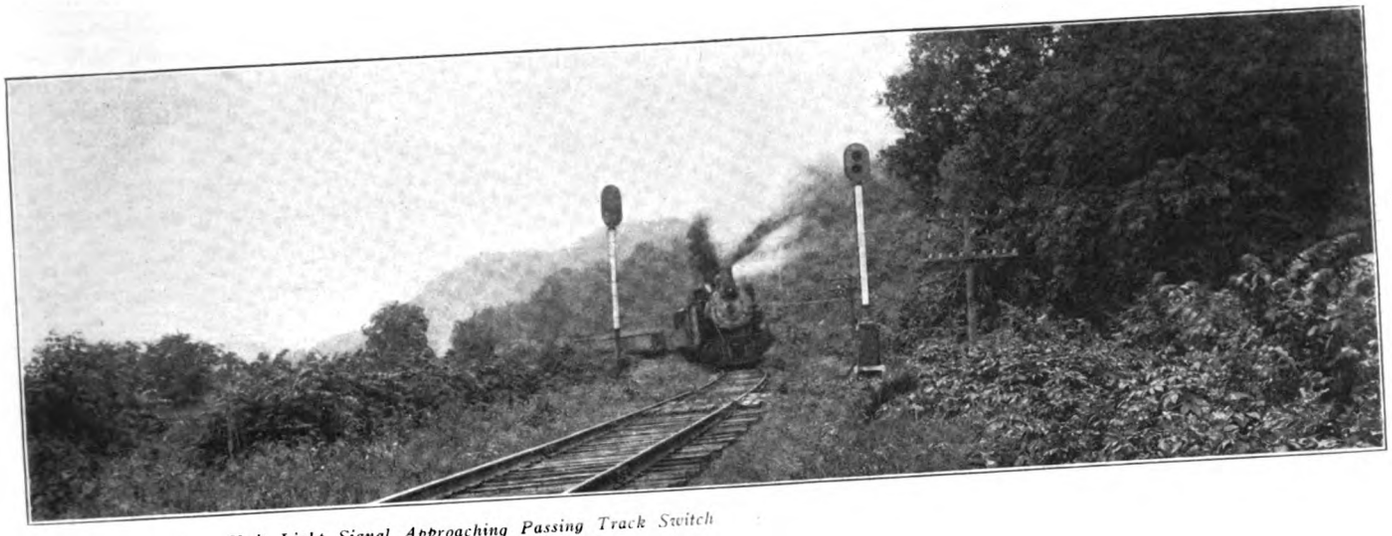
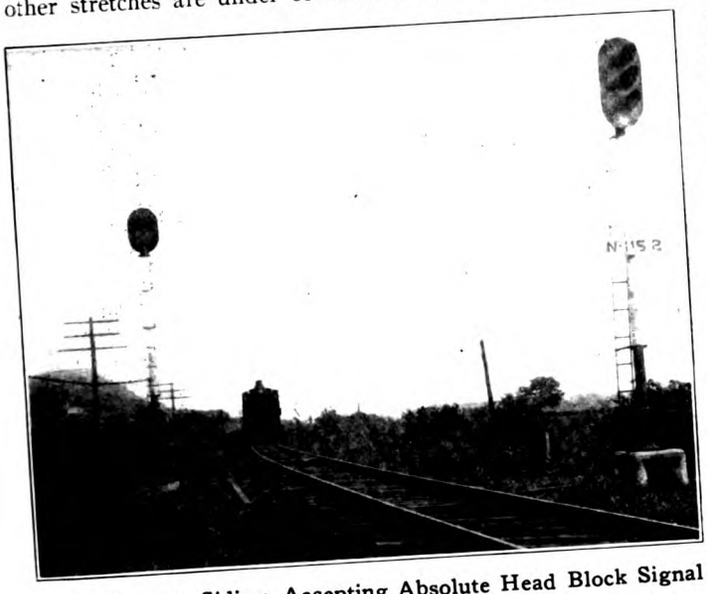


Train Passing Three Unit Light Signal Approaching Passing Track Switch

C. B. & Q. Installs New Light Signals

Burlington Standard System of Home and Distant Indications Carried Out With Colored Lights

AN INSTALLATION of color light automatic block signals has just been completed on 26 miles of single track on the Chicago, Burlington & Quincy between Hannibal, Mo., and Louisiana. This is the first installation of light signals to be placed in service on this road, although three other stretches are under construction at this time. Storage batteries, charged by vibrating rectifiers, are used as a source of energy.



