

Aug. 27, 1968

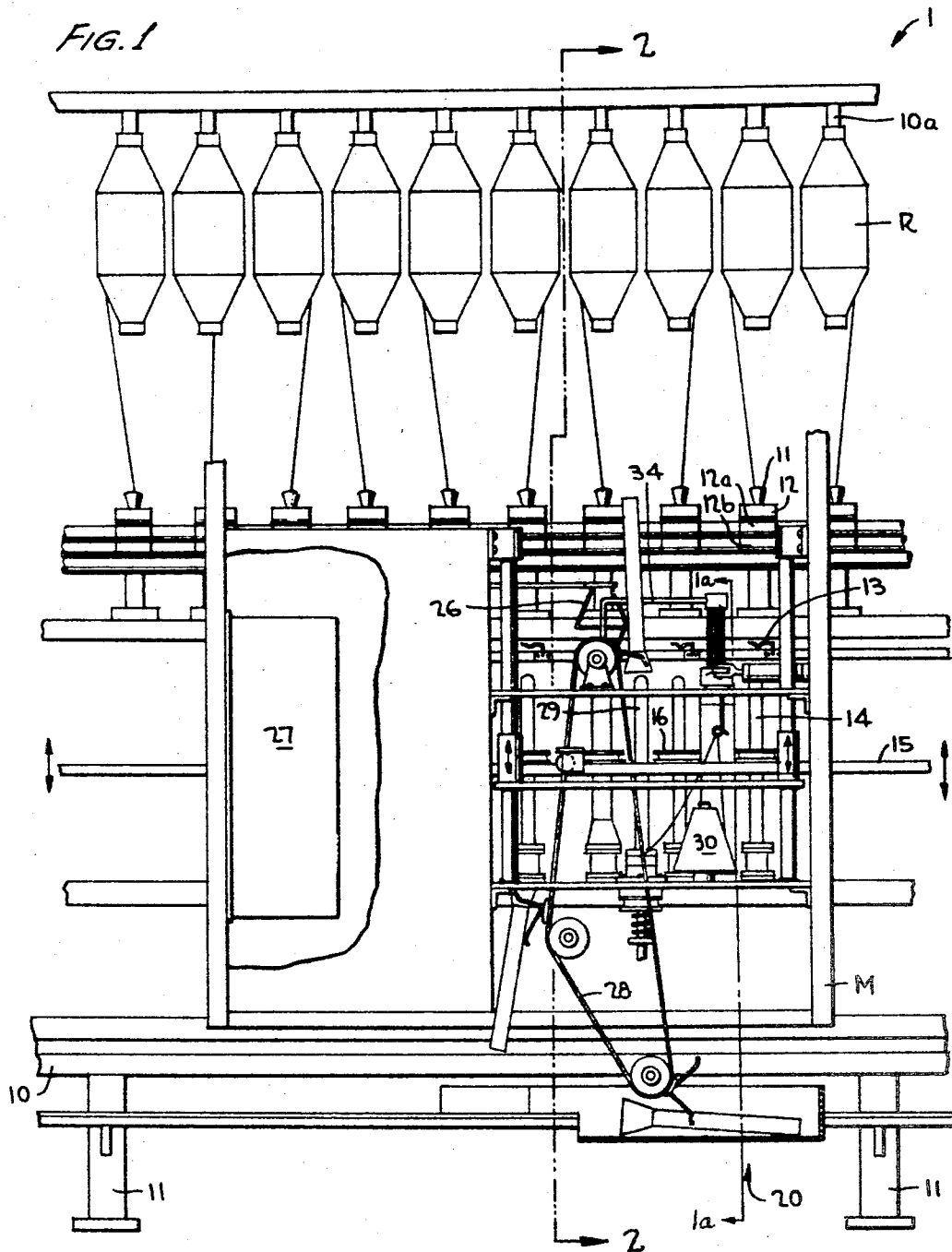
K. W. NIEDERER

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Filed May 8, 1967

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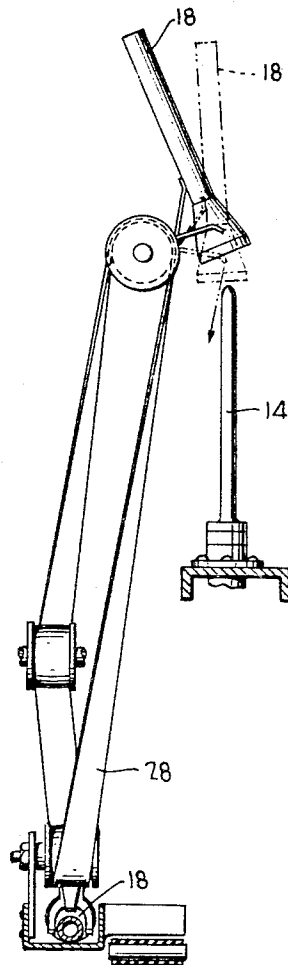
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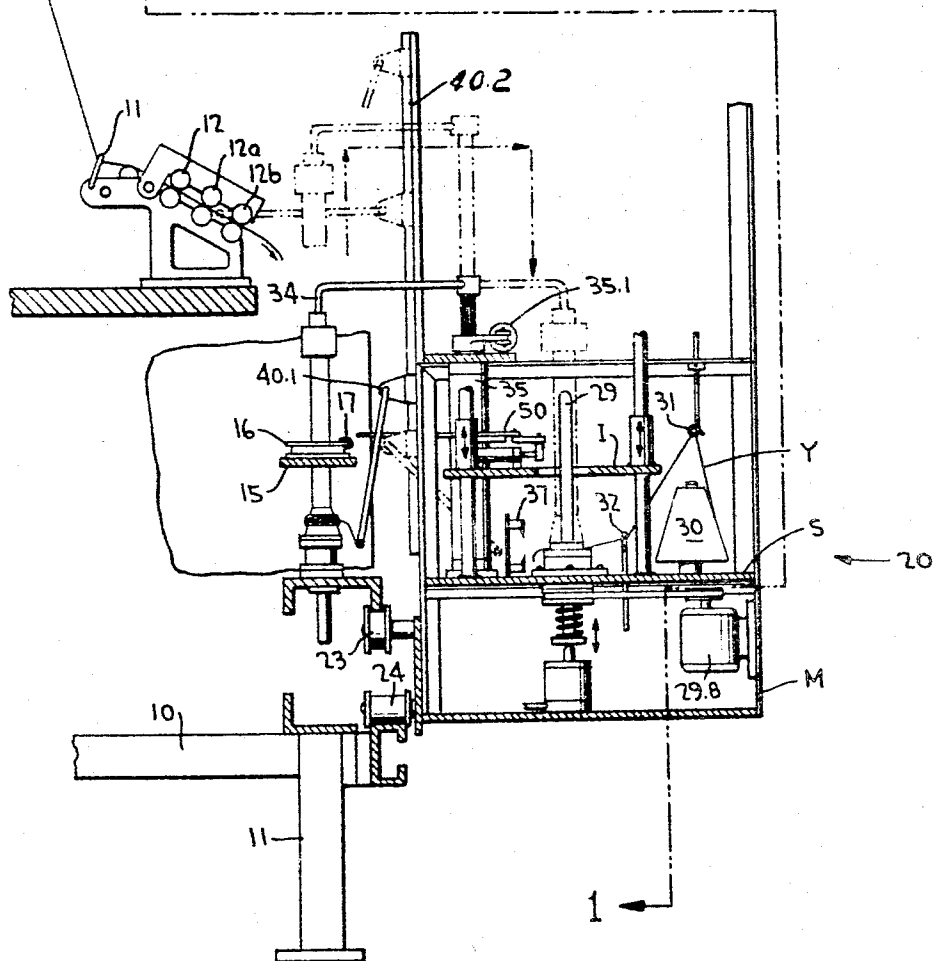
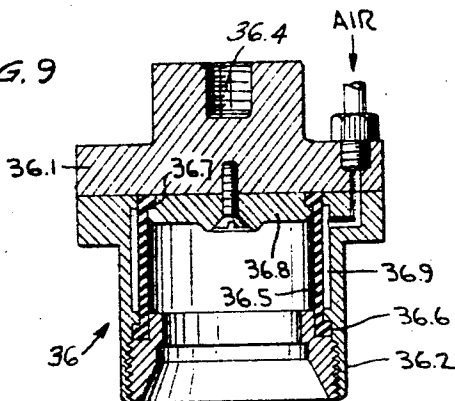
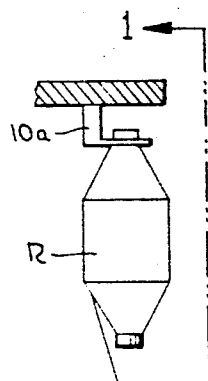
FIG. 1a



