

Dec. 5, 1967

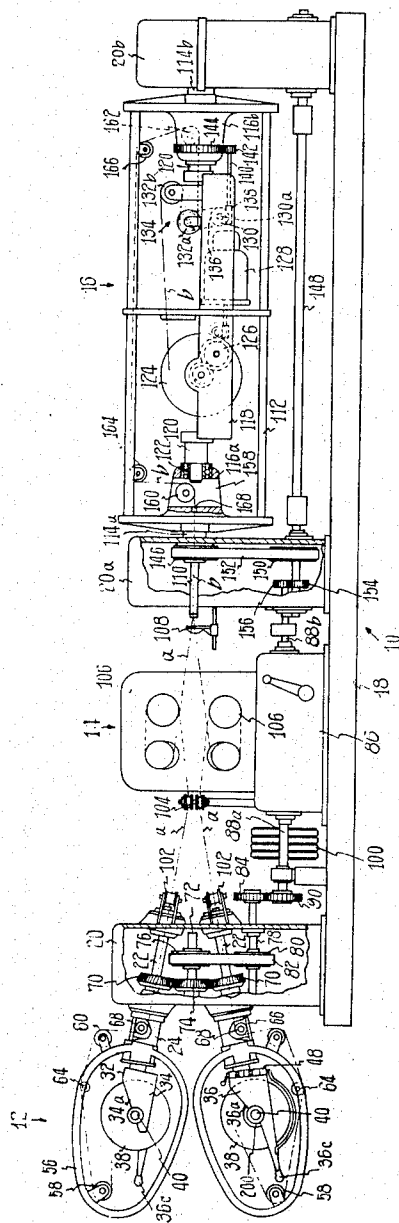
TOKUJI YOSHIDA
WIRE-TWISTING MACHINE

3,355,867

Filed March 15, 1965

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FIG-1



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Fig. 4

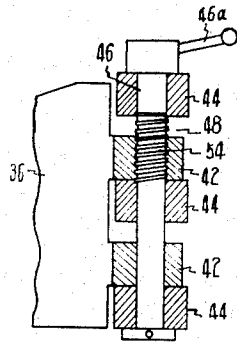


Fig. 5

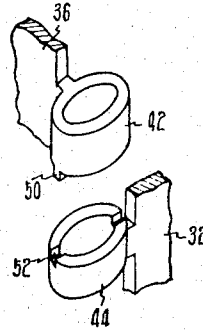
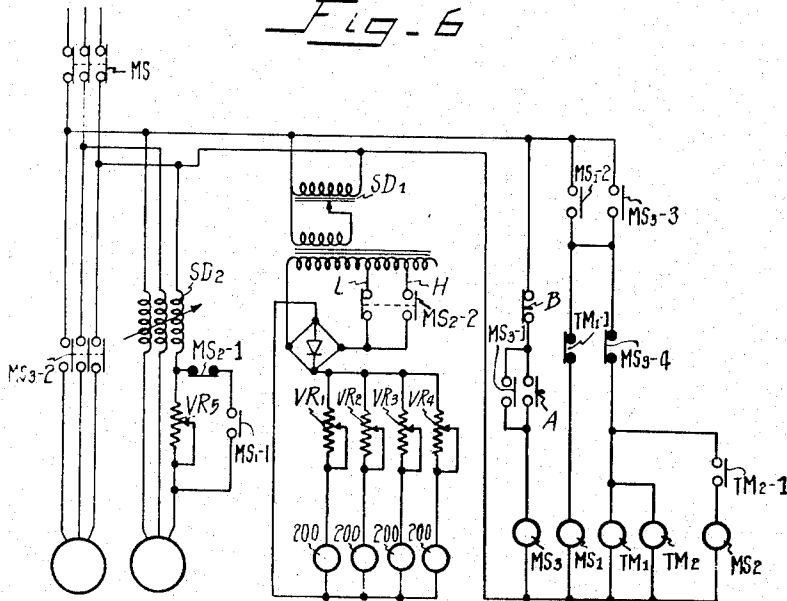