Train Leaving Siding, Accepting Absolute Head Block Signal

This 26 miles of single track is a very busy section of the main line from St. Louis to the north and west. Twenty-three time-table trains, and from 8 to 10 extras are operated over this section daily, and during the heavy traffic season approximately 35 freights and 14 passenger trains have been handled. This traffic caused considerable congestion, and it was decided to install automatic signals in order to increase the track capacity. The section from Hannibal to Louisiana was chosen for the first installation on this division, because an extra train serving several large industries, is operated between these points. This line is built at river grade throughout, but in following the river there is a continual succession of sharp curves with the view shut off frequently by the bluffs. Therefore, in addition to the increased track capacity gained by permitting closer headway of following trains, the signal installation also introduces greater safety of train operation.

There are sidings and manual block stations with lock and block instruments at both Hannibal, at the north, and at Louisiana, at the south end of the installation, and the same facilities are located at the intervening stations of Saverton, Reading and Ashburn; there is also a passing siding at Hope. The comparatively long spacing of block offices was an additional cause of delay, and an added incentive for the installation of automatic signals.

According to the usual practice on the C. B. & Q., the locations for these signals were selected carefully by the signal department in conjunction with the operating department. They were first laid out on a plan giving the alinement and profile, after which these locations were marked on the ground, and a trip was made over the territory by a representative of the signal department, with the division superintendent. If, in the opinion of the latter, any changes were advisable in the locations, they were made at that time, and then the final plans were made.

The C. B. & Q. has been installing A. P. B. automatic block signals on single track lines since 1912, and is fully convinced that their use increases the capacity of the line at least 25 per cent. Some of the most obvious advantages that have been demonstrated from their use are that passenger trains are allowed to follow each other with a space interval of practically half that under the manual block system; that freight trains are allowed to follow passenger trains when the latter have gone half way between stations instead of waiting until the next station in advance is passed, and that trains waiting at meeting points are, by the action of the starting signal ahead of them, advised as soon as the trains which they are to meet have passed the next station in advance. This gives the crews advance information and enables them to be ready to pull out just as soon as opposing trains pass. The amount of time saved in this way is considerable.

Again, the dispatchers like the signals because they are

able to get more accurate information about the movement of trains from the operators. For instance, if one station is closed, the dispatcher asks the operator at the adjacent open station to watch the starting signal, and advise him when it goes to block. This feature is found so convenient that it is the practice to put indicators in the offices of the operators at stations where the starting signals cannot be seen to repeat the position of the starting signals.

Home and Distant Indications

Continued with Light Signals

The introduction of light signals on the Burlington is of special interest due to the fact that all of the automatic block signaling installed previously uses the separate home and distant signals with separate two-position semaphore arms operating in the lower quadrant for each indication. This same principle of home and distant arms is carried out with the new color light signals. The night indications of the semaphore signals and the new light signals, are the same; the light signals simply carrying the former night indications throughout the day also. Therefore, no new operating rules are necessary for the movement of trains with the new signals.

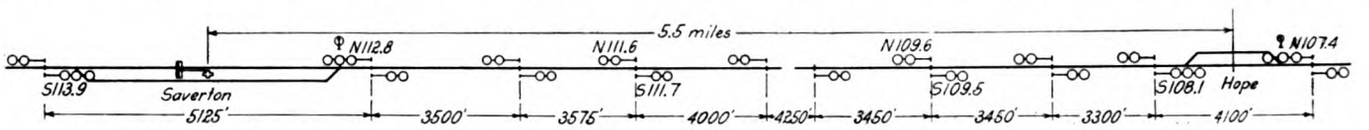
The absolute permissive block system for single track provides for an absolute stop indication for opposing moves between sidings and a permissive indication for following train movements. The signals at the leaving ends of stations, governing the entrance to a block, are absolute stop signals and carry no number plates, but the intermediate permissive signals carry number plates.

The absolute signals, and also the intermediate home automatic signals, have a red light to indicate "stop" and a green light for the "proceed" indication. Located approximately 3,000 ft. from every home signal, is a distant signal with a green light to indicate "proceed" which conveys the meaning that the home signal is at "proceed," and a yellow light for "caution," conveying the meaning that the home signal is at "stop." Only one light is shown at any signal at one time. A green light at either the distant or the home signal is a "proceed" indication. A yellow light is shown only at a distant signal and indicates "approach home signal with caution." A red light is shown only at a home signal and indicates "stop."

