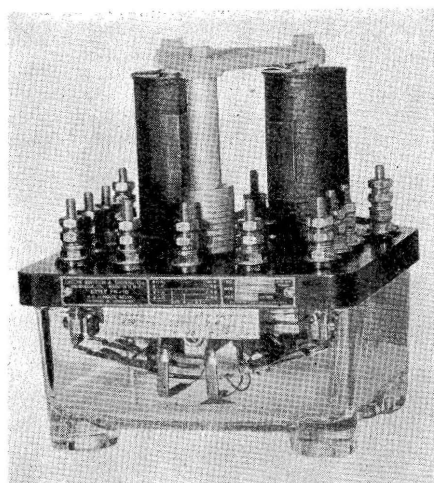


NEW DEVICES

An Improved Flasher Relay

THE Union Switch & Signal Company, Swissvale, Pa., has designed and placed on the market its new Style FN-16 Flasher Relay for the control of flashing-light highway crossing signals. This relay meets the demand for a relay that gives long life, reliable service, safety, simplicity



A flasher relay especially designed for make-and-break control

ty in parts and maintenance, and improved efficiency. Long life, even under the heavy loads imposed by modern crossings, is assured by the manufacturer. Designed so that only half of the lamp contacts are made when the relay is de-energized, it can be used either for shunt control or make-and-break control of lamps. The shunt control results in longer life of contacts and is the method recommended.

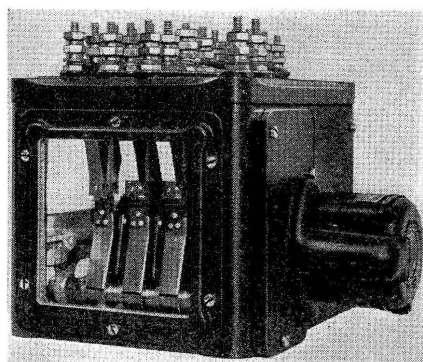
The rate of flashing remains above the A.A.R. minimum, through many years of service and a great number of relay operations, because of the special design of stop pins and pivots. Original timing can easily be restored in the field, when required, by removing some of the copper washers, used for the control of the speed of the relay, on the common core located outside of the relay case. The coils,

also located on the outside of the case, are easily replaced, it being merely necessary to remove the backstrap. The coils are 500-500 ohms for 10 to 12-volt service. The relay is also available in 180-180 ohms for 6-8 volts and 5-5 ohms for 1.0 to 1.2 volts (separate battery control).

The lamp contacts are designed to take care of the greater load requirements of modern crossings, with longer life for contacts. The relay provides for equal periods of illumination of the crossing signal lamps. These periods of illumination are independent of reasonable variations in the impressed voltage. The rate of flashing is also independent of the impressed voltage variables. Its simple construction and arrangement of contacts permits easy tracing of circuits and avoids errors in making connections. The glass case encloses the relay operating mechanism tightly and provides a clear view of all vital internal parts.

New Code Transmitter

THE General Railway Signal Company announces an improved design of an a-c. motor-operated code transmitter for coded track circuits operated from a-c. wayside energy. This



A-C. motor-operated code transmitter for coded track circuits

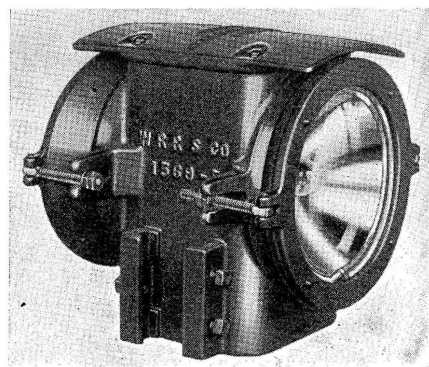
transmitter is claimed to have several outstanding features. An absolute synchronous motor is used, insuring accurate operation. The motor and

gear train are a self-contained unit which can be removed without disturbing the inside of the transmitter. The actuating assembly is of unit construction, and can be removed by unscrewing two cap screws. The contact assembly is also a complete unit with a bakelite top. These three unit assemblies and the case compose the device.

Code cams can be readily changed to provide desirable code combinations. The transmitter has a capacity of three codes for each of four independent track circuits. Provision is made for four different codes, 75, 120, 180 and 240 impulses per minute.

New Train Order Lamp

THE WESTERN Railroad Supply Company has recently placed on the market a new cast-iron train order lamp, so designed that the light beams in the two directions are independently adjustable, both in the vertical and



Train-order lamp with horizontal and vertical adjustment

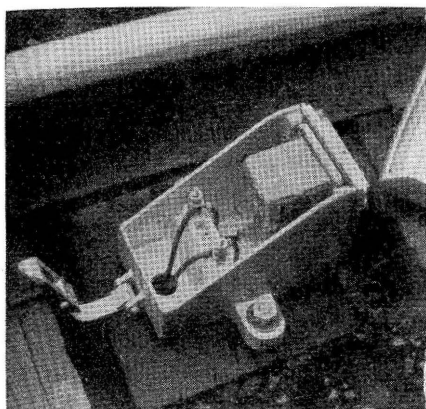
horizontal plane. The lamp consists of a cast-iron housing to be mounted on the standard lamp bracket between the spectacle castings of a train order signal, in which are mounted two independent projection units consisting of mejiradium reflectors with single-contact bayonet-base sockets and convex clear cover glasses so arranged that they can be alined to direct the light beam at any point required

within a 20-deg. angle in the horizontal plane and a 10-deg. angle in the vertical plane.

The adjustable feature provides for directing a light beam along the railway track to the point where it is desired that the engineman see it, regardless of the curvature of track or the grade approaching the station where the train order signal is located.

Track Instrument

THE NUSSCO track instrument, made by the Nachod & United States Signal Company, Louisville, Ky., is a convenient means for obtaining separate control points, as for highway crossing protection, when these are located inside of track circuit sections, since it obviates the cutting of these sections with the attendant expense and complication. The instrument



Track instrument in service with cover removed

operates on the relative motion between a pier fixed in the ground and the rail. The weight of the train, deflecting the rail as it passes over it, causes the lever of the instrument, attached to the foot of the rail, to be rotated without shock through a small angle. This is multiplied, by a compound lever arrangement without lost motion, so as to close or open an electrical contact, as desired. A very small deflection of the rail closes the contact, a further movement applies a wiping pressure, while a still further movement causes a slippage between friction surfaces so that the parts are relieved of any undue strain. Gradual changes in track alinement will be automatically accommodated by the friction clutch with the rail in the new position. The clutch friction is produced by a sheet of cork between two polished bakelite surfaces, pressed in contact by a helical spring. This maintains the friction constant over long periods, with the spring as a

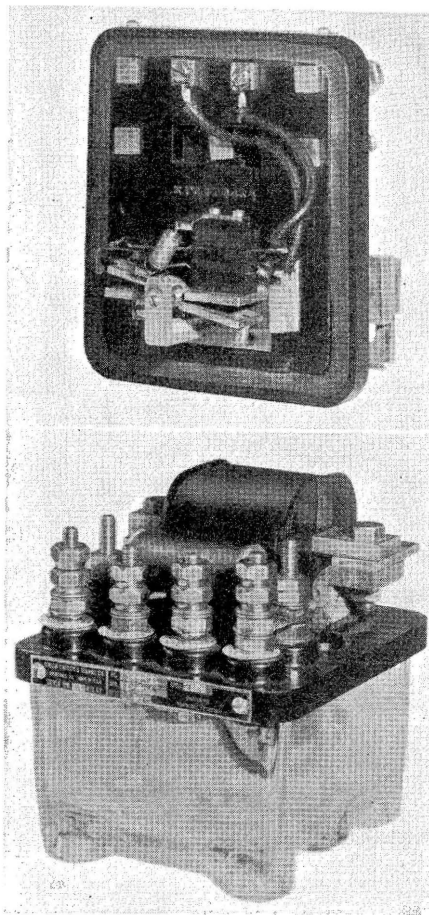
follow-up. The instrument is easily changed from normal open to normal closed, merely by turning the case through 180 deg. on its foundation, and rotating the lever 180 deg. The contact mechanism is removable as a unit, and the contacts are of silver. They are protected by a gasketed glass cover within the case. If desired, the instrument may be placed on a cradle between ties with spring plates between rail and ties, so that operation is secured by relative motion of rail and tie. Directional circuits have been devised utilizing two of these instruments spaced apart, as well as circuits for maintaining the highway crossing signal in operation while any part of the train occupies the highway. The Nussco track instrument is quite small, compact and weighs only 20 lb.

