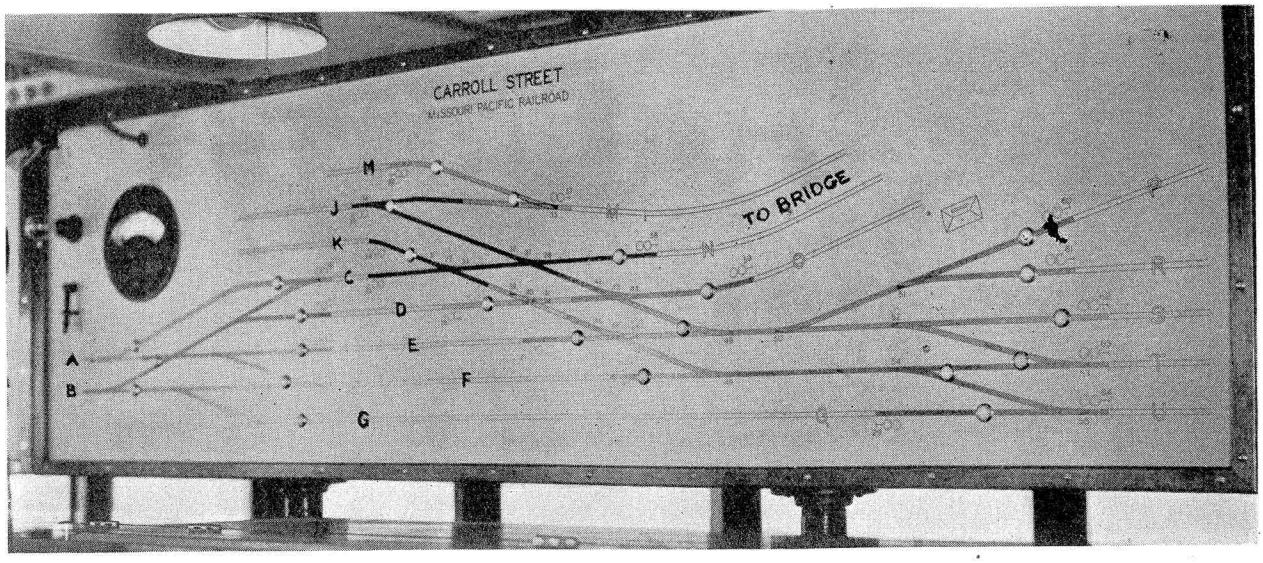
New Interlocking for the St. Louis Municipal Bridge



The general track layout is shown plainly on the illuminated track diagram

Simplicity of circuit Arrangement and unique tower are features of 64-lever electric plant

IN August, 1930, the Terminal Railroad Association of St. Louis, Mo., made an agreement with the City of St. Louis to use the tracks on the Municipal bridge over the Mississippi river, which was completed in 1917 but had never been used by steam roads. As a part of the agreement, the city was to construct five new approaches and the south approach tracks on the St. Louis side, cross and connect with freight line and yard tracks of the Missouri Pacific. A new interlocking was constructed on this south approach to the west end of the bridge.

Layout of Plant

At Rutger street, the Missouri Pacific has a large icing station and team track layout, these facilities being served from tracks P and R as shown in the view of the illuminated track diagram. The two new main tracks from the bridge are marked N and O, and it will be noted that these tracks cross the Missouri Pacific track marked S which extends into the yard by way of tracks H, J, K and M. The tracks marked A, B, F, G, U and T are municipal tracks which are maintained and operated by the Terminal Railroad Association of St. Louis. Tracks C and D are also municipal tracks which are maintained and operated by the Manufacturers Railroad. Track E is an M. P. connection to municipal track A.

Trains may be routed from the Missouri Pacific tracks J and K to the bridge tracks N and O. Other roads such as the Alton & Southern and the Manufacturers Railroad, use the bridge to deliver and pick up freight in the M.P. Carroll Street yard and the Manufacturers river yard. At present, trains are manually blocked from the east side of the bridge to the south approach on the west side of the bridge, the operators in this tower acting as block operators in conjunction with the dispatcher of the Alton & Southern located at Davis Street yard in East St. Louis.

