

March 15, 1949.

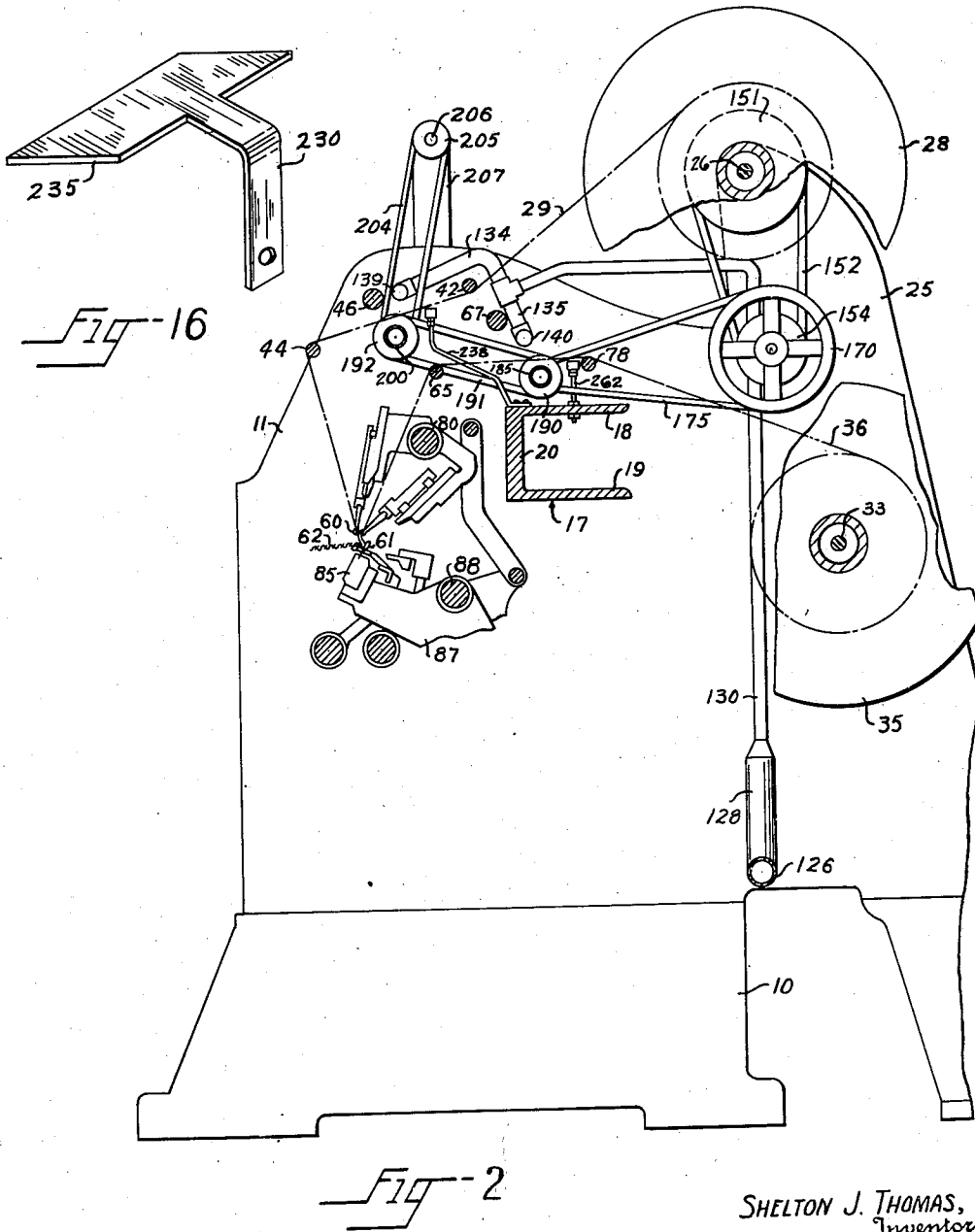
S. J. THOMAS

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ELECTRIC STOP MOTION FOR TEXTILE MACHINES

Filed Dec. 24, 1947

9 Sheets-Sheet 2



SHELTON J. THOMAS,
Inventor.

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Paulston

ATTORNEY.

Filed Dec. 24, 1947

ELECTRIC STOP MOTION FOR TEXTILE MACHINES

9 Sheets-Sheet 3.



March 15, 1949.

