

THIS PUSH-BUTTON ENTRANCE-EXIT PANEL controls the same layout as a previous 95 lever interlocking machine

## NX Control Replaces Lever Machine

**With this new machine, routes can be set up quickly,  
thereby saving train time, especially in rush periods  
—Change-over completed in three and a half hours**

IN ORDER TO SET UP routes more quickly, and to reduce operating expenses, an entrance-exit interlocking control system including an NX machine and circuits, has been installed to replace a lever-type machine including mechanical locking, at Grand Avenue interlocking in St. Louis, Mo. Within the limits of this plant, tracks of the Frisco, the Missouri Pacific and the Wabash from the west and southwest, converge and connect to one double-track line which is used by passenger trains of all three roads going to or coming from the St. Louis Union Passenger Station, which is about 2 miles east of Grand Avenue.

### Freight Trains Too

A Missouri Pacific freight yard is located at 23rd street, which is east of Grand Avenue, so that MP through freight trains to and from the west pass through the Grand Avenue interlocking. Also the 23rd street area includes a Wabash and Frisco yard. The Frisco makes transfer moves both ways between this yard through Grand Avenue interlocking to their main yard in the southwest part of the city. The Wabash has 4 through freights daily, as well as transfers. A total of

about 50 scheduled passenger trains and 20 road freight trains pass through Grand Avenue interlocking daily. Numerous freight transfer and switching moves bring the total to about 400 in each 24 hour period. Passenger and freight traffic are heavy during a peak period between 6 a.m. and 9:30 a.m. as well as between 5 p.m. and 8 p.m.

This interlocking includes 3 single switches, 5 cross-overs, 9 single slips with movable-point frogs, and 8 double slips with movable-point frogs; a total of 64 switch movements being required. Thirty switch levers were in service in the previous machine. The interlocking includes 38 home signals, which were controlled by 28 levers in the previous machine. Different track line-ups that can be established afford 342 possible routes.

### The Old and the New

The lever-type machine, including mechanical locking between levers, had 95 levers in a 96-lever frame, and was approximately 20 ft. long. This machine, having been in service at this busy location since 1896, was badly worn. Rather than make extensive replacement of parts in the old machine, a decision was made to in-

stall a modern system of relay interlocking, including a push-button type control machine.

The new interlocking control machine is the NX type, the panel being 54 in. long and 32½ in. high. Each track is represented by a white line ¼ in. wide. On this diagram, each signal is represented by a push-button which is in the location corresponding with that of the signal which it controls. In the face of each signal button, there is an arrow which points in the direction which the signal governs. Alongside each signal button there is a small-sized exit push-button.

