



Committee G: Education & Training
Communication & Signal Division, AAR

A-9 Electric Switch Lock

Approved February 1985

Definition: An electric lock connected to a switch movement to prevent its operation until released.

Symbol:

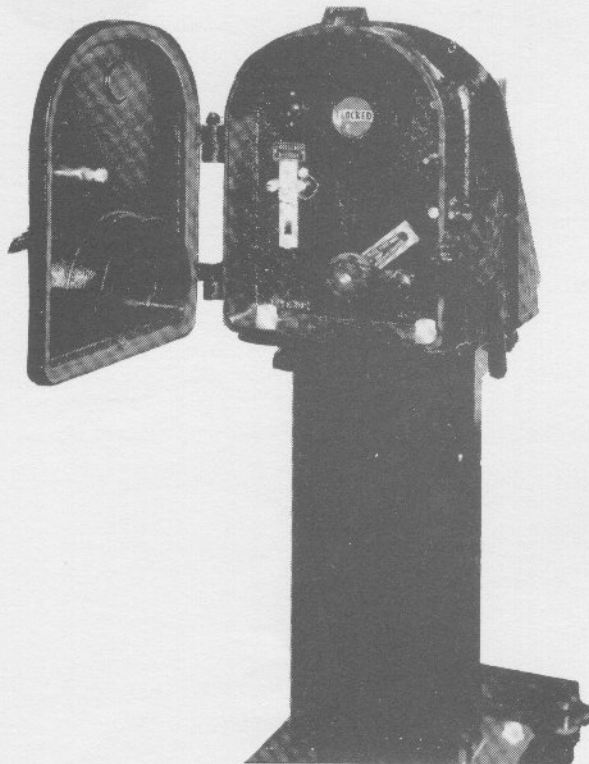


Purpose and Application: Electric switch locks prevent the use of manually operated switches in centralized traffic control and automatic block signal territory unless the signal system has determined that such an action is safe. Electric switch locks are usually installed at switch locations which are seldom used and the expense of a power operated switch machine is unwarranted.

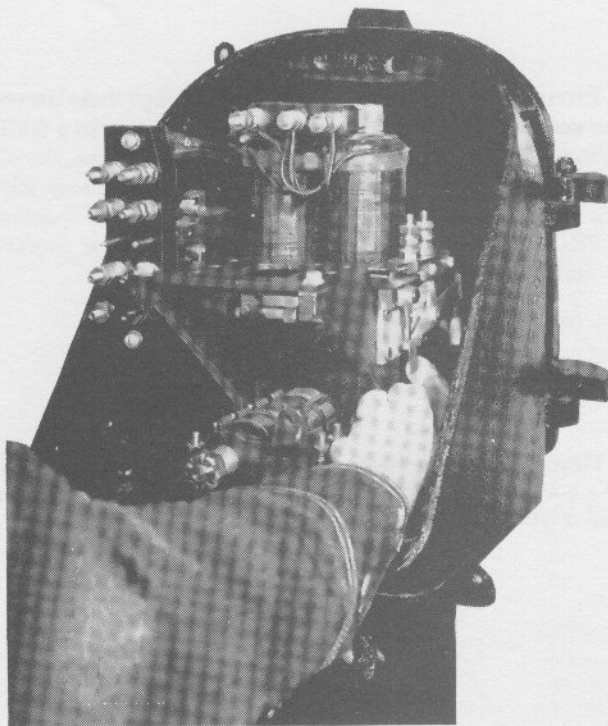
General Information: The electric switch lock consists of a housing assembly, an operating mechanism and plunger, and a lock rod.

Description: An electrically operated switch lock in which the locking key is lifted from a notch in a locking dog by an electromagnet. This allows the trainman to raise the locking plunger out of its hole in the switch rod by operating the handle to its full reverse position.

The housing assembly (Figure 1) is divided into two compartments. One compartment (the trainman's compartment) contains the operating handle, the emergency release lever and the indication banner. The other compartment (the signalman's compartment) contains the operating mechanism and is used only by signalmen.



TRAINMAN'S COMPARTMENT



SIGNALMAN'S COMPARTMENT

Figure 1: Electric switch lock showing trainman's and signalman's compartments.

