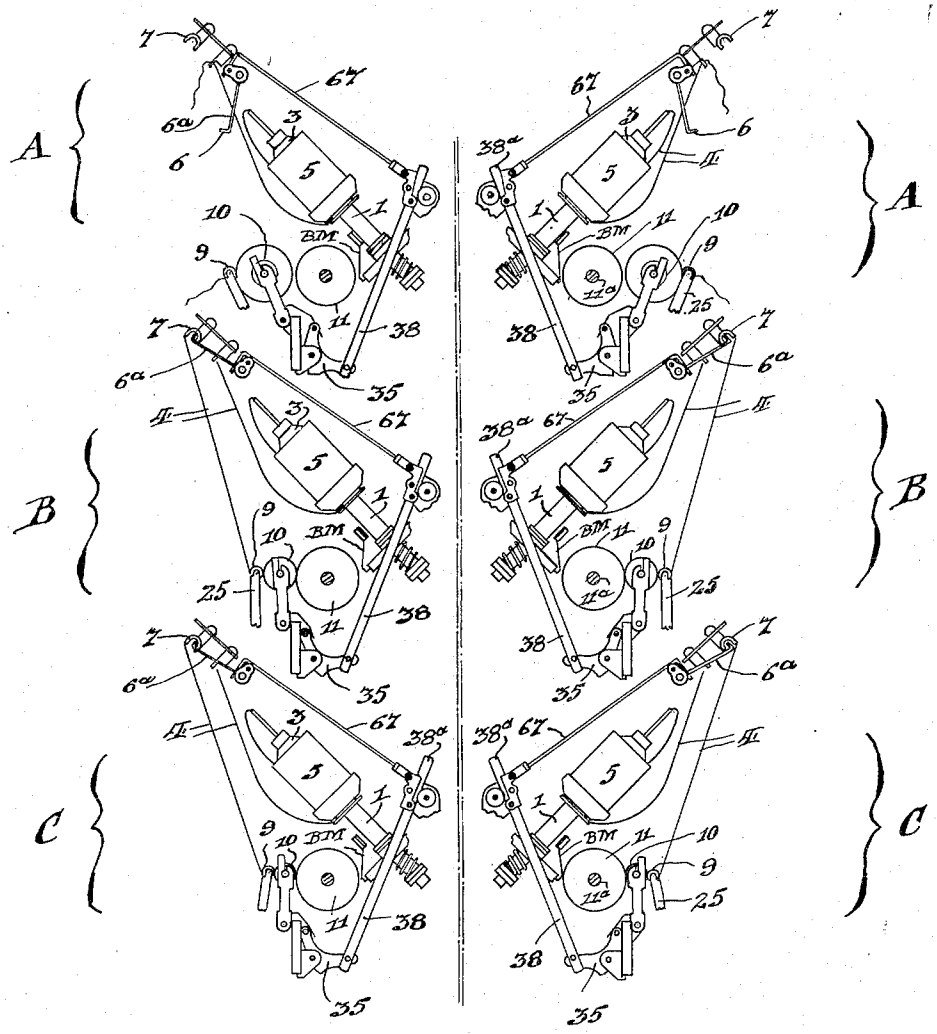
Jan. 29, 1952 P. J. THOMAS 2,584,096

STOP MOTION FOR TWISTING AND WINDING MACHINES

Filed Dec. 30, 1948 8 Sheets-Sheet 1

FIG. 1.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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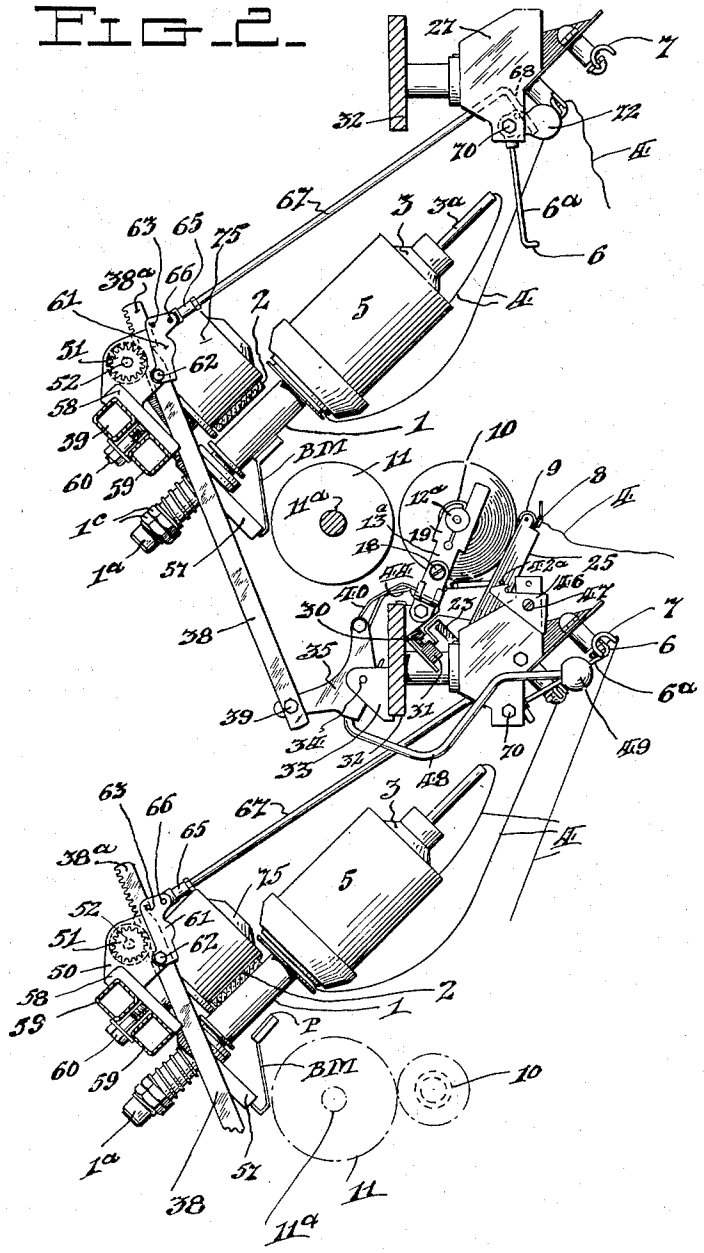
FIG. 2.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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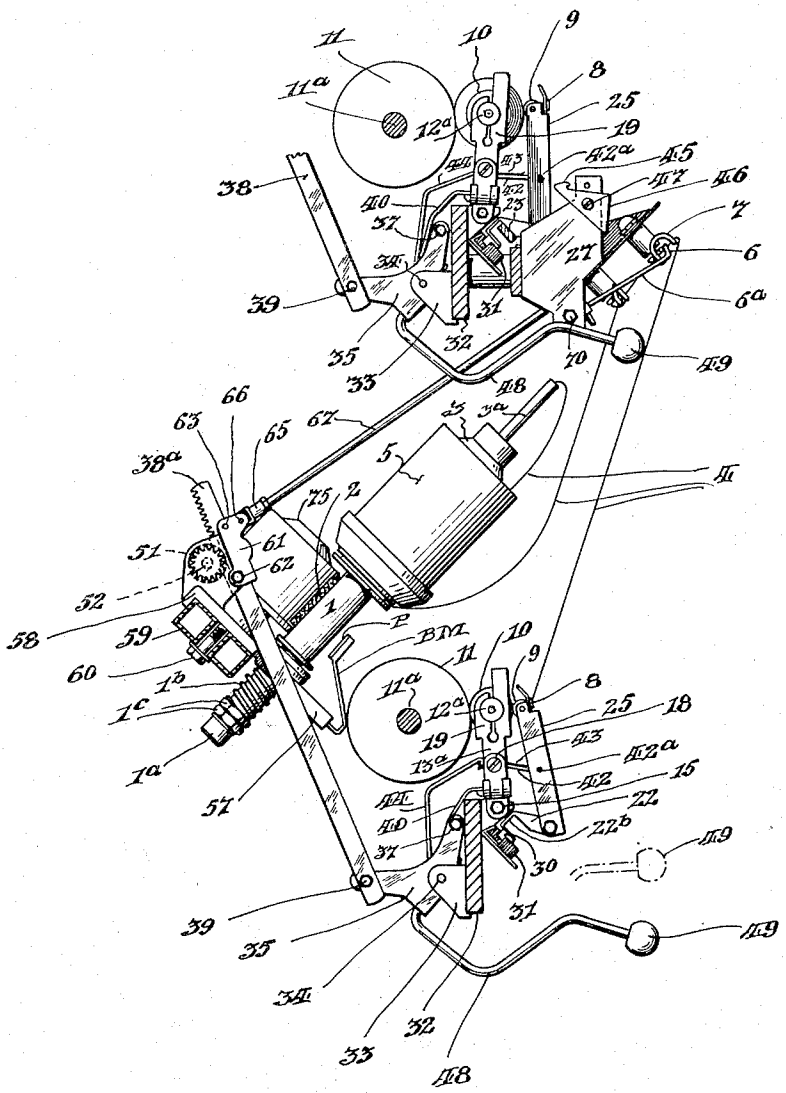