Filed May 2, 1967

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Aug. 27, 1968

K. W. NIEDERER

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8 Sheets-Sheet 4

FIG. 3

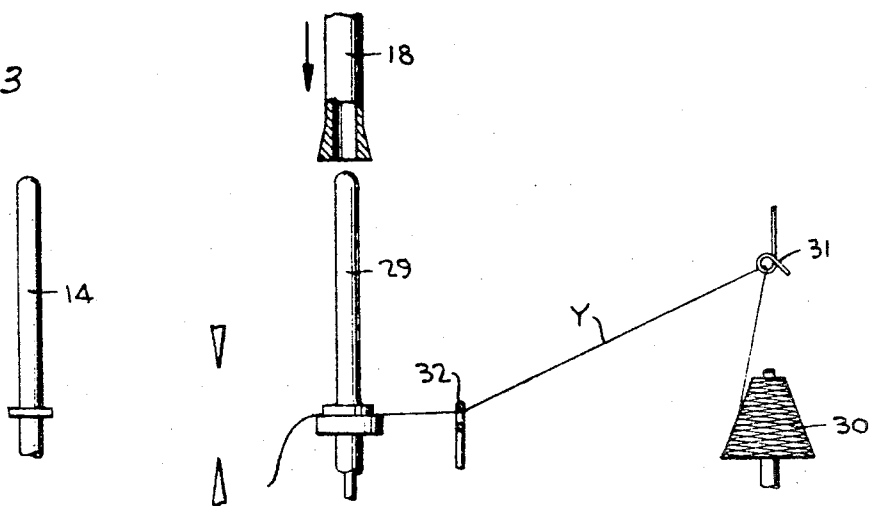


FIG. 4

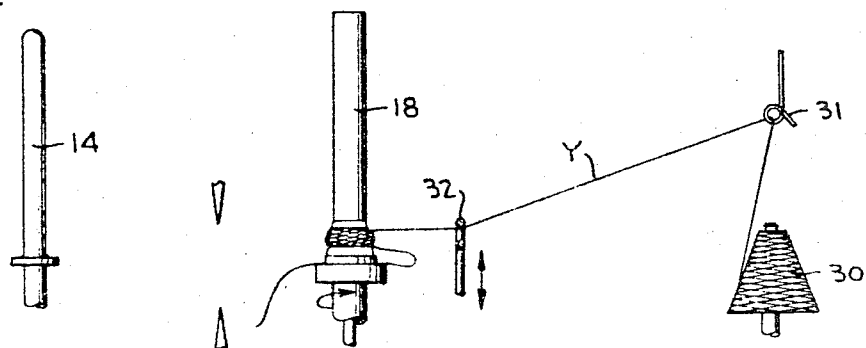
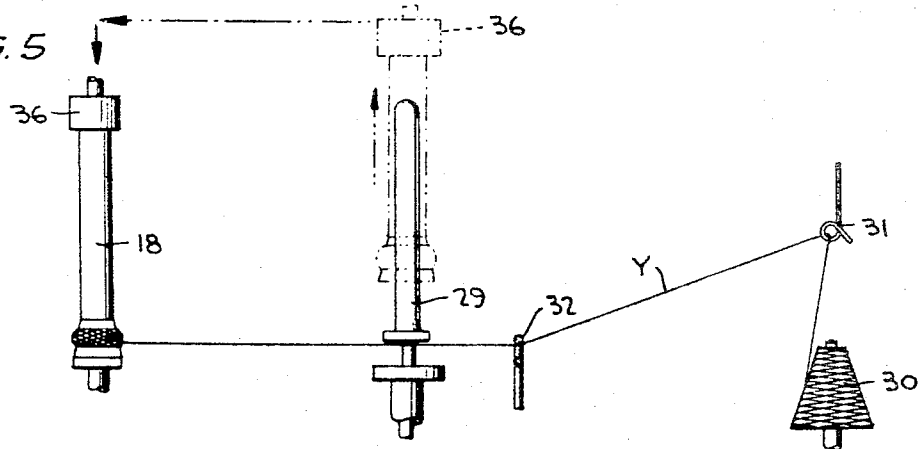