Control Relay for Battery Charging Rate

A NEW relay, the DNL-46, for use in connection with lead storage cells only, is announced by the Union Switch & Signal Company, Swissvale, Pa. It is claimed that with this relay, a fully-charged battery is assured, because its "floating-valve" characteristics do this without overcharging or undercharging. The relay is provided with proper temperature compensation and means for adjusting its operating voltage to suit the charge rate.

The DNL-46 relay releases each time the battery is called upon to deliver a load. The back contact of the relay shunts a resistor or reactor in series with the d-c. or a-c. supply of the rectifier, so that the charge rate may be increased up to the maximum output rating of the rectifier. This high rate is maintained until the battery reaches its fully-charged voltage value, at which time the relay picks

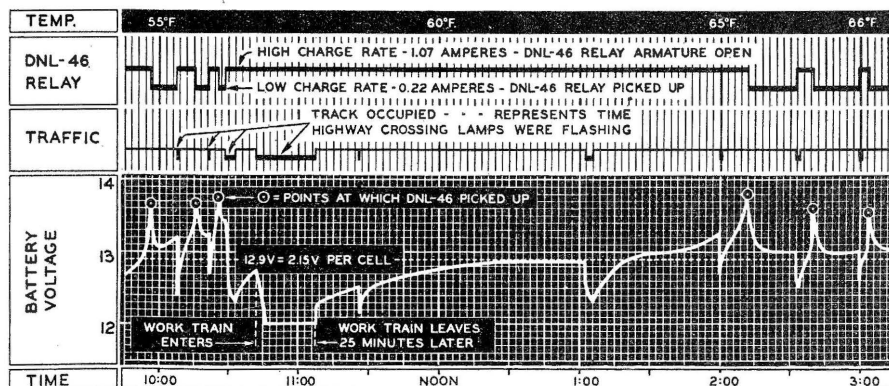
up, opening the back contact and reducing the rate to a trickle charge value for the particular capacity of the battery used. This relay has a



Bottom and front view of charge-control relay

special temperature compensation because of the fact that the fully-charged voltage of a lead cell increases as the temperature drops. This is the opposite of the conventional d-c. relay, whose pick-up voltage increases directly with temperature.

The illustrated curve shows the battery voltage during a typical day



Battery voltage on a typical day at crossing where battery charge control relay was in service

at an installation of this relay where a busy state highway crosses a double-track railroad. The crossing protection consists of three back-to-back flashing-light units, and the load on the battery, while the lights are flashing, is about 6 amp. An RX-21 rectifier, rated at 1.1 amp. maximum charge rate, is used to charge six cells of lead-acid storage battery. No power-off relay being used, the lamp load is taken from the battery. By repeated charging cycles similar to the one illustrated, some lasting minutes and some lasting hours, the relay has kept the battery properly charged for more than a year.

To meet the requirements where under-voltage power-transfer relays are used, this relay will be found of value. In such cases, it is important that the batteries remain fully charged, but as extra load may be applied to the batteries at certain locations on the line when voltage drops to the release point of the power-transfer relay, it is essential that this extra load be replaced in the reserve cells as soon as possible. The DNL-46 meets these requirements.

Some of the advantages of automatic charging with a DNL-46 relay are: (1) Saving in maintainers' time for checking batteries and adjusting charging rates; (2) batteries last longer because they are not overcharged or undercharged; (3) elimination of power wastage because of overcharging; (4) water need be added less often when batteries are not overcharged; and (5) satisfaction of dependable operation.

High-Capacity Primary Dry Cell

THE LeCarbone Company, Boonton, N. J., announces that, after many years of experiment and test, it is now ready to place on the market a new and radically different type of battery known as the High-Capacity Primary Power Carbon cell, which functions somewhat on the principle of a dry cell.

Realizing that the installation and maintenance of wet primary batteries in railway signal service involves the handling of loose caustic and mixing operations in the field, it has been the aim of the LeCarbone Company to develop large-capacity dry cells which will render the installation of primary battery a simple, rapid and inexpensive procedure.

The LeCarbone Type 517 A.-D. dry cell, first marketed about two years ago, was designed for certain

applications. However, it does not have quite enough capacity for feeding track circuits, line control circuits, and other applications where the continuous discharge on such applications depletes a cell of less than 500 a.h. capacity in too short a time, thus requiring too frequent replacement. To meet the requirements, the LeCarbone Company developed the new High-Capacity Primary Power Cell. In

heavy intermittent work such as semaphore signal or switch motor operation. They are eminently suited for lamp lighting, track circuits, telegraph and telephone work, control circuits, radio tubes, and all such applications where there are no heavy peak load requirements. Types 618 and 619 cells have an open circuit voltage of 1.4 volts—the same as all other carbon cells. The Type 2618 cell has



The new cells are made in three different capacities to meet various requirements

general, this new type of cell is designed along somewhat similar lines as the Type 517 A.-D. cell, with the exception that the new type uses a liquid rather than a dry electrolyte.

The new cells are built into attractive black moulded boxes, and are completely and effectively sealed. Provision is made for the introduction of water at the location where the cells are installed. Until this water is added, the electrolyte is solid, thus reducing weight and both shipping and handling costs. After these cells have been in service for a time, the electrolyte thickens up, from which point forward the product is similar to a dry cell. These cells are designed to be thrown away when discharged; consequently, there is no expense of maintenance in connection with the handling of renewals beyond that of simply connecting up a set of new cells. Once the cells are connected and water added, no further maintenance is required.

These new dry cells involve, in addition to Air Depolarization, an entirely new and fundamental feature of regeneration. It is this regenerative power that enables the cells to yield twice the capacity for a given quantity of electrolyte, hence the cubic volume of battery for a given capacity is claimed to be much less than that of any previous primary battery or dry cell made.

These cells must be used within their current ratings. On any work within such ratings, the cells are guaranteed. The types now being placed on the market are not designed for

two sets of elements in series, giving a cell of 2.8 volts open circuit for use where housings are crowded.

The manufacturer states that these new cells have demonstrated their ability to withstand low operating temperatures, and that when properly applied, the operating voltage is steady and practically constant. These new cells, however, deliver full capacity at one volt or over depending upon the average current output.

Continuous discharge ratings on the new A.-D. cells are as follows: Type 618—0.250 amp.; Type 2618—0.250 amp.; and Type 619—0.500 amp. The ideal operating load for continuous work is 20 per cent less than the above. On intermittent work, the continuous output rating can be doubled, but in such applications the rest periods must aggregate daily the same time as the discharge periods.

