A. E. RHOADES.

SPINNING OR WINDING MACHINE.

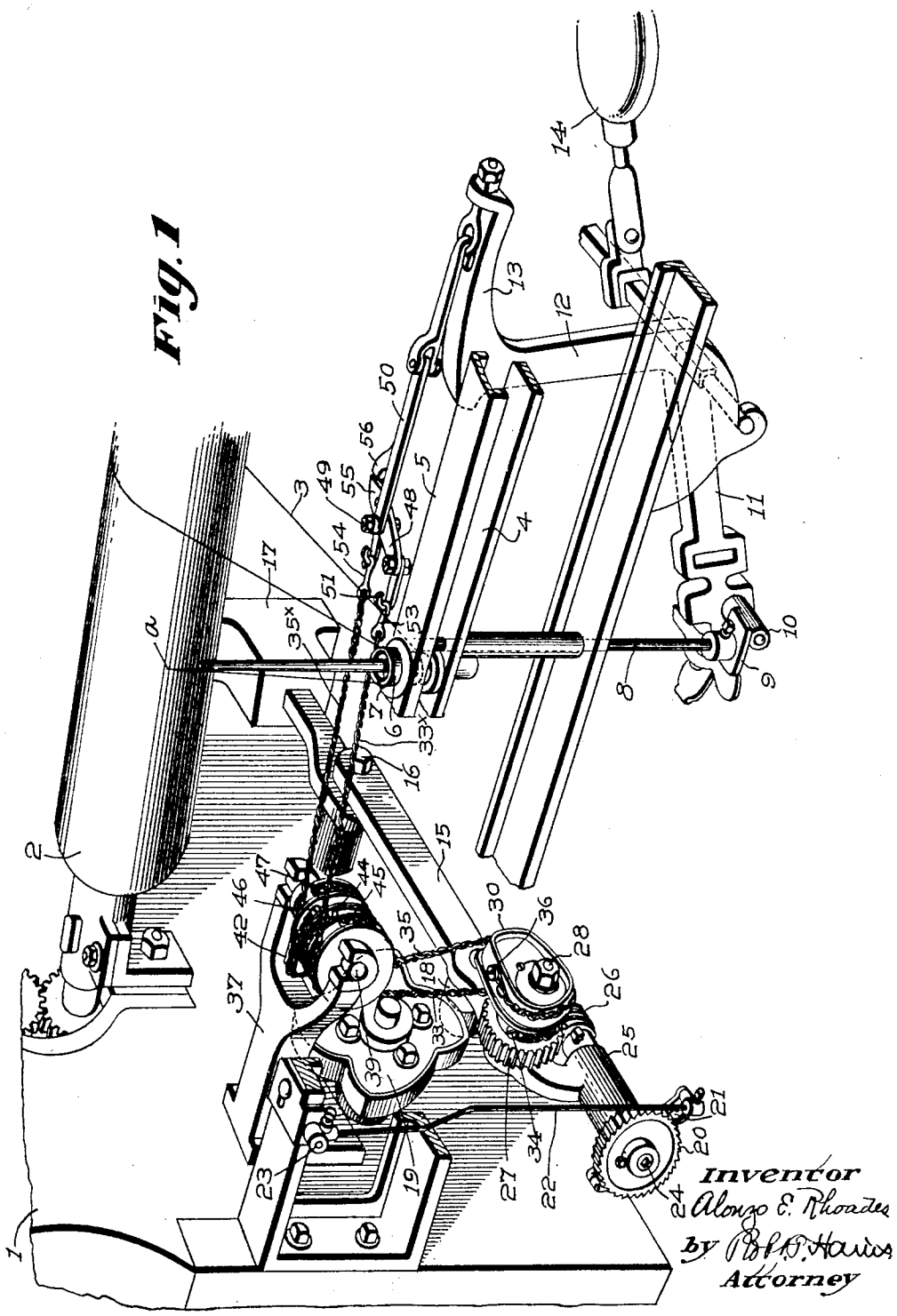
APPLICATION FILED JAN. 11, 1921.

1,397,905.

Patented Nov. 22, 1921.

3 SHEETS—SHEET 1.

Fig. 1



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3 SHEETS—SHEET 2.