FIG. 5



Aug. 27, 1968

K. W. NIEDERER

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FIG. 6

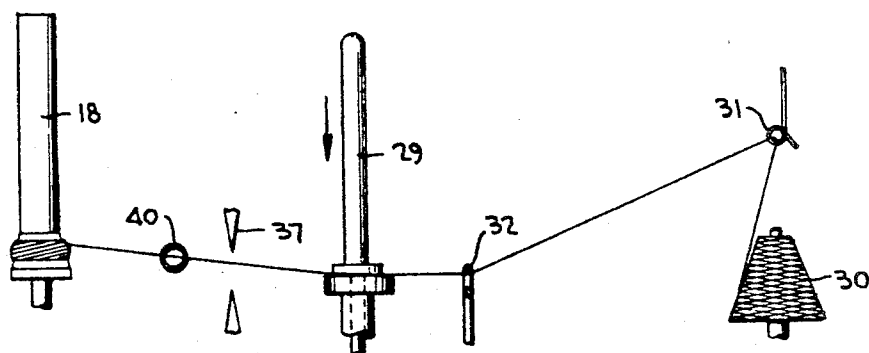


FIG. 7

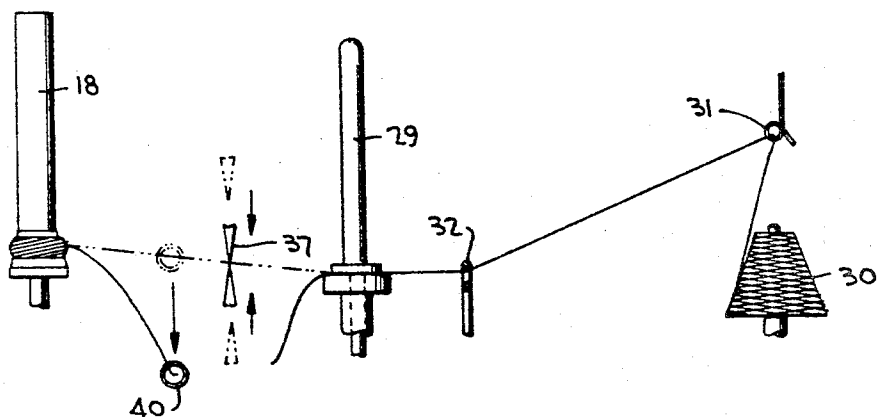
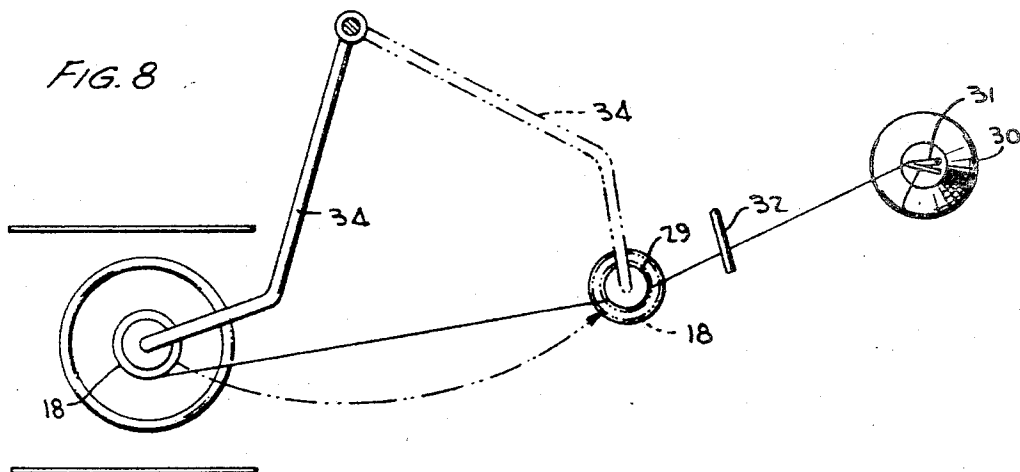


FIG. 8



Aug. 27, 1968

K. W. NIEDERER

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Filed May 8, 1967

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FIG. 10

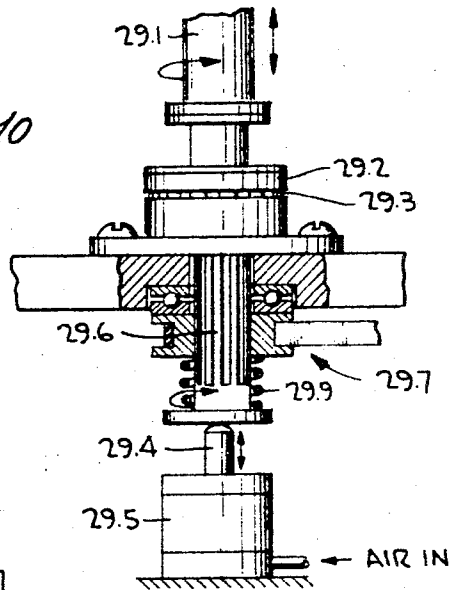
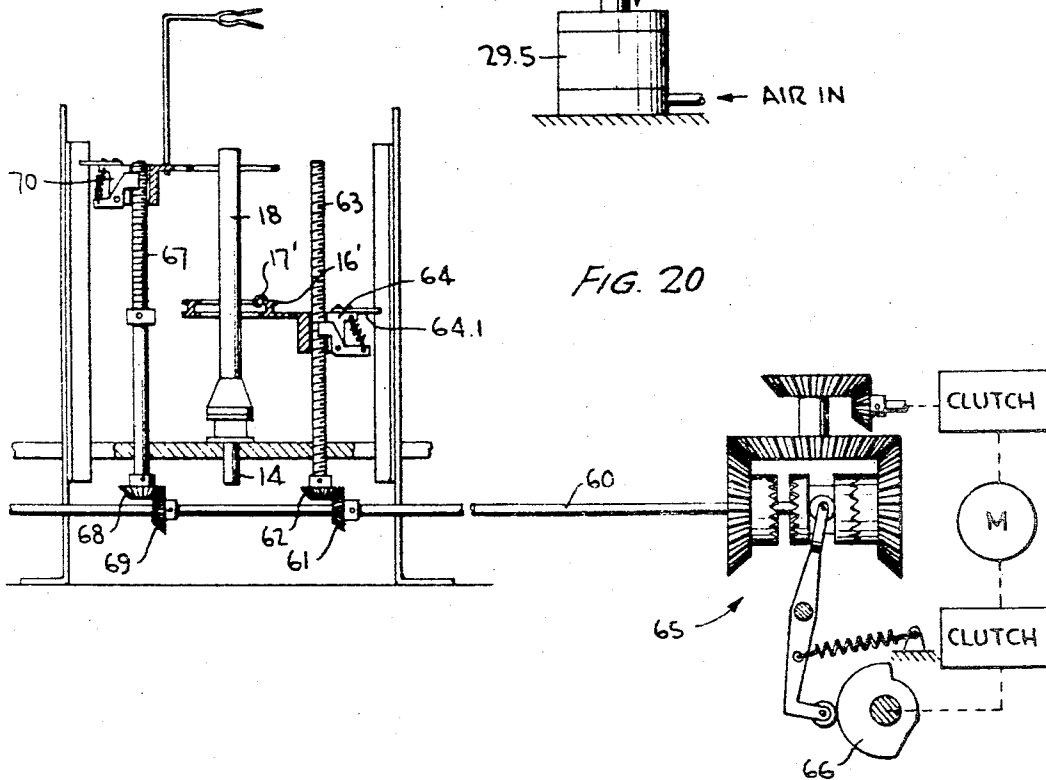


