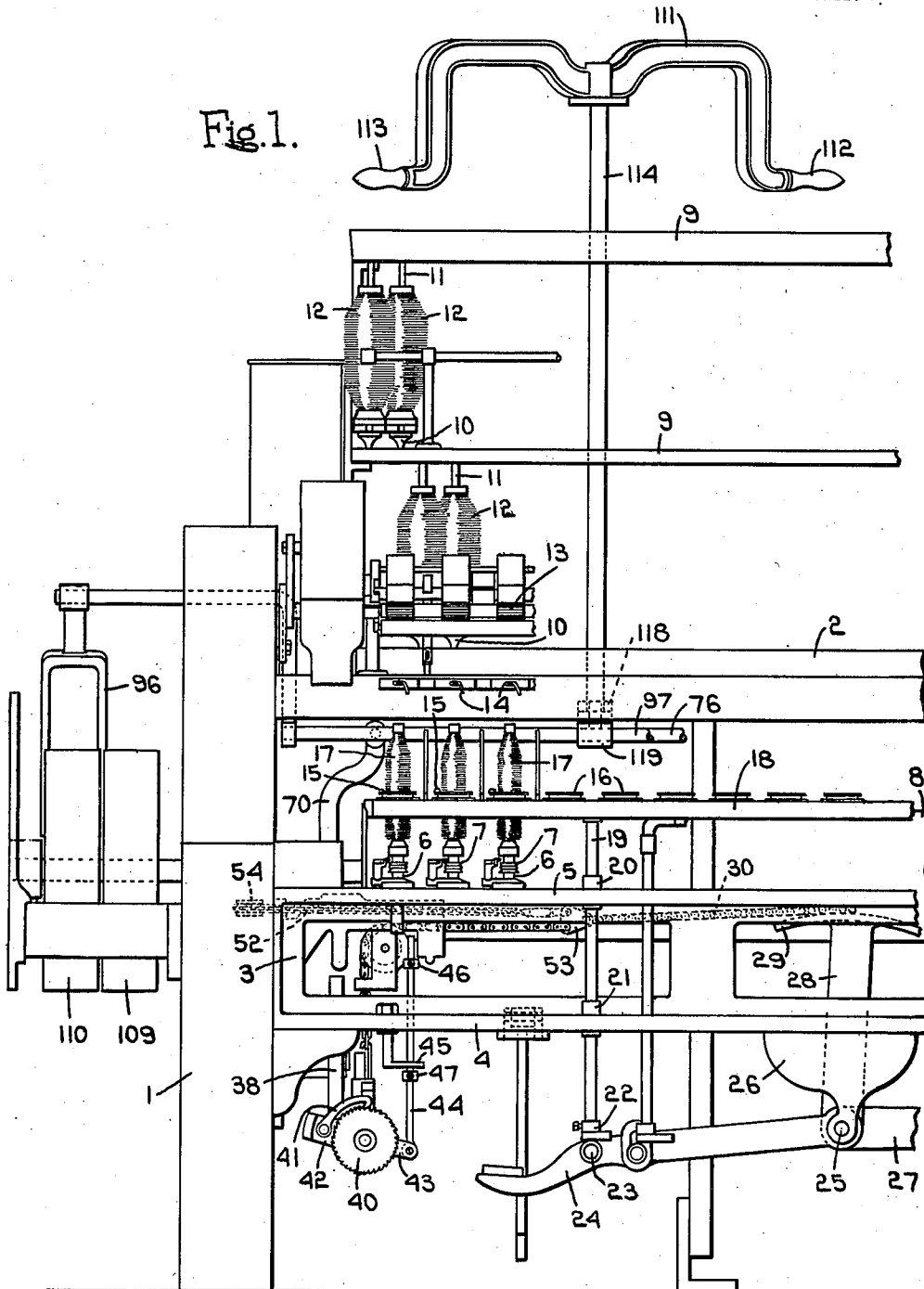


W. PARKER.
YARN WINDING MACHINE.
APPLICATION FILED OCT. 21, 1918.

1,343,333.

Patented June 15, 1920.

3 SHEETS—SHEET 1.



Inventor.
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by Heard Smith & Tennant
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3 SHEETS—SHEET 2.

Fig. 2.

