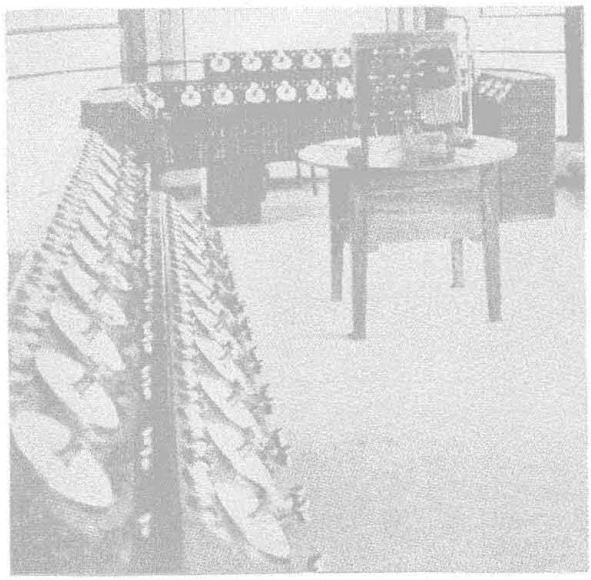
slides between the two guide rails by means of small wheels on the carrier running on the flanges of the guide rails. The outer rail, at its end, is bent away from the running rail, and with another rail point spliced to the latter, forms the branch or throw-out on which the skate normally rests, and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

but it was not delivered to train No. 90. Operator Jackson, on duty at "H. N." Cabin, stated that when he received the order, he did not think it would be necessary to deliver it, consequently he hung it on a hook and at the time he delivered other orders to the crew of train No. 90, he failed to include this order as he had entirely forgotten about it. He said that in some cases wait orders, the time limit of which had expired, were not delivered or annulled before the train involved had departed and this practice may have contributed to his oversight. His reason for his failure to ascertain that the block was clear was due to his anxiety to keep train No. 90 in motion so that it could ascend the grade beyond his cabin without further delay to train No. 21. Operator Jackson was not positive whether he gave the block to the operator at Caseyville and said that if he did so he did not remember it.

It appeared that the employees riding on the engines of both trains were on the alert and that the headlights were seen some distance apart, but on account of the physical characteristics in that locality it was not definitely ascertained that these trains were approaching each other on the same track until it was too late to avert the accident. The evidence indicates that the brakes were applied on train No. 90 only a few seconds before the collision occurred, while it did not appear that they were applied on extra 2791 prior to the accident.

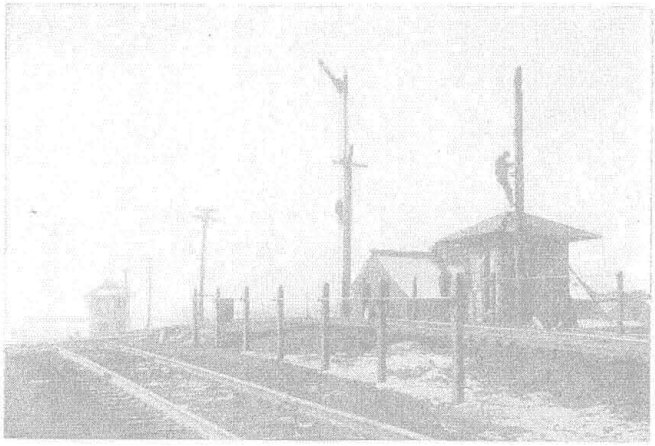
One of the paragraphs of special instruction No. 24 contained in the time-table in effect at the time of this accident reads as follows: "On single track, whether manual block rules are in effect or not, when a 'middle order' so called, is addressed to the operator at the intermediate train order office, there will be a train order signal displayed, at that office in every case and Rule 208 will govern until the order has been delivered by the operator to trains affected, until all have arrived from one direction. The operator is not relieved from such delivery, even though the time of a 'wait order' has elapsed, unless the order addressed to the operator has been annulled by the train dispatcher."

The evidence developed at the investigation of this accident indicated that it was a practice for the operator at "H. N." Cabin not to deliver a wait order if the time had expired, but at some later time, after the passage of the train to which the order was addressed, he would obtain an annulment from the dispatcher. Apparently this is precisely the practice intended to be prevented by the special instructions above quoted.

New Haven Installs Novel Hump Signal Control

THE New York, New Haven & Hartford has worked out a unique scheme of controlling the hump signal at its New Haven classification yard, by means of which it has been possible to release four yard employees, a pin puller on each shift, and one brakeman. The hump signal at the top of the hump can be operated from a lever in the yard conductor's cabin located close by. However, this signal can also be controlled from the conductor's position outside of the cabin, while engaged in the task of cutting the cars prior to their movement over the hump. This multiple control scheme eliminates the necessity of the conductor going to his cabin every time he wants to operate the hump signal.

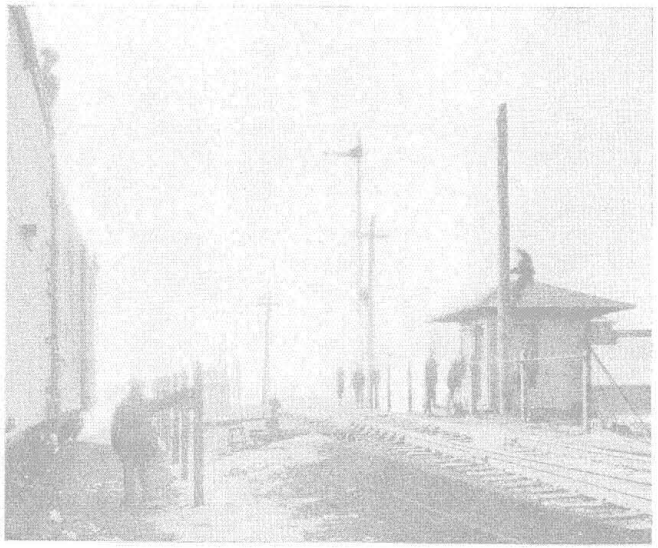
Essentially, the control scheme comprises a remotely-controlled push switch operated through the medium of a one-inch pipe line extending a length of 50 ft. parallel with the hump track. This pipe is supported by guides on three 3-in. by 4-in. oak posts. Arms are attached to this pipe at convenient points. At the other end of the pipe, a mechanical connection is made with a Crouse-Hinds push switch mounted in a Type-FS1 condulet. The toggle, ordinarily found on the Type-DF108 cover was removed and replaced with a small arm. The control wire of the hump signal is cut



Hump signal in the clear position—The conductor's cabin is at the right

through the contacts of this switch so that when the pipe is turned the switch contacts are opened or closed.

A repeater signal, for relaying the indication of the hump signal, is mounted on a pole about 700 ft. east of the hump. Klaxon horns are provided for the purpose of signaling to trainmen in stormy and foggy weather when it is difficult to see the hump and repeater signals. Two push-buttons are installed on the relay box at the hump, one of these being for a Klaxon horn located on the tower about 200 ft. west of the



The hump signal in stop position, the conductor having operated the control arm on the post

hump. The other button operates similar horns, one being located on the repeater signal, another on a pole about 1,000 ft. east of the repeater signal, and a third on a pole about 2,500 ft. east of the repeater signal. Here again, a multiple control scheme has been worked out, for still other push buttons installed in the tower and in the yard conductor's cabin can operate these Klaxon horns.