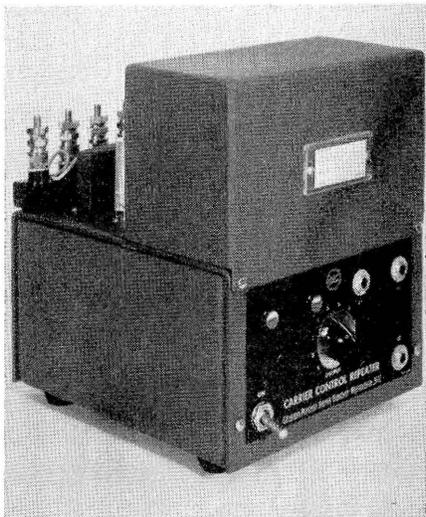


# New Developments

## CARRIER CONTROL REPEATER

THE General Railway Signal Company, Rochester 2, N. Y., has developed a single-channel repeater unit for carrier control service. It is said to be a companion unit to the transmitter and receiver units, having the same construction and external dimensions—9½ in. high, 7 in. wide, and 8¾ in. deep. It weighs 8 lb., and is designed for shelf-mounting. The repeater is used where line-wire attenuation becomes severe because of weather conditions, heavy loading of the line due to other facilities, or where small-size line wire must be employed. This unit operates on a power level of +16 dbm. A particular feature is that the output is essentially constant over wide variations of input voltages and, like



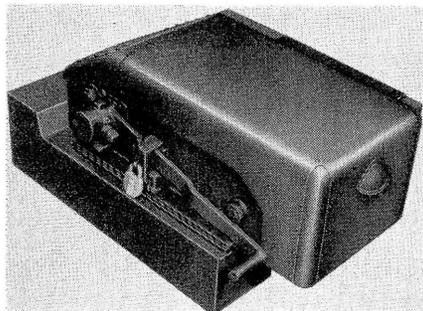
Repeater operates on +16-dbm. power level

the other G.R.S. carrier control units, can be operated directly from a 12-cell storage battery without recourse to any additional a.c. power supplies or inverters.

## E.P. TOGGLE SPRING SWITCH MACHINE

THE Union Switch & Signal Company, Swissvale, Pa., is offering the NA-10 electro-pneumatic toggle spring switch machine, which is designed especially for installation in yards. In addition to the usual advantages derived from the power operation of switches in such application, the spring-loaded toggle ac-

tion is said to afford the additional advantage of permitting trailing of the switch without damage, yet holding the switch closed in either the normal or the reversed position, with sufficient force to permit facing-point moves at normal yard speeds. When the machine is power operated, the toggle mechanism is pushed past center by compressed air, whereupon the spring-loaded toggle action forces the switch points to the opposite position, similar to the action of ordinary toggle switches used in electric lighting circuits. Since the holding force of the spring is sufficient to permit



Machine is designed especially for yards

facing moves, the air is cut off at the end of the stroke, affording appreciable savings in compressed air requirements. When the switch is trailed, the toggle mechanism is pushed past center by the movement of the points, and the spring-loaded toggle action forces the points to the opposite position.

A separate switch circuit controller, such as the "Union" U-5, is used in combination with the NA-10 switch machine for the indication of the position of the points and the control of air valve. According to the manufacturer, the switch machine is available with or without a dual-control mechanism for hand operation of the switch. When the machine is equipped with a hand-throw lever, it is possible to carry on switching operations during periods when the operators are off duty or when power is unavailable.

## TORPEDO FUSEE

THE Western Railroad Supply Company, 2428 South Ashland Avenue, Chicago 8, has introduced a new combined torpedo and fusee, ar-

ranged to be mutually destroying, which should prove of interest to users of rail motor cars in construction and maintenance work. Riders

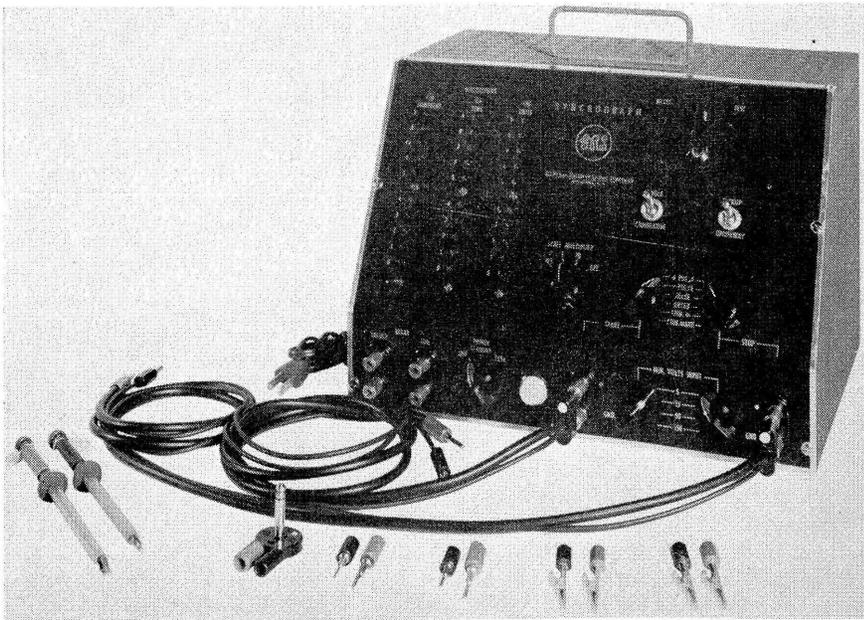


Fuses burn for 10 or 5 minutes

of such cars have sometimes been injured by fragments of torpedoes left on the rail an unknown length of time before. The fusee not only advertises itself until completely consumed but, after the lapse of its useful life (10 or 5 min.), completely removes the torpedo, so that it presents no hazard to motor cars and causes no unnecessary train delays. Motor-car riders can protect themselves against following trains for a period of 10 or 5 min., after which the flaming flagman exhausts itself and burns the torpedo. Further details are available direct from the company.

## RELAY TIMER

THE General Railway Signal Company, Rochester 2, N. Y., has developed an electronic interval timer, designated specifically for testing relays. Called the Syncrograph, this device is capable of measuring an indicating intervals as small as 0.0001 sec. and as large as 9.99 sec. The instrument is equipped with terminals and switches which permit direct control, from the Syncrograph panel, of pick-up and drop-away operation of a relay under test. A selector switch provides choice of three timing ranges: 0.0,000 to 0.0,999, 0.000 to 0.999, and 0.00 to



The Syncrograph is designed specifically for testing relays

9.99 sec., so that measurements may be made of pick-up, drop-away, and crossover times for both quick and slow-acting relays.

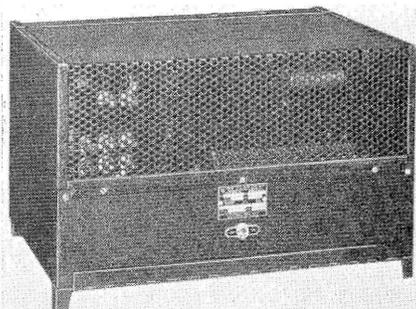
Time-interval indications are said to be given directly as three-digit readings by means of neon lamps, one of which lights in each of three columns opposite the digit appropriate for the indication. Provision is made for automatically accumulating the total of a series of readings in the indication columns, expediting the computation of totalized times and of averages. All indications are completely stable, and are retained indefinitely by the instrument until reset. Interval timing may be started and stopped by any combination of the following, applied in sequence across the "START" and "STOP" terminals: (1) Closing a circuit, (2) opening a circuit, (3) applying a positive-going voltage (+ pulse), and (4) applying a negative-going voltage (- pulse). When + or - inputs are used, a four-position sensitivity switch may be set, so as to permit acceptance only of pulses equal to or greater than a selected level, with rejection of lower-level inputs.

