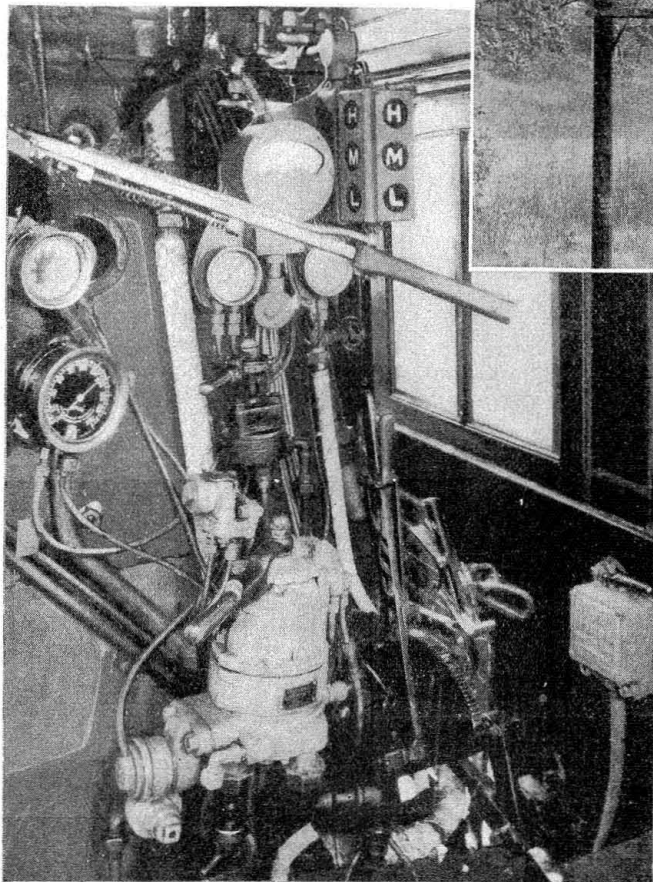


Santa Fe Is Operating Trains by Cab Signaling With Train Control

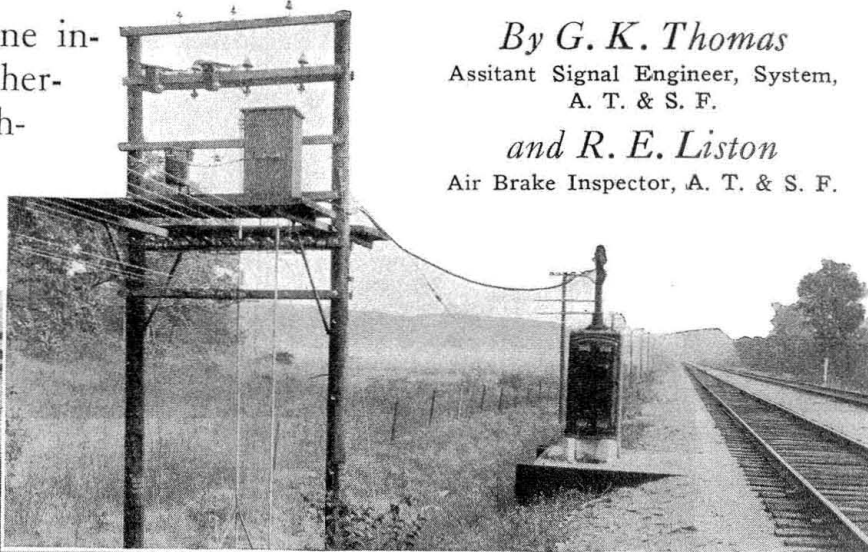
Capacity of double-track line increased substantially by either-direction operation without wayside signals

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Cab signal, speed indicator, and engineman's brake valve



Relay case and pole framing at block location

territory between Fort Madison and Chillicothe, Ill., 102 miles, and this installation was placed in service on January 1, 1925. On March 28, 1927, the manual block system and automatic block system on this territory was abolished, all trains being governed thereafter by the automatic train control system. The second order covers the territory between Chillicothe and Pequot, 73 miles, which installation was completed March 31, 1927.

No wayside signals are used except at interlocking plants. Engine cab signals only are used to indicate the maximum speeds at which trains may operate. The cab signal consists of a three-light unit mounted in front of the engineman, in which illuminated letters indicate the permissible speeds. Letters show to the front and left so that both the engineman and fireman can observe the indication. The engine equipment on passenger and freight engines is adjusted so as to impose the speed limits.

The track is divided into sections or blocks of 3,800 ft. to 4,200 ft. in length averaging 4,000 ft. and circuits are so arranged that a train occupying any block imposes "low-speed control" on the portion of that block to the rear of the train and also throughout the entire length of the first block in the rear, as well as "medium-speed control" throughout the entire length of the second block in the rear. Thus a train traveling over the road carries behind it continuously, a zone of low-speed control of 4,000 to 8,000 ft. and behind that a zone of medium-speed control of 4,000 ft.

This spacing of blocks was determined on the basis of a heavily loaded oil train, which has the lowest braking power of any class of train operated on the division. It provides ample margin to insure safety under all ordinary conditions of operation. A chart of the controls set up in the rear of a train through an interlocking plant and between stations is shown in Fig. 1.

On the Illinois division, 19 regular passenger trains are operated on week days and 17 on Sundays, as

PURSUANT to the orders of the Interstate Commerce Commission in 1922 and 1923, the Atchison, Topeka & Santa Fe installed a complete system of automatic train control and cab signals on the Illinois division between Fort Madison, Ia., and Pequot, Ill., a total distance of 175 miles of double track. The system used is the Union Switch & Signal Company's continuous three-speed control and circuits are so arranged that trains may be run in either direction on either track by signal indication and with complete automatic train control protection. All equipment was installed by railway company's forces. Previous to the installation of automatic train control this territory was handled under manual block except three short stretches totaling 37 miles which was equipped with automatic block signals.

The first order of the commission covered the ter-