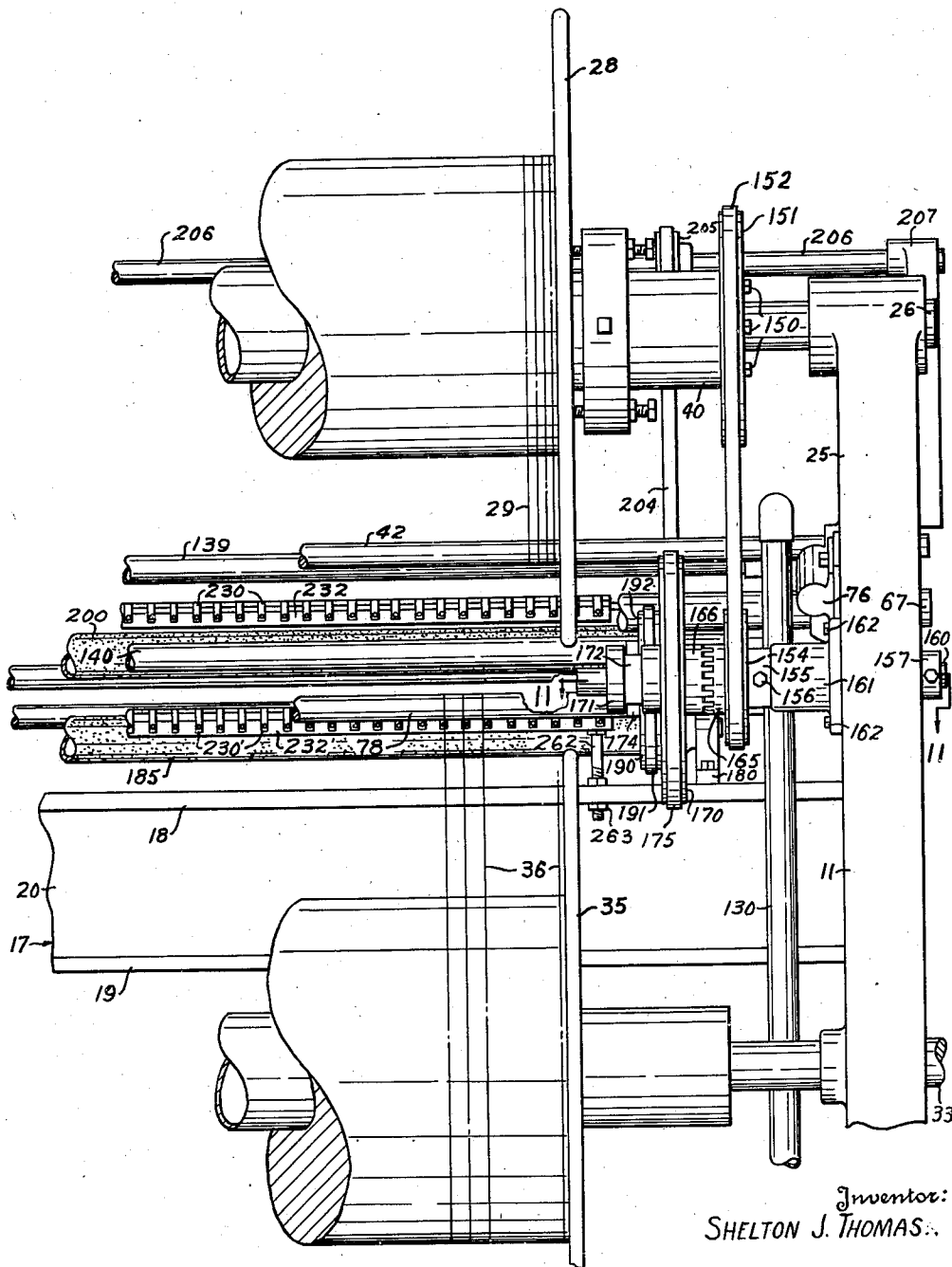
S. J. THOMAS

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ELECTRIC STOP MOTION FOR TEXTILE MACHINES

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9 Sheets-Sheet 4



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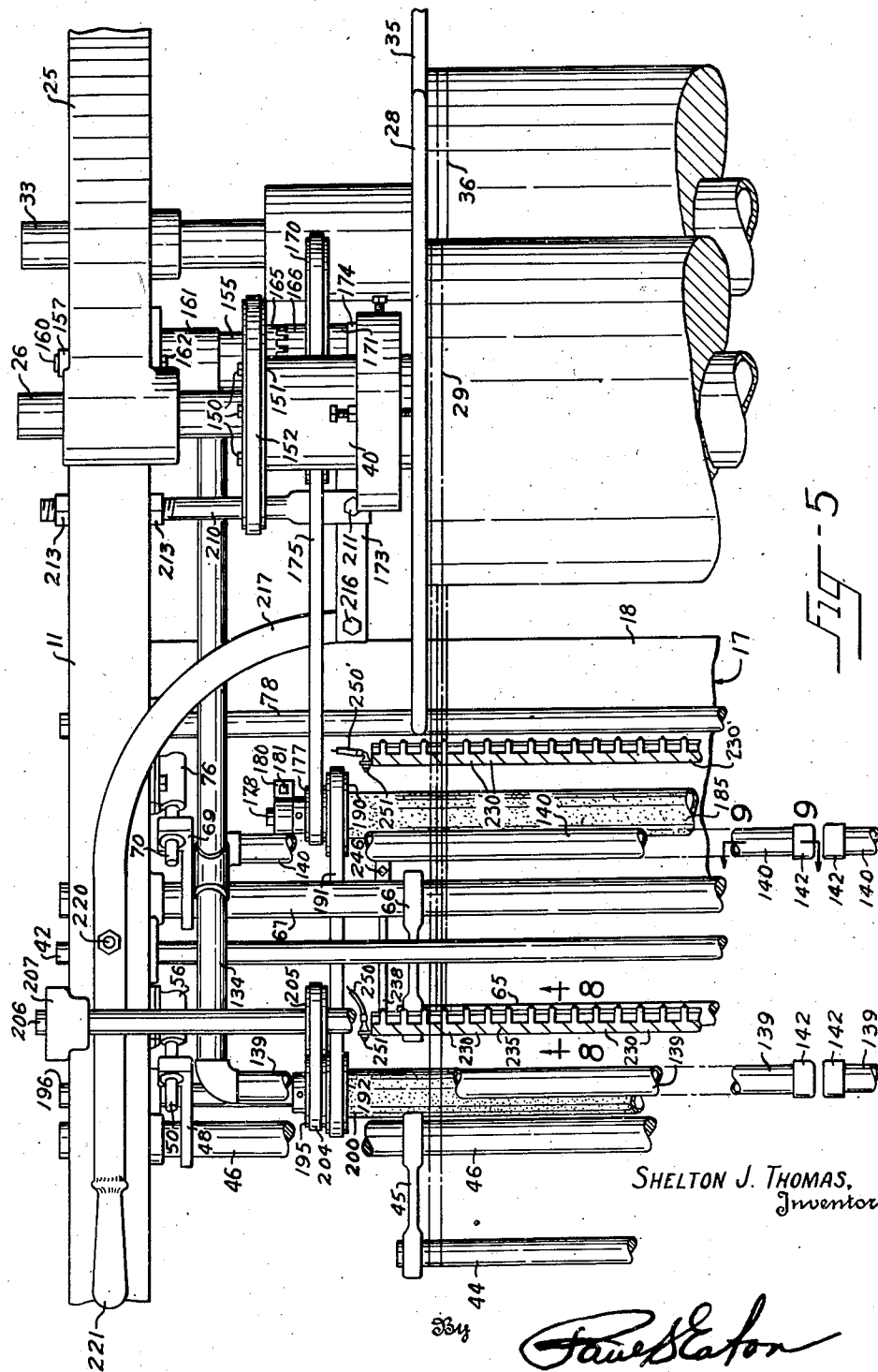
S. J. THOMAS

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ELECTRIC STOP MOTION FOR TEXTILE MACHINES

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9 Sheets-Sheet 5



SHELTON J. THOMAS,
Inventor.

Paul E. Eaton

ATTORNEY.

March 15, 1949.

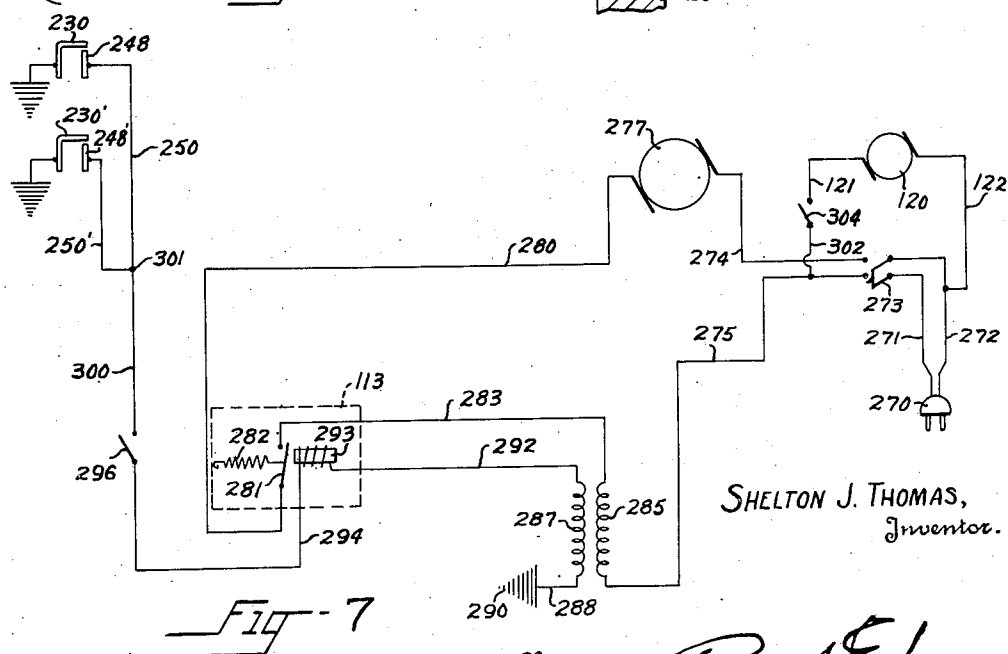
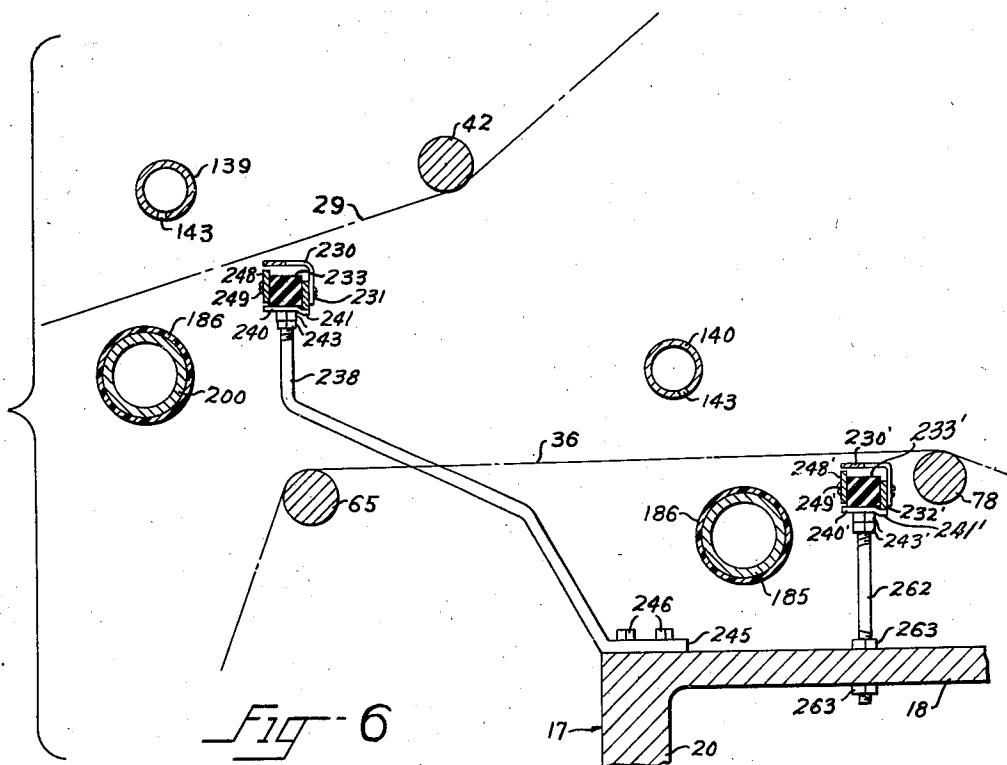
S. J. THOMAS