As one example of how start and stop input signals may be used, the pick-up time of a relay can be measured by using as a start signal the voltage pulse which appears across the relay coil when it is energized, and by using as a stop signal the closing of a front contact. Similarly, other operating time characteristics of the relay may be measured by appropriate use of coil voltage pulses and contact openings and closings as start and stop signals. The Syncro-

graph is designed for operation on a 105 to 130-volt 50 to 60-cycle a.c. supply. Standard accessories included with the instrument, as shown in the illustration, are two shielded cable assemblies and a set of alligator clips, pin plugs, phone jack, and clip-on test probes which plug onto the cable terminals. The instrument is portable, weighing approximately 28 lb., and is supplied complete with a carrying case which includes space for the test cables and accessory terminals.

### NEW C.T.C. CODE LINE UNIT

THE Union Switch & Signal Company, Swissvale, Pa., introduces a new C.T.C. code-line unit which is designed to provide a highly-satisfactory source of energy for operating C.T.C. code-line circuits. It eliminates the code-line battery, with its maintenance and periodic replacement; reduces space requirements on new installations; requires no maintenance; has no tubes or moving parts requiring replacement;



Unit is dry-disk, metallic rectifier

and has practically unlimited life, according to the manufacturer. The new unit is a dry-disk, metallic-type rectifier with a filter in the output circuit to permit voice communication on the code line without objectional hum due to rectifier ripple. It is available in two sizes; one size is for code lines requiring energization at a voltage within the range of 30 to 220 volts d.c., and its dimensions are 17 $\frac{3}{4}$ -in. wide, 11  $\frac{1}{16}$ -in. high and 10 $\frac{7}{8}$ -in. deep. The other size will handle lines requiring energization at a voltage within the range of 20 to 80 volts d.c., and its dimensions are 12 $\frac{3}{4}$ -in. wide, 11  $\frac{1}{16}$ -in. high and 10  $\frac{7}{16}$ -in. deep. The unit is energized normally from a 110-volt 50/60/100-cycle a.c. supply. During periods of power outage, it is energized from a tuned alternator fed from the local 16-volt battery. In most instances, where a tuned alternator is now in service for supplying standby power to code equipment, the code line may be energized from this same tuned alternator.

### HIGH-SPEED CODED REMOTE CONTROL

(Not Illustrated)

A new high-speed coded system for the remote control of interlockings has been developed by the General Railway Signal Company, Rochester 2, N. Y., the system transmitting a control in 0.5 sec. Controls and indications can be transmitted simultaneously over a pair of line wires—the controls by d.c. code impulses and the indications by carrier frequency. Codes are checked for completeness before being used, according to the manufacturer.

Heart of the high-speed coding is a free oscillating code transmitter having a rate of 540 cycles per minute or 9 per second. Two such transmitters are located in the control office, and two at the field location, being paired to handle the controls and indications. When no controls are being sent, the control transmitters in the office and field are locked so that their armatures are stationary. When the leverman turns a switch or a signal lever, both transmitters are unlocked simultaneously and oscillate freely and in synchronism. Eight swings of the armature, or 4 cycles, are enough to transfer the control information to the field location and control the operation of a switch or a signal. Likewise, when there are no indications to be transmitted, the indication transmitters in the field and office are

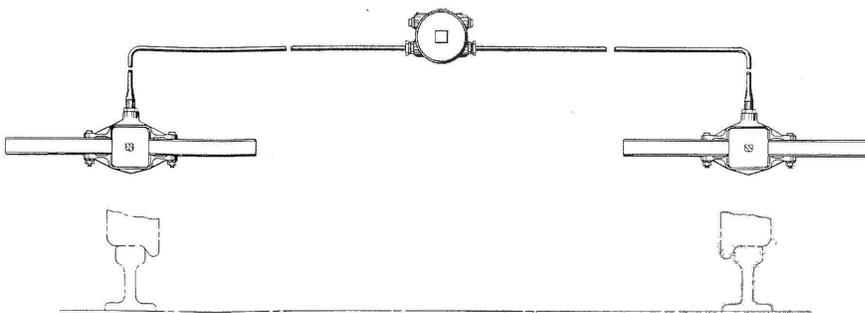
locked. The moment a change in indication occurs, both transmitters are unlocked and oscillate in synchronism. Carrier-frequency impulses originating from the field location are transmitted to the control office.

In large interlockings where many more indications exist than can be transmitted during eight swings of the transmitters, the indications are grouped in so-called "stations". The first two or three swings of the transmitters are used to identify the station group from which the indication is coming, and the remaining swings are used to transmit the actual indication. In an installation now being planned, almost 50 indications are required. These are grouped into 5 indicating stations having 10 indications apiece. When an indication change occurs, the transmitters are unlocked, make 8 swings during which one of the indicating stations is selected and 4 indications are transmitted. The transmitters are again locked for a moment, unlocked, and the remaining indications are transmitted from the same indicating station. Provision is also made to store indication changes while the system is busy transmitting.

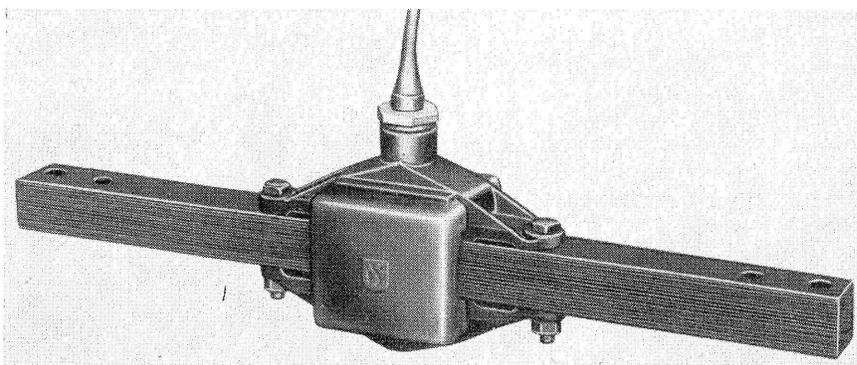
### CONTINUOUS INDUCTIVE RECEIVER COIL

A new track-receiver coil for use with continuously - controlled cab signal systems is being supplied by the Union Switch & Signal Company, Swissvale, Pa. The coil is easily installed and is interchangeable with existing receivers now in use, according to the manufacturer. The coil is die-moulded in a tough neoprene rubber jacket which is resistant to oil, water, heat and deterioration of insulation. The abrasion resistance is sufficient to eliminate the need for an additional protective housing over the coil. The rubber-covered coil is held in position by two clamping pieces, suspended around, but not touching the laminated core. By eliminating the need for wedging and the use of heated compounds, the coil may be quickly and easily removed without risk of damage to its insulation.