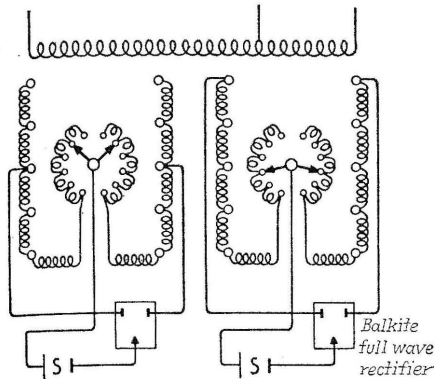
Within these ratings the guaranteed capacities are:

Type	Amp. Hours	Watt Hours
618 (1.4 v.)	850	1000
2618 (2.8 v.)	425	1000
619 (1.4 v.)	850	1000

New Balkite Transformers

AN ENTIRE new line of railway signal transformers is announced by the Fansteel Metallurgical Corporation, North Chicago, Ill. These new style transformers are made in 16 standard types, most of which are universal for charging track or signal batteries.

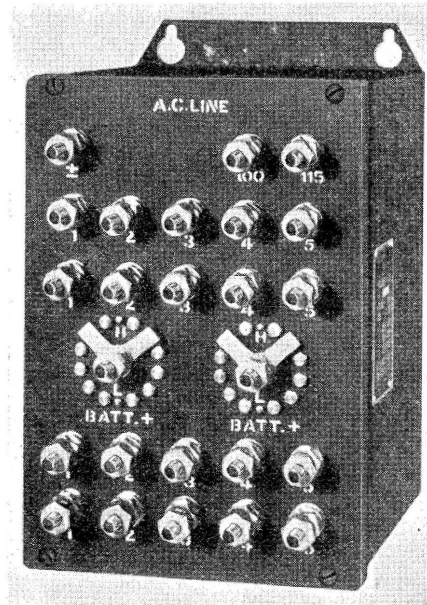
Stock types are available with or without a-c. lighting, and for one, two or three signal or track batteries. The a-c. lighting transformers are also made in capacities from 50 to 500 v.a. Design and construction have been greatly improved. Pressed steel and welding have superseded cast iron housings. Winding and core assem-



Wiring diagram for charging two cells using taper transformer

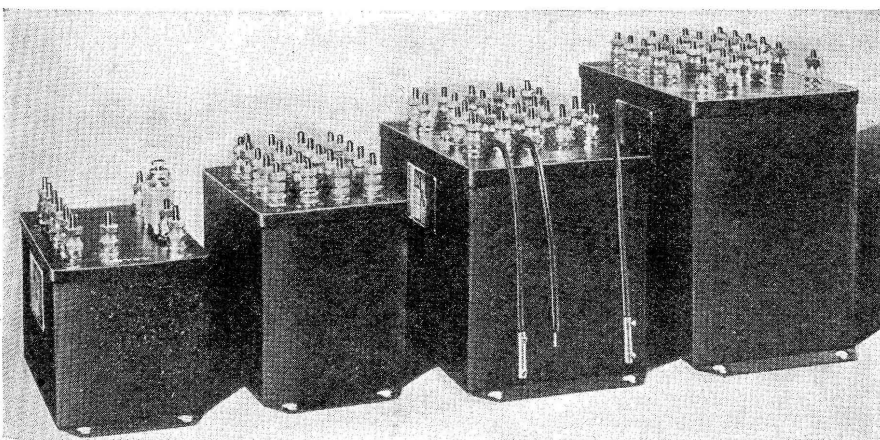
blies are mounted in housings on brackets, and are easily removable for inspection and repair. All primary windings are insulated for 10,000 volts breakdown to secondary and to core. This insures extra protection against lightning and line surges, and minimizes the possibility of failure under the severe conditions to which signal transformers are subjected. Core and wire sizes are liberally proportioned to provide high overload safety factor and losses well under A.A.R. specification allowances. Such design results in low losses and high efficiency, especially under light loads. Five standard sizes of housings are

The performance of Balkite taper rectifiers is markedly improved by another set of new transformers, announced by Fansteel. A dial switch for fine secondary tap adjustment provided with the new simplex and duplex taper transformers replaces the conventional resistance unit adjustment formerly used, thereby eliminating the ballast effect of resistance, and at the same time improving the taper characteristics and overall efficiency



The taper transformer has a dial for fine secondary adjusting

of the rectifier as a whole. Used with either Type C-10 or Type C-12 full-wave Balkite rectifier cell, these transformers are designed for charging one



The transformers are furnished in sixteen standard types as required

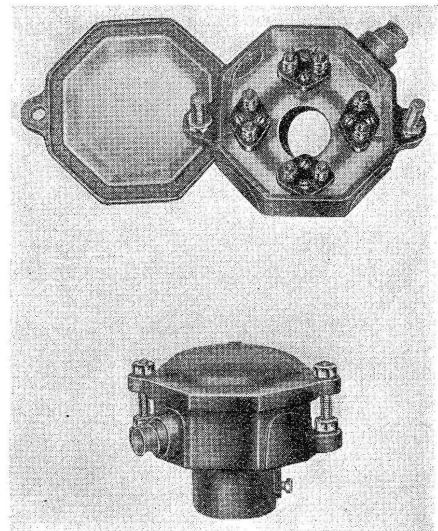
included in this new group of transformers. The accompanying illustration shows Types SS, ST, SU and SW, left to right. Type SH, not illustrated, is slightly smaller than Type SS. These designations supersede the former Types RS, RT, RU and RW.

or two signal batteries. The taper feature is especially desirable for conditions where loads are heavy or irregular such as busy highway crossings, low-voltage switch machines, or signal locations in station or switching territory.

Development of an approved shipping container now makes it possible for signal men to receive all standard Balkite rectifier cells complete containing prepared electrolyte, ready for installation. This eliminates the necessity of preparing electrolyte in the field, or carrying extra containers to signal locations. Rectifier cells containing electrolyte may be stored in their original containers indefinitely without deterioration. The proper quantity of electrolyte, depolarizer salts and oil are in the cell when shipped. All rectifier cells may be obtained without electrolyte, if desired.

An Improved Junction Box

THE NEW junction box recently developed by the Union Switch & Signal Company, as illustrated, includes many improvements. The most noticeable of these are simplicity, small size, and compact arrangement,



Eight circuits can be handled through this box

without sacrificing accessibility or room for slack wire.

The box is provided with eight independent 14-24 standard terminal posts, mounted in pairs in moulded bakelite bases. Eight independent circuits may be carried through the box, or four circuits may be so accommodated that jumpers can be inserted for removal when checking, without disturbing the wire connections.

Knock-out openings are provided at four points around the sides of the box to permit one-inch conduit fittings to be inserted. These openings, it will be noted in the open view, are placed between the terminal groups so that wires may be brought directly to the center of the box then bent

around to the desired terminal, thus providing the slack so important in such boxes.

The bottom of the box is provided with a ring opening and a socket for 2½ in. pipe so that wires may be brought up through the bottom of the box when desired. If a pipe mounting is used, but no wires are to be brought up, a heavy steel disc is available to block the opening at the bottom of the box.

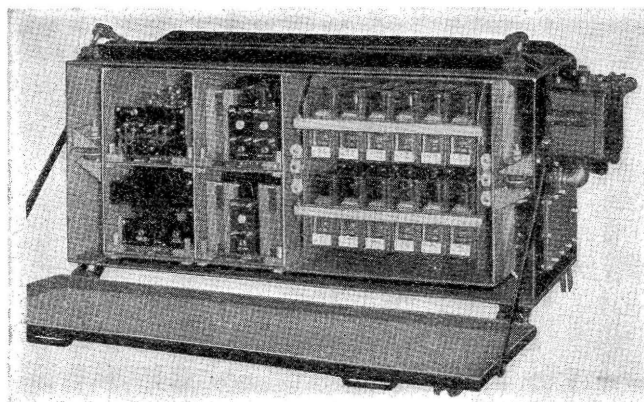
The box is closed by an overhanging cover with flax packing. The cover is held down by two ½-in. bolts on opposite sides of the box. The whole arrangement is neat, compact, weather- and drip-proof and accessible. The box measures 8¾ in. by 6½ in. across the top, and 6⅝ in. over-all in height.

