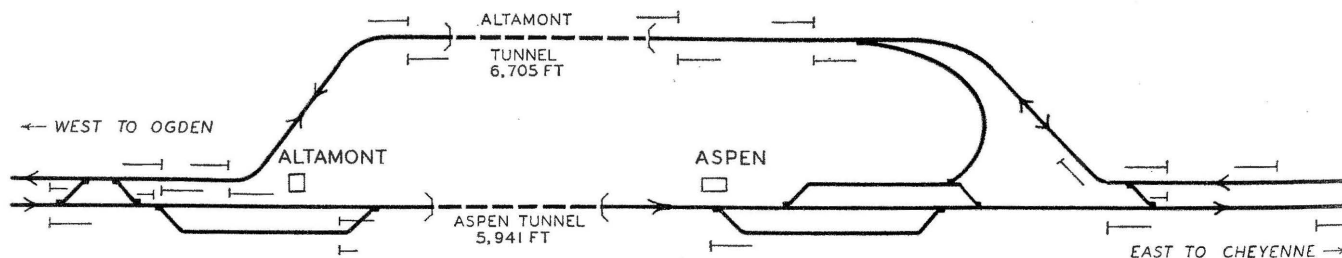




EAST END ALTAMONT TUNNEL looking west toward Ogden. Switch-key controller and indicator lamp are mounted on end of signal case, below motor car indicators. When controller operated by switch key, home signals at each end of tunnel will display flashing-red aspects. First signals in approach will display yellow, second signals in approach will display flashing-yellow and third signal in approach will be green

Union Pacific Installs ...

Protection For Motor Cars at Tunnels



Special signal controls hold trains out of tunnels for 15 min. allowing man or motor car to clear the tunnels before train can proceed. Flashing-red-aspect on home signal initiated by switch-key control

NEAR ASPEN, WYO., in the southwest corner of the state, the Union Pacific has installed switch-key control of the home signals governing train movements through Aspen tunnel (5,941 ft.) on the eastbound main track, and through Altamont tunnel (6,705 ft.) on the westbound main track. At Aspen, the westbound main track leaves the double-track mainline and swings north, following a lower grade line through Altamont tunnel, and rejoins the eastbound track at the town of Altamont. The

two lines are approximately one mile apart at their greatest separation. Four-aspect, automatic block signaling is in service on both tracks; the westbound track, between Aspen and Altamont, is signaled for train movements in both directions.

Motor Car Indicators Already in Service

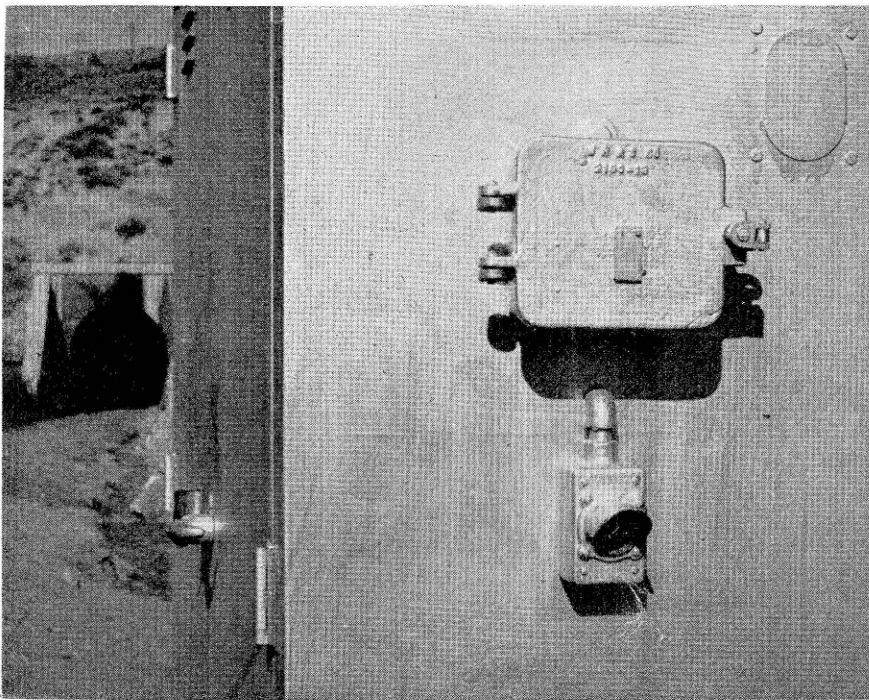
Track-occupancy indicators for motor cars are in service on both main tracks, governing in both direc-

tions on the westbound track between Aspen and Altamont. Additional protection for motor car operators, particularly when they are in the tunnels, was desirable, and thus the signal department designed and installed signal controls which would inform enginemen when a motor car was in the tunnel.

