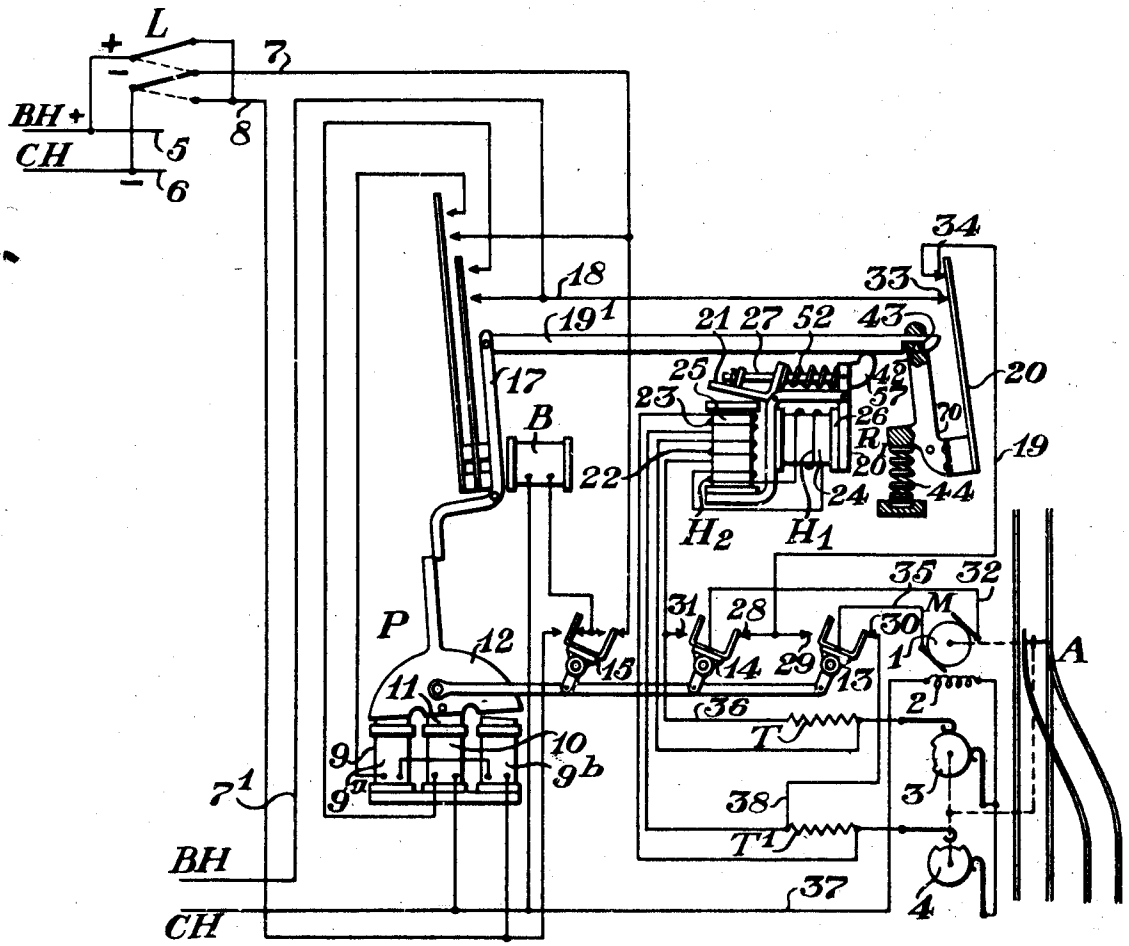
Sept. 13, 1932. A. T. JOHNSTON 1,877,513

RAILWAY TRAFFIC CONTROLLING APPARATUS

Filed Sept. 3, 1930



INVENTOR:
A. T. Johnston.
BY
A. L. Vencill
His ATTORNEY

Patented Sept. 13, 1932 1,877,513

UNITED STATES PATENT OFFICE

ALLAN T. JOHNSTON, OF MOUNT LEBANON, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

RAILWAY TRAFFIC CONTROLLING APPARATUS

Application filed September 3, 1930. Serial No. 479,456.

My invention relates to railway traffic controlling apparatus, and has for an object the protection of such apparatus from currents of such magnitude as might be injurious.

I will describe one form of apparatus embodying my invention, and will then point out the novel features thereof in claim.

The accompanying drawing is a diagrammatic view showing one form of apparatus embodying my invention.

Referring to the drawing, the reference character A designates a railway switch which is actuated by an electric motor M which in form here shown comprises an armature 1 and a field 2. Operatively connected with the switch are cut-out controllers 3 and 4; cut-out controller 3 is closed at all times except when the switch occupies its extreme reverse position, and cut-out controller 4 is closed at all times except when the switch occupies its extreme normal position.

The motor M is controlled in part by a circuit controller designated in general by the reference character P, and which is in turn controlled by a pole changer L which may be incorporated in a switch lever of an interlocking machine. The circuit controller P comprises an electromagnet 9 made up of two windings 9^a and 9^b and a polarized winding 10 which is preferably provided with a permanently magnetized core 11. Pivotally attached to the core 11 is an armature 12 which is therefore polarized by flux from the permanent magnet core 11 at such times as winding 10 is not carrying current. It follows that when the electromagnet 9 is supplied with current of one polarity the armature 12 will be swung in a clockwise direction, but that when current of the opposite polarity is supplied to electromagnet 9 the armature will be swung in the opposite direction. The armature 12 controls three movable contact yokes 13, 14 and 15 through suitable linkage in such manner that the yokes occupy their right-hand positions when the armature is swung to the left, and vice-versa.

