# *Instructions for Operating*

# LIONEL REMOTE CONTROL

# No. 022 SWITCHES

## WITH AUTOMATIC NON-DERAILING FEATURE

Railroad track switches, also known to railroaders as 'turnouts', are used to connect two lines of track so that the train can switch over from the main line to a siding, a spur line or to a different line entirely.

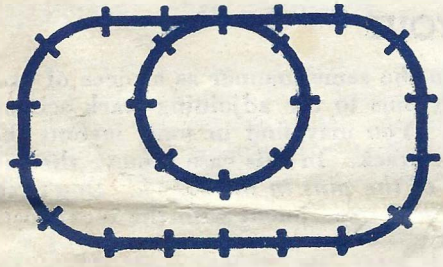

Figure 1

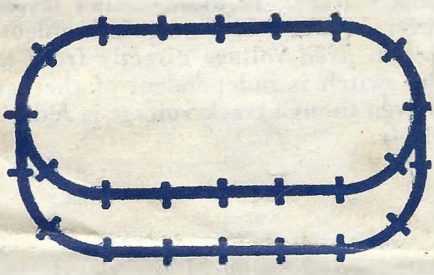

Figure 2

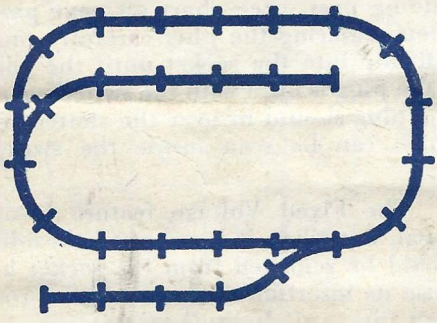

Figure 3

Lionel No. 022 switches are made to match 'O' gauge track. They have the same length and radius as ordinary straight and curved 'O' gauge track sections and are installed in the track layout in the same way, with each switch replacing one straight and one curved track section.

Switches are generally sold in pairs, consisting of a right-hand and a left-hand switch. An easy way to tell the difference is this: If a train proceeding along the main line has to turn out to the left, it uses a left-hand switch; one turning out to the right uses a right-hand switch.

Track switches can be used in a great variety of ways some of which are illustrated in the simple layouts on the left. Except when used to enter a dead-end siding, as in Figure 3, a pair of switches is generally required in the layout so that a train has a way of getting back on the main track without backing out of the siding. The pairs of switches can be installed in a layout together, as in Figure 1, or separately, as in Figure 2.

These layouts, of course, merely illustrate how switches may be used. Innumerable other layouts can be developed through the use of crossings and additional track and switches. See your instruction booklet for additional layout ideas.