2,464,468

ELECTRIC STOP MOTION FOR TEXTILE MACHINES

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9 Sheets-Sheet 6.



SHELTON J. THOMAS,
Inventor.

Paul Eaton

ATTORNEY.

March 15, 1949.

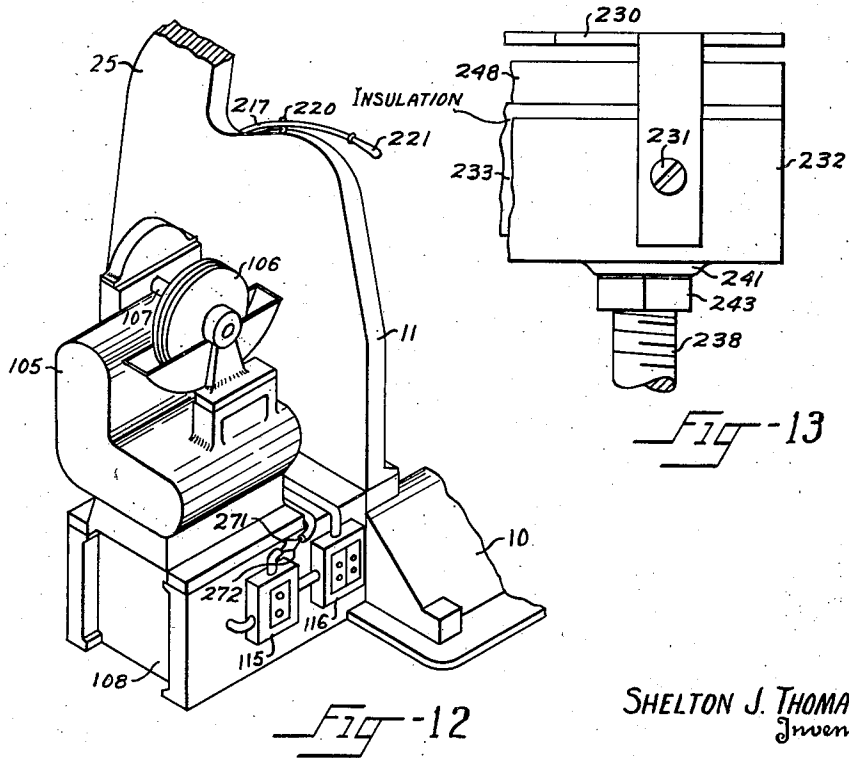
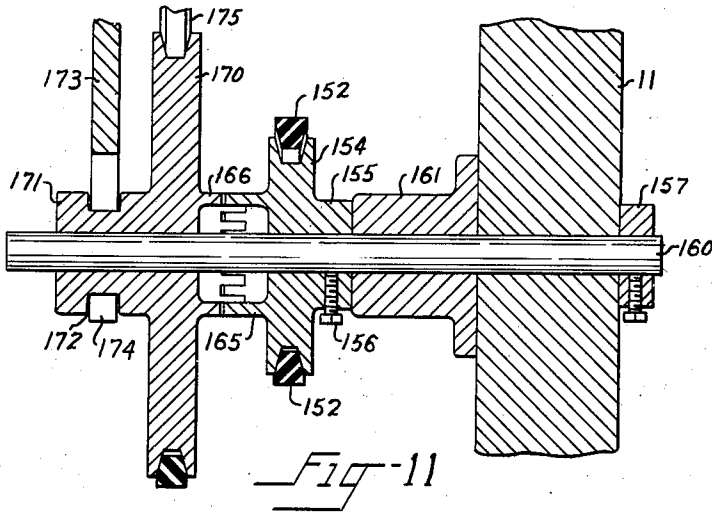
S. J. THOMAS

2,464,468

ELECTRIC STOP MOTION FOR TEXTILE MACHINES

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9 Sheets-Sheet 7



SHELTON J. THOMAS,
Inventor.

By

Paul E. Egan

ATTORNEY.

March 15, 1949.

