

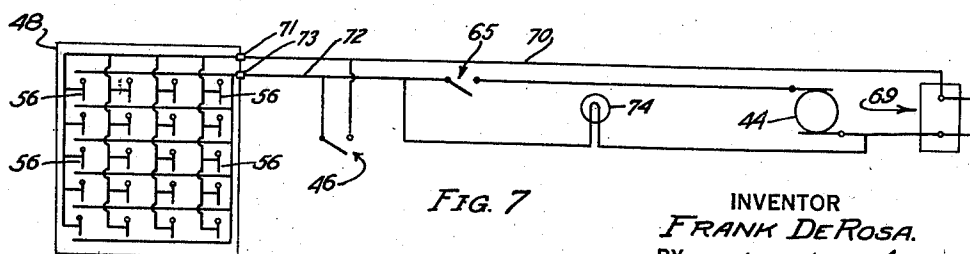
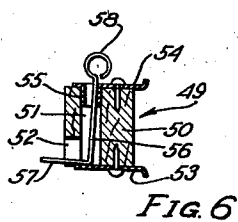
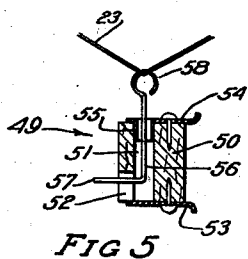
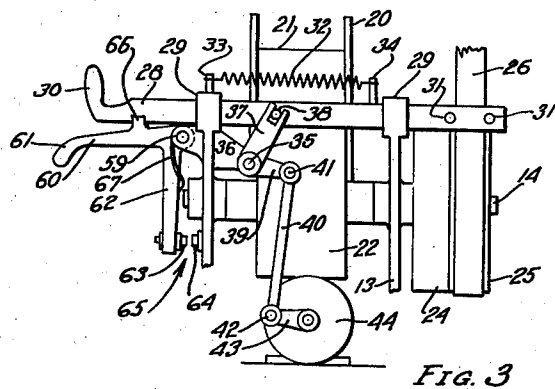
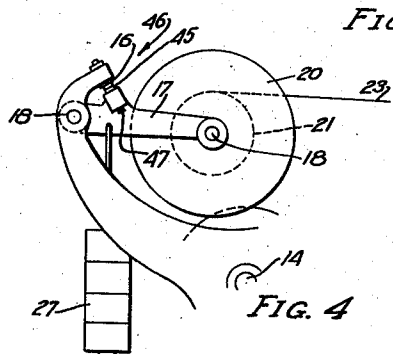
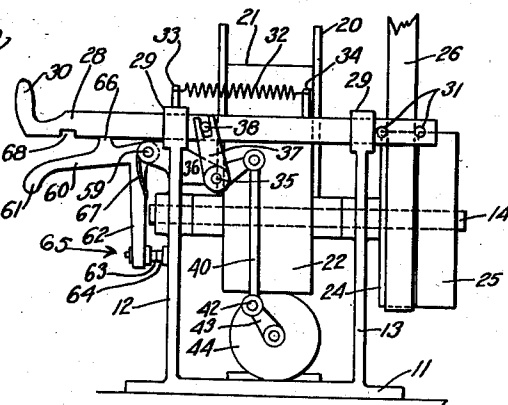
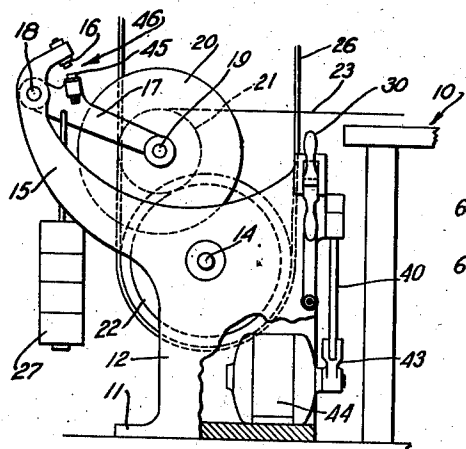
July 13, 1937.