Fig. 6



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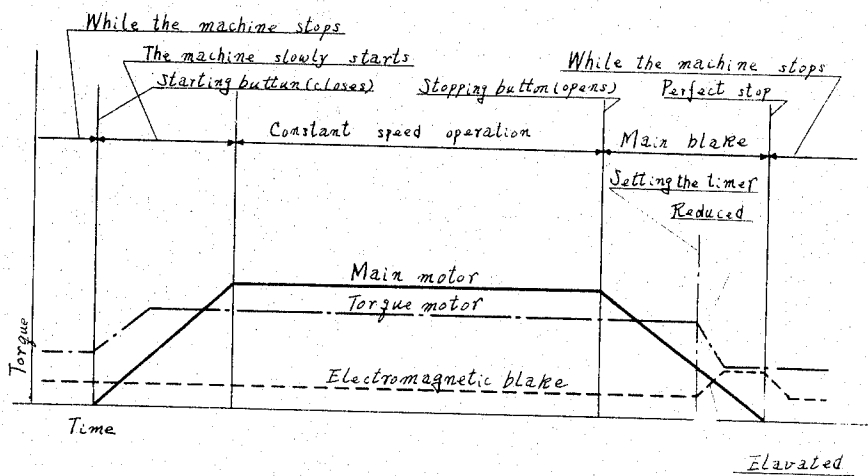
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Fig. 2



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WIRE-TWISTING MACHINE

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ABSTRACT OF THE DISCLOSURE

A wire-twisting apparatus including a plurality of double twisting delivery means in each of which a rotatable flier is positioned about a floating frame having a delivery bobbin whereby an element wire withdrawn from such bobbin may be double twisted per revolution of the flier by being withdrawn during rotation about the floating frame together with the flier along the flier and in which a double twisting winding means is such that a plurality of element wires withdrawn from the delivery means may be wound on a bobbin carried by a floating frame while being double twisted per revolution of a flier rotating about the floating frame during rotation about the floating frame along the flier.

This invention relates generally to twisted wire forming apparatus and more particularly to wire twisting machines to be used to manufacture communication cables and bare twisted wires by collecting and twisting coated element wires or bare wires together.

In a wire-twisting machine wherein, for example, four or seven delivery bobbins on which are wound element wires made in other machines or apparatus are set in parallel, the element wires are pulled from the respective delivery bobbins, collected together, then twisted with one another and wound on a winding bobbin. In order to improve the efficiency, it is desirable not only to increase the rotating speed of the rotating part but to also give the same result as if making the number of revolutions twice as large by giving two twists per revolution.

Further, in order to prevent an excess tension from being applied to element wires during the start and operation of a wire-twisting machine and prevent respective delivery bobbins from idling at the time of a sudden stop with the result that excess wires will be delivered to hang down, it is desirable to automatically adjust a braking pressure applied to the delivery bobbins and automatically adjust a winding torque applied to the winding bobbin according to the case.

Therefore, a first object of the present invention is to provide a wire-twisting machine wherein both of each delivery bobbin and a winding bobbin are mounted on respective floating frames and a rotary frame is set to rotate around each of said floating frames so that, when a wire is led along the periphery of said rotary frame, the wire may be double twisted per revolution of the rotary frame and further the weight of the rotary frame which is a rotating part is so small that its rotating speed may be increased.

An additional object of the present invention following the above mentioned object is to support said rotary frame as a cantilever in order to make the rotation of the rotary frame on the delivery side smooth and light.

A further object of the present invention is to make a supporting piece on one side of the floating frame supporting said delivery bobbin free to open and close sidewise so that the delivery bobbin may be easily and quickly fitted and removed.

A still further object of the present invention is to provide a device for preventing delivery bobbins from

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idling by using an electro-magnetic brake to brake the delivery bobbins so that, when the wire twisting machine stops, the exciting current to said electromagnetic brake may be large, the braking pressure increased and the idling of the delivery bobbin at the time of the stop thereby prevented.

