result, because of inherent transformer action between the rails and the loop, with fluctuations in the rail current caused by ballast conditions producing corresponding fluctuations in the loop current.

The low impedance bond connections, as shown in Fig. 1, are used at locations such as railroad grade crossings, where the proximity detector circuit is not located within

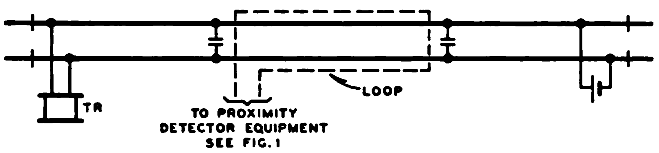
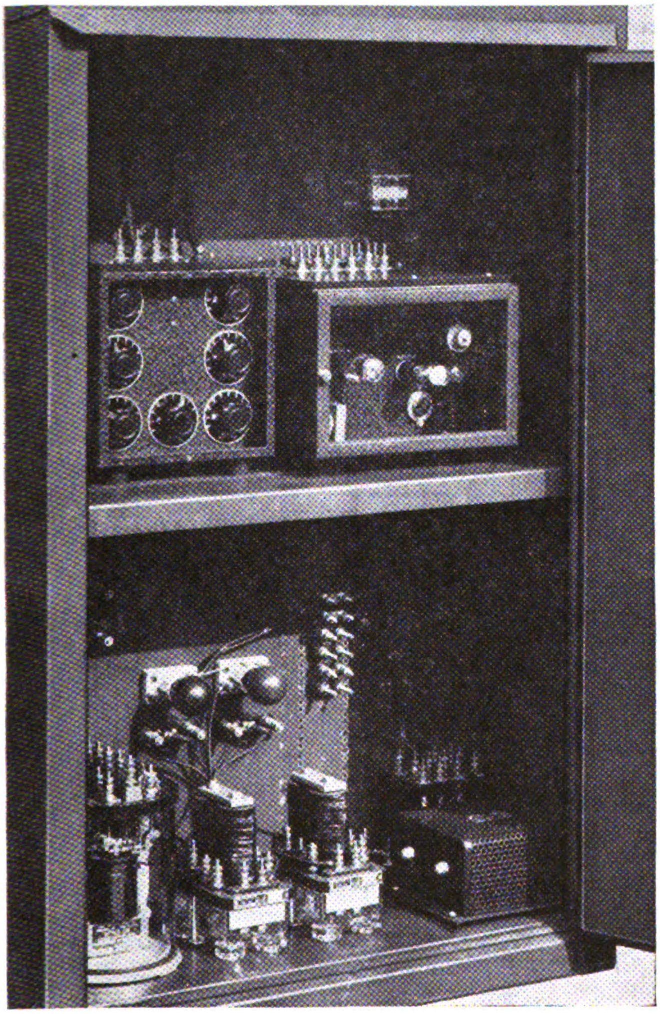


Fig. 2—Circuit where proximity detector is within limits of conventional track circuit

a conventional track circuit. In an application where the "proximity detector" is located within the limits of a conventional track circuit, capacitors having a low impedance to the high frequency a.c. are used to shunt the rails, as shown in Fig. 2.

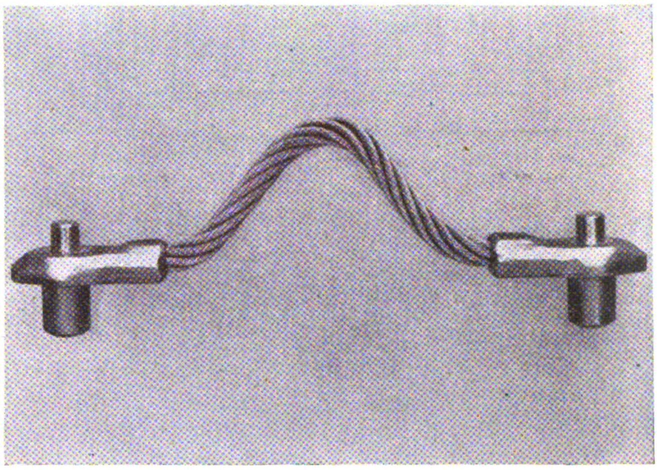
Oscillator and amplifier units employed in the proximity detector system are vacuum tube devices designed to function at a particular frequency, usually 50 k.c. The oscillator unit is designed with highly stable characteristics to prevent appreciable variation of the generated frequency from the specified value. The amplifier unit is designed to be selectively responsive only to the frequency generated by the oscillator, thus preventing energization of the detector (CD) relay by stray currents. The oscillator and amplifier units are designed to operate on 110 volts, 60-cycles. Power consumption with the bridge circuit energized is approximately 40 watts, which is low enough to permit operation from a regular tuned alternator in case of power outage.



