parent fibestos panel on the front of the controller housing. An external push button permits manual restoration of the circuit breaker.

The quick-detachable plug-coupler consists of a plug board which fastens to the relay rack and a receptacle board mounted on the controller. The unit is supported by two rods mounted on the plug board which prevent the connection of the coupler except in the proper position. The contacting members on the receptacle board are tin-plated brass shells that pass over the hairpin-type bronze springs affixed to the plug board on the controller. The plugs are easily centered in the receptacles, and, when connected, the springs are under tension giving a positive four-line long-wipe on the contact.

The receptacle members tend to protect the bronze springs, and act as self-cleaning contacts by insertion and extraction. The boards are ½-in. phenolic plate. A contact may also be mounted on the plug board which closes just before the controller is disconnected. This contact maintains the switchboard circuit breaker energized when the controller is removed, thereby permitting normal functioning of all circuits other than the switch machine circuit affected by the removal of its controller. This coupler arrangement provides a positive speedy means of removing a controller and replacing it during periodic inspection without any possibility of circuit errors.

Improvement in Primary Cells

THOMAS A. EDISON, Inc., Bloomfield, N. J., announces that metal parts in the element assemblies for all types of its primary cells are now being finished with a zinc plating.

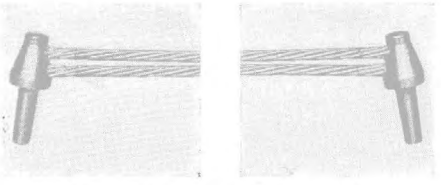
The chief reason for plating these parts, the company says, is to protect the metal against the possibility of rusting or corroding during shipment or storage of elements. Following its long established practice of continually seeking ways and means to further improve its primary cells, the manufacturer has found through extensive field and laboratory tests that a zinc plating on these structural parts is much more satisfactory than the copper plating previously applied in the manufacture.

In addition to providing better protection to the parts against oxidation in transit and storage, zinc plating is said to have advantages over the copper plating that contribute to a general improvement of the cells. Among these, it is effective in eliminating the possibility of metallic impurities being introduced into the electrolyte which might adversely affect its performance, as well as the ultimate results obtained from the cells. It also materially assists in preserving the most active conducting surface on the copper-oxide plates when elements are placed in hot solutions at the time cells are set up or renewed. This is a very desirable advantage, particularly when cells are to be placed on very light discharge or open circuit immediately after being set up. Zinc plating also eliminates the necessity of giving any elements special treatment before they are inserted in solutions, in order to insure proper results.

After the plated parts are placed in electrolyte, the zinc gradually dissolves, leaving them with bright and shiny surfaces. The amount of zinc which enters the solutions from this source is so small as to not interfere in any way with its performance or that of the cells generally. The zinc used for plating is the purest grade obtainable.

Tapered Head Terminal Bond

THE American Steel & Wire Company is introducing an improved plug type signal bond. The improved feature is in the head of the plug terminal. This has been designed with a sharp tapered portion to which the conductors are butt-welded. The conductor leaves the terminal at an angle to the axis of the terminal and away from the rail web. The usual bend close to the terminal is eliminated and there is only one long radius bend to make at each end in order to position the conductor along the top of the splice bar.



Tapered head terminal bond

The usual galvanizing or tinning of the terminals is done so that the zinc is carried up the conductors for a short distance. This dipping in hot metal solders the wires together, making a solid structure which terminates abruptly at the end of the dipped portion, the balance remaining flexible. Vibration studies in the laboratory have proved conclusively that the fatigue life is increased about five times if the wires remain soldered together adjacent to the terminals.

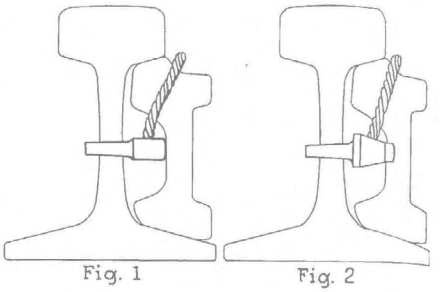


Fig. 1 Fig. 2

Application of non-tapered and tapered bonds

Bonds with cylindrical head terminals require that the conductors be bent at the terminals outwardly from the rail web (Fig. 1). This bend breaks the bond between the wires, incident to the hot dipping, thus leaving the individual wires of the conductor free to move all the way down to the point of attachment to the terminal. The tapered head (Fig. 2) does away with the bend near the terminal and leaves the wires soldered together in the dipped portion. The necessity of only making one bend, which is of long radius, greatly simplifies the forming of the bonds, which is always done in the field.

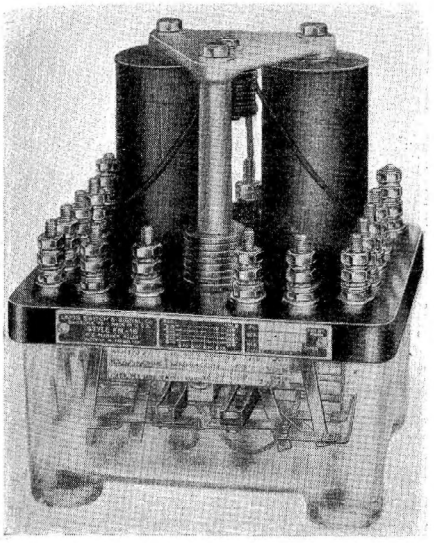
An Improved Flasher Relay

A NEW flasher relay, Style FN-16, for the control of flashing-light signals at highway crossings, is being offered by the Union Switch & Signal Company. The relay, which meets the proposed A.A.R. specification 185-39, is designed for safety, long life, reliable service, simplicity of parts, ease of maintenance and improved efficiency. The advantages claimed for the FN-16 by the manufacturer are contained in the following description:

The coils are placed outside of the case and can be maintained the same as for standard track or line relays. The copper washers, located on the common core, may be taken off easily to adjust timing without breaking the relay seal. The efficiency of

the relay is increased. The coil resistance for 10-12-volt operation is 500 ohms.