Another object of the present invention together with the above mentioned objects is to provide a device for adjusting the torque of a winding torque motor wherein the torque motor is used as a winding torque source for the winding bobbin so that, only during the operation of the wire-twisting machine, a voltage to generate a fixed torque may be applied to the torque motor but, simultaneously with the stop of the operation, the restricting torque of said torque motor reduced and the elongation of the wire thereby prevented.

Another object of the present invention is to set a winding capstan in the winding apparatus together with an outside delivery capstan so that both capstans may be freely selectively used.

These objects and advantages of the present invention are accomplished by the provision of a newly improved wire-twisting machine wherein are used several delivery apparatus in each of which a supporting piece on one side of a floating frame on which is mounted a delivery bobbin is free to open and close with a hinge, a rotary frame supported as a cantilever being rotatably borne around said floating frame and an electromagnetic brake set to brake said delivery bobbin, a winding apparatus in which a rotary frame is rotatably borne around a floating frame on which is mounted a winding bobbin and a torque motor to impart a winding torque to the winding bobbin is set in the floating frame so that, when wires from the respective delivery bobbins are to be pulled by means of an outside capstan provided between the delivery apparatus and the winding apparatus or an inside capstan provided on the floating frame on the winding apparatus side, said wires may be pulled axially first along the rotary frame on the delivery apparatus side, thereby double twisted per revolution of said rotary frame, collected by a throttled die and then wound on the winding bobbin also along the rotary frame on the winding side and the collected wires double twisted per revolution of said rotary frame.

The rotary frames on the delivery side and winding side include driving means by which said rotary frames are respectively rotated around the stationary delivery bobbins and winding bobbin. Therefore, these rotary frames are much lighter than the conventional ones generally in wide use and rotated together with the delivery bobbins or winding bobbin, their rotating speed can be increased, the wound wires prevented from collapsing by centrifugal force acting on the delivery bobbins or winding bobbin and the winding of the collected wires on the bobbin easily inspected. Specifically, the rotary frame on the delivery side is supported as a cantilever so as to rotate smoothly and lightly.

Further, as the rotary frame on the delivery side is supported as a cantilever, in order to fit and remove the delivery bobbin easily, the supporting piece on one side of the floating frame on the delivery side is free to open and close with a hinge and includes a fixing means for fixing the same in a closed state so that, when the supporting piece is opened, the delivery bobbin may be fitted or removed and when closed, the delivery bobbin may be securely supported.

The electromagnetic brake for effecting a delivery bobbin braking force and the torque motor for imparting a winding torque to the winding bobbin include respective electric control circuits. The electric circuits are operated as operatively connected with starting and stopping buttons for the entire apparatus so as to respectively

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impart a fixed braking pressure and winding torque to the delivery bobbins and winding bobbin.

Further objects and advantages of the invention will become more readily apparent to persons skilled in the art from the following detailed specification and annexed drawings and in which drawings:

FIGURE 1 is an elevation of a wire-twisting machine embodying the present invention.

FIGURE 2 is a fragmentary plan view illustrating the parts of a delivery apparatus and an outside capstan.

FIGURE 3 is a view partly in elevation and partly in section illustrating a part of the delivery apparatus in detail, the view being on an enlarged scale.

FIGURE 4 is a partly in elevation and partly in section view of a hinge part of a floating frame in a delivery apparatus.

FIGURE 5 is an exploded perspective view illustrating a part of FIGURE 4 in detail.

FIGURE 6 is a control circuit diagram of an electromagnetic brake provided for the delivery bobbins and a torque motor connected to the winding bobbin.

FIGURE 7 is a graph showing the operation of the circuit in FIGURE 6.

In FIGURE 1 of the drawings is illustrated a wire-twisting machine embodying the present invention and denoted generally by reference numeral 10. The wire-twisting machine 10 comprises a delivery apparatus 12 for delivering a plurality of element wires, an outside capstan 14 for pulling the respective element wires from the delivery apparatus 12 and a winding apparatus 16 for winding the respective element wires pulled from the delivery apparatus 12 while collecting such wires twisted together.