Proximity detector apparatus inside instrument case

Flat Top Bond

The American Steel & Wire Company, Rockefeller Building, Cleveland 13, Ohio, has recently developed a new type of rail-head bond, known as the flat top bond. Until



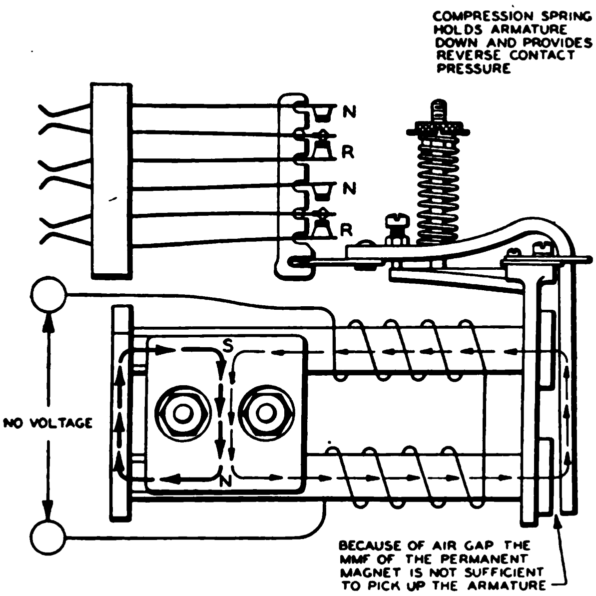
The new flat top type rail-head bond

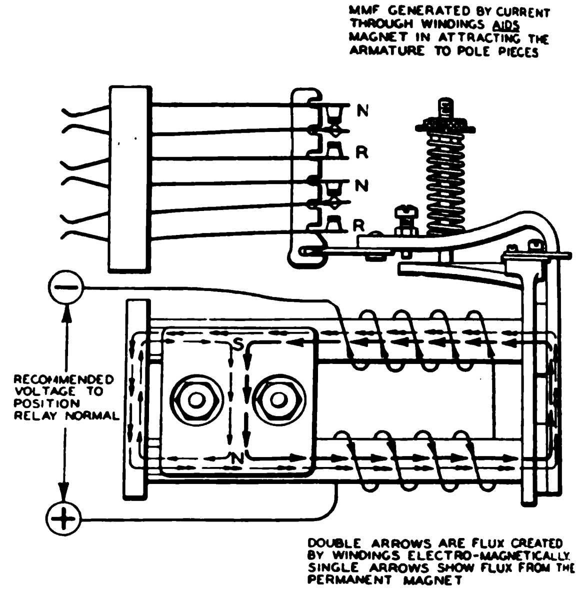
this development, bonding by means of the rail head has suffered from one serious drawback, according to the manufacturer, because bonds were vulnerable to mechanical damage from dragging equipment. This vulnerability was due to two reasons: (1) The physical dimensions were such that the distance from the rail to the top of the terminal was approximately ½ in., thus presenting a good sized target, and (2) The mass of the terminal was concentrated in the head of the terminal. This meant that when a blow was struck at the head of the terminal, the inertia of the head caused the point of maximum stress to be transferred to the weaker portion of the stud, and a shear failure occurred at the hole.

With the new design of the flat top bond the large mass is said to be taken away from the terminal head. This means that the terminal will hug the rail and seldom be struck. If it is struck, there is small likelihood it will be knocked off, since the head, now being weaker than the stud, will crumple. The force of the blow will not be transferred to the stud, but will cause distortion of the terminal head.