FIG. 20



Aug. 27, 1968

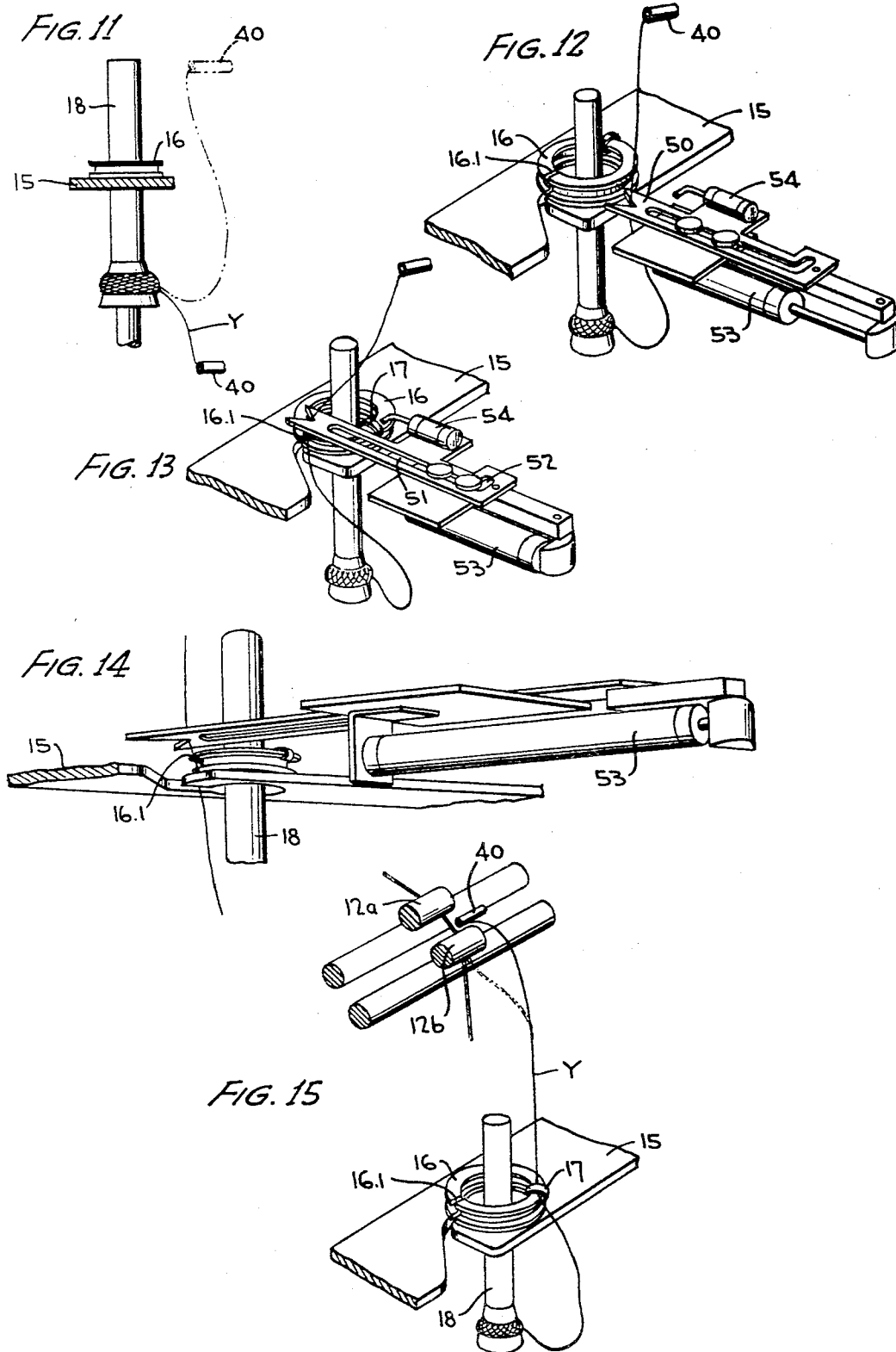
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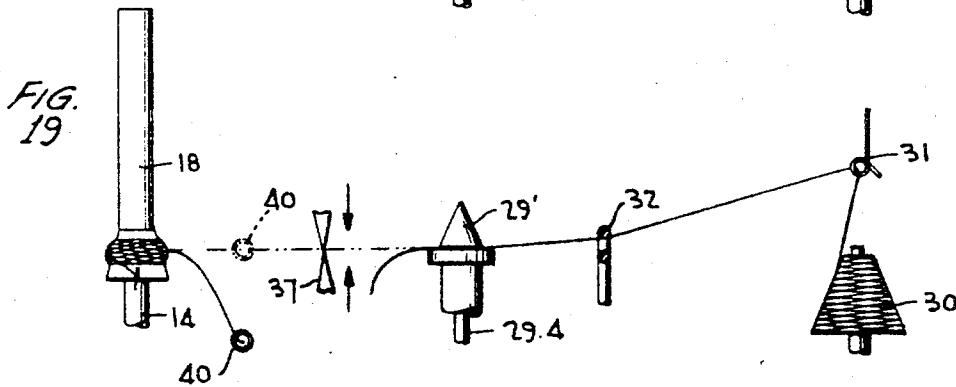
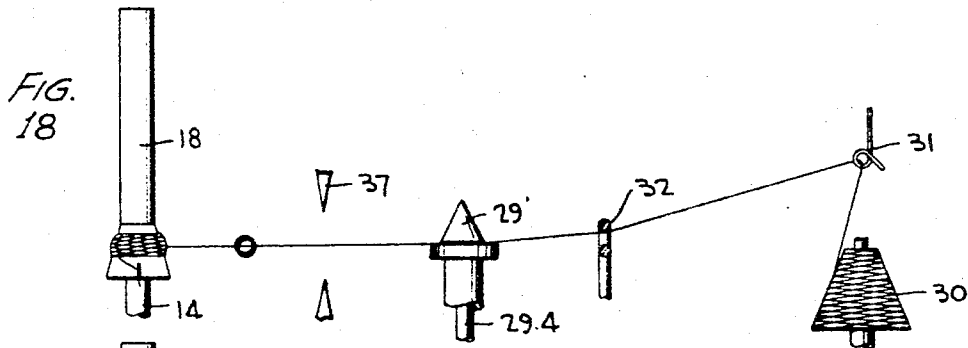
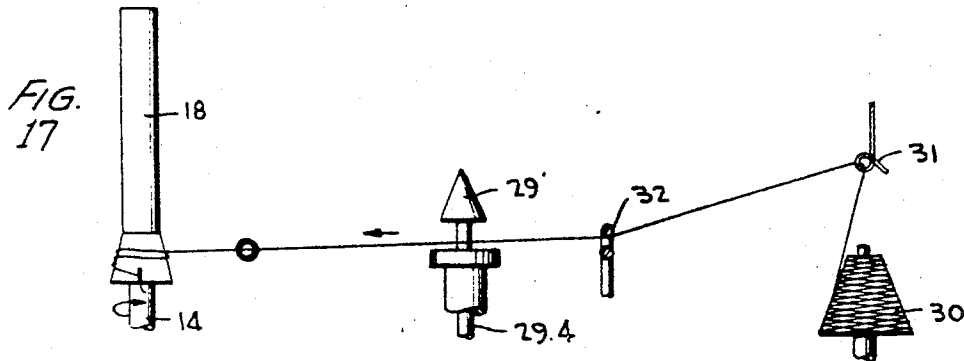
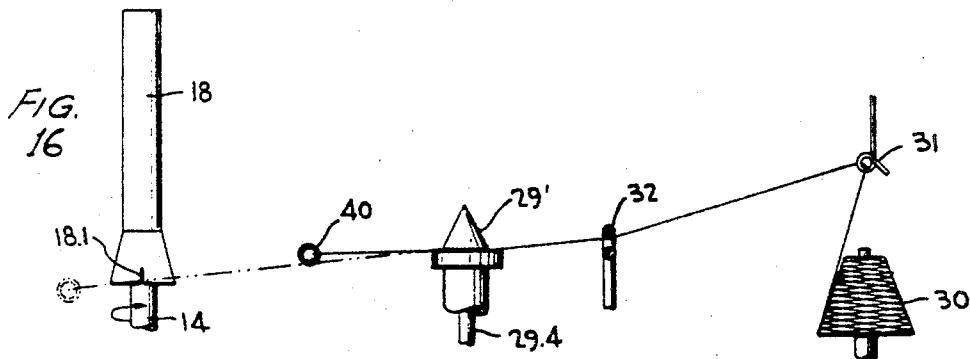
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15 Claims. (Cl. 57—53)

ABSTRACT OF THE DISCLOSURE

An automatic spinning unit comprising a spinning machine having a plurality of stations, each comprising a roving supply, yarn guide means, and a bobbin for taking up spun yarn, and a patrolling tender is described. The patrolling tender is programmed to completely service the plurality of spinning stations on the spinning machine including doffing a bobbin, donning a bobbin having a partial yarn bunch, or donning a bare bobbin upon which a yarn bunch is subsequently applied from an external source, and joining the yarn from the yarn bunch with the roving. As preferred embodiments, yarn is supplied to a bare bobbin from an external source as part of the operation of the automatic unit, and thereafter the yarn end joined with the roving.

