July 5, 1938. C. MORTON 2,122,434

BUILDER MOTION FOR TEXTILE MACHINERY

Filed April 29, 1936 3 Sheets-Sheet 1

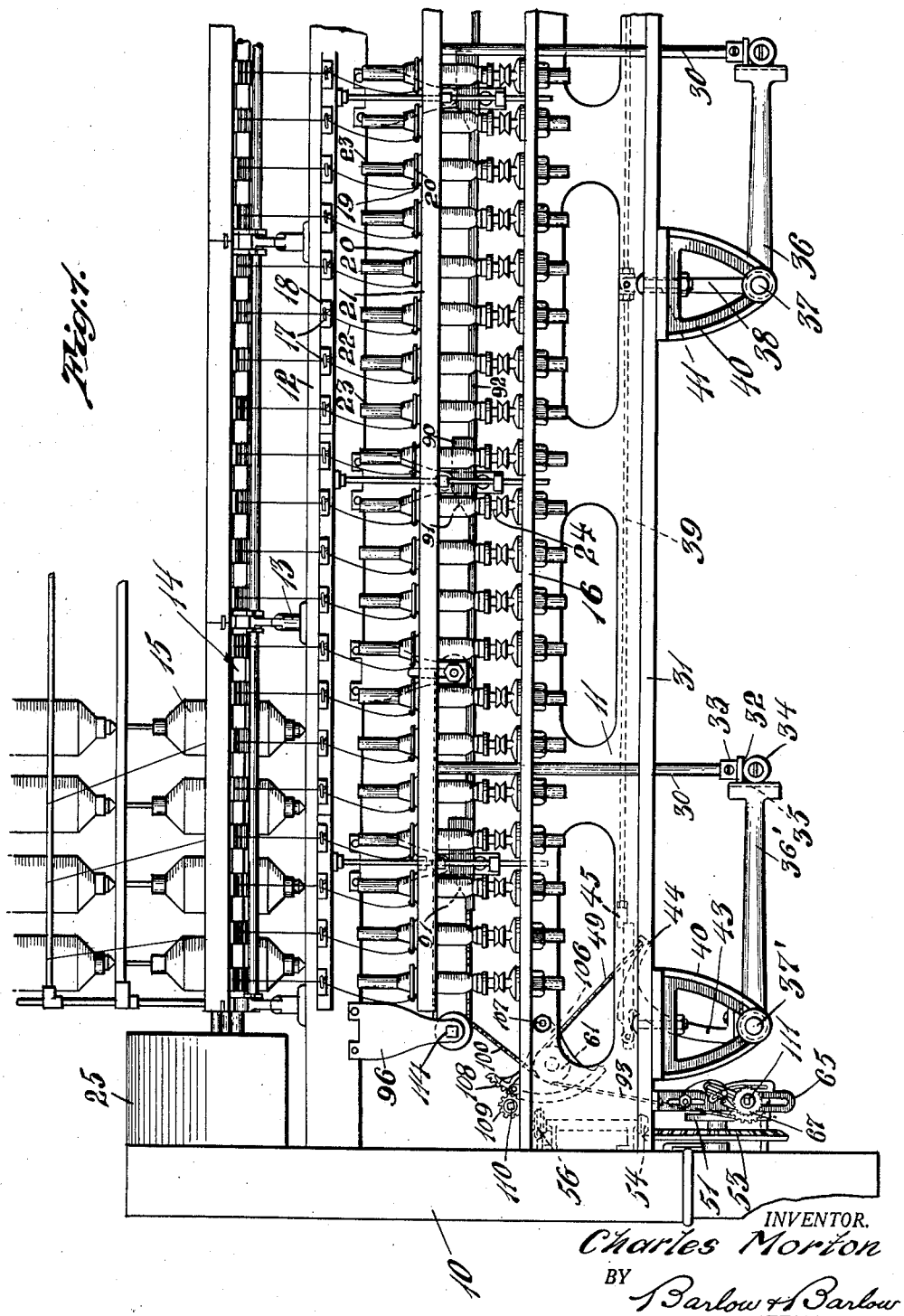


Fig. 1.