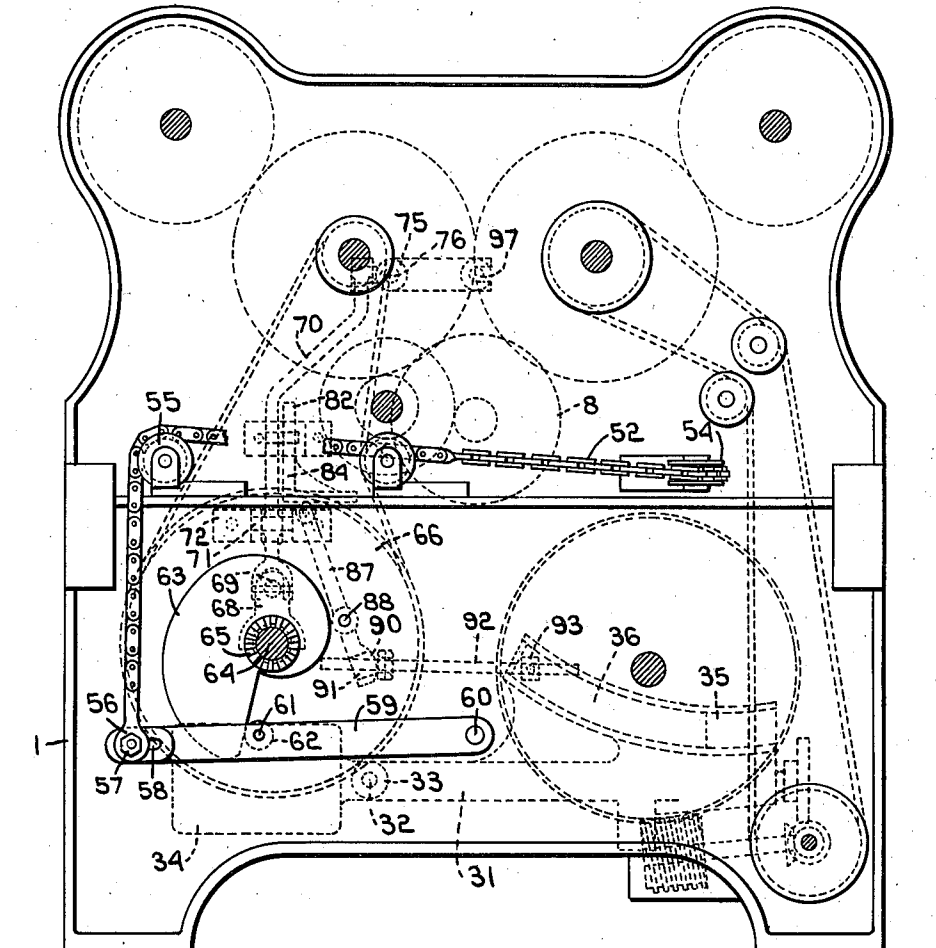
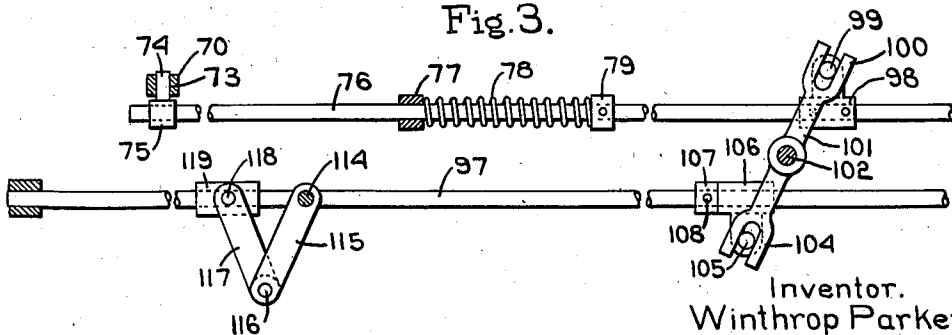


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

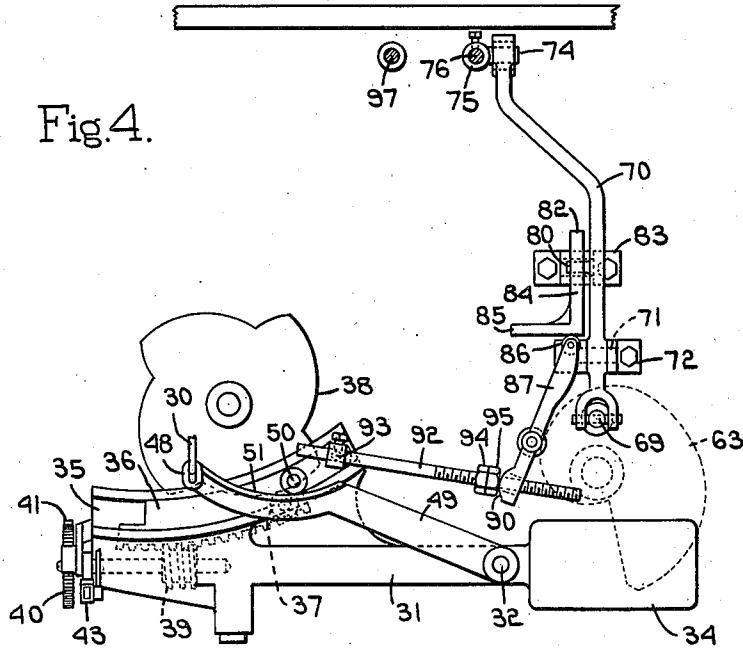


Fig. 5.