In the delivery apparatus 12, as illustrated in FIGURES 2 and 3, four hollow shafts 22 are rotatably borne in a mount 20 fixed on a base plate 18 inclined at an angle so as to intersect with one another on their forward extensions. The hollow shaft 22 is provided with a step at the outer end projecting out of the mount 20 so as to form a sleeve part 24 of a large diameter. A supporting shaft 30 is rotatably set in said sleeve part 24 through ball bearings 26 and 28, and a floating frame 32 is fixed in the middle of the upper part of the rear end to the forward end of said supporting shaft 30. Inclined edges 34a and 36a are formed on both supporting pieces 34 and 36, respectively of said floating frame 32. Bearing recesses 34b and 36b are provided opposite each other in the middle parts of said inclined edges 34a and 36a, respectively. Such recesses are positioned below the axis of the supporting shaft 30 and both side shafts 40 of a delivery bobbin 38 on which is wound an element wire are removably mounted on said bearing recesses 34b and 36b so that the center of gravity of the floating frame 32 may be placed below the position of the axis of the supporting shaft 30 whereby the floating frame 32 may be stopped and supported irrespective of the rotation of the hollow shaft 22.

Further, the supporting piece 34 on one side of said floating frame 32 is integral with the floating frame but the supporting piece 36 on the other side is separate from the floating frame 32 as illustrated in FIGURES 4 and 5. A ring 42 is formed at the base end of said supporting piece 36. A ring 44 is formed on the side of the floating frame 32 complementary to said ring 42 and the rings 42 and 44 are aligned with each other. The supporting piece 36 is fitted to the floating frame 32 and a shaft 46 then inserted through said rings 42 and 44 so that the supporting piece 36 may be connected to the floating frame 32. This provides an arrangement free to open and close through a hinge 48 consisting of the rings 42 and 44. A projection 50 formed on the lower surface of the ring 42 fits into a groove 52 in the closed position of the ring 44. A screw part 54 is provided on a part of the shaft 46 and is screwed into the ring 42 whereby upon rotating said shaft 46 by a handle 46a formed at the upper part

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thereof, the supporting piece 36 may be moved up and down to remove and insert the projection 50 from and into the groove 52, respectively. When the projection 50 is thus removed from the groove 52, the supporting piece 36 can be freely opened and closed by a handle 36c at the forward end of the supporting piece 36. On the other hand, if the shaft 46 is rotated and lowered while the supporting piece 36 is kept closed, the projection 50 will fit in the groove 52 so that the supporting piece 36 may not freely open. Thus, in fitting and removing the delivery bobbin 38 to and from the floating frame 32, by opening the supporting piece 36 on one side of said floating frame 32, the fitting and removing operations can be easily and quickly performed. Further the part represented by a reference numeral 32a in FIGURE 3 is a mounting piece for temporarily supporting said delivery bobbin 38 in fitting or removing the bobbin into or from the floating frame 32. The mounting piece 32a is integral with the floating frame 32 so that, when the delivery bobbin 38 is to be removed, the delivery bobbin 38 may be prevented from dropping as soon as the supporting piece 36 is opened and, when the delivery bobbin is to be fitted, it may be placed on said mounting piece 32a and the supporting piece 36 closed.

Outside the floating frame 32 on which is hung the above mentioned delivery bobbin 38 is provided an oval shaped flier 56 surrounding the bobbin with a proper clearance as illustrated in FIGURE 3. The flier 56 is fixed in the center of the base part to the outside of the front end of the sleeve part 24 and rotates in unison with the hollow shaft 22. A pulley 58 is rotatably mounted within and adjacent the front end of the flier 56, and a pulley 60 on the outside near the base part of the flier on intermediate pulley 64 is supported with its peripheral edge at the outside rear end of a slot 62 in the flier 56. Further, an elongated opening 66 is made in the sleeve part 24 in the rear of the bearing part of the supporting shaft 30. In said elongated opening 66 is rotatably supported a pulley 68 with its peripheral edge on the axis of the hollow shaft 22. Thus, as shown in FIGURE 3, an element wire *a* payed forward from the delivery bobbin 38 passes out the pulley 58, through the slot 62, over the intermediate pulley 64, the pulley 60 and pulley 68, is passed through the hollow shaft 22 and pulled from the mount 20 through the rear end of the hollow shaft 22.

