

Electro-Pneumatic Interlocking

With Optical
Route Indicators
in the New



Three-aspect starting signals, with two-aspect shunt signals and optical route indicators

Buenos Aires Terminal

Important South American railway station,
entirely reconstructed, is equipped
with modern interlocking system

PLAZA CONSTITUCION, the Buenos Aires Great Southern Railway's new terminal in Buenos Aires, Argentina, has been equipped with a power interlocking system which is claimed to be one of the most complete of its kind in the world, according to *Modern Transport* (London), from which paper the following description is abstracted.

This terminal is the most important station in South America from the standpoint of volume of traffic, and will also be the most magnificent when the new buildings are completed. The old station building, which has served since 1885, is being demolished, and in its place is being raised a monumental structure with every modern convenience. Daily, 550 trains are handled, as well as 100 light engines, and, in addition, shunting movements are continuously being made. The trains are handled at 14 platforms served by means of a double-track system between each pair of platforms, and having crossovers for releasing the engines, with oil fuel and water feed columns suitably placed at both ends. The rearrangement of the track layout constituted a remarkable feat of railway engineering. The tracks had to be entirely rearranged, lowered, and ballasted, and it was necessary to do this without interfering in any way with the heavy traffic.

One Signal Cabin Instead of Three

In 1925 there were two mechanical cabins serving the station layout and yard, but, with the proposed remodeling of the track layout to suit the ever-increasing traffic requirements, three such cabins would have been necessary. In view, however, of the problems and inconvenience which arise in the course of designing and installing a three-cabin system, it was decided to install power

interlocking, with one controlling cabin. The system adopted was the Westinghouse Brake & Saxby Signal Company's electro-pneumatic type. This company also furnished all of the equipment used in the plant. Previously 30 signalmen manned the 2 mechanical cabins, and 35 would have been required for the 3 mechanical cabins which were formerly contemplated, whereas the new cabin, with its interlocking frame of 275 levers, is worked by three shifts of 5 men each during the 24 hr., a total of 15 men only. On the other hand, 12 electro-mechanical signal maintainers have been appointed, although it has been possible to reduce the number of mechanical linemen previously engaged, from 6 to 3. Even so, considerable economy in labor has been effected. As all signals are electrically lighted, lampmen are no longer required, and the cost of maintenance of and materials for the new plant, as compared with a mechanical plant, is small.

There are 108 track circuits of the double-rail resistance-fed type, which are fed from a pair of 12-volt d-c. mains which run throughout the entire yard. In cases where the tracks are a long way from the cabin, storage batteries, trickle-charged by means of rectifiers, give the necessary voltage supply.

Signals

The platform starting signals, governing the main-line movements, are of the three-aspect color-light type. Under each of these three-aspect signals is fixed a two-aspect short-range color-light signal, which acts as a "shunt" signal for engine movements. These signals are located at the end of the platforms and are repeated back half-way to the buffer stops by means of a single yellow lens repeater, which is mounted on the platform

umbrella and repeats the main line signal or the shunt signal, whichever is displaying an indication.

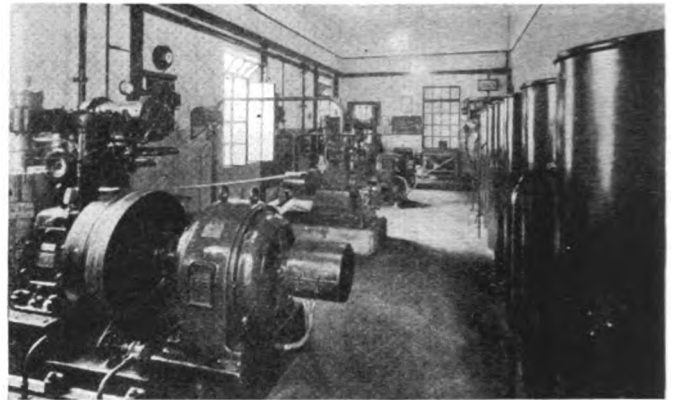
All other signals are electro-pneumatic. Those governing main line movements are of the three-position upper-quadrant type, the call-on arms are two-position upper-quadrant and the ground discs for shunting are also of the upper-quadrant type. All main-line signals are fully approach- and back-locked, and full protection is afforded.

Every controlled signal is repeated in the cabin by means of a small light which shows red when the signal is at Stop. Electric lighting, by means of a removable 100/6-volt transformer fitted into the signal head, has been adopted. Each transformer is fitted with two 6-volt bulbs. Two sources of supply are available, and if both these supplies should fail, oil founts can be substituted for the transformers. The switch which controls all signal lighting is situated in the signal cabin under the control of the signalmen.

One of the features of the signaling is the home signal bridge, with its two main-line and two call-on arms which, by the aid of route indicators, control all the traffic entering the 14 platforms. Optical route indicators have been installed and two sets of 3 indicators, with a total of 15 indications per set, have been fixed over the 'up east' and 'up west' mains, respectively. Every platform starting signal has also been provided with a route indicator with a varying number of indications as required by each individual signal. Two types of lamps are employed; the larger indicators on the home signal bridge use 100-volt, 100-watt lamps, while those that are fixed above the starting signals use 12-volt 48-watt lamps.

