

of the energy required to operate earlier types of centralized traffic control polar relays.

Code-Following Polar Stick Track Circuit Relay

THE Style CDP code-following polar stick relay has been developed by the Union Switch & Signal Company, Swissvale, Pa., for use for approach control in coded track circuit signaling or for coded line systems. This relay is similar in design to the Style CD polar neutral relay used in standard line and track coded circuits, except that the magnetic and contact structure has been modified so that the armature and contacts will remain in the position in which they were last energized. In order to operate this relay on code it is, therefore, necessary to reverse the energizing current at each "on" and "off" interval of the code.

The armature and contacts of this relay are supported on flexible strips of phosphor bronze in which the stresses are so low that fatigue fail-

ures. The contacts are designed for ease of adjustment and simplicity of replacement.

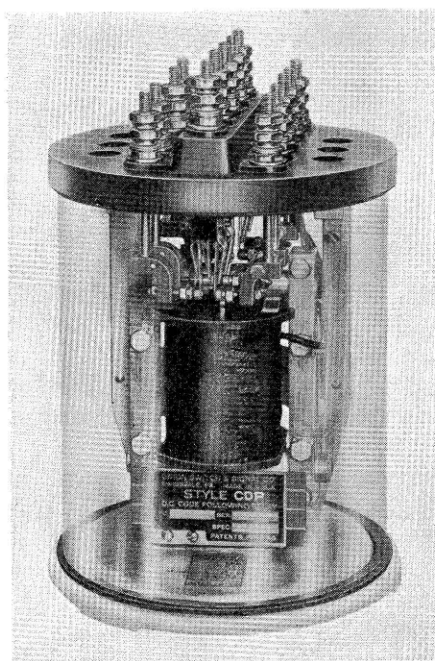
P-4 Code-Following Relay

THE Union Switch & Signal Company, Swissvale, Pa., developed its Style P-4 code-following track relay for continuous operation at the usual code speeds with its system of coded track circuit control. Because of the unique design of this relay, it operates on a very small amount of track circuit energy. This relay is furnished with one front and one back contact or with two front and two back contacts. The single-point relay has been called a pilot track relay because it is used to operate a Style CD code-following repeater relay which controls the decoding circuits. The use of this relay makes possible the operation of 11,000 ft. track circuits from a single cell of primary battery, with proper ballast and rail resistance. As the 2-point P-4 relay requires slightly more power, a track circuit of approximately 7,500 ft. can be operated from a single cell of primary battery. This relay, however, can be operated on the longer track circuits with two cells of primary connected in series or on one cell of storage battery.

The single-point P-4 Relay requires a type "CD" repeater relay for control of the usual decoding circuits, while the two-point relay can be used without a repeater relay.

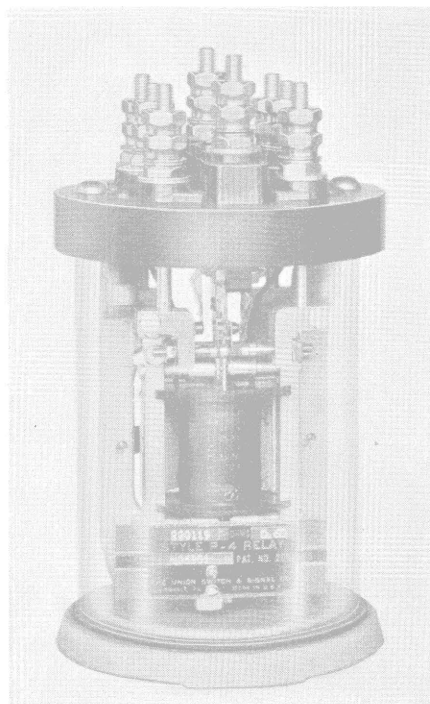
The P-4 relay is similar in design to the "CD" code-following relay in that the armature and contact bar are supported on hinge springs to eliminate the use of trunnions, and the engaging parts are heavily chromium-plated to provide exceptionally long life. The contacts regularly furnished for this relay are of 3/16-in. diameter, silver-platinum alloy. Both the single point and two-point P-4 code-following relays are, of course, adaptable to shorter track circuits than the 11,000-ft. circuit.

These relays are available in either the polar neutral type, for normal track circuit operation, or in the polar bias type, frequently used in reverse code operation in coded track circuits. The polar neutral relay is normally biased to the back contact position, and operation of the front contact is obtained only when direct current of the proper polarity is applied. This feature makes it possible to secure broken joint protection in d-c. track circuit territory by applying the proper polarity to adjacent track circuits. The polar bias relay is so designed that the armature will stay in either the normal or reverse position, depending upon the polarity of the energy last received. Therefore, in order to obtain code operation, it is necessary to reverse the direction of the applied current to provide operation.



Code-following polar stick relay

ures are said never to occur. Core pins and pole pieces are plated with a heavy layer of chromium, which, because of its hardness, prevents wear. This relay has a maximum contact capacity of four normal and four reverse non-independent contacts, of an alloy of silver and platinum for low-voltage d-c. circuits, or a fine-grain tungsten for the high-voltage a-c. cir-



Two-point code-following relay

SL-SW Signaling

(Continued from page 539)

is a set of five Exide lead storage cells rated at 40 a.h. on an 8-hr. rate. Each of the longer track circuits is fed by a cell of the same type. Each of the shorter track circuits is fed by one cell of Edison 500 a.h. primary battery with a rectifier connected to take practically all of the normal load.

The rail joints throughout the signaled territory are bonded with mechanically applied rail-head bonds, three different types being used, the Ohio Brass Company, Hammerhead, the American Steel & Wire Company PA-2 Type, and the Railroad Accessories Corporation Raco Type.

This signaling installation, including the construction of a new pole line, was made by forces of the St. Louis Southwestern, under the jurisdiction of W. S. Hanley, chief engineer, and under the supervision of B. J. Alford, signal foreman, with G. A. Davis in charge of the field forces. The major items were furnished by the Union Switch & Signal Company.