The operating mechanism (Figure 2) consists of an operating handle which is directly connected to four drum contacts (commutators), the locking dog, the force-down lever, the locking key (which is connected to the armature), and the operating coils.

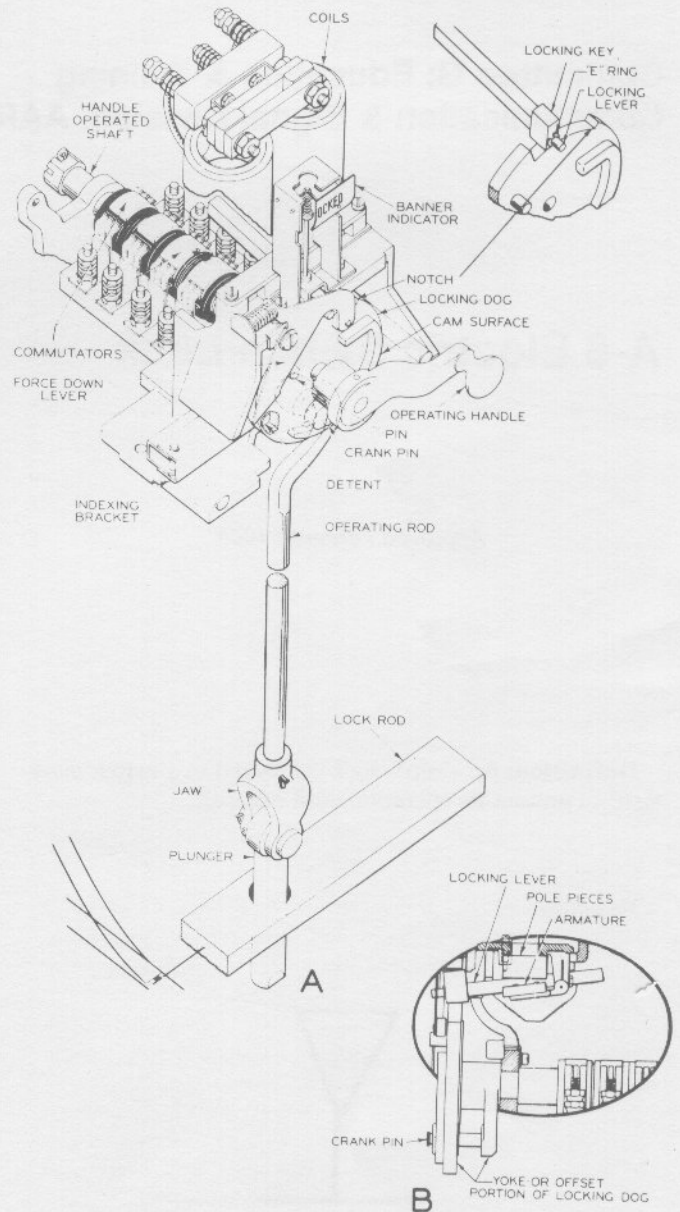


Figure 2: Operating mechanism of the electric switch lock.

The lock rod (Figure 3) is connected directly to the switch to be locked and the rectangular end extends through the lower portion of the housing. The plunger fits through a hole in the lock rod to physically lock the switch in position.

