March 3, 1931. S. N. WIGHT 1,794,568

TRAFFIC CONTROLLING DEVICE

Filed July 18, 1928

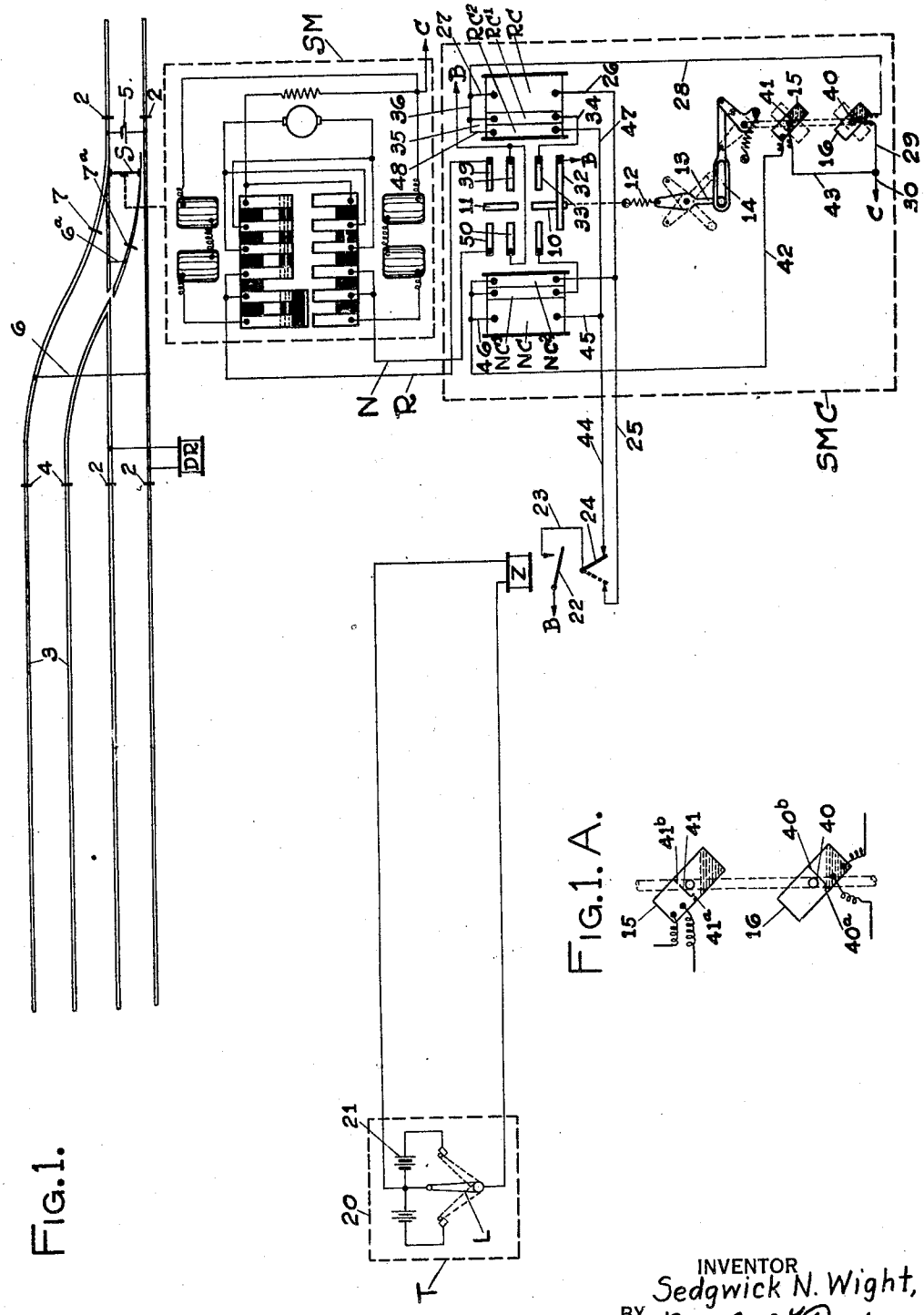


FIG. 1.

FIG. 1. A.

INVENTOR
Sedgwick N. Wight,
BY Neil D. Preston,
his ATTORNEY

Patented Mar. 3, 1931 1,794,568

UNITED STATES PATENT OFFICE

SEDGWICK N. WIGHT, OF ROCHESTER, NEW YORK, ASSIGNOR TO GENERAL RAILWAY SIGNAL COMPANY, OF ROCHESTER, NEW YORK

TRAFFIC-CONTROLLING DEVICE

Application filed July 18, 1928. Serial No. 293,664.

