

# Control of Four Layouts Consolidated in One Interlocking

AT CINCINNATI, the Southern Railway has installed a new electric interlocking, with a panel-type control machine that consolidates the control of four layouts, as well as providing train operation by signal indication in either direction on each of two main tracks for 0.7 mile on a bridge over the Ohio river. The existing semaphore type signals were replaced with colorlight signals, concurrently with the installation of the new interlocking.

This new interlocking control machine is on the second floor of a new brick tower, west of the tracks, near Gest street, which is at the south end of the Southern's yard in Cincinnati where road freight trains are received and are made up for departure southward. Hand-throw switches were previously in service at the layout, near Gest street, at the south end of this yard. Switch tenders were employed to handle the switches.

In this area, marked Zone A on the plan, the new interlocking project includes the installation of electric switch machines and signals, as follows: Crossovers 1, 7, and 9; switches 3 and 5; and interlocking home signals 2, 4, 6, 8, 10 and 12. The two tracks branching off to the

**Numerous through trains, transfer moves and switching operations are handled more efficiently by combining control in one machine**

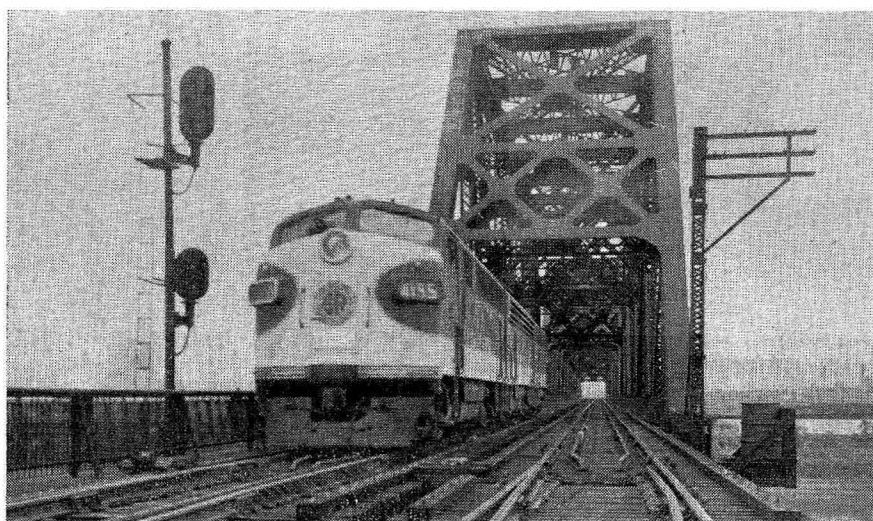
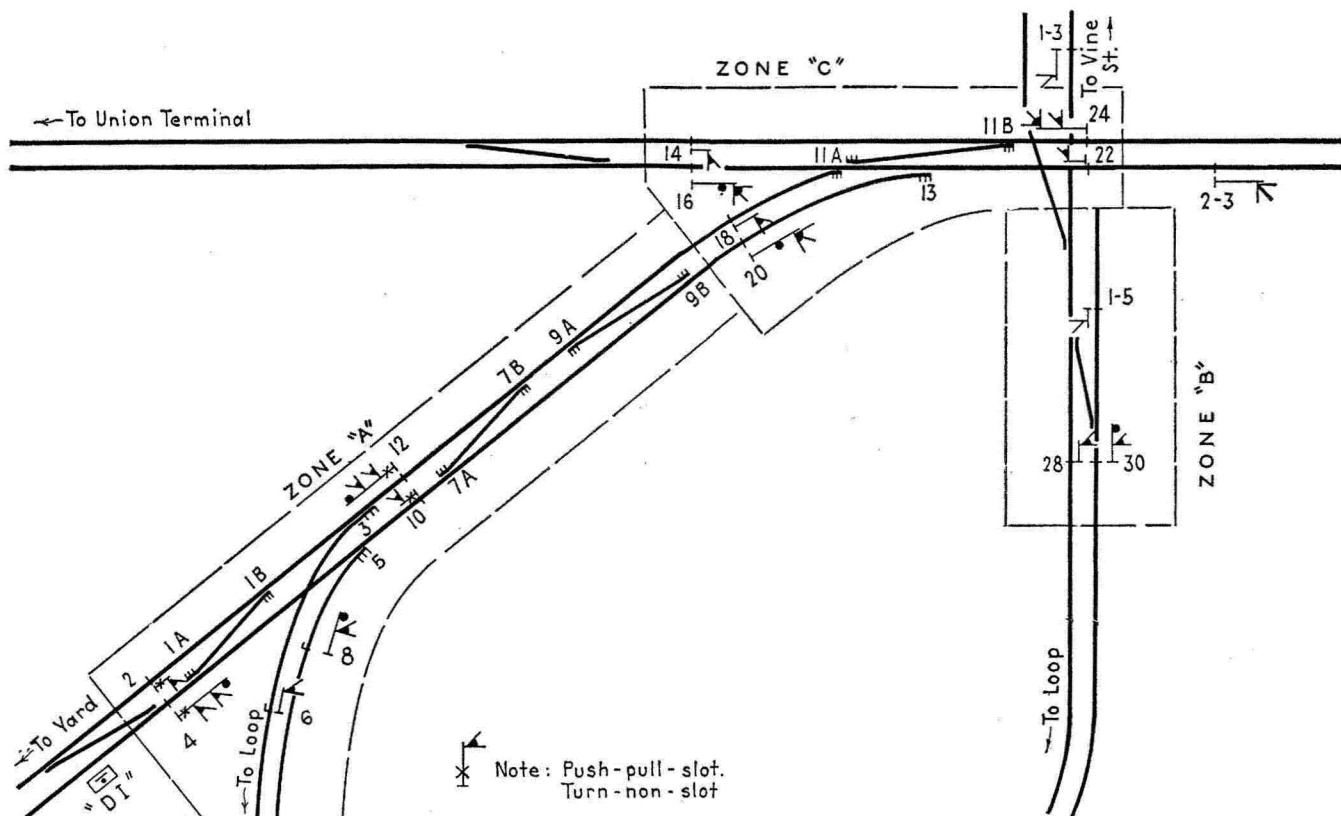
west go around a loop to a lower level, and extend on east under the main tracks and then on east to Vine street yards. This line serves numerous warehouses and industries, as well as yards where the Southern interchanges cars with other roads. On the lower level of this loop line, there is a second interlocking area, marked Zone B on the plan, which also is controlled from the new panel machine at Gest street tower. This Zone B includes controlled signals 28, 30, and automatic signals 1-3 and 1-5.