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Fig. 2.

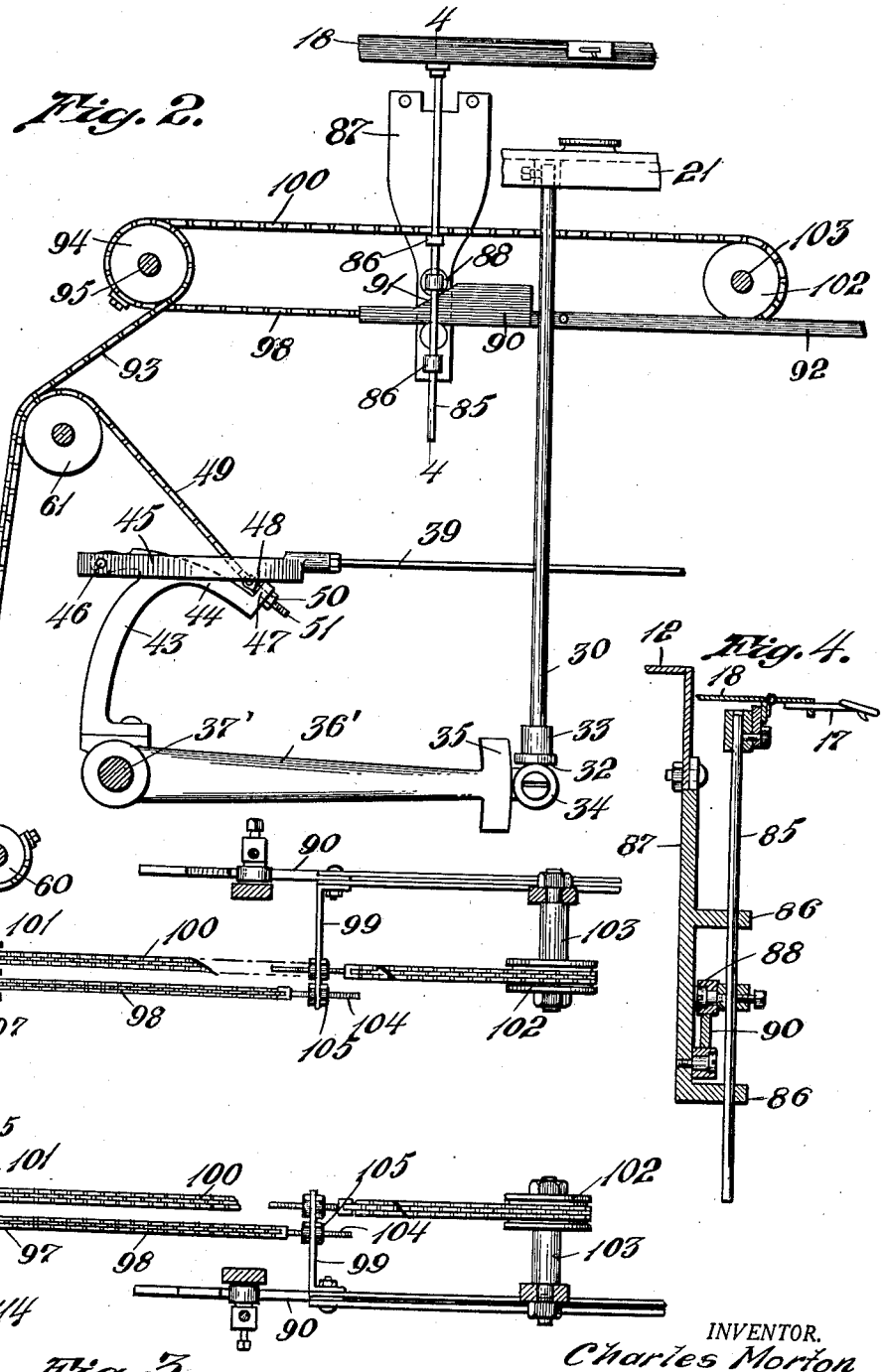


Fig. 3.

Fig. 4.

