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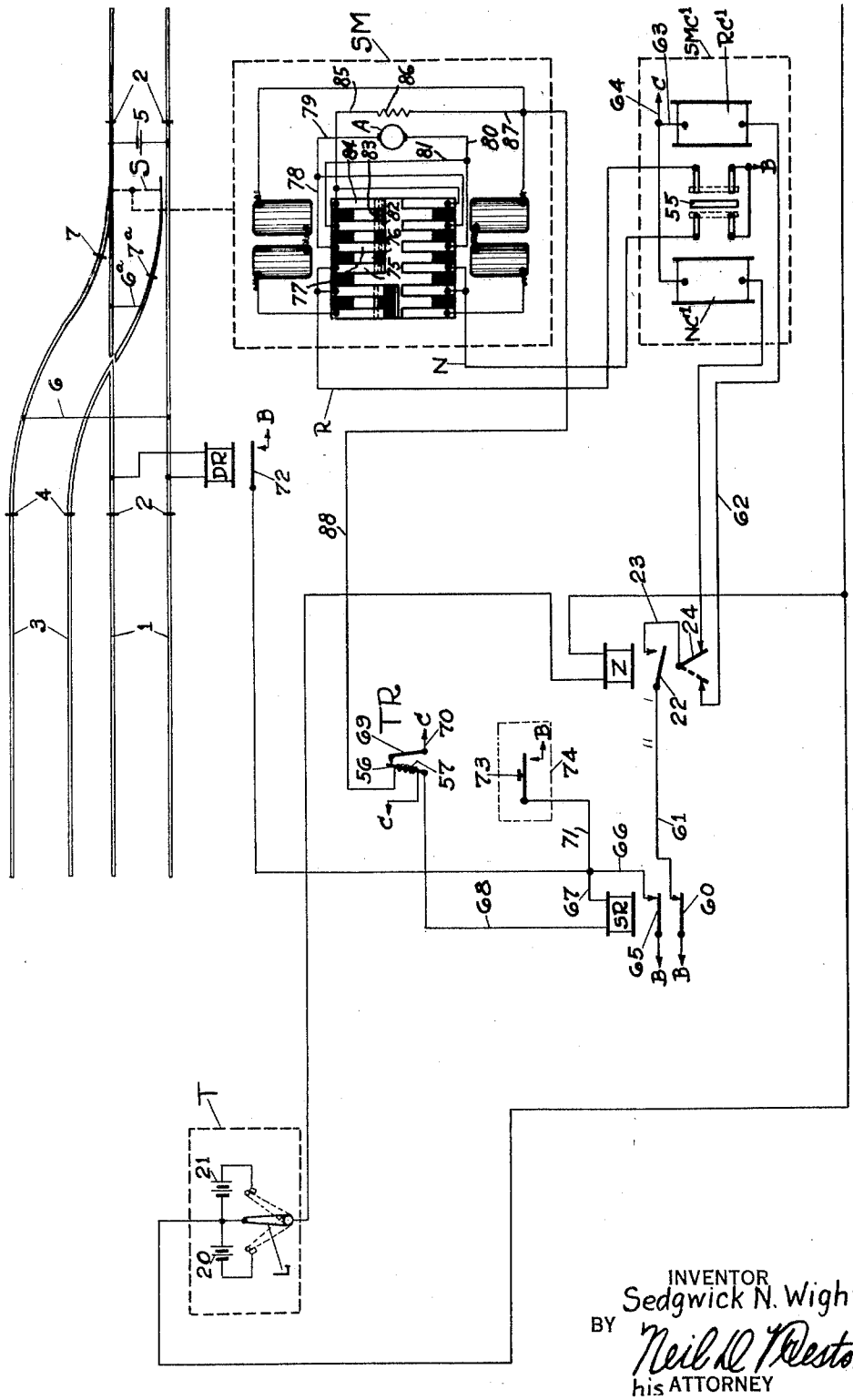
TRAFFIC CONTROLLING DEVICE

Original Filed July 18, 1928



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UNITED STATES PATENT OFFICE

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TRAFFIC CONTROLLING DEVICE

Original application filed July 18, 1928, Serial No. 293,664, now Patent No. 1,794,568, dated March 3, 1931. Divided and this application filed October 19, 1929. Serial No. 401,004.

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 drawing.

This application is a division of my prior application which matured into Patent No. 1,794,568 dated Mar. 3, 1931.

In describing the invention in detail reference will be made to the accompanying drawing in which the single figure shows a form of the invention in which provision is made for cutting power off of a switch machine after an interval of time depending somewhat upon the amount of current drawn by such switch machine, and providing the switch machine has not completed its stroke in the meantime.