This invention relates to outlying traffic controlling devices, and more particularly to switch machines controlled from a distant point and means for cutting power off of such switch machine if they do not complete their operating stroke within a reasonable or the requisite period of time.

The operating characteristics of switch machines, signals and derails are quite different from any other electrically operated devices, in that they have their power cut off automatically at the end of the operating stroke. For this and other reasons the apparatus for protecting such switch machines against possible damage, due to being stalled by excessive load with the power applied thereto, requires protecting apparatus quite different from that ordinarily used in connection with other types of electrically operated appliances and devices. In accordance with present railroad practice, it is quite common for a switch located many miles from the operator's tower to be controlled from such tower by energy supplied from a source local to such switch machine. In such a case it is quite possible for current to be applied to a switch machine and by reason of unforeseen difficulty, such as coal or ice between the switch points and running rail, may prevent such switch machine from completing its stroke, thus keeping the current flowing in the motor circuit of such switch machine. Switch machines are also usually provided with control circuits and associated mechanism for permitting them to be reversed, when stalled in mid-stroke. Another feature of operation quite common in connection with switch machines results from the provision of means for causing a switch machine if once initiated into operation to continue its operation until it has completed its stroke, this in order to prevent the switch machine having its power cut off automatically during its operating cycle by a change of traffic conditions.

With the various foregoing and other important considerations in mind, it is proposed in accordance with the present invention to provide any or all of the above mentioned operating features without conflicting with the provision of means for automatically cutting current off of the switch machine, or other traffic controlling device, if it has not completed its operating stroke within a period of time deemed sufficient.

Other objects, purposes and characteristic features of the present invention will in part be described in the specification hereinafter and in part be obvious from the accompanying drawings.

In describing the invention in detail reference will be made to the accompanying drawings in which:—

Fig. 1 shows a system of control for switch machines in which the power is cut off of the switch machine after a fixed interval of time unless it has completed its stroke in the meantime; and

Fig. 1A shows one of the mercury containers on an enlarged scale.

Referring particularly to Fig. 1 of the drawings the main track of a railway system has been shown by the rails 1 divided into sections by insulating joints 2, and a siding having rails 3 insulated from the main track by insulating joints 4. The point at which the siding joins the main track by a switch S is provided with the usual detector track circuit including the usual track battery 5 and the track relay DR, the usual cross bonds 6 and 6^a, and insulating joints 7 and 7^a, being employed.

The track switch S is operated by a switch machine SM of the usual construction and including pole changer coils for operating the contacts thereof upon reversal of the switch machine from an intermediate point in its stroke. This switch machine is described in detail in the prior patent to Howe No. 1,466,903, dated September 4, 1923, and for this reason need not be described in detail. Suffice it to say that if a source of energy is connected across the wires N and C the switch machine will operate the switch S to the normal position, and if energy is applied to the wires R and C the switch machine will operate the switch S to the take-siding position even though the switch machine has assumed an intermediate position, the switch machine cutting off its power upon the completion of the stroke in each case.

Current may be applied to the wires N and C, or R and C, as above pointed out, by the switch machine controller SMC, this switch machine controller SMC being controlled by a control relay Z, which relay is controlled from a lever L located at a distant tower T. This switch machine controller SMC, in the particular embodiment of the invention shown, includes main operating coils NC and RC, auxiliary stick coils NC^1 and RC^1 and neutralizing coils NC^2 and RC^2. If the main operating coil NC, for instance, is energized the contacts 10 and 11 are operated toward the left against the bias of the spring 12, and the crank 13 is operated in a counter-clockwise direction against the tension of the spring 12. These contacts 10 and 11 and crank 13 being returned to the normal position if no longer restrained by magnetism emitted by coil NC or NC^1. The stick coils NC^1 or RC^1 if energized hold the contacts 10 or 11 in their respective circuit closing positions if these contacts have once been moved in such position. The neutralizing coils NC^2 and RC^2 are employed to neutralize and overcome the effect of the stick coils NC^1 and RC^1, respectively, so as to cause the contacts 10 and 11 to return to their normal position.

The crank 13 through the lost motion connection, resulting from the slot 14 engaging such crank, causes the mercury containers 15 and 16 to be operated each time crank 13 is operated to the opposite extreme position to which it was last previously operated. These mercury containers are used to make and break connections as most readily explained in connection with the operation of the system hereinafter.