The four hollow shafts 22 rotate simultaneously at the same speed in the same direction. As illustrated in FIGURE 1, a gear 70 is secured to each hollow shaft 22 within the mount 20 and meshes with a gear 74 on a second intermediate shaft 72 in the mount 20. A belt 82 is trained on a pulley 76 fixed to said intermediate shaft 72 and a pulley 80 fixed to a first intermediate shaft 78 also mounted in the mount 20. The first intermediate shaft 78 projects from the mount 20, and a gear 84 is fixed on the projecting end of said shaft 78. The gear 84 meshes with a gear 90 fixed on an output shaft 88a of a reduction gear 86 provided on the base plate 18. Belts 100 are trained about a pulley 94 on an input shaft 92 of the reduction gear 86 and a pulley 98 operably related to motor 96 so that the operation of the motor 96 may be reduced by the reduction gear 86 and transmitted to each hollow shaft 22. The flier 56 fixed to said hollow shaft 22 is rotated around the delivery bobbin 38, stopped and hung by the floating frame 32 so that the element wire *a* from each delivery bobbin 38 may be twisted twice in the parts of the pulleys 58 and 60.

Each element wire *a* thus twisted twice is wound on rollers 106 of the outside capstan 14 through a pulley 102 provided on the rear surface of the mount 20 and a pulley 104 on the reduction gear 86. The rollers 106 are rotated in relation to the input shaft 92 so that each element wire *a* from the delivery apparatus 12 may be withdrawn. The respective element wires *a* are then led to a throttled die 108 on the mount 20a, collected therein and drawn into the winding apparatus 16 via the

center of the rotation through a hollow tube 110 passing through the mount 20a.

In said winding apparatus 16, as illustrated in FIGURE 1, a flier 112 is supported between mounts 20a and 20b on the base plate 18 so as to be rotatable with shafts 114a and 114b at both ends thereof. At both ends of said flier 112 are provided bearing parts 116a and 116b which are aligned with its center of rotation. Between each of the bearing parts 116a and 116b is supported by a ball bearing 122 a shaft 120 provided near the upper part of each end of a floating frame 118. Said floating frame 118 has its center of gravity placed below the position of the axis of the shaft 120 so as to always be supported in a stationary manner irrespective of the rotation of the flier 112. Within said floating frame 118, a winding bobbin 124 is removably supported and a torque motor 128 operably connected with said winding bobbin 124 through a gear train 126 is set so that a torque in the winding direction is always imparted to the winding bobbin 124 by said torque motor 128. An inside capstan 134 consisting of a driving roller 130 and guide rollers 132a and 132b is supported by supporting pieces. A worm wheel 136 is fixed to a shaft 130a of the driving roller 130. An operably connecting shaft 140 having at one end a worm 138 meshing with said worm wheel 136 is supported in the floating frame 118. Said connecting shaft 140 projects at the other end from the floating frame 118 and a gear 142 is fixed to the projecting end of said shaft 140. The gear 142 meshes with a gear 144 formed on the outer periphery of the bearing part 116b of the flier 112 so that when the flier 112 rotates, the rotation of the gear 144 rotating in unison with said flier 112 may be transmitted to the driving roller 130 through the gear 142, shaft 140, worm 138 and worm wheel 136 for rotating the driving roller 130 in the winding direction. Further, in order to impart a rotary motion to said flier 112 within the mounts 20a and 20b, a pulley 146 is fixed to each of the shafts 114a and 114b on both sides of the flier 112. A pulley 150 is fixed to each side of a power transmitting shaft 148 supported between the mounts 20a and 20b with the pulley 150 being opposite the pulley 146. A belt 150 is trained over said pulleys 146 and 150 and a gear 154 secured to one end of the shaft 148 meshes with a gear 156 fixed to the end of another output shaft 88b of reduction gear 86 so that the rotation of the motor 96 may be transmitted to the fliers 56 of the delivery apparatus 12 from the output shaft 88a of the reduction gear 86 and also to the flier 112 of the winding apparatus 16 from the output shaft 88b of the reduction gear 86 to rotate said flier 112. A through hole 158 is provided in each of the bearing parts 116a and 116b of the flier 112.