F. DE ROSA

2,086,901

WARPING MACHINE CONTROL

Filed Feb. 4, 1936



INVENTOR
FRANK DE ROSA.
BY *John F. Kaurah*
ATTORNEY

UNITED STATES PATENT OFFICE

2,086,901

WARPING MACHINE CONTROL

Frank De Rosá, Bridgeport, Conn.

Application February 4, 1936, Serial No. 62,258

10 Claims. (Cl. 28—51)

This invention relates to new and useful improvements in warping machines and has particular relation to automatic control means for such machines.

5 An object of the invention is to provide means for attachment to existing machines or to be built into new machines and which means includes a normally inoperative motor and means to close a circuit to said motor to have it act to stop the machine when a thread breaks or when the desired amount of material has been wound onto a beam and which also includes means to stop the motor when it has done its work.

10 Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein a satisfactory embodiment of the invention is shown. However it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawing:—

15 Fig. 1 is an end view with part of a supporting frame broken away and showing an apparatus constructed according to the present invention;

Fig. 2 is a view taken at right angles to Fig. 1, and showing the parts in the positions occupied by them when the machine is in operation;

20 Fig. 3 is a view similar to Fig. 2 but showing the parts in the positions occupied by them when the machine has been automatically stopped;

Fig. 4 is a detail elevational view showing the closing of a switch employed;

25 Fig. 5 is a sectional view showing another switch in its normally open position;

Fig. 6 is a similar view showing the switch of Fig. 5 closed; and

30 Fig. 7 shows the wiring diagram.

Referring in detail to the drawing a portion of a table-like structure commonly employed in machines of this type is shown at 10. At one side of said table there is arranged a mechanism including a supporting structure comprising a base 11 and uprights 12 and 13 which latter mount a drive shaft 14 and either or both include an upwardly directed extension 15 the upper end of one of which carries a contact 16. Arms 17 have their upper or outer ends pivoted to the extensions 15 at 18 and at their lower or inner ends such arms mount a spindle or rod 19 carrying a warp beam 20 which when empty has its hub portion 21 resting on a driving wheel 22 fixed to the shaft 14. The above is a more or less

common arrangement and the threads 23 are fed from spools mounted in suitable racks and are wound on to the beam 20 as the latter is rotated.

On the shaft 14 is a fixed pulley 24 and a loose pulley 25 and when the belt 26 is in the position of Fig. 2 it will through the pulley 24 serve to drive the shaft 14 and thus the wheel 22. As the threads are wound on the beam 20 they build up the diameter of the hub of the latter and the beam is driven due to the frictional engagement of the material being wound on the beam with the periphery of the wheel 22. Weights 27 are suspended from the arms 20 and serve to keep the beam and the threads being wound thereon in engagement with the wheel 22 but it will be understood that as the threads build up on the reel, increasing the diameter of its hub, the reel may move vertically since the arms 17 may swing about their pivots 18, as from the position of Fig. 1 to that of Fig. 4.

A bar 28 is slidably mounted in bearing-like portions 29 of the members 12 and 13 and such bar is adapted for longitudinal movement through said portions and at one end is provided with a handle 30 and adjacent its other end with a pair of pins 31 arranged one at each side edge of the belt 26. A coil spring 32 has one end anchored to a pin 33 on one of the bearing-like portions 29 and has its other end secured to a pin 34 fixed to the bar 28. The normal tendency of this spring is to maintain the bar 28 in the position of Fig. 2 with the belt 26 driving the fixed pulley 24. With the parts in this position the beam 20 is being rotated and threads are being wound thereon.

A bell-crank is pivoted at 35 to bracket 36 and an arm 37 of such bell-crank has its outer end bifurcated to receive a pin 38 rigid with the bar 28. To the outer end of the arm 39 of the bell-crank the upper end of a link 40 is pivotally connected at 41 and the lower end of such link is pivotally connected at 42 with one end of an arm 43 adapted to be moved by a motor 44. Any suitable or necessary gearing (not shown) may be included between the motor and the arm 43.