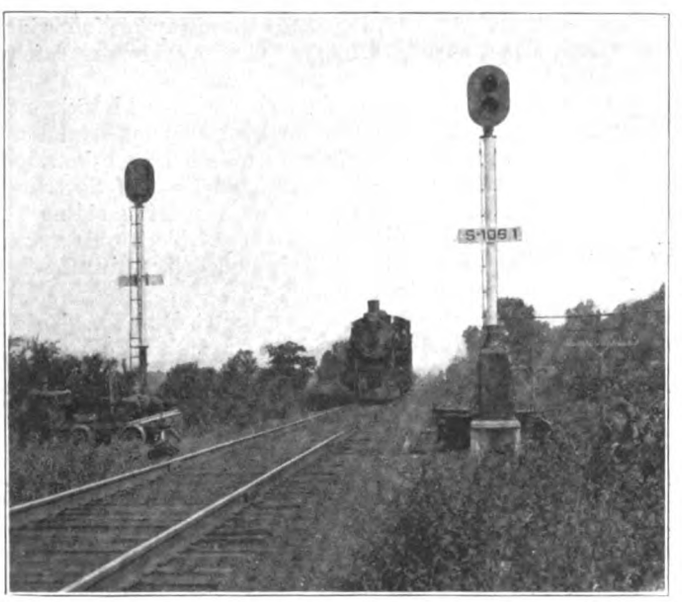
It should be noted that where two home signals governing movements in the same direction are relatively close together, as for instance at the entrance to, and exit from a station, the distant indication for the second signal is given by a third light on the preceding home signal, i.e., the yellow indication is given by a third light unit, while if the block is clear, the green indication of the first home signal may be considered as a clear distant indication for the next signal also. On all two-light signals, the green light is above the red light, but on the three-light signals, the yellow is on top, the red in the center, and the green on the bottom. This order allows separation of the green and the yellow by a position distinction.

The underlying principle of this home and distant system of signal indications is that the distant signal is located at the proper point at which, provided the distant indication is caution, the engineman must take action immediately in order to control his train for a normal train stop at the home automatic signal, thus eliminating the chance of his overrunning the home signal through forgetfulness.

The installation includes 45 two-unit light signals, and 18 three-unit light signals. The signals are the Federal color light type E, each light unit being in a separate compartment with a separate door. However, the units are all in one cast iron case which fits over the top of the 5-in. pipe signal post. The signal has a sighting device which, together with a set of adjustable bolts, allows the entire light signal to be aligned at one setting.

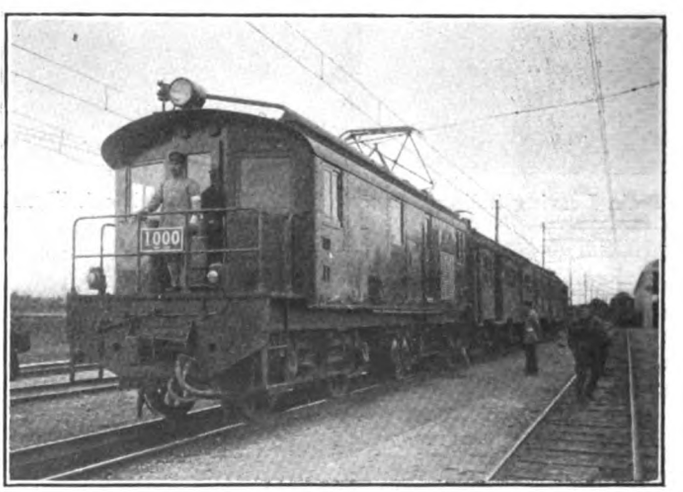


Track and Signal Plan Between Sidings, Showing Burlington System of Home and Distant Signaling



Double Location Intermediate Home Signals

FREIGHT CLAIM PAYMENTS on the Baltimore & Ohio in May amounted to $148,746, or 0.757 per cent of the freight revenue which was $19,649,633. From January 1 to May 1, 1923, the freight claim payments were $735,588, or 0.822 per cent of the freight revenue which was $89,495,436, as compared with freight claim payments amounting to 1.365 per cent of the freight revenue for the first five months of 1922.



Kadel & Herbert

An American Electric Locomotive in Japan