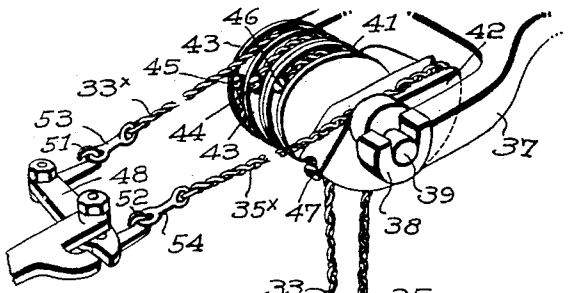


Fig. 2

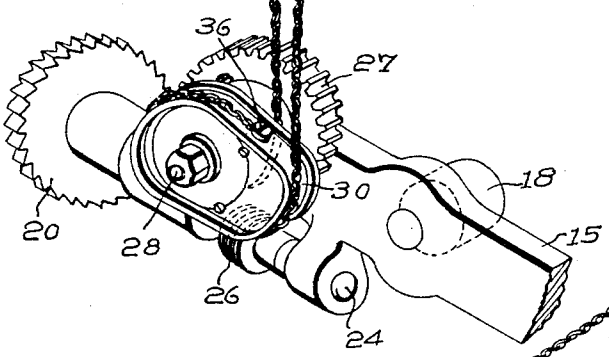


Fig. 3

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3 SHEETS—SHEET 3.

Fig 4.

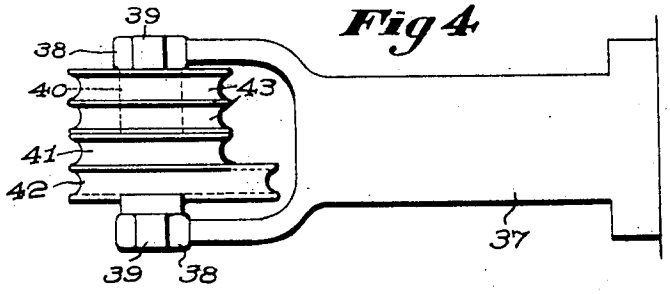


Fig. 5

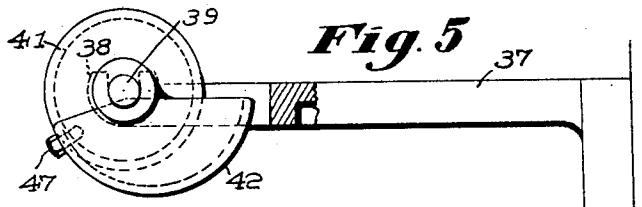


Fig. 6

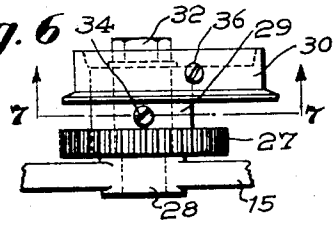


Fig. 7

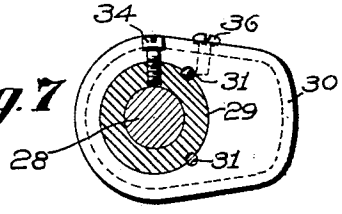




Fig.10

Fig. 8

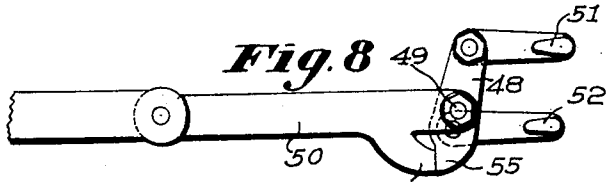
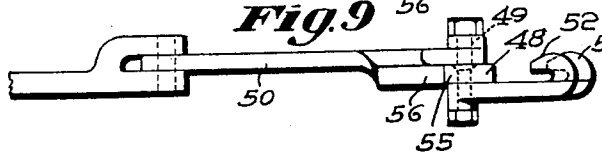


Fig.9



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UNITED STATES PATENT OFFICE.

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SPINNING OR WINDING MACHINE.

1,397,905. Specification of Letters Patent. Patented Nov. 22, 1921.

Application filed January 11, 1921. Serial No. 436,542.

To all whom it may concern:

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, residing at Hopedale, in the county of Worcester and State of Massachusetts, have invented an Improvement in Spinning or Winding Machines, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to spinning or winding machines which are adapted to build up a yarn package or wind yarn upon a yarn receiver, that the yarn may be subsequently withdrawn from the yarn receiver by draft lengthwise or axially thereof. More specifically the invention relates to the builder mechanisms whereby the yarn is laid upon the yarn receiver to constitute a preliminary winding or "bunch," and thereafter the winding is continued in substantially conical layers toward the end of the reciver.