Referring particularly to the drawing 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 6ª and insulating joints 7 and 7ª, 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 posi-

tion 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 SMC¹, this switch machine controller SMC¹ 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 SMC¹, in the particular embodiment of the invention shown, includes main operating coils NC¹ and RD¹. If the main operating coil NC¹, for instance, is energized the contacts 55 are operated toward the left against the bias of a suitable spring. These contacts are returned to the normal position if no longer restrained by magnetism emitted by coil NC¹.

The form of the invention shown to measure this interval of time includes a thermal relay TR having a piece of thermal or bimetallic metal 56 which is operated toward the left upon heating by current flow in the coil 57 of this thermal relay TR. It is believed expedient to now consider the operation of the system.

Operation.—Let us assume that the operator wishes to operate the switch S in Fig. 2 to the take-siding position, and to do so operates the lever L to the left hand dotted position, thereby energizing the control relay Z to its left hand dotted position and closing its neutral contact 22. Under this condition of the control relay Z, current may flow through the reverse coil RC¹ of the switch machine controller SMC¹ through the following circuit:—beginning at the terminal B, front contact 60 of the stick relay SR, wire 61, front contact 22 of the relay Z, wire 23, polar contact 24 in its left hand dotted position, wire 62, coil RC¹, wires 63 and 64, to common return wire C connected to the other terminal of the source containing a terminal B. Energization of the coil RC¹ causes the contact 55 to be operated to its right-hand position thereby applying current to the switch machine SM through its reverse circuit R, and causing operation of the switch S to the take-siding position.

If the switch S is free and the switch is readily operated to this position the reverse circuit R is opened at the end of the operating stroke of the switch machine. If on the other hand, however, the switch machine is overloaded or requires an undue period of time to complete its operating stroke the bimetallic strip 56 of the thermal relay TR will be bent toward the left to open the normal stick circuit for the stick relay SR. This normal stick circuit for the relay SR comprises the following:—starting at the terminal B of a suitable source of current, stick contacts 65, wires 66 and 67, winding of the stick relay SR, wire 68, contact 56 and 69 of the thermal relay TR, wire 70, to common return wire C connected to the other terminal of said source. It is of course understood that if this circuit is opened, even though only momentarily, the stick relay SR will be deenergized, thereby opening the circuit for the coil RC¹ of the controller SMC¹ and causing this controller SMC¹ to return to its neutral biased position, thus cutting energy off of the switch machine SM.

Two arrangements have been shown for restoring the stick relay SR to normal, namely, a back contact 72 on the detector track relay DR and a push button contact 73 only accessible to authorized persons, as indicated by the dotted rectangle 74, which may comprise a locked casing, or the like.

In case the switch machine SM has energy cut off of the same while in an intermediate position the signals (not shown) associated with the switch S could, of course, not indicate proceed. If the train crew reached the switch location with the signals at stop, the operator would, as through the medium of a telephone, communicate with the train crew and ask them to operate the push button 73 to restore the stick relay SR to normal. This pick-up circuit may be traced as follows:—beginning at the terminal B of the way station battery, push button contact 73, wires 71 and 67, winding of the relay SR, wire 68, contacts 56—69, wire 70, to the other terminal C of said battery. With the stick relay SR once restored the operator in the tower T would again be able to control the switch machine SM.

As disclosed in my prior application Ser. No. 120,423, filed July 3, 1926 a stick relay is used in connection with aproach locking and under certain conditions it is expedient to restore the stick relay to normal by the passage of a train over the detector track circuit associated with the particular switch. In the event the present invention is used in connection with a switch machine protected by approach locking, as is usually the case, a single stick relay corresponding to the relay SR is used to perform the aproach locking as well as the cut-out feature. The stick relay SR under the condition assumed is deenergized by reason of an approaching train, and in this case the stick relay SR will be reenergized when the approaching train passes over the detector track circuit, providing of course that the thermal relay TR is cold enough to have its contacts 56—69 closed, and the approach locking will become ineffective when such train has passed over the detector track circuit containing detector track relay DR. The contact 72 has been shown for this purpose. This contact 72 is also useful in the particular arrangement shown when the relay SR drops at the very end of the operating cycle of the switch machine, in which event a train may pass over the switch point

and if it does the relay SR is again picked up. Also, in some cases a dual control selector is employed for operating the switch S manually, and in this case the stick relay SR may be restored to normal by manipulation of the dual control selector handle. This arrangement for restoring the stick relay to normal has been shown and described in detail in my prior application above mentioned.

