause filling replenishment, should contain as little yarn as possible consistent with the intended purpose and function.

In forming the preliminary or initial windings, however, due regard must be had to the formation of the completely wound carrier or bobbin to the end that it shall contain a maximum amount of yarn and that the yarn may be properly drawn therefrom during the weaving operation. It is impracticable to pass abruptly from the preliminary or initial winds to the regular or service filling wind, but the windings must merge or pass by proper gradation from the

preliminary or initial winds to the regular or service filling wind. This merging from the preliminary or initial winds, or bunch as it may be termed, into the regular or service wind is known as the “get away” and should be accomplished as quickly as possible, consistent with proper formation of the wound bobbin.

With the above general facts in view, the present invention contemplates among other things, the provision of means, whereby the layers of preliminary or initial windings may be made relatively short in the formation of suitable windings for cooperation with the feeler mechanism, and a quick “get away” may be secured with due regard also to the proper formation of yarn load at the bottom or base of the bobbin, all as will more fully appear in connection with the following description and accompanying drawings of one form of means for carrying the invention into practical effect, it being understood that the invention is not limited to the particular means shown and described as a good, simple, and efficient embodiment thereof, but that it may be variously modified within the true scope of the actual invention which is definitely set forth by the claims.

In the drawings:—Figure 1 is a front elevation of a portion of a spinning-frame embodying the present invention, the parts being shown in position to begin the winding of a set of bobbins; Fig. 2 is a view of the lower portion of a bobbin showing in an exaggerated and graphic manner certain preliminary or initial windings produced by the present invention; Fig. 3 is an enlarged detached view in side elevation, showing part of the builder motion and features of the present invention; Fig. 4 is a detail showing in section the cam pulley and attached connection leading to the rocker arm; and Fig. 5 is a diagram showing in a general way and by an approximate curve the relations of the preliminary or initial windings, the quick “get away” and the then gradual approach to regular or service wind.

In the illustrated embodiment of the invention, the ring-rail is raised by a suitable lifting weight and lowered by means actuated through the builder motion, the usual

winding mechanism thereof letting off the flexible connection from the barrel to effect a change in the path of traverse of the ring-rail as the yarn is laid upon the carrier or bobbin. As is well understood by those familiar with this general character of mechanism, the gradual unwinding of the flexible connection attached to the barrel causes the ring-rail to rise a little higher on each upward movement and to go not quite so low on each succeeding downward movement, thereby ordinarily to change the path of the ring-rail and lay the yarn in successive layers from the base to the upper end of the carrier or bobbin.

The general character of such mechanism is well indicated in Fig. 1, wherein the supporting frame 1, the spindle rail 2, spindles 3, mounted upon the spindle rail 2, the ring-rail 4 carrying the usual rings 5, the lifter rods 6 having the feet 7 resting upon or otherwise connected to the end of the rocker 8 pivoted at 9 to a suitable bracket 10 and having the weight 11 to elevate the ring-rail, the rocker arm 12 connected to the rocker 8, and the transmitting link 13 may be and are of any well-known or preferred construction.

Pivotaly mounted at 14, Fig. 3, on a suitable support such as the bracket 15, is the builder arm, one end 16 of which carries a suitable weight as usual (not shown) acting to maintain a follower 17 on the other end 18 of said arm, Fig. 1, against the periphery of the usual builder or traverse cam 19 which may be appropriately mounted on a shaft 20, Fig. 1, and be driven from any suitable source of power, the construction being such that as the cam rotates the builder arm will be appropriately rocked upon its pivotal point 14.