FIG. 3.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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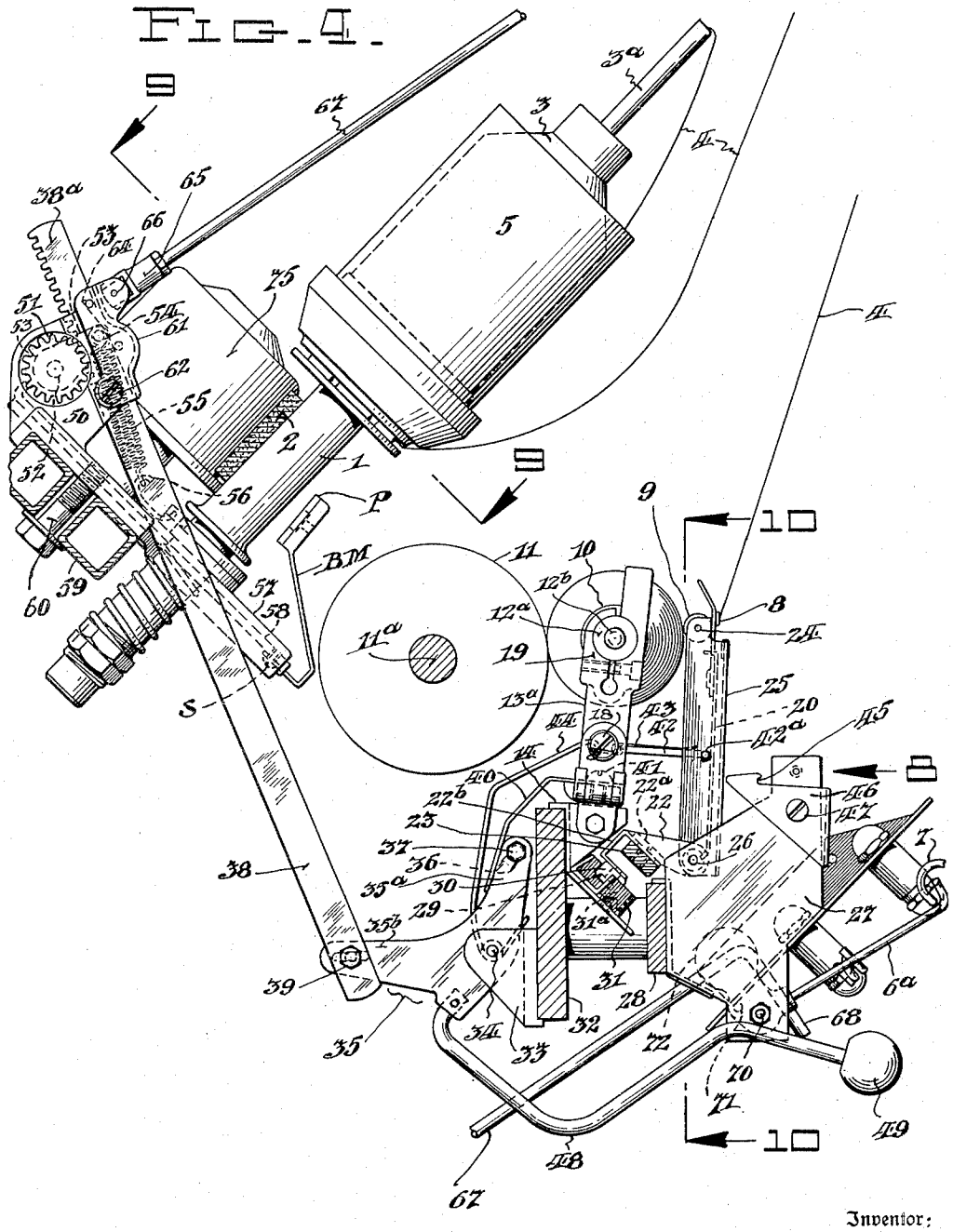
FIG. 4.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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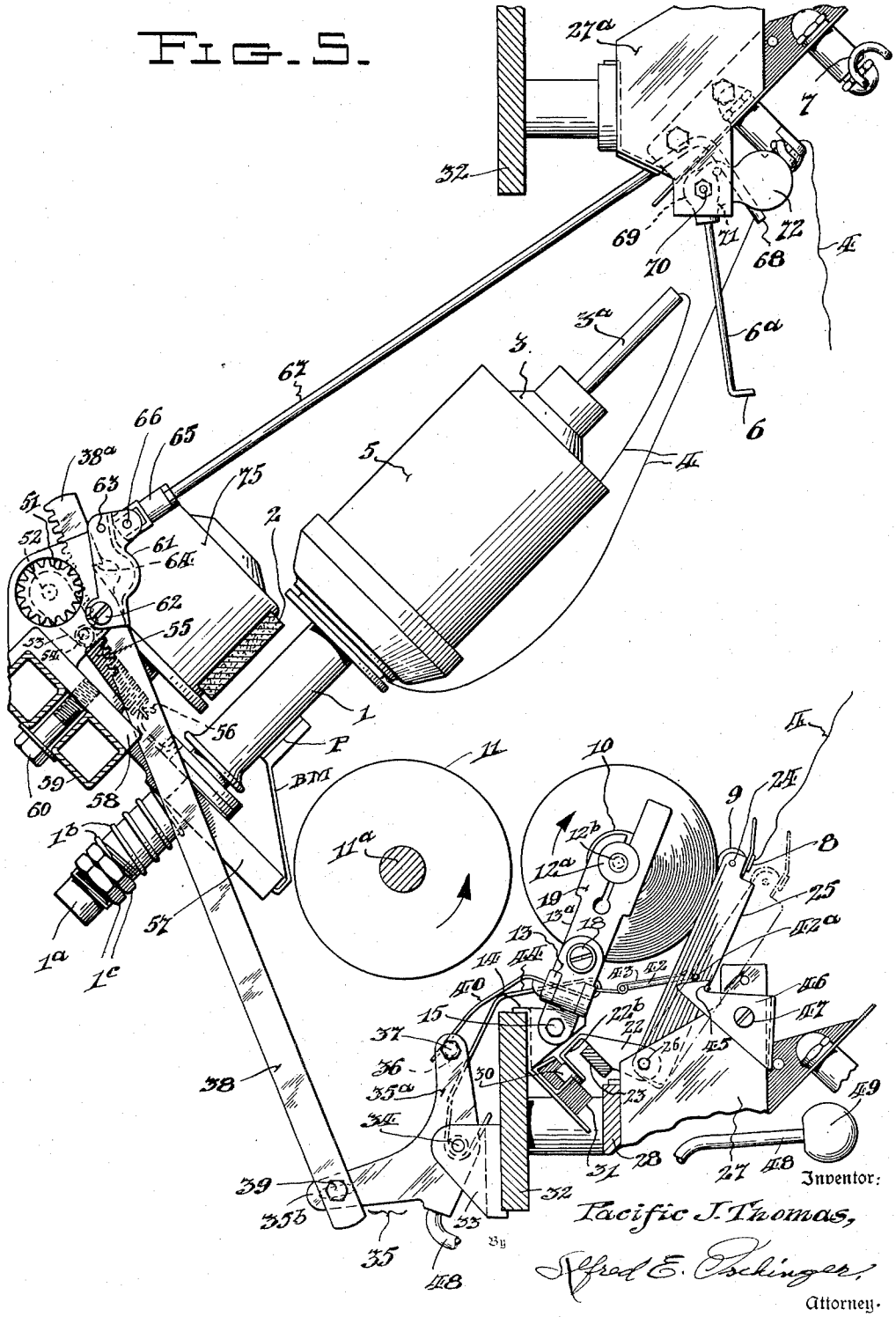
FIG. 5.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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FIG. 8.