The circuit to the motor will later be described but here it will be noted that on the motor being energized the arm 43 is shifted from the position of Fig. 2 to that of Fig. 3 whereby the link 40 is drawn downwardly rocking the bell-crank in a clock-wise direction whereby the bell-crank through its connection with the pin 38 slides the bar 28 in opposition to the spring 32. This results in the belt 26 being shifted from the pulley

24 on to the pulley 25 so that the machine is stopped.

Contact 16 cooperates with a contact 45 and both comprise parts of a switch generally designated 46 and it will be understood that while the machine is in operation the contacts 16 and 45 are spaced apart so that the switch 46 is open. When a predetermined amount of thread has been wound on the beam 20 the arms 17 have moved upward to the extent necessary to have contact 45 engage contact 16 whereby the circuit to the motor 44 is closed and the latter being energized arm 43 is swung down from the position in Fig. 2 to that of Fig. 3 whereby bar 28 is shifted to carry the belt 26 off the pulley 24.

The contact 45 is preferably adjustable toward and from the contact 16 so as to close the circuit at any desired predetermined time which time may be when the beam 20 is full or when a lesser quantity of thread is on the beam. To the desired end the contact 45 is carried by an adjustable screw 47. It will be now understood that the switch 46 on closing the circuit to the motor 44 will bring about stopping of the machine when a predetermined quantity of threads (depending on the adjustment of contact 45) has been wound on the spool.

The threads being wound on the beam 20 vary in number depending on the fabric to be ultimately produced and such threads are taken from spools (not shown) mounted on suitable racks one of which is diagrammatically shown at 48 in Fig. 7. Mounted on the racks or otherwise suitably located and associated one with each thread are switches 49 each as shown in Figs. 5 and 6 including an insulating body 50 having a vertically disposed opening 51 therein and each in a lower portion of one wall having a slot 52 entering said opening.

A contact 53 extends across the lower end of the opening 51 while a contact 54 has a sleeve-like portion 55 disposed in the upper end of said opening. Extending into the opening 51 is a pin 56 having its lower portion 57 bent to extend laterally out through the slot 52 and having its upper portion bent into an open ring or hook-like portion 58.

Each thread being wound on the beam passes through one of the rings 58 and, while that thread is being wound on the beam, supports the pin 56 in the position of Fig. 5 where such pin is out of engagement with both of the contacts 53 and 54. On a thread 23 breaking its pin 56 drops to the position of Fig. 6 engaging both of the contacts 53 and 54 thereby closing the circuit to the motor 44 whereupon the latter acts to slide the bar 28 against the action of the spring 32 shifting the belt from the driving pulley 24 to the loose pulley 25 and thereby stopping the machine.

A bell-crank pivoted at 59 includes an arm 60 the outer end of which is shaped to provide a handle 61 and also includes an arm 62 carrying a contact 63 normally engaging a contact 64 whereby the switch 65 including said contacts is normally closed. The bell-crank arm 60 carries a lug 66 normally engaging the bar 28 owing to the fact that a spring 67 is constantly tending to rock the bell-crank in a clock-wise direction. However, when the bar 28 is in normal position the engagement of the lug 66 with the underside of said bar prevents the spring 67 from moving the bell-crank in a manner to carry contact 63 away from contact 64.

In the underside of the bar 28 there is a notch

68 so located that when the bar has been moved to shift the belt 26 to stop the machine such notch is opposite the lug 66 and the spring 67 rocks the bell-crank about its pivot 59 causing the lug 66 to enter the notch 68. As the bell-crank is so moved at the end of the belt shifting operation contact 63 is moved away from contact 64 opening the circuit to the motor 44 whereby the latter is stopped and as the lug remains in the notch 68 the bar 28 is locked against a return movement to normal position under the urging of spring 32. On the handle portion 61 being depressed lug 66 is carried out of notch 68 so that the spring 32 may move the bar 28 to shift the belt back onto the pulley 24 thereby starting the machine and at the same time contact 63 is returned to engagement with contact 64 thus closing the switch 65.