S. J. THOMAS

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ELECTRIC STOP MOTION FOR TEXTILE MACHINES

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Fig. 15

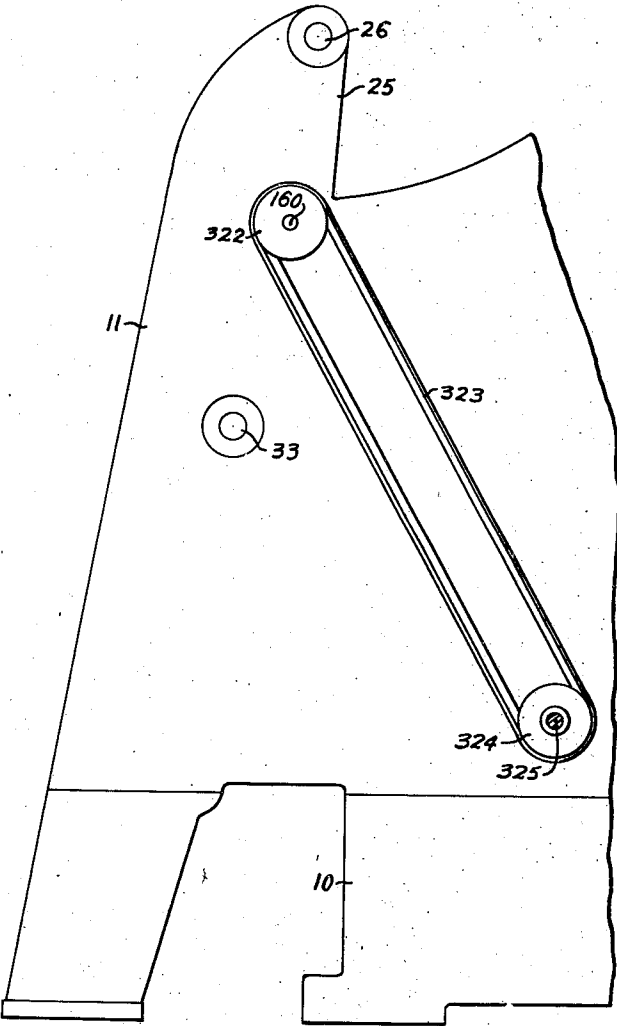
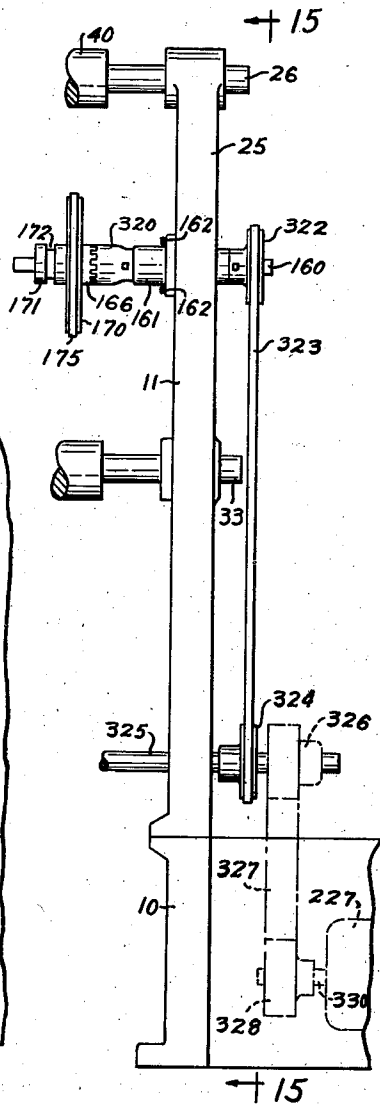


Fig. 14



SHELTON J. THOMAS,
Inventor.

334

Paul H. Carter

ATTORNEY.

March 15, 1949.

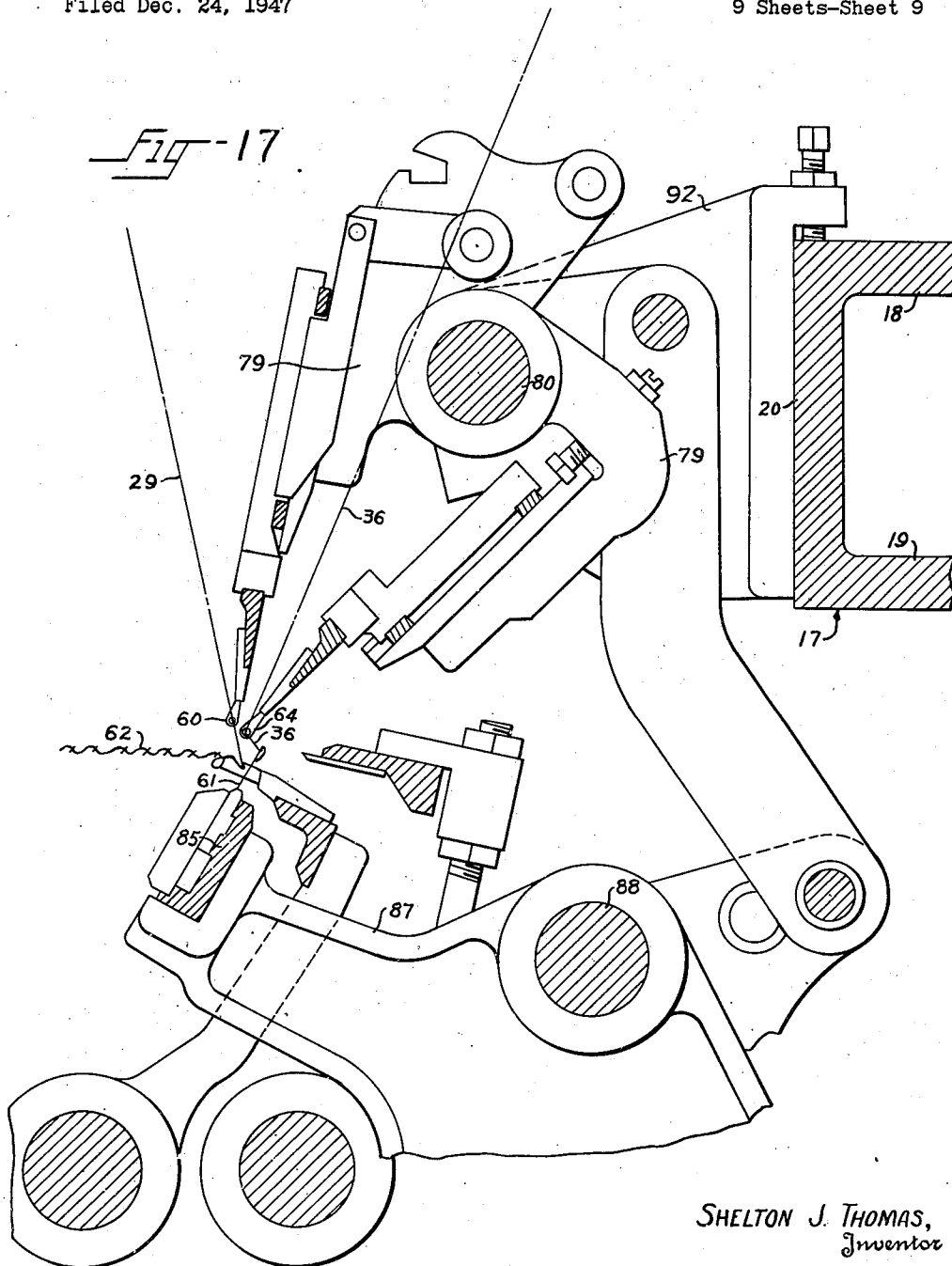
S. J. THOMAS

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ELECTRIC STOP MOTION FOR TEXTILE MACHINES

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9 Sheets-Sheet 9



SHELTON J. THOMAS,
Inventor

ವೊಕ್ಕ

Faukston

ATTORNEY.

UNITED STATES PATENT OFFICE

2,464,468

ELECTRIC STOP MOTION FOR TEXTILE MACHINES

Shelton J. Thomas, Robbins, N. C., assignor of one-half to Robbins Cloth Mills, Inc., Robbins, N. C., a corporation of North Carolina

Application December 24, 1947, Serial No. 793,639

5 Claims. (Cl. 66—163)

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This invention relates to textile machines, having warp yarns, wherein is employed an electrically operated warp stop motion and relates more especially to a knitting machine operating on the conventional tricot knitting principle. The tricot knitting machine with which this invention is shown as being adapted to be associated is of a type such as is distributed by Aveco, Inc., 350 Fifth Avenue, New York, New York. However, the invention is not restricted to this particular make of machine, but may be used on any tricot knitting machine as well as other types of textile machinery.