In machines of this general type, the yarn receiver and the yarn guiding means are given a relative movement in a direction longitudinally of the receiver during the continuous rotation of the latter. This relative movement is generally known in the art as the "traverse." In order that the yarn may be properly withdrawn from the receiver in a direction of the longitudinal axis thereof, the traverse is progressively shifted along the axis of the yarn receiver and such relative shifting of the receiver and yarn guiding means is generally known as the "gain."

It has been common heretofore to provide a yarn receiver with preliminary windings or a "bunch" which may be subsequently utilized to effect a change in the operation of a loom during the weaving of cloth. In such prior cases, however, it has been the usual practice to wind the bunch and then pass at once from the bunch building traverse to the regular or service traverse. This abrupt change in the traverse has been the cause of breaking down of many ends during the winding operation, and in some cases, has produced undesirable formation at the base of the wound yarn package or bobbin.

An important feature of the present invention consists in a builder mechanism for spinning or winding machines wherein the bunch is formed by a bunch building traverse which gradually increases from a minimum to the regular traverse which is thereupon continued throughout the rest of the operation of building the yarn package or bobbin by the regular traverse without any abrupt change.

In carrying the above feature into practical effect the present invention provides connection between the builder arm and the yarn guiding means which includes two flexible portions or chains, both of which are connected to mechanism on the builder arm for letting back on both said chains during the bunch building operation, and further mechanism for modifying the relative movement of the yarn guiding means and yarn receiver so that the yarn will be laid upon the receiver with a minimum and gradually increasing traverse for the bunch building purposes which merges into the regular traverse at the conclusion or completion of the bunch.

The present invention further provides a simple and effective means for satisfactorily providing a yarn receiver with preliminary windings or a bunch and merging the bunch building traverse into the regular traverse without abrupt change which might break down the ends. Further objects and purposes of the invention will hereinafter appear from the following description and accompanying drawings which disclose one good, practical form of the invention.

In the drawings:—

Figure 1 is a perspective view showing sufficient portions of a ring spinning frame with the present invention applied thereto to make clear its construction and mode of operation;

Fig. 2 is an enlarged detached detail showing the two chains or flexible portions of the connection between the builder arm and the yarn guiding means, the let-back mechanism, the deflector, the traverse gaining device, and the compensating mechanism, the parts being in the position they occupy on starting to build the bunch;

Fig. 3 is a view of similar character to

that of Fig. 2, with the parts in the position they occupy when the bunch building traverse has been merged into the regular traverse at the completion of the bunch;

Fig. 4 is a detached plan view showing the chain guiding and traverse gaining device;

Fig. 5 is a side elevation of the same, parts of the bracket being broken away;

Fig. 6 is a detached detail plan view of portions of the let-back mechanism and deflector;

Fig. 7 is a sectional view on the line 7—7 of Fig. 6;

Figs. 8 and 9 are detached detail views showing in plan and side elevation respectively, the compensating device between the chains and the yarn guiding means; and

Fig. 10 is a diagrammatic view showing a bobbin having the yarn wound thereon in accordance with the present invention.

The present drawings show the invention associated with a ring spinning frame by which the yarn is twisted and progressively wound upon the continuously driven yarn receivers, but it is to be understood, of course, that such showing and association of the invention is for illustrative purposes and that the invention may be applied to other forms of yarn winding machines, though in some respects it is especially adapted to ring spinning frames.

The machine frame is of a character to support the operating parts, and in the present instance comprises the end frames 1, only one of which is illustrated in Fig. 1. An operating roller or drum 2 (sometimes referred-to as the "tin roller") is mounted on the machine frame and through the belting connection 3, Fig. 1, drives a series of spindles, as usual, on which the yarn receivers or bobbins are mounted.

The spindles are supported upon the usual spindle rail 4 which is secured to the machine frame, and above the spindle rail 4 is the ring-rail 5 which usually has a number of yarn guiding means supported thereby. These, in the present instance, are constituted by the rings 6 and travelers 7, only one of such rings and travelers being indicated in the drawings. The yarn *a* is taken from a source of supply and passes through the traveler 7 by which it is guided to the yarn receiver or bobbin on which the yarn is wound.