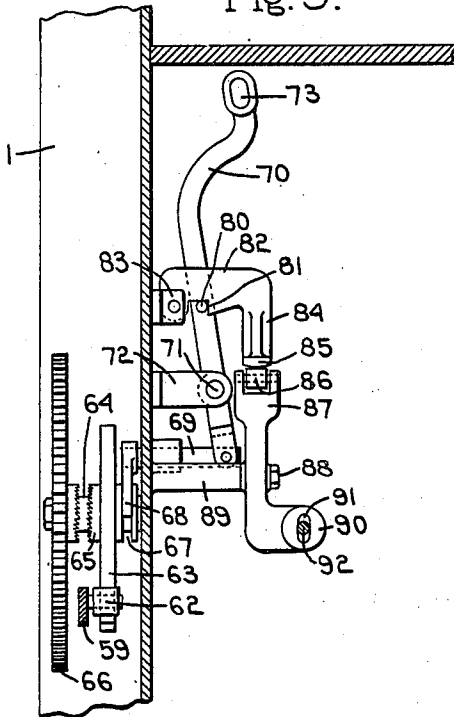


Fig. 6.

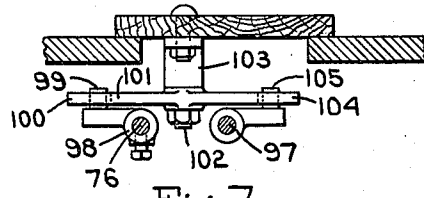
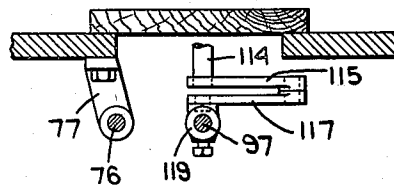


Fig. 7.



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UNITED STATES PATENT OFFICE.

WINTHROP PARKER, OF MANCHESTER, NEW HAMPSHIRE.

YARN-WINDING MACHINE.

1,343,333.

Specification of Letters Patent. Patented June 15, 1920.

Application filed October 21, 1918. Serial No. 259,077.

To all whom it may concern:

Be it known that I, WINTHROP PARKER, a citizen of the United States, residing at Manchester, county of Hillsboro, State of New Hampshire, have invented an Improvement in Yarn-Winding Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to improvements in spinning and other yarn winding machines and the general object thereof is to provide means for insuring more complete and uniform filling of the bobbins, cops, and other yarn receivers and also to provide a machine which will be more easily operated by the attendant.

In yarn-winding machines, particularly spinning machines, the operatives suit their own convenience in doffing the bobbins or other yarn receivers and as a consequence a considerable variation in the amount of yarn wound upon the yarn receivers results. This is objectionable for several reasons. If the yarn receivers are doffed too frequently a needless amount of the operative's time is wasted and the use of the partially filled yarn receivers in subsequent textile operations, is undesirable. If the yarn receivers are filling-wound bobbins in use in weaving, a more frequent replenishment of the shuttle becomes necessary, and where, as in ordinary looms no automatic means is provided for taking care of the filling end, each replenishment of the shuttle causes a defect in the weave. When, therefore, such replenishment is frequent, a more imperfect web of cloth is produced. Where the yarn receivers are used for other purposes, their frequent doffing again causes a loss of time and production.

Where the bobbins are wound too full, as sometimes happens, in usual spinning and other yarn winding machines, more or less of the excessive amount of yarn wound upon the ends of the bobbin slubs off and is wasted or becomes tangled thereby causing a loss of material and also a loss of time in the placing of the bobbin in the machine which is to be used. The present invention contemplates the provision of means for automatically shifting the traversing mechanism of spinning or other yarn winding machines

to doffing position and stopping the machine when a predetermined amount of yarn has been wound upon the yarn carriers, so that a uniform amount of yarn will be wound upon all of the yarn-receivers at all times.

It is desirable that the machine should be stopped slightly before the traversing mechanism reaches doffing position, in order that the momentum of the rotating yarn receivers will not wind bunches at their bases. A further object of the invention, therefore, is to provide means automatically operating in conjunction with the mechanism for shifting the traversing mechanism to doffing position, which will stop the machine slightly before the traversing mechanism has reached the doffing position, manually operable means being provided for permitting the operative to start and stop the machine at will to complete the shifting of the traversing mechanism to doffing position, thereby supplying just the amount of yarn which is necessary for the doffing of the yarn receivers and the starting of the yarn on the new receivers.

A further object in the invention is to provide a machine of the character described, with a manual control for stopping the machine which is operable independently of the automatic stopping mechanism, so that the machine will always be under the control of the operative, and may be stopped at any time.

A further object of the invention is to provide mechanism of the character just described which may be readily applied to spinning machines and other yarn winding machines without material modification of the original machine.

Other objects or features of the invention will be more fully set forth in the following description and the accompanying drawings and will be pointed out in the annexed claims.

The drawings illustrate a preferred embodiment of my invention as applied to a spinning machine, comprising a builder motion of the Whitin type.