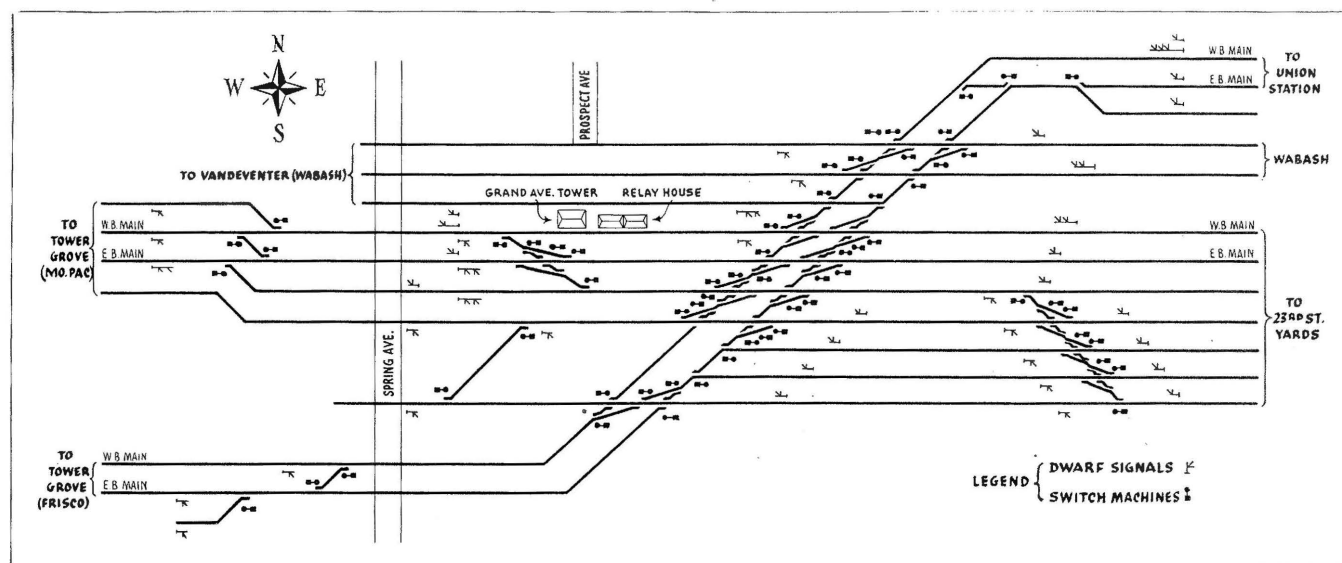
### Rapid Manipulation

When a train is approaching, the operator pushes the button representing the home signal at which the train is to enter the interlocking, and a red arrow is lighted in the face of the signal button. Then he pushes the exit button representing the exit from home signal limits, after which the switches and crossovers will be operated to the positions called for to complete the track line-up from that entrance to that exit. Then the signal for that route will be cleared, and the arrow in the face of the button changes to amber. No matter how many switches

As a train accepts and passes the signal, the amber light in the entrance button is extinguished. As the train occupies each track circuit section, a corresponding track-occupancy lamp is lighted red. As the rear of the train clears each section, the corresponding red track-occupancy lamp is extinguished. The route and detector lamps remain lighted until the locking is released behind each movement. The operator is not required to return the functions to their normal positions as routes remain in their last position until needed for other moves. Thus, the manipulation of this NX interlocking control machine requires much less time and is concentrated at the one small panel. An important advantage is that one man at this new machine can set up the routes more quickly and thus handle the trains with less delays than was possible with the previous lever machine.

### Changed Over Quickly

The switch movements in the previous interlocking were the electro-pneumatic type, and these movements were retained in the new plant. On the second floor of the tower, space was available to locate the new NX



**IN THIS INTERLOCKING, which includes 64 switch machines and 38 home signals, different track line-ups can be established to afford 342 possible routes**

are to be operated, the change of track line-up is complete and the signal clears in a few seconds. To line up the same route with the previous lever machine would have required much more time—perhaps several minutes for the more complicated line ups.

### Information on the Panel

In the white line which represents each track, there are small indicator lamps that are normally dark. The one in the portion of "track" which represents the switch point or stock rail of the turnouts serves as the track-occupancy light which burns red when the track is occupied; flashes amber while the switch is in transit; then is steady amber; and, in combination with adjacent lamps, indicates the position of the corresponding switch when a route over that switch is called for. This latter combination of burning lights also is used to indicate approach, route, and detector locking. Thus these amber lights will indicate the route lined between the entrance and exit buttons.

machine in front of the old lever machine, and keep the old machine in operation as usual. To avoid interference with the operation of the existing interlocking, a complete new system of circuits and relays was installed in the ground floor of the tower, and in separate instrument houses nearby.

This new system was completely tested out ahead of time, and the change-over from the old to the new machine was a matter of disconnecting the field wires from the old machine and connecting them to the new control system. The actual change-over was made during a period of minimum traffic when the few movements that were made were handled through the plant on hand signals. Three and one-half hours were required to make the change-over and complete the final tests.

This interlocking improvement was planned and constructed by Missouri Pacific forces. The new NX interlocking machine was furnished by the General Railway Signal Company.