

# Pennsylvania Exhibits Speed-Control

Actual equipment or working models are included in demonstration arranged in baggage car for an exhibition to public officials and to press representatives

THE Pennsylvania Railroad, after many months of continuous study and experimentation, is now introducing into its operations a new speed-control system, the extent of the project being explained in a news story on page 203 of the March issue. In order to show public officials and representatives of the press what speed control is and how it works, the Pennsylvania in co-operation with the Union Switch & Signal Company, has outfitted a baggage car with actual equipment and working models to demonstrate how the speed control will operate in conjunction with wayside signaling. To make the safety story more complete, the exhibit also includes other apparatus, such as dragging-equipment detectors and the Pennsylvania's system of telephone communication between locomotives, wayside towers and employees on the ground. In addition, visitors are shown the speed-governor, cab signaling and brake equipment which has been installed on a road locomotive.

An important part of the new exhibit is a scale model of a three-block wayside signal system, connected to full-size relays and other apparatus. When a signal displays the Stop aspect, the next signal displays Approach, the second shows Approach Medium, and the third signal will be Clear. Approach Medium is commonly used approaching an interlocking where diversion from one track to another is made on a medium-speed crossover.

As the locomotive model is moved

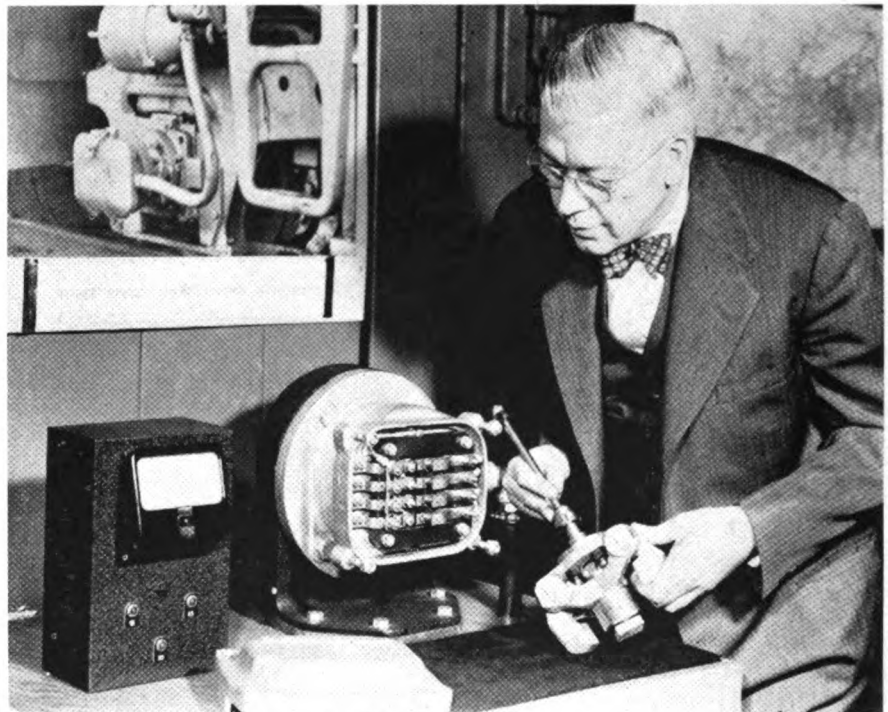
from left to right through the four blocks, the miniature signals are activated as would be the actual wayside signals. The full-size cab signal indicator responds immediately as does the warning whistle. The locomotive in effect picks up the signal which "rides" in the cab with the engineman so he continuously "sees" the condition of his track and is instantly warned of any changing conditions ahead.

The cab signal indicator is within constant sight of engineman and fireman in the locomotive, regardless of weather and visibility conditions. A warning whistle and acknowledg-

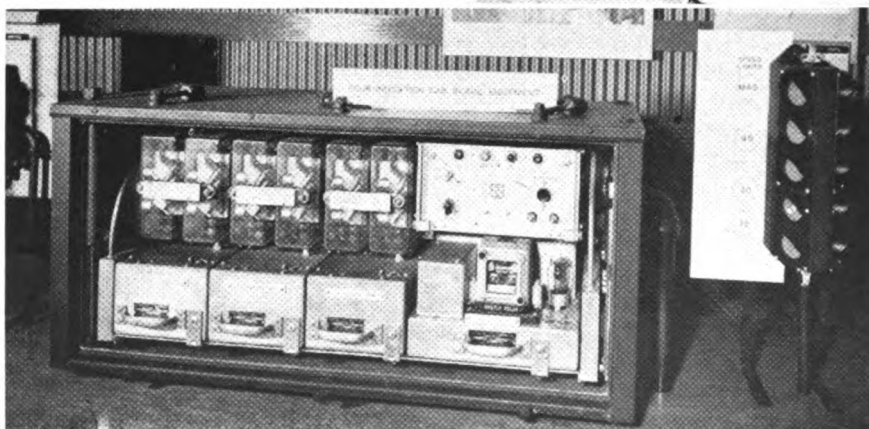
ing lever are also within the cab and near the engineman's seat. They are applied to steam, electric and diesel-electric locomotives, and to multiple-unit cars used in commuter and suburban service.