In the drawings—

Figure 1 is front elevation of the end of the spinning machine showing my invention as applied thereto.

Fig. 2 is an end elevation of the machine, showing the gearing and other parts dia-

grammatically, and illustrating in full lines a preferred means for shifting the traversing mechanism to doffing position.

Fig. 3 is a detailed view of the clutch-shifting and belt-shipping rods which extend longitudinally of the machine and are adapted to be operated automatically for the purpose described.

Fig. 4 is a detailed view of the builder motion, and its connection to the clutch mechanism for shifting the traversing mechanism to doffing position.

Fig. 5 is a vertical sectional view through a portion of the end of the machine, showing the cam for shifting the traversing mechanism to doffing position, and a portion of the clutch mechanism which controls the operation of the cam.

Fig. 6 is a vertical sectional view through a portion of the frame and the clutch-shifting and belt-shipper rods, showing the means by which the movement of the clutch shifting rod automatically actuates the belt-shipper rod.

Fig. 7 is a similar vertical section, showing the connection of the belt-shipper rod to the lever mechanism for manually controlling the starting and stopping of the machine.

The invention is illustrated herein as applied to the ring-spinning machine, but it will be understood that the invention may be embodied in cap-spinning or flier-spinning machines, or twistors, or any other form of yarn-winding machines in which it may be found desirable.

As illustrated in the drawings, the spinning machine comprises the usual end frames 1, which are connected by suitable side members 2, including a ladder 3, having a lower arch rail 4, and an upper spindle rail 5 carrying a series of spindles 6 which are rotated by bands passing over the usual whirls 7 and driven from a central drum 8 in the customary manner. The usual creel, which is mounted on the spinning machine frame, comprises two or more rails 9 which carry cups to receive the lower ends 10 of spindles 11 which carry the spools 12 of roving or other material from which the yarn is supplied to the spinning mechanism.

The strands of roving are carried from the spools 12 through the ordinary drawing rolls 13, thence through guide-eyes 14 and the travelers 15, which ride upon the rings 16, to the yarn receivers 17, which, as illustrated herein, are in the form of "filling-wound" bobbins carried by the spindles 6.

The traverse of the yarn upon the bobbins or other yarn receivers is accomplished by the raising and lowering of the lifter rail or ring rail 18 upon which the rings and the travelers are mounted. It will be understood, however, that the invention is adapted for use with any form of traversing mechanism

in which relative movement is provided between the guiding mechanism for the running strands and the yarn receivers upon which the yarn is wound to produce a traverse of the yarn upon the yarn receivers.

The ring rail 18 is supported in the customary manner upon a series of lifter rods 19, which pass through suitable bearings 20 in the spindle rail and 21 in the arch rail and are provided at the lower ends with feet 22, which rest upon bowls 23 projecting laterally from the horizontal arms 24 of the usual rockers which are connected together in the usual manner and are operated through a chain connecting the builder arm to the one nearest it. The rockers are pivotally mounted upon studs 25 and carried by brackets 26 supported by the arch rail 4 of the ladder and have the usual extensions 27 having a counter-weight (not shown). The rocker nearest the builder arm is also provided with a vertical member 28 which carries at its upper end a sector 29 to which the builder chain 30 is secured in the ordinary manner.

The construction thus described is of the well-known type in which the counter-weights upon the arms 27 tend always to elevate the lifter rail or ring rail 18 and in which the ring rail is depressed by the builder motion through the chain 30.

The builder mechanism, which is illustrated in Figs. 1 and 4, comprises the usual builder arm 31 which is pivotally mounted upon a stud 32 carried by a boss 33 projecting from end frame and has a counter-weighted extension 34 which counterbalances the weight of the builder arm. The builder arm has, at its forward end, an inclined sector-shaped guideway 35 in which a sector 36 is slidably mounted. The sector 36 has a laterally projecting stud 37 provided with an antifriction roll which is engaged by the builder cam 38 which, during its rotation depresses the builder arm and thereby causes the depression of the ring rail through the builder chain 30 which connects the builder arm to the sector 29 of the lifter-rod-supporting rocker.

In the operation of the machine, therefore, the rotation of the builder cam 38 acting in conjunction with the counter-weight upon the arm 27 repeatedly depresses and raises the lifter rail or ring rail thereby causing the travelers on the rings to traverse longitudinally of the bobbins so that the successive spirals of yarn are wound thereon. The change in the traverse is produced as the building up of the yarn receivers progresses by shifting the position of the stud 37 which is engaged by the builder cam 38 so as to cause the builder arm 31 to be lowered progressively and the ring rail consequently to be raised.