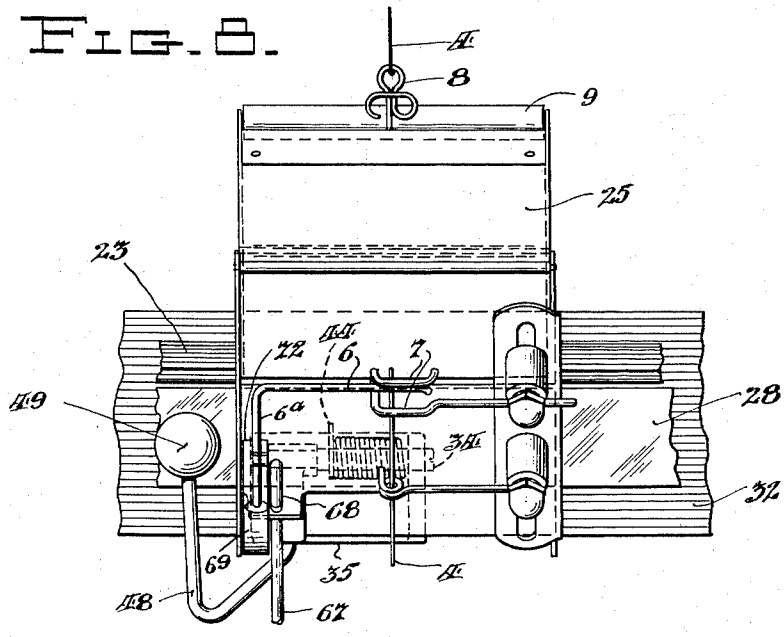


FIG. 6.

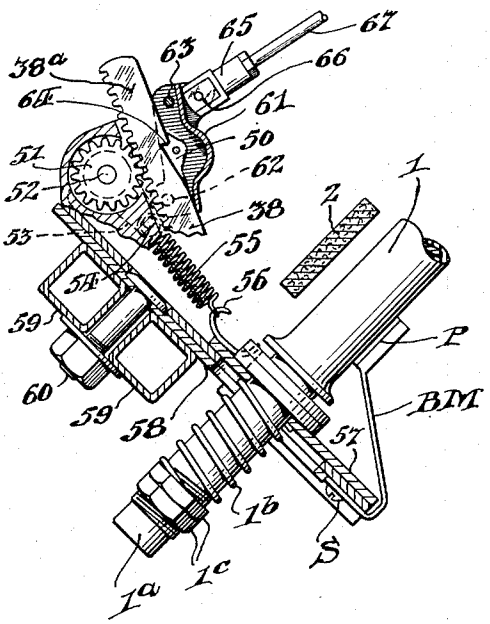
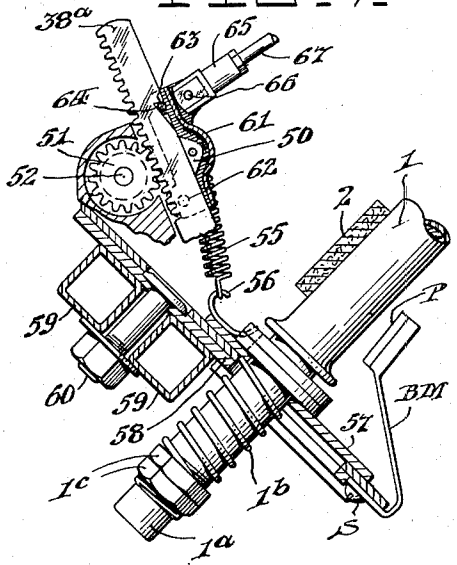


FIG. 7.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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FIG. 9.