Field of invention

This invention is directed to improved spinning devices. More particularly, the invention relates to a spinning unit in combination with a patrolling tender for servicing the spinning unit. The tender performs all of the servicing of the spinning unit automatically, including doffing full bobbins at a spinning station, readying a new bobbin for continued spinning and restarting the spinning operation.

Background of invention and prior art

Conventional spinning machines have a plurality of spinning stations comprising a roving supply, draft rollers, yarn guide means, and a bobbin for taking up the spun yarn. Such devices are maintained by a skilled operator. In the event a yarn is broken, the operator will manually join the ends together again and restart the spinning at the station. Periodically the entire spinning operation is interrupted and the bobbins at each station doffed, fresh bobbins donned, and the machine otherwise readied for continued spinning, all done manually, by the operators. The over-all operation is time consuming, adding appreciably to the cost of the yarn due to high labor costs and idle machine time.

More recently in commonly assigned Bell and Niederer application Ser. No. 534,081 filed Mar. 14, 1966, an improved spinning unit is described which includes a conventional spinning machine in combination with a patrolling tender. The tender travels in a closed circuit, or back and forth, adjacent to the spinning machine. When a full bobbin or a missing yarn strand is sensed at a spinning station by the tender, it stops and services the spinning station, including doffing the full bobbin, donning a fresh bobbin, readying the fresh bobbin, and restarting the spinning operation and, after the servicing is completed, continues on its patrol. According to the aforesaid device, roving from the roving supply passes through the draft rolls, and is spun down through suitable guide means, traveler rings, and the like, and threaded directly onto the bobbin on the spinning machine.

2

Objects and brief description of invention

It is an object of the present invention to provide an automatic spinning unit comprising a spinning machine and modified patrolling tender.

It is another object of this invention to provide an automatic spinning device comprising a spinning machine and patrolling tender, whereby the patrolling tender doffs a bobbin from the spinning machine, dons a bobbin having a partial yarn bunch, and joins the yarn from the fresh bobbin to the roving.

It is another object of this invention to provide an automatic spinning device comprising a spinning machine and patrolling tender whereby the patrolling tender doffs a bobbin from the spinning machine, dons a fresh bobbin, supplies a yarn bunch to the fresh bobbin from a yarn supply, and joins the yarn from the yarn bunch on the bobbin to the roving.

It is another object of this invention to provide an automatic spinning device comprising a spinning machine and patrolling tender, whereby the patrolling tender doffs a bobbin from the spinning machine, supplies a partial yarn bunch to a bare bobbin, dons the bobbin with a partial yarn bunch on the spinning machine and joins the yarn from the yarn bunch on the bobbin to the roving.

It is another object of this invention to provide an automatic spinning device comprising a spinning machine and patrolling tender whereby a bare bobbin is positioned on the tender, supplied with a partial yarn bunch from a supply on the tender, the fresh bobbin with the partial yarn bunch transferred to the spinning machine, and the yarn from the bobbin joined with the roving.

It is another object of the invention to provide an automatic spinning machine and patrolling tender whereby the patrolling tender dons a bare bobbin onto the spinning unit, winds a partial yarn bunch on the bobbin, and joins the yarn from the yarn bunch on the bobbin with the roving supply and starts the spinning operation at the spinning station.

It is another object of this invention to provide an automatic spinning device comprising a spinning machine and patrolling tender whereby a bare bobbin is positioned on the tender, supplied with a partial yarn bunch from a supply carried on the tender; the bobbin with the partial yarn bunch transferred to the spinning machine while connected to the yarn supply; the yarn running from the yarn supply to the partial yarn bunch on the bobbin secured; the yarn running from the bobbin to the secured point being severed while controlling the free yarn end on the bobbin, and the yarn from the bobbin joined with the roving supply.

It is another object of this invention to provide an automatic spinning device comprising a spinning machine and patrolling tender whereby the patrolling tender dons a bare bobbin onto the spinning machine, winds a partial yarn bunch onto the bobbin from a supply on the tender, secures the yarn running from the tender to the bobbin, severs the yarn between the point of retention and the bobbin to control the free end of the yarn on said yarn supply while simultaneously retaining control of the free end of the yarn on the yarn bunch and joining the yarn from the yarn bunch on the bobbin with the roving.

These and other objects of the invention will be more fully apparent from the following detailed description, with particular reference to the drawing.

The objects of the invention are accomplished by modifying a substantially conventional spinning machine with suitable means, such as rails, to permit a tender to travel either in a continuous circuit or back and forth adjacent

to the spinning machine as fully described in the aforesaid Bell and Niederer application. The tender is equipped with a yarn sensor, a full bobbin sensor, and brake and carriage stop means, again as set forth in the aforesaid co-pending application. Upon detecting a full bobbin and/or a missing yarn strand, the tender is stopped, properly aligned at a spinning station, and a servicing operation at the particular station is initiated, including doffing a full bobbin, donning a fresh bobbin and otherwise readying the station for continued spinning. This operation is controlled automatically by a programmer, again as fully described in the earlier mentioned application. However, according to the present modification, the steps of the operation and their sequence are programmed differently. According to the present invention, after the full bobbin or partially filled bobbin on the spinning machine is doffed, a fresh bobbin is donned on the spinning machine which initially contains a yarn bunch and thereafter the yarn on the bobbin joined with the roving in the vicinity of the draft rolls, or with a free yarn end connected to the roving supply, again in the vicinity of the draft rolls. Alternatively, a yarn bunch can be supplied to the bare bobbin positioned on the spinning machine from a supply on the tender, and the yarn from the yarn bunch joined to the roving supply as indicated.

In a preferred embodiment, a bare bobbin is supplied from a suitable source, such as a fresh bobbin magazine on the tender, and positioned on a rotatable mandrel or end clamp on the tender. A free yarn end running to a supply of yarn is held by the mandrel or end clamp. The positioning of the bobbin on the end clamp and rotation thereof causes the yarn to be taken up by the bobbin. A tensioning means and a yarn traverse means located between the yarn supply and end clamp properly distributes the yarn on the bobbin. After a predetermined amount of yarn is supplied to the bare bobbin, the bobbin, while still connected to the yarn supply, is transferred by suitable means to a position directly over the spinning mandrel on the spinning machine and lowered into spinning position. The yarn running to the yarn supply on the carrier is held by the end clamp on the tender readying the yarn end for a subsequent operation. The yarn strand, while being controlled, is severed and by a series of sequential steps, which will be fully described hereinafter, the free yarn end in contact with the bobbin is transferred to the vicinity of the draft rolls where it is joined with the roving supply.

An alternative method of performing the operation comprises donning a bare bobbin directly onto the spinning machine from a suitable source such as a fresh bobbin magazine on the tender. A partial yarn bunch is applied to the bobbin from an external yarn supply, such as a supply carried on the tender. For example, as in the earlier embodiment a free yarn end running from a supply of yarn on the tender is held by an end clamp. Suitable means, such as an aspirator, engages the free yarn end adjacent the end clamp, whereupon the end clamp releases the yarn permitting the yarn to be carried, while being controlled, to the bare bobbin on the spinning machine where it is wound on the bobbin. As before, suitable tensioning means and a yarn traverse means located between the yarn supply and the end clamp properly distributes the yarn on the bobbin. After a predetermined amount of yarn is supplied to the bare bobbin, the end clamp is again brought into engagement with the yarn strand on the tender while the yarn is being controlled and the yarn severed, thus controlling both yarn ends. By a series of sequential steps the yarn end from the bobbin is joined to the roving supply at, or in the vicinity of, the draft rolls.

