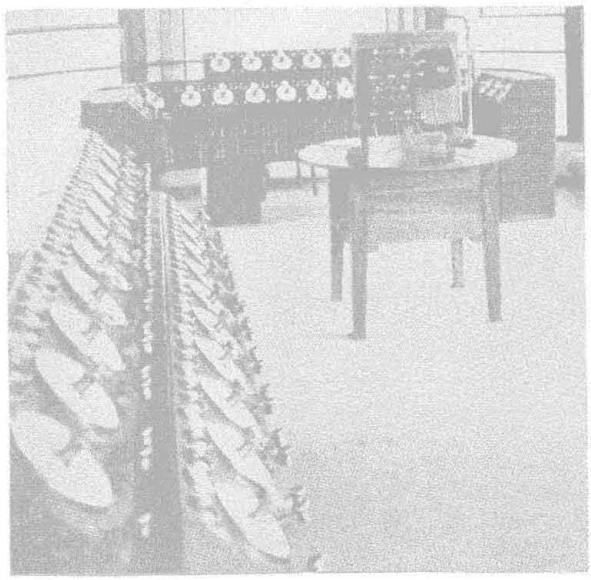
slides between the two guide rails by means of small wheels on the carrier running on the flanges of the guide rails. The outer rail, at its end, is bent away from the running rail, and with another rail point spliced to the latter, forms the branch or throw-out on which the skate normally rests, and to which it is driven back by the car which is retarded.

The controlling device in the operator's cabin is ingeniously contrived and regulates the electric motor in such a way that the carrier propels the brake skate toward the oncoming car and leaves it on the rail at the exact spot which the operator judges will give the distance necessary for correct retardation. As soon as that spot is reached, the motor reverses and the skate is left free to slide when the truck wheel



Control apparatus in signal "cabin"

mounts it. Damage to the mechanism, or derailment of the truck through any excessive speed, is avoided completely by means of a track circuit so arranged as to reverse the motor and withdraw the carrier at a certain minimum distance from the leading wheel of the oncoming car, and also to prevent the apparatus being operated again before the last wheel is clear.

The following details explain the operation of the system, which can be followed by reference to the layout plan. A carrier conveying the retarder skate, runs between the rail *X* and a guide rail *Y*. In the normal position the carrier with the skate stands clear of the running road in the "Throw Out" *E*, connecting with the running rail at *K*.

The carrier, operated by means of an electro-mechanical winch combination *MT*, is moved out to a distance determined by the operator, after which it stops and returns rapidly, leaving the retarder skate on the rail. The car then pushes the retarder skate back, leaving it in the "Throw Out" *E* as it passes. The carrier and the retarder skate are then ready for the next operation.

Operation and Control

The operator in the cabin controls the carrier. Two methods are available to bring out the skate to a certain distance sufficient to retard the car, taking into consideration its speed and its weight.

(a) Automatic working permits the operator to bring out the carrier to a determined distance, even if he cannot see its travel. For each retarder there is a plunger *A*, upon which the operator presses after having placed the handle *M* (in the form of a needle) on the division of the quadrant showing the distance in meters that the carrier must advance from the "Throw Out" *E*, which distance is regulated by the operator according to his judgment.

(b) Direct working is utilized when the operator can clearly see the retarder. It comprises a plunger *D* upon which the operator presses during the whole time that he wishes the carrier to advance. The retarder (and carrier) stops immediately when the operator releases the plunger.

A collision of the carrier, mounting the retarder skate, with the wheels of a car, is prevented by the aid of track circuits and contacts fixed on the guide rail *Y*. To indicate to the operator that the carrier has left the "Throw Out" *E*, bringing with it the skate, a lamp showing yellow is lighted during the travel forward and remains so until the carrier returns to the "Throw Out." To indicate to the operator that the carrier after having deposited the retarder skate is returning to the "Throw Out," a lamp showing green is lighted during the return travel, and remains so until the carrier is clear of the running rail, that is to say, has arrived at the "Throw Out" *E*. To indicate to the operator that the carrier, carrying the retarder skate, cannot operate owing to a vehicle being on the insulated rail section contiguous to the "Throw Out" *E*, a lamp showing red is lighted during the time the rail is so occupied. The electrical winch is operated by a 220-volt, three-phase motor. The track circuits are worked by 2-volt batteries.

Report on B. & O. Head—End Collision at East St. Louis

W P. BORLAND, director of the Bureau of Safety of the Interstate Commerce Commission, has just issued a report relating to the investigation of the head-end collision between two freight trains on the Baltimore & Ohio on January 6, 1929, at East St. Louis, Ill. This accident resulted in the death of three employees and one trespasser, and the injury of three employees. In the immediate vicinity of the point of accident this is a single-track line over which trains are operated by time table, train orders and a manual block-signal system.

Eastbound freight train No. 90, consisting of 32 cars and a caboose, left Cone yard, 4 miles west of "H. N." Cabin, at 7:00 p. m., on time, received a clear signal indication at "H. N." Cabin and as it passed that point, the operator delivered three Form 19 orders to the crew, none of which related to Extra 2791. The train then entered the single-track just east of the tower and shortly afterwards it collided with Extra 2791, while traveling at a speed estimated to have been between 20 and 30 m. p. h. Westbound freight train Extra 2791 consisted of 29 cars and a caboose. At O'Fallon, 10.9 miles east of "H. N." Cabin, the crew received, among others, a copy of a train order No. 678, Form 19, directing train No. 90 to wait at "H. N." Cabin until 7:30 p. m. Extra 2791 departed from O'Fallon at 6:56 p. m., passed Caseyville, 7.8 miles beyond, at 7:11 p. m., under a clear signal indication, and after passing the east yard-limit board near Mounds yard, it collided with train No. 90, while traveling at a speed estimated to have been about 30 m. p. h.

This accident was caused by the failure of the operator to deliver a train order No. 678 and by his failure to secure the block before permitting train No. 90 to enter it. According to the evidence, train order No. 678 was issued to extra 2791 at O'Fallon and was put out at "H. N." Cabin for train No. 90 on Form 31. This order was delivered to the crew of extra 2791