As illustrated herein, the sector 36 has a

series of teeth which engage a worm 39 upon a stud shaft mounted in suitable bearings upon the builder arm. The stud shaft carries at its outer end a picker wheel 40, the teeth of which are adapted to be engaged by a dog 41 which is pivoted upon a lever 42 fulcrumed upon the stud shaft. The end 43 of the lever 42 opposite the dog 41 is connected to a rod 44 which is slidably mounted in suitable bearings in the arch rail 4 of the ladder, and also passes through a bracket 45 which is secured to the arch rail 4. Collars 46 and 47 adjustably secured upon the rod 44 limit the vertical movement of said rod, and provide means for controlling the action of the picker wheel. As the builder arm is raised, the collar 47 engages the bracket 45 and stops the upward movement of the rod 44 thereby depressing the end 43 of the lever 42 and causing the dog 41 to ride over the teeth upon the picker wheel 40. As the builder arm descends, the collar 46 engages the upper surface of the arch rail 4 and limits the downward movement of the rod 44 so that as the builder arm descends further the lever 42 is rocked about the stud shaft, thus causing the dog 41 to rotate the picker wheel 40 and the stud shaft and worm 39. This rotation of the worm acting upon teeth of the sector moves the sector 36 longitudinally of the guideway 35 of the builder arm.

Where the spinning machine is designed to produce bobbins having a filling wind, the builder chain 30 is connected to the end 48 of a supplemental arm 49 which is mounted upon the stud 32 which forms the pivot of the builder arm, said arm being actuated through a suitable stud 50 carried by the sector 36 which engages an arcuate surface 51 in the end portion of the arm 49. By reason of the fact that the point of connection of the chain 30 at the end 48 of the arm 49 is always at a uniform distance from the pivotal stud 32 the vertical motion of the builder arm will always cause the same length of traverse of the yarn upon the bobbin so that as the traverse is advanced a series of conoidal superposed spirals will be laid upon the bobbins.

If, however, the builder chain instead of being connected to the supplemental arm 49 is connected to the sector 36, the movement of the sector will carry the point of its connection with the builder arm toward the pivot 32 thereby shortening the traverse as the bobbin is built up. This will produce a warp-wound bobbin. The machine may therefore be caused to produce either a warp-wound or a filling-wound bobbin, by merely shifting the connection of the builder chain to the builder arm, and by substituting a builder cam having a single lobe when the machine is to be used for the warp-wound bobbin for the cam having a plural-

ity of lobes which is used in forming the filling-wound bobbins.

The machine thus described is a spinning machine of a usual well-known type and the present invention contemplates the application thereto of mechanism which will operate automatically when a predetermined amount of yarn has been wound upon the bobbins or other yarn receivers to shift the traversing mechanism to doffing position, whether the machine is producing a "filling wind" or a "warp wind."

The operation of the mechanism for shifting the ring rail to doffing position is, preferably, determined by the position of the traverse of the yarn upon the yarn receiver, since, when a predetermined amount of yarn has been wound upon the bobbin, the traversing mechanism will have reached a certain definite point. In the present embodiment of the invention, the actuation of the means for shifting the traversing mechanism to doffing position is controlled by the movement of the sector 36 which is adapted, when it reaches a certain point in its travel in the guide-way 35 to release a clutch-shifting device which will cause the actuation of means for depressing the ring rail to doffing position. Preferably at the same time means are automatically actuated to ship the belt from the fast to the loose pulley of the machine, thereby causing the stoppage of the machine at, or preferably before, the time the traversing mechanism has reached doffing position.

Any suitable mechanism may be provided for shifting the traversing mechanism from its operating position to doffing position. As illustrated herein, the traversing mechanism, which is the ring rail, is lowered to doffing position through a supplemental chain which is connected to the builder chain, said supplemental chain being actuated by a cam which is thrown into operation by a clutch which is controlled by the movement of the sector 36. In the mechanism shown in the drawings, the supplemental chain 52 is connected at one end to a triangular link 53 in the chain 30 and passes therefrom through suitable sheaves 54 and 55 across the outer side of the end frame where its other end 56 is secured by bolt and slot connection 57—58 to the end of a lever 59 which is fulcrumed upon a stud 60 projecting from the end frame. The lever 59 has, intermediate of its length, a laterally extending stud 61 provided with an anti-friction roller 62 which engages a cam 63 which is rotatably mounted upon a shaft 64 and adapted to be connected to an actuating means by suitable clutch mechanism. It will be obvious that the rotation of the cam 63 will cause the lever 59 to be depressed thereby pulling down the chain 52 and through it and the chain 30 actuat-

ing the rocker to depress the ring rail. Inasmuch as this mechanism is only to be operated when the bobbins or other yarn receivers have been filled, the cam 63 is rotatably mounted upon the shaft 64 and is only operated when the traversing mechanism has reached the predetermined position at which the bobbins are filled to the extent desired.