A water-tight polarized plug-connector is part of the receiving coil assembly. The receptacle part of the connector is moulded into the rubber covering of the coil and the plug portion is moulded on the end of a heavy-duty, two-conductor, rubber-covered cable. A ring nut is used to lock the two parts together. Installation and maintenance costs are said



Sketch showing application of continuous inductive receiver coils



The Coil is die-moulded in a tough neoprene rubber jacket

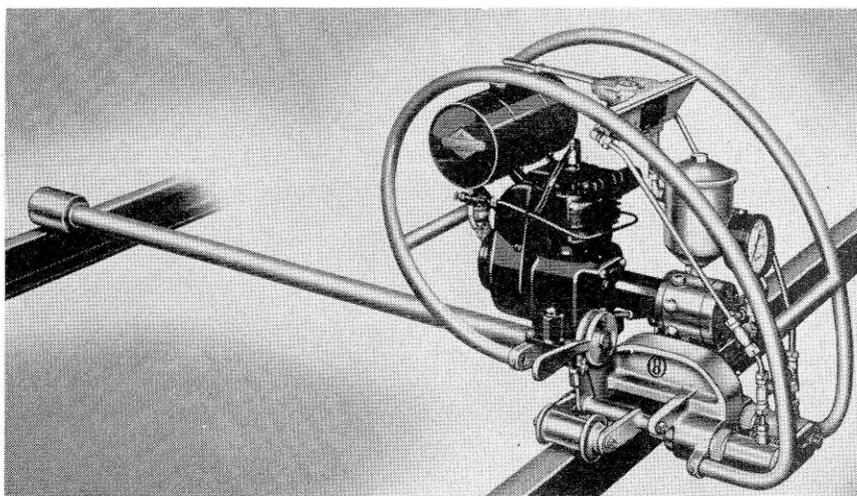
to be lowered, because the number of parts required for this receiver has been reduced to less than one-third the number required in the former model, making it possible to install the receiver assembly in less time and requiring fewer parts to be carried in stock.

### HYDRAULIC PRESSURE BOND MACHINE

THE Ohio Brass Company, Mansfield, Ohio has developed a machine described by railroad signalmen as an outstanding contribution to the

art of signal bonding. This new machine is the O-B Hammerhead Twindriver which uses closely controlled hydraulic pressure to install O-B Hammerhead signal bonds in the rail-head for signal track circuits. Designed to replace the hammer as a bonding tool on major track relay operations, the machine actually is a mobile hydraulic press. It uses an exact hydraulic force of 24,000 lb. each time it drives a bond in place. Both terminals are driven simultaneously.

Developed for use with the O-B Twindrill, a precision tool for drilling holes in the rail-head at the



Machine drives bonds at rate as high as three per minute

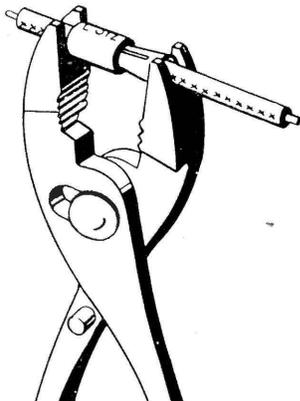
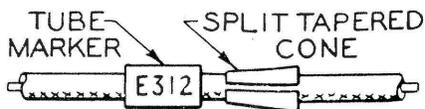
rate of two joints a minute, the Twindriver can be used on either standard-T or head-free rail. A gasoline engine drives its hydraulic pump. The machine weighs only 165 lb., and is easily rolled along the rails from joint to joint. This Twindriver can install three Hammerhead bonds a minute, which is considered to be more than fast enough to keep up with the best equipped track relay gang. Since almost 200 bonds per hour can be installed with the new machine, the manufacturer recommends that the Twindriver be used with two Twindrills. Using the Twindriver, makes it possible to install signal bonds in half a day on track that represents a full day's work for a re-lay gang. Thus for the other half day the bonding crew is available for other signal work.

Uniformity of installation, rather than speed, however, is the advantage stressed by the manufacturer. The hydraulic pressure is controlled exactly for each bond installation. As soon as the maximum pressure of 12,000 lb. is applied to each bond terminal, a release valve immediately cuts off pressure. Pressure is equalized on both driving rams, so there is no possibility of one terminal being driven harder than the other. The equalization of pressure also helps to align the machine on the rails.

The Twindriver's Briggs & Stratton engine develops 1.3 h.p. at the 2,000 r.p.m. used in the bonding operation. Ordinarily, its one-gallon tank requires filling only once a day. The engine drives a seven-cylinder radial pump built by Simplex Engineering Company. For the bonding operation, only three of the pump's seven pistons are needed. The excess cylinders can be used as replacements as the originals become worn. The driving rams, one for each terminal, are products of Blackhawk Manufacturing Company and can be serviced with standard replacement parts. They are housed in a steel alloy body casting that has a proved safety factor of three, for withstanding the total pressure of 24,000 lb. that is applied with each bond installation. Both the engine and pump use the same grades and quality of oil, even under variations in temperature.

## WIRE MARKER

THE General Railway Signal Company, Rochester 2, N. Y., has developed and is now supplying a new form of wire marker, consisting of a vinylite tube held in place on the



The marker consists of a vinylite tube

wire by a nylon cone-shaped wedge. The tube, according to the manufacturer, is lettered or numbered in accordance with the terminal or circuit designation, the printing being done on a special machine developed by the company. A maximum of four letters or numbers can be imprinted on the tube which is  $\frac{1}{2}$  in. long; or a longer tube can be used with additional letters or numbers. The tube is then slipped on the wire along with the nylon cone. A special tool can be used to spread the cone which is slotted to allow spread. The two are then pressed together with a pair of pliers with slotted jaws. The tube and cone can be supplied for various diameters of wire. The tube can be slipped over the ears of wire eyelets for insulation. It prevents wire insulation from fraying where eyelets without ears are used, and insulates the exposed wire strands.

## SHELF MOUNTING BRACKET FOR PTV-42 A.C. RELAY

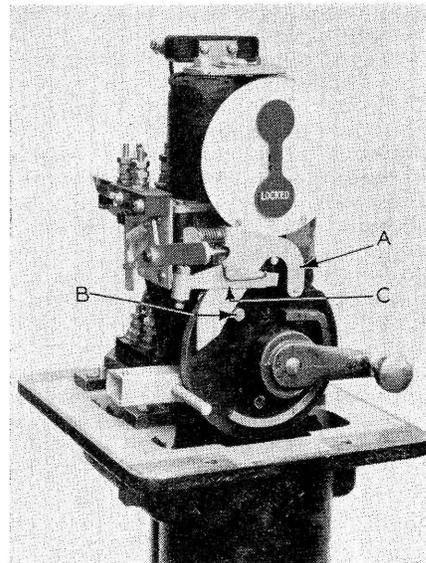
(Not Illustrated)

BECAUSE of the increased use of plug-in relays, and to permit individual shelf mounting of the PTV-42 plug-in relay in instrument houses and cases, the Union Switch & Signal Company Swissvale, Pa., has developed for this relay a shelf-mounting bracket which is said to be very similar to that used with many d.c. plug-in relays. The bracket adapts the relay for use on the shelf of the house or case, yet retains the plug-in feature of the relay. Except

for the increased width, this mounting compares with the d.c. relay shelf mounting, Type 1, described in the September, 1949, issue of this magazine. The overall dimensions including the mounted relay are: Width,  $5\frac{1}{8}$ -in., depth,  $11\frac{1}{8}$ -in. without leads, height,  $10\frac{1}{8}$ -in. The mounting bracket requires no more shelf space than the width of the PTV-42 relay itself.