The series of steps for joining the yarn to the roving can be the same in both of the embodiments described above and include the movement of suitable means, such as an aspirator, while engaging the free yarn end to a position preferably above the bobbin. Thereafter the yarn, by

suitable means, is brought into operable association with the ring rail and the traveller. The yarn end, while controlled, is joined to the roving supply by any of various means, including lapping in of the yarn with the roving behind the draft roll; joining the yarn to the roving at the nip of the draft rolls, or by spinning down a suitable length of roving from the draft rolls and joining the yarn end obtained to the yarn end on the bobbin by means of a mechanical knitter or the like. Furthermore, as will be apparent, by modifying the tender employed in this invention, and by suitable modification in the programming, a yarn piece with both ends being controlled can be joined at one end with the yarn end at the bobbin and at the other end with the roving supply by any of the means described hereinbefore. Thereafter the yarn is brought into operable association with the ring rail and traveller, again as set forth above.

As a still further embodiment, a yarn bunch can be applied to a bobbin preliminary to supplying the bobbin to the automatic spinning unit. After the full bobbin is doffed from the spinning machine by the patrolling tender, a bobbin with the partial yarn bunch is donned, the free end located by suitable means, and piece-up with the roving supply as set forth hereinbefore. However, in view of the difficulty encountered in transporting bobbins having a yarn bunch and due to the difficulty in locating a free yarn end on a bobbin, the embodiments whereby a yarn bunch is applied to a bare bobbin are preferred.

Having described the invention in general terms, preferred embodiments will be set forth with particular reference to the drawings. In the drawing like numerals are used throughout to designate like parts wherever possible.

The drawing and detailed description

FIGURE 1 is a front elevation of a section of an automatic spinning unit comprising a spinning machine equipped with one embodiment of the tender of the invention, only enough of the actual spinning machine and tender being shown as needed to convey the manner in which the invention is accomplished, certain parts being cut away or omitted for clarity;

FIGURE 1a is a sectional view, on a somewhat enlarged scale, along lines 1a—1a of FIGURE 1 showing only the positioning of the elevator belt for a modified embodiment;

FIGURE 2 is a transverse cross-section of the unit of FIGURE 1 taken substantially along the lines 2—2 of FIGURE 1, again with parts omitted or cut away for clarity in observing the essential aspects of the present invention;

FIGURES 3—7 illustrate schematically the sequential steps of applying a yarn bunch to a bare bobbin on the tender, and transferring the bobbin to the spinning machine;

FIGURE 8 is a plan view showing the thread line of FIGURES 3—7;

FIGURE 9 is a cross-sectional detailed view of a doffing clamp employed herein;

FIGURE 10 is a side elevation view, with portions broken away, of the end clamp employed herein;

FIGURES 11—15 illustrate schematically the sequential steps of transferring the yarn from the bobbin to the draft rolls;

FIGURES 16—19 illustrate schematically by sequential steps an alternate method of applying a yarn bunch to a bare bobbin; and

FIGURE 20 illustrates a modified ring rail and associated mechanism of the type which can be employed on a spinning machine according to the present invention.

SPINNING MACHINE

The spinning machine utilized according to the present invention is of conventional construction and operation and is well known to those skilled in the art and requires no detailed description herein. Accordingly, for

sake of conciseness and clarity only so much of the details of the spinning machine will be described as needed to illustrate the present invention. Referring particularly to FIGURES 1 and 2, the spinning machine referred to generally by the numeral 1 comprises a base frame 10 supported on legs 11. The frame provides support for the plurality of spinning stations each comprising roving supply creels 10a, guide 11, draft rolls 12, 12a, and 12b, guide eye 13, and a rotatable spindle 14. A movable ring rail frame 15 supports a ring rail 16 containing a traveller 17 for each spinning station of the machine. The draft rolls, spindles and ring rail frame are actuated and controlled by motor means, belts and pulleys, or the like, as conventionally utilized in a spinning machine and accordingly are not shown in detail herein. In operation of the spinning unit, a roving supply R is positioned in the supply creels and threaded down through guide 11, draft rolls 12, 12a and 12b through the guide eye 13, ring rail 16, and traveller 17 and taken-up on bobbin 18.

PATROLLING TENDER

A patrolling tender similar to the tender employed in the presently described automatic spinning unit has been described in Bell and Niederer application Ser. No. 534,081. Again, therefore, for sake of conciseness and clarity only so much of the tender will be described as necessary for illustrating the present invention. The tender referred to generally by numeral 20 comprises a main carriage M, a stationary platform S and sub-carriage I which is movably mounted in the main carriage. The movement of sub-carriage I, as described in the aforesaid Bell and Niederer application, follows the movement of the ring rail for reasons which will be more apparent hereinafter. The entire tender is positioned on rails 23 and 24 and powered by motor means, not shown. The tender travels back and forth or in a complete circuit adjacent to the spinning stations on the spinning frame. The tender by means of yarn sensor 26 and a full bobbin sensor, not shown, detects a missing yarn strand or full bobbin at a spinning station and upon signal stops the tender by brake means and registration means, not shown, in front of the spinning station requiring service and initiates a servicing operation. All of the operations of the patrolling tender including the doffing of a full bobbin, donning a fresh bobbin, and readying the bobbin for continued spinning are controlled automatically by a programmer, referred to generally by numeral 27, which is fully described in the aforesaid application Ser. No. 534,081. Alternatively, the programmer of the application can be modified as set forth in commonly assigned co-pending Bell, Kent, and Niederer application Ser. No. 620,454 filed Mar. 3, 1967.

GENERAL DESCRIPTION

Referring more specifically to the drawings, according to a preferred embodiment, when the patrolling tender senses a full bobbin or missing yarn strand at a spinning station, the tender is positioned by suitable brake and stop means in front of the proper spindle. The spindle on the spinning machine is doffed and a fresh bobbin from a fresh bobbin magazine, as described in application Ser. No. 534,081, or from a conveyor and elevator belt 28 as shown in FIGURE 1 of the drawing is fed to end clamp 29. End clamp 29 as shown in detailed in FIGURE 10 is positioned on stationary platforms of the tender and comprises a spindle element 29.1 which is in movable engagement with a friction material on element 29.2 which in turn rests on bearing 29.3. The spindle 29.1 is movable vertically by pin 29.4 which is actuated by means of an air cylinder 29.5. Shaft 29.6 is splined to permit its vertical movement and also rotation of the spindle 29.1 by means of belt and pulley 29.7 which is driven by motor 29.8. The clamping means is closed by spring 29.9. The end clamp as seen most clearly in FIGURE 3 retains a yarn strand Y flowing from a supply package 30 when element 29.1 is in engagement with friction material 29.2.

A tensioning device 31 and traverse means 32 are positioned between the supply package and end clamp.

As further seen most clearly in FIGURES 1 and 2, the modified tender has an arm 34, master cylinder 35 for vertical movement of the arm, and cylinder 35.1 for rotating the arm also positioned on the stationary platform of the tender. A doffing clamp 36 is at the extreme end of arm 34. A cutting device 37 is positioned on the carrier platform adjacent end clamp 29.

As seen in FIGURE 9, doffing clamp 36 comprises a two-part housing 36.1 and 36.2 held together by suitable means, not shown. The clamp is positioned onto arm 34 by means of a threaded screw 36.4. A rubber sleeve 36.5 is positioned within the clamp by means of annular channels 36.6 and 36.7 in the lower portion of the housing and by means of insert 36.8. A passage 36.9 between the rubber sleeve and housing is in fluid communication with an air supply. When the doffing clamp is over the bobbin and fluid applied to passage 36.9, the rubber sleeve grips the bobbin and maintains its grip until the fluid pressure is released.