10 In the present construction the hub 65 of the cam 63 is provided with a clutch face which is adapted to engage the complementary clutch face upon the hub of a gear 66, also carried by the stud shaft 64. The gear 15 65 may be driven through any suitable co-operating gearing. The hub of the cam 63 is provided with an annular groove 67 which receives the forked end of a clutch-shifting arm 68 which is connected to a shaft 69 20 slidably mounted in a boss extending inwardly from the end frame. The opposite end of the shaft 69 is secured to the lower end of a lever 70 which is fulcrumed upon a stud 71 carried by a bracket 72 secured to 25 the end frame. The clutch-shifting lever 70 has at its upper end a slot 73 which engages a stud 74 carried by a collar 75 mounted upon a clutch-shifting rod 76 which extends longitudinally of the machine in parallelism with and adjacent to the usual shipper rod. The rod 76 is slidably journaled in suitable bearings including a bearing in a bracket 77 midway of the frame. A helical spring 78 surrounding the clutch-shifting rod bears at one end against the bracket 30 77 and at its opposite end against a collar 79 fixedly secured to the rod 76 acting normally to force the clutch-shifting rod 76 in a direction to cause the lever 70 to throw 40 the clutch face of the cam into engagement with the co-operating clutch face of the gear. (See Figs. 3, 4, and 5.)

In the operation of the machine, the clutch must necessarily be held out of engagement 45 to permit the normal operation of the traversing mechanism. This is accomplished by locking the lever 70 in such a manner that the clutch faces are separated, a stud 80 upon said lever being normally engaged 50 by a shoulder 81 upon a latch 82 which is pivotally mounted upon a bracket 83 secured to or integral with the end frame. The other end of the latch 84 extends downwardly and preferably is provided with a 55 lateral extension 85 which is engaged by an anti-friction roller 86 which is mounted in the end of a releasing lever 87. The releasing lever 87 is fulcrumed upon a stud 88 carried by the bracket 89 projecting from 60 the end frame and has at its opposite end a curved face 90 through which a central slot 91 extends.

The releasing lever is actuated by a rod 92 which extends at one end through said 65 slot and at the opposite end is secured to

a collar 93 having a stud projecting into and secured to the sector 36. Set nuts 94 and 95 upon the rod 92 provide means whereby the effective length of the rod between the collar 93 and the releasing lever 70 87 may be adjusted so that the clutch operating mechanism may be caused to operate when the sector 36 which controls the position of traverse has reached a predetermined point. 75

It will be obvious from the construction thus described that when the sector 36 is moved by the picker mechanism to a predetermined point, the nut 95 upon the rod 92 will engage the curved surface 90 of the actuating lever, and on further movement will rock said lever sufficiently to raise the latch 82 out of engagement with the stud 80 upon the clutch-shifting lever 70. The spring 78 which is held normally under compression 85 will thereupon force the clutch-shifting rod (to the right of Fig. 3) thereby rotating the clutch-shifting lever 70 about its fulcrum 71 and causing the arm 68 to force the clutch face of the cam into engagement with 90 the clutch face of the gear 66. The cam will thereby be rotated, and through its engagement with the anti-friction roller 62 on the lever 59 will depress said lever thereby drawing upon the supplemental chain 52 95 and builder chain 30 and thus causing the rockers to lower the ring rail.

While the mechanism thus described may be operated to force the ring rail completely to doffing position, it is desirable that the machine should be stopped slightly before the ring rail reaches this position, otherwise a small bunch might be wound upon the base of the bobbin. Means have therefore been devised to operate in conjunction 105 with the clutch-shifting mechanism to stop the machine at some point intermediate of the highest and the lowest point of traverse of the ring rail, preferably slightly before the ring rail has reached doffing position, 110 said means being such that the operative can, by starting and stopping the machine, gradually move or lower the ring rail down to doffing position thereby avoiding an undesirable accumulation of yarn upon the 115 base of the bobbin while still providing a sufficient amount of yarn for the purpose of doffing and starting a fresh bobbin. This is accomplished by connecting the clutch-shifting rod to the usual belt-shipper rod 120 in such a manner that the automatic actuation of the clutch-shifting rod will cause the belt-shipper rod to be actuated to ship the belt from the fast to the loose pulley of the machine, while still permitting independent 125 operation of the belt-shipper rod by the usual hand lever.

In the preferred mechanism shown herein, the belt-shipper comprises the usual fork 96 which is adapted to engage the opposite 130