It will be noted that pulleys 160 and 162 positioned through each hole 158 in the parts 116a and 116b, respectively and pulleys 164 and 166 located on each side of the flier 112 coast so that collected wires *b* leaving the tube 110 pass through a central orifice 168, about pulley 160, over pulleys 164 and 166, the pulley 162, the guide roller 132a, guide roller 132b and wound on the bobbin 124. Meanwhile, the flier 112 is rotated so that the collected wires *b* may be twisted twice in the parts of the pulleys 160 and 162.

In thus winding on the winding bobbin 124 the respective element wires *a* from the delivery bobbins 38 while collecting and twisting the same together, in order to feed the collected wires *b* of said element wires *a*, there are provided two outside capstans 14 and inside capstans 134. However, either of the capstans 14 and 134 may be selectively used according to the operating conditions or if necessary both may be simultaneously used.

In the case of performing an operation of twisting electric wires in the above apparatus, if the delivery bobbin 38 is merely supported in the floating frame 32, the bobbin 38 will rotate too much due to its inertia dur-

ing the operation and, as a result, the element wire *a* withdrawn from the delivery bobbin 38 will be likely to hang downwardly during its travel. Therefore, generally a braking pressure is applied to the delivery bobbin so that a constant tension is given to the element wire *a* withdrawn from each delivery bobbin. However, if the braking pressure to be applied to the delivery bobbin 38 is too high, the tension applied to the element wire *a* will be too great. Therefore, it cannot be made too high. If the entire apparatus is suddenly stopped and the operation arrested, the delivery bobbin 38 will idle due to its inertia and an excess element wire *a* will be likely to be delivered. On the other hand, if a fixed torque is always applied to the winding bobbin 124 via the torque motor 128 during the operation and if the operation is stopped, the electric charge as existing during the operation is applied to the torque motor 128 to prevent the winding bobbin 124 from reversing and the collected wires *b* and the element wires *a* from hanging downwardly, the torque of said torque motor 128 will be too large resulting in elongation of the wires.

Therefore, each delivery bobbin 38 is provided with an electro-magnetic brake 200 wired with the torque motor 128 and the motor 96 as shown in FIGURE 6. More specifically the braking pressure of the electromagnetic brake 200 to be applied to each delivery bobbin is adjustable simultaneously throughout by adjusting a component SD₁, SD, or individually by separately adjusting variable resistances VR₁ to VR₄. Further, the torque of the torque motor 128 is also made freely adjustable by adjusting a component SD₂ as shown in FIGURE 6. On the other hand, a variable resistance VR₅ inserted in one line of said torque motor 128 and in parallel with the variable resistance VR₅ is connected in a series circuit of a contact MS₁-1 to be closed by the energization of a magnetic switch MS₁ and a contact MS₂-1 to be opened by the energization of a magnetic switch MS₂. Further, the magnetic switch MS₁ is so made as to close not only the contact MS₁-1 but also the contact MS₁-2 when it is energized. On the other hand, the magnetic switch MS₂ is also so made as to open the contact MS₂-1 and switch a voltage changing switch MS₂-2 of the electromagnetic brake 200 from a low voltage side L to a high voltage side H when it is energized. A magnetic switch MS₃ has in series in its circuit a starting switch A opened in the normal state and a stopping switch B closed in the normal state. In parallel with said starting switch A is connected a contact MS₃-1 to be closed when the magnetic switch MS₃ is energized so that, even if the magnetic switch MS₃ is energized by closing the starting switch A and then the starting switch A is released, the magnetic switch MS₃ remains energized until the stopping switch B is opened through the contact MS₃-1 closed by the energization of the magnetic switch MS₃. Said magnetic switch MS₃ is so made as to close not only the contact MS₃-1 in a self-holding circuit but also a main contact MS₃-2 of the motor 96 and at the same time close a contact MS₃-3 and open a contact MS₃-4 when it is energized. Further, said circuit included two timer relays TM₁ and TM₂. Although electricity is simultaneously passed through both timer relays TM₁ and TM₂ in a fixed time after the electricity is passed, the timer relay TM₂ will first operate and, by the energization of said timer relay TM₂, its contact TM₂-1 will be closed and the magnetic switch MS₃ will be operated. On the other hand, following in the same manner in a fixed time, the timer relay TM₁ operates and, by the energization of said timer relay TM₁, a contact TM₁-1 will open.