It is an object of this invention to provide a simple and positive means for automatically stopping a machine in the event of one or more warp yarns being severed or broken.

It is another object of this invention to provide means whereby upon the breakage of a strand of yarn, which is generally at the needles in a tricot knitting machine, an intermediate portion of the yarn will be forced by air against an adhesive roll and the yarn, which is being drawn from the warp beam, will be rolled up onto the adhesive roll as well as the loose end which extends beyond the roll and when the machine has automatically stopped, following the breakage of the yarn, the rotation of the adhesive roll may be reversed manually to draw the free end of the broken yarn off the roll and to thus have a sufficient length of yarn to again thread the needles without having to piece the yarn.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which

Figure 1 is a rear elevation of a tricot knitting machine showing the pertinent parts of the machine with respect to this invention and also showing the invention applied thereto;

Figure 2 is a vertical sectional view taken substantially along the line 2—2 in Figure 1 with parts omitted;

Figure 3 is an enlarged view of the upper portion of Figure 2 showing the parts in detail;

Figure 4 is an enlarged elevation showing my invention as observed from the rear of the machine and taken along the line 4—4 in Figure 3;

Figure 5 is a plan view taken along the line 5—5 in Figure 3 and showing that end of the machine on which the driving mechanism of the invention is installed which is the right-hand end of Figure 1;

Figure 6 is a schematic diagram of the princi-

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pal parts of the invention on an enlarged scale and is a view similar to Figure 3 with parts omitted;

Figure 7 is a schematic diagram of the electrical circuit associated with this invention;

Figure 8 is a vertical sectional view on an enlarged scale and taken along the line 8—8 in Figure 5 through one of the contact bars;

Figure 9 is a vertical sectional view on an enlarged scale and taken along the line 9—9 in Figure 5;

Figure 10 is a vertical sectional view taken along the line 10—10 in Figure 9;

Figure 11 is a vertical sectional view taken along the line 11—11 in Figure 4;

Figure 12 is an isometric view of the head end of the machine and looking at the back of the right-hand end of Figure 1;

Figure 13 is an elevation of one end of the circuit closing means and being taken substantially along the line 13—13 in Figure 3;

Figure 14 is a rear elevation showing a modified form of drive for the invention;

Figure 15 is an elevation looking from the right-hand end of Figure 1 toward the left and showing the modified drive of the invention and is also looking from the right to left in Figure 14 and being taken along the line 15—15 in Figure 14;

Figure 16 is an isometric view of one of the leaf spring contact members;

Figure 17 is an enlarged vertical sectional view of the central left-hand portion of Figure 2.

Referring more specifically to the drawings, the numeral 10 indicates the base of a knitting machine mounted on a floor 9 which has disposed at each end thereof vertically disposed end frame members 11 and 12, and an intermediate supporting member or samson 14 is disposed in the middle of the base member 10. Spanning the distance between the vertical end members 11 and 12 and being secured thereto is a channel girt member 17 having horizontally disposed flanges 18 and 19 and a vertically disposed web portion 20. The head end 11 of the machine has an upwardly extending portion 25 in which is rotatably mounted one end of a shaft 26 which passes through and has fixed thereon a plurality of warp beams 28 having warp yarns 29. The shaft 26 is supported at the center of the machine by the upper end of the intermediate supporting member or samson 14, and is supported at the foot end of the machine by an upwardly extending portion 30 of the foot end 12. The shaft 26 has a conventional braking means 32 mounted on the end thereof.

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Another shaft 33 is rotatably mounted in the head end 11 of the machine, at a lower level than the shaft 26 and also has fixedly secured thereon a plurality of warp beams 35 having warp yarns 36 thereon. The shaft 33 is also supported intermediate its ends in the intermediate supporting member 14 and is rotatably supported at its foot end in the foot end 12 of the machine. Shaft 33 is also equipped with a conventional braking means 38 mounted on the foot end thereof.

The upper warp beams 28 on each end of shaft 26 have a hub portion 40 with which this invention is adapted to be associated. The warp yarns 29 extend from the beams 28, as observed in Figure 3, and downwardly and to the left where they are engaged by and pass beneath a guide rod 42. The guide rod 42 is fixedly secured in the vertical side members at each end thereof. The warp yarn 29, after passing beneath the guide rod 42, extends forwardly and downwardly and passes over a tension rod 44 which is secured in tension rod arms 45, at its ends, which arms are oscillatably mounted on a warp rocker shaft 46 which is mounted at each end in the head and foot ends 11 and 12 of the machine.

The warp rocker shaft 46 (Figure 3) has secured near the remote ends thereof spring arms 48 which are slidably penetrated by shafts 50 each having a compression spring 52 mounted therearound, the upper end of which engages an adjusting nut 53 having a lock nut 54 associated therewith and the adjusting nuts 53 as well as the lock nuts 54 are threadably mounted on the free ends of the shafts 50. The lower ends of the shafts 50 also slidably penetrate the spring arms 48 and are secured in brackets 55 which are secured on the vertical side members 11 and 12.

As heretofore stated, the yarn 29 passes over the tension rod 44 and then extends downwardly to where it is threaded through a plurality of guides 60 (Figures 2 and 6) as well as needles 61 where the cloth 62 is knitted in a conventional manner and also connected to the needles 61 are the ends of warp yarns 36.

The warp yarns 3 pass through similar thread guides 64 and pass upwardly over a tension rod 65 which is secured at each end in arm 66 fixedly secured to a warp rocker shaft 67 loosely mounted at each end in the vertical side frame members 11 and 12.

After the warp yarns 36 have passed upwardly from the thread guides 64 to the tension rod 65, they are in a horizontally disposed position and extend rearwardly of the machine and pass over a rod 78 which extends the full length of the machine and is secured at each end thereof in the head end 11 and the foot end 12.

Fixedly secured to the shaft 67 at the remote ends thereof and adjacent the vertical side members 11 and 12 are spring arms 69 having similar shafts 70 to the shafts 50 which have heretofore been described, and the shafts 70 slidably penetrate the spring arms 69 and each has a compression spring 72 therearound which engages the spring arm 69 at its lower end and at its upper end it is threadably engaged by an adjustment nut 73 which is secured by a lock nut 74. The lock nut 74 and adjustment nut 73 are threadably mounted on the upper end of the shafts 70. The lower ends of the shaft 70 are fixedly secured in brackets 76 which are secured to the vertical side members 11 and 12.

The thread guides 60 and 64, heretofore described, are secured in conventional guide rocker

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brackets 79 (Figure 6) which are secured to a guide rocker shaft 80 which is caused to oscillate by conventional means, not shown.

The needles 61 are secured to a needle bar 85 which is secured to needle bar brackets 87 fixedly secured on a conventional needle shaft 88 which is also caused to oscillate by conventional means not shown. The shaft 88 is oscillatably mounted in brackets 92 which are secured to the vertical leg 20 of the channel girt member 17. The needle shaft 88 is oscillatably mounted in bearings not shown, in the vertical side members 11 and 12 at each end of the machine.

