May 23, 1933. W. J. SCOTT 1,911,000

CLUTCH CONTROL FOR TWISTING FRAMES

Filed July 29, 1932 2 Sheets-Sheet 1

Fig. 1.

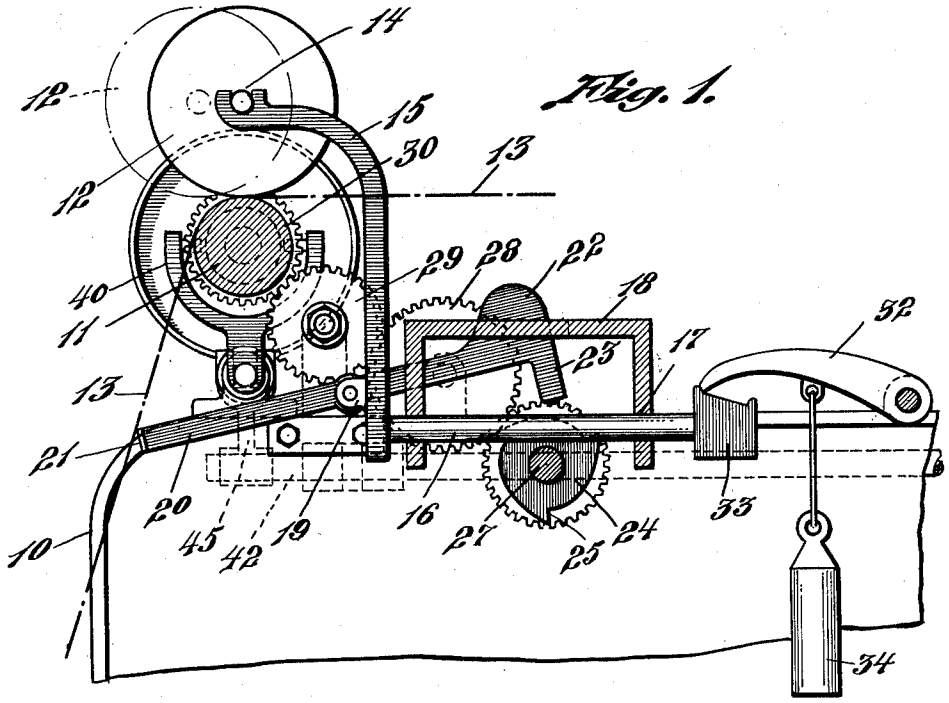
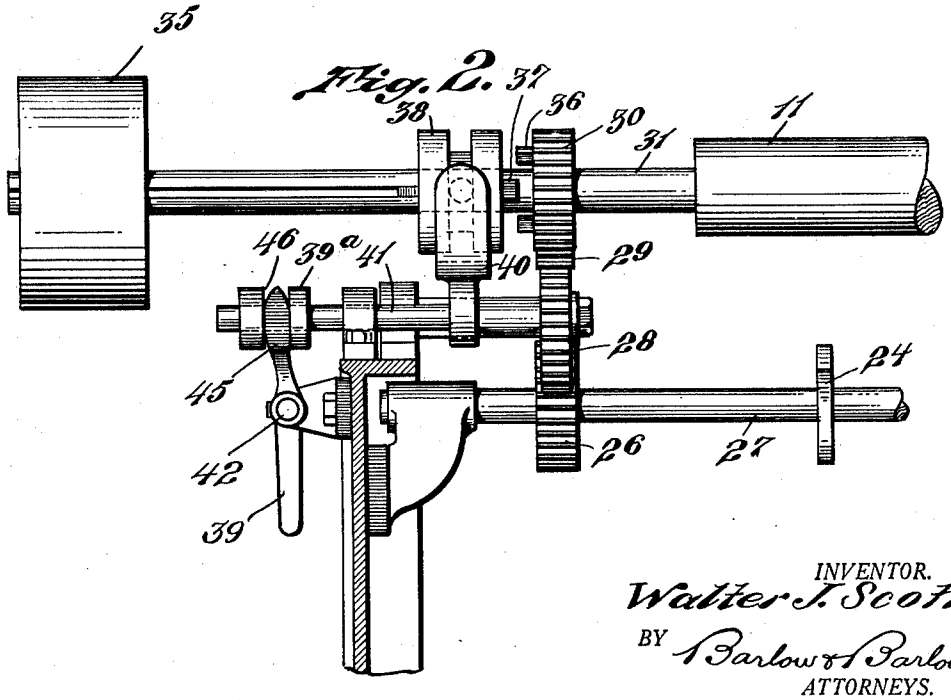


Fig. 2.



