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1,962,545

TROLLEY SWITCH

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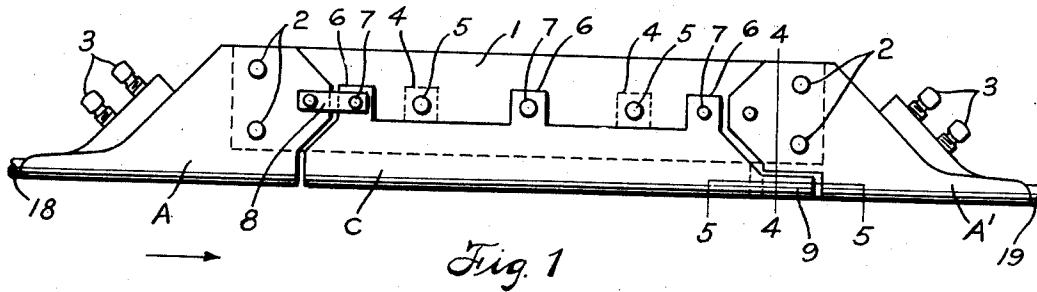


Fig. 1

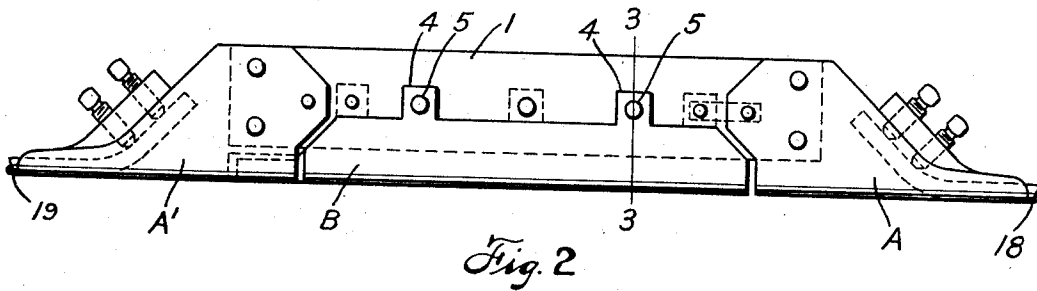


Fig. 2

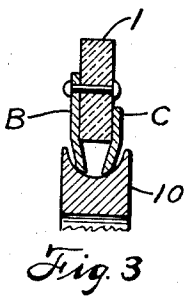


Fig. 3

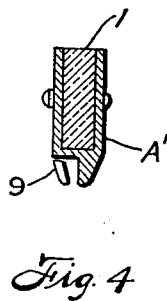


Fig. 4

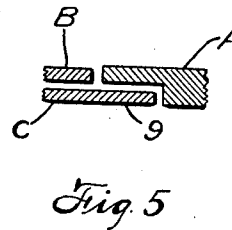


Fig. 5

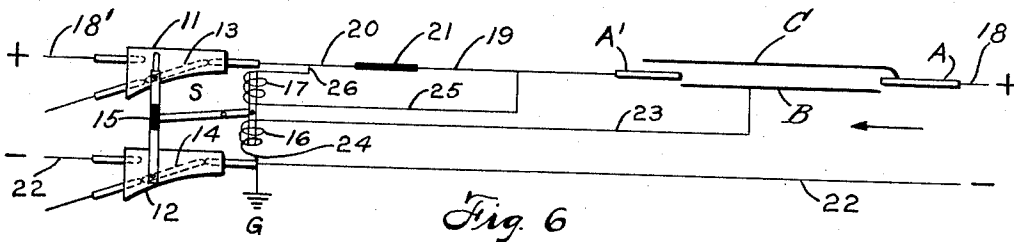


Fig. 6

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TROLLEY SWITCH

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5 Claims. (Cl. 191—38)

Our invention relates to overhead trolley construction and is particularly adapted for turnout points in a system intended particularly for trolley bus operation.

5 The object of our invention is to provide an overhead construction in which the operation of overhead trolley frogs or switches is under control of the bus operator.

10 Another object of our invention is to provide a contactor of improved design for controlling the operation of the switching mechanism.

Other objects of our invention will be disclosed as we further describe our invention.

15 Our invention resides in the new and novel construction, combination and relation of parts and circuit connections described in the specification and shown in the drawing accompanying the specification.

20 Fig. 1 is a view in elevation of one side of the contactor referred to above.

Fig. 2 is a view in elevation of the other side of the contactor shown in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a section on the line 4—4 of Fig. 1.

25 Fig. 5 is a section as shown by 5—5 of Fig. 1.

Fig. 6 is a schematic view showing a pair of electrically operated overhead switches or frogs together with the contactor shown in Figs. 1 and 2 and other parts and circuits required.

30 Our invention is a modification of our co-pending application Serial Number 491,099 filed October 25th, 1930 with respect principally to the contactors for controlling the operation of the switch.