Mounted to rotate in suitable bearings, such for instance, as 20', Fig. 3, carried by the builder arm, is the pick shaft 21 carrying a worm 22 fixed to rotate therewith. The pick shaft may be appropriately rotated by any suitable means, and to this end is shown as having secured thereto the usual pick-wheel 23 which is engaged by a pawl 24 carried by a suitably weighted rock arm 25, the tail 26 of said pawl being adapted to engage an actuator 27, Fig. 1, adjustably secured at 28 to a bracket 29, the construction being such that as the pick shaft carrying end of the builder arm is raised, the pawl engages the actuator 27 and upon further upward movement of the builder arm the pick-wheel and perforce the pick shaft is given movement of rotation, all as is usual in this general type of builder arm and is well understood. The builder arm has rotatably mounted thereon, the winding drum 30 to which is connected the worm wheel 31 in operative engagement with the worm 22, whereby as the worm

rotates with the pick shaft, the drum is given movement of rotation, the amount of such rotary movement thus imparted to the drum depending, of course, upon the amplitude of rotation imparted to the pick shaft.

The parts so far described are well known and their operation well understood by those skilled in the art.

Between the drum 30 and the rocker arm 12 there is a flexible connection for communicating motion of one to the other. In the present form of the invention this connection comprises a chain 32, one end of which is secured at 33 to rotate with the drum 30 and the other end to a pulley 34 at 35. The ends of the chain may for convenience of adjustment be adjustably connected to said parts or one of them as indicated by the sockets 36, Fig. 3. The pulley 34 is loosely mounted on a suitable supporting stud or shaft 37, and has secured to it a pulley 38 to be described to which is connected at 39 one end of a flexible element, such as the chain 40, the other end whereof is secured to the rocker arm 12, Fig. 1.

From the construction thus far described, it will be seen that as the builder arm is rocked in the manner hereinbefore described, the flexible connection between said builder arm and the rocker arm will result in a rising and lowering traverse movement to the ring-rail, and the action of the pick-shaft upon the drum 30 will cause the latter to give off or unwind an amount of the flexible connection 32 dependent upon the arc of rotary movement to thereby shift or change the path of traverse of the ring-rail upon successive traverses thereof to lay the yarn upon the carrier or bobbin in successive layers in what is known as the filling wind. It will also be noted that in case the cam pulley 38 is made cylindrical, such successive traverses of the ring-rail will be equal and uniform.

As hereinbefore stated, it is desirable that preliminary or initial winds of short traverse and sufficient in amount to properly cooperate with the feeler mechanism of the loom, shall be laid upon the carrier or bobbin at the commencement of the winding operation and thereafter that there shall be a quick "get away" or merging of the preliminary or initial windings into the regular or service wind which is then continued in uniform traverse to the completion of the wound bobbin. To this end, the present invention contemplates means acting upon the flexible connection between the builder arm and rocker arm to modify the movement transmitted between the two, such that, at the time of the first traverse of the ring-rail, the length of traverse will be shortened to a minimum and then on each succeeding traverse, the length will be rapidly increased and the gain of traverse decreased from a

maximum to secure a quick "get away" or merging into the regular or service filling wind.

In the present form of the invention which has been found simple, convenient, and efficient, the flexible connection 32 has secured thereto in any appropriate manner, or formed integral therewith, a lug or block 41 having a surface to engage the drum 30 as the parts assume position for starting the winding operation, substantially as indicated in Fig. 3. This surface 42 of the block 41 is preferably made to fit the cylindrical portion of the drum when the parts are in starting position and to deflect the flexible connection 32, as will presently appear.