The ring-rail 5 has extending downwardly therefrom the rod 8, the lower end of which has a footpiece 9 resting upon a roller or other bearing 10 carried by the arm 11 of a lever which is pivoted on the machine frame as usual. The other arm 12 of the lever in the present instance of the invention, has a segment portion 13, and the lever constituted by the arms 11 and 12 is normally under the influence of a weight 14 which tends to left the ring-rail. These parts are as usual in a ring spinning frame.

The builder arm 15 is pivotally supported on an axis 16 by the machine frame in the usual manner, and is provided with a weight 17 which normally tends to hold the roller 18, projecting from the builder arm, in operative relation with the builder cam 19. The builder cam will be driven as usual, from an appropriate source of power, but since the builder arm and its relation with the builder cam and the operating means for the builder cam are all old and well known, further detailed description and illustration of these features are not needed.

The builder arm 15 has mounted thereon a let-back mechanism which is driven as usual in this class of machines, through a pick-wheel 20 and the operating pawl 21 carried by the depending arm 22, the upper end of which is secured to the frame of the machine at 23. The pick-wheel 20 is secured to the pick-wheel shaft 24 which is mounted for rotative movement in the bearing 25 carried by the builder arm. The pick shaft 24 has the worm 26 which is in operative engagement with the worm wheel 27 of the let-back mechanism. These parts are all of usual character as shown in the present instance of the invention, and further description of these features will not be necessary.

The present invention provides connections between the builder arm 15 and the yarn guiding means or ring-rail 5 which include two flexible portions or chains which are separately connected to the let-back mechanism so that they may both be let-back during the operation of the builder arm; and between the let-back mechanism and the yarn guiding means or the ring-rail 5, means is provided for modifying the action of the chains upon the yarn guiding means or ring-rail to effect the building of a bunch by a bunch-building traverse which is gradually merged into the regular traverse without abrupt change in the extent of traverse.

The worm wheel 27 which constitutes part of the let-back mechanism, is mounted upon a stud 28 carried by the builder arm 15 and has a hub portion 29. The let-back mechanism has secured to it a deflector which, as will hereinafter more fully appear, is for the purpose of deflecting one of the chains and causing it to let-back faster than the other chain, and to finally slacken the chain on which it operates to enable regular traverse wind to be effected through the other of said chains.

In the present instance, the deflector is constituted by an arm 30 mounted on the projecting hub portion 29 of the worm wheel 27 and secured thereto by means such as the pins 31. The pins 31 prevent relative movement of the deflector 30 and the worm wheel 27, and the deflector is conveniently held in

associated relation with the worm 27 by means of a nut 32 on the end of the stud 28.

The two chains which constitute the flexible portions of the connection between the builder arm and the yarn guiding means or ring-rail, may be conveniently formed in two parts, although this detail is not essential. In the present instance one of the chains 33 is connected to the let-back mechanism by the pin 34, and the other chain 35 is connected to the let-back mechanism by the pin 36 and then such chain 35 passes about the deflector 30 as indicated in Fig. 1, the construction being such that when the builder arm is operated and the let-back mechanism is actuated through the pick-wheel, as usual in this class of machines, both the chains 33 and 35 will be let-back, but the chain 35 will be let-back faster than the chain 33 due to the action of the deflector.

A bracket 37 is secured to one of the end frames of the machine for supporting the guide pulley for one of the chains and the traverse gaining device of the other chain. In the present instance, the arm 37 has the open bearings 38 in which are received the end portions 39 of a cylindrical barrel 40 which is preferably formed as part of the traverse gaining device. The traverse gaining device is formed by a cylindrical member 41 and a slabbed-off or segmental member 42. Between the member 41 and one of the bearings 38, the guides 43 for one of the chains are mounted upon the cylindrical barrel 40 of the traverse gaining device. The construction is such that the guides 43 for one of the chains may rotate independently of the traverse gaining device 41, 42.

The chain 33, which for purposes of identification may be called the regular traverse building chain, extends from the let-back mechanism and is secured at 44 to one of the guides 43, Fig. 2. Secured at 45 to the other of the guides 43 is the completing portion $33^{\times}$ of the regular traverse building chain 33.

The other chain 35, which for identification may be known as the bunch-building chain, extends about the deflector 30 and is secured at 46 (Fig. 2) to the part 41 of the traverse gaining device. The complemental portion $35^{\times}$ of the bunch builder chain 35 is secured at 47 (Figs. 2 and 5) to the slabbed-off member or segment 42 of the traverse gaining device.