Zone C is at the junction between the Southern double-track main line and the double track extending into the Cincinnati Union Terminal. This zone includes switch 13, switch and movable frog 11B and 11A, and signals 14, 16, 18, 20, 22 and 24. These interlocked switches and signals

were previously in service, but were controlled from the interlocking then existing at the south end of the Ohio River bridge.

Zone D, at the south end of the bridge, includes switches and signals connecting the two main tracks to the north end of the coach yards, enginehouse and an industrial yard, all known as Ludlow yards. This layout includes power switch 21, power crossover 19 and electrically-locked hand-throw switch 17, as well as home signals 36, 38, 40, 42 and 44. These switches and signals, in Zone D, are now controlled from the new panel-type machine in the tower at Gest street in Cincinnati.

This layout was previously controlled by a Model-2 electric interlocking machine in a tower that was located as marked "MS" tower on the plan. In this previous interlocking switch 17 was operated by an electric switch machine. Because this track is used only for occasional switching moves, the switch machine was replaced by a G.R.S. Model 9 hand-throw switch-and-lock mechanism which has a Model 9-A electric lock to lock the lever in the normal position. This MS tower interlocking also included levers for controlling



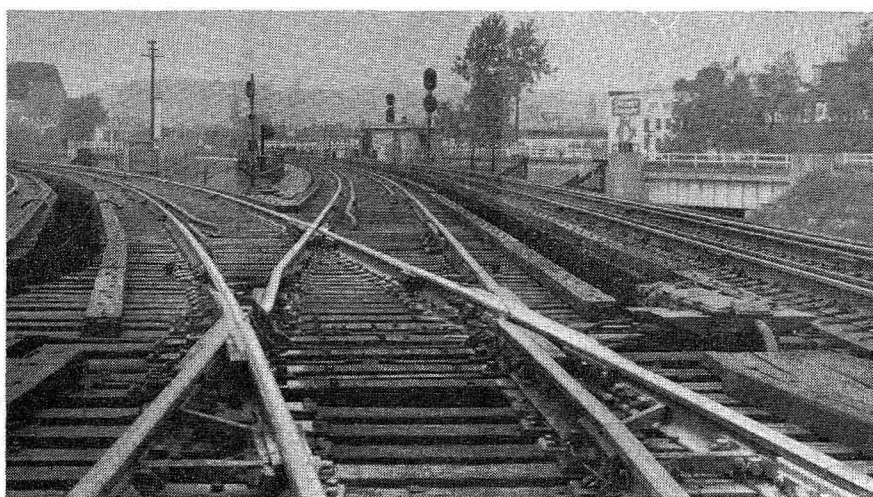
**Left—Trains or light engines run either way on both tracks on bridge over the Ohio river**

the switches and signals in what are now Zones B and C.

Thus the one new panel-type interlocking machine, in the new tower at Gest street, now controls all the interlocking in Zones A, B, C and D. Also included in the new system is the control of signals to authorize train movements in either direction on both main tracks between Zones A, C and D.

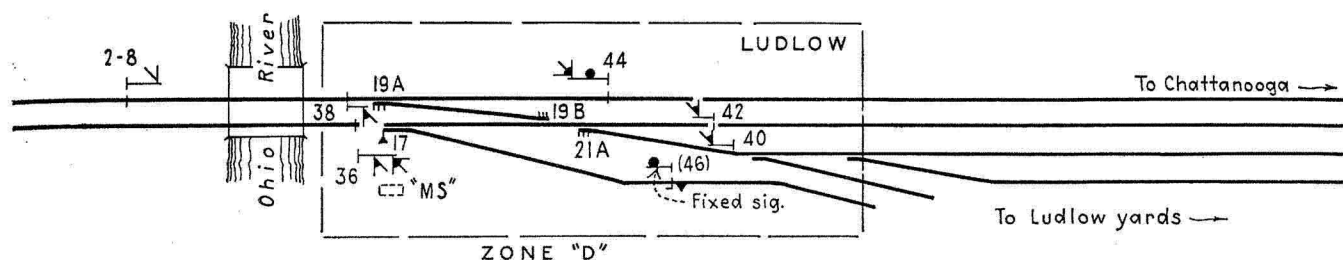
#### **Numerous Trains and Switching Moves**

Daily traffic through this interlocking includes 8 scheduled passenger trains, approximately 20 freight trains, and numerous switching and other movements. Locomotives and certain empty cars of inbound passenger trains are turned at the Cincinnati Union Terminal, then moved over the bridge to Ludlow coach yard and engine terminal. Locomotives of inbound freight trains are moved light from Gest street yard to Ludlow enginehouse. Locomotives and certain empty passenger cars of southward passenger trains are backed from Ludlow to Cincinnati Union Terminal. Likewise, locomotives for southward freight trains move from Ludlow engine terminal over the bridge to the freight yard in Cincinnati. The new interlocking arrangement permits coordination of these various



**Movable-point frog No. 11A on bridge structure**





trains, switching and other movements to advantage, thus providing a more efficient operation.

The maximum permissible train speed on the Ohio River bridge is 20 m.p.h. The special arrangement to control signals to direct train or engine moves, in either direction on both main tracks over the Ohio River bridge, is a great advantage in getting light engines or switch runs across the bridge while the other track is being used by a train. The overall block between Zones C and D is cut into two automatic blocks by an intermediate signal for each track for each direction, thus permitting the following moves, which saves time.

Crews of southbound freight trains, that are ready to depart from the yard, get their orders from the leverman-operator in the new tower, whereas they previously had to go

to an operator in an office in the yard building to get their orders. Most of the movements within the yard are directed from an office located on the top floor of the new tower. An extensive loud-speaker communication system is used in directing movements. The men on the ground can also "talk back" to obtain instructions or to give information to those in the tower.