Therefore, as shown in FIGURE 6, when an electric source switch MS is closed, an electric current will be fed to the torque motor 128 with the variable resistance VR₅ inserted in one line of the motor, so said torque motor 128 will generate a torque lower than a fixed torque and an exciting current to generate a fixed braking pressure will be fed to the electromagnetic brake 200

through the voltage changing switch MS₂-2 switched to the low voltage side L. Here, if the starting switch A is closed, the magnetic switch MS₃ will be energized, the contact MS₃-1 closed and the magnetic switch MS₃ will be self-held. On the other hand, by the energization of said magnetic switch MS₃, the main contact MS₃-2 will be closed, the motor 96 will start and at the same time the contact MS₃-3 will close and the contact MS₃-4 will open. When said contact MS₃-3 closes, the magnetic switch MS₁ will operate through the contact TM₁-1, the contact MS₁-2 will close, the self-holding circuit of said magnetic switch MS₁ will close, the contact MS₁-1 will also close at the same time, and a by-pass circuit connected in parallel with the variable resistance VR₅ inserted in one line of the torque motor 128 will be closed, with the restricted torque of the torque motor 128 being increased to generate a fixed torque. Hence, during the operation, in this condition, the braking pressure of the electromagnetic brake 200 will be kept at a fixed low value and the winding torque of the torque motor 128 at a fixed high value.

Then, when the stopping switch B is pushed and opened to terminate or stop the operation, the magnetic switch MS₃ will be deenergized, the contact MS₃-1 will open, its self-holding circuit broken, the main contact MS₃-2 will also open, the passage of electricity to the motor 96 will be interrupted, and at the same time the contact MS₃-3 will open, the contact MS₃-4 will close so that electricity passes through the timer relays TM₁ and TM₂ through the contact MS₁-2. When electricity is thus passed through the timer relays TM₁ and TM₂ in a fixed time, the timer relay TM₂ will operate to close the contact TM₂-1, with the magnetic switch MS₂ being energized to open the contact MS₂-1. The voltage changing switch MS₂-2 will be switched from the low voltage side L to the high voltage side H, whereby the torque motor 128 will return to the state in which the variable resistance VR₅ is inserted in one line thereof, and the produced torque will be reduced to the low value existing prior to starting. On the other hand, a high voltage current will be fed to the electromagnetic brake 200 through the voltage changing switch MS₂-2 switched to the high voltage side H and, as a result, the braking pressure of the electromagnetic brake 200 will quickly rise. Then, the timer relay TM₁ will operate also in a fixed time to open the contact TM₁-1. When the contact TM₁-1 is thus opened, the magnetic switch MS₁ will be de-energized and the contacts MS₁-1 and MS₁-2 will open. When said contact MS₁-2 opens, the magnetic switch MS₂ and timer relays TM₁ and TM₂ will be also de-energized. When the magnetic switch MS₂ is thus de-energized, the contact MS₂-1 will be closed and the voltage changing switch MS₂-2 will be switched from the high voltage side H to the low voltage side L so that the braking pressure of the electromagnetic brake 200 will be returned to a fixed low value. On the other hand, when the timer relays TM₁ and TM₂ are de-energized, the contact TM₁-1 will be closed, the contact TM₂-1 opened and the initial state will exist. The above operation can be graphed as in FIGURE 7.

