To all whom it may concern:

Be it known that I, Joseph Poisson, of Fall River, in the county of Bristol and State of Massachusetts, have invented an improvement in Building-Motions for Ring-Spinning Machines, of which the following is a specification.

The object of this invention is the production of a traverse motion to be used in connection with weft-spinning machines whereby the reciprocating of the ring rail is so controlled that the yarn is laid upon a bobbin with a primary winding and thereafter with a main or surface winding to complete the up-building of the yarn mass. In accordance with the present invention the winding is started with a short traverse which is gradually increased up to a predetermined point after which the winding is completed with a traverse of uniform length, and during the primary winding the gain starts at the maximum and gradually decreases until the main winding is begun, and throughout the main winding the gain is uniform. The result is to produce a yarn mass which reels off, while in use, easily throughout the entire mass and one which is particularly useful in so-called "feeler" looms wherein an instrumentality called a "feeler" comes in contact with the mass of yarn near the base of the bobbin and on the depletion of the yarn to a predetermined extent puts in action a weft-replenishing mechanism which automatically ejects the nearly spent bobbin from the running shuttle and inserts a fresh bobbin. In such feeler looms a portion of the yarn is left upon the bobbin and when the yarn is wound upon the bobbin in accordance with the present invention it is readily stripped from the bobbin, this obviating any unwinding or any cutting of the yarn while on the bobbin.

The present invention resides in the novel mechanism which gives the gradually increasing traverse and the gradually decreasing gain during the primary winding.

The present improvements are illustrated in the accompanying drawings, wherein—

Figure 1, is an elevation of a portion of a spinning machine equipped with the present invention. Fig. 2, is a perspective view of a portion of the mechanism. Fig. 3, is an enlarged view of the mechanism for automatically adjusting the pick motion.

The drawings illustrate a well-known type of spinning frame to which the improvements have been added. As shown, the rising and falling ring rail 45 (of which only a small portion is illustrated) is mounted upon vertically reciprocating lifter rods 60 46, a portion only of which are shown. These lifter rods, as usual, rest at their lower ends upon the outer ends of rocker arms, four of such rocker arms being shown at 28, 24, 25, and 26. These several illustrated rocker arms are carried by rock shafts 22, 16, 20, and 21, respectively. The weight of the ring rail and its adjuncts upon the rocker arms is partly counterbalanced by counterbalancing weights on counterbalancing arms such as are shown at 27, 28, and 29, each counterbalancing arm being secured to one of the rock shafts. The several rock shafts have upwardly extending equalizer arms 30, 31, 32, and 33 which are all operatively connected together by means of a connecting rod 34 so that all of the rocker arms move together.

The ring rail descends by reason of its weight and it is lifted by the rotating cam 80 1, and intervening connections. The cam 1 oscillates the arm 2 from which extends the upwardly projecting standard B. The standard B has an arm 4 at its upper end in which is mounted a pulley 5 and a vertically sliding block 7 to which is attached one end of the pick chain 8. The pick chain passes over the top of the pulley 5 and is connected by its flexible extension 10 to the equalizer arm 11. As the cam 1 rotates, the standard B and its attached parts are swung back and forth thereby taking up the pick chain when the upper end of the standard moves to the left (as shown in Fig. 1) thereby lifting the ring rail 45. When the upper end of the standard B moves to the right the pick chain is slackened and the weight of the ring rail causes it to descend.

As thus far described, the illustrated mechanism operates in a well-known way, being similar to the construction shown in the United States Letters Patent of Meats, No. 400,084, dated April 9, 1889. This gives
a uniform traverse to the ring rail. During this uniform traverse of the ring rail there is a uniform gain imparted in a well-known way. The sliding nut 7 is moved up and down in the arm 4 by means of a vertically extending worm 6 which is automatically rotated in one direction as the progress of the spinning continues. The effect of this automatic rotation of the worm 6 is to cause the sliding nut 7 to descend, thereby gradually taking up the pick chain and hence lifting the ring rail so that the successive up and down traverses of the ring rail occur at gradually increasing elevations.

