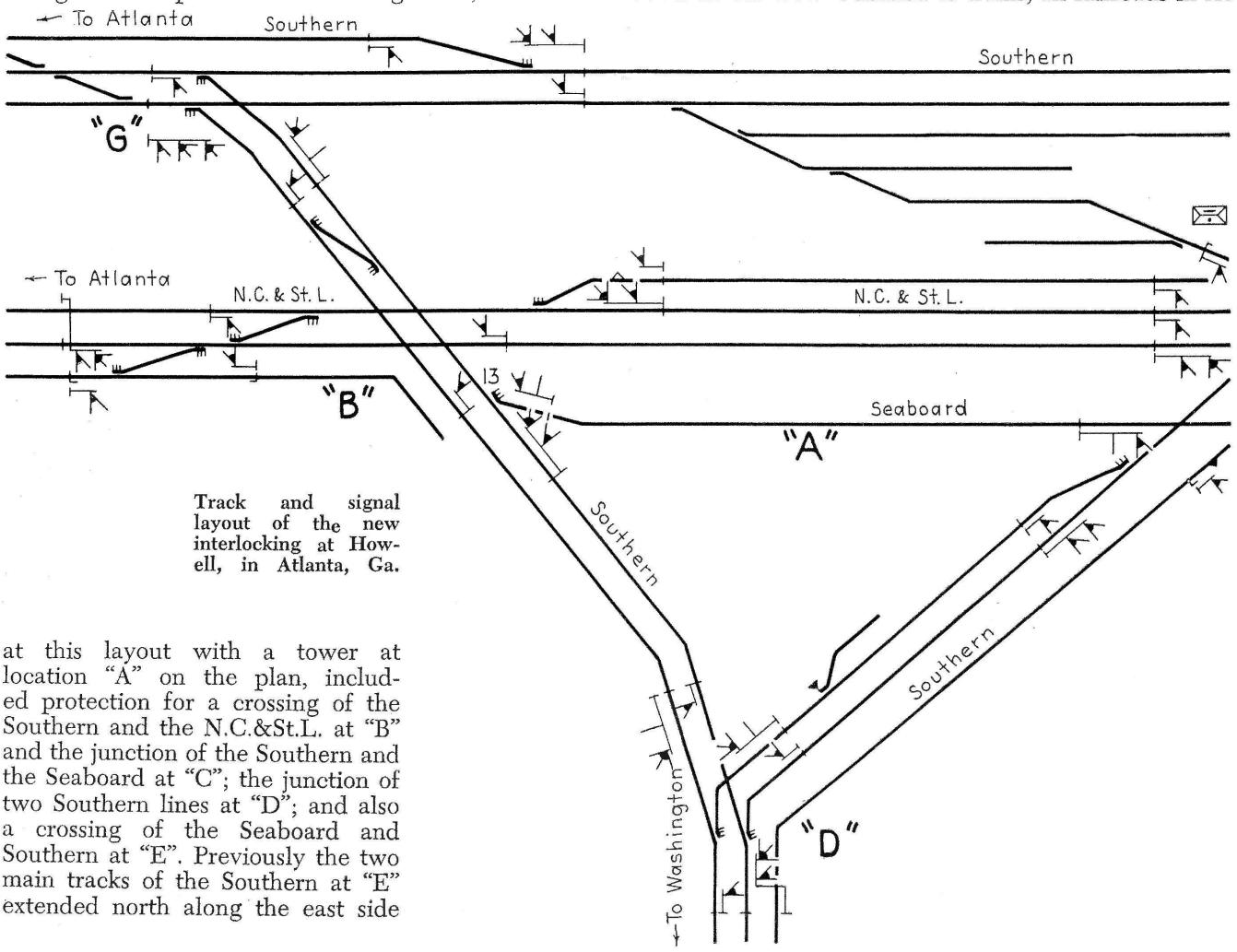
Big NX Interlocking

About 400 train moves daily through busy area used by four roads now controlled efficiently by new plant installed by N., C. & St. L.