The invention is not to be confined to any strict conformity to the showings in the drawings but changes or modifications may be made therein so long as such changes or modifications mark no material departure from the spirit and scope of the appended claims.

What is claimed is:

1. A wire communication cable and rope twisting machine comprising a plurality of double twisting delivery apparatus in each of which a rotatable flier is positioned around a floating frame carrying a delivery bobbin so that an element wire withdrawn from said delivery bobbin may be double twisted per revolution of the flier by being withdrawn while being rotated around the floating frame together with said flier along the flier and a double twisting winding apparatus so made that a plurality of element

wires withdrawn from said delivery apparatus may be wound on a winding bobbin carried by a floating frame while being twisted double per revolution of a flier rotating around the floating frame by being rotated around the floating frame along said flier, an outside capstan positioned between the delivery apparatus and the winding apparatus, and inside capstan located within said floating frame of said winding apparatus capable of selective and simultaneous use.

2. The twisting machine according to claim 1 having delivery apparatus in each of which the floating frame is rotatably supported with a supporting shaft at the front end of a hollow shaft rotatably supported in a mount and the center of gravity of said floating frame being positioned below the rotating axis of the floating frame so that, even when the hollow shaft rotates, the floating frame may be kept stationary and the flier fixed in the base part to the hollow shaft and supported as a cantilever being formed to surround said floating frame so that an element wire withdrawn from the delivery bobbin carried by the floating frame may be led rearward along one side of the flier from the front of said flier and withdrawn through the hollow shaft.

3. The delivery apparatus supported as a cantilever according to claim 2 wherein a supporting piece on one side of the floating frame is free to open and close by means of a hinge.

4. A wire communication cable and rope twisting machine comprising a plurality of double twisting delivery apparatus in each of which a rotatable flier is positioned around a floating frame carrying a delivery bobbin so that an element wire withdrawn from said delivery bobbin may be double twisted per revolution of the flier by being withdrawn while being rotated around the floating frame together with said flier along the flier and a double twisting winding apparatus so made that a plurality of element wires withdrawn from said delivery apparatus may be wound on a winding bobbin carried by a floating frame while being double twisted per revolution of a flier rotating around the floating frame by being rotated around the floating frame along said flier, an electromagnetic brake to brake the delivery bobbin so that at the time of starting and during the operation, a required exciting current may be made to flow to apply a fixed braking pressure, a timer, and, when the operation is stopped, in a fixed time, a voltage changing switch may be automatically switched through said timer to increase the exciting current and temporarily increase the braking pressure.

5. A wire communication cable and rope twisting machine comprising a plurality of double twisting delivery apparatus in each of which a rotatable flier is positioned around a floating frame carrying a delivery bobbin so that an element wire withdrawn from said delivery bobbin may be double twisted per revolution of the flier by being withdrawn while being rotated around the floating frame together with said flier along the flier and a double twisting winding apparatus so made that a plurality of element wires withdrawn from said delivery apparatus may be wound on a winding bobbin carried by a floating frame while being double twisted per revolution of a flier rotating around the floating frame by being rotated around the floating frame along said flier, a torque motor constituting a winding torque generating source for the winding bobbin, a timer, a resistance inserted in one line of said torque motor and a by-pass circuit having a contact in parallel with said resistance connected so that during the operation the contact of said by-pass circuit may be closed and an electric charge to generate a fixed torque may be applied to the torque motor and that, when the operation is stopped, in a fixed time, the contact of the by-pass circuit may automatically open through the timer and the restricted torque of the torque motor may be thereby reduced.

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