Pivotaly connected to the block 41, as at 43, Fig. 3, is a finger or deflector 44 extending in the general direction of the flexible connection 32 between the drum 30 and pulley 34. The finger or deflector 44 has a heel portion 45 carrying an adjusting device, such as the set screw 46, whereby the position of the finger or deflector and its action upon the flexible connection 32 may be varied to suit conditions of use, the construction being such that when the parts are in position to commence the winding operation, the block 41 bearing on the drum 30 will cause the finger or deflector 44 to bend or deflect the connection 32, substantially as indicated in Fig. 3, and as the builder arm rises to traverse the windings on the carrier or bobbin from the bottom toward the top, the end 44^x of the finger 44 will travel substantially in the direction of the arrow *a*, Fig. 3, giving greatest deflection to the flexible connection. On successive movements of the builder arm the drum 30 is rotated more or less, dependent upon the movement of the pick shaft, to thereby unwind or give off a portion of the flexible connection 32, so that the finger or deflector gradually straightens from the full to the dotted line positions, Fig. 3, as the block 41 is gradually lifted by the connection or chain 32. Since at the commencement of the winding operation the connection 32 is wound the maximum amount upon the drum 30 and the block 41 is in consequence interposed between the drum and connection 32 with the finger 44 bending the connection 32 it follows that the maximum deflection of the connection 32, will occur when the parts are in position for placing the first winding upon the carrier or bobbin, as indicated in Fig. 3; and, as the finger or deflector 44 gradually straightens, due to the successive unwinding movements of the connection 32 from the drum 30, such deflection will become less and less with the result that the gain in traverse will vary from a maximum at the start until service traverse is reached. The variation in the gain of traverse during the straightening of the finger or deflector

will not be uniform, however, being greatest on the first part of the straightening movement and gradually decreasing in amount of variation as the finger or deflector moves from full to dotted line relation with the flexible connection, as indicated in Fig. 3, to get a quick "get away" consistent with proper formation of the preliminary or initial windings.

The diagram, Fig. 5, indicates in an approximate and graphic way, the relations of the traverse and their variation as above described. In said diagram, if *b c* indicates the minimum traverse, and *d e* the next traverse, *f g* the next, and so on to the completion of the windings, then the curve *b m* will approximately indicate the increase in the length of traverse from minimum, and the distances *d d'*; *f f'*; and *h h'* will approximately indicate the variation in gain of successive traverses which decreases from a maximum at *d d'* to a minimum at *m*.

As hereinbefore noted, the movement of the builder arm and chain 32 is transmitted to the ring-rail through the chain 40 and cam pulley 38, the effect of said cam pulley being to impart a rounded and more full bottom portion to the wound mass upon the bobbin or carrier, as will now be explained. Should the pulley 38 be made cylindrical, the traverse of the ring-rail at each descending movement would be more nearly uniform and result in the formation of a sharper or more nearly conical bottom to the yarn mass, because the only modifying effect would be that due to the deflector or finger 44. In the present form of the invention, however, the pulley 38 is formed with a cam or flattened surface 50 over which the flexible connection or chain 40 connected to the rocker arm passes, being secured to the pulley 38 at 39, Fig. 4.

When the parts are in position to commence the winding operation the pulley 38 and chain 40 are related substantially as indicated in Fig. 4, and as the cam pulley 38 turns during the rising and falling movements of the ring-rail which occur at the initial or preliminary windings, the chain 40 will lead over the cam or flattened part of the pulley 38 so that little variation takes place in the length of traverse especially in the limit of the downward movement of the ring-rail. There will be some change due to the fact that the chain 40 does not pass through the axis of the cam pulley 38, but such change or variation of traverse at the bottom of the carrier or bobbin will at first be small. As the drum unwinds more and more, however, the path of the cam pulley movement will gradually change, thereby causing the chain 40 to lead more and more from the cylindrical part of the cam pulley, as indicated by dotted lines, Fig. 4, until when the chain leads from the

cylindrical part of the cam pulley the traverse becomes uniform.

The variation in traverse at the bottom of the carrier or bobbin is not uniform so long as the chain leads over the cam portion of the cam pulley but commences with a minimum variation during the operation of the finger or deflector 44 and increases to a maximum which is reached about the time when or sometime after the finger or deflector 44 passes out of control of the flexible connection, the result being that the base or bottom portion of the wound carrier or bobbin is properly rounded and the yarn may be readily drawn therefrom.

Referring to Fig. 2, a few of the preliminary or initial windings are shown as 52, as well also as the general relation of these windings at the base or bottom of the bobbin 53, but no attempt is here made to secure absolute accuracy of illustration, but merely to make clear by an exaggerated showing, the relation of parts.