AT Howell, in the city of Atlanta, Ga., about 3.5 mi. from the center of the city, the Nashville, Chattanooga & St. Louis has recently installed a new electric interlocking with NX control, to include the track layout of a previous plant, as well as other switches formerly not interlocked. In addition to the N.C.&St.L., this new plant includes tracks of the Southern and the Seaboard in an extended area involving 64 power switches, 24 power crossovers, 1 power derail, 3 electric locks on hand switches and 64 signals. The previous interlocking



Track and signal layout of the new interlocking at Howell, in Atlanta, Ga.

at this layout with a tower at location "A" on the plan, included protection for a crossing of the Southern and the N.C.&St.L. at "B" and the junction of the Southern and the Seaboard at "C"; the junction of two Southern lines at "D"; and also a crossing of the Seaboard and Southern at "E". Previously the two main tracks of the Southern at "E" extended north along the east side of the N.C.&St.L. for about 1 mi. to another interlocking known as Tower 1 where these Southern tracks crossed those of the N.C.&St.L.

Changes were made to abandon this mile of double track and the interlocking at Tower 1, and to extend one Southern track across the N.C.&St.L. in the area "E", and to connect this Southern track with the Southern tracks at "F". These changes were necessitated in part as a means of routing trains into and out of a Southern yard about 1 mi. north of Howell.

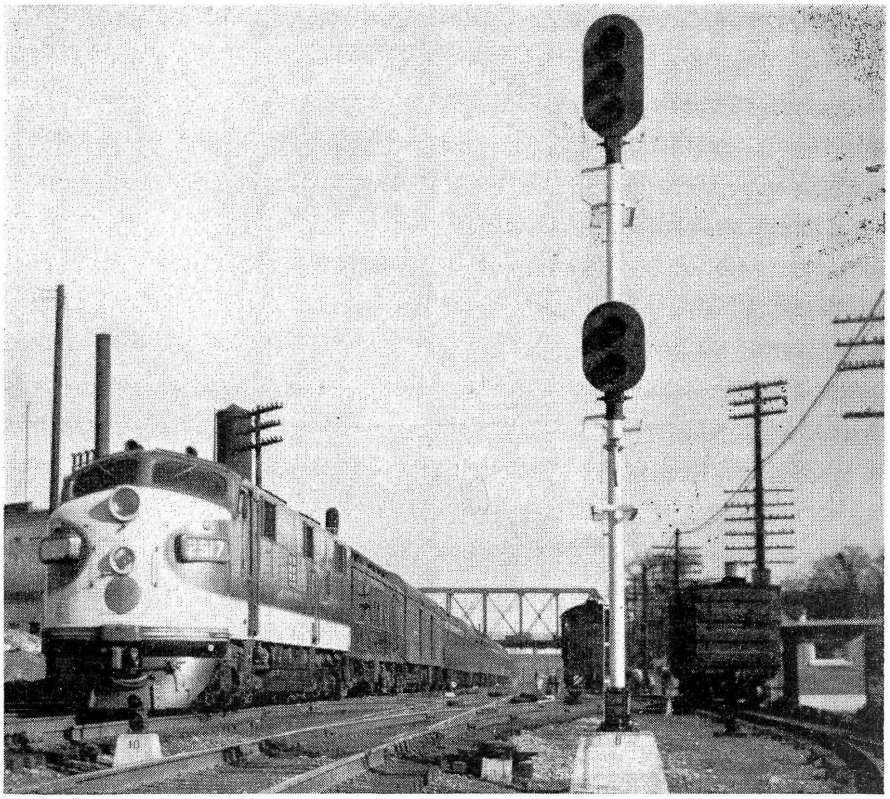
Area "G"

The switches included in the junction of Southern tracks in area "G" were previously hand-operated by switch tenders. These switches, as well as additional crossovers in this area, are now included in the new interlocking. Through this interlocking, trains of the Louisville & Nashville are operated over the main tracks of the N.C.&St.L. The Seaboard has its own track from the north to a junction with the Southern at switch 13, from which point the Seaboard operates over the Southern through the interlocking and beyond to and from the Atlanta passenger terminal.