Mounted adjacent the head end 11 and resting on a motor housing 108 is a conventional pattern gear box 105 (Figure 12) having conventional pattern wheels 106 secured to a shaft 107 extending from the gear box 105, and the conventional motor housing 108 has mounted thereon and secured to the floor 9 upon which the knitting machine rests, an electric motor 110 (Figure 12). The rear vertical surface of the motor housing 108 has mounted thereon a transformer 112 and a relay box 113, the use of which will be later described. The front vertical surface of the motor housing 108 has mounted thereon electric push button switch boxes 115 and 116, the use of which will also be later described. The parts heretofore described are conventional parts of a tricot knitting machine and it is with these parts that this invention is adapted to be associated.

Secured to the floor 9 and mounted adjacent the intermediate support member 14 is an electric blower 120 having wires 121 and 122 leading therefrom to be later described. The blower 120 blows air through a pipe 124 which extends upwardly from the blower 120 and is connected to a pipe T 125 which has branch pipes 126 leading therefrom. The branch pipes 126 extend outwardly to the head end 11 and foot end 12 where they are turned upwardly as at 128. Smaller branch pipes 130 are coupled to and extend upwardly from the pipe 128. The pipes 130 extend upwardly and are connected to horizontally disposed pipes 132 (Figure 3) which extend forwardly or to the left as viewed in Figure 3, and are connected to pipe T's 133 having branch pipes 135 and 135 secured thereto.

The branch pipes 134 and 135 are connected to horizontally disposed pipes 139 and 140 which extend toward the center of the machine and are capped as at 142 on the proximate ends thereof. The longitudinal pipes 139 and 140 have a plurality of holes 143 disposed on the lowermost point in the periphery of the same, through which the air from the blower 120 escapes and to thus blow against the warp yarns 29 and 36.

Secured on the end of each of the hubs 40 of one of the warp beams 28 by any suitable means such as screws 150 is a V-pulley 151 which supports a V-belt 152 (Figures 1, 2, 3, 4 and 5). The V-belt 152 passes downwardly around a pulley 154 (Figure 11) having a hub portion 155 which is secured on a shaft 160 by a set screw 156.

The shaft 160 is rotatably mounted in the head end 11 of the machine as well as a bearing block 161 which is secured to the head end of the machine by any suitable means such as screws 162, and is confined against longitudinal movement by the hub 155 of the pulley 154 and a collar 157 (Figure 11).

The V-pulley 154 also has integral therewith a clutch face 165 (Figure 11) which engages a sim-

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ilar clutch face 166 integral with a V-pulley 170 having a hub portion 171 integral therewith which is grooved as at 172 and the groove 172 is engaged by a forked end 174 of a yoke member 173 to be later described. The V-pulley 170 is rotatably and slidably mounted on the shaft 160 and is engaged by a V-belt 175 which extends forwardly and engages a V-pulley 177 secured on a shaft 178. The shaft 178 is rotatably mounted in a bearing block 180 which is secured by any suitable means such as bolts 181 to the horizontally disposed flange 18 of the girt member 17 (Figure 5). The shaft 178 extends from a tubular shaft 185 which is mounted at its other end on a shaft similar to the shaft 178 which is also rotatably mounted in a bearing, not shown, similar to the bearing 180 and secured in a like manner.

The tubular shaft 185 has an adhesive coating 186 applied thereto which will remain adhesive for a considerable length of time and this coating 186 may be such as is manufactured by Paisley Products, Inc., 1770 Canal Port Avenue, Chicago 16, Illinois, and is known as their No. 919 Paisley Adhesive.

Integral with the V-pulley 177 which is secured on the shaft 178, is a larger V-pulley 190 (Figures 3, 4 and 5) which is engaged by a V-belt 191 which extends forwardly or to the left as viewed in Figures 3 and 5 and engages a similar V-pulley 192 which has integral therewith a smaller V-pulley 195 and is secured to a shaft 196 which is rotatably mounted in the head end 11 of the machine. The other end of the shaft 196 is integral with and extends into a tubular shaft 200 which is identical to the tubular shaft 185 and has the same type of adhesive material 186 applied thereto.

The tubular shaft 200 has secured in its other end a shaft not shown, similar to the shaft 196 and this shaft is rotatably mounted in the foot end 12 of the machine in the same manner as the shaft 196.

A V-belt 204 engages the V-pulley 195 and extends upwardly and passes over a V-pulley 205 which is fixedly secured on a shipper shaft 206. The shipper shaft 206 is rotatably mounted in bearing blocks 207 at each end of the machine which extends downwardly and are secured to the vertical side members 11 and 12. The yoke member 173 is oscillatably supported intermediate its ends in the slotted end of a transverse horizontally disposed shaft 210 which penetrates and is secured to the head end of the machine by lock nuts 213. The shaft 210 and the yoke 173 are slidably penetrated by a bolt 211.

The free end of the yoke member 173 is slotted as at 215 and is penetrated by a bolt 216 which also penetrates the end of a control lever 217 which is curved upwardly and toward the vertically disposed head member 11 and is pivotally mounted on the head member 11 as at 220. The control lever 217 then extends toward the front end of the machine and is curved downwardly at its front end and has a handle portion 221 integral therewith (Figure 3).

Since the pulley 170 is rotatably mounted and also slidably mounted on the shaft 160, by moving the handle 221 in a counterclockwise direction, as observed in Figure 5, the control lever 217 will move the yoke member 173 in a clockwise direction and the forked end 174, which is engaging the slot 172 of the pulley 170, will move in a clockwise direction and will move the pulley 170 so that the clutch portion 166 will be moved out of engagement with the clutch portion 165

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of the pulley 154. By moving the handle 221 the opposite direction, the clutch portion 166 on the pulley 170 will again engage the clutch portion 165 of the pulley 154.

Whenever one of the warp yarns 29 breaks or is severed, which is usually at the needles 61, the blast of air from the pipe 139 will blow the loose end of the strand against the tubular shaft 200 and the adhesive surface of the same will cause the parted yarn 29 to be wound about the tubular shaft 200 as it rotates. This will also draw the yarn 29 tighter than normal conditions require and it will cause that part of the yarn 29 which is disposed between the shaft 42 and the tubular shaft 200 to be moved downwardly against a leaf spring member 230. (Figures 8, 13 and 16), a plurality of which are secured by any suitable means such as screws 231 to the vertically disposed surface of a horizontally disposed metal contact bar 232.

Each end of the leaf spring members 230 are cut on an angle as at 235 so that when the yarn strand 29 is brought into contact near the edges of two adjacent spring members 230, the yarn 29 will not pass between the two adjacent leaf spring members 230 whenever one or both of them are pressed downwardly. The contact bar 232 is also secured by the screws 231 to an insulation bar 233 having holes 236 near each end thereof which are penetrated by the free end of rods 238.

Although the upper ends of the rods 238 are threaded, it does not threadably penetrate the end of the insulation bar 233, but the threads do cut into the walls of the hole 236 slightly when the insulation bar 233 is pressed downwardly onto the ends of the rods 238. The insulation bar 233 is supported on washers 240 which are bent downwardly as at 241 to contact the lower end of the horizontally disposed contact bar 232 which extends below the lower surface of the insulation bar 233. The washers 240 are supported on lock nuts 243 which are threadably secured near the upper end of the rods 238 and the insulation bar 233 may be adjusted vertically by these lock nuts 243. The insulation bar supporting rods 238 extend downwardly and to the right as observed in Figures 2 and 3 and have a flattened portion 245 which are secured to the girt 17 by any suitable means such as screws 246.