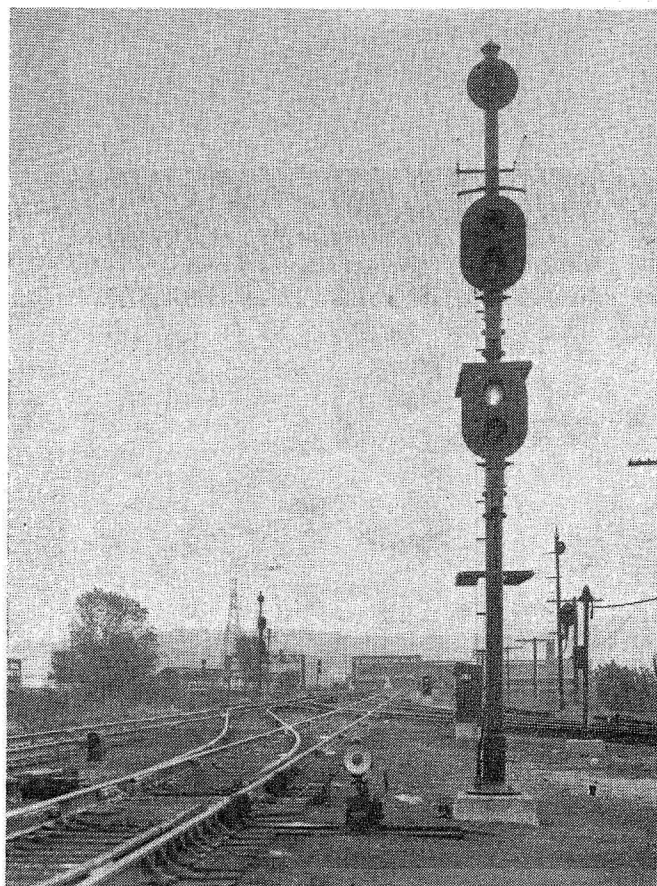
### Control Machine Easily Operated

This new interlocking is the all-relay control type, using a Type C, floor model panel interlocking control machine, the panel of which is 24 in. high and 37 in. wide, as shown in the picture herewith. Below the track diagram is a set of small black-handled toggle levers, one for each switch or crossover. When a lever is thrown "down," its switch is controlled to the normal position; and

when the lever is thrown "up," its switch is reversed.

Above each switch lever, there are two small indication lamps. The lunar white lamp (known as an out-of-correspondence lamp) is lighted from the time the lever is thrown until the switch operates and is locked in the position called for by the lever. The other lamp, which is red, is lighted when electric locking is in effect to prevent operation of the switch, even if the lever were thrown inadvertently. On the panel, white lines,  $\frac{1}{8}$  in. wide, represent the tracks. Movable sections (switch indicators) operate when switches are lined up, so that the route is indicated by a continuous white line  $\frac{1}{8}$  in. wide. On these lines representing tracks, there is a knob at the place corresponding to the location of each home signal.

