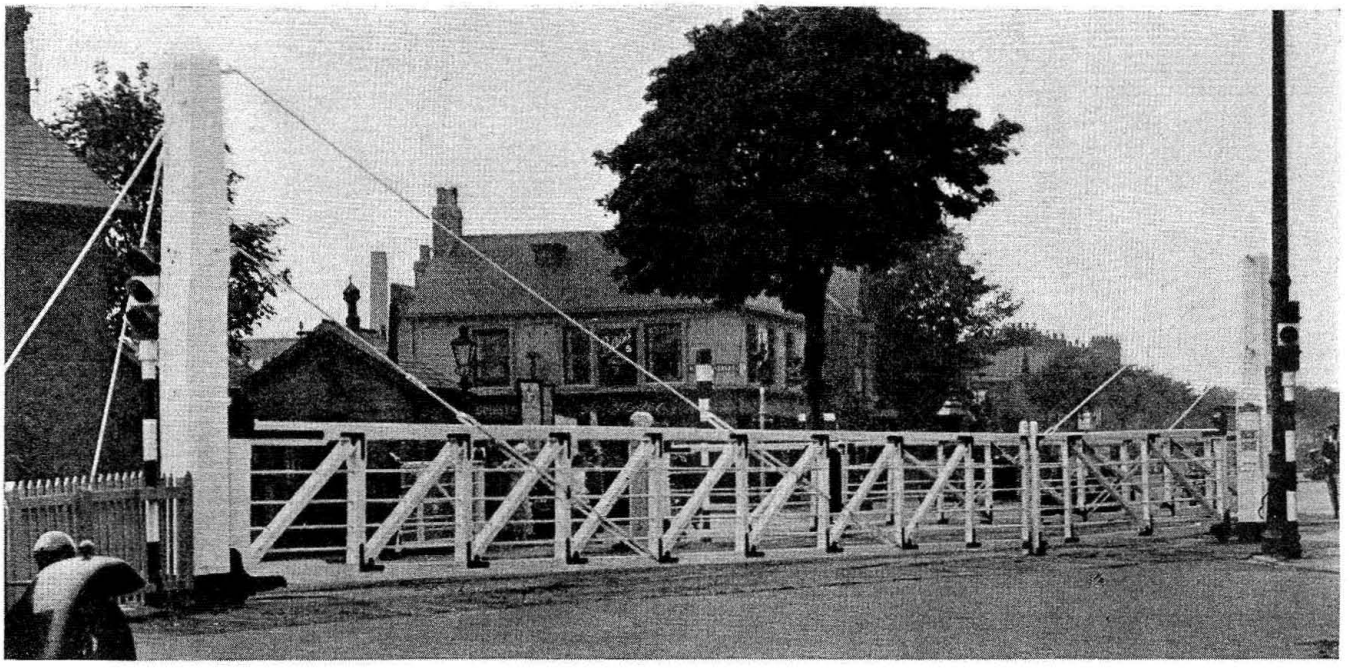

A signal is mounted at each side of the highway—Note heavy construction of the gates

Highway Crossing Protection in England

Power-operated gates with street-traffic-type signals to stop vehicles

By A. T. Tatersall

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A NEW arrangement of crossing protection, consisting of power-operated gates, together with street-traffic-type color-light signals, has recently been installed on the London & North Eastern at Walton Street grade crossing, in Hull, England. At this street is one of the main approaches to the city, the vehicular traffic has, in recent years, become very heavy and speeds have increased, so that the gateman has been unable, without the assistance of a groundman, to stop the vehicles to permit closing the manually-operated gates.

This unsatisfactory condition has been corrected by the installation of road-traffic color-light signals to stop the highway vehicles, and at the same time power-operated mechanisms have been installed to operate the gates. Now the gateman in the tower controls the operation of the signals and the gates.

The road-traffic light signals used at this crossing are of the same type as those in service at street and highway crossings. One signal is mounted at each side of the roadway on both sides of the track. Each signal consists of three units; the top one has a red lens with the word STOP etched on it, the bottom unit has a green lens with the word GO, and the middle unit has an amber lens. These signals go through the same cycle of operation as road-traffic signals but instead of being controlled by an automatic arrangement, as used for the road-traffic signals, these crossing-protection signals are controlled by the gateman's lever.

Normally the green lamp is lighted as a proceed indication to highway traffic. When a train approaches, the gateman operates his lever. The preliminary contact, made when moving the lever, causes the green lamp in each signal to be extinguished and the amber to be lighted until a 4-sec. time relay has operated, at which time the red lamp is lighted. Until the red lamps are lighted, the lever is prevented from being moved any farther, which is necessary before the gates can be closed to road traffic. These signal indications, being identical to those encountered by drivers at other points along the highways, serve to stop the vehicles. The gateman then continues the operation of the control lever to close the gates across the highway. When the train has passed, the gateman moves his control lever to the reverse check position, which causes the gates to start to move to the clear position and also causes the amber lamp in each signal to be lighted. After the gates have swung to the fully-open position clear of the highway, the amber lamps are extinguished; the green lamps are lighted when the lever is moved to the full-normal position, locking and checking the gates.