500 Line-Ups Daily

About 70 passenger trains are scheduled through this plant daily. The Southern and the Louisville & Nashville operate road freight trains through the plant. The N.C.&St.L. and the Seaboard freight yards are to the north and east of this area, so that no road freight trains of these two roads pass through the plant. In addition to trains, all railroads in At-

at Atlanta

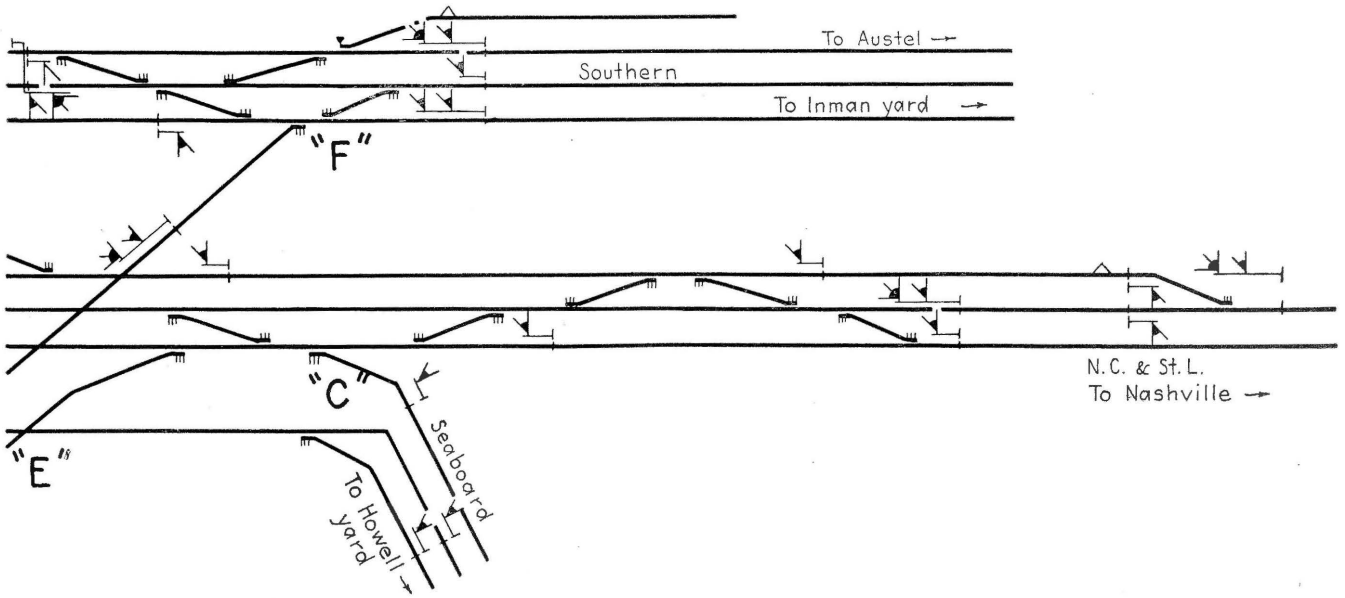


Train passing through plant near location "G". Signals 8 and 10 in foreground

lanta operate numerous switching moves, and transfer moves through this interlocking, so that between 450 and 500 different line-ups are required every 24 hours during busy seasons. Considerable of the traffic is bunched in certain hours in the morning and evening, during which time the line-ups must be changed quickly to avoid delay to approaching trains. For this reason, the NX control of the new plant is a decided advantage.

The Control Panel

The panel of the interlocking machine is 91 in. long and 30 in. high. Each track is represented by a white line ¼ in. wide. On this track diagram, there is an entrance knob at each of the 40 locations corresponding with signals on the ground at which a train can enter home signal limits. Also 40 exit buttons are located on the track diagram at the locations corresponding to places on the ground where trains can depart from interlocking limits.