The relay armature is biased by a counterweight so that it normally closes the circuits for one-half the total flashing lights. Thus, if the track relay becomes de-energized, and proper energy is not received at the FN-16 relay for its operation, one steady red indication will be displayed by each signal. The relay can be used either for "shunt control" or for "make and break" control of lamps. The shunt control of lamps



Improved flasher relay

results in longer life of contacts.

The contacts are made of a special alloy material with non-sticking characteristics, and are designed for long life and heavy loads. The relay is compact, requiring only small mounting space. The trunnions and stop pins are of an improved design. The number of operations per minute remains above the A.A.R. minimum without need of any adjustment for many million operations. The original timing can easily be restored by removing some copper washers from the common core.

The relay provides equal periods of illumination for the flashing of lamps of the crossing signals. These periods of illumination for each lamp are independent of the impressed voltage within reasonable limits because of the method of short-circuiting windings and consequent retardation of flux changes.

Because of the simple construction and arrangement of the contacts, circuits can be easily traced and mistakes in connections avoided. Eight lamp contacts are provided to care for the greater modern load requirements, thus frequently eliminating the necessity for a second relay.

Means for effective suppression of radio interference are included as standard equipment. The relay operating mechanism is enclosed and sealed in a one piece glass case which provides a clear view of all vital internal parts. The relay coils are wound to resistances suitable for the usual ranges of voltages commonly available. The rating of the contacts is 5 amp. each, thus making it possible to control practically any type of complicated crossing layout with one relay having 4N-4R contacts. The life of these contacts depends upon the load they carry and the frequency with which they operate.

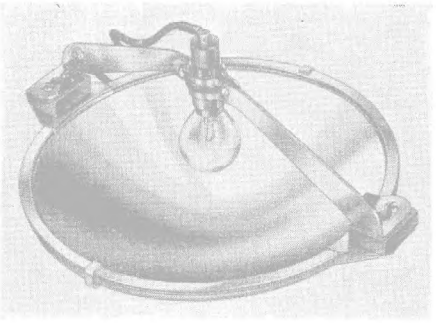
The FN-16 flasher relay is available as follows:

Relay Resistance	Normal Operating Voltage
4.5-4.5	1.0-1.2
200-200	6.0-8.0
500-500	10.0-12.0

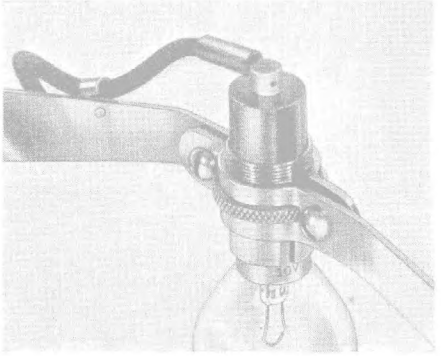
Focusing Crossing Signal

A NEW focusing type lamp bracket has been designed by the Western Railroad Supply Company, which will be standard equipment on their Type 880 and Type 950 flashing-light signal lamp heads. The lamp socket is supported by two formed brass brackets which are attached to the reflector support in such a manner as to insure that the lamp socket is exactly centered in front of the reflector. The lamp socket may be moved toward or away from the mirror by turning the knurled ring which acts on the threaded barrel of the socket.

Peep sights in the ears of the supporting brackets are in line with the side light glasses of the lamp head. It is claimed that, with the door open and the filament dark, it is easily possible to attain perfect focus by lining up the filament and the two opposite peep sights.



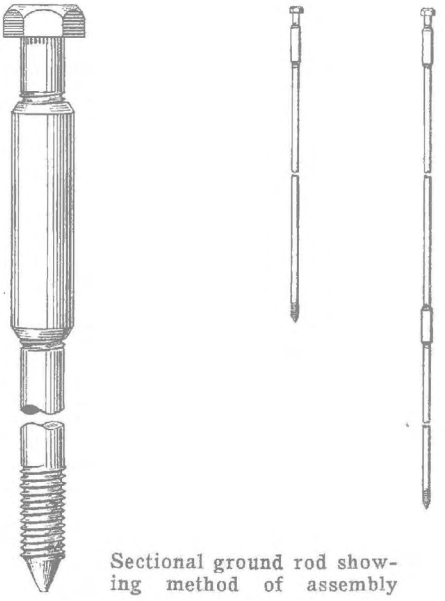
View of whole optical unit



Close-up of adjustable socket

Sectional Ground Rod

THE Copperweld Steel Company has recently introduced a new sectional ground rod. Experience and tests have shown that as a general rule, where the surface layers of earth show a high resistance, a resistance



Sectional ground rod showing method of assembly

under 20 ohms may be obtained in most locations by using 30- to 50-ft. grounds. Copperweld sectional rods have been driven to depths greater than 50 ft. in clay and glacial gravel, without bending or damage to threads or couplings. These rods are identical with standard Copperweld rods, except that they are cold drawn for greater stiffness and are roll-threaded on both ends. Copperweld couplings for sectional rods are heavy bronze sleeves, threaded on the inside to fit the rod sections with which they are to be used.

Steel stud bolts are used when driving sectional rods. These stud bolts take the blows of the driving hammer (see accompanying illustration). In driving deep sectional grounds, the coupling is first tightly screwed on the unpointed end of the first section of rod, and the stud bolt screwed into the top end of the coupling. The first section is then