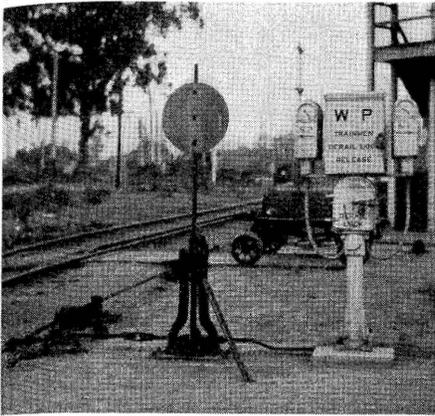
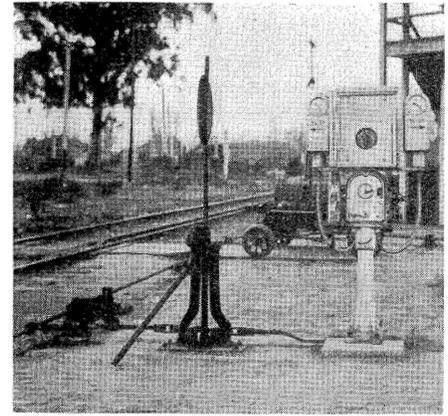


# Depression Operation of Interlocking



Stand and lock in normal position



Stand and lock in reverse position

Electric switch locks protect crossing while mechanical plant is temporarily closed owing to reduced traffic

IN SAN JOSE, CALIF., a single-track industry and switching line of the Western Pacific crosses a single-track branch line and passing track of the Southern Pacific. A 24-lever mechanical interlocking had been in service at this crossing for 12 years. At present the traffic on the Southern Pacific includes one passenger train daily, one daily except Saturday, Sunday and holidays, and one Saturday only, in addition to extra trains and several switching moves. The traffic on the Western Pacific is seasonal, ranging from one or two to a dozen switching moves daily. On account of the reduced business and fewer train movements on these lines, the expense of maintaining and operating this mechanical interlocking was not justified, nor was it considered practicable at this time to replace the plant with an automatic interlocking. Therefore, as a temporary means of reducing expenses, a switch-stand interlocking with electric locking was devised and installed.

The plant is normally lined up for the Southern Pacific trains, but the Western Pacific trains have to stop while a trainman lines up the plant. Style-B home and distant signals on the Southern Pacific, mechanical home signals on the Western Pacific and derails on both roads were included in the old plant. In making the changeover, electric semaphore signals were installed to replace the mechanical signals. The derails on the Southern Pacific were removed but the two derails on the Western Pacific were pipe connected to a regular switch stand located near the crossing. The derails are of the split-point type, each being operated by a mechanical switch and lock movement on which the usual indication contacts check the position of the side bar. An additional switch

circuit controller is connected to the derail point to check the closed position of the point. Ordinarily one-inch pipe lines with compensators extend to the switch stand at the crossing.

The switch stand, used to operate the derails, is set on a concrete foundation on which the first crank is located. A section of 1½-in. pipe about 3 ft. long was slipped over the handle of the stand and riveted in place. This extra length of the handle affords enough leverage to permit a man to throw the two derails easily.

## Use of Electric Lock

Operation of the switch stand is controlled by an electric switchlock machine. A lock rod is connected to the pin on the crank arm of the stand and extends through a guide in the base of the electric lock machine. When the lever of the stand is in the normal position, a hole in the lock rod is in position to receive a plunger coming down through the pipe pedestal, this plunger being raised or lowered by a small crank and handle in the case. When the plunger is down through the lock rod, the small crank handle is at the right, the crank being moved to the left to raise the plunger. Operation of the crank is controlled by the lock coils so that when this lock is energized it releases the crank, and this fact is indicated by a small semaphore-type indicator just above the crank.

Mounted on top of the case for the electric switch lock, there is a wooden case with a hinged door, enclosing a clockwork time-release, and mounted on the sides of this case are two indicators controlled by the approach track circuits on the Southern Pacific.

The circuit controlling the electric lock checks several conditions: The home signals on the Southern Pacific must be in the stop position; the track circuits on both the Southern Pacific and the Western Pacific within the home signal limits must be unoccupied; the time release must be in its normal position and, in addition, an electric-lock stick relay, normally open, must be energized.

A switch circuit controller, shown to the left of the illustration, is connected to and operated by the pipe line which extends to the switch-and-lock movements for the operation of the derails. The signals on the Southern Pacific are controlled through normally-closed contacts in this switch circuit controller, through normally-closed contacts in the roller of the electric lock, and also through a back contact of the electric-lock armature, as well as through approach circuits, the hand release, the electric-lock stick relay and the track circuits within the home signal limits of the plant. Likewise, the signals on the Western Pacific are controlled through contacts in the controller at the crossing, which are closed in the reverse position, the reverse contact on a roller of the electric lock, the hand release, the GP relays of Southern Pacific signals, the approach circuits, the track circuits within the interlocking limits, the electric-lock stick relay and the circuit controllers on the derails.