Improved Coded Cab Signaling

THE General Railway Signal Company has announced certain improvements in their continuous-inductive coded cab-signal equipment. The mechanism case has been reduced in weight and made more compact, thereby requiring less space on a locomotive or tender. The apparatus contained in the mechanism case consists of individual assemblies with plug-in features. This method facilitates the manufacture of 2, 3, or 4 indication systems. Furthermore, maintenance is made easier, because individual units can be removed, should that be necessary, without disturbing other apparatus or wiring.

Also jacks and terminals for instruments (meters), and a power plug for a portable lamp, are provided within the mechanism case. Field adjustment or replacement of individual parts of each decoder has been made possible by the use of similar parts in all decoder assemblies.

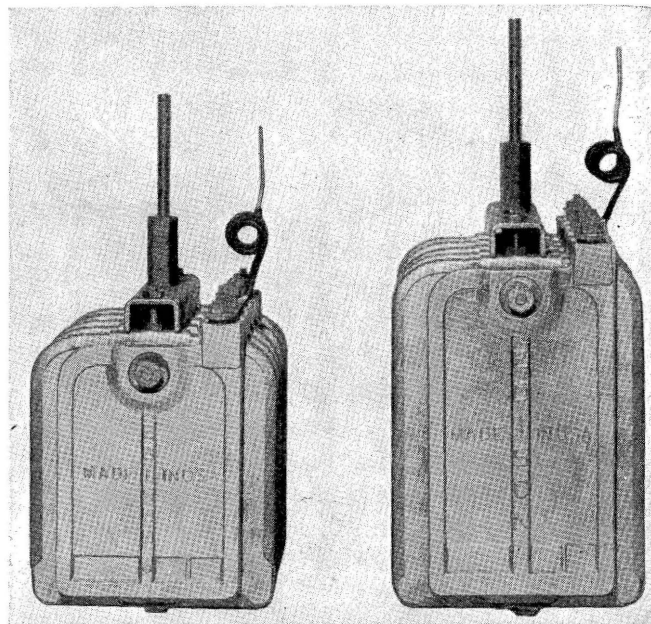
New compact light-weight locomotive equipment for coded cab signaling



New Primary Cell

THOMAS A. EDISON, Incorporated, announces that the plate surface area in the element of the Edison HA-1000 ampere-hour primary cell

New element for Edison HA-1000 a. h. cell at right has 25 per cent more plate surface than previous design, shown at left



per cent of rated capacity has been taken from the cell.

The increased plate area has been provided by lengthening the zinc and copper oxide plates although this in no way interferes with the continued use of A.A.R. standard

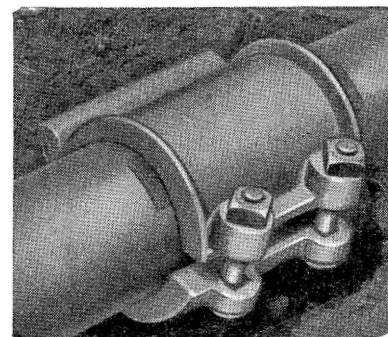
has been increased more than 25 per cent.

This increase in the plate area has been made primarily to meet unusual service requirements which have developed since this heavy duty cell was introduced a few years ago. At the same time it has also effected a general improvement in the performance characteristics of the cell. For example, under room temperature conditions, it will now continuously deliver 20 amp. at a serviceable voltage up to 50 per cent of its rated capacity, 15 amp. up to 75 per cent capacity and 9 amp. to full rated capacity. The renewal periods for these different discharge rates is readily determined by means of the progressive indicator panels which accurately show when 50, 75 and 100

jars for 1000 a-h. cells. The width, thickness, indicator panels and general appearance of the plates remain the same as in the previous design.

Redesigned Pipe Clamp

THE INCREASING demand for pipe clamps, as well as the higher pressure being adopted in pipe lines today, are responsible for the radically rede-



Clamp can be applied to stop leaks in pipe lines

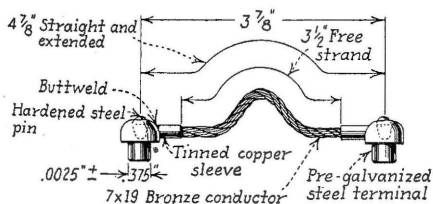
signed pipe clamp illustrated, a product of the M. B. Skinner Company, South Bend, Ind. These clamps are easily applied for permanently stopping leaks in pipes, regardless of how large or small, and whether high or low pressure. They are applied while pipe lines are in service except upon

extremely high-pressure lines. The new specifications for these clamps require a metal of higher tensile strength and of uniform density and hardness. To insure absolutely that every clamp is as perfect as humanly possible, this company has installed new equipment to test every clamp under a pressure of 3,000 lb. before it leaves the factory. The clamps are available for stopping leaks in air, steam, gasoline, oil, chemical, brine and all other types of pipe lines, high or low pressure.

New Type Rail-Head Signal Bond

THE AMERICAN Steel & Wire Company has developed and placed on the market a new type of mechanically-applied Tigerweld rail-head signal bond, known as Type BA-2M, which incorporates several improvements over the bond introduced by this company about a year ago. With the previous type of mechanically-applied bond, a special punch was furnished to be inserted in the head of the bond and struck with a hammer to expand the metal in the hole in the rail. With the new type BA-2M bond, no punch is required, a small piece of hardened steel, which performs the function of the punch, being built into each bond head. The workman no longer has to worry about misplacing or breaking a separate punch.

As shown in the illustration, the bond is made up of a 7 by 19 rope stranded bronze conductor, with a



Details of construction of the new rail-head stud bond

tinned copper sleeve at each end, flash butt-welded to pre-galvanized terminals. The outer wires are tinned to give the appearance of steel and discourage theft.

To install, holes $\frac{3}{8}$ in. in diameter and $\frac{1}{4}$ in. deep are drilled in the lower section of adjoining rail heads. The studs are then fitted into the holes, and the hardened steel pin given three good blows with a $2\frac{1}{2}$ -lb. hammer. The much softer studs readily expand, and entirely fill up the holes. The principle of expansion is exactly the same as with the old style bond and separate punch. Although BA-

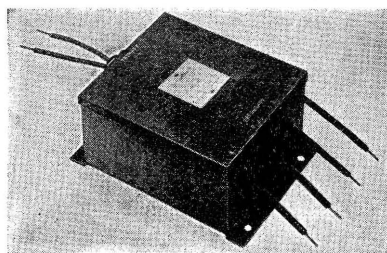


Three hammer blows will set each plug

2M bonds have great holding power, they can be removed with an American Steel & Wire Company extracting tool, and can be easily reinstalled, due to the novel principle of expansion and the sturdy construction of the terminals. Another advantage of the steel terminal is that its coefficient of expansion is the same as that of the steel rail.

Westinghouse Transformers

THE WESTINGHOUSE transformer illustrated in the accompanying photograph is for general application where a low-voltage power supply is required such as for the operation of alternating-current bells, gongs, horns, sirens, annunciators, and signaling systems. Transformers of this type are designed in a suitable number of volt-ampere capacities and with a wide range of secondary voltage taps to take care of the requirements of most installations. The core and windings are given a special impregnation treatment and sealed in a heavy steel case with a high grade of compound which renders the transformer moisture proof. This compound remains solid permanently, as its melting temperature is much higher than the operating temperature of the transformer.