On the track side of each starting signal there is a

facing point is fitted with a point lock and detector. In the case of the four sets of movable crossings, standard mechanisms have been employed, the cylinders which operate the crossing frogs being 5 in. by 8 in., the same as those used for the operation of double slips. These frogs are operated, locked and detected in the

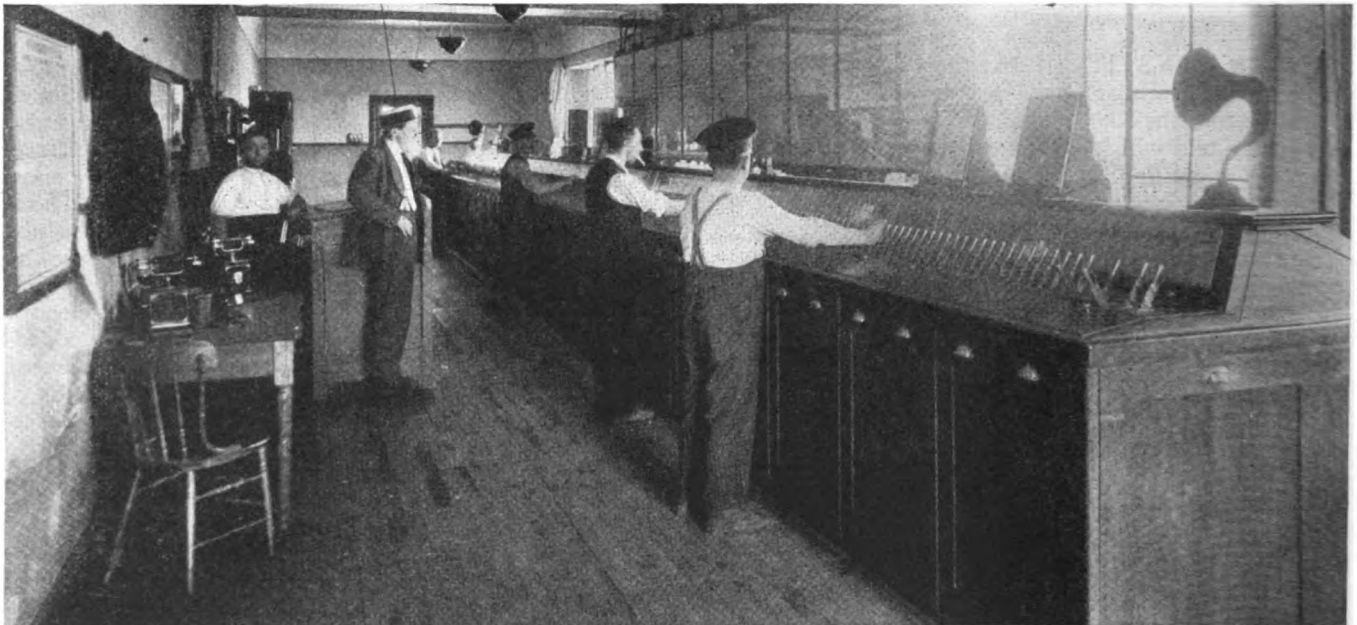


Duplicate compressors insure continuity of pneumatic power supply

same way as facing points. Altogether 140 sets of points have been equipped with electro-pneumatic control, the greatest distance a pair of points is operated from the cabin being 936 yd.

Signal Tower

The signal cabin is a two-story structure of steel and brick. On the top story is situated the 275-lever power



The 275-lever frame in the signal cabin

double-sided indicator lamp. The light inside this indicator is directly controlled by the condition of the buffer stop track of the particular platform to which it corresponds. When this track is occupied, two 100-volt 30-watt lamps are illuminated within the indicator, which is supplied with two purple lenses. Thus, an engineman backing a train into a platform is able to ascertain when the rear of his train is nearing the buffer stop, so that he can apply his brake and prepare to stop.

The switch machines are of the Westinghouse Style-C cut-off-valve type, operated electro-pneumatically. Each