Having lined up the switches for



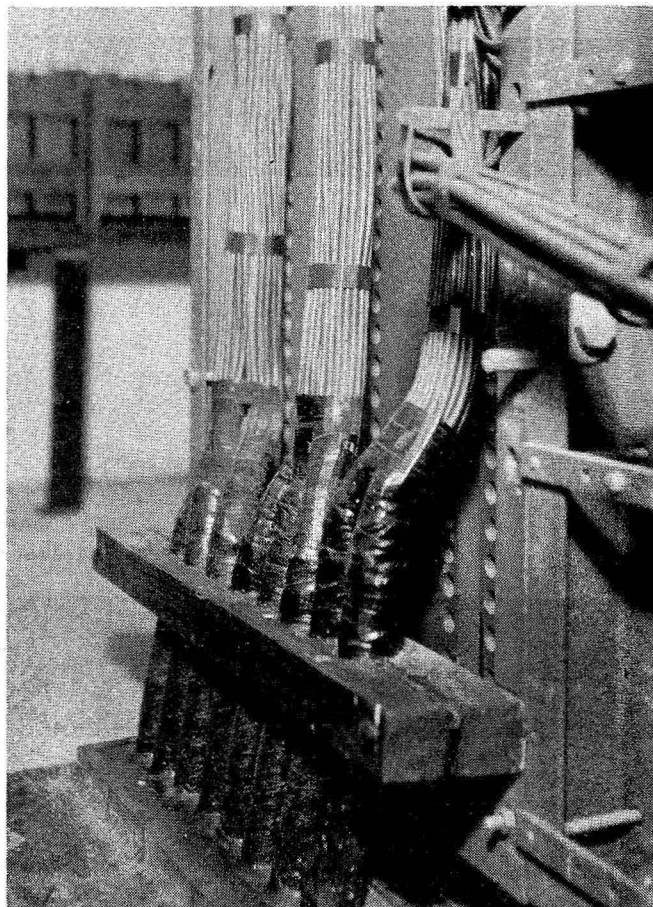
Signal No. 4 displays special switching aspects



The tower is of modernistic design



Plug-in relays save time and prevent mistakes



Incoming cables are well sealed

a route, the signal is then cleared when the leverman presses the knob for that signal. When the signal clears, a lamp is lighted behind a small lens in the face of the knob. If a signal, that has been cleared, is to be taken away, the leverman cancels the route by pulling the knob.

### Special Signaling Controls

Zone A, as shown on the plan, is a slow-speed area used by freight trains when entering or leaving the yard, and by yard engines when making switching moves. In order to arrange for the use of the interlocking home signals to direct these complicated switching moves, each of the signals in Zone A (when displaying a restricting indication) is "normally" track circuit controlled through only the one short track circuit beyond such a signal. For example, signal 4 is track controlled through track circuit 4T only. The word "normally" in the previous sentence applies when using the "push" operation of the signal control knob.

In this Cincinnati freight yard, the cars are classified by flat switching in which the yard engine runs back and forth on certain tracks in Zone A to kick cars into the various yard tracks. When lining up for these

back-and-forth moves by the yard engine, the leverman "turns" the signal control knob, as for example for signal 4. This establishes controls that are independent of track circuit occupancy, and causes signal 4 to display a restricting aspect, red-over-red-over-yellow. Because the control circuit is not "slotted" through the track, the signal aspect is displayed continuously until the switching is finished, or until the leverman wants to clear the lead for an incoming or departing train. This special control applies only on signals 2, 4, 10 and 12.

### Approach Annunciator Sections

Locomotives assigned to southward freight trains that are to depart from the Cincinnati freight yard, are run light from the engine house at Ludlow and over the bridge north to Cincinnati. Special short annunciator track circuits were installed in approach to dwarf signal 40 at Ludlow. When a light engine is ready, it is stopped on this circuit and a special track occupancy lamp indication is lighted on the interlocking panel at Gest street tower. Then the leverman lines up for the move as soon as he can. The same practice is followed for backup passenger equipment

moving from the Ludlow coach yard to the Cincinnati Union Terminal.

The relays in the new interlocking tower are the quick-detachable plug-in type. On the bridge structure, conventional relays with spring hangers are used. Some of the cases on the bridge are supported on rubber cushions, about one inch thick, to absorb vibration. Compression-type wire terminals made by Aircraft-Marine Products Company are used on all outside case wiring.

The 110-volt battery for feeding the switch machines in Zones A and C consists of 88 Edison B4H storage cells. Control circuits are fed by 9 A4H cells. Similar sets of battery are in service at the Ludlow end of the bridge. Each track circuit is fed by two Edison 1,000-a.h. primary cells, or one B4H storage cell.

This interlocking was planned and constructed by signal forces of the Southern Railway, under the jurisdiction of L. C. Walters, assistant to vice-president, signal and electrical, and under the direction of H. A. Hudson, signal and electrical superintendent, Lines West. M. Brock, signal and electrical supervisor, had supervision of the construction forces. The major items of signaling equipment were furnished by the General Railway Signal Company.