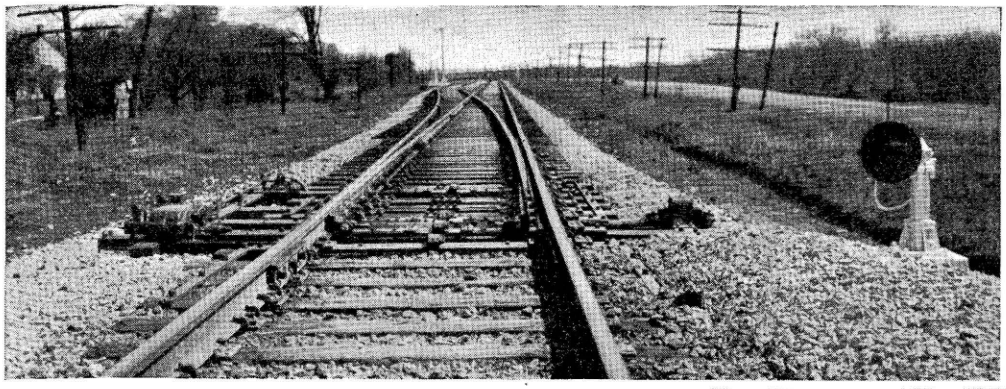
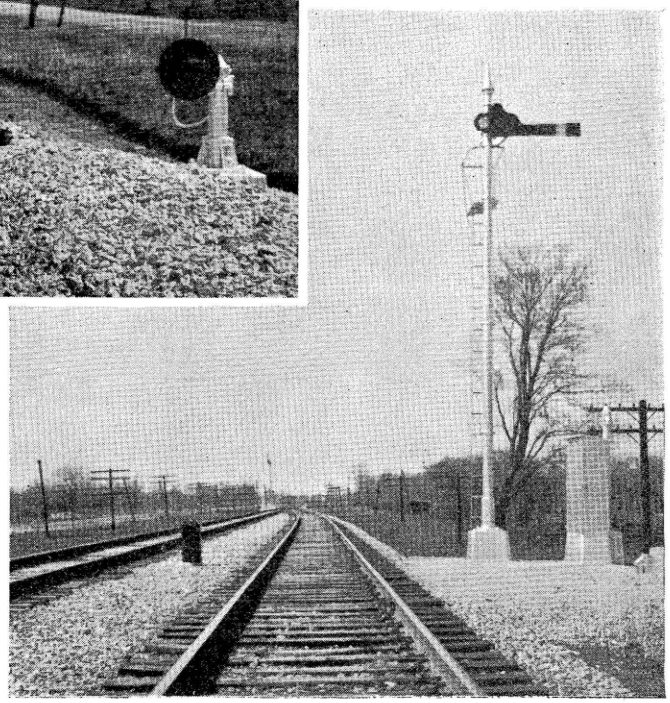




Above—Spring switch at Rinaker. Below—Right Signal E and Dwarf Signal 3 at Rinaker

Alton Uses Spring Switches on Ends of Double Track

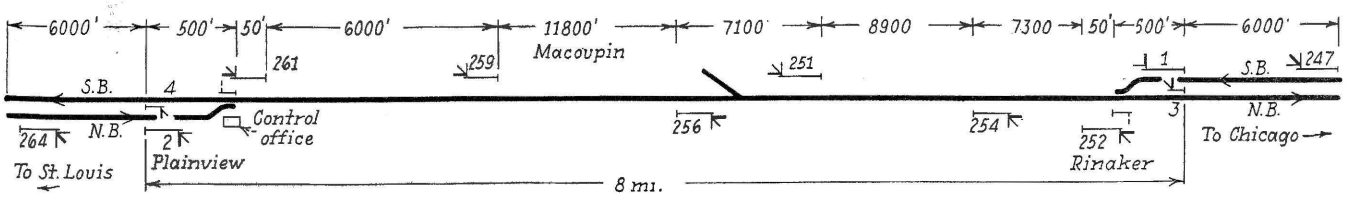
THE ALTON has two or more main tracks on the route between Chicago and St. Louis, Mo., with the exception of eight miles of single track between Rinaker, Ill., and Plainview. When adding the second track on this division it was evident that, on the section Rinaker to Plainview, the new double-track line should be constructed on a different alinement in order to secure more favorable grades and curvature. This construction was so expensive that it was postponed, the old single-track line being continued in service between Rinaker and Plainview. This line handles 12 passenger trains, 8 freights and 1 local freight train daily, totaling 21 trains.