Each of the two chains which constitute part of the connection between the builder arm and the yarn guiding means or ring-rail, is, as above described, preferably formed of two portions, but in some instances, if desired, each of these chains may be continuous. In either event, the ends of the chains remote from the builder arm are associated with a compensating device which, in the present instance of the invention, comprises a rocking member or lever 48 (Figs. 2, 3, 8 and 9) pivoted at 49 to a bar or arm 50 which is itself connected to the ring-rail-operating lever 11, 12, through the segment portion 13 thereof, as indicated in Fig. 1.

The rocking member or lever 48 may be conveniently formed with the two hooks 51 and 52 to which the respective chains $33^{\times}$ and $35^{\times}$ may be secured by I-pieces 53, 54, Figs. 1 and 2.

The hooks 51 and 52 are connected to the rocker 48 at points differently distanced from the pivotal connection 49 of the rocking member with the arm 50, as indicated in Figs. 2, 3 and 8, and the rocking member has a stop 55 which is adapted to engage a complemental stop 56 carried by the arm 50 under conditions as will presently appear.

In starting the winding operation, the parts are placed in the position indicated in Figs. 1 and 2. In this position of parts the initial winding or bunch, as indicated in Fig. 10, will be started on the yarn receiver or bobbin 57 at the base 58, due to the maximum deflecting action of the deflector 30 upon the bunch building chain 5 and the position of the traverse gaining device. As the bunch builder arm is given its oscillatory movements by the bunch building cam as usual, and the pick-wheel is actuated through the train of mechanism hereinbefore described, the let-back mechanism will be operated to let-back on both the regular traverse and bunch builder chains 33 and 35 respectively; and the let-back action on the bunch building chain will be faster or greater than that of the regular traverse by reason of the deflector 30. This differential let-back action upon the chains 33 and 35 is further modified by the traverse gaining device, and both chains are caused to function through the compensating device during the bunch building operation. As the let-back mechanism continues to let-back on the successive oscillations of the builder arm, the deflector and traverse gaining device gradually change from the position indicated in Fig. 2 to that indicated in Fig. 3, thereby gradually merging the bunch building traverse into the regular traverse, until finally, when the regular traverse is reached, as indicated by the position of parts in Fig. 3, the bunch building chain will be slackened and the regular traverse accomplished through the regular traverse chain. At such times it will be noted, that the stops 55, 56 are engaged, Figs. 3 and 8, and remain in engaged position throughout the winding operation until the yarn receiver has had wound upon it its complete load of yarn. Under control of the above described train of mechanism, the yarn guiding means or ring-rail will start the bunch building operation by a traverse of minimum extent, and will gradually increase the traverse and also the gain of traverse until

the traverse gradually merges into the regular service traverse, and the gain of traverse merges into the regular service gain.

What is claimed is:—

1. In a machine of the class described, the combination of yarn guiding means for guiding yarn to yarn receivers, a builder arm, a builder cam for operating the builder arm, a let-back mechanism mounted on the builder arm, connections between the builder arm and yarn guiding means including two flexible portions both of which are connected to the let-back mechanism, a deflector movable synchronously with the let-back mechanism and about which one of the flexible portions passes between its connections with the let-back mechanism and yarn guiding means, and means for operating the let-back mechanism and deflector.

2. In a machine of the class described, the combination of yarn guiding means for guiding yarn to yarn receivers, a builder arm, a builder cam for operating the builder arm, a let-back mechanism mounted on the builder arm, connections between the builder arm and yarn guiding means including two flexible portions both of which are connected to the let-back mechanism, means for operating the let-back mechanism to let-back on both said flexible portions, and a deflector actuated synchronously with the let-back mechanism for causing one of the flexible portions to be let-back faster than the other, but with a progressively decreasing rate of let back.

3. In a machine of the class described, the combination of yarn guiding means for guiding yarn to yarn receivers, a builder arm, a builder cam for operating the builder arm, a let-back mechanism mounted on the builder arm, two chains both of which are connected to the let-back mechanism, and yarn guiding means for transmitting traverse movements to the latter, and a deflector about which one of the chains passes between the let-back mechanism and yarn guiding means for letting-back on one of the chains with a progressively-decreasing rate during the building of a bunch to cause the bunch building and regular traverse to gradually merge without abrupt change of traverse.