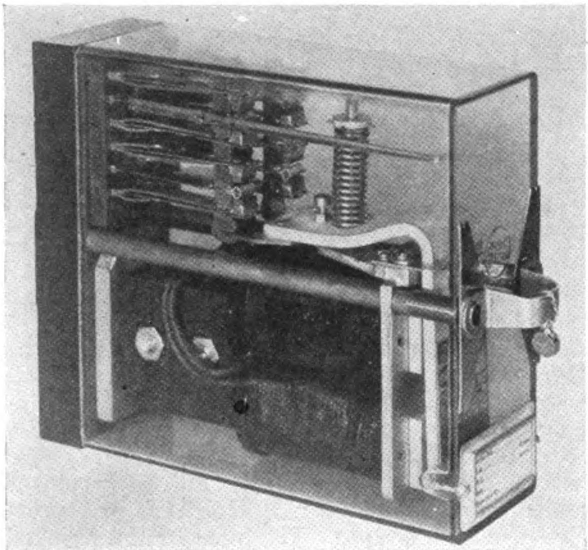
Magnetic-Stick Relays

Polarity-responsive relays with the magnetic-stick feature have been announced by the General Railway Signal Company, Rochester 2, N. Y. These relays are made plug-in, quick-detachable, and referred to as Type B relays; they are also available with A.A.R. binding posts, in the line commonly known as the Type K. In both types of relays, the magnetic structure is equipped with an alnico permanent magnet. Current of one polarity through the relay windings causes the armature to pick up. Current of opposite polarity causes the armature to



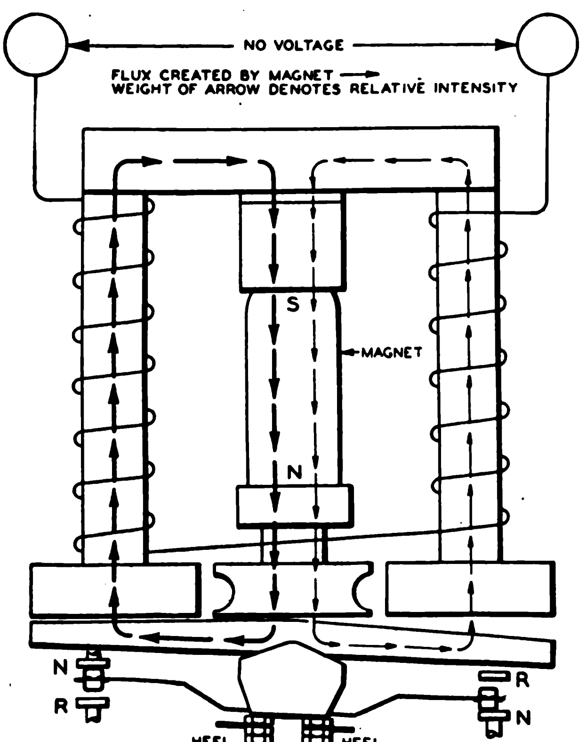


Left — Fig. 1 — Type-B magnetic-stick relay in several positions. Right —Fig. 2—Type B relay armature picked up with normal polarity closing the normal contacts