As seen more fully in FIGURES 3-7, a bare bobbin 18 from a fresh bobbin supply magazine as described in the above mentioned co-pending application, or from a conveyor and elevator belt as seen most clearly in FIGURE 1, is dropped down on end clamp 29 which holds a yarn strand Y. The end clamp is rotated by means of belt and pulley 29.7 to apply a predetermined amount of yarn onto the bobbin. The proper winding of the bobbin is controlled by traverse means 32. After the yarn bunch is applied to the bobbin, doffing clamp 36 at the end of arm 34 engages the bobbin. End clamp 29 releases the yarn strand Y due to the actuation of pin 29.4. The bobbin is then transferred to the spinning machine while the yarn strand is still connected to supply package 30. After the bobbin with the yarn bunch is properly positioned on the spindle of the spinning machine, end clamp 29 again secures the yarn strand and cutting device 37 severs the yarn strand between the end clamp and the bobbin. However, prior to severing, an aspirator 40 pivotally mounted at 40.1 and movable vertically in track 40.2 on main carriage M moves out and gains control of the yarn end connected to the yarn bunch on the bobbin. A plan view of the thread line of the entire operation is shown in FIGURE 8.

After the bobbin with the yarn strand is positioned on the spindle of the spinning machine, the yarn end is carried upward by aspirator 40 to a position above the bobbin as seen in FIGURE 11. Thereafter, as shown in FIGURES 12-15, the traveller on the ring rail is threaded. The yarn threading apparatus and method of threading is substantially similar to the method described in co-pending application Ser. No. 534,081, however, according to the present invention a split ring is employed, avoiding the need to raise the bobbin from its position on the spindle. The first step is to deflect the yarn from the path assumed as it extends between the bobbin 18 and aspirator 40 to permit engagement with traveller 17. Accordingly, a slidable threading fork 50 mounted on sub-carriage I and having a slot 51 extending through most of its length and terminating in a transverse extension 52 which controls the movement of the fork is brought into engagement with the yarn. The driving force of the threading fork is supplied by air cylinder 53. The movement of the threading fork progresses inwardly through the opening in ring rail frame 15 and to one side of the bobbin carrying the yarn strand past the bobbin as shown most clearly in FIGURES 13 and 14. As the yarn is carried past the bobbin, it passes below the ring rail flange and a small air jet 54 causes traveller 17 to pass over the thread. Substantially simultaneously at the furthestmost point of the yarn travel, the yarn will pass through slit 16.1 in the ring properly positioning the yarn for spinning as shown most clearly in FIGURE 15. The traveller is wide enough to pass over the slit in the rail without binding. The threading fork is retracted and the ring traveller is fully threaded. There-

after, the aspirator controlling the free yarn end as seen in FIGURE 15 is moved upwardly to the side of draft roll 12b and causes the free yarn end to contact the roving between draft rolls 12a and 12b. The movement of the roving causes the yarn to be carried under draft roll 12b, lapping the yarn into the roving to provide a strong splice. As seen most clearly from FIGURE 1, draft rolls 12b are open ended on alternate sides for adjacent spindles. Accordingly, the tender is provided with a sensing device to indicate the path of movement required for the aspirator and yarn thread, depending upon the spindle being serviced.

Although the aforesaid embodiment illustrates the yarn being lapped into the roving supply, it is possible to spin yarn down from the roll by means of a vortex aspirator as shown in our aforesaid co-pending application and join the yarn end from the roving supply and from the bobbin by means of a knoter or the like. Additionally, it is possible to join the yarn end from the bobbin with the roving supply by bringing the yarn end to the nip of the rolls. The yarn and the roving will unite and be spun down to the bobbin. The lapping in, or spinning down and knotting technique, is preferred over the latter in view of a lower incident of failure.

In another embodiment a bare bobbin from a supply magazine or conveyor and elevator belt 28 is positioned directly upon the spindle of the spinning machine. As seen from FIGURE 1a, the aforesaid can be accomplished by turning the uppermost pulley controlling the elevator belt 28 ninety degrees and out of the plane of the machine. Thereafter as seen in FIGURES 16-19, the aspirator 40 pivotally mounted on the carriage of the tender engages the free yarn end secured by end clamp 29' which no longer needs to be a full spindle. The end clamp releases the yarn strand by actuation of pin 29.4 and the yarn is carried across to the bare bobbin 18 positioned on spindle 14 of the spinning machine by the aspirator. The yarn is carried beyond the bobbin in an arc as shown in phantom lines in FIGURE 16 so that the yarn can engage a notch 18.1, or yarn adherent material, on the bare bobbin. Rotation of the bobbin by release of spindle brake means, not shown, causes the yarn to be taken up by the bobbin. When a predetermined amount of yarn is taken up on the bobbin, the end clamp again secures the yarn ends in order to control the yarn end for a further operation and cutting device 37 severs the yarn. Again, the free yarn end connected to the bobbin is controlled by the aspirator. Thereafter the piecing-up of the yarn end from the bobbin to the roving supply is carried out as set forth hereinbefore with reference to FIGURES 11-15.

The air needed to actuate the various pneumatic elements of the present invention, as set forth in our earlier case, can be supplied from a suitable compression pump carried on the main carrier. No attempt has been made in the present description to describe the control circuitry employed in regulating the actuation of the mechanical and pneumatic components heretofore referred to or to describe the manner in which the various movements and operations of the patrolling tender are programmed. Our earlier application describes the method of programming the various steps including a detailed description of the circuitry.

Furthermore, commonly assigned co-pending application of Bell, Kent, and Niederer Ser. No. 620,454 filed Mar. 3, 1967, describes a sequencing pulse programmer which initiates a work operation and only at the end of the work operation feeds back a signal pulse to initiate a further operation of a programmed series. According to the aforesaid programmer, an electrical pulse is received by a diode activating an electrical actuator which sets an indexing cylinder in motion. The indexing cylinder moves a shaft by means of a shaft indexer. At the end of its movement, the shaft indexer actuates a switch which reverses the operation of the electrical actuator, resetting the indexing cylinder and shaft indexer for the next operation.

Cam means on the work shaft set a means in motion for actuating a work cylinder which performs the first operation in the sequentially programmed series. At the end of its work stroke, and at the completion of the operation, the work cylinder feeds a signal through a rotary contact switch common to the shaft, to the diode which actuates a second operation. The sequence is repeated as many times as desired utilizing different cam positions, work cylinders, and the like, and passing the signal through a different set of contact points on the rotary switch. Time delays in the sequential operation can be obtained by going through an operation one or more times without having the cycle programmed to a positive work step. Moreover, by throttling the work cylinder, the work operation can be slowed down. The programmer is readily adapted for use in controlling the various operations of the patrolling tender. As further seen from the aforesaid application, the electrical systems and pneumatic systems are relatively simple permitting their incorporation in a limited space.

In view of the aforesaid, it is not considered necessary or desirable to duplicate the description herein since the modifications to the circuitry and in the programming required to carry out the instant invention are readily apparent to one skilled in the art.