Referring now particularly to Fig. 7 the main switch is designated 69 and from it a wire 70 extends to a detachable connector 71 on the rack 48 while a line 72 from a similar connector 73 also on the rack extends back to the switch 69. In this line 72 the motor 44 is inserted as is the switch 65 while the switch 46 is arranged to close a circuit between the wires 70 and 72. Since the switch 65 is normally closed it will be apparent that on a thread breaking its pin will drop down to the position of Fig. 6 closing the circuit through the motor 44.

Also on the beam being filled to a predetermined extent the switch 46 will be closed to close the circuit to the motor. Obviously switches 46 and 49 are in parallel and are independent of one another in so far as the closing of the circuit to the motor is concerned. When the motor is energized by the closing of switch 46 or of a switch 49 it shifts the bar 28 as above explained and when the bar has moved sufficiently to shift the belt 26 to stop the machine the switch 65 is opened breaking the motor circuit and at the same time the lug 66 enters the notch 68 locking the bar 28 in its shifted position.

If the machine has been stopped by closing of the switch 46 the filled beam is replaced by an empty beam and the operator presses down on the handle 61 whereupon spring 32 returns bar 28 to normal position starting the machine. If the machine has been stopped because of the breaking of a thread the operator repairs the thread by tying together its broken ends and then by engaging the projecting portion 57 of the pin 56 of the broken thread he raises such pin up to a position where the repaired thread may be conveniently engaged in the hook 58. This projecting end 57 of the pin 56 being disposed through the slot 52 prevents the pin from moving entirely out of the body 50 and also prevents turning of the pin about its longitudinal axis.

After the broken ends of the thread have been tied together and the switch 49 reset the machine does not start up automatically but is then in condition to start on the operator depressing the handle 61. If desired a signal in the form of a light 74 may be incorporated in the circuit so as to be energized on energizing of the motor 44. This may be an audible signal if desired but it is in parallel with the motor and remains energized after the motor has been stopped due to opening of the switch 65. The detachable connections 71 and 73 are provided since at various times different racks 48 are used with the same warping machine. It is to be understood that while the warping machine is shown as equipped to

handle but one beam this is for the purpose of keeping the drawing simple as possible it being recognized that normally a warping machine handles several beams simultaneously.

5 Having thus set forth the nature of my invention, what I claim is:—

1. In a warping machine, a driving shaft, driving and loose pulleys on said shaft, a belt selectively engageable with each of said pulleys and normally operating said driving pulley, swingable arms mounting a warp beam for rotation, means on said shaft and normally rotating said beam, a belt shifter operable to shift said belt from the driving pulley to the loose pulley to stop operation of the machine, a motor for operating said belt shifter to stop the machine, means to close a circuit to said motor on the breaking of a thread, means to close a circuit to the motor on the filling of said beam to the desired extent, and means to open the circuit to the motor on the latter completing the belt shifting operation.

2. In a warping machine, a driving shaft, driving and loose pulleys on said shaft, a belt selectively engageable with each of said pulleys and normally operating said driving pulley, swingable arms mounting a warp beam for rotation, means on said shaft and normally rotating said beam, a belt shifter operable to shift said belt from the driving pulley to the loose pulley to stop operation of the machine, a motor adapted when energized to operate the belt shifter to stop the machine, means to close a circuit to said motor on the breaking of a thread being wound on the beam, and means to open the circuit to the motor on the latter completing the belt shifting operation.

3. In a warping machine, a driving shaft, driving and loose pulleys on said shaft, a belt selectively engageable with each of said pulleys and normally operating said driving pulley, swingable arms mounting a warp beam for rotation, means on said shaft and normally rotating said beam, a belt shifter operable to shift said belt from the driving pulley to the loose pulley to stop operation of the machine, a motor adapted when energized to operate the belt shifter to stop the machine, adjustable means to close a circuit to said motor on the filling of said beam to the desired extent, and means to open the circuit to the motor on the latter completing the belt shifting operation.