35 In our present invention we have eliminated one section insulator shown in our previous case and have substituted a combined contactor and insulator and so arranged the contactors and insulators that it is possible for the current collector to pass across the contactor with "power on" the vehicle without causing severe arcing as the current collector passes from the first contactor onto the second contactor as will be later described.

40 The electrically operated switches are not shown in full detail as they are the same as shown in our copending application.

Referring to the contactor, we employ two end castings A and A' spaced apart and insulated from each other and secured to the insulating member 50 1 by means of the rivets or screws 2.

The end castings A and A' are provided with means to receive the ends of a trolley wire and held in position by means of the set screws 3.

55 The insulating member 1 has secured thereto on opposite sides thereof and insulated from each

other contact plates or members B and C. The contact plate B, it will be noted by Fig. 2, is provided with lugs 4 by means of which it is secured to the member 1 by the thru-rivets 5. The member 5 is not electrically connected with the members A or A'. The plate C on the opposite side of the member 1 from the plate B is shown in Fig. 1 and is provided with lugs 6 and secured to the member 1 by the thru-rivets 7. The lugs 4 and 7 are staggered.

The plate C is electrically connected to the member A by means of the connecting strip 8. The opposite end of the member C from the strip 8 is provided with a projecting portion 9 in overlapped relation to the member A' but is insulated therefrom as shown in Figs. 1, 4 and 5.

The left end of the plate C may have a projecting part overlapping the member A if desired the same as shown at the right end and may be in direct contact with the member A if desired thus eliminating the space between the plate C and member A shown in Fig. 1.

In Fig. 3 is shown the manner in which a grooved current collector such as a trolley wheel 10 will contact with and electrically connect the inwardly projecting plates B and C as it passes across the contactor and when the wheel reaches the portion shown in section in Figs. 4 and 5 the collector 10 will likewise connect the projecting portion 9 with the member A' prior to the collector breaking contact with the plate C as the collector moves in the direction shown by the arrow in Fig. 1.

In the main, the electrical switch or frog mechanism S shown schematically in Fig. 6 comprises the switch pans 11 and 12 provided with pivotally mounted tongues 13 and 14 connected for unit operation by means of the insulated tie-rod 15.

The switch S is provided with two operating coils, one coil 16, sometimes termed the voltage coil and the other coil 17 termed a current coil. They are provided with plungers or cores acting upon the tie-rod 15 to shift the tongues 13 and 14 depending upon whether the bus is to go straight through or to take the turnout.

The contactor above described is shown as having the terminal A connected to the positive trolley wire 18 and the terminal A' connected to the conductor or contact member 19. The trolley wire 20 is connected to the switch pan 11 with the insulator 21 interposed between the conductor 19 and trolley wire 20. From this it will be seen that the conductor 19 is insulated from the trolley wires 18 and 20 and constitutes a contactor. The plate C is electrically connected to the trolley

wire 18 and the plate B insulated from the trolley wire 18.

The negative trolley wire 22 is shown connected to the switch pan 12 and if desired may be grounded as at G.

The voltage coil 16 is connected to the plate B by means of the conductor 23 and to the ground or negative trolley by means of the conductor 24. The current coil 17 is connected to the insulated section or contactor 19 by the conductor 25 and to the positive trolley 20 by the conductor 26.

The operation of our invention is as follows:—
A bus is moving in the direction of the arrow as indicated in Fig. 6 and as it enters the first contactor and moves across the same it will connect the plates B and C thus electrically connecting the coil 16 to the positive trolley 18 and energizing the coil 16 and automatically set the switch tongues 13 and 14 for straight-through operation providing they are not already in that position. This operation will take place regardless of whether the operator crosses the contactor with his controller in the "on" or "off" positions that is with "power on" or "power off". If the operator desires to take the turnout he will cross the contactors with "power on" or will throw his controller to "power on" when the current collector engages with the insulated section or contactor 19. This will energize the coil 17 and move the switch tongues 13 and 14 to the turnout position as shown by the dotted lines in Fig. 6.

If it is not desired to take the turnout, the operator must cross the second contactor 19 with "power off" otherwise the switch tongues will be thrown to the turnout position.

It will be evident that if the operator has his controller set for "power on" as the collector passes contact member C that with the arrangement shown there will be very little if any arcing as the collector leaves contact member C and engages with contact member 19 because of the overlapping relation of the plate C to the end member A' which may be considered as a part of contact member.

While engaging the contactor plates B and C the collector will be drawing operating current from the trolley wire 18 but when the collector is on the contact member 19 it will be drawing its current from the trolley wire 18' through the pan 11, conductor 20, the coil 17, and conductors 25 and 26 therefore if there is not an overlapping of the plate B and member A' so that there will be a period of simultaneous engagement of these two elements with the current collector there will be more or less of a destructive arc which will shortly destroy the parts of the contactors.

