KINKS

Local Control System

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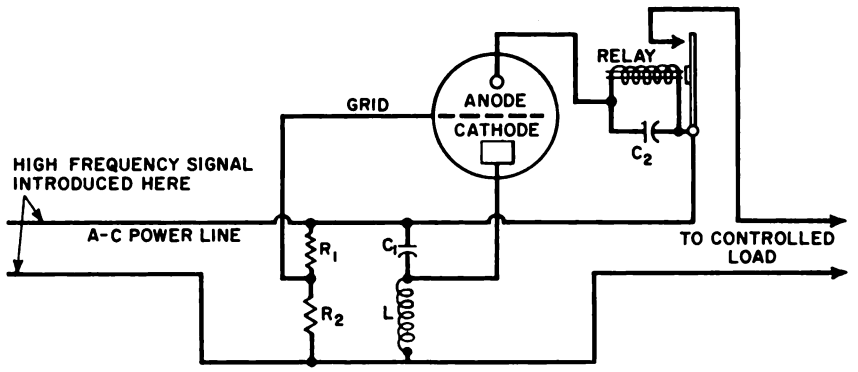
Local controls may be transmitted over an AC power line to operate an information signal in advance of a train. Such a signal might indicate that the train has actuated a dragging equipment detector. These are local controls and are not connected into the existing signal system. How these controls may be sent over the power line is explained below, with reference to the circuit drawing.

Gas triodes may be used for operating magnetic relays, with the relay doing the switching for a load operated from an AC power line. A cold cathode type of gas triode is used for relay control of a load located at a distance from the point of control on an AC power line. The tube anode is connected through the relay winding to the upper side of the line, and the cathode is connected to the lower side of the line through coil L. During half-cycles in which the upper side of the line is positive and the lower side negative, the tube anode will be positive with reference to the cathode, and the tube may be made to conduct by a change of grid voltage. During opposite half-cycles the anode is negative with reference to the cathode, and there can be no conduction. Therefore there is pulsating direct current through the tube.

The relay will be operated when a high-frequency signal voltage is transmitted over the power line and reaches the grid control circuit consisting of resistors R_1 and R_2, capacitor C_1 and coil L. The grid of the tube is connected to a point between resistors R_1 and R_2, which form a voltage divider across the power line. During half-cycles in which the anode is positive the grid is maintained at a potential just a little lower than needed for breakdown. The cathode of the control tube is connected to a high Q, high-frequency resonant circuit consisting of capacitor C_1 and indicator L connected across the AC line. This resonant circuit is tuned to some high-frequency, usually in the lower radio-frequency range, which may be transmitted over the AC power line without interference from the power frequency.

When such an RF signal is transmitted over the line from some distant control point, there are produced high voltages at the resonant frequency in the tuned circuit C_1-L. Thus the average potential of the tube cathode is made more negative by the signal. Making the cathode more negative brings its potential nearer to the grid potential, and in effect makes the grid less negative with reference to the cathode. Then the tube breaks down and there is a large electron flow in the anode circuit to close the relay contacts completing the circuit to the controlled load. Capacitor C_2 discharges through the relay winding during the half-cycles in which the tube does not conduct, holding the relay closed during these periods.



Unsworth, B&O: Local controls may be sent over AC power lines.

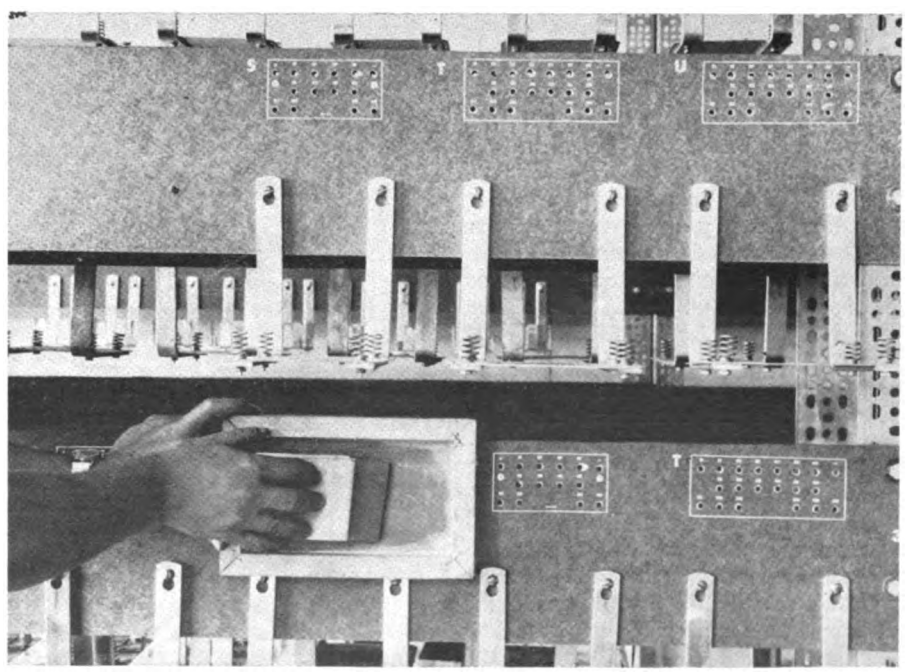
Backboard Stencilling

D. W. Shackley

As a result of an interlocking control consolidation in the Pittsburgh area, it was necessary to erect a new relay house. AIM brand slotted angle was used to frame the relay rack; pieces of tempered Masonite were mounted on this angle and the relay hanger mounted through the Masonite and fastened to the AIM angle for support. An individual silk screen was made for each type of relay which provided P&LE with a quick and easy method for stencilling wiring information.

Each relay is identified as to rack row (number) and row location (letter) in the house. A silk screen was then used to stencil the individual wire (relay terminal) location for each relay. The stencil also provided a marking for drilling, as shown in the photographs.

The silk screens (from largest to smallest) average approximately $7.00 each and, if properly cleaned after each use, should last indefinitely. The necessary tools are the silk screen, a rubber squeegee and the paint.



Shackley: Stencilling applied using silk screen and squeegee.