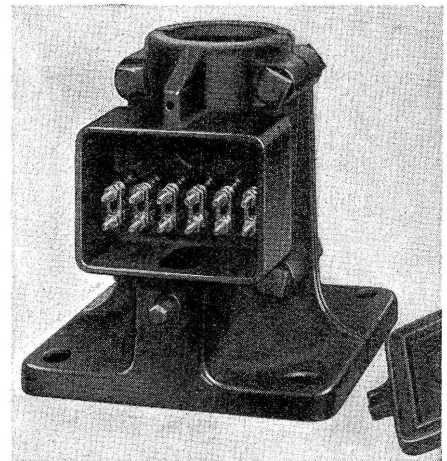


Small Westinghouse transformer

The volt-ampere capacity of these transformers is based on the full secondary rating, 24 volts. Reduced voltage taps are rated to deliver power at the lower voltage in proportion to the full secondary voltage. Thus, the 100 volt-ampere transformer will deliver full power at 24 volts, but when using the 16-volt taps, the rating is reduced to approximately 67 volt-amperes, and for the 12-volt tap to about 50 volt-amperes. These transformers are designed to be connected to the power line continuously with low power loss.

Junction Boxes for Crossing Signals

THE General Railway Signal Company has designed and is producing two new bases, with cast-in junction boxes, for highway crossing signals. The base illustrated shows the smaller junction box having a capacity of six

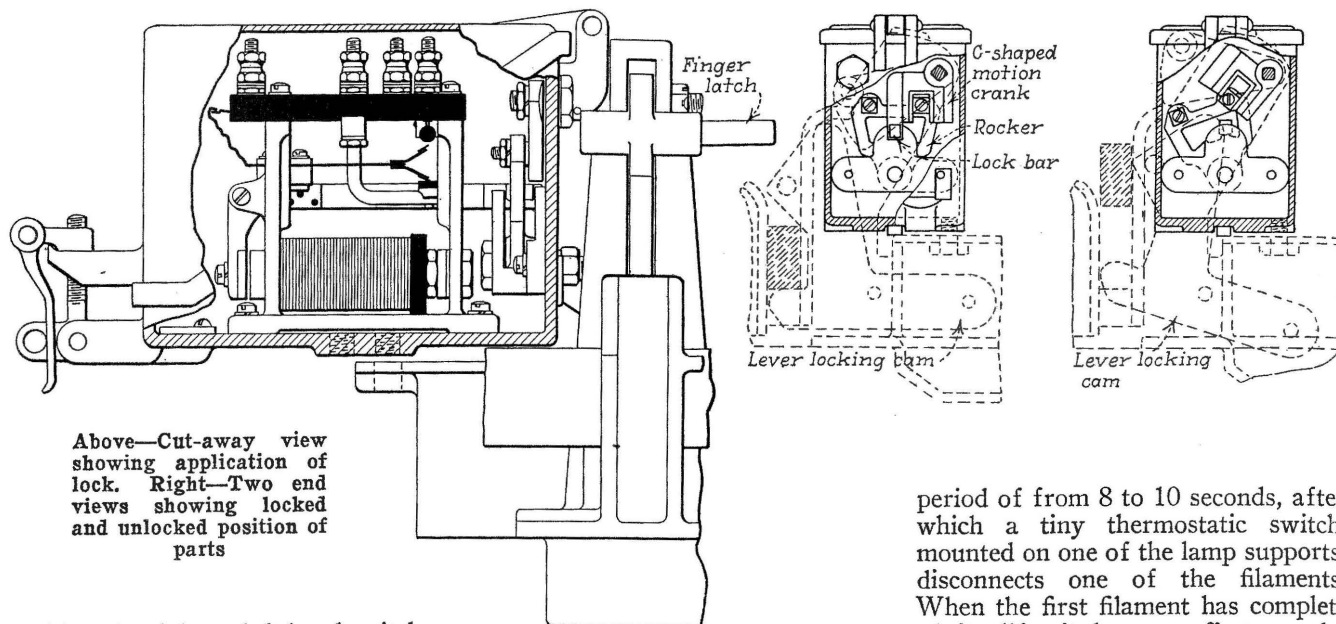


This junction box fills a long-felt requirement

moulded terminal blocks. The base with a junction box of the same height, but wider, has a capacity of six G.R.S. lightning arresters or eight moulded terminal blocks. It is apparent that a combination of halves using two smaller, a smaller with a larger, or two larger junction boxes, will provide increased capacity. Ample openings are provided in the junction boxes for the entrance of wires and cables.

New Electric Locks

THE T. Geo. Stiles Company announces a new electric lock with a forced drop feature, designed for the Bethlehem New Century Switch Stand. The lock is so designed that it can be arranged in a few minutes



Above—Cut-away view showing application of lock. Right—Two end views showing locked and unlocked position of parts

for either the right or left hand switch stand. To mount the lock on a switch stand in service but one half-inch rivet that carries the finger latch has to be cut out. The shaft of the lock is then passed through the hole, and the nut on the shaft is tightened up. A tap bolt is then passed through a part of the switch stand into the base of the lock on the under side. A small bracket is also mounted under the lock and fastened to the base of the lock at one end, the other end being fastened to the base of the stand, making a very firm job in a few minutes time. It is then wired to suit the requirements. A number of these locks have been manufactured and are giving good service. In order to lift the finger latch through its full stroke, the lock shaft must revolve, turning the C-shaped motion crank in a clockwise direction. Since a slide block, attached to the rocker, is engaged in the slot in the motion crank, the rocker must also revolve, in a counter-clockwise direction. Normally, the rocker is locked by an electrically-operated lock bar fitting into a notch in the rocker. Even if the coil controlling this lock bar is electrically energized so that the lock tends to raise, the finger latch must be raised before motion of the lock bar results.

Method of operation is as follows: Trainmen ask for release at a distant point, which, when given, energizes the magnet. This tends to pull the armature in, and raise the lock bar from its normal engagement in the notch of the rocker at the other end of the assembly and allows the finger latch to be raised turning the lock shaft and raising the interference cam to a non-interference position. The finger latch has to be held in the raised position until movement of the switch lever throws its locking cam clear and locks the finger latch in the raised po-

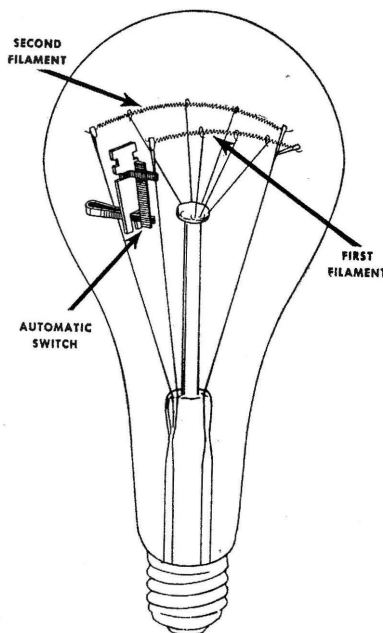
sition. On restoration of the switch lever to its normal position, the finger latch will force the armature locking arm into the locked position, although it will be free to operate until the magnet coils are de-magnetized.

Double-Filament Lamps

AN incandescent lamp having two filaments, one of which automatically goes into service after the other one has burned out, has been developed by the Double-Life Lamp Company, Hoboken, N.J. When the lamp is turned on both filaments burn for a

period of from 8 to 10 seconds, after which a tiny thermostatic switch, mounted on one of the lamp supports, disconnects one of the filaments. When the first filament has completed its life, it has no effect on the switch and the second filament goes into continuous service.