The switches in this yard lead had formerly been operated by hand but when the tracks were built from the bridge approach, this introducing a double-track crossing, it was decided that an interlocking plant was necessary to insure safety and to facilitate train movements.

Unique Tower

A special feature of this installation is the unique construction of the tower. The building is of reinforced concrete construction. The two lower floors are 8 ft. 2 in. by 30 ft. 8 in., the width of the building being limited on one side by track clearance and on the other side by the requirement that space be left open for a drive used by fire trucks. The third floor is 13 ft. 6 in. wide by 36 ft. long inside, and, as shown in the picture, extends out 2 ft. 8 in. beyond the lower floors, all the way round. The first floor is used for a signal maintainers workshop and also contains a thermostatically controlled oil-burning furnace, heat radiation being accomplished with steam radiators equipped with electrically operated blower fans which can also be used for ventilating purposes when the furnace is not in use. The second floor is divided into three rooms. The first contains the battery, the battery-charging apparatus, the switchboard and the motor generator set, all the wiring in this room being protected with conduit. The second room contains all of the relays used in connection with this installation, while the third room is equipped and furnished with complete lavatory, toilet and locker facilities.

The third floor is the operating room, the roof being supported by four steel columns which extend upward in line with the walls of the lower floors. No supports

of any sort are included in the outer walls of the top floor which are entirely taken up by metal casement windows, thus affording excellent ventilation and a good view of the tracks in all directions. An additional feature is the cupola in the roof with a row of windows on each

The reinforced concrete tower is of unique construction

side, which can be opened or closed by a gear arrangement. Every possible means has been used to provide ventilation and lighting in this tower.

The Interlocking Machine

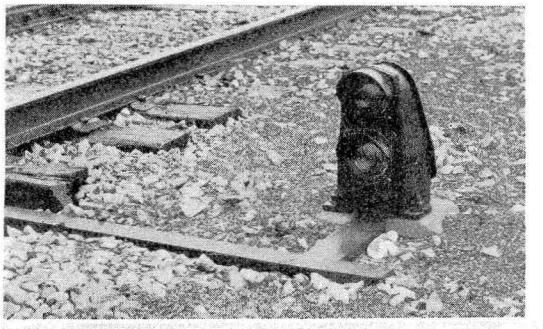
The interlocking machine is the G. R. S. Model-2 unit-lever type with 55 working levers and 9 spare spaces. Twenty-three levers are for 23 signals and 32 levers for 32 switch machines operating five single-slip switches with movable-point frogs, and 17 single switches. No mechanical locking is used between switches. Above each lever there is a small case the lower portion of which contains the lever number on a glass cover, and the upper portion has a round red lens. The lamp behind the switch lever is illuminated when the lever-latch is operated if the lever is unlocked electrically so that this is an indication to the leverman that the lever can be moved. The lamp behind the red lens above each signal lever is lighted when the respective signal indicates Stop. The fact that a signal has changed from the Stop to the Proceed indication, in correspondence with the movement of a lever, is indicated by the indication light being extinguished. The circuits are so arranged that the signal will display a Stop indication in case the lamp in the proceed indication is burned out.