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Fig. 3.

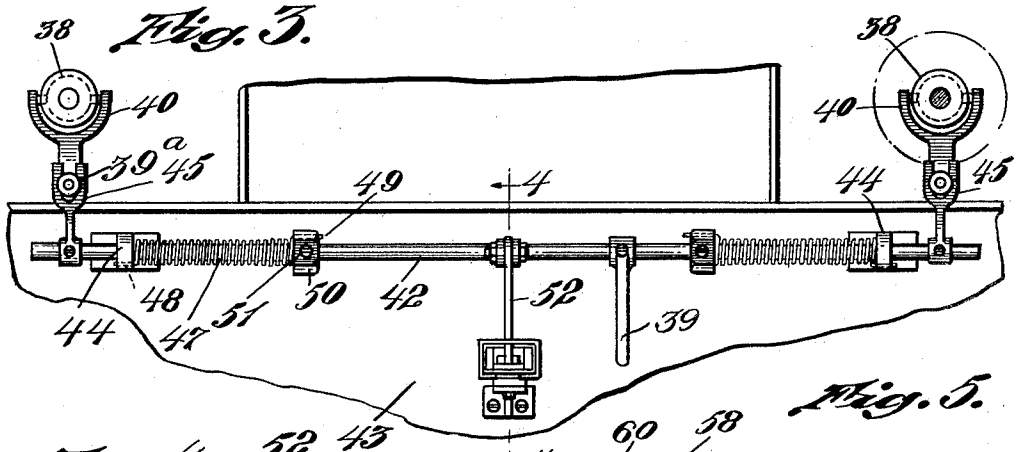


Fig. 4.

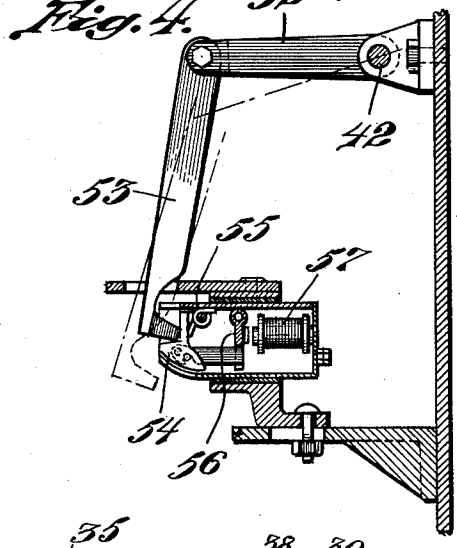
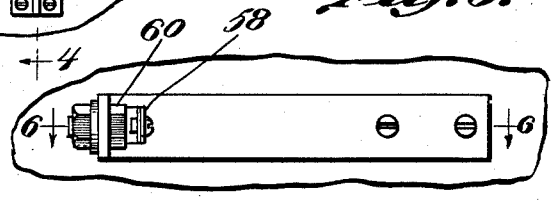


Fig. 5.



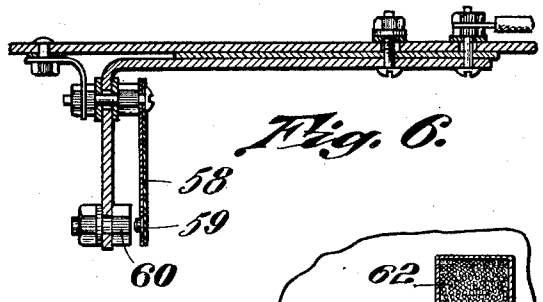
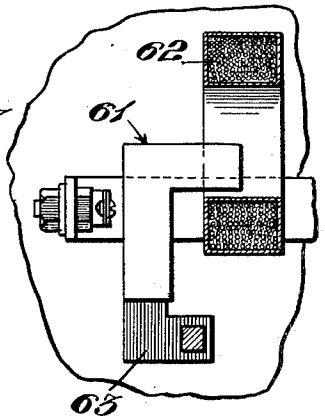


Fig. 6.

Fig. 7.