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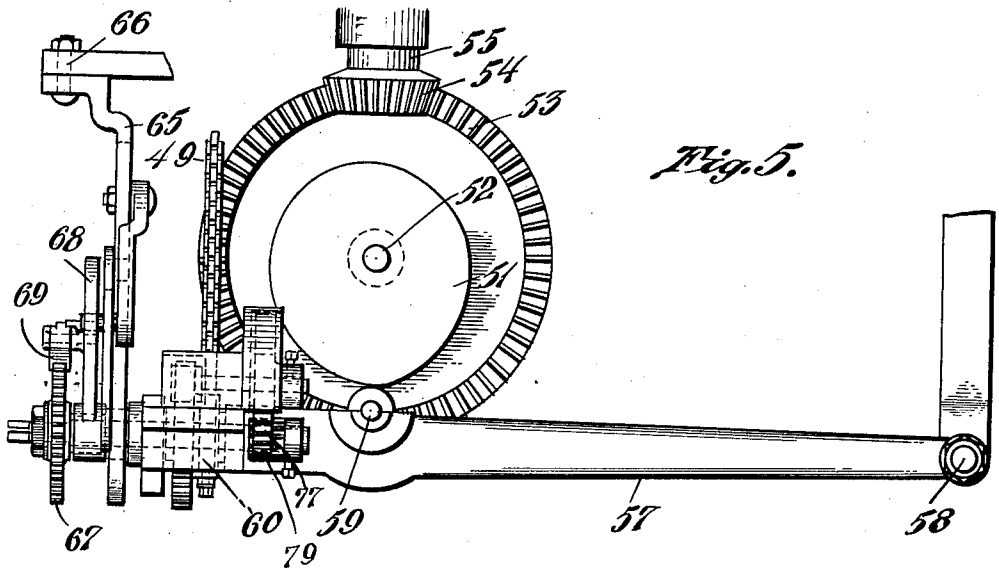


Fig. 5.

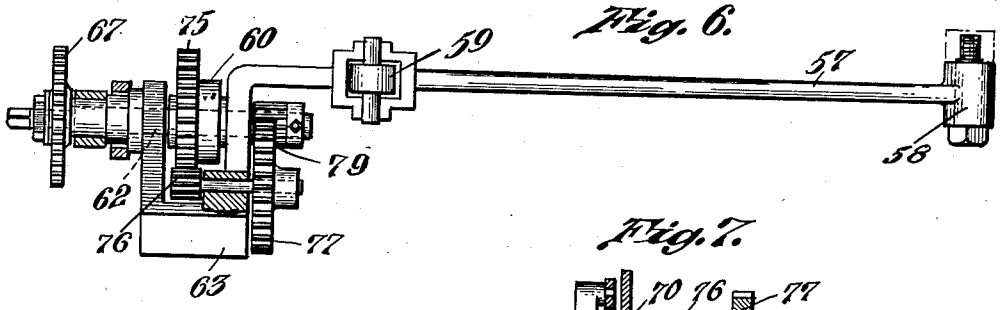


Fig. 6.

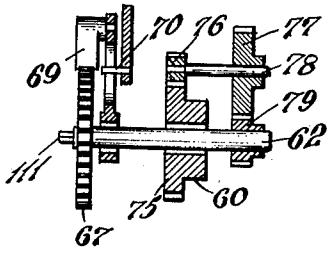


Fig. 7.

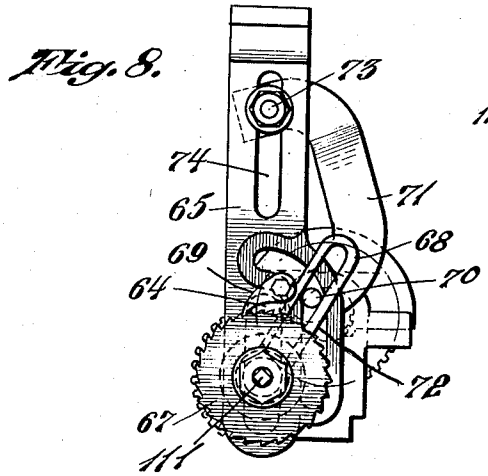


Fig. 8.