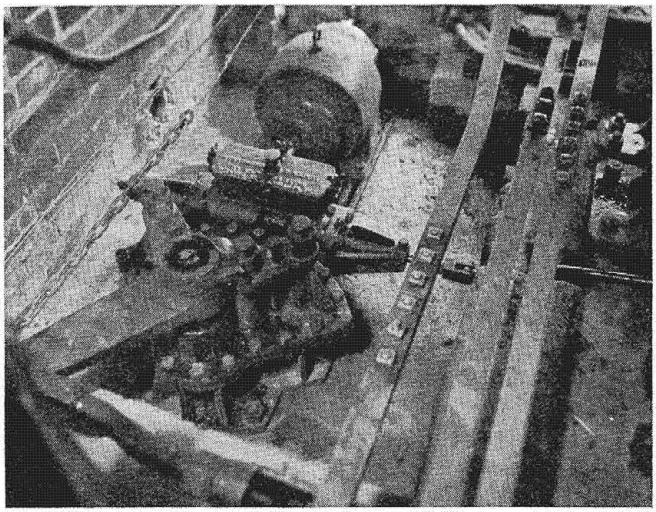
The gates are operated by a mechanism actuated by an oil pressure arrangement, including an electric motor for pumping the oil. The motor runs in the same direction whether opening or closing the gates, the oil being pumped on one side or the other of a vane, to which the gate operating rod is connected. The position of a slide valve determines the side of the vane to which oil is forced and also controls the rate of pumping. This valve, operated by the control lever in the gateman's cabin, com-

prises the control of the gates. One advantage claimed for this oil-pressure system, with the slide-valve control, is that the gateman by manipulating the valve properly can utilize the momentum of the electric motor armature for stopping and reversing the gates.

The motor for the gate mechanism is operated from a 220-volt supply, which is used also to operate the traffic signal lamps and to charge a storage battery, which serves as a standby supply for the signals and gate-detection circuits in case of an outage of the 220-volt circuit. The drive rod from the gate motor to the gates is provided with a selector, for use in case of a power-supply failure, which when operated by the lever in the locking frame provided for that purpose, disconnects the gate from the motor and connects it to a gate wheel in the signal cabin.

General Considerations

The installation of road-traffic light signals at a large number of street and highway intersections during the last few years has resulted in educating the average road-vehicle driver in the meaning of the aspect of these color-light signals. Therefore, it seems certain that economies can be effected by the railroads taking the fact of this education into account in solving their problem of grade crossing protection, as has been done in this case.



The gate mechanisms includes an oil pump driven by an electric motor

This scheme of protection was developed in collaboration with and to meet the requirements of C. M. Jenkin Jones, superintendent N. E. Area, L. & N. E., and the work has been carried out under contract by the Westinghouse Brake & Saxby Signal Company. The scheme was installed under the instructions of John Miller, B.E., L.L.D., engineer, to the designs and under the supervision of A. E. Tattersall, M.I.E.E., F. Inst. P., signal and telegraph engineer.

Interlocking on the S. P.

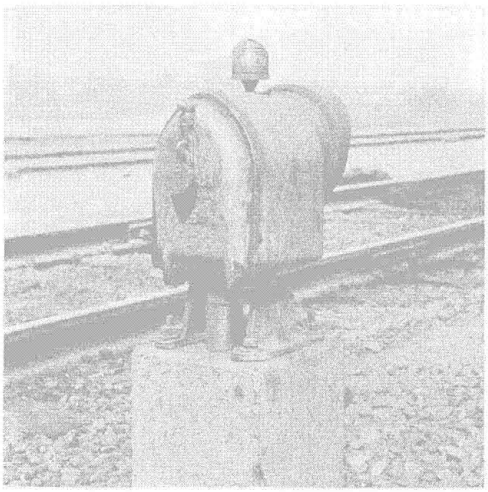
(Continued from page 592)

The home interlocking signals, which are semi-automatic, carry a number plate, under which is an additional plate with the letters "SA," which means that this is an interlocking signal which is track-circuit controlled in the automatic block beyond the interlocking limits. The rules require that an engineman encountering such a signal indicating "stop," must stop and not proceed until he gets authority to do so from the signal operator; also that beyond interlocking limits, automatic-signaling rules apply.

The dwarf signals are also of the searchlight type, operating to two positions with a red or a green aspect. The signals are mounted on concrete foundations which raise them as high as possible without interfering with clearances. Where clearance is not limited, the signal mechanisms are mounted on an iron mast so as to bring the center of the signal 7 ft. 6 in. above the level of the rail. As a safety marker to prevent trainmen from injuring themselves when alighting, each dwarf is equipped with a small lamp, consisting of a mounting screwed into the top of the case which holds a 3-in. conically-shaped fresnel lens enclosing a 3-watt 6-8-volt lamp. This is lighted continuously from the a-c. supply at a greatly reduced voltage.

Power Supply

The signal mechanisms at each location operate from a local battery of four cells of DM-GO-5 battery. The signal lamp is fed normally from alternating current but is cut over to the battery automatically in case of a power outage. All signals are on approach lighting. The 110-volt d-c. supply is used for the line control of the signal relays, with a 7,000-ohm resistance in series with the 500-ohm relay to reduce the voltage to about 7 volts. Each track circuit is operated from a battery of four cells of 500-a.h. Edison primary battery using 4-ohm track relays.



A small lamp on top of each dwarf assists in preventing accidents to trainmen

The switch machines are the G.R.S. Model-5A equipped for operation on 110 volts d-c. The wires coming to a machine are brought up through a trunking riser and out through a flexible metal conduit to the switch machine so as to allow for vibration. The rail through this plant is 110-lb., with good ties and crushed-rock ballast. Insulated gage plates, ⅞ in. by 9 in., are used on three ties including the one ahead of the points. The ¼-in. riser plates are welded in place and machined to fit the base of the rail. The malleable-iron rail braces are bolted to the gage plates which in turn are spiked and bolted to the ties. In order to prevent excessive rail running, a sufficient number of anti-creepers is used at each switch layout. These are placed on both sides of each tie under the rails in both directions from the switch.

This interlocking was designed and installed by signal forces of the Southern Pacific.