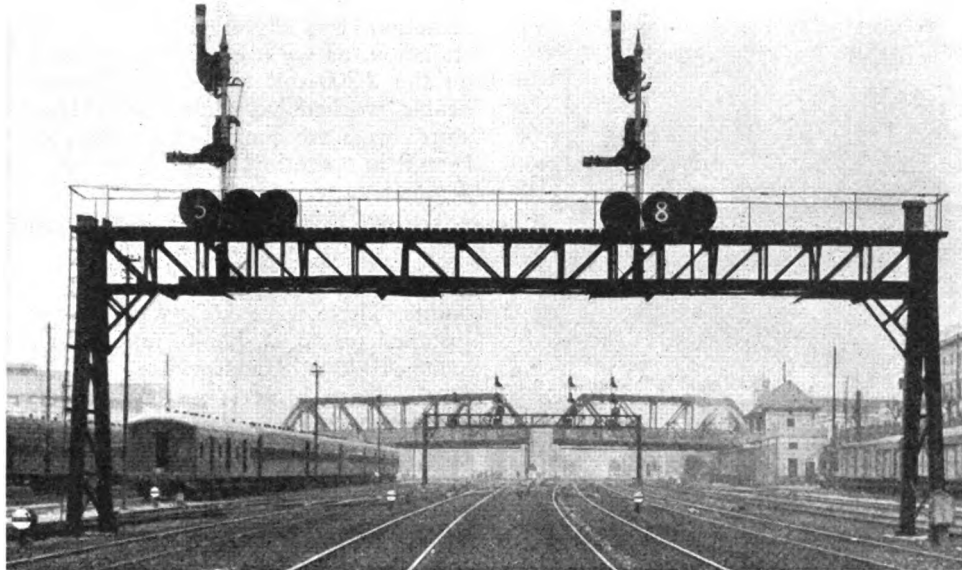
frame, with an illuminated diagram suspended above the frame from steel girders.

The compressor room contains three electrically-operated two-stage water-cooled compressors, each of which is capable of producing 87 cu. ft. of free air per minute at a pressure of 70 lb. per sq. in. Only one compressor is run at a time, the motive power being a 16-hp. 3-phase 440-volt direct-coupled 480-r.p.m. motor. Two of these motors are arranged for running on a 25-cycle supply, while the remaining one is powered from a 50-cycle supply. The reason for this is that the

railway company has its own power house, which supplies current at 25 cycles, while the 50-cycle current has to be purchased through a meter from the town supply, which is much more expensive.

The control current for both switches and signals, is 12 volts d-c. The battery used for control circuits

are directed. Two inspectors are on duty during the day, one controlling all movements on the east and the other those on the west side, but at night only one inspector is required. The apparatus is constructed so that it is possible to receive and transmit from the same loud-speaker. A button is pressed when speaking, but



Optical route indicators on home-signal bridge

has a capacity of 1,440 a. h., and is capable of maintaining a load of 30 amp. for 48 hours at a pressure of 12 volts. As the load on the track main is much less than the control, the battery used to feed this main is smaller and has a capacity of 528 a. h., capable of maintaining a load of 11 amp. for 48 hours at a pressure of 12 volts.

The relay room is of the same dimensions as the actual cabin upstairs. Underneath the power frame, which is supported on steel girders, was constructed a steel relay rack running from one end of the room to the other. As this rack is embedded in the concrete floor, it is quite firm and no vibration is transmitted to the relays. The shelves and cable runs are of cedar screwed to the steel framework. The total number of relays housed in this rack, which is double-sided, is 385. This arrangement has the advantage that wires going to the power frame contacts are taken straight up through wooden ducts, thus avoiding expensive cable runs and avoiding the use of more cable than necessary.

All cables above ground are carried in wooden trunking. As there is a wall extending for some distance throughout the yard, a considerable amount of trunking is run in iron supports which are secured to the bricks. Where there is no wall, the trunking is run on Quebracho stakes. Quebracho is a hard wood native to Argentina, and is very suitable for this work, as it will not rot when driven into the ground. It is found that the longer it is exposed to the elements, the harder it becomes.

Yard Control Tower

Two loud-speakers are provided on the instrument shelf of the power frame in the cabin. One is fixed over the portion of the frame that controls the east-side movements, while the other is fixed over the portion that controls the west side. These speakers are connected with two similar instruments in the inspector's yard-control tower, at the south end of No. 7 platform, from which point all the shunt movements of the yard

normally speech is received without touching anything. The advantage of this method is apparent, as the leverman can attend to his work and at the same time hear all that the yard inspector has to say without having to go to a telephone.

The entire installation was designed and executed by the Westinghouse Brake & Saxby Signal Company, Ltd., under the personal direction of Hayes Bruxby, signal and telegraph superintendent of the Buenos Aires Great Southern Railway.

New Type of Lead-Out

By T. G. Inwood

Signal Supervisor, New York Central, Chicago

RECENTLY the 56-lever mechanical interlocking at R. Porter, Ind., was completely overhauled and repaired. This plant protects a crossing of two main tracks of the Michigan Central with three tracks of the New York Central and a single-track junction of the Pere Marquette with the N. Y. C. The original machine was a Saxby & Farmer 54-lever machine with 53 working and one spare levers. This was replaced with a General Railway Signal Company 56-lever Style-A machine with all levers working. The new machine is equipped with Type-L lever-locks which replaced the old electric latch-locks formerly in use.

A novel feature in connection with this change was the replacement of high rocker-shaft bearings in the leadout with low-type bearings supported by 12-in. channel-iron mounted on edge on concrete walls. This arrangement gives a very rigid as well as an easily maintained leadout. By using this type of construction, which is illustrated by the accompanying photograph, we were able to replace the old timber-supported leadout without taking