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Patented July 5, 1938

2,122,434

UNITED STATES PATENT OFFICE

2,122,434

BUILDER MOTION FOR TEXTILE MACHINERY

Charles Morton, Pawtucket, R. I., assignor to J. & P. Coats (Rhode Island) Incorporated, a corporation of Rhode Island

Application April 29, 1936, Serial No. 76,947

21 Claims. (Cl. 118—15)

This invention relates to textile machinery, more particularly to the control of the yarn as it is being packaged, and has for one of its objects the better control of the yarn as it is being directed to the package and the reduction of breaks, particularly as the package is nearing completion.

Another object of the invention is the provision of larger packages on the same gauge spinning frame without increasing the breakage of ends whereby doffing is less frequent.

Another object of the invention is to relieve undue tension on the yarn as it is being packaged.

Another object of the invention is by means of a better control of the yarn to form better yarn from a drafting mechanism where the same is attenuated.

Another object of the invention is the obtaining of a greater movement of the thread guide board of a drafting frame.

Another object of the invention is the provision of a mechanism which may be attached to the means for oscillating the ring rail of a spinning frame to derive its movement therefrom and yet provide an independent operation of the thread board as to the amount of travel of the ring rail and a control thereof.

Another object of the invention is the control of the thread guide board of a drafting or spinning frame independently of the ring rail so that the thread guide board may be moved or remain stationary during any part of the operation of the ring rail, without interrupting or in any way affecting the movement of the ring rail.

A more specific object of the invention is to obtain a greater movement of the thread guide board of a drafting or spinning frame during a portion of the builder motion while stopping the movement of the thread guide board and maintaining it in its highest position during the completion or finish of the builder motion in forming the package.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is an elevation of a fragmentary portion of a drawing or spinning frame, illustrating certain operating parts of my apparatus, for controlling the operation of the thread guide board;

Fig. 2 is a diagrammatic view of the operating parts of my thread board control mechanism separated from the spinning frame;

Fig. 3 is a fragmentary view looking down on the top of the cam controlling mechanism for the thread guide board;

Fig. 4 is a sectional view of some of the parts shown in Fig. 2 showing the thread guide board and the rod through which it is supported;

Fig. 5 is an elevation of the builder motion power lever and the operating mechanism carried thereby;

Fig. 6 is a top plan view of the mechanism shown in Fig. 5;

Fig. 7 is a fragmentary sectional view largely diagrammatic of the driven mechanism at the end of the power lever;

Fig. 8 is a fragmental detail of a portion of the mechanism which causes the traverse mechanism to progressively move along the package.

In the use of spinning and drafting frames, the size of package which may be formed on the spindle is limited by certain factors entering into commercial production, such as by the closeness of the spindles one to the other or the gauge of the frame. If the spindles are too close together, the balloon of the yarn as the traveler moves along the ring of one spindle will interfere with the balloon of the yarn of the next spindle. The greater the distance between the ring rail and the thread board guide, the greater will be the balloon of the yarn; also, the length of the packages which are wound is limited as should the top of the package approach too closely to the thread board guide a tension will occur so great that the yarn will break. The commercial spinning frame is so arranged as to gauge and position of the thread board guide as to acquire the largest package with least breaks. By the use of this invention, a package containing substantially fifty percent more of yarn on a bobbin may be obtained than in the frames now in commercial use; and this is accomplished by the much larger and independent selective and controlled movement of the thread board guide than has ever heretofore been known.

The thread board guide is moved downwardly with the ring rail to control the ballooning and yet it is raised to its extreme height near the end of the winding of thread onto the package to relieve undue tension on the yarn as the top of the package is reached.