When the locomotive (model or actual) passes signals less favorable than Clear the aspect of the cab signal changes to conform with the wayside signals, and the speed-control governor, together with the cab signal apparatus, selects the authorized speed setting to activate the electro-pneumatic valves controlling the brakes, slowing or stopping the

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Above—G. C. Felton, of the signal department forces of Pennsylvania demonstrated a speed governor, shown center, with the centrifugal unit in his hands. In service, the governor is on the end of a locomotive axle, as shown upper left. The meter to the left in this picture shows the speed at which governor revolves in this exhibit.



Left—Exhibit of a cab signal (right) and control equipment in case as used on the locomotives to control cab signals and also the new speed control equipment

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length of time, a scale or scum forms on the inside. When pots have reached this condition, they should be cleaned thoroughly and given a good coat of graphite or stove polish. No metal or slag will then stick to the inside of the pots, and all impurities will rise to the top of the solder and can be easily skimmed off.

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train if the engineman fails to respond. At the same time, the cab signal warning whistle blows to warn the engineman of each change to a more restrictive indication and must be acknowledged by the engineman. Acknowledgment consists of operating the acknowledging lever and brake valve to make the proper reduction of speed in order to comply with the signal indication. If the engineman is slow to respond, the brakes are applied automatically and may be released only when the train reaches the authorized speed for that signal indication. If the engineman is incapacitated and does nothing, the train comes to a stop.

If the speed of the train increases above that permitted by the signal indication, after having once reduced speed to comply with a signal, the brakes will again be applied automatically. A typical manual brake valve as used on various types of Pennsylvania locomotives has been modified to incorporate the

necessary changes required by automatic speed control.

Also the exhibit in the baggage car includes a speed governor, as shown in the picture herewith. The axle turns at the actual speed of the train; the governor, connected to the axle, represents the authorized speed, and through the braking system, slows the locomotive down to the authorized speed if it is going faster. Speed settings will be 45 miles per hour for Approach Medium signals, 20 m.p.h. for Approach, and 15 m.p.h. for any signal aspect less favorable than Approach.

In the initial stage of the present construction program, 307 Pennsylvania locomotives will be equipped with automatic speed control devices as rapidly as materials can be obtained. When this phase of the program is completed, more than two-thirds of the railroad's passenger train service will have the added protection of this system. It is planned that further extension of this automatic speed control system will be progressed as rapidly as possible thereafter to cover all areas where frequency of train service is such as to warrant the use of this system.

Also displayed in the exhibit car is the nameplate taken from the first interlocking used on the Western Continent. Designed and built in 1874 by the firm of Saxby & Farmer, of London, England, this appliance was placed in service February 11, 1875, at East Newark Junction, about one mile east of Newark in what is now Harrison, N. J.

## Burlington

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tion switch with the main line. A second spring switch connects two leads from the south end of the yard toward the junction with the main line of the Hannibal division at Block 224. Each of these spring switch layouts includes a Pettibone-Mulliken spring buffer unit and a General Railway Signal Company automatic mechanical facing-point lock.

A dwarf signal is located about 20 ft. in approach to the facing-point of each spring switch. Such a signal indicates proceed as long as the switch point is within 1/4 in. of its normal position and the facing point lock is normal.

The 110-volt main battery at Ustick tower for feeding the 110-volt switch motors, consists of 55 cells of 200-a.h. Exide lead storage battery. At each of the outlying stations, the 30-volt switch machines are fed by a set of 14 cells of 80-a.h. Exide lead storage battery. Various other sets of battery feed line circuits, lock circuits and line code equipment. Each track circuit is fed by one cell of 120-a.h. Edison storage battery.

### Wiring Distribution

On account of the extended area included in this new interlocking, the installation of wires and cables was an important part of the project. Between the tower and remote locations, such as Broadway, Block 4 etc., circuits are on open line wire or in aerial cable. The line code circuit is on two No. 6, 30 per cent conductivity Copperweld wire with tape and 2/64 in. Neoprene covering. The 220-volt a.c. power is on two No. 6 copper wires with the same covering as described above. The aerial cable has braided covering.

The buried cable is made up of various numbers of conductors as required, and most of these conductors are No. 12 copper. The cable to track connections is single-conductor No. 8. The insulated wires are protected by coverings including lead, jute, steel tape and outer layer of jute. The insulated wire and cable on this project furnished by the Okonite Company. This new interlocking was planned and installed by Burlington signal department forces. The major items of interlocking equipment were furnished by the General Railway Signal Company.

## CUT IT OUT

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