## FORCED-DOWN ELECTRIC SWITCH LOCK

THE General Railway Signal Company, Rochester 2, N.Y., announces the addition of the forced-down feature to their Model-9A electric switch lock. The forced-down feature has been incorporated in the mechanism; lever A in the accompanying illustration, forces down and holds the armature-locking finger in the lock position. The lever is locked in position by stud B on the locking dog. When unlock is desired, the crank is operated and lever A rides up on a cam face on the lock dog, releasing its hold on the armature. A spring catch has been added to the mechanism to hold the operating crank in the preliminary release position while the trainman awaits electric unlock. The spring catch is automatically released when the case door is closed, to make sure that the crank is re-



Model-9A lock with forced-down feature turned to its normal position and the signals cleared. Two contacts on the controller hold the signal circuits closed during the preliminary part of the unlock movement. Upon lockup, the signal circuits cannot be closed until the crank is fully normal. The emergency release mech-

anism has been structurally revised, according to the manufacturer, now having two No. 14-24 standard binding posts. A resilient connection between the emergency release lever and lever C prevents damage to the emergency release mechanism if an attempt is made to operate it when the hold-down feature is in effect.

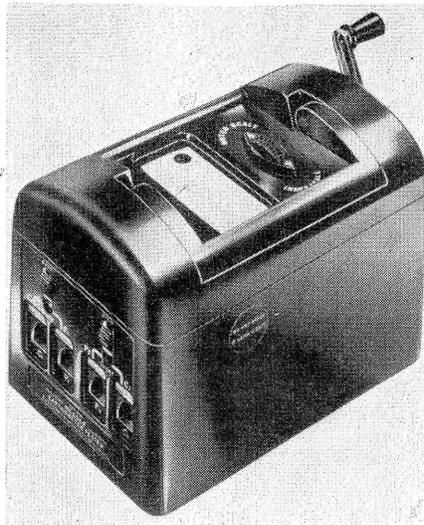
## NEW LAMP BULB

(Not Illustrated)

A new light bulb for use in signal lamps is now available from the Westinghouse Lamp Division, Bloomfield, N. J. Designed to replace oil-burning lamps now in use at an estimated 500,000 switches throughout the country, the new bulb will greatly reduce maintenance time and expense, according to a recent announcement by the manufacturer. The bulb became practical upon the development of a new type primary battery by the Primary Battery Division of Thomas A. Edison, Inc. Lamp life is expected to exceed the ten months that the battery can operate continuously, but for lowest maintenance cost, the lamp will be replaced at the time the battery is replaced. The lamp is available in ratings of 0.15 amp. at 2.7 volts, and 0.12 amp. at 3.5 volts. The inside frosting of the bulb diffuses the light to approximately oil-lantern-flame size, making it possible to retain existing optical systems in converting.

## CVM MEGGER

THE James G. Biddle Company, 1316 Arch street, Philadelphia 7, Pa., has announced a new Megger ground tester, known as the Type CVM, for measuring resistance to



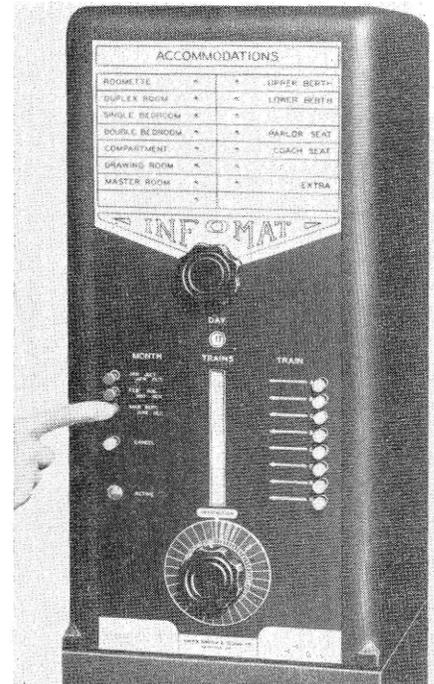
The Megger is available in two ranges

earth of ground connections. The instrument is said to provide a dependable and easy method for ascertaining if the resistance to earth of man-made grounds is sufficiently low, to ensure their correct operation and to minimize dangers due to lightning. It has its own generator for supplying test current and is, therefore, always ready for service without dependence on battery or other supply. The terminal arrangement employs two switches which short-circuit the terminals for two, three and four-terminal tests, and each instrument has two scales, permitting open, well-proportioned markings. Two ranges are available, 0 to 40 and 0 to 200 ohms; 0 to 100 and 0 to 500 ohms. Complete information is contained in Bulletin 25-80-36.

## SPACE RESERVATIONS

THE Union Switch & Signal Company, Swissvale, Pa., announces the new Infomat\* system, which is de-

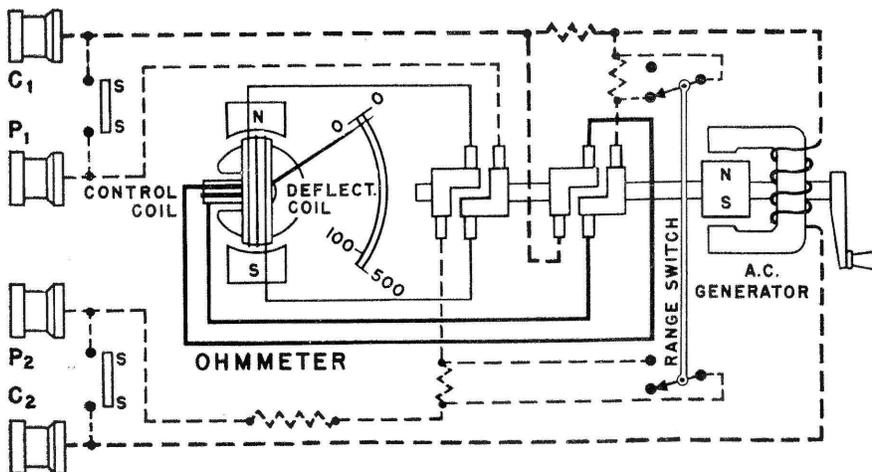
signed to provide quick, accurate reporting of Pullman and train space information to ticket sellers. It can handle any regular inquiry regarding train accommodations for a three-month period in advance, and enables ticket agents to obtain, within a few seconds, a complete visual report of accommodations available on any designated train, without the need for contacting a reservation clerk. The necessary telephone traffic is reduced to that required for confirming the sale of space with the personnel at the reservation bureau. The Infomat equipment, according to its maker, consists essentially of the ticket agents' sets and associated apparatus, which are located in the ticket