When a motor car operator desires to pass through one of the tunnels, he first observes the motor car indicator at the entrance. Having seen that the indicator is clear (no train

Centralia Has New Gates

(Continued from page 40)



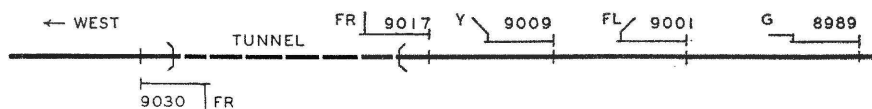
INDICATING LAMP burns steady, then flashes showing motor-car protection is "OK"

approaching within limits) he inserts his switch key in the controller case on a relay, or signal case at the end of the tunnel, turns the key to the right 90 deg., then back, and removes the key. If no train is approaching the tunnel, this action will cause the home signals at each end of the tunnel to display a steady red aspect for 5 sec. and then a flashing-red aspect for 15 min. As shown in Fig. 2, the first signal in approach will display a yellow aspect; the second signal in approach the flashing-yellow aspect; and the third signal in approach, the green aspect.

A normally-dark white indication lamp on the switch-key controller case burns steady for 5 sec. and then will flash 55 times per min., indicating to the motor car operator that the protection system is in operation, and that he has 15 min. to pass through and clear the tunnel. If a westbound train had passed signal

restricted speed" signal, indicating that a motor car is in the tunnel. For a second motor car movement through the tunnel while the home signal is still flashing-red, the operation of the key controller will change flashing-red indication to a steady red for 5 sec., after which the signal will display flashing-red for another 15 min. A train encountering such a signal must stop, then proceed at restricted speed to the next signal, keeping close lookout for track car. When a train passes a flashing-red signal, the flashing-red indication changes to steady red; so as to provide the necessary protection for a train in the tunnel.

When the key controller is operated, a relay and its repeater are released, which transfers the signal lighting circuit to the red aspect and introduces flashing control, all of which are automatically cut out by the 15-min. time element relay. None



8989 (Fig. 2), the motor car operator could not set signal 9017 to the flashing-red aspect, even though he operated the switch-key control. Accordingly, he would know that a train is approaching and he would not enter the tunnel. The same information is, of course, shown by the motor car indicator.

Signal 9017 with a flashing-red aspect is a "stop and proceed at

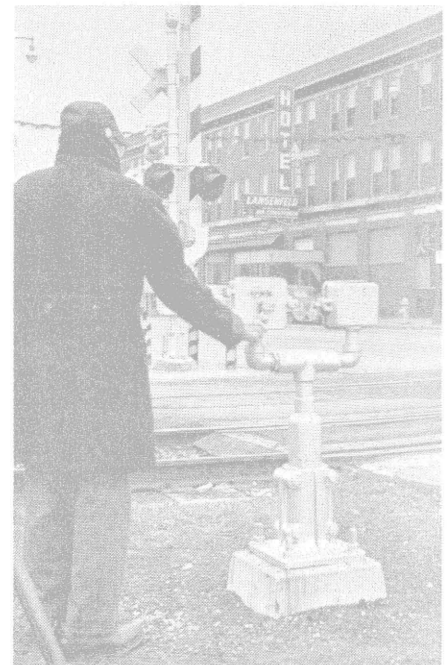
of these special controls function if the approach relay is down when the key controller is operated. The 15-min. timing is obtained by using a GRS type B time-element relay. The flasher relay is a Union model FN 27. The motor car indicators are the MC-1, position-type. Design and installation of the motor car protection controls was handled by the Union Pacific signal department.

battery are in a concrete house. At other locations the relays are in sheet-metal cases, and the batteries are in concrete boxes. The houses and cases were wired in the IC signal shop at Carbondale, Ill.

At each crossing, a set of 7 cells of 160-a.h. Exide lead storage battery feeds the gate motors. If the a.c. fails, this battery feeds the lamps in the flashing-light signals and on the gate arms. The batteries are on floating charge from Fansteel rectifiers. In each house, the low-voltage transformers, rectifiers, terminals and arresters, are on a ¾-in. plywood panel. Also the thermal time-element relays are on a ¾-in. plywood panel.

The State of Illinois paid for the underpass; the City of Centralia paid about \$31,000 on the expense of moving the Burlington tracks and connections thereto; and about \$29,000 toward the total cost of the new crossing protection.

The Illinois Central prepared the detail plans and did the construction work for the four gate crossings. The protection at the other crossings was installed by the signal department of



KEY CONTROLLER puts gates down

the railroad involved. The gates and flashing-light signals were furnished by the Western Railroad Supply Company, and the relays by the General Railway Signal Company.