This is a well-known operation being similar to that described in the aforesaid Meats patent. The gradual rotation of the worm shaft 6 is effected in a well-known way by a pick gear 9 and a pick pawl 3 mounted upon a swinging arm 3'. This pick pawl 3 has a uniform oscillating stroke so that, during the normal wind, the pick gear 9 is rotated uniformly at each traverse of the ring rail.

So far as the mechanism has been thus described, it is old and like existing types of spinning machines, except for the pick chain extension 10 which, in accordance with the present improvement, extends from the pulley 5 past several of the rocker shafts before attachment to one of the equalizer arms. The mechanism as thus far described gives a uniform traverse and a uniform gain and this is the mode of operation during the normal laying of the yarn on the bobbin and during the greater part of the length of the yarn mass.

The present improvements reside in the added mechanism (including the pick chain extension) whereby during the primary winding at the base of the bobbin there is a gradually decreasing gain. The winding begins with the minimum traverse and the maximum gain, the traverse increasing until the normal traverse is reached and the gain beginning at its maximum and decreasing until the normal gain is reached.

The pick chain extends over two fixed supports 12 and 13, which are located between the pick motion and the point at which the pick chain extension is attached to the equalizer arm 11 of one of the rockers. These pick chain supports 12 and 13 are on opposite sides of the rocker arm 24. This rocker arm 24 has a horizontal extending arm 17 which carries a vertically extending rod 18 which at its upper end has a horizontally extending bearing 19 which extends across and above the pick chain. When, now, the sliding nut 7 occupies its highest position and the ring rail 45 is at its lowest position, the bearing 19 puts a sag or bight in the pick chain 10 between the two supports 12 and 13. When the ring rail 45 is thus at its lowest position the standard B is swung its maximum distance to the right. Accordingly, when the winding of the yarn on the bobbin starts the bight in the pick chain is at its maximum. When, then, under the action of the cam 1, the standard B is swung to the left for the purpose of raising the ring rail, a portion of this movement is expended in partly straightening out the bight in the pick chain extension and only a part of this movement is effective in lifting the ring rail with the result that the winding starts with a short traverse. Assuming that the gain remains constant the extent of bight put into the pick chain by reason of the descending of the ring rail will become less and less until the pick chain is so far effectively taken up by the descent of the nut 7 as to render the bearing 19 ineffective to any longer put a bight into the pick chain extension. During the period from the start to the point when this condition is reached, the traverse gradually increases; and, thereafter, the traverse remains uniform until the winding and winding is completed. Thus, the gradually increasing traverse during the primary winding is due to the bight which is put into the pick chain by reason of the bearers 19 and the supports 12 and 13 below the pick chain.

The maximum gain at the beginning of the winding and the gradual decrease of the gain until the normal condition is reached are effected by varying the effectiveness of the pick pawl 3 during the primary winding. The effective stroke of the pick pawl 3 is determined by a swinging shield 36. During the normal winding this shield 36 is maintained in a definite place by means of an arm 37 extending therefrom which is maintained in contact 105 with a fixed stop 44 (carried by a rod 43 secured to the frame of the machine) against which it is held by a weight 30 on an arm 38 fixedly connected with the shield 36. When the shield occupies this normal position it restricts the effective stroke of the pick pawl 3 on the pick wheel 9 and maintains a uniform effective stroke for the pawl. When, however, the ring rail is at its lowest position the shield 36 is swung 115 downwardly so as to increase the effective action of the pick pawl upon the pick wheel to the maximum extent. To this end, the rocker 22 has an arm 42 which is adapted to encounter a stop 41 on the upper end 120 of a rod 40, the lower end of that rod being pivotally connected to the arm 37 of the shield. The upper end of the rod 40 extends through a hole in the arm 42 and the stop 41 is thereby retained in proper relation to the arm 42. Owing to this construction, when the ring rail 45 occupies its lowest position (at the starting of the wind-
ing) the upper end of arm 42 is swung to the maximum extent to the right (see Fig. 1) thereby encountering the stop 41, thus moving the rod 40 to the maximum extent to the right, hence lowering the shield 36 to the maximum extent, and thereby giving the pick pawl 3 its maximum effectiveness. Accordingly, at the beginning of the winding the gain is at the maximum. Owing to the gradual taking up of the pick chain as the winding continues, the upper end of the arm 42 moves less and less toward the right as the ring rail descends at the successive traverses so that the encounter of the arm 42 upon the stop 41 becomes less and less effective in extent. Hence, the shield 36 is gradually raised by the weight 39 thus decreasing the extent of the effective movement of the pick pawl 3. Thus, a gradually decreasing gain is effected during the primary winding and while the extent of the traverse is increasing. Finally, when the primary winding has been completed and the normal traverse begins, the taking up of the pick chain by the descent of the nut 7 has so far continued that the arm 42 on its right-hand stroke no longer encounters the stop 41 and the shield 36 is maintained in uniform position with its arm 37 resting against the stop 44, and thereafter the normal uniform gain is effected.