Selecting month on ticket agent's set

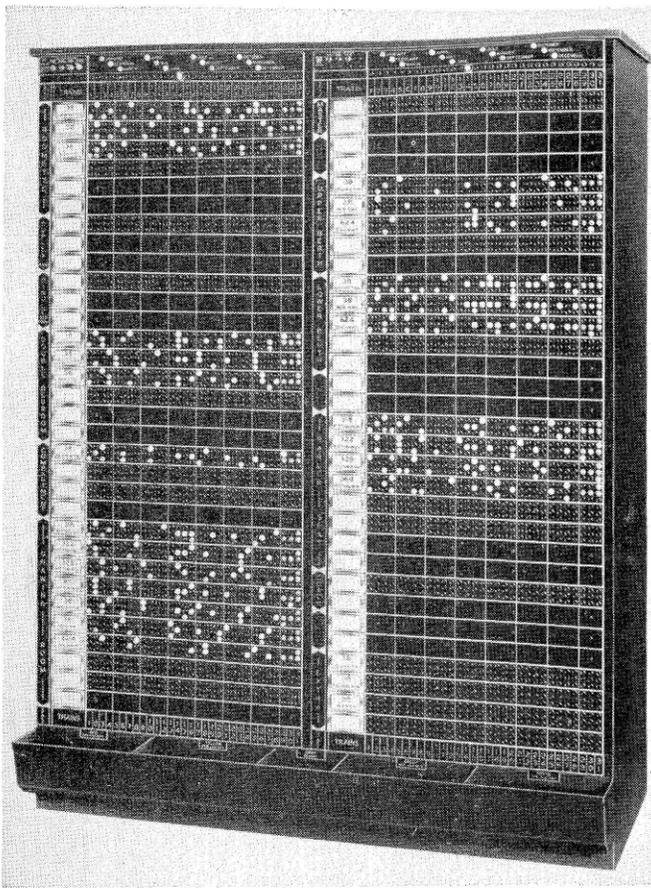
offices, and can be placed in plain view of customers; and the recording machine, which is located at the reservation bureau.

On the ticket agent's set, controls consisting of dials and push-buttons are conveniently located on the lower panel, and manipulation of these controls in a logical sequence transmits to the recording machine a "request" specifying the month, day, destination and train on which accommodations are desired. This "request" is interpreted by the apparatus in the recording machine and a "report" is automatically returned. All accommodations available on the designated train are then indicated by lighted lamps in the panel at the top of the ticket agent's



Internal electrical connections and mechanical operation of Megger

\*Trade Mark



Recording machine is located at the reservation bureau

set. From this information, the customer can select the accommodation desired. The accompanying photographs and captions show how a typical request is handled.

The recording machine for the reservation bureau is composed of standard sections approximately 2½ ft. wide, 6 ft. 9 in. high and 18 in. deep. If the size of the installation requires it, a number of sections can be assembled end-to-end to form a single integral machine. The front plate or posting board of the recording machine provides a continuous record of all reserved space on trains departing from the terminal. As can be seen in the illustration, the panel is arranged in sections for the various classes of reserved space. Each of these sections is subdivided to provide a panel for each train carrying that particular class of space. Each panel has three rows of receptacles, with 31 receptacles in each row, thus covering a three-month period in advance. To indicate through the system that a particular class of space on a train is sold out for a particular day, a colored plastic plug is inserted in the proper receptacle on the board. In order that months of the year can readily be identified, these plugs are provided in different colors. The color code is shown at the top of the posting board. Loose plugs are

stored in trays at the bottom of the front plate. This arrangement also facilitates visual scanning of the posting board, so that verbal requests from offices not connected to the Infomat system can be handled more efficiently. With all receptacles vacant, the recording machine will automatically report that all classes of space are available. Insertion of a plug in a particular receptacle preconditions the machine circuits so that subsequent "reports" will indicate that the associated space is not available. If space becomes available because of a cancellation, the plug is removed from the proper receptacle so that availability of that space will then be reported in the regular manner. Facilities are provided in the Infomat recording machine for adding or removing accommodations from any train, and for handling additional trains.

The Infomat system illustrated is designed to handle as many as 15 different types of accommodations for 90 days in advance on a maximum of 256 train-destinations. The number of ticket offices which can be connected into the system is limited only by practical considerations. Also, at busy ticket offices several ticket agent's sets can be handled by one operating unit, the number of sets handled at a given office being limited primarily by practic-

ability. The additional sets may be separately mounted on pedestals or on counters. Each ticket office is connected to the recording machine at the reservation bureau by a two-wire line circuit. Where several ticket offices are located in the same general direction from the reservation bureau, they may be connected to the same pair of wires and controlled separately by individual carrier units. Telephone communications can be handled over this same line circuit.

Among the Infomat system's numerous advantages, one of the most important is said to be its high public relations value to the railroad. For example, since the ticket agent's set can be located in plain view of the customer, he can watch as the agent makes the necessary manipulations to request the train space information, and when the indication lights become illuminated a few seconds later, he can actually see for himself what accommodations are available. Another important consideration from the customer standpoint is the greatly reduced time required for the handling of reservations. Another advantage of the Infomat system is the extreme simplicity of operation, which makes the selling of reserved space so simple and direct that existing personnel in ticket offices and reservation bureaus can handle the system with only a very short period of instruction.

## SWITCH MACHINE CONTROLLER

THE General Railway Signal Company, Rochester 2, N. Y., now offers a biased-neutral switch machine

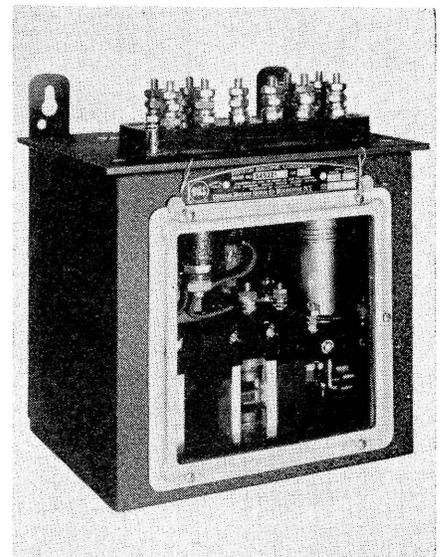


Fig. 1—Controller is biased-neutral unit

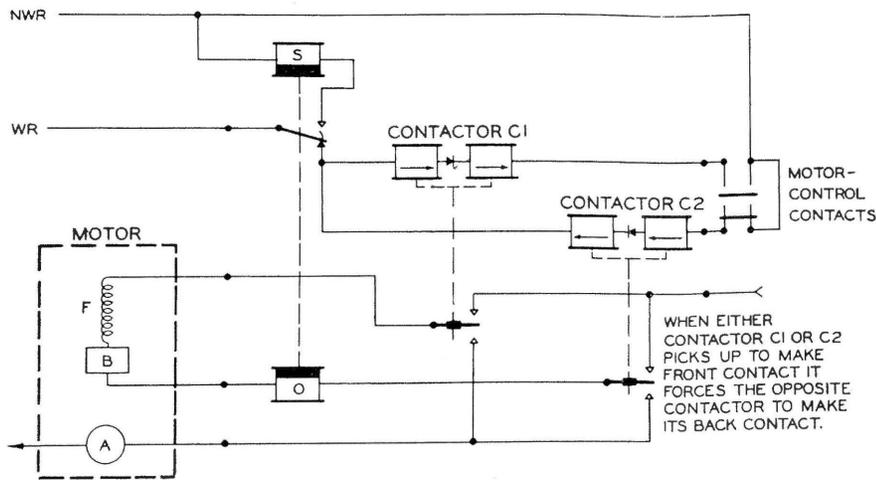


Fig. 2—Simplified circuit for biased-neutral controller

controller for mounting either on a tower rack or in a wayside housing. The controller, Fig. 1, is said to provide two-wire polarized control of any G.R.S. switch machine. This controller make its possible to operate a switch over a greater distance than is practical over direct wire from the switch-control lever. In locations subject to flooding, it is advantageous to use this controller in a wayside housing above high-water level, instead of using a built-in type of controller, such as is supplied in Model-5C and D switch machines.