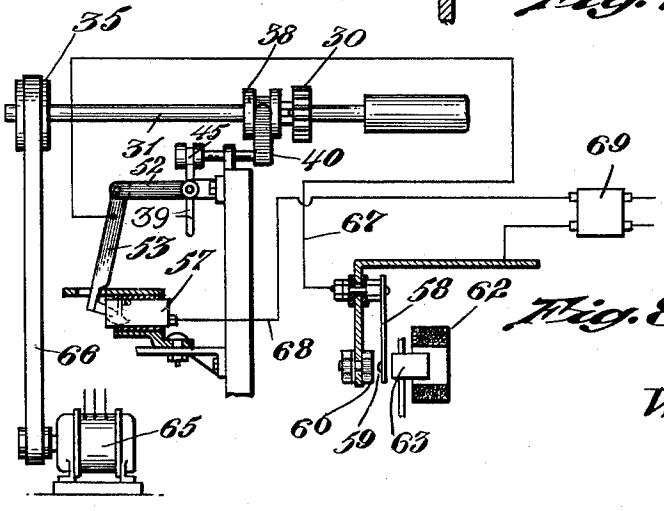


Fig. 8.

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Patented May 23, 1933 1,911,000

UNITED STATES PATENT OFFICE

WALTER J. SCOTT, OF WOONSOCKET, RHODE ISLAND

CLUTCH CONTROL FOR TWISTING FRAMES

Application filed July 29, 1932. Serial No. 625,823.

This invention relates to an automatic control for the clutch of a textile machine, more particularly a twisting machine, and has for one of its objects to provide a construction by which the stopping of the machine will simulate a hand control when the driving motor is suddenly thrown off and the operator is unable to manually manipulate the control handle for the proper stopping of the machine.

Another object of the invention is the provision of a construction which, if the machine is suddenly stopped, the yarn will not faultily twist, necessitating the breaking and piecing of the ends and the consequent loss of time and imperfect yarn in so doing.

Another object of the invention is the provision of a construction whereby the twisting machine may be more readily started after the machine has been standing and the parts have become cool without the danger of the machine suddenly stopping and the yarn acquiring a faulty twist thus requiring the breaking down of the ends for proper yarn.

A further object of the invention is the provision of a construction which may be attached to the machines now in use and utilize the movement of the magnetic protecting switch for operating an auxiliary switch to control the stop motion as desired.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:—

Fig. 1 is a sectional view of a portion of a twisting frame showing in dotted lines my attachment at one end thereof.

Fig. 2 is a view looking at the front of the construction shown in Fig. 1 with parts removed to illustrate the manner of attachment of the automatic control mechanism which I apply to the twisting frame.

Fig. 3 is a view largely diagrammatic looking at the end of the twisting frame and showing my control mechanism as applied thereto, the frame being viewed in the opposite direction from that shown in Fig. 1.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is an elevation of a fragmental detail looking at the control switch which I mount adjacent the magnetic protecting switch which is a part of the complete equipment of the standard machine.

Fig. 6 is a section on line 6—6 of Fig. 5.

Fig. 7 is a fragmental detailed view showing a portion of the control switch as shown in Fig. 5 with the magnetic control switch and its electromagnetic coil in such position as it will assume relative to that of the control switch when in operating position.

Fig. 8 is a diagrammatic view illustrating the electrical connections of the operating parts of the machine.

In practice in the use of twisting machines, such for instance as ring twisting, it is customary for the twisting frame to be driven by an electric motor controlled by a magnetic switch so arranged that when excessive power is required to operate the machine the motor may be protected. The magnetic switch is inserted in the line and set to throw out when too great a current is passed through the motor, thus stopping the machine. This condition frequently occurs when the machine is cold and also when sudden or unexpected stopping occurs such as when the power is suddenly shut off from its source of supply. When a stopping of the machine occurs in such a manner, the operator is usually unable to manipulate the clutch for controlling the cam shaft as when the power is shut off by the operator intentionally.

The cam shaft of the twister drives one cam for each spindle and engages a trip mechanism to throw the top roll of the pair of drive rolls from its nipping engagement with the lower roll and thus by releasing this nip the control of the twist of the yarn is released and faulty twist occurs which, in many cases, must be remedied by breakage of the yarn requiring piecing up the ends. As such faulty twist occurs on every end of yarn along the entire length of the machine, it is common practice to break all of the ends and piece them together again in order that this twist may be definitely set or established in the yarn by taking out the faulty length. This

frequent happening is very inconvenient for the operator and expensive for the manufacturer.

I remedy this undesirable result by providing a device which instantly stops the rotation of the cam shaft and the cam upon operation of the magnetic switch so that the turning of the machinery, due to momentum after the power is shut off, will not turn the cam shaft and consequently will not throw the top roll out of nipping engagement with the bottom roll and thus no release of the nip on the yarn occurs and consequently no faulty twist occurs, and it is unnecessary to break down the ends and remove any portion of the yarn; and the following is a detailed description of the present embodiment of this invention illustrating the preferred means by which these advantageous results may be accomplished.