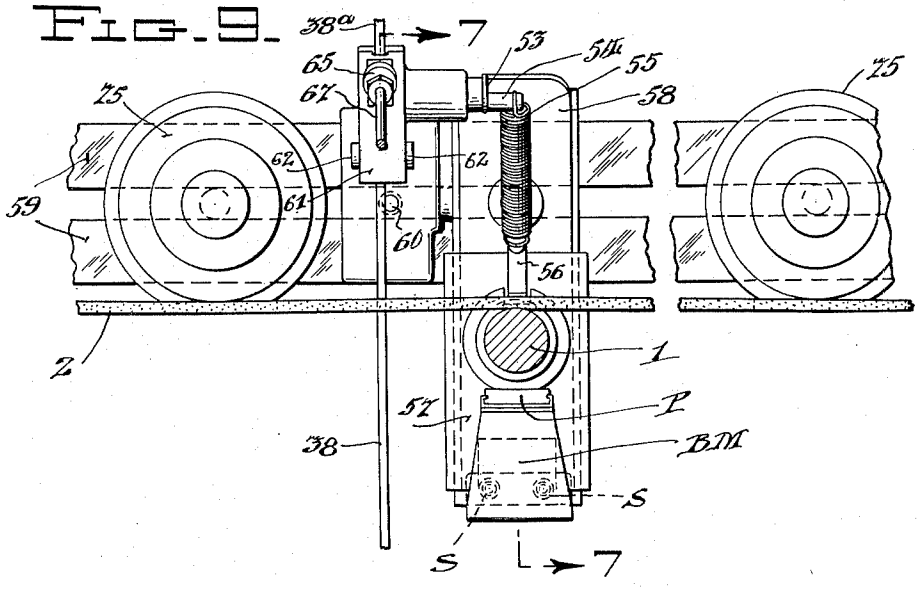
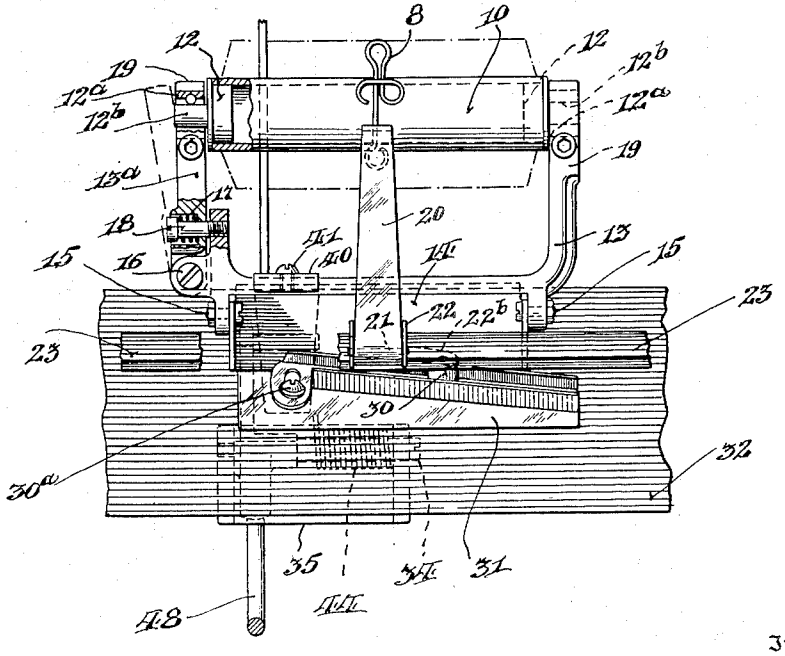


FIG. 10.



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STOP MOTION FOR TWISTING AND WINDING MACHINES

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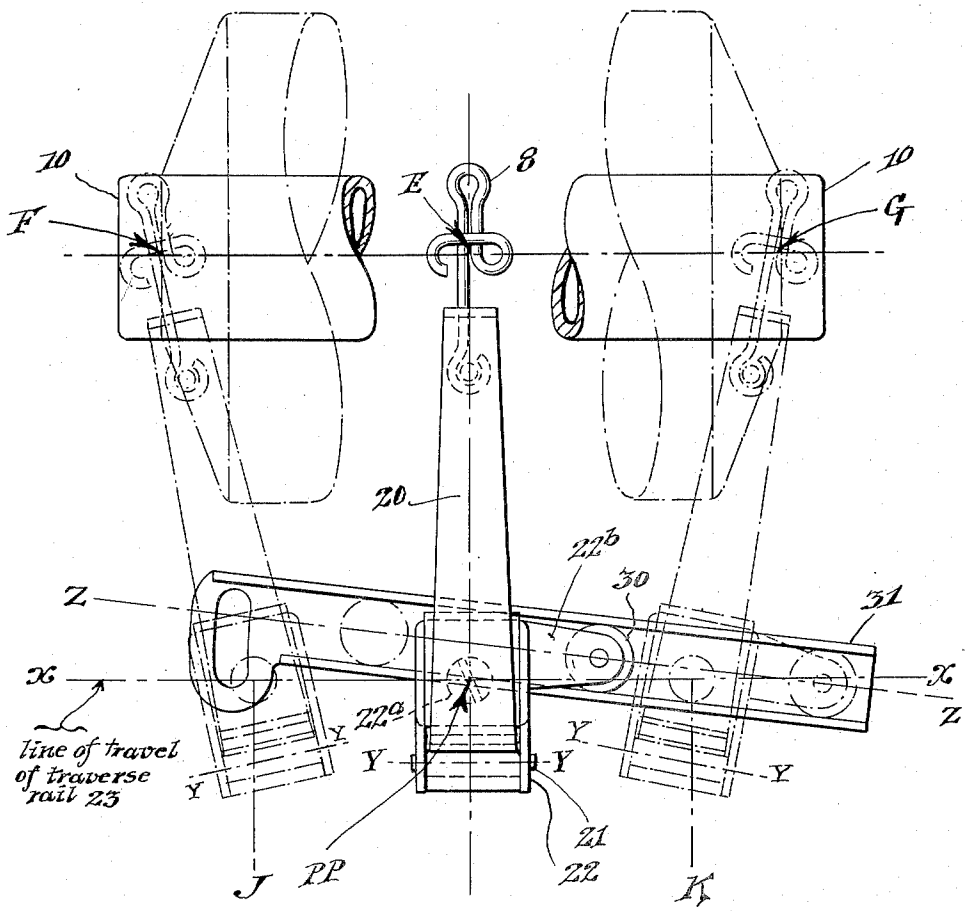
Fig. 11.



