cell, floated across a Union RX-10 rectifier.

Most all of the relays on this plant are the Union Type DN-11, although the Saco flasher relays are used for the river flashing lights. The tower relays are located on the first floor below the operating room, the racks being constructed of angle-iron with shelving of asbestos board. As will be noted in the illustration, the hooks for carrying the hand-made cables through the racks are made of hard fiber so as to prevent chafing of the insulation and to prevent grounds in case the insulation is defective.

An interesting feature of this plant is the extensive use of lead-covered underground cable. The cables under the river are laid in three-inch steel duct with welded joints imbedded in the river bottom; thus the use of submarine cables was dispensed with. On the remainder of the plant the main runs are in lead-covered cable laid in vitrified duct imbedded in concrete. The lead cable is Hazard. Parkway is used for the local runs.

It will be noted that derails are used on each of the five approaches to the bridges on the east side. Derails were not used, however, on the west side, as the bridges are pivoted on that side and the bridge itself, when raised, obstructs the path of a train. Split-point derails are used on the B. & O. while Wharton lift-point derails are used on the Air Line.

All of the signals are a-c. lighted without a d-c. reserve, those on the Air Line being continuously lighted, while those on the B. & O. are approach lighted. Ten-volt 18-watt lamps are standard on the Air Line, 13½-volt 17-watt on the B. & O. Power for the signal lighting is taken from the 110-volt distribution line, which is carried in cable to each signal location. Union Style M-2 switch machines, with point detectors and Type-F controllers, are used throughout for the operation of the switches. Copperweld messenger wire and cable rings are used for the cable drops. Ohio Brass welded bonds are used throughout for rail bonding, the Air Line being 90 lb., the B. & O. 130 lb.

Three maintainers and one assistant maintainer comprise the maintenance staff, these men handling not only the interlocking maintenance but also make light repairs on the bridge machinery. The interlocking plant was installed under the jurisdiction of G. H. Dryden, signal engineer of the Baltimore & Ohio, plans being furnished by his office. C. O. Seifert, signal supervisor of the Baltimore & Ohio Chicago Terminal, had supervision of the construction and J. J. Clancy was the general foreman.

C. T. C. on the B. & M.

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relay cases, directly from the line. All main line runs of wires from the houses to the switch machines and the signals were carried in parkway cable. Parkway cable runs to all signals. When located on signal bridges the cable terminates in junction boxes under each signal, between which and each mechanism loose wires extend in flexible conduit. Wires for other branch wiring were run in redwood trunking.

The 550-volt power wires are No. 6 triple-braid weatherproof copper wire. East of East Deerfield the power line carries power for the train stop as well as for the signaling system. In this territory, automatic switching is provided, so that if power fails at one source the other end of the line is automatically connected. Additional switch-boards were required, inasmuch as the load for the signaling system was added. West of East Deerfield the power is used for signaling only, consequently there is no automatic switching. Here the lines radiate from a source of power and end midway between two sources.

The junction boxes used in connection with the parkway cable are of welded steel, mounted on concrete foundations. Terminal boards were used for the distribution of the wires. The Type-R relay is used for the control of the 20-volt switch machine. Exide storage batteries of 60- and 80-a.h. capacity, were used and G. R. S. dry-plate rectifiers are in use throughout for charging the storage batteries.

Sand Causes Signal Failure

SAND on a fouling track section in an interlocking plant was the cause of a false-clear signal failure resulting in a collision between a switch engine and a passenger train, near the Union station at St. Louis, Mo., on August 21, at 10:28 p. m. The report of the Bureau of Safety of the Interstate Commerce Commission states that the sand had evidently been deposited on the rails by a locomotive at some time prior to the collision. One employee was killed and two were injured.

The collision occurred a short distance south of the St. Louis Union station, where two of the north-and-south station lead tracks converge, at switch No. 285, on a sharp curve, the westerly track being known as track D and the easterly one as track C. Color-light dwarf signals were involved. The entering signal, governing facing movements through switch 285, consists of two 2-color units mounted vertically one above the other. The indications of the upper unit are red for Stop, and green for a movement through the switch to either track C or D. The indications of the lower unit qualify the Proceed indication of the upper unit; i. e., a green on the lower unit indicates that the track for which switch 285 is set is clear, while a yellow indicates that this track is occupied. Thus, green over green indicates that the track which is being entered is clear. In addition to this entering signal, an outbound starting signal on track D was involved. Train movements in this area are governed entirely by signal indications, the switches and signals being controlled from the interlocking tower. Speed is restricted by time-table rule to 15 m. p. h. on main tracks and to 8 m. p. h. on station tracks.

A T. R. R. A. switch-engine had pushed six cars of a Missouri Pacific train in on track D, uncoupled, moved a few feet away from them, and stopped to await a Proceed indication on the starting signal, the crew being unaware of the fact that the engine was fouling track C. In the meantime an Illinois Central passenger train was being backed into the station on track C, under the authority of a green-over-green indication on the entering signal, and while so doing struck the tender of the switch engine which was fouling track C.

The evidence disclosed the fact that sand on the fouling track section prevented the switch engine from shunting the track relay, and with this relay falsely energized, it was possible for the towerman to clear the entering signal. The rules provided that sand should not be used over movable parts of an interlocking plant unless absolutely necessary. Subsequent to the collision, a general notice was issued by the T. R. R. A., modifying the rule to exclude entirely the use of sand in interlocking plants.