With reference to the drawings, 10 designates the frame of the twisting machine, which is here shown as a ring twister, upon which there is rotatably supported a driven roll 11 with which there engages the upper roll 12 and between which there passes the yarn 13 shown in dot-dash lines.

The roll 12 is mounted in the bearing notch 14 of the arm 15 which is secured to the rods 16, slidably supported in the openings 17 of the frame portion 18 of the machine. A bearing 19 is fixed to the arm 15 and in this bearing there is pivoted a feeler member 20 having a finger 21 with which the yarn 13 engages in its travel from the supply to the traveler on the ring to maintain the arm in the position illustrated in Fig. 1. This feeler arm member 20 is provided with a weighted portion 22 on the other side of its pivot and should the yarn break or become slack this feeler member will then swing, allowing the rear portion 23 of the member to drop into engagement with the cam 24 having abutment surfaces 25 to engage this portion 23 and slide the rod 16 together with the arm 15 and the roll 12 forward to position the roll 12 as shown in dotted lines out of nipping engagement with the bottom roller 11.

The cam 24 is driven by the gear 26 on the cam shaft 27 through gears 28 and 29, the latter of which engages with the gear 30 on the lower roll shaft 31.

The pivoted pawl 32 engages the block 33 secured to the rods 16 and is held in such engagement by the weight 34 to maintain the carriage for the upper roll in the position to which it is shifted.

The shaft 31 is driven by a pulley 35 and belt from a suitable source of power, such as an electric motor. The drive of the roll is controlled through a clutch comprising the parts 36 and 37, the latter of which is attached to a member 38 shiftable axially along the shaft 31 for engagement or disengagement of the clutch parts for the driving of the roll and the gears driven from the shaft 31. This clutch is shifted by a handle 39 through suitable arm 40 and push rod 41. In operation it is usual for the operator to keep the clutch disengaged until the motor and machine are sufficiently warmed up in order to avoid the overload, due to the cold machine when first starting, and then when the clutch is engaged to watch the operation to see whether any such overload does occur as will throw out the magnetic protecting switch for the motor, and in such event withdraw the clutch through the handle 39 in order to prevent the throwing forward of each of the upper rolls and consequent release of the nip, untwisting of the yarn and necessity of breaking down the ends and piecing up the yarn.

When the operator desires to stop the machine, the drive for the cam is first thrown out before the motor is stopped in order to avoid the throwing off of the top roll. It so happens, however, that sometimes overloads occur, such as where the lines are damaged by an electrical storm or the power may be suddenly shut off at its source of supply and the machine will suddenly stop before the operator has an opportunity to withdraw the clutch by handle 39, and when such a condition occurs each of the top rolls are thrown forward and the nip is lost on the yarn and this necessitates the breaking by hand of each of the parts of twisted yarn and piecing them together again which takes considerable time where a large number of spindles are being operated such as in twisters of this character.

The above description relates to the known form of twisting machine, and in order that this undesirable result may be eliminated, I mount a shaft 42 on one end 43 of the twister frame supporting the same suitably in bearings 44 for rotation therein. An arm secured to said shaft 42 is provided with a bifurcated yoke 45 which will engage the recess 46 in the collar 39*a* secured to the push rod 41. A spring 47 tends to rotate the shaft 42 in such a way as to move the collar 39*a* to pull the clutch out of engagement. This spring is fastened at one end 48 to the bearing and at its other end 49 to the nut 50 which may be rotated on the shaft 42 to adjust the tension thereof, in which desired position of adjustment it is held by the set screw 51.

When the clutch parts are engaged and the spring is under tension, I resist the tendency of the spring to pull the clutch out of engagement by the arm 52 secured to the rod 42 and link 53 pivoted at the end thereof and extending downwardly therefrom to rest upon a trigger 54 which is held in a position to support the link 53 by reason of spring 55. This trigger mechanism is more fully shown in my co-pending application Serial No. 386,173,

filed August 15, 1929 and this trigger is controlled through an armature 56 and electromagnet 57 which is placed in circuit with a control switch 58 having contacts 59 and 60 so positioned as to be engaged and closed by the portion 61 of the armature 63 which are part of the magnetic protecting switch in the circuit of an automatic starter with an overload relay mounted on one end of the machine as the usual equipment thereof for protecting the electric motor in case of an overload.