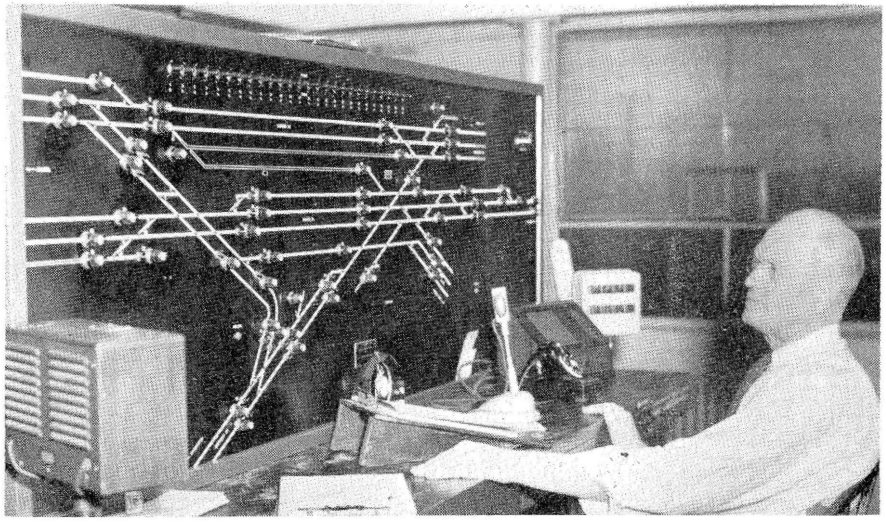
To Establish a Route

To initiate a route, the man in charge of the machine pushes an entrance knob, and then the exit button, following which the switches automatically operate to the positions called for in the track line up, and are locked; then the signal for the route clears. When an entrance knob is pushed, a red light inside the knob is lighted to illuminate a black arrow which points in the direction in which the signal controls. When the signal clears, this red light is replaced by a green light.

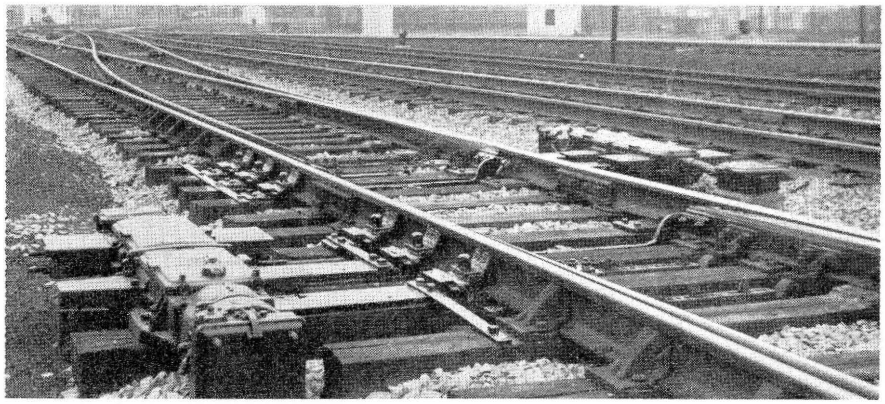
Route Indicators

On the track diagram, each switch is represented by a triangular piece of sheet metal pivoted so that it swings to repeat the position of a corresponding switch and thus on the track diagram the route line up is indicated by a full width line. These route indicators are operated magnetically by mechanisms behind the control panel. In the track line at each location corresponding with a switch, there is a lamp which is lighted red when electric locking is in effect to lock the corresponding switch. Sectional route releases is provided to release sections behind a train so that a different route or routes can, in many instances, be set up without waiting until a train has entirely cleared home signal limits. As the locking on each switch is released, the red lock lamp in the diagram at the location representing the switch, is extinguished.

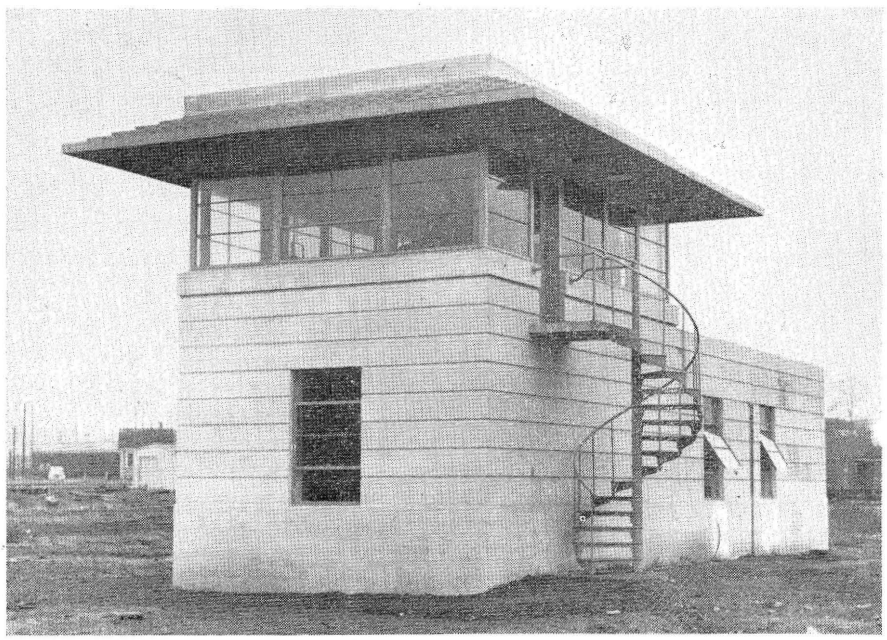
If a clear signal is to be taken



Panel of machine is 91 in. long and 30 in. high



Typical electric switch machines in the new plant



Modernistic tower. Floors and walls are solid concrete poured in place

away, the entrance knob is pulled, which changes the green light in the knob to a red which flashes until the locking is released by the electric locking. If there are two or more home signals on a route to be followed by a train when passing through the plant, operation of the first entrance knob and the final exit button will line up the entire route and clear all the signals on that route. This is known as end-to-end control.