The manufacturer claims that the lumen output of the lamp is equal to that of one having a single filament, and that blackening of the glass during the life of the two filaments does not appreciably reduce light output when the lamp is burned base up. One objection to the use of two filaments has been that the life of the second filament is shortened by a deposit placed on it by the burning of the first. The manufacturer states that the 8 or 10-second burning period of the second filament each time the lamp is turned on is sufficient to dissipate the deposit and insure full life to the second filament. The lamps are now being tested by the Electrical Testing Laboratories, New York, N.Y.



Double filament incandescent lamp

Improved SA Signal

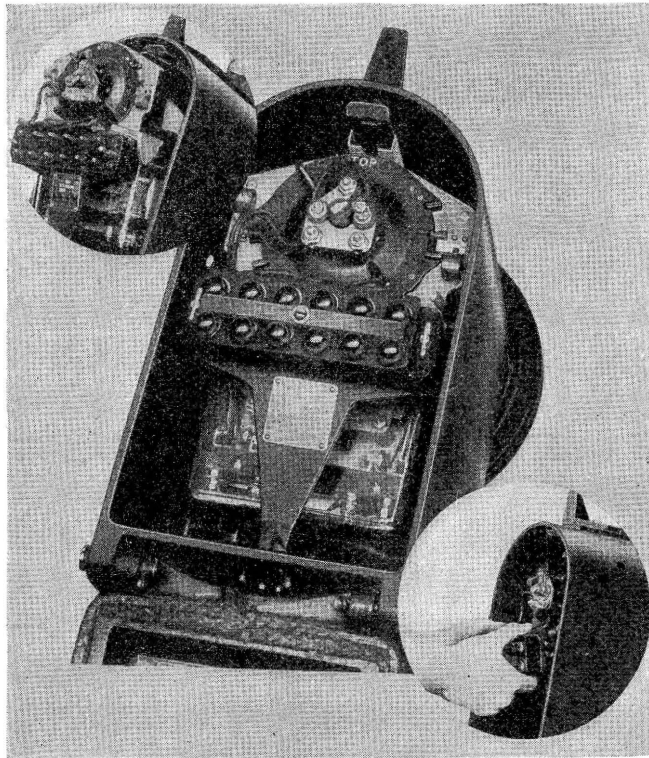
THE General Railway Signal Company has recently made improvements in the design of the Type SA signal mechanism and housing, which will greatly facilitate maintenance. The SA signal mechanisms will shortly be available equipped with a terminal board having a plug coupler arrangement, so that the signal mechanisms may be removed from service and replaced without disconnecting the field wires. Internal connections on the signal mechanism are made to the contact springs on the male half of the coupler. Field wires are connected to the corresponding posts on the female half of the coupler. After the initial field connections are made, it is only necessary to remove the female half of the coupler, with the

field wires attached, in order to remove the signal mechanism from service.

A redesign of the signal housing and mechanism case will shortly be available to simplify the removal or

locked position. After lining up the guides on the mechanism case with those in the housing, the mechanism may be pushed home in one simple motion.

An improved type door latch on



A mechanism can be replaced without removing wire connections

replacement of an inner mechanism. Corresponding slides or guides have been added to the top and bottom of the mechanism and housing, as shown in the illustration, which guide and support the mechanism into its final

position. The signal housing engages a hole in an extension on the upper slide in the housing which acts as a spring latch. The door-locking screw is automatically lined up and fastened in the usual manner.

Spring-Type Ball-Socket Connection for Switch Circuit Controller Rod

A SWITCH circuit controller rod must be able to take hard punishment located as it is where vibration from passing trains results in extremely hard wear with resultant development of lost motion. In order to reduce the excessive wear and maintenance expense, the Union Switch & Signal Company announces an improved fitting for the switch circuit controller rods.

The fitting is an improvement over the usual screw-jaw connection because it automatically takes up any lost motion. The new design consists of a ball-and-socket connection and a spring of ample stiffness and strength to operate a switch circuit

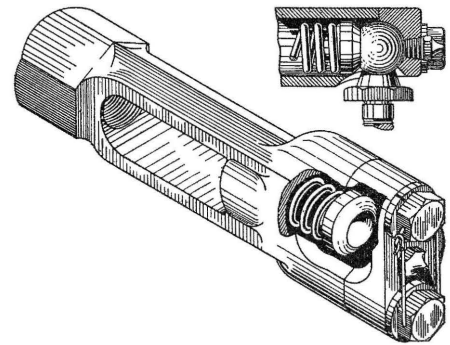
controller under all conditions. Even though the spring should accidentally break, the ball connection cannot get out of the socket, and no unsafe condition will result.

The design provides the greatest



Application to switch point and to front rod

safety through positive drive for the more usual application when the switch circuit controller is located on the side of the track adjacent to the



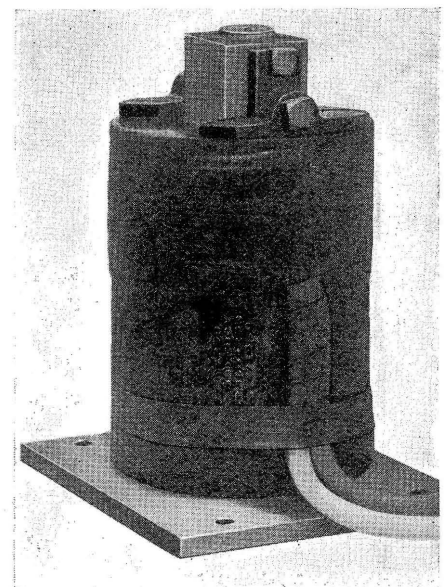
Cut-away views of construction at each end of rod

normally-closed point. The illustration shows the construction of the socket, which is very rugged, and the cap screws are large in size and are securely held in place by means of wire and lock washers. The body and cap portions are of malleable iron.

Another feature of the design is the provision for force lubrication. It will be noted that the socket is open at one side only, thus permitting the dirty grease to be forced out, and at the same time reduce the opportunity for dirt and grit to get in. The complete rod assembly makes an ideal arrangement for a switch circuit controller rod, but there is much to be gained by substituting the improved socket alone in place of the screw-jaw type fitting used on existing rod assemblies.

New Coil Insulation

THE General Railway Signal Company has developed a rubber-insulated coil, as illustrated, which is a new type of winding insulation, and new method of application. The rubber



The rubber insulation of the coil excludes moisture and air

insulation is built around the coil in a form of unvulcanized gum, which, when vulcanized under heat and pressure, results in a continuous, seamless, waterproof jacket completely surrounding the coil winding. To protect the rubber from mechanical abrasion or from deterioration by foreign substances, a special rubber-impregnated tape is vulcanized to the outer jacket surfaces.

Union Inert Car Retarder

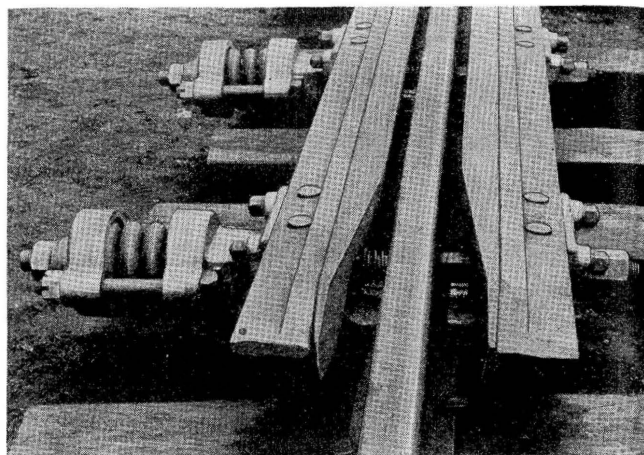
AN INERT car retarder, designed for use on tracks where there is a need for a constant amount of retardation on all cars for given weather or traffic conditions, is now available for use where required. This inert car retarder, manufactured by the Union Switch & Signal Company, Swissvale, Pa., is inexpensive and is especially adaptable for use in classification tracks of yards which handle the same type of freight, that is, either "all empty" or "all loaded" cars.

