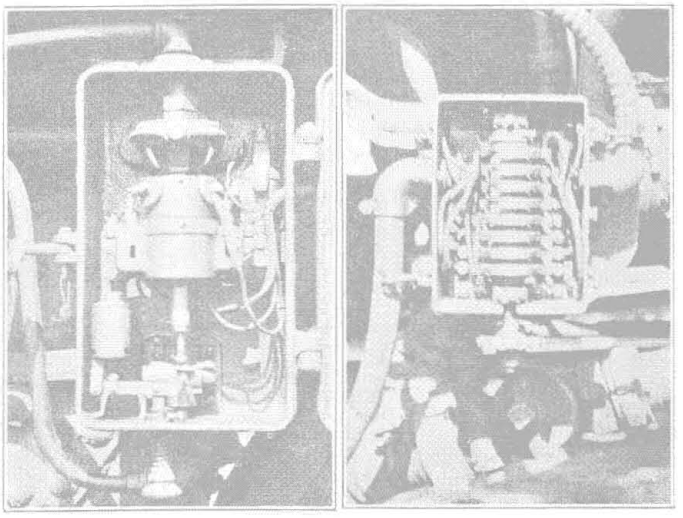
shoe will, in raising, operate the circuit controller attached to the plunger, thus interrupting the normal electrical locomotive circuit, causing the armature of valve magnet *M* of the stop valve to assume the position shown in the cross section of the stop valve apparatus. When the valve magnet armature *o* drops to the position shown pin valve *p* will seat and close off main reservoir pressure from chamber *n* of valve magnet body, thereby causing valves in blanking valve *E* or brake control valve *D* to seat and relieving the pressure from the diaphragm of vent valve *L*, causing train line pressure to exhaust to atmosphere through ports *m-m* in vent valve *L*, producing the desired train line reduction. When the stop ramp rail is energized the valve magnet *M* of the stop valve apparatus is held energized by positive battery through a point on the line relay, through the ramp rail, through the contact shoe and contact drum on the shoe through wire *M*, through the circuit reverser and terminal board to one side of the electromagnet *M* and from there over wire *10* to frame of the locomotive, thus completing the circuit and maintaining this valve in the energized position, which prevents a stop being made. The bell circuit is a simple local circuit as shown by dotted lines on the diagram.



The Stop Valve and the Circuit Reverser

The engine apparatus or "shoe" is fixed to the frame of the front truck of the tender, each ramp causing an upward movement of the "shoe." A battery on the roadside conveys current to the ramp, and with the ramp energized, this current is carried by the shoe to the apparatus on the locomotive; and by controlling electric magnets it prevents the application of the brakes at the stop ramps and the giving of the cautionary signal in the cab at cautionary ramps. With the ramp de-energized, the lifting of the shoe opens a circuit, de-energizing a magnet; and thus air is exhausted from the train line so as to apply the brakes. The bottom of the contact shoe is in the form of a circular disk, and is arranged so as to make contact even when a little out of line. The ramp rail is of the inverted T shape. The T iron used is ⅜ in. by 3 in. by 3 in. and is mounted on a 6-in. sleeper bolted to the ties.

A vibrating bell in the cab is arranged to sound whenever the shoe rises as much as ¼ in., so that the engineman thus receives notice every time a shoe goes over a ramp, without regard to whether the indication is or is not against him. If the vertical movable member of the shoe is broken there is provision made for opening the train line and applying the brakes; if it is bent the first contact with a ramp will tend to cause it to stick in its upward position, thus causing a continual ringing of the bell in the cab. If the shoe should be broken off completely the electrical connections would be broken so as to cause application of the brakes.

To provide for running in either direction and also to provide for using the left hand apparatus in place of the right hand, or vice versa, all of the wires on the locomotive are run through a box containing circuit reversers. Thus in case either shoe is lost or disabled the engineman, by a single operation, can change all of the circuits and substitute either shoe for the other. The cab signal has a proceed light and a cautionary light, but none for stop; but always on the dropping of the stop valve both lights go out, thus indicating that an automatic stop contact has been made.

After the brakes have been applied the apparatus can be restored to normal position only by lifting the armature of the stop valve; and this must be done by pushing a knob which can be reached only by a person standing on the ground.

The circuits on the engine are fed normally from a storage battery, of 80 a. h. capacity. The normal voltage is from 10 to 12 volts, furnished by 10 cells of this battery mounted on the running board. A permissive movement may be made over a ramp providing the speed has been reduced to a predetermined limit and in addition the engineman presses the button while passing over the ramp. Provision has also been made for an automatic cutting off of the bleeding of the train line when a reduction to 25 lb. has been made, thereby lessening the time of stopping, as it is not necessary to pump up the entire train line.

British Report on Light Signals

The Ministry of Transport of the British Government has issued a report, dated October 28, in which a committee, appointed in July, reports on its investigation of light signals to be used for both day and night signaling on British railroads. The committee consists of Major C. H. W. Edmonds, of the Ministry of Transport, chairman; J. C. Allen, of the National Union of Railwaymen; Major G. L. Hall, government inspecting officer; H. J. Oxlade, Associated Society of Locomotive Engineers and Firemen; Captain B. H. Peter, Westinghouse Brake & Saxby Signal Company; W. J. Thorrowgood, telegraph and signal superintendent, London & Southwestern; M. R. Gardner, Ministry of Transport.

The committee inspected the color light signals in use on the Liverpool Overhead Railway, where such signals have been in use for some considerable time; and it was found that the signals were distinctly visible at a distance of 1,000 yards, when seen during brilliant sunshine. A position light signal on the London & Southwestern was also examined, and in both cases the lights were found sufficient and satisfactory. The conclusion of the committee is that the color light signal, with separate lenses for each color indication, is superior to all other signals. The committee holds that the use of color light signals will afford most, if not all, of the advantages obtained from power worked semaphores, and at considerably lower cost, particularly in congested districts, where power is available; and even for sparsely signaled areas there is little difference in cost as compared with mechanical semaphores.

The committee believes that not more than three types of color light signals would be necessary, namely, for long range, for short range and for switching. It is believed that artificial backgrounds are not necessary; also that lenses alone are preferable to reflectors or to combinations of reflector and lenses. Extensive hoods are believed undesirable.