The heretofore commercial thread guide board has had a very short movement, possibly a quarter of an inch; and in order to overcome the difficulties which exist in such a mechanism I have arranged a construction whereby the thread board may be moved any desired extent and

through different amounts during the building of the yarn on the bobbin as I control the movement of the thread board by a cam, the surface of which may be varied throughout a wide range; and as it is unnecessary that the thread guide board move during the latter half of the packaging, I move the thread guide board only during the first part of the building of the yarn on the package and stop it at the top of its movement during the latter part or at any desired point during its travel; thus, I control the ballooning where such ballooning is desired to be controlled as the yarn is wound on the package at the lower end while as the ballooning will not occur to as great an extent at the top of the package, the thread guide board may have its movement halted and yet be such a distance from the top of the package that no undue strain will be caused on the yarn. Thus, I provide a better yarn and may provide a package containing more thread and yet be obtained on a frame of a gauge which has a maximum size package of much less yarn; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

The spinning or drafting frame is largely of the usual type consisting of back to back sides of the frame, each side comprising a plurality of spindles, thread board guide, roll stand and rolls for drafting and supports for roving packages. My invention is applied to both sides of the frame with a common control between the parts for controlling the operation thereof.

With reference to the drawings, the back to back sides of the frame are substantially alike and the description of one will serve for both; 10 designates the common upright portion of the frame at one end and 11 the horizontal fixed angle iron beam supported therefrom, the upper flange 16 of which provides a spindle rail, while 12 is the fixed roll stand support also supported by the upright frame 10. A roll stand 13 suitably supports pairs of draft rolls designated generally 14 which receive roving from the supply packages 15 to attenuate the same and deliver each end down through the pigtail guide 17 supported by the thread guide board 18, thence downwardly under the traveler 19 on the ring 20 supported by the ring rail 21 from whence the thread designated 22 is delivered to the bobbin 23 supported on the spindle 24 and rotatably mounted in the spindle rail 16 and suitably driven by a belt from the large drum as is usual in constructions of this character. The draft rolls are driven by suitable gearing housed within the guard 25 at one end of the frame.

This ring rail 21 is supported by rods 30 at spaced intervals along the frame, which rods are slidably mounted in the flange 16 and the flange 31 of the beam 11 and are movable relatively thereto for the traverse motion of the rail along the bobbin.

The rods 30 are each provided with an enlarged abutment surface 32 formed by the flat flanged end of a collar 33 which is secured to the end of the rod 30. Each abutment surface 32 rests upon the anti-friction roller 34 adjustably supported at the end 35 of a bellcrank lever 36, several of which are pivoted about shafts 37 positioned along the frame on brackets 40 bolted as at 41 to the beam and extending across from one side to the other of the frame where the shafts are similarly supported and serve to mount similar bellcrank levers at the head end of the frame.

The bellcrank levers 36' on opposite sides are fixed to the shaft 37' in the brackets 40 to transmit motion through shaft 37' from one side of the machine to the other that the bell crank levers 36', 36' on both sides of the frame will operate by applying operating movement to one alone. The arms 38 of the bellcrank levers 36 are all connected together and to the arm 43 of the lever 36' by a suitable coupling rod 39 so as to cause all of the bellcrank levers on one side of the machine to operate in unison and uniformly raise the ring rail at all of its spaced supporting points.

The bellcrank lever 36' at the head end of the machine has its arms 43 shaped differently from the arms 38 of the other bellcrank levers along the side of the frame. The arm 43 is provided with an arcuate end portion 44 on an arc struck from the center of the shaft 37' to which arm coupling 45 of the rod 39 is pivoted as at 46. While it is provided with a lug 47 for receiving a connecting bolt 48 for tieing a flexible connection such as the chain 49 thereto, the bolt being secured in position by a nut 50 on the threaded shank 51 thereof, and through this chain an oscillating motion is provided for all of the bellcrank levers of the frame.

The pick motion is derived by means of a cam 51 mounted on shaft 52 which is driven by a bevel gear 53 from the bevel pinion 54 mounted on shaft 55 and suitably driven by gear 56 from some source of power. A lever 57 pivoted at 58 is urged by means of the cam 51 engaging anti-friction roller 59 supported thereon to cause the lever 57 to be reciprocated. This lever has certain take-up mechanism mounted at the end thereof including a drum 60 to which the chain 49 is connected so that as the lever moves it bodily moves the drum 60 which pulls the chain 49 over the pulley 61 to swing the levers 36', 36 about their pivot and lift the rods 30 and in turn the ring rail. The weight of the ring rail serves to impart movement of the lever 36', 36 in the opposite direction to keep the chain 49 taut and the roll 59 against the cam 51.