As shown in the simplified circuit, Fig. 2, the controller contains two biased-neutral contactors and an overload relay. Each biased-neutral contactor is primarily a neutral relay. It has a permanent magnet located between the cores in such a way that the armature will operate only when current is flowing in one specified direction (indicated by arrows in the coils in Fig. 2). Although the half-wave rectifier between the coils fixes the possible direction of current flow, the magnetic structure is such that the contactor will not pick up when voltage of the wrong polarity is applied, even if the rectifier were removed from the circuit. Laboratory tests show that if 10 volts applied in the proper direction are required to pick up the armature, it would require at least 4,000 volts in the wrong direction to pick it up.

The rectifier is used for the following reasons:

(1) It permits a relatively high-energy input to the contactor. As soon as the motor-control contacts within the switch machine have operated in response to the energization of the control circuit, the energy input to the contactor is cut down to the amount permitted by the backleak of the rectifier (a maxi-

mum of 0.007 amp. at 10 volts). This makes normally energized control practical and economical—although not essential to operation of the controller.

(2) Both contactors are in multiple when the switch machine is unlocked, but only one is taking current. The only current through the other contactor is that permitted by the backleak of the rectifier. This permits the use of control wires with higher resistance than is practicable with present controllers.

(3) Since only one contactor is energized when the machine is unlocked, and since both contactors are connected in multiple, there is a tendency for the deenergized contactor to absorb the inductive surge produced by the other contactor when the control energy is interrupted in midstroke.

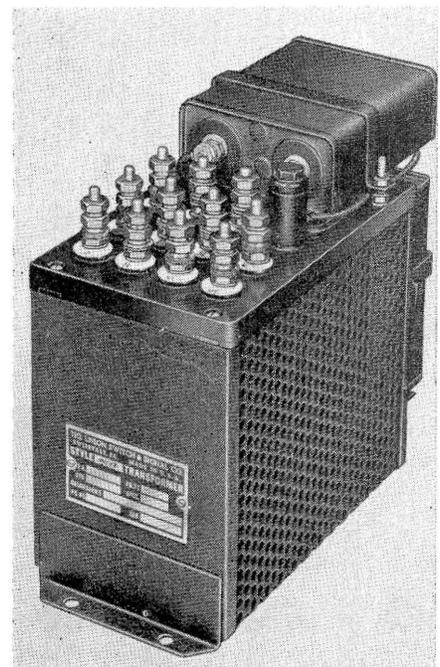
The magnetic structure also has a leakage strip, so that depreciation or even removal of the alnico permanent magnets could not cause the contactor to respond to the wrong polarity. The overload relay is said to be substantially the same as has been supplied in the past. It has an operating coil and a holding coil. The operating coil is in a series with the motor circuit so an abnormally large current will open the motor circuit. The holding coil keeps the motor circuit open until the control circuit is pole changed. Pickup time can be varied by an adjusting screw.

Figure 1 shows the controller with A.A.R. binding posts. It is also available with a plug coupler or as a plug-in unit that can be mounted on a regular Type-B relay rack. All contacts are visible through a transparent window. Dimensions are: depth, 7½ in.; width 9½ in.; height, 10⅝ in. with binding posts, 11 in. with plug coupler. Weight is 31½ lb. The controller may be wall-

mounted, shelf-mounted or plugged into a B relay rack. It takes the rack space of two Type-B, Size-2 relays. The contactor, overload relay, and cover are all removable as a unit by simply taking out the screws that hold the cover in place. These controllers are available for 10 to 12-volt and for 24 to 32-volt d.c. control. Operating voltage may be 24 or 110 volts d.c.

## NEW STYLE W-12 TRANSFORMER

THE Union Switch & Signal Company, Swissvale, Pa., announces a new transformer, Style W-12, which is said to have been developed particularly as an output transformer for use with a tuned alternator. The transformer provides better output wave shape than the usual output transformer-tuned alternator combination, because of the use of a liberal air gap in the magnetic circuit, together with capacitors of relatively large rating. The transformer is compact for its rating, and carries the necessary arc-suppressing capacitors mounted as part of the transformer assembly. This arrangement saves wiring and space in the instrument case, and practically eliminates the possibility of the capacitors becoming disconnected with resultant



Unit is for use with tuned alternators

destructive arcing on the tuned alternator contacts.

A typical rating for the W-12 transformer is 115 volts, 250 v.a., 100 cycles output, with primary winding for use on six cells of lead

storage battery. Taps are provided on the output winding for adjusting one of the capacitors to provide best arc suppression. The transformer can be supplied for use with tuned alternators of any usual power frequency and battery supply, and for any common output voltage. The combination of a "Union" tuned alternator and a W-12 output transformer provides an excellent method of obtaining alternating voltage from a battery, especially for intermittent or standby service.

## BROAD-BAND, NARROW-BAND CODED CARRIER

THE Union Switch & Signal Company, Swissvale, Pa., announces the availability of their broad-band, narrow-band coded carrier control system for consolidating at one point, such as at division headquarters, the control of a series of remote interlockings. In this system, controls and indications are carried by broad-band carriers between terminals at the control point and one or more field locations, according to the maker. The necessary channels for the controls and indications of the interlockings are obtained by using a group of narrow-band carrier frequencies to modulate each broad-band carrier. Therefore, separate broad-band carrier frequencies serve to transmit each group of narrow-band carrier frequencies in a separate "compartment". And, since the frequencies assigned to each group of narrow-band carriers can be repeated in each "compartment", the controls and indications of an extensive series of interlockings can be confined to a relatively narrow range of frequencies handled by a few broad-band carriers.

Figure 1 illustrates a typical line plan for using the broad-band, narrow-band system to control a series of six remote interlockings. Two broad-band carriers are employed, one modulated by a group of six narrow-band carriers assigned to handle controls, the other modulated by a group of six narrow-band carriers assigned to handle indications. The broad-band carrier terminals are located at the control point and interlockings "B" and "E". At terminal "B", the control codes handled on the narrow-band carriers assigned to interlocking "A", "B" and "C" are converted to d.c. control codes and transmitted to their respective interlockings in the usual manner. The narrow-band carriers handling the control codes for interlocking "D", "E" and "F" are "passed"