It is claimed that the use of the Union inert car retarder in the classification tracks will permit the grade of such tracks to be greater than would otherwise be the case. The advantages of this increase in grade lies in the fact that it prevents hard-running cars from stalling in the upper part of the classification tracks, and it also prevents easy running cars from reaching the lower end of the yard at too high a speed. If a change in weather or traffic conditions in the yard requires a change in the amount

of retardation, this change can be made by manual adjustments. The construction of this retarder is such that locomotives with driving wheels having treads up to $6\frac{1}{2}$ in. wide can pass through it at any time without

which a brake-beam brake-shoe assembly is attached. The lever brake shoe and brake beam are both made from the same standard L-shaped brake-shoe section used in the Union power car retarders. The material and

Close-up view of end of single-rail unit of inert retarder showing spring and lever arrangement



damage to either the locomotive or the retarder.

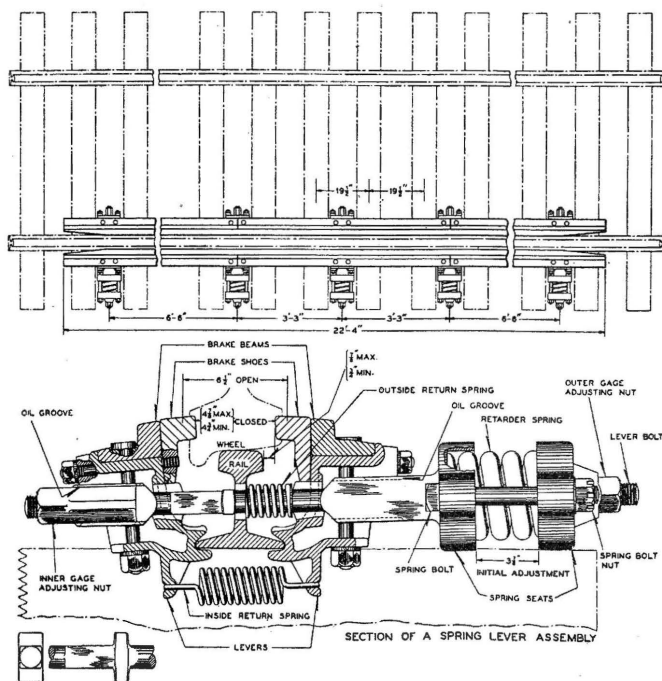
This inert retarder is of unit design and can be made up in any length required. The usual length, however, is 22 ft. 4 in. It can also be used as a single or double-rail retarder. As there is no metallic connection between the two rails, track circuits can be run through without providing special insulation.

The retardation in an inert retarder generally will be equal to that of a standard power-operated retarder of the same brake shoe length, in its lowest braking position. The inert car retarder is composed of a series of lever spring assembly units, mounted on the base of the running rail, to

section of the brake shoe has been especially designed to give high retardation and long life. The brake shoe can be readily replaced when worn to the condemning limit.

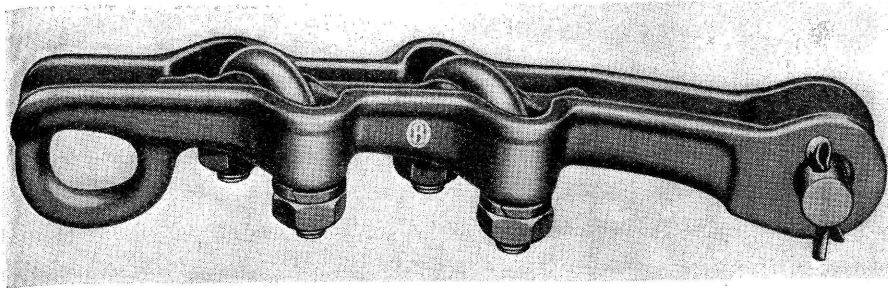
Only one retarder spring assembly at each lever unit is required to operate both inside and outside lines of the brake shoes. The brake shoes engage both sides of the car wheel in such a manner as to equalize the pressure and eliminate strain on the wheels. Very little motion of parts takes place during retardation, and this motion is a pivoting one, rather than a sliding one. All lost motion is automatically taken up by the retarder spring and the return springs. No special tie plates are required as the retarder is mounted entirely on the track rails. The only provision that is necessary to make for its installation is to drill the rail at 3-ft. 3-in. intervals to provide clearance for the lever bolt, to space certain ties, and to provide a guard rail if a single-rail retarder is used.

Top—Application of retarder to single rail showing tie spacing. Bottom—Section and end view of spring lever assembly



New Straight-Line Clamp

TO PROVIDE a suitable straight-line clamp for station dead-ending or for line use where the engineer prefers a holding device of this type, the Ohio Brass Company, Mansfield, Ohio, has developed a clamp, known as the Strateline. Used in either line or station, the Strateline clamp is easy to install. It is light in weight, but develops slip strengths of 50 per cent of the ultimate strength of hard drawn copper conductors. When used to



New Strateline clamp

dead-end conductors or transmission structures, the companion fittings, either the long socket eye or clevis, provide clearances for the conductor. The eye at the end of the clamp makes hot-line changes easier and safer. The Strateline clamp is available in three sizes, for cable diameters of 0.28 to 0.43 in., 0.42 to 0.55 in., and 0.54 to 0.68 in., and can be furnished with a socket eye, a clevis, or no fitting.

Improved Waterbury High Amperage Cells

THE WATERBURY Battery Company announces distinctive improvements in the Waterbury High-Amperage cells of both 500 a.h. and 100 a.h. capacity. The improvements are both

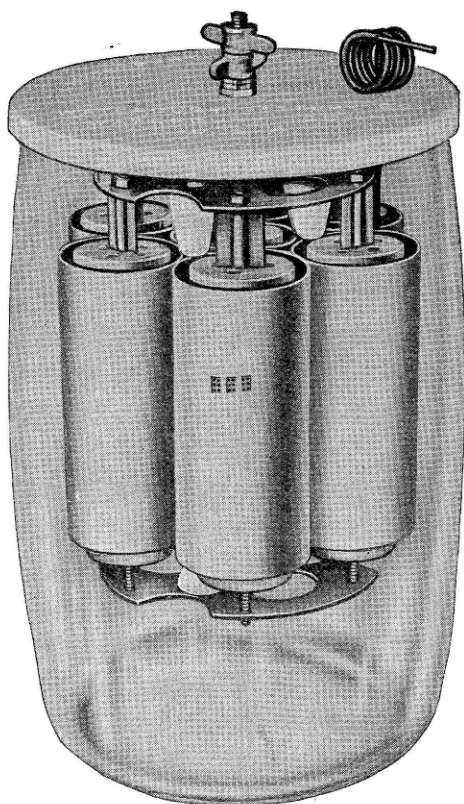
structural and electro-chemical. The arrangement of the porcelain insulators is a distinctive feature of the latest high amperage type cells. These porcelains suspend the zinc electrode in a positive lateral position in spaced relationship with the main suspension bolt of the cell, and they are so shaped that no particles of metal can rest on them, thus providing an efficient assembly from the standpoint of insulation. The usual features of indication of exhaustion, with the windows and the bars, have been maintained so that it can be seen at a glance how much capacity remains, the bars in the windows being graduated as to thickness so that the indication of exhaustion

is quite positive. In order to provide for a very high current drain in both the 500 a.h. and 1,000 a.h., there is an excess capacity over the rated capacity in these cells.