edges of the belt, and is mounted upon the end of the shipper rod 97 which extends longitudinally of the spinning frame in parallelism with the clutch-shifting rod 76. The clutch-shifting rod 76 has a fixed sleeve 98 which is provided with an upwardly projecting stud 99 which enters and engages the bifurcated end 100 of a lever 101 which is mounted upon a stud 102 carried by a suitable bracket 103 which is supported upon a suitable cross piece on the spinning frame. The lever 101 is provided at its opposite end with a similar bifurcation 104 which engages a stud 105 projecting upwardly from a sleeve 106 which is slidably mounted upon the belt-shipper rod 97. A collar 107 is secured upon the belt-shipper rod 97 by a set-screw 108 and is adapted to be adjusted to abut against the end of the sleeve 106 when the belt-shipper is in proper position to cooperate with the fast and loose pulley. It will be obvious that when the clutch-shifting rod is actuated by the spring 78 to cause the clutch face 66 to engage the clutch face 65, the lever 101 will be rocked about its fulcrum 102 and will force the belt-shipper rod 97 in the opposite direction causing the shipper 96 to ship the belt from the fast pulley 109 to the loose pulley 110 thereby permitting the machine to stop. It will also be obvious that the tension of the spring 78 will determine the speed with which the belt is moved from the fast to the loose pulley. Hence, by varying the tension of the spring, as by shifting the position of the collar 79 fastened to the rod 76, the point in the traverse of the ring rail toward doffing position at which the machine is stopped may be determined with sufficient accuracy. Owing to the fact that there is an appreciable extent of movement of the shaft 69 and connected clutch shifting arm 68 from the point at which the teeth of the clutch face on the hub 65 engage the teeth on the clutch face of the gear 66 to the point at which these teeth are finally seated together and owing to the fact that this movement is multiplied by the position of the fulcrum 71 of the lever 70, the extent of the rotation of the cam 63 after the initial engagement of the clutch faces will depend upon the momentum with which the belt is thrown from the fast to the loose pulley.

In order that the operative may have full control of the starting and stopping of the machine independently of the actuation of the clutch mechanism, the shipper rod is provided with an independent means of actuation. As illustrated herein, the manually operated mechanism comprises a lever 111, preferably U shaped, having laterally extending handles 112 and 113 so positioned as to be easily accessible from either side of the machine. The lever 111 is connected to the upper end of a rod 114 which

is mounted in the rails 9 of the creel or convenient members of the spinning frame. The lower end of the rod 114 has an arm 115 which is pivotally connected at its end to a stud 116 in the end of a link 117, the opposite end of which is pivotally mounted upon a stud 118 projecting upwardly from a sleeve 119 which is fixedly secured to the belt-shipper rod 97. By moving the handles 112 and 113, therefore, the rod 114 will be rotated, and acting through the arm 115 and link 117 may be used to shift the belt from the fast to the loose pulley to stop the operation of the machine.

This stoppage of the machine can be accomplished at any time during the normal operation of the machine without actuating the clutch, which shifts the traversing mechanism to doffing position, for during the normal operation of the machine the clutch-shifting lever 70 will be locked in the position shown in Fig. 1 and the spring 78 will be compressed so that the sleeve 106 will be at some distance from the collar 107 and the belt-shifting rod 97 will be free to be moved. When, however, the clutch-shifting lever has been released upon the completion of the winding of the yarn-receiver the spring 78 will automatically throw the belt-shipper to the position illustrated in Fig. 1.

Further starting and stopping of the machine will require actuation of the shipper rod 97 against the force of the spring 78 so that the operative may, by carefully pulling upon one of the handles 112 or 113 cause the belt to be shifted temporarily from the loose to the fast pulley, thereby lowering the ring rail gradually to doffing position without shifting the belt permanently from the loose to the fast pulley.

When the doffing has been completed and fresh yarn receivers substituted, the operative may, by forcing the handles 112 or 113 in the opposite direction, rock the clutch shifting lever 70 until the shoulder 81 of the latch 82 again engages the stud 80 on the lever 70 thereby disengaging the clutch face of the cam 63 from that of the gear 59 and locking the same out of engagement so that the machine may be started in the usual manner and again operated as above described.

It will be understood that the embodiment of the invention disclosed herein is illustrative and not restrictive and that various modifications in structure and arrangement of parts may be made within the spirit and scope of the following claims.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a machine of the class described, comprising means for rotating a series of yarn receivers and means for causing a

traverse of the yarn upon the yarn receivers; means automatically operable when the traversing means has reached any predetermined position to shift said traversing means to doffing position and means automatically operable to stop the machine and arrest the shift of said traversing means before doffing position has been reached.

2. In a machine of the class described, comprising means for rotating a series of yarn receivers and means for causing a traverse of the yarn upon said yarn receivers; means automatically operable when the traversing means has reached any predetermined position to shift said traversing means to doffing position, means automatically operable to stop the machine and arrest the shift of said traversing means before doffing position has been reached and means for manually starting and stopping the machine and thereby automatically and gradually completing the shift of the traversing means to doffing position, whereby the operative is enabled to control the winding of such extra amount of yarn on the yarn receivers as may be required for doffing and for starting the winding of fresh yarn receivers.

3. In a machine of the class described comprising means for rotating a series of yarn receivers and means for causing a traverse of the yarn upon the yarn receivers; means automatically operable when the traversing mechanism has reached any predetermined position to shift said traversing means to doffing position, means automatically operable to stop the machine at any predetermined point in said shift of the traversing means, and means manually operable to start and stop the machine at all times whereby the machine will be constantly under control of the operative.

4. In a machine of the class described comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers adjustable to effect either a warp or a filling wind and means for causing a gain in traverse, means for automatically shifting said yarn traversing means to doffing position and means operable by the means for causing a gain in traverse when the same has reached any predetermined position to initiate the action of said shifting means.