Operation Fig. 1.—Referring to Fig. 1, and observing that the switch machine assumes the normal main track position, let us assume that the operator wishes to operate the switch S to the take siding position. Just as soon as the lever L is moved to the left hand dotted position the control relay Z is energized to its left hand dotted position by energy supplied from the battery 20, the battery 21 being employed when it is desired to operate the control relay Z to the right hand position. With the control relay Z energized to the left hand dotted position the main reverse coil RC of the switch machine controller SMC is energized through the following circuit:—beginning at the terminal B of a suitable source of current, preferably a battery, front neutral contact 22 of the control relay Z, wire 23, polar contact 24, wires 25 and 26, winding RC, wires 27 and 28, mercury in the mercury container 16, wires 29 and 30, back to the common return wire C connecting to the other side of the said source of current. With this circuit complete the contacts 10 and 11 are moved to the right hand position and the crank 13 is moved in a clockwise direction to its dotted position.

Under this condition of the switch machine controller SMC the stick coil RC^1 is energized through the following circuit:—beginning at the terminal B stationary contact 32, movable contact 10, stationary contact 33, wire 34, stick coil RC^1, wires 35, 36, and 28, mercury of the mercury container 16, wires 29 and 30, through common return wire C back to the source of current. With the stick coil RC^1 energized as just explained, this coil will be able to hold the contacts 10 and 11 in the right hand position even though the operator in the tower returns his lever L to the neutral position. In other words, the switch machine controller SMC if once initiated remains in its initiated condition until changed by other means. Also, with the contacts 10 and 11 in the right hand position, the contacts 11 bridge the stationary contacts 39 and apply current to the reverse wire R of the switch machine, thereby causing the switch machine SM to be operated to the take-siding position. After an interval of time, sufficient for the switch machine to complete its operating stroke, the mercury will have passed through a small orifice 40^a in the partition 40 of the container 16 to an extent to break the circuit between wires 28 and 29. This partition 40 is also provided with a small opening 40^b which affords the flow of air or suitable inert gas contained in the tube 16. This will stop the flow of current through both the main coil RC and the stick coil RC^1, thus allowing the contacts 10 and 11 and the crank 13 to return to the neutral biased position. By reason of the lost motion afforded by the slot 14 the mercury containers 15 and 16 will not be tilted by this return of the crank 13 to its normal position.

If the operator should have desired to reverse the switch machine controller SMC before this interval of time had elapsed he could have done so, because sufficient mercury would have passed through the orifice 41^a of partition 41 of mercury container 15 to bridge the wires 42 and 43 after a very short interval of time. These mercury containers 15 and 16 are shown on an enlarged scale in Fig. 1A. In this case the control relay Z would of course be energized to the right hand position, in which event current will flow through the coil NC and also through the coil RC^2 through the following two circuits: (1) B, 22, 23, 24, 44, 45, NC, 46, 42, mercury of 15, 43, and 30, and (2) B, 22, 23, 24, 44, 47, RC^2, 48, 36, 28, mercury of 16, 29, and 30. With these circuits completed the flow of current in the coil NC would tend to operate the contacts 10 and 11 toward the left but the flow of current in the stick coil RC^1 would prevent such operation, the flow of current in the neutralizing coil RC^2, however, will neutralize the effect of the current flowing in this stick coil RC^1, these coils RC^1 and RC^2 having their turns arranged oppositely, so that there will be no tendency to hold the contacts 10 and 11 to-

ward the right, and the main coil NC will then actuate these contacts 10 and 11 toward the left.

With the switch machine controller SMC in the left hand position current may flow through contacts 11—50 to the wire N and through the normal circuit of the switch machine, thus causing the switch machine to be operated to the main track position. It is deemed unnecessary to explain how the switch machine is operated to the reverse take-siding position under other conditions, such for instance as when the switch has been stalled in an intermediate position, it being understood that the entire apparatus is symmetrical and what has been said about operating the switch machine in one direction applies equally as well for operation of the switch machine in the opposite direction.

Although applicant has shown a rather specific form of apparatus for accomplishing a particular result constituting one example of apparatus embodying the present invention, it should be understood that many other forms embodying the same invention are readily perceived from the description of the embodiment of the invention shown in Fig. 1.

It is desired to be understood that even though no approach locking arrangement has been specifically shown in connection with the particular system illustrated, that such approach locking features are ordinarily employed and in many cases are necessary to protect traffic, and that the approach locking arrangement shown in my prior application may be applied to the present system, if desired.

Having thus shown and described two distinct forms of the present invention, it is desired to be understood that the particular systems illustrated have been selected to disclose the nature of the invention rather than its scope or the precise construction preferably employed in carrying out the same; and it is further desired to be understood that various changes, modifications and additions may be made within the scope of the present invention to adapt the invention to the particular system to which it is to be applied, all without departing from the spirit or scope of invention or the idea of means underlying the same, except as demanded by the scope of the following claims.