MODIFICATIONS

The automatic spinning device shown in FIGURES 1 and 2 utilizes a ring rail which travels continuously in a vertical path from top to bottom of the bobbin applying a "wandering warp" wind onto the bobbin. The sub-carriage I on the tender is synchronized with the ring rail movement to permit threading of the ring rail and traveller. In view of the random wind, it is immaterial insofar as point of time is concerned where the winding is interrupted by doffing a full bobbin and donning a fresh bobbin, and the spinning operation restarted.

Although the aforesaid mechanism is highly satisfactory, for certain applications, such as for winding bobbins for use on looms, it is desirable to apply a filling wind directly to the bobbin on the spinning machine. FIGURE 20 sets forth a modification which can be made to the spinning machine as illustrated in FIGURES 1 and 2 to permit the application of winds of various types directly to the bobbin. Accordingly, ring rail frame 15 is replaced with shaft means 60 which runs the full length of the spinning machine as did movable ring rail frame 15. At each spinning station a gear 61 is positioned on the shaft which meshes with gear means 62 which is in association with a vertical threaded rod 63 which stands adjacent to spindle 14 containing a bobbin 18. A ring rail 16' is in operable association with threaded rod 63 by means of a half nut 64. A traveller 17' is positioned on ring 16'. Shaft 60 is in engagement with drive means for rotating the shaft, indicated generally by numeral 65 which in turn is in operable association with cam means 66. Accordingly, a reversing clutch is caused to rotate longer in the "ring-up" direction than in the "ring-down" direction providing for an advancing filling wind. More specifically, according to the aforesaid mechanism, the ring rail will move upward, for example, approximately two inches for each rotation of the cam means, but will only move approximately 1 7/8 inches in the downward direction. As is apparent, the upward movement and the downward movement can be modified depending upon the yarn feed and the type of wind desired. When the ring rail approaches the top of its stroke and the bobbin is filled, or it is desirable to terminate the cycle at a particular spinning station for any other reason and the bobbin is to be doffed, the ring is reset to its lowermost position by having a lever arm project from the patrolling tender and trip lever 64.1 on lock nut 64 to cause the ring to reset.

The aforesaid device can be modified with a balloon control ring which reciprocates in relation to the ring with the traveller, but at lower speed to produce a shorter stroke. As seen from FIGURE 20, a threaded vertical rod

67 is in operable association with a gear 68 which in turn is driven by gear 69 on shaft 60. The thread of rod 67 has a lower pitch than the thread on rod 63. As further seen from the drawing, the lowermost position of the balloon ring is at approximately one-half the height of the bobbin. After doffing, the balloon ring is reset to the bottom position to start a new filling wind as is ring 16' by means of lock nut 70. The use of the balloon ring in conjunction with ring rail 16' permits improved tension control.

Although the modified ring rail has been described with reference to a spinning machine, it will be apparent that it has application in other textile machines such as twist-ers, or the like, when a fill wind on a bobbin is desirable. Furthermore, as employed herein, "yarn bunch" includes one or more wraps of yarn. It is to be appreciated that the present invention is not to be limited by the illustrative embodiments. It is possible to produce still other embodiments without departing from the inventive concept herein disclosed. Such embodiments are within the ability of one skilled in the art.

It is claimed:

1. The method of automatically servicing a textile machine having a plurality of stations, each comprising supply means, yarn guide means, and a bobbin for taking up spun yarn, comprising the steps of applying a starting yarn end from an external source to a bobbin and joining the yarn end from said bobbin to said supply means.

2. The method of automatically servicing a spinning machine having a plurality of stations each comprising a roving supply, draft rolls, yarn guide means, and a bobbin for taking up the spun yarn, comprising the steps of applying a starting yarn end from an external source to a bobbin and joining said yarn end to the roving supply.

3. The method of automatically servicing a spinning machine having a plurality of stations, each comprising a roving supply, draft rolls, yarn guide means, and a bobbin for taking up the spun yarn comprising the steps of donning a fresh bobbin onto the spinning machine, supplying a yarn bunch to the fresh bobbin from an external yarn supply and joining the yarn from the yarn bunch on the bobbin to the roving supply.

4. The method of automatically servicing a spinning machine having a plurality of stations, each comprising a roving supply, draft rolls, yarn guide means, and a bobbin for taking up the spun yarn comprising the steps of supplying a partial yarn bunch to a bare bobbin from an external yarn supply, donning the bobbin with the partial yarn bunch on the spinning machine, and joining the yarn from the yarn bunch on the bobbin to the roving supply.

5. The method of automatically servicing a spinning device comprising a spinning machine having a plurality of stations each comprising a roving supply, draft rolls, yarn guide means, and a spindle for holding a bobbin for taking up the spun yarn and a movable tender comprising the steps of donning a bare bobbin from a suitable source onto the spindle of said spinning machine, winding a partial yarn bunch on said bare bobbin, and joining the yarn from the yarn bunch on the bobbin with the roving supply.

6. The method of claim 5 including the step of starting the spinning operation at the spinning station.

7. The method of claim 6 wherein the yarn from the yarn bunch is joined to the roving supply by lapping in the yarn with the roving.

8. The method of automatically servicing a spinning device comprising a spinning machine having a plurality of spinning stations each comprising a roving supply, draft rolls, yarn guide means, and a spindle for positioning a

bobbin for taking up the spun yarn and a movable tender comprising the steps of donning a bare bobbin onto the spindle of said spinning machine, winding a partial yarn bunch onto the bare bobbin from a supply on the tender, securing the yarn running from the tender to the bobbin, severing the yarn between the point of retention and the bobbin to control the free end of the yarn on said yarn supply while simultaneously controlling the free end of the yarn on the yarn bunch and joining the yarn from the yarn bunch on the bobbin with the roving.

9. The method of claim 8 wherein the yarn from the yarn bunch is joined to the roving supply by lapping in a yarn end with the roving.

10. An apparatus for readying a bare bobbin on a spinning machine having a plurality of spinning stations, each comprising a roving supply, draft rolls, guide means, and a bobbin for taking up spun yarn, including means for providing a starting yarn end from an external source, means for engaging said yarn end to said bobbin, and means for joining said yarn end to the roving supply.

11. An apparatus for readying a bare bobbin on a spinning machine having a plurality of spinning stations, each comprising a roving supply, draft rolls, guide means, and a bobbin for taking up spun yarn, including means for applying a yarn bunch to said bobbin from an external source, and means for joining said yarn end to the roving.

12. An automatic spinning device comprising a spinning machine having a plurality of spinning stations, each comprising a roving supply, draft rolls, yarn guide means, and a spindle for holding a bobbin for taking up spun yarn, and a patrolling tender, said tender including means for donning a bare bobbin onto the spindle of said spinning machine, means for applying a partial yarn bunch on said bare bobbin, and means for joining the yarn from said yarn bunch on the bobbin with the roving supply.

13. The spinning device of claim 12 including means for starting the spinning operation at the spinning station.

14. An apparatus for readying a bare bobbin on a textile machine having a plurality of work stations, each comprising supply means, yarn guide means, and a bobbin for taking up spun yarn, including means for providing a starting yarn end from an external source, means for engaging said yarn end to said bobbin, and means for joining said yarn end to the supply means.

15. An automatic spinning device comprising a spinning machine having a plurality of spinning stations each comprising a roving supply, draft rolls, yarn guide means, and a spindle for holding a bobbin for taking up the spun yarn, including means for donning a fresh bobbin at a select station onto the spindle of the spinning machine, means for applying a starting yarn end from an external source to said fresh bobbin, means for joining said yarn end to the roving supply, and means for starting the spinning at the spinning station.

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