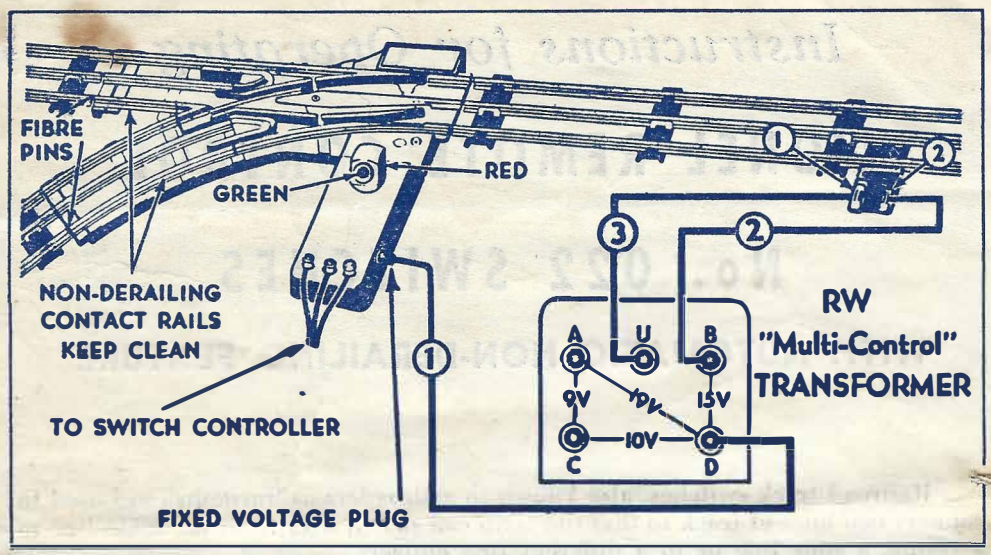


Figure 4—How to Connect Fixed Voltage Plug to Type 'RW' Transformer

## INSTALLING SWITCHES IN LAYOUT

Switches are installed in the layout in the same manner as a piece of ordinary track. Carefully line up the switch pins to the adjoining track sections and press the track firmly to the switch. You may find in some layouts that the switch pins interfere with those in the track. In this case remove the pins *from the regular track; don't disturb any of the pins in the switch.* Don't take a chance of distorting the rails on the switch—experiment with the inexpensive ordinary track instead.

When the switch is installed in the layout, its power connections are made automatically so that it gets the regular track voltage. In most smaller layouts this arrangement is quite satisfactory. However, in larger layouts, it is frequently desirable to supply the switch mechanism with *fixed* voltage directly from the transformer. With fixed voltage supply the switch is independent of the variable track voltage and operates with a snap even though track voltage is reduced to slow down the train or is turned off entirely.

## FIXED VOLTAGE PLUGS

To make fixed voltage connections No. 022 switch is provided with a Fixed Voltage Plug which fits into a socket located on the side of the switch box. Connect the wire leading from the Fixed Voltage Plug to the proper transformer binding post. See chart on next page. Then centering the plug carefully push it firmly into the socket until the edge of the plug is flush with the switch cover. The plug should fit over the slotted pin which can be seen inside the switch.

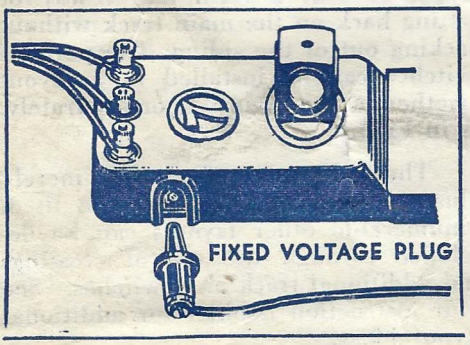


Figure 5—Fixed Voltage Plug

The Fixed Voltage feature is optional, but when it is not used the plug should be removed from the socket because its insertion automatically disconnects the switch mechanism from its normal track power supply.

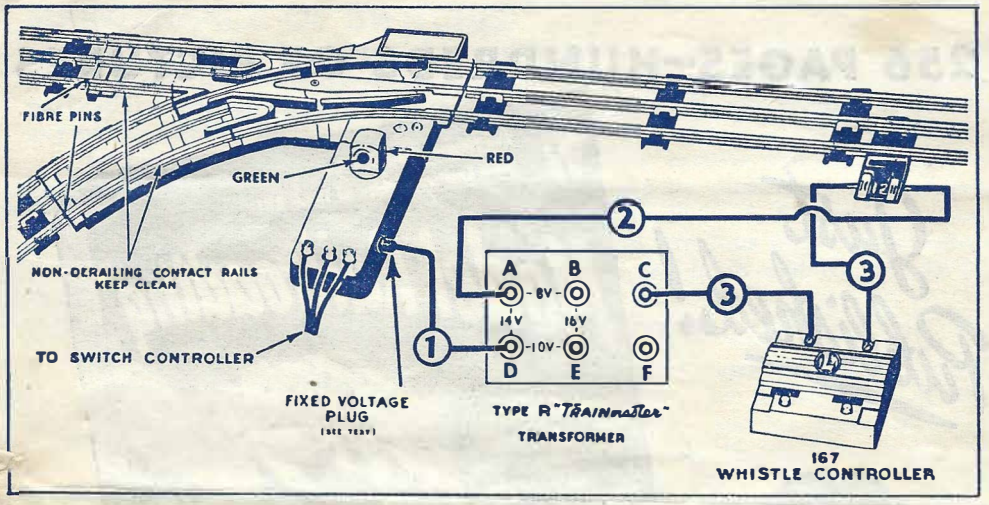


**Figure 6—How to Connect Fixed Voltage Plug When 167 Whistle Controller is Used**

## ADJUSTING THE SWITCH

No. 022 Switch is operated by means of its controller which is connected to the three binding posts by a 3-wire cable. After the switch is installed in the track layout, connect the center controller wire to the center post of the switch. Then connect the outside wires to the outside posts, and turn on the power. The lamp in the switch and one of the two lamps in the controller will light. Now, as the controller lever is moved forward or backward one of the indicator lamps in the controller will go out and the other will light instead. At the same time, the swivel rail of the switch will snap from one position to the other causing the lamp hood on the switch housing to rotate.