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Patented Jan. 29, 1952 2,584,096

UNITED STATES PATENT OFFICE

2,584,096

STOP MOTION FOR TWISTING AND WINDING MACHINES

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Application December 30, 1948, Serial No. 68,199

5 Claims. (Cl. 57—80)

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This invention relates to textile machines of the yarn winding and twisting type adapted to produce so-called "headless" yarn packages having a straight or tapered-end construction.

Textile machines of the referred to type wind the yarn on tubular spools, or cylinders, while simultaneously imparting to the yarn a predetermined twist. Such machines have heretofore been provided in single deck form, in double deck form and in triple deck form. The decks of multiple deck machines are positioned in superimposed relation with respect to each other, and multiple deck machines are provided where it is desired to increase the production, or output of the machine, per square foot of floor space occupied by the machine. In this country, the triple deck machines are probably the largest machines which have been commercially used to date. However, the presently available triple deck machines are no longer considered satisfactory from a practical and commercial standpoint for various reasons. One of the main reasons being that such machines do not successfully meet the requirements of modern high speed operation, design and practice. To meet these requirements involves the solution of various problems. For example, the problem of incorporating in such machines certain highly desirable and essential features, such as a practical and efficient fully automatic thread control means adapted to stop the individual yarn winding and twisting units when the thread breaks, as well as a more simple and efficient means for operating the reciprocating yarn laying fingers that effect laying of the yarn in such manner as to produce the conventional straight or tapered-end construction of the yarn packages wound by the machine. The elimination of yarn wastage, constitutes another problem to be solved. In such machines, the tubular spools or cylinders on which the yarn is wound, are usually mounted on mandrels of one type or another. When the yarn has been wound on the tubular spools, the yarn winding tension of certain modern yarns like Nylon yarn, is so great ,that it will exert a pressure on the slightly yieldable, or distortable central portions of such spools, to an extent causing frictional binding between the spool and the mandrel, and this makes it difficult for an operator to remove the spools from the mandrel. As a consequence, the operator finds it necessary to grasp the finished yarn spools or packages so tightly with his usually soiled hands, that detrimental soiling of the outer yarn layer takes place before the spool can be removed from the mandrel. This soiled yarn must ordinarily be eliminated from the yarn packages and consequently represents yarn wastage. Then too, each yarn winding unit of such machines usually comprises a yarn laying finger that is operated by a movable track arrangement of one kind or another. It has been found that these prior art movable track arrangements are not entirely practical or satisfactory in their performance when subjected to the high speed operating conditions of modern practice.

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One object of my invention is to provide a novel high speed, high production, yarn winding and twisting machine of the multiple deck type indicated, which solves the referred to and other problems and eliminates the mentioned and other deficiencies and detrimental features of the similar prior art machines.

A further object is to provide such a machine which has certain novel structural and functional features of advantage over the prior art machines.

Another object is to provide such a machine which is constructed and arranged to effect higher yarn package production, or output, per square foot of floor space occupied by the machine, than the similar prior art machines.

Another object is to provide such a machine in which the movement of the yarn laying fingers of the individual yarn winding units is determined by simple and effective stationary track means.

A further object is to provide such a machine in which each individual yarn winding and twisting unit embodies a novel fully automatic and sensitive stop motion mechanism.

It is also an object to provide an automatic stop motion mechanism for the yarn winding and twisting units of such machines, which comprises a unique gravity actuated element adapted to provide the motivating power for operating the stopping means of the unit, as well as other novel structural and functional features of a highly desirable and advantageous character.

An additional object is the provision and utilization in a textile machine of the character indicated, of one or more of the above indicated unique parts or elements, in cooperative combination with other parts or elements. For example, (1) in combination with a rotatable yarn supply spindle, spindle rotating means, and a movable support for the spindle arranged so that the latter is movable from a position of engagement with the spindle rotating means to another position, of a brake device arranged to stop the ro-

tation of the spindle when moved to said other position; (2) in combination with a yarn receiving spool, spool rotating means, a yarn guide arm provided with a yarn guide element adapted to direct the winding arrangement of the yarn on the spool, a yarn guide arm traversing bar, and a yarn guide arm support pivotally mounted on the traversing bar, of a stationary device arranged to determine the extent of the pivotal movement of the yarn guide arm support relative to the traversing bar; and (3) in combination with a yarn receiving tube, tube rotating means, a pivotally mounted supporting bracket for the tube arranged to effect lateral movement of the tube into and out of driving engagement with the tube rotating means, of a pair of opposed relatively spaced freely rotatable tube supporting members on said bracket arranged to project into the opposite ends of the tube, and means on said bracket arranged so that one of the members is movable towards and from the other member to an extent required in effecting seating connection or disconnection of the members with the tube.

With these and other objects in view which will become more apparent from the following detailed description of one practical and illustrative form of my multiple deck high speed, high production yarn winding and twisting machine shown in the accompanying drawings, the invention comprises the novel machine improve ments, elements, features of construction and arrangement of parts in cooperative relationship, as more particularly defined by the hereto appended claims.

In the drawings:

Figure 1 is a partial, vertical cross-sectional view through the upper section of a triple deck yarn winding and twisting machine, constructed in accordance with my invention, and more particularly shows the location and arrangement of certain parts of the individual yarn winding, twisting and stop motion units thereof.

Fig. 2 is an enlarged view of the two yarn winding and twisting units shown at the upper right-hand portion of Fig. 1, and more particularly shows the parts of these two units in greater detail.

Fig. 3 is an enlarged view of the yarn winding and twisting unit shown in the lower right-hand portion of Fig. 1, and more particularly discloses the structural details of this unit in greater detail.

Fig. 4 is a view similar to Fig. 3, but on a larger scale and with certain parts omitted, and others added.

Fig. 5 is a view similar to Fig. 4, but shows certain parts thereof in another position as effected when yarn breakage occurs.

Fig. 6 is a vertical cross-sectional view of certain parts disclosed in Fig. 5.

Fig. 7 is a vertical cross-sectional view, similar to Fig. 6, but shows the parts thereof in the position shown in Fig. 4, the view being taken substantially as indicated by the arrows 7—7 in Fig. 9.

Fig. 8 is a front elevational view of certain parts shown in Fig. 4, as seen by looking in the direction of the arrow 8 indicated in Fig. 4.

Fig. 9 is a cross-sectional view, taken substantially as indicated by the arrows 9—9 in Fig. 4.

Fig. 10 is a vertical cross-sectional view of certain parts shown in Fig. 4, taken substantially as indicated by the arrows 10—10 of the latter, and

Fig. 11 is a more or less schematic diagram which illustrates certain parts of my novel mechanism in their various positions to effect the production of tapered-end yarn packages.