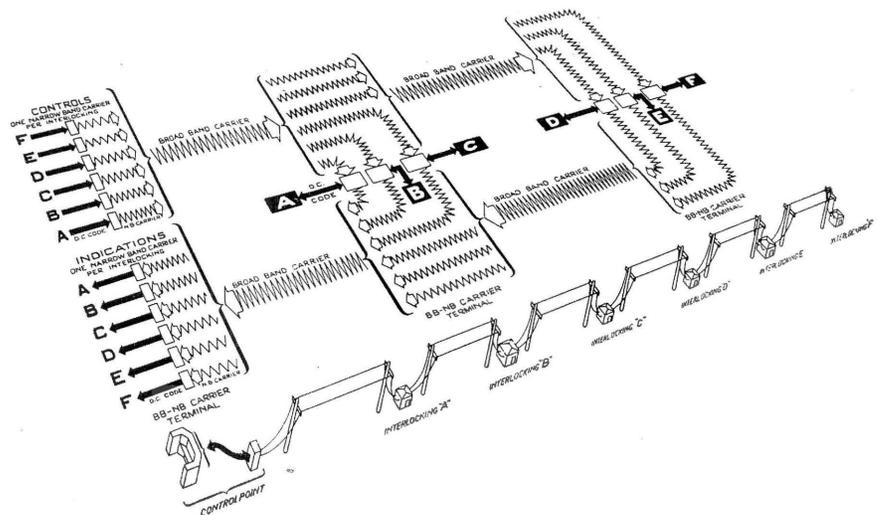
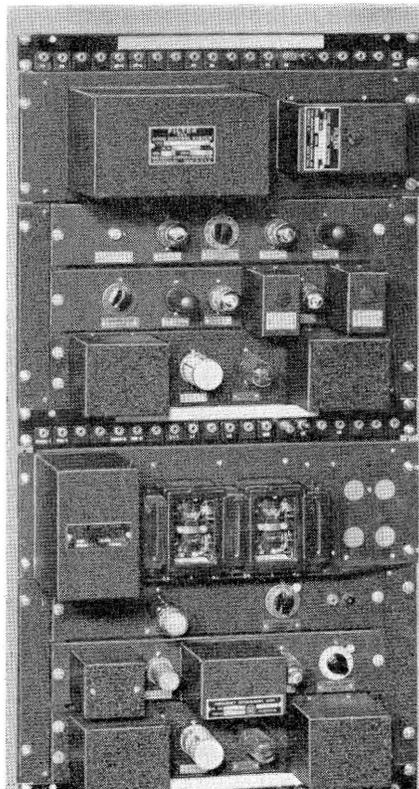


Fig. 1—Application to the control of a series of remote interlockings

through terminal "B", to terminal "E", where the carrier codes are converted to d.c. codes and transmitted to interlockings "D", "E", and "F". Indication codes, originating at interlockings "A", "B" and "C" in the form of d.c. impulses, are transmitted to broad-band terminal "B", where they are converted to narrow-band carrier codes. These coded carriers are used to modulate the broad-band carrier handling indications, and are transmitted back to the control point. Similarly, the d.c. indication codes originating at interlockings "D", "E" and "F" are transmitted to terminal "E", where they are handled in the same manner as at terminal "B", and transmitted to

the control point on the same broad-band carrier that handles indication codes from interlockings "A", "B" and "C".

The carrier circuits, as well as d.c. circuits for interlockings "A", "C", "D" and "F" are all handled on the same pair of line wires. Since interlockings "B" and "E" are located at the broad-band carrier terminals, it is not necessary to transmit the d.c. codes for these interlockings over the line wires. For simplification, in Fig. 1, only two broad-band channels are used for control and indication and six associated narrow-band channels for each broad-band channel are shown. However, additional broad-band and narrow-band channels can be used as required. This limiting of the over-all carrier-frequency range required for the control of an extensive consolidation of remote interlockings is said to be the outstanding advantage of the system. Another important advantage is that where repeaters are required, each modulated broad-band carrier can be handled by a single repeater. The broad-band, narrow-band coded carrier control system will handle large installations using the "Union" Form 504, 506 or 510 Systems, or any combination of them.



Panel-mounted equipment for system

## WIRING HARNESS FOR SWITCH MACHINE

(Not Illustrated)

THE Union Switch & Signal Company, Swissvale, Pa., announces that they have adopted as standard the use of a wiring harness for electric switch machines. The new harness can also be readily applied to "Union" electric switch machines with up-to-date terminal boards and standard wiring, that were in service prior to adoption of the new harness.

It is made up of No. 14 and No. 12 plastic insulated wire, bound together with plastic electrical tape. Wires carrying motor current are No. 12 and all others are No. 14. The harness is oil and moisture resistant, according to the company, and "uses" pressure-type terminals that give support to the insulation of the wire. The support around the wire insulation is itself insulated. The leads on the circuit-controller end of the harness are bound into a form, so that they will lay in place on the proper terminal of the circuit controller. Leads on the terminal-board end are numbered, and are applied to the same-numbered terminals on the terminal board, as are illustrated on the diagram which is furnished. Internal wiring diagrams of the switch machine are also furnished with each harness that is supplied for field application.

### PANEL MOUNTED CARRIER EQUIPMENT

THE Union Switch & Signal Company announces that its coded carrier control equipment is now available for panel mounting on individual racks or cases manufactured by

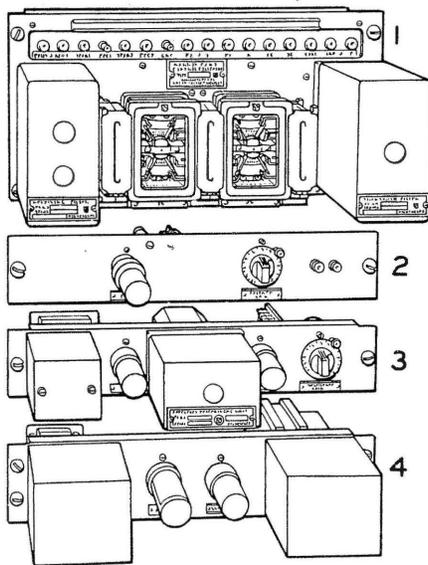


Diagram of panel units

them, or on standard commercial racks. The new equipment is made up of four panels (see accompanying plan), as follows: Panel 1, relay-filter; panel 2, receiver; panel 3, transmitter, and panel 4, the power supply. Panels 2, 3 and 4 are interchangeable with panels used on all three types of mountings, namely, individual racks, commercial racks and cases. Panel 1 (relay-filter) is used with either individual racks

and commercial racks, but a different relay-filter assembly is required for case mounting, as this arrangement permits mounting the new panels on the top of existing cases with only slight modification. The new equipment is said to give the railroads maximum flexibility with respect to handling their coded carrier control systems. For example, commercial racks can be installed at the office, where there is a concentration of carrier equipment, and individual racks can be installed in the field. Or, any other desired combination can be used, and since the panels are interchangeable, the amount of spare panels required for maintenance is minimized. An illustration of panel-mounted carrier equipment is shown elsewhere in these columns under the items, "Broad-Band, Narrow-Band Coded Carrier."

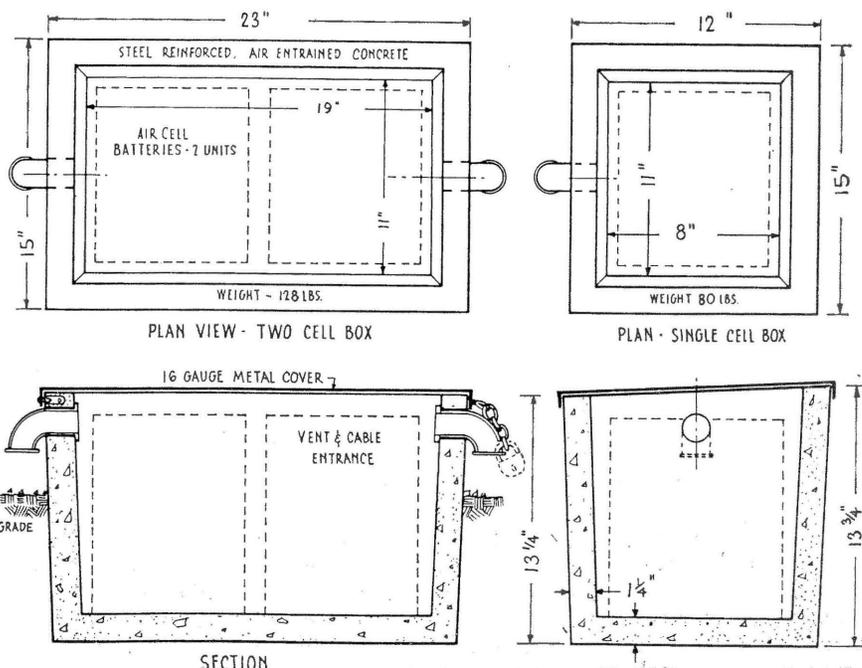
### AIR CELL BOXES

THE Permacrete Products Corporation, 1839 South Wall Street, Columbus 7, Ohio, has developed a line of concrete battery boxes for the express purpose of housing air cells for electric switch lamp lighting projects. At double switch locations the two-cell box may be used. The boxes are said to provide permanency, protection and ready access for both visual inspection and maintenance. The metal cover can be locked to the vent cover for security as shown. Vents are large enough to supply the necessary air for breather-type cells, but not