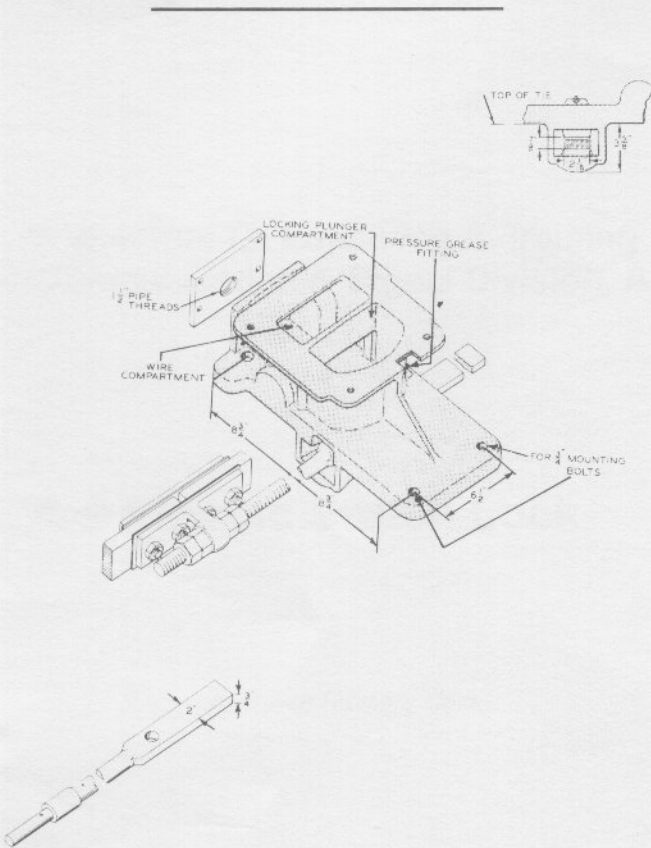


Figure 3: Lock rod assembly showing its functioning.

The material shown in this training bulletin is typical and shown for descriptive purpose only. Equipment, nomenclature and application should be in accordance with individual railroad requirements.

Detailed Operation: When the switch is to be reversed, the trainman's door must be opened and the operating handle rotated to the intermediate position (approximately 42°).

The movement rotates the drum contact which informs the associated signal circuits that the electric switch lock is being requested to unlock. This is normally done (Figure 4) by de-energizing the normal switch repeater relay (NWPR). With the NWPR de-energized, signal control energy is removed from the line, setting the signals governing movement over the switch to the Stop indication. The signal control energy is then transferred through the back contacts of NWPR energizing the coils of the east home repeater relay (EHPR) or the east approach relay (EAR) and the west home repeater relay (WHPR) or the west approach relay (WAR).

Note: If energy is present on the line wires, it indicates that no trains are present within the block and it is safe to unlock the switch.

With the EHPR and WHPR energized, the WL coil (operating coil) will become energized. The armature of the WL will remove the locking key from the locking notch and display the unlock banner in the indication slot.

The operating handle can then be rotated to the reverse position extracting the plunger from the lock rod thereby allowing the switch to be reversed.

If a train is occupying one of the approaches to the electric switch lock, and desires to enter the siding through the reversed switch, it will prevent one of the approach relays from energizing. In order to allow the lock to unlock, a release track (RT) is installed in front of the switch location. When the train occupies the release track, the RTR de-energizes. This allows energy to pass through its back contacts to the WL coil thereby unlocking the electric switch lock.

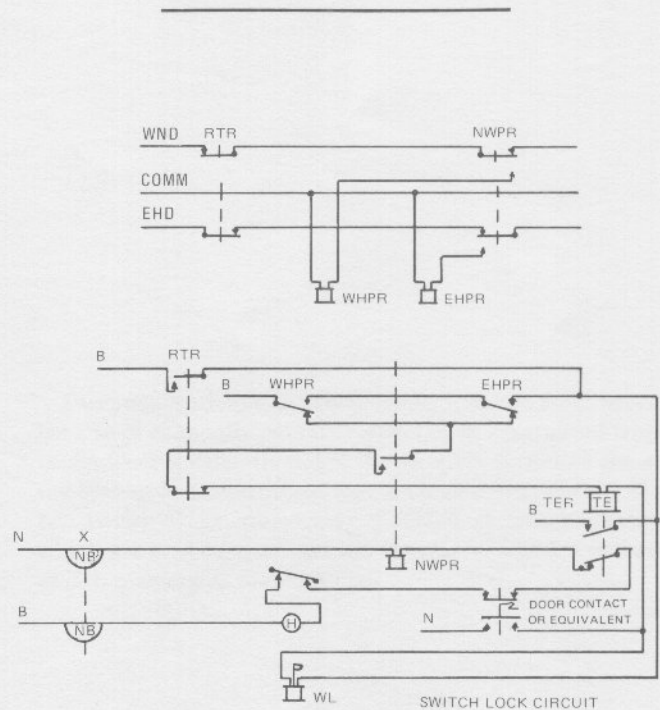


Figure 4: Signal circuits associated with electric switch lock.

NOTE: This Bulletin is for general information only. For specific applications consult the rules, standards and instructions published by your railroad.