5. In a machine of the class described comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers adjustable to effect either a warp or a filling wind, supplemental means including a cam operable to shift the yarn traversing means to doffing position, manually operable means normally acting to prevent the operation of said supplemental means and means operable when the traversing means has reached any pre-

termined position for initiating the action of said supplemental means whereby the traversing means will be shifted to doffing position when the yarn receivers have been built up to a predetermined size.

6. In a machine of the class described, comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers adjustable to effect either a warp or a filling wind including a lifter rail and a builder motion for raising and lowering said lifter rail; supplemental means for depressing said lifter rail to doffing position and means for causing the actuation of said supplemental depressing means when the builder motion has reached any predetermined position.

7. In a machine of the class described, comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers including a lifter rail and a builder motion for raising and lowering said lifter rail; supplemental means for depressing said lifter rail to doffing position independently of the movement of said builder motion, clutch mechanism operable by said builder motion, when the latter has reached any predetermined position, to cause the actuation of said supplemental rail-depressing means, and means for automatically stopping the said supplemental rail depressing means at any predetermined point in its movement.

8. In a machine of the class described, comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers adjustable to effect either a warp or a filling wind and including a lifter rail and a builder motion for raising and lowering said lifter rail; supplemental means for depressing said lifter rail independently of the movement of said builder motion including a spring-actuated clutch mechanism normally held out of operating position, means automatically operable by said builder motion when it has reached any predetermined position for releasing said clutch mechanism thereby causing the operation of the supplemental lifter rail depressing means, and means for automatically stopping said supplemental lifter rail depressing means at any predetermined point, whereby the lifter rail will be depressed to any predetermined position when a predetermined amount of yarn has been wound upon the yarn receiver.

9. In a machine of the class described, comprising means for rotating a series of yarn receivers, and a lifter rail and means including rockers for supporting same, a builder motion including a reciprocable builder arm and a chain connecting said builder arm to one of said rockers, and means for producing a gain in traverse of the yarn upon the yarn receivers, a sup-

plemental chain connected to said builder chain, means independent of said builder arm for actuating said supplemental chain to depress the lifter rail to doffing position, and means for controlling the actuation of the latter operable by the means for producing the gain in traverse when it has reached a predetermined position whereby the lifter rail will be depressed to doffing position when a predetermined amount of yarn has been wound upon the yarn receivers.

10. In a machine of the class described, comprising means for rotating a series of yarn receivers, and a lifter rail and means including rockers for supporting the same, a builder motion including a reciprocable builder arm and a chain connecting said builder arm to one of said rockers, and means for producing a gain in traverse of the yarn upon the yarn receivers, a supplemental chain connected to said builder chain, a lifter rail-depressing lever connected to said supplemental chain, a cam shaft, a cam having a clutch face rotatably mounted upon the cam shaft engaging said lever, a clutch upon said cam shaft and means operable by the means for producing the gain in traverse when it reaches a predetermined position to cause engagement of said cam with said clutch and thereby to operate the lifter rail-depressing lever.

11. In a machine of the class described, comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers; belt shifting means including a belt shifting rod extending longitudinally of the machine, means for manually actuating said belt shipping rod, supplemental means for shifting the traversing means to doffing position, means for controlling the action of said supplemental means including a clutch and a clutch shifting rod extending longitudinally of said machine in parallelism with said belt shipping rod, means operable by said traversing means when the same has reached any predetermined position for actuating said clutch, and means connecting said clutch shifting rod with said belt shipping rod

whereby the latter will be simultaneously operated to ship the belt from a fast to a loose pulley and thereby stop the machine.

12. In a machine of the class described comprising means for rotating a series of yarn receivers, means for causing a traverse of the yarn upon the yarn receivers; belt shipping means including a belt shipping rod extending longitudinally of the machine, means for manually actuating said belt shipping rod, supplemental means for shifting the traversing means to doffing position, means for controlling the action of said supplemental means including a clutch and a clutch shifting rod extending longitudinally of said machine in parallelism with said belt shipping rod, a spring mounted upon said clutch shifting rod normally tending to force the clutch into operative position, means for normally locking said clutch in inoperative position, means operable by said traversing means when the same has reached a predetermined position for releasing said locking means, and means connecting said clutch shifting rod with said belt shipping rod whereby the latter will be simultaneously operated to ship the belt from a fast to a loose pulley and thereby stop the machine.

13. In a machine of the class described comprising means for rotating a series of yarn receivers and means for causing the traverse of the yarn upon the said receivers, means for effecting a gain in the traverse including an element having a step by step movement, a positively operated supplemental mechanism for shifting the traversing means to doffing position, means controlled by the position of said step by step movable element for initiating the operation of said supplemental mechanism, and means for automatically stopping the operation of said supplemental mechanism when the traversing means in its movement to doffing position has reached a predetermined position prior to doffing position.

In testimony whereof I have signed my name to this specification.

WINTHROP PARKER.