| TRANSFORMER | TRANSFORMER CONNECTIONS | | | | | |
|---|---|---|---|---|---|---|
| | LOW TRACK VOLTAGE | | | HIGH TRACK VOLTAGE | | |
| | WIRE No.1 | WIRE No.2 | WIRE No.3 | WIRE No.1 | WIRE No.2 | WIRE No.3 |
| A & Q | LOW VOLTAGE NOT USED | | | C | A | U THROUGH 167 |
| R | E | B | C OR F THROUGH 167 | D | A | C OR F THROUGH 167 |
| Y & Z | A OR B | U | C OR D THROUGH 167 | | | |
| S | C | B | U | C | A | U |
| RW | D | B | U | D | A | U |
| VW & ZW | B OR C | U | A OR D | | | |
| KW | D | C | A OR B | D | U | A OR B |
| No. 1033 | NOT USED | B | U | C | A | U |

These transformers have no Fixed Voltage Posts

When the switch is in position for the train to proceed along the main line, green lamp should be on in the controller and the green light in the lamp hood should shine along the straight track. If red controller lamp is on, interchange the two outside wires connecting the controller to the switch. If the red side of the lamp hood is pointed along the straight track, lift up the lamp hood and snap it back into the ring correctly.

Note that no action takes place if the controller lever is

Wire No. 1—Connection from transformer to Fixed Voltage Plug on 022 Switch.
Wire No. 2—Connection from transformer to ground (outside) rail through No. 2 terminal on track Lockon.
Wire No. 3—Connection from transformer to power (center) rail through No. 1 terminal on track Lockon.

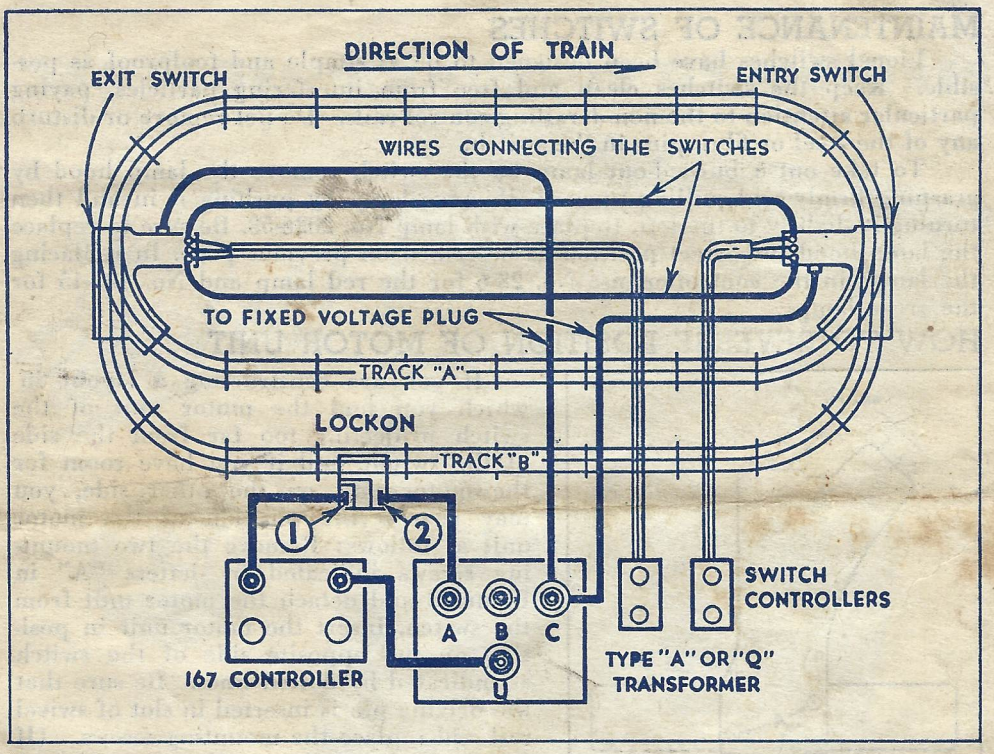


Figure 7—A Layout with Automatic Operation of Switches

moved more than once in the same direction. If, however, the lever is pressed in the reverse direction, the position of the switch swivel rail and lamp hood will change and the corresponding lamp in the controller will go on instead. By connecting and adjusting the controller in this way, you will know the position of the switch swivel rail even though it may be concealed, by merely noting whether the red or green controller indicator is on.