For a number of years, full-time block offices were maintained at Rinaker and Plainview so that orders could be issued and the switches at the ends of double track could be thrown by hand by the operators. Automatic block signaling was in service as safety protection on the double track as well as on the section of single track. As a means of reducing the hazards of operating the switches by hand, and in order to facilitate train operation by directing train movement by signal indication rather than by train orders, spring switches have been installed at the two ends of double track, and an arrangement of signaling, controlled by the operator at Plainview, is used to direct train movements in either direction over the single-track section.

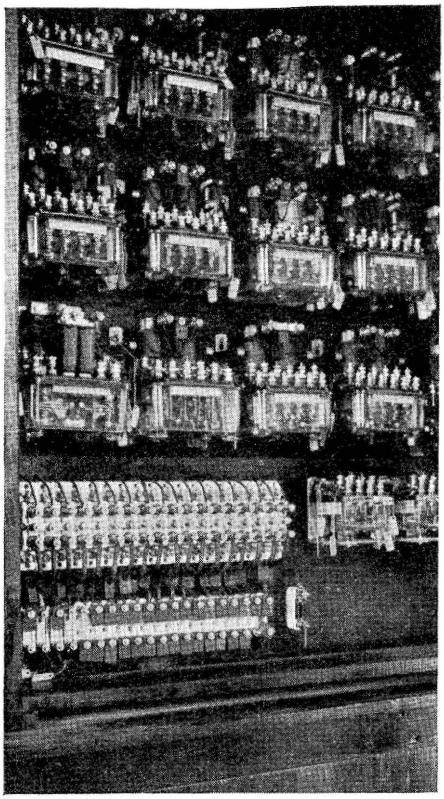
Switch Layout Construction

The turnouts are No. 20, constructed with 112-lb. rail, using 30-ft. reinforced switch points. The ballast is crushed rock, the ties are good and a sufficient number of anti-creepers are used to prevent running of the rails. Insulated gage plates 1 in. by 8 in., together with adjustable rail braces, are used on three ties, the one ahead of the points and the first two under the points. Adjustable braces are used also on the next six ties. Plates on the first two ties under the points extend and are connected to the switch stand. Likewise, the plate on the sixth tie extends under the base of the crank, and a plate ½ in. by 8 in. connects the stand and the crank base. With this arrangement of plates and braces, the position of the stand and crank with reference to the rail is easily maintained, which is necessary for the correct operation of the spring switch layouts.

The switch stand, including the operating and facing-point lock features, the head rod and front rod in-



Track and signal plan of spring switch and signal layout at Plainview and Rinaker



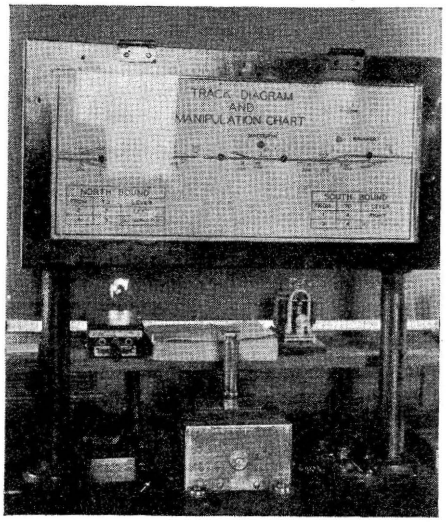
The relay cabinet presents a very neat appearance

cluding the spring arrangement, and the oil buffer, are of the type manufactured by the Union Switch & Signal Company. This arrangement includes lock rods and a plunger which normally lock the switch points in the normal position for all facing-point train movements. During a trailing movement, the deflection of the mid-section of the points by the leading wheels of the locomotive, causes the plunger to be withdrawn, allowing the switch points to open for the train to trail through. When making switching movements, the lever on the stand can be used to operate the switch in the normal manner. With this safety feature of the facing-point lock, speed restrictions, formerly in effect for facing-point train movements over these switches, have been lifted. As indicated on the plan, a train making a movement from the right-hand track of double track to the single track at each location, passes out over a No. 20 turnout. The speed restriction for such a movement has been set at 40 m.p.h., and no trouble has been occasioned by the operation of the unlocking features.

Signaling System

At Rinaker, signal No. 1 is an absolute signal which is used to give southbound trains on the right-hand track authority to proceed over the single track to Plainview. Signal No. 2 at Plainview likewise authorizes northbound movements to Rinaker. In addition to regular track circuit control, these two signals are controlled by a Stiles desk controller, with one three-position lever, in the office at Plainview. When the lever is in the normal, center position, both signals are held in the stop position. When the lever is thrown to the right, signal No. 1 is cleared to authorize a southbound train movement, or when the lever is thrown to the left, signal No. 2 is cleared to authorize a northbound train movement. The single track between Rinaker and Plainview is operated as an absolute block and, therefore, the controls are so arranged that neither of the signals will clear if a train is occupying any portion of the track between these two signals.