Guides 14 and 15 are shown above the pick chain extension 10. These guides are carried on fixed standards on the frame of the machine. They prevent any upslash of the pick chain.

This improved mechanism is simple, economical and efficient and can be readily added to a large number of existing spinning frames.

I claim—

1. A ring spinning frame having, in combination, a ring rail; rockers operatively connected with the ring rail and having connected rocker arms 11 and 42; a cam-actuated swinging builder arm 4; a nut 7, sliding on said builder arm; a pick chain connected at one end to said nut and at its other end to the rocker arm 11; supports 12 and 13, for the pick chain between said builder arm 4, and said rocker arm 11; a bearer 19, above the pick chain and located in a plane between said supports 12 and 13, said bearer being operatively connected with the ring rail to rise and fall therewith, and to produce a bight in said pick chain when the ring rail is at and near its lowest position; a weight moving the shield in opposition to said arm 42; and a stop 44, which limits the movement of the shield caused by said weight.

2. A ring spinning frame having, in combination, a ring rail; a rocker operatively connected with the ring rail and having a rocker arm 11; a cam-actuated swinging builder arm 4; a nut 7, sliding on said builder arm; a pick chain connected at one end to said nut and at its other end to the rocker arm 11; supports 12, and 13, for the pick chain between said builder arm 4, and said rocker arm 11; and a bearer 19, above the pick chain and located in a plane between said supports 12, and 13, said bearer being operatively connected with the ring rail to rise and fall therewith, and to produce a bight in said pick chain when the ring rail is at and near its lowest position.

3. A ring spinning frame having, in combination, a ring rail; a rocker operatively connected to move with the ring rail and having a rocker arm 42; a pick chain; a pick wheel operatively connected with said pick chain to gradually feed the pick chain as the spinning progresses; a movable pawl which feeds said pick wheel; a movable shield governing the effective stroke of said pawl; a rod 40, connected with said shield having a stop 41, which is encountered by said rocke

4. A ring spinning frame having, in combination, a ring rail; a rocker operatively connected with the ring rail and having a rocker arm 42; a cam-actuated builder motion; a pick chain connected at one end to said builder motion and at its other end to said rocker arm; supports for the pick chain between said builder motion and said rocker arm; and a bearer above the pick chain and located in a plane between said supports, said bearer being operatively connected with the ring rail to rise and fall therewith, and to produce a bight in said pick chain when the ring rail is at and near its lowest position.

5. A ring spinning frame having, in combination, a ring rail; actuating mechanism therefor; a builder motion; a pick chain connected at one end to said builder motion and at its other end to said actuating mechanism; and a bearer operatively connected with and depressed by the ring rail to produce a bight in said pick chain between said actuating mechanism and said builder motion when the ring rail is at and near its lowest position.

6. A ring spinning frame having, in comb-
combination, a ring rail; a rocker operatively connected to move with the ring rail and having a rocker arm; a pick chain; a pick wheel operatively connected with said pick chain to gradually feed the pick chain as the spinning progresses; a movable pawl which feeds said pick wheel; a movable shield governing the effective stroke of said pawl; and a rod connected with said shield having a stop which is encountered by said rocker arm when the ring rail is at and near its lowest position.

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

JOSEPH POISSON.

Witnesses:
Ada E. Hagerty,
J. A. Miller.

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