It is desired to be understood that even through no approach locking arrangement has been specifically shown in connection with the partciular system illustrated, 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. Further, although the heating coil 57 of the thermal relay TR has been shown connected in series with the switch machine, through a circuit starting at contact 55, wire R, contacts 75—76—77, armature A of the switch machine, wires 80 and 81, contacts 82—83—84, wire 85, field winding 86, wires 87 and 88, and therefore the heating is proportional to the current drawn by the switch machine, it may be connected in wire 64 of the switch machine controller SMC[1] or in multiple with the switch machine, so that the heating will be constant and the device TR will be strictly a time measuring device.

Having thus shown and described a distinct form of the present invention, it is desired to be understood that the particular system illustrated has been selected to disclose the nature of the invention rather than its scope of 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, a stick relay having a normally closed stick circuit including its own front contact and a source of current, a three-position control relay for controlling said switch machine by current conducted through a front contact of said stick relay, and means for opening said stick circuit if current is applied to said switch machine for more than a predetermined period of time.

2. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a stick relay having a normally closed stick circuit including its own front contact and a source of current, a three-position control relay for controlling said switch machine by current conducted through a front contact of said stick relay, and means for opening said stick circuit if an excessive amount of current is flowing in said switch machine.

3. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a stick relay having a normally closed stick circuit including its own front contact and a source of current, a three-position control relay for controlling said switch machine by current conducted through a front contact of said stick relay, and means for opening said stick circuit if an excessive amount of current is flowing in said switch machine for more than a predetermined period of time.

4. Apparatus for controlling operation of a track switch from a distant point comprising, a switch machine having a normal and a reverse operating circuit, means controlled from a distant point for closing one or the other of said operating circuits, cut-out means for effecting opening of both of said operating circuits when an excessive amount of current flows to said switch machine which cut-out means if once operated remains in its operated position until restored, means for restoring said cut-out means, and other means accessible only by an authorized person for restoring said cut-out means.

5. Apparatus for controlling operation of a track switch from a distant point comprising, a switch machine having a normal and a reverse operating circuit, means controlled from a distant point for closing one or the other of said operating circuits, cut-out means effective after a time for opening both of said operating circuits which cut-out means if once operated remains in its operated position until restored, and means responsive to the passage of a train for restoring said cut-out means.

6. Apparatus for controlling operation of a track switch from a distant point comprising, a switch machine having a normal and a reverse operating circuit, means controlled from a distant point for closing one or the other of said operating circuits, cut-out means effective after a time for opening both of said operating circuits which cut-out means if once operated remains in its operated position until restored, and means responsive to the presence of a train for restoring said cut-out means.

7. Apparatus for controlling operation of a track switch from a distant point comprising, a switch machine having a normal and a reverse operating circuit, means controlled from a distant point for closing one or the other of said operating circuits, cut-out means effective after a time for opening both of said

operating circuits which cut-out means if once operated remains in its operated position until restored, traffic responsive means for restoring said cut-out means, and other means accessible only by an authorized person for restoring said cut-out means.

8. Apparatus for controlling operation of a track switch from a distant point comprising, a switch machine having a normal and a reverse operating circuit, means controlled from a distant point for closing one or the other of said operating circuits, cut-out means effective after a time for opening both of said operating circuits which cut-out means if once operated remains in its operated position until restored, and means responsive to the passage of a train for restoring said cut-out means.

9. Apparatus for controlling operation of a track switch from a distant point comprising, a switch machine having a normal and a reverse operating circuit, means controlled from a distant point for closing one or the other of said operating circuits, cut-out means effective after a time for opening both of said operating circuits which cut-out means if once operated remains in its operated position until restored, and means responsive to the presence of a train for restoring said cut-out means.

10. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a stick relay having a normally closed stick circuit including its own front contact and a source of current, a three-position control relay for controlling said switch machine by current conducted through a front contact of said stick relay, means for opening said stick circuit if an excessive amount of current is flowing in said switch machine, and manually operable means for restoring said stick relay to normal.

11. A system of remote control for switch machines of railroads comprising, a power operated switch machine, a stick relay having a normally closed stick circuit including its own front contact and a source of current, a three-position control relay for controlling said switch machine by current conducted through a front contact of said stick relay, means for opening said stick circuit if an excessive amount of current is flowing in said switch machine or normal current is flowing for more than a predetermined period of time, and manually operable means for restoring said stick relay to normal.

12. In combination, a railway switch, an electric motor for operating said switch, an overload relay, a thermal relay having a heating element and a normally closed contact, operating circuits for said motor controlled by said overload relay and including the heating element of said thermal relay, manually operable means for controlling said motor circuits and for energizing said overload relay, and a stick circuit for said overload relay controlled by said thermal relay contact.

In testimony whereof I affix my signature.

SEDGWICK N. WIGHT.