When the maintainer is testing a switch, it can be controlled by an individual lever of the toggle key type. These little levers, one for each switch, are in a row at the upper part of the control machine panel. Under each of these levers is a small yellow indication lamp which is lighted whenever a switch is out of correspondence with the control as set up by NX or by individual levers. Whenever a control is established for a switch to be operated, its "out-of-correspondence" lamp is lighted until the switch is over and locked. If such a lamp stays lighted, the man in charge of the machine knows that the switch is not working, or it is obstructed.

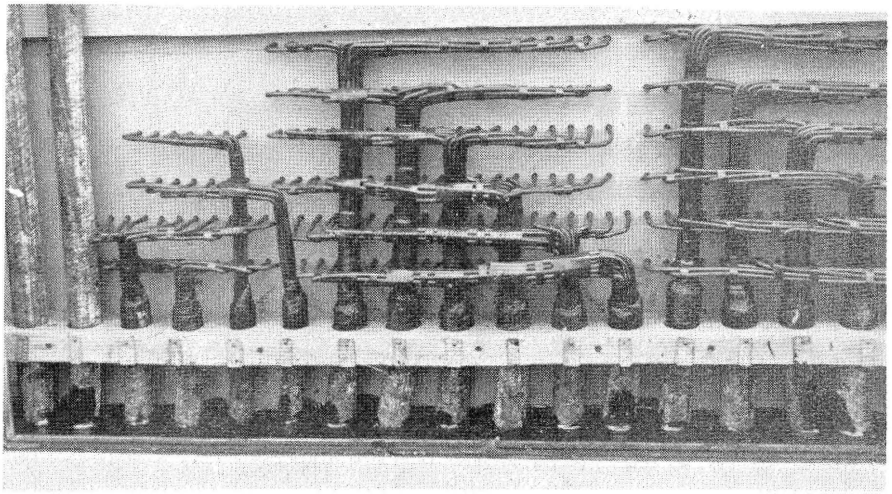
Relays

The relays located in the instrument housings are shelf-mounted Type K relays and the relays in the vital circuits in the control office are plug in Type B relays. The detector track relays are the K2 biased-neutral type rated at 4 ohms. A biased track relay can provide foreign current protection when connected properly in a circuit, if the foreign current is the same polarity all the time.

The switch machines on this interlocking are the Model 5A without built-in controllers. Each machine is controled by two Type K2 biased-neutral relays with contacts having magnetic blowouts. These relays are in housings adjacent the respective switch machines. This use of biased-neutral relays provides a high degree of cross protection, and they are easy to maintain, inspect and repair. The relays in the tower for controlling indication lamps on the machine, and for the non-vital circuits are the plug-in Type A, in cabinets each of which has a capacity for 40 of these little relays.

Plant Communications

On account of the extended area of this plant, many of the signals and switches are beyond calling distance and out of sight from the tower. As a means of communication between the tower and all locations over the plant, a special two-wire telephone circuit was installed. Connected to this circuit at signals are telephones in boxes that can be used by maintain-