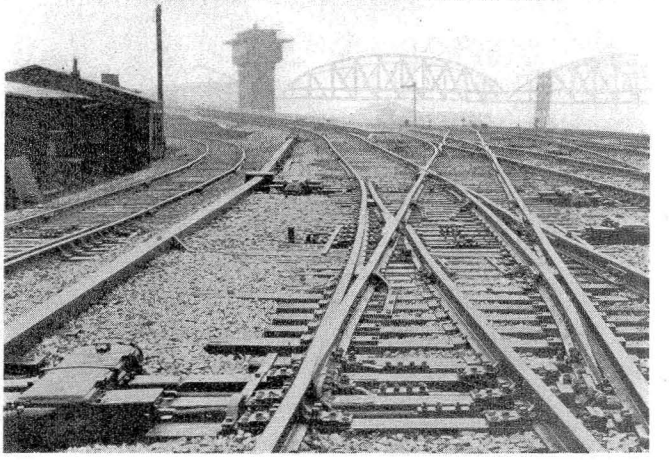
The relays and trickle-charged battery for the five d-c. track circuits are located in the tower. No approach locking or annunciators are used, but detector and route locking are provided. Signal levers are each equipped with a time-contactor requiring 30 sec. from the time a signal lever is moved from reverse toward normal before the route can be changed. The individual cross-protection relays, as well as the fuses in the switch and signal circuits, are located in a case mounted on top of the interlocking machine. The front of this case is hinged to swing downward so that the leverman can readily reset a cross-protection relay or replace a blown fuse.

The illuminated track diagram and manipulation chart, mounted above the machine, are constructed of Transite board with tracks, switches, signals and manipulation instructions painted on the surface. The ammeter, ground-test lamp and switch are also mounted in this board, thus making a neat arrangement. The switch machines used are G. R. S. Model 5A operated by 110 volts d-c.

As this is a slow-speed switching territory, two-position color-light dwarf signals are adequate and these signals give a purple indication for Stop and yellow for Proceed-with-Caution. Each signal is equipped with a 110-volt to 9-12 volt transformer for the 10-volt 14-watt lights. The signals are operated on 110 volts a-c., the

All the signals are of the two-color dwarf type





A general view of the plant looking north toward the tower

indication relays are controlled through the rectifier unit in series with the 110-volt signal feed circuits extending to the respective signal.

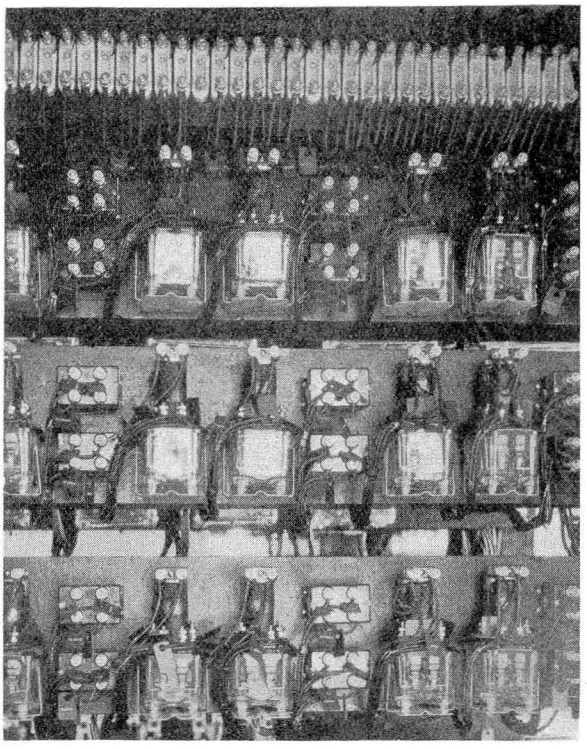
Battery and Power Room

A set of 55 cells of Exide Type EMGO-7 lead storage battery is provided for the operation of the 110 volt d-c. switch machines. This battery is on a floating charge of about 1,500 milli-amperes from two copper-oxide rectifiers operating on 220 volts each with a capacity of 3 amp. A set of 6 cells of Exide type KXHS-7 battery is used for the local repeater circuits and this battery is also on a floating charge. A commercial feed of 220 volts a-c. is brought into the tower and in case this a-c. supply is cut off temporarily a d-c.—a-c. motor-generator, feeding from the 110 volt battery, will automatically assume the a-c. load of the signa lights until the normal supply is restored. The interloc ing plant will operate

approximately eight hours off of the storage battery, and as the commercial power supply in St. Louis is very reliable the chances for a power failure of serious duration is extremely remote.