The accompanying drawings disclose one practical and illustrative form of apparatus constructed, arranged and operative in accordance with my invention. As previously indicated herein, this apparatus may be embodied in textile machines of the yarn winding and twisting type adapted to produce "headless" yarn packages having a straight or tapered-end construction, the yarn packages produced by the particular apparatus shown in the drawings having a tapered-end construction. Machines of this type ordinarily take the yarn from either a regular spindle, or from one usually referred to as a "two-for-one" twist spindle. Such machines ordinarily comprise a multiplicity of similar yarn winding and twisting units arranged in two opposed horizontal rows, extending in parallel relation along opposite sides of the machine. These rows of units are referred to as "decks."

For illustrative purposes, my invention is shown applied to a machine having three superimposed decks of yarn winding and twisting units along each side of the machine, as indicated more or less schematically at A, B and C in Fig. 1. However, as the description proceeds, it will become apparent that the invention is not limited in its application to a triple-deck machine and that it may also be embodied in a machine having a greater or lesser number of such decks.

To simplify the disclosure of my invention, only one yarn winding and twisting unit of each deck is shown. It is to be understood that each deck comprises a multiplicity of such units, arranged in juxtaposed relationship along both sides of the machine, and that the yarn supply spindles and yarn receiving spools of each unit are similarly driven by a standard and well-known type of operating mechanism, certain parts of which will be hereinafter more particularly explained and identified.

Since my invention is applied in similar manner to all the individual yarn winding and twisting units of the machine, a description of the construction and operation of one such unit will suffice to make clear the structural and functional features thereof, as well as their advantages. Accordingly, the detailed description hereinafter presented, will identify the various parts of one of the yarn winding and twisting units by reference numerals, which are to be understood as likewise applying to the corresponding parts of all the other units of the machine.

In accordance with my invention, each of the yarn winding and twisting units comprises a usual spindle 1, which is driven by a belt 2, and carries a yarn supply package 3, from which the yarn 4 passes along a balloon shield 5, and then through a tube 3a to the guide eye 6 of a stop-motion control wire 6a. The yarn 4 passes through the two legs of a U-shaped guide 7, and normally through the intermediately positioned guide eye 6 of the stop-motion control wire 6a. Travel of the yarn 4 between the legs of the guide 7 causes the yarn to be maintained under a certain tension at this point. The yarn 4 loops over the upper leg of the U-shaped guide 7, then passes through a delivery guide 8, over a pressure roller 9 and is then wound on a yarn receiving spool or cylinder 10, in twisted form, as determined by the rotation of the spindle 1.

The surface of the winding tube 10, or the outer layer of the yarn wound thereon, is normally frictionally engaged by a usual type driver drum 11,

mounted on a shaft 11a, and the ends of the tube 10 are supported by trunnions 12 (see Fig. 10), mounted on a swingable yoke 13, which is pivoted on a bracket 14 by studs 15. The yoke 13 has an arm 13a swingably mounted on a pivot stud 16, which arm is yieldingly held in the position shown in Fig. 10, by a compression spring 17 mounted on the shank of a stud 18, between the flat head of the latter and a recessed surface section of the arm 13a.

The upper ends of the arms of the yoke 13 are formed into pinch-binding locking members 19 arranged to fixedly hold in position ball bearings 12a in which rotate stud extensions 12b of the trunnions 12.

The yarn delivery guide 8 is formed of wire and is mounted on the upper end of a laterally swingable accelerating arm 20, the lower end of which is pivotally supported on a pin 21, fixed in a bracket 22, in turn pivotally held in position by a stud screw 22a secured to a reciprocating thread traversing rail or bar 23. This arrangement of the arm 20 permits free, but limited, swinging movement of the yarn delivery guide 8, toward and from the winding tube 10, to an extent hereinafter pointed out. The pressure roller 9 is freely rotatable and mounted on a shaft or rod 24, the ends of which extend through side flanges of a plate bracket 25, pivotally mounted at its lower end on studs 26 secured to a stationary bracket 27, which is supported on a longitudinally extending frame member 28. The wire formed yarn delivery guide 8 is normally held against the surface of the pressure roller 9, by the yarn 4, when under tension, and the arm 20 is maintained in free floating position intermediate the roller 9 and the flat front plate section of the bracket 25, so as to permit the said limited swinging movement of the yarn delivery guide 8, as above noted.

The bracket 22 has a depending extension or arm 22b, to which is fixedly secured a stud 29 having freely rotatable thereon a roller 30, which is free to ride in a stationary track 31, fixed in angular position on the lower inclined section of bracket 14.

The bracket 14 is secured in fixed position on a flat stationary frame member 32, which extends lengthwise of the machine and has secured to its lower section a bracket 33, provided with a mounting pin 34, on which is pivotally supported a three-arm member 35. A freely rotatable roller 36 is mounted on a stud 37 fixed in the upwardly extending arm 35a, of the member 35, and a connecting bar 38 is pivotally secured to the arm 35b of the member 35, by a stud 39.

An arm 40 is fixed to yoke 13 by a screw 41, and the roller 36 is normally held in engagement with the lower portion of arm 40, as shown in Fig. 4. A loop wire 42 has one end thereof connected to a side flange of the plate bracket 25 and its other end connected with a thread guard 43, in turn hooked to a spring 44 which is wound about the stud 34 and has one end thereof in engagement with the edge of a cross member of bracket 33. The spring 44 is so arranged that it will normally urge the bracket 25 toward the winding tube 10, to thereby yieldingly hold the pressure roller 9 against the surface of the tube 10, or the yarn wound thereon, at the case may be. When the roller 36 is moved to the left, as seen in Fig. 4, by turning movement of the member 35 about its pivot 34, the arm 40 will be moved upwardly, as shown in Fig. 5, and this will cause the spool

10 or the surface of the yarn wound thereon, to become disengaged from the driving drum 11.

If it is desired to move the plate bracket 25, arm 20, roller 9 and yarn delivery guide 8, to the inoperative position indicated in dot-and-dash outline in Fig. 5, this can be done by manually moving the bracket 25 to the said position so that the end 42a of the loop wire 42, which projects outwardly beyond a side flange of the plate bracket 25, will be engaged by a hook 45 formed on a plate 46 that is pivotally secured by a stud 47 to the side of stationary bracket 27. To then release the bracket 25 from its inoperative position, it is merely necessary to tilt the hook plate 46 so that the hook 45 thereof will become disengaged from the extension 42a of the wire 42.