The above serves to give a reciprocating motion to the ring rail but in order to cause the ring rail to advance along the package the drum 60 is gradually rotated automatically by a shaft 62 mounted in suitable bearings in the U-shape portion 63 of the lever 57. This shaft extends through slot 64 in the bracket 65 which is suitably mounted by means of a bolt 66 on the beam 11 so that as the lever 57 moves up and down this shaft 62 will move up and down in the slot 64 in the bracket. A ratchet wheel 67 is fixed on the end of the shaft 62 while a slotted arm 68 is loosely mounted on the shaft 62 and has a pawl 69 for engaging with the teeth of the ratchet wheel 67.

The arm 68 is guided in its movements by a pin 70 carried by the end of an arm 71 which extends through a slot 72 in the bracket 65 and may be held in different adjusted positions by means of a bolt 73 which extends through a slot 74 also in the bracket 65. Thus, the position of the pin 70 may be determined for varying the throw of the pawl 69 and the relative rotation of the ratchet wheel 67 which will be caused by reciprocating movement of shaft 62 and the arm 68 thereon so as to rotate the ratchet wheel 67 and the shaft 62.

The drum 60 is loosely rotatably mounted upon the shaft 62 and has secured to it a gear 75 which may be integral therewith. This drum is rotated by means of the train of gears 76, 77, fixed on

shaft 78 and a gear 79 fixed on shaft 62 by reason of which a very slow but positive rotation is given to the drum 60 to gradually wind up the chain 49 to cause the traverse of the ring rail to move upwardly along the bobbin.

The thread board guide 18 is supported by a plurality of rods 85 extending downwardly and suitably guided through the spaced eyes 86 mounted on the bracket 87 secured to the roll stand support 12. A roller 88 is adjustably secured to each rod 85 and rests upon a movable controlling member 90 which I have formed in the desired shape to govern the movement of the thread board guide which I here show as an inclined surface 91 of a predetermined desired pitch and length. Each of these members 90 is the same and are positioned the same with reference to the rod 85 while all are connected together by a suitable thrust transmitting connection 92, whereby I may move all of these control members 90 together or in unison. The weight of the thread guide board 18 and its supporting rods is sufficient when resting upon the incline 91 to move this member to the right as viewed in Figs. 1 and 2; and in order to move these members 90 in the other direction or toward the left in these figures I attach to some reciprocating part of the mechanism of the machine which will exert a pull in the required direction at the desired interval and for this purpose I here attach a flexible connection 93 to the aforementioned chain 49 which imparts motion to the ring rail mechanism through which chain 93 a movement is periodically transmitted to the members 90 to the left in Fig. 1. In this particular showing a drum 94 is secured to shaft 95 supported in brackets 96 on opposite sides of the frame about which drum the chain 93 is partially wrapped and secured. On shaft 95 a pulley 97 is secured from which a chain 98 leads to bracket 99 secured to the member 90. Connection is also made to the other side of this bracket that the members 90 may be more readily returned to starting position by means of chain 100 extending about a drum 101 fixed to shaft 95 and pulley 102 fixed on stub shaft 103. The connection to the bracket 99 permits of adjustment by means of the threaded members 104 and nuts 105. This mechanism enumerated as 97 to 105 is duplicated on the other side of the machine being controlled through shaft 95 as shown in Fig. 3.

It will, of course, be apparent that as the reciprocation of the ring rail takes place the drum 60 is being ratcheted around so as to cause the ring rail to continually rise, that is, it will never come quite down to where it did the previous reciprocation and will each time go up just a little higher, although the length of traverse will be the same. Likewise, the chain 93 moving with chain 49 intermittently pulls the support 90 with its inclined surface 91 so that at the beginning of operation when the roll 88 is at the bottom of the incline 91 a pull on the member 90 will raise the roll 88 upwardly along the incline 91 and when the pull toward the left, Fig. 1, ceases and the lever 57 lifts the weight of the thread board will move the member 90 in the other direction, keeping the chain 93 tight. Gradually, however, as the chain 49 winds on the drum 60 the cams 90 will be drawn to the left and the roll 88 will travel higher and higher on the incline 91 until it reaches the flat surface as shown in Fig. 1 so that the thread board guide will no longer reciprocate. Thus, by this arrangement I may control the thread board through any desired shape of surface cam 91 so that the desired movement may be obtained and all this independently of the movement of the rail, although I obtain my movement from the mechanism which operates the ring rail.

