

movement, unless conditions are proper for the operation of that function. The operator is free to manipulate the levers at any time and in any sequence that he chooses, but he cannot set up an unsafe condition.

Derails 2 and 2A on the C. B. & Q. cannot be operated unless all of the home signals are at stop, unless Derails 3 and 3B on the U. P. are in their derailing positions and unless movable-point frog 3A is in its normal position. Likewise, Derails 3 and 3B and movable-point frog 3A cannot be operated, unless all home signals are at stop and unless Derails 2 and 2A are in their derailing positions. Home signals are controlled through all four deraills, movable-point frog, and the opposing signals. For example, before Signal 1D can be cleared, Deraills 2 and 2A must be clear, movable-point frog 3A must be normal, Deraills 3 and 3B must be in their derailing positions and opposing Signal 1U must be at stop.

#### Locking Features

When a route has been lined up and a proceed signal displayed, the deraills on this route cannot be operated after a train has entered the approach section to the distant signal, until the home signal has been placed at stop and has remained in that position for a period of two minutes. During this time interval the train will have stopped at the home signal or will have passed on to the detector circuit, which prevents operation of deraills until the train has passed over the route. This is the same kind of approach and detector locking protection that is usually provided at interlocking plants, but it is secured directly through the circuits at the crossing, rather than through the control machine.

The economy of operating the protection at a crossing of this kind from a location where an operator is required for other duties is self-evident, there being no facilities or protection sacrificed that a regular interlocking plant affords, yet the cost of installation compares favorably with any type of electric plant handled directly by individual levermen. The maintenance should be no more costly than on any type of electrical equipment as it is planned to utilize the same maintenance force to maintain this plant that has been maintaining Hall tower and the old mechanical plant. This maintenance force consists of one maintainer and one assistant maintainer working eight hours a day and subject to night calls.

#### Operating Advantages

An added advantage of this type of interlocking is the speed with which routes can be lined and traffic handled. The operation of the switch machine (timed on the ground) shows that the four movable points at the crossing can be operated in 14 sec. in spite of the fact that the points are short and of heavy rail, which operate rather stiffly. The deraills operate in 11 sec., which is fast enough for this type of a plant.

This is a joint plant with the Union Pacific as is also the electric interlocker at Hall tower where the control board is located. As all trains operating on these lines of the Burlington and the Union Pacific pass through both plants, it is evident that one set of operators is ably adapted to handle both plants. Hence, it is expected that a greater efficiency and economy will result than what is shown by the elimination of the levermen at Sherman tower.

## Report on I. C. Derailment at Interlocking Plant

THE Bureau of Safety of the Interstate Commerce Commission has issued a report covering the derailment, on November 7, 1928, of a passenger train on the Illinois Central at Centralia, Ill., an abstract of which follows. This accident resulted in the death of two employees and the injury of three passengers, three employees and a Pullman porter. In the vicinity of the point of accident, this is a double-track line over which trains are operated by time-table, train orders and an automatic block signal system. The accident occurred within yard limits, at a lifting-type derail located 746 ft. south of a crossing at grade with the tracks of the Chicago, Burlington & Quincy.

The signals involved are Signals 1 and 2544, located 59 and 5,726 ft., respectively, south of the point of accident. Signal 1 is a one-arm, home interlocking signal of the two-position, lower-quadrant type, and Signal 2544 is a two-arm signal, also of the two-position, lower-quadrant type, the bottom arm giving a distant indication for Signal 1, which normally is in the stop position.

Northbound passenger train No. 8 departed from Carbondale, 55.7 miles from Centralia at 2:31 a. m., four minutes late, and was derailed by the derail south of the C. B. & Q. crossing, while traveling at a speed estimated to have been between 30 and 50 m.p.h.

#### Conclusions

This accident was caused by failure properly to obey signal indications. The evidence indicated that home interlocking Signal 1 was in the stop position, with distant Signal 2544 in the caution position, and that these signals were displaying these indications because of the fact that the route through the interlocking plant was lined for the movement of a C. B. & Q. freight train, the caboos of which was just passing over the crossing when train No. 8 was derailed. It did not definitely appear that the usual whistle signals were sounded by the engineman of train No. 8 when approaching the interlocking plant, while the statements of the train crew indicated rather strongly that the accident occurred without any application of the brakes having been made, with the exception of a light service application made some distance away.

The Centralia district, on which this accident occurred, is on the main line of the Illinois Central extending between Chicago and New Orleans and other southern points. On this district there are 31 scheduled trains of all classes in addition to such extras as traffic conditions may require; 27 of the 31 scheduled trains are operated daily. The movements of these trains are protected by an automatic block-signal system, with interlocking plants at a few points. Extending northward from Branch Junction, 2.3 miles north of Centralia, to Champaign, a distance of 121.8 miles, there is an automatic train control installation in service; this automatic train control system is designed to prevent accidents such as that here under investigation. In view of this accident "it is believed the carrier should seriously consider whether the automatic train control system now in use should not be extended southward from Branch Junction."