The parts 8, 20, 22 and 25, are connected so as to function as a unit that is turnable about the pivot stud screw 22a, through the action of roller 30, which rides within the confines of the U-shaped track 31. The traverse rail 23 is inclined from the horizontal, the same as said track 31, and the latter is initially set at an angle with respect to the rail 23, so as to effect maximum travel of the yarn delivery guide 8 at the beginning of the yarn winding operation. During operation of the machine, the traverse rail 23 is longitudinally reciprocated, back and forth, in usual manner, so as to effect swinging movement of the accelerating arm 20 in a manner such that the yarn delivery guide 8 will travel back and forth along the pressure roller 9, to an extent required in providing either straight ends or tapered ends on the yarn packages formed by winding successive layers of yarn on the tube or spool 10. The drawings show the track 31 set so as to produce tapered ends on the yarn package. Throughout the winding operation, the diameter of the yarn package increases on the winding tube 10, so that the center of the yarn package, and the unit comprising the pressure roller 9, yarn delivery guide 8, arm 20, and plate bracket 25 will gradually move away from the driver drum 11. This movement automatically and gradually reduces the length of stroke of the accelerating arm 20, and causes the yarn package to build up with tapered ends. The degree of taper on the ends of the package may be regulated from zero (to produce a straight-end package), to maximum, by angular adjustment of track 31 relative to the rail 23. After the desired package end contour is obtained by angular adjustment of the track 31, the said track is locked in position by a screw 31a, so that the track remains stationary during the entire yarn winding operation.

Secured to the member 35 is a rod 48, having at its outer end a knob 49 which functions as a handle. When it is desired to re-set the yarn winding mechanism, after it has been tripped, or moved to inoperative position by breakage of the yarn, the knob 49 may be manipulated to effect re-setting of the member 35, as hereinafter explained.

The bar 38 is provided with a gear rack section 38a, arranged to slidingly move in a slotted portion of a stationary bracket 50. The teeth of the rack section 38a are arranged to mesh with the teeth of a freely rotatable gear wheel 51, which is fixed on a shaft 52. Also secured to the latter is a crank arm 53, which is provided with a pin 54, having anchored thereon one end of a tension spring 55, the other end of which is engaged on a hook member 56 secured to a sliding bracket 57 arranged to have sliding move-

ment on a stationary bracket 58, secured to longitudinally extending frame members 59 by a stud bolt 60.

Secured to the lower end of the bracket 58, by a screw S is a resilient brake member BM, provided with a brake pad P of rubber, or other suitable braking material adapted to frictionally engage the side surface of the spindle 1, to stop the rotation of said spindle 1 after it is released from driving connection with the belt 2, as hereinafter explained.

The spindle part 1, shown in Figs. 6 and 7, is arranged to rotate on the spindle part 1^a and the latter extends through an aperture in the sliding bracket 57 and is held against the latter by a spiral compression spring 1^b, positioned between the under side of bracket 57 and two tension adjusting nuts 1^c. This arrangement permits the spindle 1 to yield slightly in a lateral direction to assure best frictional driving connection at all times, between the spindle 1 and belt 2.

A swingable latch 61 is pivotally mounted on the bracket 50 by two studs 62 secured to opposite sides of the bracket 50. The latch 61 is provided with a trip pin 63 which normally rests in a notch 64 formed in the bar 38. An extension joint member 65 is connected with the latch 61 by means of a pin 66, and said member 65 has threadedly connected therewith for lengthwise adjustment, the lower end of a rod 67. The upper end of the rod 67 is bent at an angle to form a trip leg 68, which normally rests in position on a balance swivel 69. The latter is pivotally mounted by a stud 70 to the stationary bracket 27^a of the superimposed yarn winding unit comprising the next deck of the machine. The balance swivel 69 has fixed to it a trip stud 71, a weight member 72, and the control wire 6^a.

Since each deck of the machine includes a multiplicity of the yarn winding and twisting units above described, and these units are alignedly arranged in parallel rows along both sides of the machine, it will be understood that such parts as the stationary frame members 28, 32 and 59, belt 2, shaft 11^a and traverse rail 23, extend lengthwise along both sides of the machine and serve to support and operate all the other units in the same manner. Likewise, that the drive belt 2 for each deck of the machine, is looped at each end of the machine so as to form an endless drive belt which is guided and rides along idle pulleys 73 that are spacedly arranged in usual manner between a certain number of the spindles 1. All the drive belts 2 are operated at the same rate of speed, and the traverse bars or rails 23 are reciprocated in unison, by motor driven means (not shown), of the conventional design and construction commonly utilized for this purpose in yarn winding and twisting machines of the type made and sold by U. S. Textile Machine Company of Scranton, Pa., and other U. S. manufacturers. For further information concerning such well-known driving means, reference may be had to the catalogs and other literature distributed by said manufacturers.

Operation

Assuming that the parts of the unit are in operating position, as shown in Fig. 3, the control wire 6^a is so arranged that when the yarn 4 breaks, the yarn guide element 6 will immediately move from between the legs of the U-shaped yarn guide 7 and swing downwardly to the position shown in the upper part of Fig. 5. This action is accelerated by the changing position of the gravity actuated weight member 72, and will bring trip stud 71 into contact with trip leg 68 of the tripping rod 67, so as to thereby effect pulling of the latter upwardly in lengthwise direction, and cause the swingable latch 61 to be turned upwardly about its pivot studs 62. Such swinging movement of the latch 61 will effect disengagement of the trip pin 63 from the notch 64 and will permit the bar to be instantaneously moved downwardly in longitudinal direction, by the action of tensioned spring 55. Downward movement of the bar 38 will cause the rack section 38^a to rotate gear wheel 51 about the shaft 52, so that crank arm 53 will be swung to the position shown in Fig. 6, thereby releasing the tension of spring 55 and permitting the slide bracket 57 to move downwardly, so as to disengage spindle 1 from the drive belt 2 and bring the side of rotating spindle 1 into frictional braking contact with the pad P of the brake member BM. This will stop the rotation of spindle 1. Simultaneous with this action, downward movement of the bar 38 will cause the three-arm member 35 to be partly rotated about the mounting pin 34, so that the roller 36 will force the arm 40 upwardly, thereby moving the yoke 13, swingable plate bracket 25 and the therewith associated parts, away from the driving drum 11, so as to effect disengagement of the yarn supply package from driving engagement with the latter.

The spindle stopping and yarn package disconnecting actions described, take place substantially simultaneously and instantaneously.

After the broken ends of the yarn 4 have been knotted together, the stop-motion control wire 6^a is again re-set as shown in Fig. 3, so that the yarn guide 6 is positioned between the legs of U-shaped guide 7 and the yarn arranged to travel therethrough, as before. The spindle 1 and the yarn package or spool 10, may then again be quickly moved to their operating positions by simply lowering the mechanism re-setting knob 49 from the position shown in dot-and-dash lines in Fig. 3, to the position shown in full lines. This will effect re-setting of the various parts of the mechanism as shown in Fig. 3, connect the spindle 1 with the drive belt 2, the yarn package with the driving drum 11, and the yarn winding action will then be resumed as before.