When the free ends of one or more of the leaf spring members 230 are urged downwardly by the yarn 29, they will contact a metal bar 248 which is secured by screws 249 to the front or left-hand side of the insulation bar 233 as observed in Figure 8. It will be noted that the bar 248 extends upwardly beyond the upper surface of the insulation bar 233 but does not quite reach the bottom surface of the bar 233 so that the electric current, which will be presently described, passing through the bar 248 will not be passed through the washer 240 and thus be grounded.

The end of the horizontally disposed bar 248, which is nearest the head end 11 of the machine, has a wire 250 secured thereto, by any suitable means such as a screw 251, which leads from an electrical circuit to be presently described.

When any one of the yarns 36 breaks or is severed it will be wound about the tubular shaft 185 in a manner identical to that in which the yarns 29 are wound about the shaft 200 heretofore described.

When any one of the yarns 36, which may have become severed, is blown by the blast of air from

the pipe 140 downwardly against the tubular shaft 135, the tautness of one of the yarns 36, or that part of it which is disposed between the rods 78 and the tubular shaft 135, will be drawn downwardly against a leaf spring member 230' to close a circuit. These parts being identical to the leaf spring member 230 previously described as being contacted by the yarn 29, will bear the same reference characters as well as the associated parts with the prime notation added.

The insulation bar 233' has holes identical to holes 236 vertically disposed in each end thereof and these holes are penetrated by vertically disposed shafts 252 having washers 240' with downwardly turned front portions 241' and which are supported by lock nuts 243'. The vertically disposed shafts 262 are secured in the horizontal flange 18 of the girt member 17 by any suitable means such as lock nuts 263, which are threadably secured on the lower ends of the shafts 262.

By referring to Figure 5, it may be observed that a horizontally disposed metal bar 248' secured to the insulation bar 233' extends beyond the end of the insulation bar 233' and has a wire 250' leading therefrom and which is secured thereto by any suitable means such as a screw 251'.

By referring to Figure 7 there may be observed a wiring diagram which, for purposes of clearness, shows only the pertinent parts, and these schematically.

Leading from a suitable source of electrical energy 270 are wires 272 and 271 which extend to one side of a switch 273 which is disposed within the housing or relay box 113 as observed in Figure 12. When the switch 273 is closed, it will complete a circuit through the wires 274 and 275. The wire 274 leads to one side of an electric motor 277 which is the main driving motor of the entire knitting machine. From the other side of the electric motor 277 there is a wire 280 which leads to one side of a relay switch 281 which is disposed within the relay box 113 heretofore described. The switch 281 is urged to closed position by a compression spring 282 and when the switch 281 is closed it contacts and completes a circuit through a wire 283 leading to one side of a primary coil 285 and which has a wire 275 leading from the other side thereof. The coil 285 is a part of the transformer 112.

The transformer 112 which in this instance is an air core transformer, has a secondary coil 287 which is generally of approximately 12 volts, which has a wire 288 leading from the lower end thereof which is grounded as at 290. Leading from the top side of the secondary coil 287 is a wire 292 which leads to one side of a conventional relay magnet 293 having another wire 294 leading therefrom to a switch 296. The switch 296 is disposed within the switch box 116 and has a wire 300 leading therefrom which leads to a contact point 301 and the wires 253 and 250' lead therefrom to the metal contact bars 240 and 248' respectively.

When any one of the leaf spring members 230 or 230' heretofore described are urged downwardly against the metallic bars 240 and 248', a circuit is completed through the leaf spring members 230 or 230', the washer 240 or 249' and then through the rods 232 or 282 to the girt 17 where it is grounded.

The blast of air which is emitted from the pipe 139 and pipe 140 is from the blower motor 120 which has the wires 121 and 122 leading therefrom. The wire 122 leads to the wire 272 which

leads from the source of electrical energy 270 and the wire 121 leads to a switch 304 which is within the switch box 116 as observed in Figure 12. When the switch 304 is closed, the current will pass through the wire 121 in the switch box 116 to the switch 304 and through a wire 302 to the wire 275 and when the switch 273 is closed the current will continue through one side of the switch 273 and through the wire 271 and thus complete the circuit to the source of energy 270.

By referring to Figures 14 and 15, there may be observed a modified means of driving the shaft 160 so that in the event that the tension on the yarns 29 may be too great as a result of the shaft 160 being driven by the warp beam 28 in the manner heretofore described, the V-pulley 154 on the shaft 160 may be omitted or at least the V-belt 152 leading therefrom as well as the V-pulley 151 may be omitted and the V-pulley 154 may be replaced, if so desired, by a clutch member 329 or the same V-pulley 154 may be used, but omitting the V-belt 152. The clutch member 329 will, of course, be engaged by the clutch portion 166 of the V-pulley 170 and the V-pulley 170 will be employed in the same manner which has been previously described.

In this instance, it is necessary that the shaft 160 extend outwardly beyond the vertical side frame member 11 substantially enough to receive a V-pulley 322 to be secured thereon and a V-belt 323 is mounted on the pulley 322 at its upper end and extends downwardly to a V-pulley 324 which is fixedly secured on a drive shaft 325 which is a conventional part of the machine and is mounted in the head end of the machine and extends into the machine.

The shaft 325 is driven by a conventional pulley 326 which is secured on the shaft 325, and the pulley 326 is engaged by a belt 327 which extends downwardly to a conventional pulley 328 which is secured on a shaft 330 leading from the motor 277 heretofore described.

Method of operation

When the master switch 273 is closed the yarns 29 and 36 are normally drawn through the thread guides 60 and 64, through the needles 61 and thus knit into the cloth 62. The upper warp beam 28 is turned by the warp yarns 29 which are being drawn off the warp beam 28 and the pulley 151, which is secured to the end of the hub portion 40 of the warp beam 28, transmits the power downwardly through the V-belt 152 to the pulley 154. The clutch consisting of the portions 165 of the V-pulley 154 and 166 of the V-pulley 170 is engaged by moving the handle 221 of the lever 217 and this movement is in a clockwise direction in Figure 5, and the yoke member 173 will move the pulley 170 and the clutch portion 166 to engage the clutch portion 165. Thus rotation will be transmitted from the pulley 154 to the pulley 170 having the V-belt 175 thereon which transmits rotation to the pulley 177 on the shaft 178. The pulley 177 transmits rotation to the pulley 190 having the V-belt 191 thereon which transmits rotation to the pulley 192 on the shaft 196 and having the pulley 195 integral therewith. Thus the tubular shafts 135 and 200 being integral with the shafts 178 and 196 respectively are rotated.

It has already been described how the warp yarns 29 and 36, when one or more of them become broken, engage and depress the leaf spring members 230 or 230' and will thus complete a circuit through the metallic bars 240 or 248' through

wires 250 or 250' and to thus complete a circuit in cooperation with the wiring diagram which has heretofore been described.

The current will pass from the wires 250 or 250' through the wire 300 and through the switch 296 which will then be closed, and then into the relay box 113 where it will energize the magnet 293 by having the current continue through the wire 292 which receives current from the coil 287 having the wire 288 leading therefrom to a ground 290.

At the same time the switch 273 is closed and the current passes from the source of electrical energy 270 through the wire 271 and then through the wire 275 and through the primary coil 285, through the wire 283 and to the switch 281. The switch 281 is normally closed as heretofore stated, by the spring 282 and the current, will of course continue through the wire 280 to the motor 277 and through the motor 277 to the wire 274 and through switch 273, wire 272 and thus to the source of electrical energy 270. When the magnet is energized as heretofore stated, the switch 281 will be drawn open and thus the circuit to the motor 277 will be broken and this will stop the machine.