Although trains are normally operated right-hand running on the double



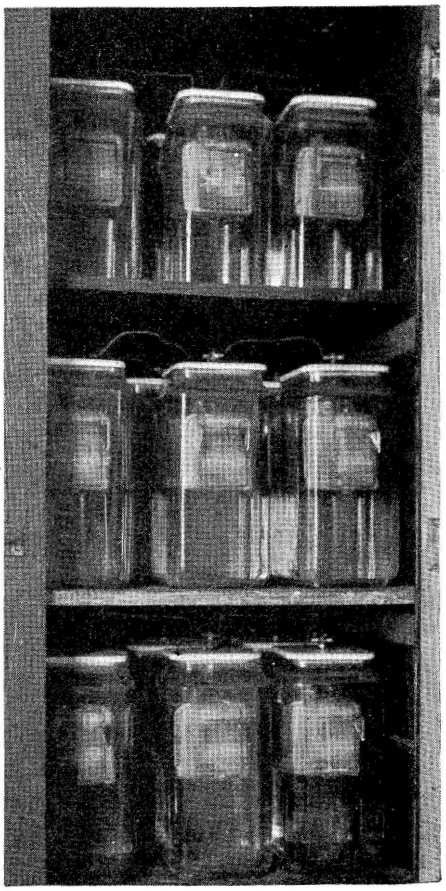
Illuminated track diagram and control lever at Plainview

track, provision was made to direct train movements over the single track by signals if, in case of emergency, trains had to be run left-handed on the double track. At Rinaker dwarf signal No. 3, and, at Plainview, dwarf signal No. 4, are for directing trains when running left hand on the double track to the single track. When such a move is being made, the train is brought to stop short of the dwarf signal and the conductor or a trainman goes to a box at the signal, where he operates a clockwork time release. Operation of the release at Rinaker sets and holds signals No. 1, No. 2 and No. 4 at stop, thus giving any other approaching train time to stop. Then, after a predetermined time, dwarf signal No. 3 will be cleared, providing no trains are occupying the single-track territory.

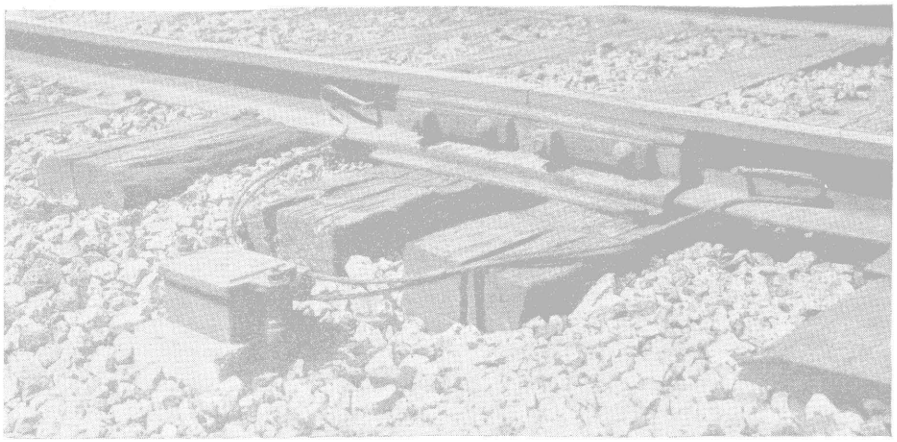
An additional feature of the control of the absolute, as well as the automatic, block signals is the checking of the position of the switches and the plungers in the facing-point locks. The position of the normally-closed switch point is checked within $\frac{3}{16}$ in. by the point detector. Circuit controllers in the locking mechanism check the position of the lock rod plunger within $\frac{7}{16}$ in. over run or under run. The circuits just mentioned control a normal switch-position relay, which, in turn, controls the line circuits of the several signals involved.

In addition to the signals explained previously, the enginemen have additional information as to the position of the switch when approaching in the facing-point direction. This additional protection is a color-light type switch marker located at the right of the track when approaching the facing-point. This marker consists of a style-D marker lamp mounted on a short mast to bring the center of the lens 24 in. above the level of the rail. The lens in this lamp is red, and the bulb is normally extinguished when the switch and lock plunger are in the normal position, as checked by the NWP relay energized, as previously explained. If the NWP relay is released, the bulb in the marker is lighted to give a red aspect. The bulb in this marker is rated at 8 volts and

(Continued on page 396)