4. In a machine of the class described, the combination of yarn guiding means, a builder arm and builder cam, a let-back mechanism mounted on the builder arm connections between the builder arm and yarn guiding means including two chains each of which is connected to the let-back mechanism, and a chain deflecting arm mounted on the builder arm constructed and arranged for deflecting one of said chains during the building of the bunch and slacking said chain when the bunch is completed to permit regular service traverse to be imparted to the yarn guiding means through the other of said chains.

5. In a machine of the class described, the combination of yarn guiding means, a builder arm and a builder cam, a let-back mechanism mounted on the builder arm, connections between the builder arm and yarn guiding means including two chains each of which is connected to the let-back mechanism, and a deflector which is under control of the let-back mechanism and acts to deflect one of said chains during the bunch building operation and slackens the said chain when the bunch is completed to permit regular service traverse to be imparted to the yarn guiding means through the other of said chains.

6. In a machine of the class described, the combination of yarn guiding means, a builder arm and a builder cam, a let-back mechanism mounted on the builder arm, connections between the builder arm and yarn guiding means including two chains each of which is connected to the let-back mechanism, a deflector movable with the let-back mechanism and about which one of the chains pass and which acts to let-back on said chain faster than the other chain is let-back by said mechanism.

7. In a machine of the class described, the combination of a ring-rail, a builder arm and a builder cam, a let-back mechanism mounted on the builder arm, connections between the ring-rail and builder arm including two chains both of which are connected to the let-back mechanism, a deflector which is operated by the let-back mechanism and acts upon one of said chains to let-back said chain faster than the other chain is let-back by the let-back mechanism during the bunch building operation, and means for gradually increasing the bunch building traverse until regular traverse is reached.

8. In a machine of the class described, the combination of yarn guiding means, a builder arm and a builder cam, a let-back mechanism on the builder arm, connection between the yarn guiding means and builder arm including two chains both of which are connected to the let-back mechanism, and a deflector operated through the let-back mechanism and acting on a bight of one of the chains to gradually let-back thereon during the building of a bunch for causing the combined action of both said chains to build a bunch of gradually increasing traverse and then one of said chains to effect regular service traverse.

9. In a machine of the class described, the combination of yarn guiding means, a builder arm and a builder cam, a let-back mechanism on the builder arm, connections between the yarn guiding means and builder arm including two chains both of which are connected to the let-back mechanism, and means including a deflector on the builder

arm and a separately mounted traverse gaining device for building a bunch with a gradually increasing traverse merging into the regular service traverse.

10. In a machine of the class described, the combination of a ring-rail, a builder arm, a builder cam for operating the builder arm, a let-back mechanism, a lever for moving the ring rail, connections between the lever and builder arm including two chains both of which are connected to the let-back mechanism, a traverse gaining device for controlling one of said chains, and a compensating lever connected to both of said chains and connecting them to the ring-rail moving lever to effect the building of a bunch with a gradually increasing traverse which merges into the regular service traverse when the bunch is completed.

11. In a machine of the class described, the combination of a ring-rail, a builder arm, a builder cam for operating the builder arm, a let-back mechanism on the builder arm, and means between the builder arm and ring-rail for imparting a gradually increasing traverse to the ring-rail for building a bunch which gradually merges into the regular service traverse, comprising two chains both of which are let-back by the let-back mechanism, a deflector actuated by the let-back mechanism and acting to cause one of said chains to let-back faster than the other, and a traverse gaining device also acting on said chain.

12. In a mechanism of the class described, the combination of a ring-rail, a builder arm, a builder cam for operating the builder arm, a let-back mechanism on the builder arm, means between the builder arm and ring-rail for imparting a gradually increasing traverse to the ring-rail for building a bunch which gradually merges into the regular service traverse, comprising two chains both of which are let-back by the let-back mechanism, a deflector actuated by the let-back mechanism and acting to cause one of said chains to let-back faster than the other, a traverse gaining device also acting on said chain, and a compensating device to which both said chains are connected.

13. In a machine of the class described, the combination of a ring-rail, a builder arm, a builder cam, connections between the builder arm and ring-rail including two chains, means on the builder arm for letting-back on both of said chains unequal amounts during the formation of a bunch, and a traverse gaining device which acts upon one of said chains to gradually merge the bunch building traverse into the regular service traverse.

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

ALONZO E. RHOADES.