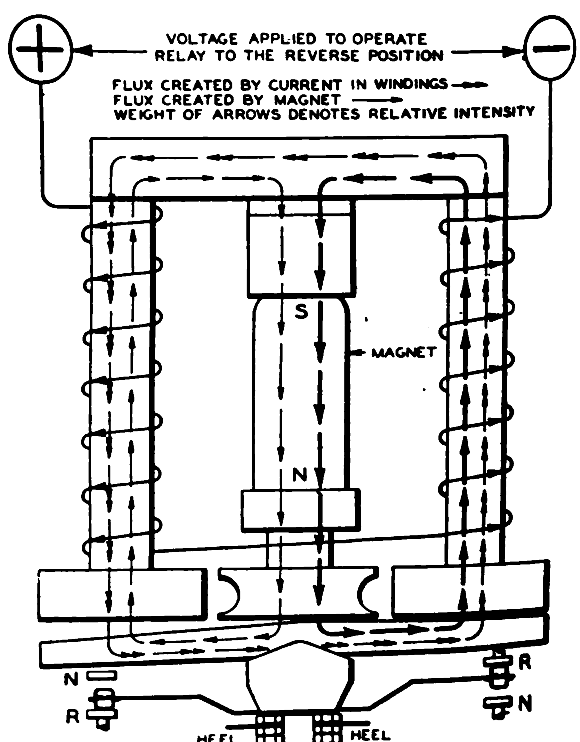


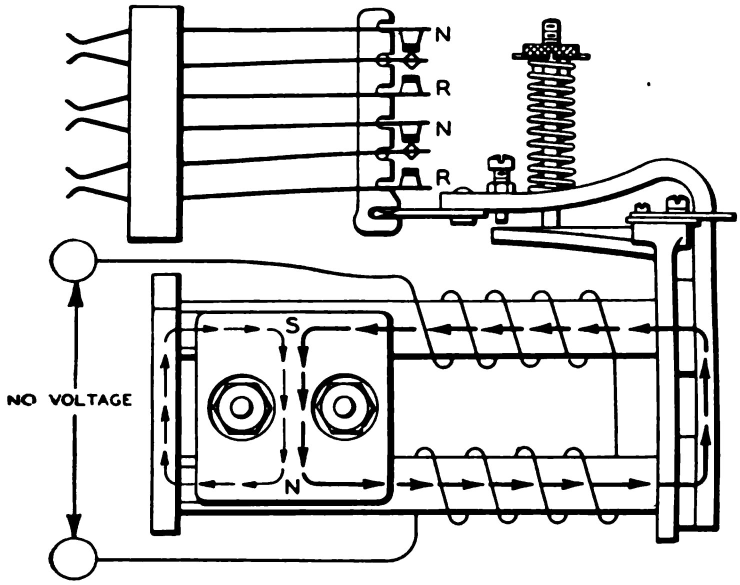
release. In the Type B relay, when the armature is operated to the pickup position, it is held up by the permanent magnet after the windings are deenergized. When the armature is operated to the released position, it is held down by a compression spring after the windings are deenergized. In the K relay the armature is held up or down in its last operated position by the permanent magnet, after the windings are deenergized. The relays are in effect two-position polarized relays with polar contacts only—no neutral contacts. The operation is illustrated by the accompanying diagrams, Fig. 1 to Fig. 8, inclusive.

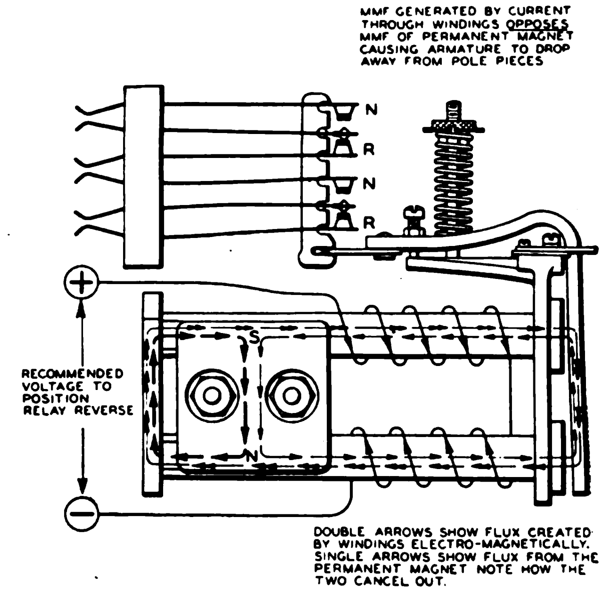
The Type B relay is equipped with four normal-reverse dependent contacts, silver to silver-impregnated carbon. The Type K relay has four normal-reverse dependent contacts, platinum-silver to platinum-silver. At present the Type B relays have been designed with a total resistance of 30, 46 and 1,100 ohms, and require maximum working current of 35, 28 and 6 milliamperes, respectively. The Type K relay is available with coils having 50 and