The diagram of Fig. 5 results from the combined action of the deflector and the flattened cam pulley 38 on the connection between the builder motion and ring-rail, and graphically illustrates in a general way that the cam pulley affects the traverse to secure a full and rounded base to the wound bobbin, while the deflector modifies the "gain" in traverse, and shows that while the length of traverse $b\ c$ at the start is shortest, it increases at $d\ e$, $f\ g$, and so on, and that the "gain" in traverse decreases from a maximum at $d\ d'$ until, when service traverse is reached, as at $p\ o$, both the length and gain in traverse become uniform. Under some conditions it may be desirable to employ the deflector without the flattened cam pulley 38, in which case the advantages of the quick "get away" will be secured, but the base of the wound bobbin will not be so full and rounded as where the flattened cam form of pulley is employed.

The finger or deflector acts upon the flexible connection between the builder arms and rocker arm, and in the present form of the invention acts in conjunction with the winding drum for the purposes described. It is likewise preferably adjustable for varying the character of the initial winding, and affords a simple yet efficient means for a quick "get away", but it is to be understood that the invention is not confined to the particulars shown and described as one skilled in the art may readily change such particulars within the true scope of the invention.

The spindles 3 are appropriately driven by means of the whirls for winding the yarn upon the carriers or bobbins, as usual.

What is claimed is:—

1. In a machine of the character de-

scribed, the combination of a ring-rail, a builder motion, a flexible connection between the ring-rail and builder motion, means carried by the flexible connection and acting with maximum deflecting influence upon said flexible connection at the commencement of the winding operation and becoming automatically less effective upon said flexible connection as the winding proceeds, and an adjusting device for varying the initial position of the means carried by the flexible connection.

2. In a machine of the character described, the combination of a ring-rail, a builder arm, a flexible connection between the builder arm and ring rail, and a deflector pivotally mounted on the flexible connection to deflect the same during the preliminary or initial windings, said deflector becoming ineffective when the windings have reached a predetermined point.

3. In a machine of the character described, the combination of a ring-rail, a builder arm, a flexible connection between the ring-rail and builder arm, means mounted upon the flexible connection and movable by the builder arm for deflecting said flexible connection, and means for adjusting said first-named means to vary its deflecting capacity.

4. In a machine of the character described, the combination of a ring-rail and builder arm, a flexible connection between the ring-rail and builder arm, a block secured to the flexible connection between its ends, a finger carried by the block, and means to engage the block during the winding of a bunch to deflect the flexible connection.

5. In a machine of the character described, the combination of a ring-rail and builder arm, a flexible connection between the ring-rail and builder arm, a block secured to the flexible connection between its ends, a finger carried by the block, an adjusting device to adjust the finger with respect to said block, and means to engage the block during the winding of a bunch to deflect the flexible connection.

6. In a machine of the character described, the combination of a ring-rail and builder motion including a builder arm, a winding drum carried by the builder arm, a flexible connection between the winding drum and ring-rail, a block secured to the flexible connection between the drum and ring-rail, said block having a drum engaging surface to engage the drum during the building of a bunch, a finger secured to the block, and means for adjusting the finger with respect to the block.

7. In a machine of the character described, the combination of a ring-rail and builder arm, a flexible connection between the ring-rail and builder arm, a block se-

5 cured to and projecting from the flexible connection, a finger mounted on said block and engaging the flexible connection, and means for engaging said block during the building of a bunch and determining the deflecting action of the finger on the flexible connection.

10 8. In a machine for winding yarn on a carrier or bobbin, a builder arm, means for directing the yarn to the carrier or bobbin as it is being wound thereon, a flexible connection between the builder arm and direct-

ing means, a finger secured to and extending along said flexible connection, and a drum on the builder arm adapted to deflect said finger a maximum amount at the commencement of the winding operation.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

CHARLES E. LOVEJOY.

Witnesses:

GEORGE B. ARNOLD,
DANA OSGOOD.

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