When the machine stops due to the breakage of any one of the yarns 29 or 36, since the switch boxes 115 and 116 are conveniently placed near the head end of the machine, the operator may open or close the master switch 273, which is within the box 115, and also may open or close the switches 293 and 304, which are within the switch box 116, to thus stop the fan motor from operating as well as stopping the current from passing through the bars 248 and 248'. The object of stopping the current from passing through these bars 248 and 248' as well as stopping the blast of air from the pipes 139 and 140 is so that the yarns 29 and 36 may be handled without being tossed about by the air from the pipes 139 and 140, and in the event that the operator should touch one of the bars 248 or 248' the operator will not receive an electrical shock from the same.

It will be noted that the controlling lever handle 221 is also conveniently close to the switch boxes 115 and 116 so that the operator may also disengage the clutch members 166 and 165, or in the modified form, the clutch members 166 and 320, at the same time the operator opens or closes the switches in the switch boxes 115 and 116 if so desired.

As has heretofore been stated, when one of the yarns 29 or 36 breaks, the loose end is blown against the rotating tubular shafts 200 or 185 respectively by the blasts of air. The broken end 29 or 36 will then be wound around the tubular shaft 200 or 185 due to the adhesive surface 186 of these shafts and when the machine has stopped in the manner heretofore described, one of the tubular shafts 200 or 185 will have wound a portion of a yarn 29 or 36 therearound and the free end of the yarn will hang down from the shaft 200 or 185. When it is desired to again start the machine, the shaft 206 which is disposed in the bearings 207 secured to the vertical side members 11 and 12, may be rotated manually in a clockwise direction, as observed in Figure 3, and this rotation will transmit rotation to the V-pulley 205 which will transmit rotation to the V-pulley 195 by means of the V-belt 204 and this in turn will cause the tubular shafts 185 and 200 to be rotated due to the interconnecting V-belt 194 and this will unwind the loose end of

the yarn 29 or 36 as may be the case. As the yarn 29 or 36 in unwound, the operator grasps the free end of the same and passes it over the tension rod 44 or 65 and threads the same in a conventional manner through either one of the thread guides 60 or 64. The switches 296, 304 and 272 are then closed and the machine is again operated in a conventional manner until another of the yarns 29 or 36 breaks and then the procedure is again followed as described above.

In the drawings and specification there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. In a warp knitting machine having a bank of knitting needles and having a plurality of warp rolls for supplying a sheet of warp threads to the knitting needles, a contact bar disposed adjacent the path of travel of the sheet of warp threads and having a plurality of side by side spring contacts normally held out of contact relation with the contact bar, a blower pipe disposed adjacent the sheet of warp threads and having openings therein for projecting jets of air against the sheet of warp to tend to force the sheet of warp toward the contact bar, a roller disposed on the other side of the sheet of warp threads remote from the blower pipe and said roller having a surface to which a warp thread is adapted to be secured when contacting the same, means for driving the roller, an electrical circuit having one side connected to the contact bar and having the other side connected to the spring contacts associated with said contact bar, a means for forcing compressed air into said blower pipe, parting of a strand allowing the blower pipe to blow the parted strand against the said roller and to wind the strand around the roller to thereby cause the strand to engage and depress one of the spring contacts to cause it to engage the contact bar to thus close the electrical circuit to stop the motor for driving the roller and to stop the means for forcing compressed air into the blower pipe and to disconnect the electrical circuit passing through the contact bar and the depressed spring contact.

2. In a warp knitting machine having a plurality of needles and having a warp roll for supplying a sheet of warp threads to the knitting needles, a driven roller disposed on one side of the sheet of warp threads and a blower pipe disposed on the other side of the sheet of warp threads, a fixed contact bar disposed on the same side of the sheet of warp threads as the roller, said fixed contact bar having associated therewith a plurality of spring contacts disposed above the contact bar and normally not in contact with the contact bar, means for forcing compressed air through the blower pipe to cause jets of air to impinge upon the sheet of warp threads passing to the knitting needles, means for imparting rotation to the roller disposed adjacent the sheet of warp threads, said roller having a surface to which warp threads will become engaged when a warp thread parts and is blown against the periphery of the roller to thus wind the broken warp thread around the roller and to cause it to contact and depress one of the spring contacts to engage the fixed contact bar, and an electrical circuit connected at one side to the contact bar and at the other side to the spring contact bars,

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an electric motor for driving the roller, the winding of a parted warp thread around the roller serving to depress one of the spring contacts into engagement with the fixed contact bar to thus close the electric circuit, and means operable by the closing of the electrical circuit for disconnecting the driving means for the means for creating a blast of air in the blower pipe and also for disconnecting the motor for driving the roller and also disconnecting the current to the fixed contact bar and to the spring contact bars to thus break the electrical circuit which is closed by a parted warp thread.

3. In a machine having a sheet of warp threads passing therethrough and a blower pipe disposed on one side of the sheet of warp threads and a roller having a surface for engaging a fallen warp thread disposed on the other side of the sheet of warp threads remote from the blower pipe, a plurality of switches disposed in overlapping relation on that side of the sheet of warp threads where the roller is located, means for forcing compressed air into the blower pipe, means for driving the roller, an electric circuit passing through the means for driving the roller, the means for forcing compressed air into the blower pipe, and through the switches disposed adjacent the sheet of warp threads, parting of a strand in the sheet of warp threads allowing the blower pipe to blow the parted strand against the roller to cause it to be wound around the roller and to thus bring it into engagement with one of the switches to close the same, an electrical circuit passing through the means for driving the roller, the means for forcing compressed air into the blower pipe and through the switches and means operable by closing of one of the switches by a parted warp strand wound around the roller for de-energizing the means for driving the means for forcing compressed air into the blower pipe and de-energizing the means for driving the roller and de-energizing the switches disposed adjacent the sheet of warp threads.

4. In a machine having a sheet of warp passing therethrough, a roller having a surface adapted to engage and wind warp threads therearound, a blower pipe disposed on the other side of the warp threads remote from the roller and having nozzles for projecting streams of compressed air against the sheet of warp, a contact

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bar disposed adjacent the roller and having a plurality of spring contacts normally out of contact with the contact bar, means for driving the machine, means for driving the roller, means for forcing compressed air into the blower pipe, and means operable by a warp thread having less than normal tension therein in engaging the roller on account of the jets of air normally blowing the same toward the roller to wind the warp strand having sub-normal tension therein around the roller to cause it to contact one of the spring contacts to close an electrical circuit passing therethrough to thus stop the machine.

5. In a machine having a sheet of warp passing therethrough, a roller having a surface adapted to engage and wind warp threads therearound, a blower pipe disposed on the other side of the warp threads remote from the roller and having nozzles for projecting streams of compressed air against the sheet of warp, a contact bar disposed adjacent the roller and having a plurality of spring contacts normally out of contact with the contact bar, means for driving the machine, means for driving the roller, means for forcing compressed air into the blower pipe, and means operable by a warp threads having less than normal tension therein in engaging the roller on account of the jets of air normally blowing the same toward the roller to wind the warp strand having sub-normal tension therein around the roller to cause it to contact one of the spring contacts to close an electrical circuit passing therethrough to thus stop the machine, and to stop the blower means and to stop the rotation of the roller and means for disconnecting the electrical circuit to the spring contact members when one of the same is depressed into contact with the fixed contact bar.

SHELTON J. THOMAS.

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