The arcing which may take place as the collector leaves the plate B will be quite small because the coil 16 carries only a very small current, possibly a fraction of an ampere, but if the operator passes from contactor plate C onto contactor 19 with "power on" he will be drawing more or less full load current in operating the motors.

The voltage coil 16 of the circuit which includes coil 16 will have a much higher resistance than that of coil 17 or its circuit and the resistance of the circuit of coil 16 may be controlled by means of resistance included in the circuit. The resistance of the coil 17 circuit is kept very low.

The trolley wires 18—18' and 22 are connected to a source of power and if the system has only one switch and trolley wire as for street car op-

eration the trolley wire is usually made positive and the ground is negative.

There will be modifications to our invention which will suggest themselves to those skilled in the art after our disclosure herein therefore we wish to be limited only by our claims.

We claim:—

1. A switch system comprising in combination a switch pan to guide a current collector on a moving vehicle and associated with a trolley wire connected to a source of power, a movable tongue on the switch to guide the current collector, electrically operated mechanism having two coils to operate the tongue to its different positions, a pair of longitudinally disposed and spaced contacts normally insulated from each other and to be engaged in sequence by the collector, one coil having one end connected to the first engaged contact and a third contact connected to the trolley wire and to be connected to the first engaged contact by the moving collector and the other end of the coil connected to a second trolley wire which in turn is connected to the other side of the source of power to energize the coil and position the tongue whenever the said first and third contacts are engaged by the collector, the other coil connected to the said second engaged contact and to the first said trolley wire and arranged to be energized when the collector engages the contact with "power-on" the vehicle motors to change the position of the tongue from that set by the other coil, the third said contact extending beyond the adjacent end of the said second engaged contact in overlapping relation thereto such that the collector will engage both contacts simultaneously in passing from the first contact onto the second contact.

2. A contactor comprising an elongated member of insulating material, conducting end members secured to each end of the insulating member and means on each conducting member to receive and other means to secure a conductor thereto, a pair of spaced contact members insulated from each other and positioned between the end members on opposite sides of the insulating member and arranged to be electrically connected by the grooved surface on a current collector on a moving vehicle throughout the length of one contact member, one contact member insulated from the end members, the other contact member permanently connected electrically to one of the end members and insulated from the other end member and projecting means on the last said contact member overlapping the last said end member, the said projecting means and the adjacent end member to be electrically connected by the moving current collector.

3. A contactor comprising a pair of parallel and longitudinally disposed and spaced contact members to be electrically connected by a moving current collector engaging the contact members, conducting end members spaced apart and insulated from each other, means on each end member to receive a trolley wire and other means to secure the wire in place, one contact member insulated from the two end members and the other contact member connected to one end member and insulated from the other end member and both contact members having their lower edges projecting toward each other to be received by the groove of a current collector, means to be engaged by the collector and projecting from the last said contact member and overlapping the last said end member and in insulated relation thereto, the said projecting means

and adjacent end member to be simultaneously engaged and electrically connected by the moving current collector and the said contact members electrically connected by the moving current collector throughout the length of one of the contact members and insulating means secured to the said parts to hold them in a predetermined fixed relation.

4. A contactor comprising a pair of parallel and longitudinally disposed and spaced contact members to be electrically connected by a moving current collector engaging the contact members, conducting end members spaced apart and insulated from each other, means on each end member to receive a trolley wire and other means to secure the wire in place, one contact member insulated from the two end members and the other contact member connected to one end member and insulated from the other end member, a connecting member to electrically connect either end of the last said contact member to the adjacent end member at will, the last said end member and the adjacent end portion of the last said contact member being arranged in spaced overlapping relation to each other to be engaged and electrically connected by the moving current collector and the contact members to be engaged and electrically connected throughout the length of one contact member by the moving current collector and insulating means secured to the said end members and the adjacent ends of the contact members to secure the parts in a predetermined and fixed relation.

5. A trolley switch comprising in combination a contactor provided with a pair of spaced conduct-

ing end members secured to elongated insulating means and one end member having means to receive and means to secure a trolley wire thereto, a pair of laterally spaced contact members insulated from each other and extending between the said end members and arranged to be electrically connected by a moving current collector throughout the contact length of one contact member, one contact member having one end electrically connected to the approach end member and the other end overlapping the leaving end member but insulated therefrom except when connected by a current collector and the other contact member insulated from both end members, a third contact member having one end secured to the leaving end member and in longitudinal alignment therewith, a pair of spaced switch pans insulated from each other to guide moving collectors at a turnout point, means to secure trolley wires thereto, a movable tongue on each switch to guide the current collectors, electrically operated mechanism associated with the pans and having two coils to operate the tongues to different positions, one coil having one end connected to one of the first said contact members and the other end connected to one trolley wire to be energized when a current collector engages the first two contact members and the other coil having one end connected to the third contact member and to one of the trolley wires and to be energized only when a current collector engages the third contact member with "power on".

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