What I claim is:—

1. A system of remote control for switch machines of railroads comprising, a power operated switch machine, stick electro-responsive means for controlling said switch machine which if once energized remains in its energized condition until specially restored, a control relay for energizing said stick means, and a neutralizing winding associated with said stick means which winding if energized will restore said means to normal.

2. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a three position stick electro-responsive means biased to a neutral position for controlling said switch machine, means for operating said means to either of its energized positions, a holding coil connected in a stick circuit closed when said stick means assumes one extreme position, another holding coil connected in another stick circuit closed when said means assumes the other extreme position, and a neutralizing winding for each of said holding coils for neutralizing the effect of such holding coil for returning said stick means to its neutral position.

3. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a three position stick electro-responsive means biased to a neutral position for controlling said switch machine, two operating coils for operating said means to one or the other of its energized positions, a holding coil connected in a stick circuit closed when said stick means assumes one extreme position, another holding coil connected in another stick circuit closed when said means assumes the other extreme position, and a neutralizing winding for each of said holding coils for neutralizing the effect of such holding coil for returning said stick means to its neutral position.

4. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a three position stick electro-responsive means biased to a neutral position for controlling said switch machine, two operating coils for operating said means to one or the other of its energized position, a holding coil connected in a stick circuit closed when said stick means assumes one extreme position, another holding coil connected in another stick circuit closed when said means assumes the other extreme position, and a neutralizing winding for each of said holding coils for neutralizing the effect of such holding coil for returning said stick means to its neutral position, said holding and neutralizing coils when energized being unable to actuate said stick means from its neutral position.

5. A system of remote control for switch machines of railroads comprising, a power operated switch machine, stick electro-responsive means for controlling said switch machine which if once energized remains in its energized condition until specially restored, a control relay for energizing said stick means, and other means for de-energizing said stick means after a predetermined period of time.

6. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a three position stick electro-responsive means biased to a

neutral position for controlling said switch machine, means for operating said means to either of its energized positions, a holding coil connected in a stick circuit closed when said stick means assumes one extreme position, another holding coil connected in another stick circuit closed when said means assumes the other extreme position, and other means for de-energizing said stick means after a predetermined period of time.

7. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a three position stick electro-responsive means biased to a neutral position for controlling said switch machine, means for operating said means to either of its energized positions, a holding coil connected in a stick circuit closed when said stick means assumes one extreme position, another holding coil connected in another stick circuit closed when said means assumes the other extreme position, and means for opening the circuit including such holding coil and the corresponding holding coil such holding coil was electrically energized.

8. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a three position stick electro-responsive means biased to a neutral position for controlling said switch machine, means for operating said means to either of its energized positions, a holding coil connected in a stick circuit closed when said stick means assumes one extreme position, another holding coil connected in another stick circuit closed when said means assumes the other extreme position, and means for breaking the circuit of the operating coil and the corresponding holding coil a predetermined period of time after said stick means assumed the corresponding position.

9. A system of remote control for switch machines for railroads comprising, a switch machine, a control relay biased to its inactive position for controlling when active said switch machine, a mercury contact controlled by said control relay and opened a predetermined period of time after energization of said control relay, and a circuit for energizing said control relay including said mercury contact, whereby said control relay can be energized for a predetermined period of time only.

10. A system of remote control for switch machines for railroads comprising a switch machine, a control relay for controlling said switch machine and biased to its inactive position and having a circuit for energizing it to its normal position and having another circuit for energizing it to its reverse position, a mercury contact included in the normal circuit for said control relay and closed only upon operation of said control relay to the reverse position and maintained closed only for a predetermined period of time after operation of said control relay to the normal position, and a mercury contact in said reverse circuit closed only upon operation of said control relay to the normal position and maintained closed for a predetermined period of time only after operation of said control relay to the reverse position, whereby said control relay can be energized to its normal position or to its reverse position for a predetermined period of time only.

11. A system of remote control for switch machines for railroads comprising, a switch machine, a control relay biased to its inactive position for controlling when active said switch machine, a mercury contact controlled by said control relay and opened a predetermined period of time after energization of said control relay, a pick-up circuit for energizing said control relay including said mercury contact, a stick circuit for said control relay including said mercury contact whereby said control relay can be energized by a momentary closure of its pick-up circuit and be maintained energized for a predetermined period of time only.

In testimony whereof I affix my signature.

SEDGWICK N. WIGHT.