I may extend these inclined surfaces of the cams 91 to any extent and I may cause them to be sufficiently steep to obtain the desired reciprocation of the thread board guide. In the present instance, I have so arranged the cams that the thread board guide will operate about three-quarters of an inch, although the range of reciprocation is from a quarter of an inch to an inch and a quarter. The ring rail operates or lifts an inch and five-eighths which is more or less standard. The inclined surface 91 is of such an incline and so positioned that the thread board guide will operate through this three-fourths of an inch, while the thread is being packaged on the lower part of the bobbin, however, when the rail reaches a point so that the bobbin is substantially half full the horizontal surface of the cam will then be carrying the roll 88 and from this point on the thread board guide will remain at the top of the stroke and no longer reciprocate.

After the bobbins are full and it is necessary to doff, the pulley 61 which is mounted upon a segment 106, pivoted as at 107 and having a toothed rack 108 which is engaged by a pinion 109, is lowered by turning the squared end of shaft 110 by a crank so as to thereby drop the ring rail to its lowermost position; also, a crank is applied to the squared end 111 of the shaft 62 and by disengaging pawl 69, I unwind from the drum the chain 49 returning it to starting position. Also, a crank is applied to the squared end 114 of the shaft 95 and by turning in the proper direction the chain 100 draws the control members 90 back to their starting positions with the roll 88 resting upon the incline 91 at the lower portion thereof, it being more desirable to manually return the control members 90 to starting positions than to apply some spring or weight means which would require too great a force and drag upon the mechanism while it was reciprocating back and forth during the working transverse of the thread board guide.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In a textile machine, packaging means comprising a traversing member, means for oscillating said traversing member, a guide member, and means for oscillating said guide member during a portion only of the operation of the traversing member.

2. In a textile machine, packaging means comprising a traversing member, means for oscillating said traversing member, a guide member, and means for oscillating said guide member during a portion of the operation of the traverse member and rendering the same inoperative during another portion of the operation of the traverse member.

3. In a textile machine, packaging means comprising a traversing member, means for oscillating said traversing member, a guide member, and means attached to the means for oscillating the traverse member for oscillating the guide

member whereby the lower limit of its stroke is gradually raised in synchronism with the traversing member during a portion of the stroke of the guide member and for controlling the movement of the guide member independent of the movement of the traverse member so as to cause the same to be inoperative at an upper position of its stroke.

4. In a drafting frame, ring rail builder mechanism, a thread board, and means responsive to the movement of the builder mechanism for reciprocation of the thread board during a part only of the reciprocating movement of the builder mechanism.

5. In a drafting frame, ring rail builder mechanism, a thread board, and means attached to the builder mechanism and said thread board for reciprocating said thread board only during a selected portion of the operation of the builder mechanism less than the whole.

6. In a drafting frame, ring rail builder mechanism, a thread board, and cam means reciprocable in a rectilinear path for controlling the operation of the thread board.

7. In a drafting frame, a ring rail, means for oscillating said ring rail through a constant length of traverse which progressively moves along the bobbin, a thread board, and cam means reciprocable in a rectilinear path for oscillating said thread board in time with said rail.

8. In a drafting frame, a ring rail, means for oscillating said ring rail through a constant length of traverse which progressively moves along the bobbin, a thread board, and means for oscillating said thread board in time with said rail through a different length of traverse and for a portion only of the progressive movement of the rail along the bobbin.