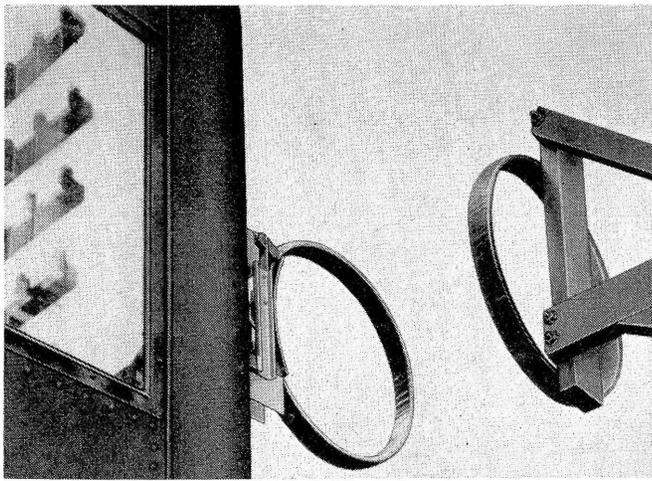
great enough to seriously reduce the insulation value of the concrete box. Insulation board can be supplied for side walls if desired.

### INDUCTIVE TRAIN IDENTIFICATION SYSTEM

THE Union Switch & Signal Company, Swissvale, Pa., announces a new system for identifying trains, known as the "Union" inductive train identification system. It was developed especially to meet the need for a method of indicating the destination of approaching trains to the operators at interlockings, and is said to be of great value in avoiding incorrect routing, particularly where trains are operated on a close headway. It also has many other possible applications where a reliable method of train identification is desired. One of the chief features of the new system is the simplicity of the train-carried equipment, which consists simply of a coil and tuning condenser in a suitable mounting, and does not require any sources of energy on the train. Since the number of train-carried units would normally be considered greater—especially on rapid transit lines—than the number of wayside stations, the system affords maximum installation economy. The wayside equipment consists of a combined transmitter and receiver coil, mounted adjacent to the track; an electronic oscillator unit for energizing the transmitter coil; and a pretuned am-



Plans and sections of one and two-cell boxes



Wayside and car-carried coils used with inductive train-identification system

## On the "J"

(Continued from page 556)

controls for Lake street. Time cut outs, similar to those used at Chicago Heights, as explained previously, are also included in this Hobart project.

### Dwarf Signal Rule

The dwarf signals used on these crossing protection projects are the type SA, arranged to display either red or green. Below each signal there is a large letter "X" which designates it as a signal associated with crossing protection, and as having nothing to do as an automatic signal or as an interlocking signal.

The bulletins and time table instructions explain that a green aspect on such a signal indicates that the crossing protection is operating properly, and that a red light may indicate that the crossing is not protected and therefore, care must be exercised to prevent accidents to highway vehicles and pedestrians.

These crossing signal projects were planned and installed by railroad forces under the jurisdiction of F. G. Campbell, chief engineer, and under the direction of W. K. Waltz, signal engineer. The flashing-light signals and gates at Euclid avenue in Chicago Heights were furnished by the Griswold Signal Company, and those at Main street and Lake street in Hobart were furnished by the Western Railroad Supply Company. The dwarf signals and relays were made by the General Railway Signal Company. Transformers and rectifiers were made by Fansteel. At each crossing, the gate motors are fed from a set of 10 cells of 160-a.h. Edison storage battery at Main and Lake, and 240-a.h. at Euclid. Six of these cells are used also to feed control circuits. These batteries are on floating charge through Fansteel Balkite rectifiers. Each track circuit is fed by three cells of 500-a.h. Edison primary battery. The buried cable on these projects is double No. 8 for the motor feeds and single No. 8 for track connections. The insulated wire and cable was furnished by the Okonite Company.

The crossing protection described above at Chicago Heights, Ill., was installed in accordance with order of the Illinois Commerce Commission and that at Hobart, Ind., pursuant to ordinances of the Common Council of that city.

plifier and indicating relay. A separate amplifier and relay are used for each identification frequency.

The system operates by means of the magnetic field or inductive coupling between the wayside and car-carried coils. When a tuned coil on a train is opposite the wayside coil installation, the coupling from wayside to train coil and back from the tuned train coil to the wayside receiver coil causes the indicating relay for this particular tuning frequency to operate. The selective tuning of the electronic circuit associated with each indicating relay prevents the other relays from being operated. The equipment will respond properly no matter how high or low the train speed may be and even if the train should stop at the identification point. The relay circuit can be furnished to restore to normal automatically in some predetermined short time after passage of the train, or for manual resetting by a pushbutton.

Special circuits are included in the amplifier to make the equipment immune to false tripping by metal that may come close to the wayside coil or by stray magnetic or electric fields. There is no appreciable radiation from the transmitter and consequently no interference with other equipment or with identification of trains on adjacent tracks. The induction field becomes negligibly small at distances more than two or three times its diameter from the transmitter coil. Where trains are made up of multiple-unit cars, the car-carried coils can be furnished as separate, demountable units, each complete with its condenser pre-tuned to one frequency and arranged so that the coil can be replaced with one of another frequency. Thus, a pool of coils can be maintained at points where trains originate, and each train equipped with a coil of the proper identity

before starting its run. Where trains are pulled by one locomotive, a coil can be mounted permanently on the locomotive with a tuning selection key located in the cab for the engineman to effect the proper identification.

## SOLDERING FLUX

(Not Illustrated)

DIVISION Lead Company, 836 West Kinzie Street, Chicago 22, has announced a new liquid soldering flux, known as Divco No. 229, which is said to eliminate practically all cleaning and burnishing of metal parts usually necessary before soldering can be done. It is usable on copper, brass, bronze, nickel, cadmium, zinc, tin, galvanized iron, steel, monel. Full particulars are available from the manufacturer.

## INSULATED GROMMET

(Not Illustrated)

ANNOUNCEMENT has been made by the Automotive Rubber Company, Inc., 8601 Epworth Boulevard, Detroit 4, Mich., of a newly-designed metal-formed grommet, completely covered with rubber, for insulating blanked holes in metal to prevent cutting, chafing, shorting and rattling of wires, cables, conduits and tubing, which pass through the holes. Known as the Arco Staput series 3120, the principal advantages are said to be that it can be installed easier and faster than grommets previously offered, and that it holds in position at all times. Installation from the face of the hole is another feature, and an expanding hand tool is available to roll and force the curled prongs tight against the under-surface, assuring a positive secure fit. Further information is available from the manufacturer.