The Relay Room

The relay room contains two double relay racks made up of Johns-Manville impregnated asbestos board one-half inch thick, nine inches wide, and 6 ft. long. These boards are bolted to channel-iron uprights at the ends,



The relays are all located in the tower and are mounted on asbestos board

which are set in the floor and ceiling as a part of the permanent construction. The relays are spring mounted, the supporting brackets being bolted to the asbestos board with small carriage bolts. The porcelain-based terminals at the top and bottom of the racks are likewise bolted to asbestos board. Metal wire chases are used between the two relay racks and from the racks to the interlocking machine directly over the relay room. The track and track-repeater relays are all on one side of relay rack No. 1, while the route stick relays are on the other side of this rack. The switch-repeat relays are on one side of rack No. 2, the indication relays being on the other side.

The control circuits from the tower are run as single-conductor insulated wires laid loose in trunking built up of redwood lumber. Fibre conduit laid in concrete is used where the main wire lead extends under the tracks. An individual return wire is provided for each switch and signal function.

With 64 routes through this plant the present traffic averages 250 movements a day and this number will be greatly increased when all of the approaches to the municipal bridge are completed.

The interlocking plant is the property of the City of St. Louis, the General Railway Signal Company supplying the equipment and performing the construction by contract under supervision of the signal engineer of the Missouri Pacific.

Grade Crossing Accidents in California

THE annual report of the California Railroad commission, relative to grade crossing accidents in the year 1930, is abstracted in the following paragraphs. The report covers all accidents occurring at crossings of highways and electric interurban or steam railways; it also deals with accidents that occurred between crossings where railroad tracks are located in and along traveled streets. Accidents occurring on railroads at locations other than grade crossings and traveled streets, and accidents occurring on street railways, are not included in this report.

The report deals with a total of 2,756 accidents reported to the commission during the year 1930, resulting in 203 deaths and 881 injuries. With respect to the number of grade crossing accidents the report shows a reduction of 5.9 per cent from the 1929 figures, while the casualties decreased 10 per cent. Practically all of the decrease in accidents during the year occurred at Class A crossings, these being reduced from 2,723 to 2,455. Accidents at private crossings show practically no change, there being 65 in 1930, compared with 67 in 1929. A somewhat larger percentage of accidents occurred during the winter months than in the summer months. An estimate of the damage to property in connection with grade crossing accidents for 1930 shows a substantial decrease, compared with the 1929 damage to railroad property.

The number of persons killed and injured at grade crossings in California during 1930 was approximately 12.2 per cent less than in 1929, amounting to 1,011, compared with 1,154. However, the 1930 casualties exceed all previous years with the exception of 1929.

A check of 1,189 reports shows that 1,045 cases, or 88 per cent, involved male drivers, while 144 cases, or 12 per cent, involved female drivers. The relative registration of operators is 72 per cent male and 28 per cent female. It should be pointed out, however, that a mileage basis, if figures were obtainable, would afford a better basis of comparison than the number of registered drivers. This also applies to the above comparison on the age of drivers. An analysis of 59 crossings protected by crossing gates shows that at such crossings 13 accidents occurred, involving two deaths and five injuries. These were all cases involving contact with trains at times when gates were operative and includes all gate-protected crossings in the state, except those along Alameda street, Los Angeles. Trial of various protective devices other than the wig-wag signal, now the standard in California, has been continued throughout the year. Such devices include flash-light signals, rotating-stop flash-light signals and automatic gates.

Slightly over 20 per cent of the grade crossings over main and branch line railroads are now provided with some type of special protective device which, for the most part, has been installed by the railroads, and these universally are maintained by the carriers. The addition of protective devices at unprotected main line crossings undoubtedly would reduce grade crossing accidents.

It is important that such devices give the motorist a distinctive signal and only upon the immediate approach of a train. The railroads are now spending considerable sums of money to eliminate excessive operation of signals, in the way of re-arranging circuit controls. It often has been urged, principally by the carriers, that the public should pay a portion of the expense incurred in installing grade crossing protective devices.