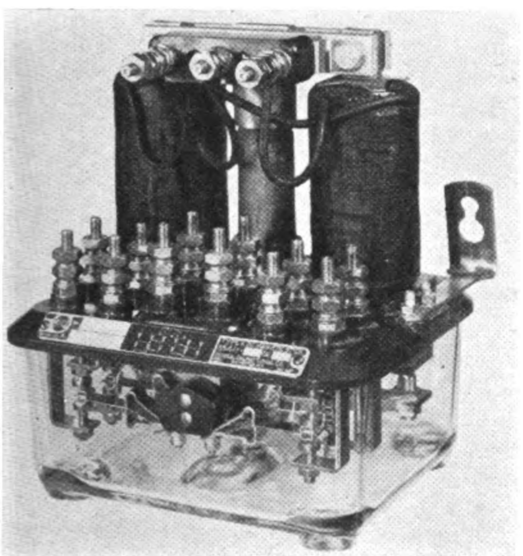


Above left—Type-B plug-in magnetic-stick relay. Left—Fig. 5—Type-K magnetic-stick relay normal, armature held normal by magnetic attraction. Right—Fig. 6—Type-K relay operated reverse, current through windings creating stronger magnetic pull in right core and tending to cancel any pull existing in the left core





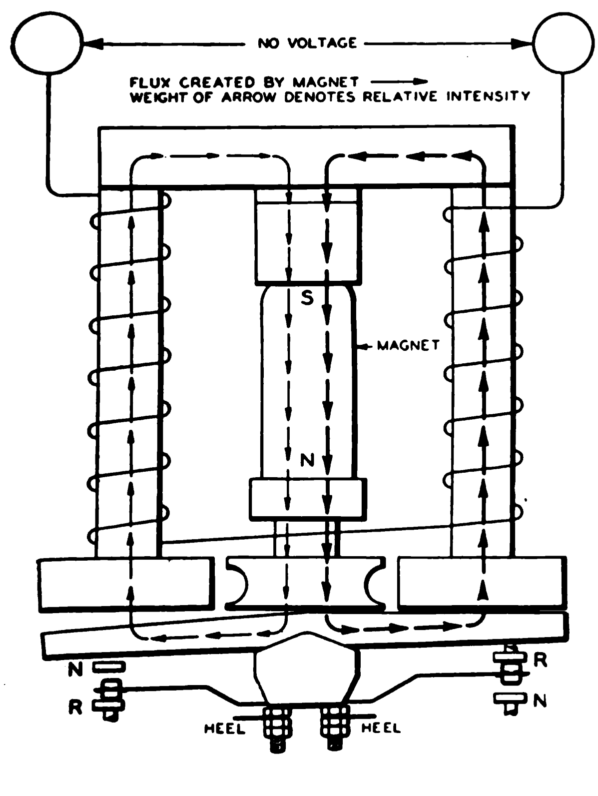




Above left—Fig. 3—Type-B relay armature stuck up by permanent magnet's attraction, holding normal contacts closed. Above right—Fig. 4—Type-B relay armature knocked down with reverse polarity, closing reverse contacts.• Left—Type-K magnetic-stick relay

1,000 ohms resistance, requiring a maximum working current of 21 and 5.5 milliamperes, respectively.

The Type B relay is plugged on to a plugboard to which all wiring is soldered and secured. The relay itself measures 2½ in. wide, 6-5/16 in. high and 8¾ in. deep. A registration plate with a certain combination of holes is sealed on the back of the relay. This plate matches up with a similar registration plate on the plugboard, this plate having pins in the same combination. The registration of pins with holes is said to assure that the proper relay is plugged on to the plugboard. The Type K relay is furnished for mounting on a wall or a shelf and measures 7½ in. wide, 9½ in. high and 6 in. deep. Means of mounting increase these overall dimensions slightly.



Left—Fig. 7—Type-K relay stuck reverse by magnetic attraction. Right—Fig. 8—Type-K relay operated normal, current through windings creating a stronger magnetic pull in the left core and tending to cancel any pull existing in right core