Entrance of underground cables at the rear and base of instrument case

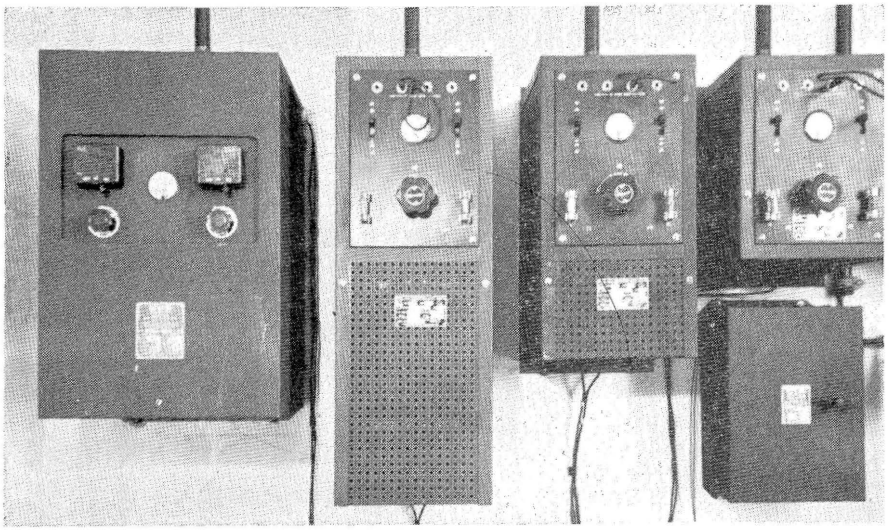
ers or train conductors to call the towerman. Also the circuit extends to jacks in the switch machines. The maintainer has a pocket-size handset phone that he can plug-in to talk to the towerman when working on a switch. At the tower, this phone circuit is connected to a loudspeaker on the control machine. When the towerman wants to call the maintainer when is away from the tower, he sounds a loud electrically operated horn. Also on a separate circuit are two talk-back speakers, one on the control machine and the other downstairs in the maintainer's room. These speakers are used for direct, quick-calling conversation between the towerman and maintainer.

Power Supply

The 110-volt d.c. switch machines on this interlocking are operated by a set of 85 cells of Edison A4H storage battery which is on floating charge by a Fanstel selenium rectifier rated at 120-volts, 6 amp. output. The relays and local circuits in the tower are fed by a set of 16 cells of A8H battery charged by a General Railway Signal Company rectifier rated at 7 amp., 20 volts. Each track circuit on this plant is fed by one cell of Edison B4H storage battery charged by a G.R.S. Type B3T104 rectifier. The a.c. power for this plant is fed normally at 440-volts from a signal power line. If this fails, a power-off lamp is lighted on the interlocking machine and the towerman throws a switch that cuts in power from a standby source.

Because of the long distances between the tower and many of the switches and signals a large amount of cable was required, a total of 813,120 conductor feet—154 miles—buried cable being installed on this new plant. This cable is buried at least 30 in. below the bottom of the ties, and is protected by a layer of clay all around, and also by a 2-in. creosoted timber on top, thus preventing damage by cinders, sharp rocks, and also from any digging tools which may damage cables. The cables are brought up through the bottom of each instrument case into a compartment at the rear behind the terminal board. Holes the size of cables are bored through a 2 in. by 4 in. which is then sawed lengthwise through the 2 in. dimension. One half is attached to the rear of the terminal board, then the cables are installed and the other half of the 2 by 4 is screwed in place to hold the cables as shown in the picture herewith. The outer covering of the cables is potheaded above the 2 by 4 and the separate insulated conductors extend through individual holes in the board. The space, around the cables as they enter the bottom of the case, is made tight with waste, and sealing compound about 1 in. deep is poured in around the cables to keep out insects and moisture. At the tower the cables come up through a duct and outlet in the floor including a sealing box as explained above. Solderless connectors, made by Aircraft-Marine, are used to connect these wires to posts on the terminal board. Wires in buried cables are of various sizes: No. 6 for the 110-volt d.c. circuit to the switch motors; No. 12 for the various control circuits; and No. 9 for track connections. This buried cable was made by the Kerite company.

The new tower of this plant is of modernistic design, as shown in one of the pictures. The floors, and walls are solid concrete poured in place. Likewise, the roof and overhanging canopy are reinforced concrete poured in place. Windows extend as all the wall space completely around the operating room on the upper floor, the concrete roof and canopy being supported by 8 in. pipe posts. On the ground floor there is a room 20 ft. 1 in. by 12 ft. 9 in. for relays, a room 8 ft. by 12 ft. 9 in. for battery, and a room between the other two 21 ft. by 12 ft. 9 in. for maintainers' headquarters, including toilet and shower bath. This building was designed and constructed by the engineering department of the N.C.&St. L. The interlocking was planned and installed by signal department forces under the direction of E. W. Anderson, signal and telephone engineer. The major items of interlocking equipment were furnished by the General Railway Signal Company.



Battery-charging rectifiers in the tower