Referring to Fig. 7 the numeral 62 designates the magnetic coil provided in the circuit of the automatic starter with an overload relay and 63 is a pivotally mounted armature being shaped to provide an extension 61 adapted to swing into the central opening provided in the coil 62.

When an overload occurs in the circuit of the starter the coil 62 is deenergized and the armature 63 swings away from the coil and operates to shut off the current to the motor. The switch 58 of my device is positioned to be engaged by this armature 63 when disengaged from the coil 62.

Referring to Fig. 8 the general arrangement of the parts will be understood and considering that the framework of the machine is a ground or one side of the electrical connection it may be explained that the shaft 31 is driven through pulley 35 from a suitable electric motor 65 by means of belt 66 and that this motor is in the circuit of the automatic starter and is protected by the electromagnetic switch in the said circuit when an overload occurs the armature 63 swings away from the coil and into engagement with my switch 58 which closes contacts 59 and 60 to close the circuit of my device which may be traced through wire 67 to the arm 53 and thence through this arm or ground to the electromagnet 57 and from the other end of the electromagnet through the lead 68 to the source of power indicated diagrammatically at 69, whereby upon energizing the coil 57 the trigger 54 is tripped, allowing the link 53 to fall and the spring 47 to rotate the rod 42 and withdraw the clutch from engagement. When the link 53 falls its cam surface swings it out of engagement with the trigger and in this way breaks the electrical circuit which passes through it.

By this arrangement the mechanism operates sufficiently fast so that the clutch is withdrawn and the nip is not lost on the yarn, thus eliminating the necessity of breaking down the yarn and then piecing it up again upon the accidental stopping of the machine.

I have shown and described this invention as applied to a twisting frame having a clutch for controlling the cam shaft. However, it will be understood that I may utilize the same or a similar construction and arrangement in connection with other twisting frames in which an increased twist rather than a decreased amount of twist is caused by the stopping, which twist is difficult to locate, and accordingly faulty twist frequently occurs.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:—

1. A stop motion for a twisting frame having a clutch control and a magnetic protecting switch comprising means responsive to the movement of said protecting switch to withdraw said clutch from operating engagement.

2. In combination, a twisting frame having a cam shaft, an electric drive motor, a magnetic protecting switch and a clutch control for the cam shaft, of means to operate said clutch in response to the movement of said magnetic protecting switch.

3. A stop motion for a twisting frame having a clutch control and a magnetic protecting switch, comprising a shaft, means tending to rotate said shaft in one direction, means for connecting said shaft to said clutch to move the clutch out of engagement, means for resisting the said rotating movement of said shaft and means responsive to the movement of said protecting switch to remove said resistance.

4. A stop motion for a twisting frame having a clutch control and magnetic protecting switch, comprising a shaft, means tending to rotate said shaft in one direction, means for connecting said shaft to said clutch to move the clutch out of engagement, a trigger for resisting the said rotating movement of said shaft, and electromagnetic means responsive to the movement of said protecting switch to remove said resistance.

5. A stop motion for a twisting frame having a clutch control and a magnetic protecting switch, comprising a shaft, means tending to rotate said shaft in one direction, means for connecting said shaft to said clutch to move the clutch out of engagement, a trigger, means connecting said trigger to said shaft to resist said turning when the clutch is in engaged position and means responsive to the movement of said protecting switch to withdraw said trigger and permit said shaft to turn and withdraw said clutch.

6. A stop motion for a twisting frame having a clutch control and a magnetic protecting switch, comprising a shaft, means tending to rotate said shaft in one direction, means for connecting said shaft to said clutch to move the clutch out of engagement, electromagnetic means for operating said trigger, the last said means being positioned to

be operable upon operation of the protecting switch for stopping the motor.

7. In combination, a twisting frame having mechanism for altering the nipping relation of the rolls upon stopping of the machine, means to control said mechanism, and a magnetic protecting switch, of means to operate said control means in response to the movement of said magnetic protecting switch to prevent the altering of the nipping relation of said rolls.

8. A stop motion for a twisting frame having mechanism for altering the nipping relation of the rolls upon stopping of the machine and means to control said mechanism, a shaft, means tending to rotate said shaft in one direction, means connecting said shaft to said control means, means for resisting the rotation of said shaft and means responsive to the movement of said protecting switch to remove said resistance.

In testimony whereof I affix my signature.

WALTER J. SCOTT.