9. In a drafting frame, a ring rail, means for oscillating said ring rail through a constant length of traverse which progressively moves along the bobbin, a thread board, and means for oscillating said thread board in time with said rail at the lower part of the progressive movement of said rail and terminating the oscillation of the thread board at some desired point in the progressive movement of the rail and during the completion of progressive movement of the ring rail.

10. In a drafting frame, a ring rail, means for oscillating said ring rail through a constant length of traverse which progressively moves along the bobbin, a thread board, and means for controlling movement of the thread board to determine its movement relative to the movement of the rail at the lower part of the progressive movement of said rail and terminating the oscillation of the thread board at some desired point in the progressive movement of the rail and during the completion of progressive movement of the ring rail.

11. In a drafting frame, a ring rail, means for oscillating said ring rail through a constant length of traverse which progressively moves along the bobbin, a thread board, rods supporting the thread board, and oscillating members reciprocable in a rectilinear path and having control surfaces for lifting said rods the desired amount each reciprocation.

12. In a drafting frame, a ring rail, means for oscillating said ring rail through a constant length of traverse which progressively moves along the bobbin, a thread board, rods supporting the thread board, and oscillating members having inclined control surfaces for lifting said rods the desired amount each reciprocation and a flat surface for terminating said lift at a desired point.

13. In a textile machine, packaging means comprising a traversing member, means for oscillating said traversing member, a guide member, and means for oscillating the guide member, said means including means for controlling the movement of the guide member independently of the movement of the traversing member, said means causing such movement as is given to said guide member to be in the same direction as and constantly in time with said traversing member throughout the entire length of stroke of said guide member.

14. In a textile machine, packaging means comprising a traversing member, means for oscillating said traversing member, a guide member, and means for oscillating the guide member and controlling the movement of the same independent of the traversing member, said means causing such movement as is given to raise said guide member to be synchronous with the traversing member throughout the lower end portion of the stroke of the traverse member and rendered inoperative during another portion of the operation of the traverse member.

15. In a drafting frame, a thread board, a plurality of rods supporting said thread board, oscillating members reciprocable in a rectilinear path and having an element positioned to lift said rods the desired amount each reciprocation of said oscillating members, said members being connected together so that the movement received by one means is transmitted through such means to another means so that said members oscillate in unison.

16. In a drafting frame, a thread board, a plurality of rods supporting said thread board, members adjustably positioned on said rods and provided with engaging surfaces, and oscillating means reciprocable in a rectilinear path and having an element positioned to engage said surfaces to lift said rods the desired amount each reciprocation of said oscillating means.

17. In a drafting frame, a thread board, a plurality of rods supporting said thread board, members adjustably positioned on said rods and provided with engaging surfaces, and a plurality of oscillating cams having inclined surfaces thereon for engaging said surfaces to lift said rods the desired amount each reciprocation of said oscillating cams.

18. In a drafting frame, a thread board, a plurality of rods supporting said thread board, members adjustably positioned on said rods and provided with engaging surfaces, and a plurality of oscillating cams having inclined surfaces thereon for engaging said surfaces to lift said rods the desired amount each reciprocation of said oscillating cams, said cams oscillating in a substantial horizontal path.

19. In a drafting frame, a thread board, a plurality of spaced rods supporting said thread board, a collar adjustably secured on each of said rods and each provided with an anti-friction member thereon, a plurality of cams mounted for movement in a substantial horizontal path and positioned to engage said anti-friction members, means for connecting said cams in spaced relation to be moved in unison, and means for moving said cams to lift said rods.

20. In a textile machine, packaging means comprising a traversing member, means for oscillating said traversing member, a guide mem-

ber, and means responsive to the movement of said traverse-member oscillatory means for oscillating the guide member, said guide-oscillating means including a control for continuously actuating the guide member to cause movement of the same throughout but a portion of the range of operation of said traversing member.

21. In a drafting frame, ring rail builder mechanism, a thread board arranged for oscillatory movement, and means responsive to the movement of the builder mechanism for independently operating the thread board for oscillating the same, said means acting to cause gradually raising of the lower limit of stroke of the thread board in synchronism with the rail movement and during a part only of the reciprocating movement of the builder mechanism and becoming mechanically inoperative after a predetermined amount of operation.

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