## Method of Operation

Normally the plant is lined up with the Southern Pacific signals at "clear," and as soon as a train passes through the plant the signals again return to "clear," automatically. When a Western Pacific train wants to cross, it is stopped short of the

home signal, and a trainman proceeds to the switch stand at the crossing. He observes the indicators, and, if no Southern Pacific train is approaching, he opens the electric-lock door; this closes a circuit breaker on the electric lock and picks up the electric-lock stick relay which causes the Southern Pacific signals to indicate "stop." The lock lever can then be operated.

If an approaching train is in the approach circuit, opening the lock door will not put the Southern Pacific signals at "stop" but will retain them at "stop" after the train has cleared the interlocking limits, and then the lock can be operated.

If a train is switching within the approach circuit, then after the lock door is opened the hand release has to be operated to put the Southern Pacific signals at "stop." After an interval of four minutes the signals on the Western Pacific will change to "proceed."

When his train has passed over the plant and out of the home signal limits, the trainman places the lever of the stand at normal and operates

the lever in the lock to return the plunger through the lock rod. A cam on the inner side of the door prevents closing the door unless the lock handle has been returned to the normal position, which is with the knob toward the right. He then puts padlocks on the stand, the electric-lock case, and the time-release case. The plant is then returned fully to the normal position, and he is free to catch his train and depart.

In view of the fact that all of the Western Pacific train operations over this plant are switching moves, no serious delays have been introduced, and furthermore, as all of the switching is handled by one or two crews, the trainmen soon learned to handle the new arrangement satisfactorily. The mechanical interlocking has been left in place for the present with the thought that it may be necessary to return it to service when traffic increases to normal. The annual saving accruing is approximately 2.5 times the cost of the changes.

This special arrangement was designed and installed by signal forces of the Southern Pacific.

## Automatics on the Erie

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alkaline Type-B6H storage cell is used on each track circuit, and an Everett-RV5 resistance is used in series with each track feed. The maintainer reads the voltage on each storage battery cell each week and the gravity reading is taken every three months, and recorded on a card, provided in each case for the purpose.

The line wire for the control circuits is No. 10 hard-drawn copper, with weather-proof covering, run on glass insulators. The cables at signal locations are made up of single-conductor No. 14 insulated wires using Raco cable straps. Parkway cable is used for underground runs, the runs to the rails being single-conductor No. 9 parkway made up with two wraps of steel tape but with no lead. At the rail, this cable is brought up through a Raco bootleg outlet and is connected to a 32-strand copper cable, which is clamped in the top of the bootleg and extends to a 3/8-in. plug in the rail. The rail joints on this installation are bonded with stranded steel bonds with copper core, applied by welding, both the Tiger-weld and the OBalloy types being used.

### Reconstruction of Interlocking

As a part of the signaling improvements, the 48-lever electric interlocking at Ridgewood Junction was mod-

ernized. This plant was installed in 1907, using a General Railway Signal Company Model-2 interlocking machine, semaphore signals and Model-2 d-c. switch machines with the dynamic indication. The entire plant



Aerial cables are run on concrete posts

was overhauled as a part of the recent reconstruction program. The interlocking machine was reconditioned, the interior wiring being replaced, using bakelite-based terminals on the board. A separate common wire was extended to each switch machine, individual cross-protection relays being installed.

The indication circuits for the switch machines were revised to use a KR switch-repeater relay to repeat the positions of each switch. The tower wiring was replaced, and new sheet-metal relay cabinets were located on the ground floor of the tower. The terminal boards in these cases are made of bakelite, holes being provided in which terminal posts are placed as required. The wiring between the interlocking machine and the relay case is run in a chase made up of 1/4-in. Transite insulating board bolted to angle iron.

The new outside wiring over the plant is in made-up cable run on concrete cable posts, using a Copperweld stranded messenger with Raco cable straps. The completed cable is painted with Victolac to protect the insulation and braid. The cable wires are No. 14 copper with 5/64-in. Kerite insulation.

The design and construction work of this signal and interlocking program was handled by the signal department forces of the Erie Railroad, signals, relays, etc. being furnished by the Union Switch & Signal Company.

## N. Y. C. Interlocking

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transformer were carefully insulated. A G.R.S. Type-W power-off relay is also in this instrument case. The bond wires are of the DS-1 type, furnished by the American Steel & Wire Company. Trenchlay cable is used for track connections.

At the new switch location No. 25 at the crossing, the pipe-connection for the switch-operated derail has been fitted on to the main operating rod of the switch, rather than from the switch machine directly.

The recent extension of the South Bend interlocking was carried out by the signal forces of the New York Central, as was the original installation, from plans prepared in the office of the signal engineer. Train crews using the crossing facilities which have supplanted the mechanical interlocking are being given more expeditious switch and signal service from the all-electric interlocking machine located some distance away, than was formerly possible with a separate plant.