As the yarn winding action proceeds, the yarn package (or packages), are provided with tapered ends in the manner more particularly illustrated by Fig. 11, and about to be described. Since the bracket 22 is pivotally connected to the traversing rail 23 by a stud screw 22^a, the center of the latter constitutes the pivot PP for the laterally swingable accelerating arm 20. In Fig. 11, the line X—X represents the path of travel of the pivot point PP. The swingable bracket 22 pivots about point PP, as the traverse rail 23 is moved longitudinally along line X—X, because of the action of roller 30 which is confined within the two sides of the stationary U-shaped track 31. The accelerating arm 20 is pivotally mounted at its lower end on bracket 22, so that it is free to swing about the pivot pin 21 in a plane angling up from the plane of the drawing paper. Considering now the movement carried out by the yarn guide 8 at the upper end of arm 20, this will become apparent from the following:

When starting the wind on an empty tube 10, the plane of arm 20 is parallel to the plane of the drawing paper. As the pivot point PP moves from right to left, the thread point indi-

cated by the letter E starts beyond pivot point identified by the letter K, at a point marked G, thus increasing the stroke of the traverse. Similarly, at the left-hand end of stroke marked J, the thread point moves to F. As the yarn package builds up, however, the plane of arm 20 is forced upward about the pivoting axis Y—Y, thus decreasing the stroke of the thread points F and G. This shortening of the stroke takes place automatically as the yarn builds up on the package to produce tapered ends.

From Fig. 11, it is believed to be clear that when the axis Z—Z coincides with the axis X—X, a straight-end package will be produced.

Modifications

It will be understood that the textile apparatus improvements which have been specifically shown and described, can be changed and modified in various ways, without departing from the invention herein disclosed, the scope of which is more particularly indicated by the hereto appended claims. For example, instead of utilizing the form of spindle device indicated by the numeral 1 in the drawings, some other similar standard or conventional type of spindle may be substituted, which is mounted substantially as shown, so that it is movable laterally from its point of connection with suitable driving means, such as the belt 2 into cooperative relation with a brake device of the character illustrated. Similarly, other elements, parts, or devices of the mechanism disclosed, may be replaced by means adapted to carry out the same purpose, or function, of the parts depicted in the drawings.

I claim:

1. A textile apparatus for winding and twisting yarn comprising a supply spindle, a yarn receiving spool and a yarn breakage detector arm in close relationship to one another, spring means for holding said yarn supply spindle in operative position, spring means for holding said yarn receiving spool in operative position, an operating member controlled by said yarn breakage detector arm and movable and extending between the spring holding means of said yarn supply spindle and said yarn receiving spool for effecting release and movement of said yarn supply spindle and yarn receiving spool from an operative position to an inoperative position in its movement in one direction, and effect movement of said yarn supply spindle and yarn receiving spool from their inoperative to their operative position in its movement in the opposite direction.

2. In a textile apparatus for winding and twisting yarn including spindle rotating means, a fixed brake member spacedly mounted opposite said rotating means, a spindle supporting member below said spindle rotating means and said brake member and angularly arranged for gravity actuated movement in a direction from said rotating means to said brake member, a spindle mounted to rotate on said spindle supporting member, a crank, and spring means connecting said crank with said spindle support, the combination of a gear wheel for rotating said crank, a rack in mesh with said crank for movement of said crank to yieldingly hold said spindle against said rotating means, latch means engaging said rack for positioning said crank and holding said rack against movement in one direction, and a yarn breakage detector for operating said latch means for the release of said rack and movement of said gear wheel and crank so as to cause the spindle to move away from said spindle rotating means into contact with said brake member.

3. In a textile apparatus for winding and twisting yarn including spindle rotating means, a fixed brake member spacedly mounted opposite to said rotating means, a spindle supporting member movable below said spindle rotating means vertically spaced from both said rotating means and said brake member and angularly arranged for gravity actuated movement in one direction, and a spindle mounted to rotate on said spindle supporting member, a crank and spring means connecting said crank with said spindle support, the combination of a gear wheel for rotating said crank, a rack in mesh with said gear wheel, means on said rack for positioning said crank so as to yieldingly hold said spindle against said rotating means and hold said rack against movement in one direction, latch means engaging said rack positioning and holding means, a balance swivel, a weight member carried by said balance swivel, means connecting said latch means with said balance swivel for operation of said latch means by said balance swivel, a control wire carried by said balance swivel, a yarn guide element carried by said control wire, and a U-shaped yarn guide adapted to have said control wire move said yarn guide element in and out thereof.

4. In a textile apparatus for winding and twisting yarn including spindle rotating means, a fixed brake member spacedly mounted opposite said rotating means, a spindle supporting member movable below said rotating means and vertically spaced from both said rotating means and said brake member and angularly arranged for gravity actuated movement in one direction, a spindle mounted to rotate on said spindle supporting member, a crank and spring means connecting said crank with said spindle supporting member, the combination of a gear wheel for rotating said crank, a rack in mesh with said gear wheel, means engaging said rack to normally position said crank so as to yieldingly hold said spindle against said rotating means, means for releasing said positioning means from said rack, a yarn breakage detector for operating said positioning means, a driving drum, a yoke rotatably supporting a receiving spool and adapted to swing said spool into and out of driving engagement with said driving drum, means connecting said rack and said yoke to cause simultaneous movement of said yoke for movement of its spool out of driving contact with said driving drum and gravity actuated movement of said spindle support on the release of said rack by said positioning means when operated by said yarn breakage detector.

5. In a textile apparatus for winding and twisting yarn including spindle rotating means, a fixed brake member spacedly mounted opposite said rotating means, a spindle supporting member movable below said rotating means and vertically spaced from both said rotating means and said brake member and angularly arranged for gravity actuated movement in one direction, a spindle mounted to rotate said spindle supporting member, a crank and spring means connecting said crank with said spindle supporting member, the combination of a gear wheel for rotating said crank, a rack in mesh with said gear wheel, means engaging said rack to normally position said crank so as to yieldingly hold said spindle against said rotating means, means for releasing said positioning means from said rack, a yarn breakage detector for operating said positioning means, a

driving drum, a yoke rotatably supporting a receiving spool and adapted to swing said spool into and out of driving engagement with said driving drum, means connecting said rack and said yoke to cause simultaneous movement of said yoke for movement of its spool out of driving contact with said driving drum and gravity actuated movement of said spindle support on the release of said rack by said positioning means when operated by said yarn breakage detector, and manually operated resetting means carried by said connecting means for positive movement of said spindle by said spindle supporting member and said spool by said yoke from their inoperative to their operative position.

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