## NON-DERAILING FEATURE

Note that two of the rails of the 022 switch end with fibre pins. These pins insulate the control sections of the switch rails from the rest of the layout and are part of the non-derailing feature.

The operation of the non-derailing feature is this. As a locomotive approaches an 'open' switch, its wheels 'short' the control rail to the opposite outside rail. This action throws the switch to the correct position for the locomotive to pass through. For proper operation be sure to keep the control rails clean and free of rust or grease.

The non-derailing feature of the No. 022 switches can be used to construct layouts where trains are switched from one track to another automatically. A typical layout of this type is illustrated in Figure 7. If the two outside posts of the switches are connected by wires, as shown, the following action can be obtained. Train leaving track section "A" operates the non-derailing device in the "exit" switch throwing it automatically to the position which allows the train to proceed onto the single track. Simultaneously the "entry" switch is thrown to the position to allow the train to enter track section "B." As the train leaves section "B" it will again throw both switches, but this time to the opposite direction, thus enabling it to go back into section "A" on the next circuit of the track.

## MAINTENANCE OF SWITCHES

Lionel switches have been designed to be as simple and foolproof as possible. Keep the switches clean and free from interfering particles, paying particular attention to the non-derailing control rails. Do not remove or disturb any of the steel or fibre pins in the switch.

To take out a burned-out lamp on the switch remove the lamp hood by grasping firmly and pulling upward. Remove lamp by pushing it in and then turning it slightly to the left. Replace with lamp No. 2026-58. Be sure to replace the lamp hood in correct position as described on previous page. In replacing the lamps in the controller, use No. 28-6 for the red lamp and No. 408-45 for the green lamp.

## HOW TO REVERSE POSITION OF MOTOR UNIT

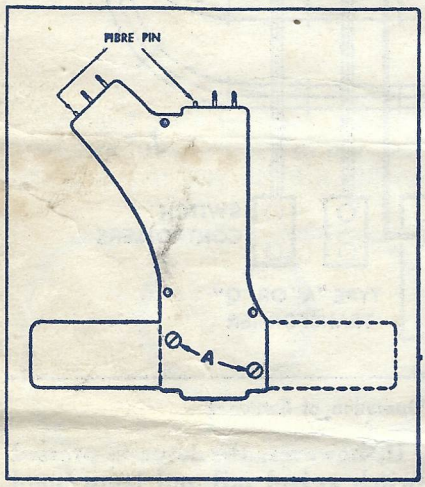


Figure 8—Illustration showing how position of motor unit may be changed

If you are constructing a layout in which you find the motor unit of the switch projecting too far from the side of the switch, and if you have room for the motor unit on the other side, you may change the position of the motor unit as follows: Remove the two mounting screws indicated by letters "A" in Figure 8 and detach the motor unit from the switch. Insert the motor unit in position on the opposite side of the switch as indicated by dotted lines. Be sure that the driving pin is inserted in slot of swivel rail and replace the mounting screws. (If the lamps in the controller are adjusted to conform with the position of the switch as described in a previous section it will be necessary to interchange the lamps when reversing the position of the motor.)

## SERVICE INFORMATION

These switches were thoroughly inspected before they left the factory and are in perfect condition. Like all Lionel products they are guaranteed against faulty material or workmanship to the extent that if any such defective switch is returned to Lionel Service Department or to any Lionel Authorized Service Station within one year of purchase it will be repaired or replaced. If in the future they should ever require servicing you may either send them to the Factory Service Department, or take them to your nearest Lionel Service Station listed in the general instruction booklet.

If you decide to mail the switches to us, be sure to pack carefully to avoid damage in transit. Use the original box, if possible, and enclose in another corrugated box or strong container. A letter in a stamped envelope stating fully the service desired *must be pasted to the outside wrapper* since postal regulations do not permit a letter or any written message to be placed inside the package.


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