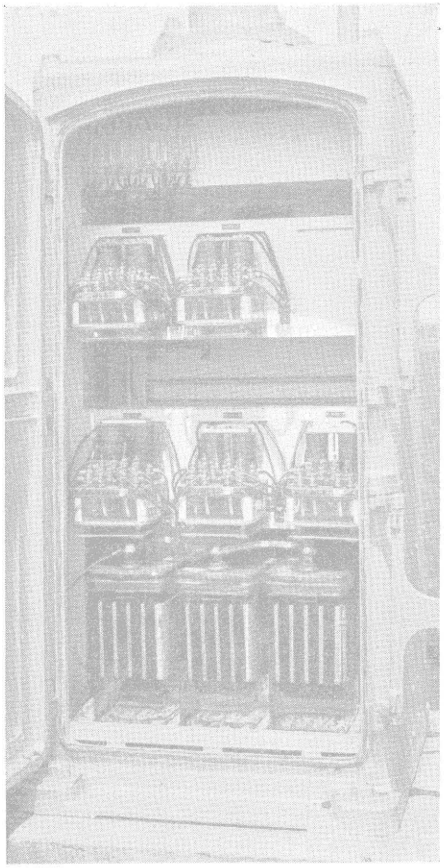


1,000-a.h. primary batteries are used for the line circuit



One parkway bootleg outlet located beyond the end of the ties serves for the two rail end connections

effected because, under the previous method of operation, an absolute block was maintained ahead and behind all passenger train movements for the 8.4 mile block, whereas with the auto-



At the signal locations the relays and batteries are housed in one large case

matic blocks, controlled on the absolute-permissive system, following train movements can be made safely.

Searchlight Signals Used

The automatic block signals are of the d-c. searchlight type, mounted on masts at the right of the track governed. The relays and rectifiers at each location are housed in sheet-metal cases forming the base for the signal mast, on the pole line side. At single locations the battery also is housed in the case, however, at head-block locations the battery is housed in concrete boxes. The cases have a door on the track as well as on the field side, the relays being located on the track side and the transformers and rectifiers on the field side.

The incoming parkway cables are brought up through a hole in the concrete foundation and into the case, where the wires are terminated on porcelain based terminals on the top board. Flexible No. 14 wires extend from these terminals through slots to the relays. A special feature of these jumpers is the use of Thomas & Betts wedge-on terminals. The relays are of the shelf type, set on individual shelves with spring supports for the relays.

The a-c. floating system of power supply is used, including a 110-volt, single-phase power distribution line. At each signal or pair of signals a set of five cells of Exide DMGO-9 storage battery, charged by an RX-11 rectifier, is used to feed the line circuits and act as a stand-by for the signal lamps. Each track circuit is fed from one cell of DMGO-5 storage battery, charged by an RT-10 rectifier.

The track connections are made with single-conductor No. 9 Okosheath cable, using I. C. standard bolted-type bootleg outlets with stranded Copperweld cables extending to plugs in the rail, as shown in one of the illustrations. Two such cables connect to each rail end, one on the gage side and one on the field side. The same type of cables and bolted connections are used between the rails and switch circuit controllers, one U-5 controller being connected independently to each of the two switch points at each switch. These controllers are connected to shunt the track but not to break line circuits.

The circuits extending under the track between signals are in underground cable consisting of seven No. 14 AWG SD solid copper conductors with 5/64 in. wall Okonite insulation and single braid, taped into cable form, then served with one layer of jute, two steel tapes and one layer of saturated jute overall.

Although existing pole lines parallel this section of track, it was determined that it would be cheaper and more satisfactory to construct a new pole line for the signal power and line control circuits. This new line was built using 25-ft. creosoted pine poles, measuring not less than 6 in. at the top, the poles being set 132 ft. apart with slight variations to bring a pole opposite each signal, so as to make the line cable as short as possible. The line wires have weatherproof covering, No. 8 solid copper being used for the 110-volt power circuit and No. 12 copper alloy 30 per cent conductivity for the signal control circuits. Power is purchased at three points on the territory.

The major items of signaling material for this installation were furnished by the Union Switch & Signal Company. The pole line was constructed and the concrete foundations were made at a central point and set by forces of the Litchfield & Madison. The remainder of the construction was handled by signal department forces of the Illinois Central.

Alton Spring Switches

(Continued from page 394)

has a double filament, one rated at 5 watts and the emergency filament at 3.5 watts.

As will be noted in the track diagram, automatic block signals are so located as to serve also as distant signals, and in addition signals 251 and 256, provide switch protection for the industry spur track at Macoupin. All of the controlled signals, as well as the automatic signals, are equipped with electric lights.

The line control circuits originating at the office at Plainview, as well as the lamps in the illuminated track diagram, are energized by a set of 16 cells of Edison 1,000-a.h. primary battery. The signals and track circuits throughout the installation are likewise operated by primary battery.

The signals, relays, etc., on this installation were furnished by the General Railway Signal Company, and the spring switch, stand and locking arrangement by the Union Switch & Signal Company. The project was planned and installed by the signal department forces of the Alton.