The reference character B designates a neutral magnet which controls a pivoted armature 17, the lower end of which projects into the path of movement of a portion of armature 12 to prevent the reversal of the armature when the neutral magnet B is deenergized. Pivotally attached to the armature 17 is a link 19^1 provided with a slot 42 which at times engages a pin 43 in a rocker arm 70 which carries a contact 20. When magnet B is deenergized the link 19^1 moves the rocker arm 70 against the bias exerted by spring 44 into a position in which the contact 20 connects wire 33 with wire 34. When neutral magnet B is energized, however, the spring 44 urges the rocker arm 70 into a position wherein the contact between wires 33 and 34 is interrupted. As shown in the drawing, the switch A occupies its normal position; the neutral magnet B is deenergized thereby locking armature 12 of circuit controller P in its left-hand position; and the pole-changer L on the switch lever occupies its normal position.

The apparatus thus far referred to is illustrated and described in United States Letters Patent No. 1,722,364, granted to Henry S. Young on the 30th day of July, 1929, for railway traffic controlling apparatus.

The reference character R designates an automatic thermal overload circuit breaker. Windings 22 and 23 of the circuit breaker R are shunted respectively by resistors T and T^1, which have a large resistivity temperature constant. A continuous current flowing through resistor T or T^1 will cause it to heat, increasing its resistance, with consequent increase in the voltage across the coil winding 22 or 23. When the voltage is of sufficient value the circuit breaker will operate to open contact 33–34 by armature 21 being attracted, that is, detent 57 will lift the link 19^1 and the spring 44 will open the contact between wires 33 and 34. The circuit breaker R is made slow-releasing to prevent the possibility of the heavy starting current causing the circuit to be opened at each operation. Circuit breaker R consists of two magnets, one having a core 24 and the other having a core 25, with armatures which are pivoted separately, but are jointly connected to a tripping arm 27. When the motor circuit is first closed, there is a heavy surge of current through it, due to the low resistance of the motor and the fact

that the counter electromotive force has not had an opportunity to build up, but as soon as the motor speeds up the counter electromotive force approaches the value of the impressed electromotive force and therefore the current is reduced to the normal operating current. To prevent the momentary current above-mentioned from tripping the breaker every time the motor starts, core 25 has a winding H_2 which is connected in series with the winding H_1 on core 24. This double winding, H_1—H_2, function like a transformer. When the first surge of current passes through the coil winding, 22 or 23, there is induced in winding H_2 an electromotive force generally proportionate to the rapidity of the rise of the current in the motor circuit. This electromotive force is impressed on the winding H_1, sending a current through it which assists in holding the armature 20^1 against the pole face 26. When the current ceases to change in value, no more current will be induced in the winding H_2 and hence there will be no magnetic attraction of the armature 20^1 by the secondary magnet 24. If the current in the motor circuit continues at too great a value, the primary magnet is then unopposed by the secondary magnet and the circuit breaker operates as before described. If the surge of current is reduced to normal within a specified time, the attraction of the armature 21 will not be sufficient to overcome the spring 52 and the motor circuit will not be opened. Two resistors T and T^1 are used, one for each direction of the motor, to allow the return of switch A to its original position without waiting for the resistor, just used, to cool.

When the pole-changer L is first reversed, proper contacts close and the current flows in such a direction through the circuit controller P that the armature 12 is reversed from the normal position shown in the diagram, thus the yokes 13, 14 and 15 are moved to the left by the linkage. The motor circuit is now from terminal BH of a source of current, through wire 7^1, wire 18, wire 33, contact 20, wire 34, wire 19, contact 29, wire 35, armature 1, wire 32, contact 31, wire 36, resistor T and in parallel through winding 22, cut-out controller 3, field 2, wire 37, to terminal CH of the same source of current. When the switch is returning to the normal position from the reverse, cut-out controller 3 is open, cut-out controller 4 is closed and the motor circuit is from terminal BH, through wire 7^1, wire 18, wire 33, contact 20, wire 34, wire 19, contact 28, wire 32, armature 1, wire 35, contact 30, wire 38, resistor T^1 and in parallel through winding 23, cut-out controller 4, field 2, wire 37 and to terminal CH.

The automatic thermal overload circuit breaker is characterized by the fact that it will introduce a time delay which will trip the breaker after allowing the clutch on the switching motor to slip for a reasonable length of time. The clutch on the switching motor will slip when an obstruction occurs in the switch to prevent it from locking.

Although I have herein shown and described only one form of apparatus embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claim without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

In combination, an electric motor, two circuits for said motor each including a resistor having a high positive temperature coefficient, means for supplying current to one of said circuits or the other to cause operation of the motor in one direction or the other, a circuit breaker for controlling the supply of current to said motor and having two tripping windings in inductive relation with each other connected across the terminals of said two resistors respectively, whereby when current is supplied to one of said motor circuits the tripping winding associated with the other motor circuit will be closed through its resistor for decreasing rapid current variations in the other tripping winding, a third winding in inductive relation to each of said tripping windings, and a holding winding for said circuit breaker connected with said third winding.

In testimony whereof I affix my signature.

ALLAN T. JOHNSTON.