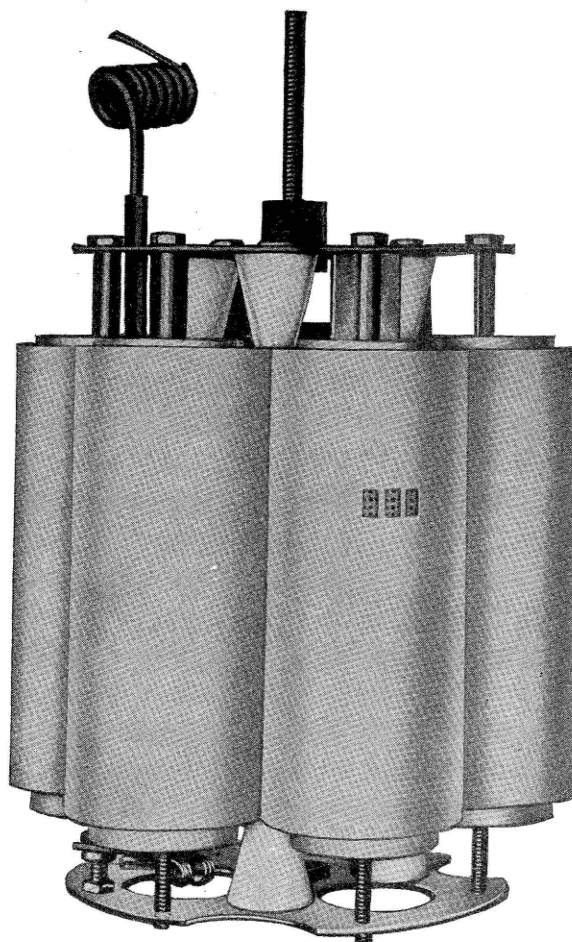
Mercury Switch

A SMALL, compact electric switch, which is completely silent in operation and which has no moving parts to wear out, has been announced by the General Electric Company, Schenectady, N.Y. About the size of a marble, the "works" of the new switch utilizes the mercury-break principle. In the laboratory at Schenectady, one of the mercury switches has turned a 200-watt incandescent lamp on and off some 65 million times in the last two years without failing or wearing out, according to the manufacturer.

The switch consists of two shallow chrome-steel cups about $\frac{3}{4}$ -in. in diameter, sealed together with a strip of lead glass to form a hollow compartment. Separating the cups is a disk of ceramic material in



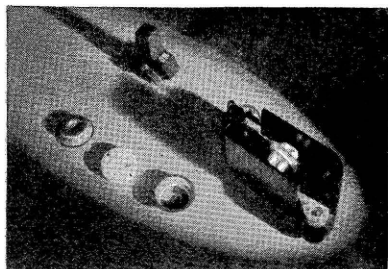
Assembled view of cell with new type of element



Assembly view of new Waterbury high-amperage cell element showing indication bars

which there is a small hole located near the edge. The compartment is evacuated after fabrication and in it about four grams of mercury are inserted. The mercury fills roughly one quarter of the space. After insertion of the mercury, the compartment is filled with hydrogen at about atmospheric pressure and sealed by welding.

In the "off" position, the hole in the ceramic insulating disk is above the line of the enclosed mercury. However, when rotated 20 degrees, the switch assumes a position where the mercury can flow through the hole, thus establishing a contact between the two chrome-steel cups and closing the circuit. Hydrogen is



The mercury switch is silent in operation

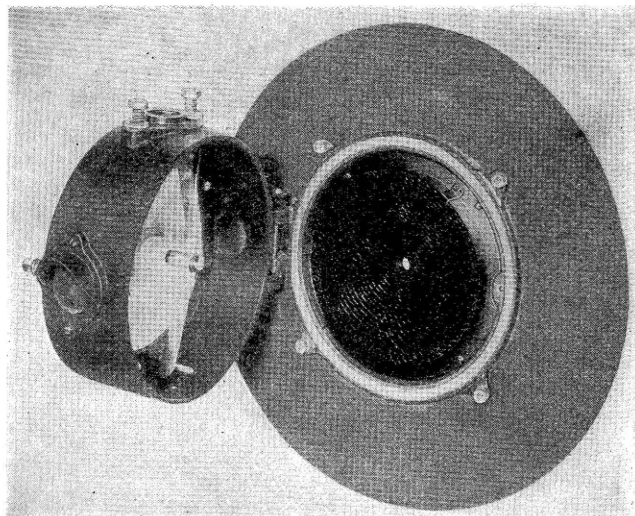
used in the switch because of its properties as a cooling agent and because in it an arc can be better quenched.

An additional feature of the switch is a tiny plate of steel with 0.0002 in. of platinum superimposed on its surface. One such plate is welded to the inside of each steel cup, affording better mercury-to-metal contact and keeping the switch from heating. As a final operation in its manufacture, the switch is cadmium-plated to give a good surface for external contact. It is then fitted into a suitable enclosing case.

"Phankill" Unit for Highway Crossing Signals

WHILE the use of "Phankill" screens, in connection with color-light signals, has been common for more than 10 years, such an innovation has been considered of negligible importance in connection with flashing-light highway crossing signals, until quite recently. With the large increase in the use of these signals, however, there have been a few cases where phantom indications, because of reflected external light, gave some trouble. To overcome this situation, the Union

The special screen for killing phantom is mounted behind the cover glass



Switch & Signal Company, Swissvale, Pa., has designed a "Phankill" screen for use in flashing-light highway crossing signals.

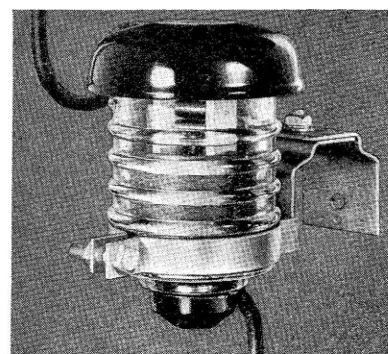
The screen is made of two thin copper strips (one plain and one corrugated), wound in a roll to conform with the shape and diameter of the cover glass. It thus presents innumerable cells, the walls of which are parallel with the axis of the lamp unit. When installed, only direct external light, which is also projected parallel with the lamp unit axis, can enter, and this is reflected to the focal point of the lamp where it is broken up by the lamp filament and socket or support. Because of the thin walls of the screen, the range of the signal indication is reduced so slightly that it is negligible. Three clips fasten the cellular screen to a mounting ring, which has four punched holes conforming with the spacing of the screws used to secure the cover glass to the door casting. The complete unit is made of copper and is oxidized to present a smooth, thin and non-corrosive finish.

While the "Phankill" unit is at present designed for the Union Style HC-81 flashing-light unit and the front light of the Style HC-8 unit, to existing units of which it is applicable, it can be furnished for application to other units.

Lightning Arresters

LIGHTNING arresters of the valve-type for line voltages from 1,000 to 15,000 are now made in Pyrex glass housings, by the Line Material Company, Milwaukee, Wis. The arresters consist fundamentally of a multiple or ladder spark gap and a valve element connected in series between the line conductor and ground. The spark gap serves to insulate the

valve element from the line conductor under normal conditions. The valve element has the property of being a poor conductor at normal voltages, but a very good one at high voltages, such as produced by lightning surges. The arresters are characterized by the large amount of



All parts of the new ladder-gap arrester are readily replaceable in the field

Granulon valve material used, which provides the arrester with the ability to conduct heavy lightning surges without damage to the spark gap or valve material.

The transparent housing makes it possible to inspect the arrester for common causes of arrester trouble, such as moisture, corrosion of metal parts, electrical leakage and damaged electrodes or valve material due to too severe a surge of lightning.

