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red indication is displayed when the switch is unlocked, or when the lock plunger is overdriven.

Position-light distant switch signals or color-light distant switch indicators are provided for facing and trailing movements where the speed exceeds 20 m.p.h. for such movements. If the switch is locked in its normal position, a Clear distant signal (Rule 281 green indication) on the distant switch indicator is displayed. If the locking plunger is withdrawn, or is in the overdrive position, a Caution distant signal, the indication of which requires a train to approach the switch prepared to stop, or a yellow indication on the distant switch indicator, is displayed.

Small Red Light

By E. B. DeMERITT
Signal Engineer
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WHERE the spring switch is equipped with a facing-point lock, we have a small red lamp located near the fouling point of the switch which is lighted only when the lock is overlocked. When that occurs, we see no reason to slow up train movements, other than those to trail through the switch—that, we want to prevent. Thus, on trailing train movements from a siding to the main line, or at the end of two or more tracks, when the trailing lamp is lighted, it indicates that the switch must be thrown by hand and, after the movement has been made, the switch must be restored by hand to its proper position, locked, and the points examined in the same manner as a hand-operated switch.

For facing-point moves, there is usually a signal approximately 50 ft. ahead of the switch points. No light is necessary to indicate the position of the switch, as the signal gives its most restrictive indication if the switch point is not closed and locked. When a train is stopped at the signal, the switch points must be examined by a member of the train crew before proceeding at restrictive speed. At locations where a low yellow light is used to indicate what is sometimes called a "tonnage" or "grade" signal, to allow a train to proceed at restrictive speed without making a stop, this low yellow light is not illuminated unless the points of the spring

switch are closed and locked. At the few locations where there is not an automatic signal within 100 ft. governing facing point moves over the spring switches, we have a main-line facing-point spring switch light, which consists of two light units mounted horizontally—red to the left and green to the

right—to indicate whether or not the switch points are up and locked. When a train is stopped at a Stop-and-Proceed signal, a member of the crew must examine the switch point if the red light is displayed or no light displayed, but need not do so if the green light unit is displayed.

INTERLOCKING PLANT HORNS

"At towers and outlying points in interlockings, what is the most effective type of horn, you have found, for calling main-tainers or for other signaling purposes—air, straight electric, etc.? What is your practice with reference to the location, installation and control of, and power supply for such horns?"

Air Type Most Effective

By E. T. GARRISON
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THE most effective type horn is air operated. Horns or other type audible signals have to be selected for each particular location, depending on the distance you desire the sound to carry, and other noises that must be overcome. The sound should be distinctive, i.e., different from other whistles or horns that might prove confusing.

We overcame several difficulties at one outside location on our railroad, by the use of a duplex air horn, which had a very distinctive sound and could be heard for one mile. This particular horn was operated by 75-lb. air pressure, actuated by push-button control, which operated a 110-volt a.c. electro-pneumatic valve magnet. This horn was in constant competition with the audible signals of engines, ships, automobiles and sirens, and filled every expectation.

Straight electric horns, I could not recommend for outside use, unless it was out at some remote point, void of other noises and then, not to be heard too far away. This type horn is all right for inside use, such as in storerooms and shops. Where air is available, the most reasonable installation is the air whistle, which can be hand operated by direct chain-to-valve, or remotely controlled from a push button, with either low-voltage d.c. or 110 volts a.c., actuating an electro-pneumatic valve magnet.

Where air is not available and distance for sound travel is desired, the most effective horns are those with self-contained compressors, which are operated by push-button or relay control at outlying points, and which can be obtained for use

with either low-voltage d.c. circuits or 110 volts a.c. Horns should be installed with shields over them to protect against becoming clogged with snow, sleet, etc., and the action of mud-carrying wasps.

C.T.C. CODE LINES

"Where a C.T.C. control office is to be located so that the code line must be in aerial or underground cable for a considerable distance—a mile or more, for example—what problems are involved, and what are the solutions from an engineering standpoint?"

Depends Whether Carrier Is On Line

By E. W. HORNING
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FOR the physical or direct d.c. code line, cable presents no special problem, except that which is found in any straight d.c. circuit. The use of superimposed carrier frequencies over a pair of line wires, a portion of which is in cable, involves a study to determine the necessity of one or more carrier repeater units, which may be required to provide input to the carrier receiver at the converter location.

Factors, such as size of wire over which the carrier will be operated, ohmic unbalance, results of a transmission-line test and local conditions, such as proximity of other carrier circuits, power lines, etc., should be considered. The manufacturer who would furnish the carrier equipment should be consulted to determine what is required to enable them to provide an efficient and reliable carrier system.