4. In a warping machine, a driving shaft, driving and loose pulleys on said shaft, a belt selectively engageable with each of said pulleys and normally operating said driving pulley, a rotatable warp beam, means on the shaft and normally rotating said beam, a belt shifter operable to shift the belt from the driving to the loose pulley to stop operation of the machine, a motor adapted when energized to operate the belt shifter to stop the machine, means to close a circuit to the motor on each of the breaking of a thread and the filling of the beam to the desired extent, means to open said circuit on the shifter completing the belt shifting operation, means to lock the shifter in the position into which it is shifted by the motor and manually operable to release the shifter, and a spring to return the shifter and belt to normal position on release of said means.

5. In a warping machine, a driving shaft, driving and loose pulleys on said shaft, a belt selectively engageable with each of said pulleys and normally operating said driving pulley, a rotatable warp beam, means on the shaft and nor-

mally rotating said beam to wind threads thereon, a belt shifter operable to shift the belt from the driving to the loose pulley to stop operation of the machine, a normally open electric circuit, a motor in said circuit and adapted when energized to operate the belt shifter to stop the machine, means to close the circuit on the breaking of a thread and means to close the circuit on the filling of the beam to the desired extent, a normally closed switch in said circuit, means whereby said switch is opened as the motor completes shifting of the shifter whereby the motor is stopped, means to lock the shifter in the position to which it is shifted by the motor, a spring normally tending to return the shifter and the belt to normal position, and means whereby said normally closed switch is again closed on release of said locking means.

6. In a warping machine, a driving shaft, driving and loose pulleys on said shaft, a belt selectively engageable with each of said pulleys and normally operating said driving pulley, a rotatable warp beam, means on the shaft and normally rotating said beam to wind threads thereon, a belt shifter operable to shift the belt from the driving to the loose pulley to stop operation of the machine, a normally open electric circuit, a motor in said circuit and adapted when energized to operate the belt shifter to stop the machine, a normally open switch means operable to close said circuit on the breaking of a thread being wound on said beam, a normally closed switch in said circuit, means whereby the last switch is opened as the motor completes the shifting of the shifter whereby the motor is stopped, means to lock the shifter in the position to which it is shifted by the motor, a spring to return the shifter when released, and means whereby releasing the locking means causes closing of normally closed switch.

7. In a warping machine, a rotatable warp beam, means including a driving and a loose pulley arrangement for driving said beam, a belt normally engaging said driving pulley, a belt shifter operable to move the belt from the driving to the loose pulley to stop the machine, a normally open electric circuit, a motor in said circuit and adapted when energized to operate the belt shifter to stop the machine, a normally open switch means operable to close said circuit on the filling of the beam to a predetermined extent, said switch means adjustable whereby to close the circuit on any desired predetermined amount of thread being wound on the beam, a normally closed switch in said circuit, means whereby said switch is opened as the motor completes the shifting of the shifter whereby the motor is stopped, means to lock the shifter in the position to which it is shifted by the motor, a spring normally tending to return the shifter and the belt to normal positions, and means whereby said normally closed switch is again closed on release of the locking means.

8. In a warping machine, a rotatable warp beam, means including a driving and a loose pulley arrangement for driving said beam, a belt normally engaging said driving pulley, a belt shifter operable to move the belt from the driving to the loose pulley to stop the machine, a normally open electric circuit, a motor in said circuit and adapted when energized to operate the belt shifter to stop the machine, means to close the circuit at predetermined times, a normally closed switch in said circuit, means whereby said switch is opened as the motor completes

the shifting of the shifter whereby the motor is stopped, means to lock the shifter in the position to which it is shifted by the motor, a spring to return the shifter to normal position when released, means closing the normally closed switch on release of the locking means, and a signal in circuit parallel with the motor and normally closed switch whereby to be energized as the motor starts and remain energized until the first circuit closing means is returned to normal condition.

9. In a warping machine, power means therefor, controlling means for said power means,

swingable arms mounting the warp beam for rotation, means to normally rotate said beam, a motor adapted when energized to actuate said controlling means to stop the machine, means to close a circuit to said motor on the breaking of a thread being wound on the beam, and means to open the circuit to the motor after the latter operates to stop the machine.

10. In a warping machine according to claim 9, means to close a circuit to said motor upon the filling of said beam.

FRANK DE ROSA.