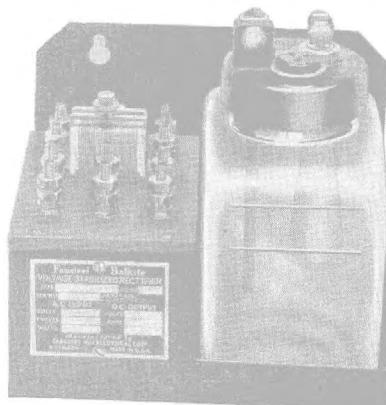


the rod; the other half is in the form of a spring socket bolted to the rod by one bolt. This socket projects in towards the rail and is thus well protected from dragging equipment. It carries two springs of ample capacity to transmit the maximum operating thrust, as well as to take up lost motion and to prevent vibration of the various parts which would otherwise cause wear.

## Voltage-Stabilized Rectifier

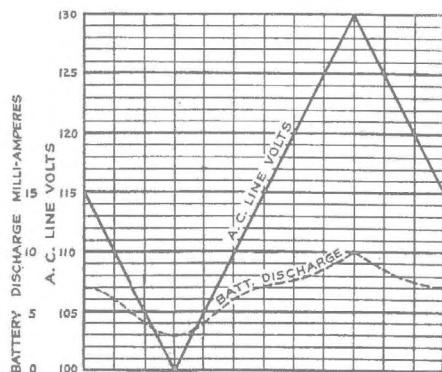
A NEW line of Balkite tantalum rectifiers, incorporating voltage-stabilizing transformers, is being introduced by the Fansteel Metallurgical Corporation, North Chicago, Ill.

These rectifiers are recommended



Type VSR-601 Balkite voltage-stabilized rectifier

for service where the a-c. voltage is subject to wide fluctuations, under which conditions the new type of rectifier delivers a constant d-c. output. One model, Type VSR-601, illustrated, consists of the rectifier and transformer in a complete assembly. Other models, such as VSH-C-1,



This curve, plotted from a circuit consisting of a Type VSR-601 Balkite rectifier in parallel with a 10-volt primary standby battery, shows a-c. line fluctuations from 100 to 130 volts and the practically constant battery discharge during the same period. Note that in no case did the battery discharge fall below 3 m.a.

consist of separate rectifier cells and suitable voltage stabilizing transformers.

The Type VSR-601 has been developed, for use with primary battery for line or crossing signal power circuits, to maintain a constant battery discharge under variations in line voltage. Once adjusted to meet local load, voltage and current conditions and the desired primary battery discharge (usually from 4 to 7 m.a.), the line voltage may fluctuate between 95 and 130 volts with no appreciable change of current in the load circuit. In the accompanying curve showing performance of this rectifier under one load condition, it will be noted that at no time was the battery charged. Type VSR-601 rectifier has a universal primary for 95-130- or 190-260-volt, 60-cycle, a-c. lines, and d-c. output of 8 to 13.5 volts, 0 to 250 m.a.

The use of the new voltage stabilizing transformer with the Balkite taper rectifiers for storage battery charging does not interfere with the taper charge characteristics.

## Testing Sets

THE Western Railroad Supply Company has placed on the market three styles of test sets designed for use in testing the electrical characteristics of signals, relays, slot coils, electric locks and other signaling apparatus.

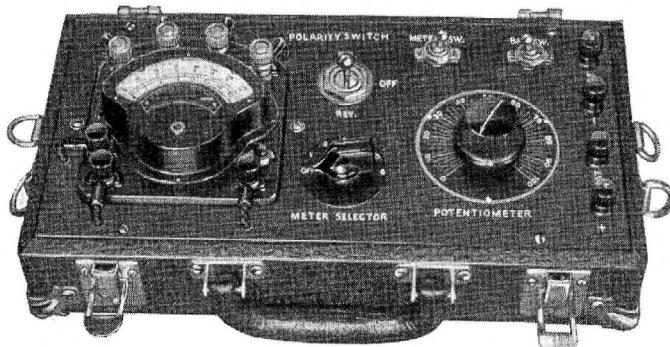
The Type-K d-c. test set is intended for field use in making torque and drop away tests on semaphore signals, and for all required tests of relays, slot coils, valve magnets, motors, etc. It is furnished complete less the me-

the contacts is said to be high with extremely low contact resistance. The design provides a positive index to the various switch positions with numerals corresponding to ranges of the measuring instrument in use as indicated on the circuit diagram in the cover of the test set. A toggle switch, labeled "A" and "V" in its two positions, changes connections for making current or voltage readings.

A heavy-duty d.p.d.t. toggle switch with a definite-center "Off" position serves to reverse polarity on the line or device under test. Contact resistance of this switch is said to be negligible. A d.p.s.t. toggle switch is provided to disconnect the battery from the potentiometer when energy is connected to the battery terminals with no device under test.

The potentiometer is especially designed to give smooth, stepless control for pick-up and release value tests. It is of 100-ohms resistance and 150-watts capacity. The all porcelain, vitreous enamel construction leaves nothing to burn or char if excessive current is accidentally allowed to flow through its winding. Windings cannot stretch and become displaced due to excessive heat. The contact shoe of the potentiometer is copper-carbon (Cophite), of a width to span several turns of the resistance winding, which it is claimed insures good contact at all times without heavy pressure. A pigtail connection carries the current from the contact shoe. The dial of the potentiometer is graduated 0-100 in order that the approximate percentage of resistance in the circuit may be easily determined.

The set is housed in a leatherette-covered plywood case measuring 6½



Type-K test set with the cover removed

in. by 12½ in. by 4½ in., with cover in place. The cover is attached with slip hinges permitting its ready removal if desired. Swivel "D" rings and a shoulder strap, furnished with the set, make it convenient to use in places where no space is available for resting the test set, such as at top post signal mechanisms, or at instrument or relay cases having no empty shelf space, etc.

The various ranges of the voltmeter are selected by means of a 7-point rotary switch of the shorting type which permits changing from one range to another without opening the circuit. The carrying capacity of

The fact that this set is furnished without a meter, and with space therein for a commonly used standard instrument, makes it comparatively low in first cost and permits the use of a meter to which the user has presumably already become accustomed. It has the further advantage of permitting the use of an instrument having scale values best suited to the tests to be made, and obviates the necessity of possessing more than one test set, even though meters of different scale range combinations are required for different classes of work.

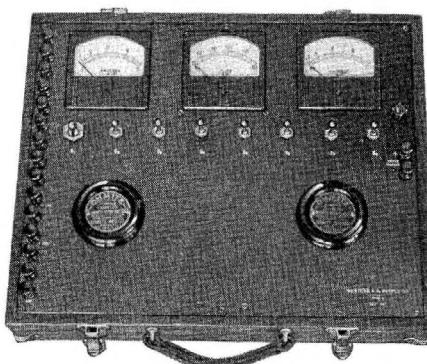
#### The Type-T Test Set

The second of the three new test sets placed on the market by the Western Railroad Supply Company is the Type-T, which is said to have all of the desirable characteristics of the Type-K test set above described. The Type-T has two built-in meters, one voltmeter and one ammeter, permitting simultaneous voltage and current readings. The instruments are shielded, and each has six scale ranges. The voltmeter is arranged to read both a-c. and d-c. when used independently. Sensitivity of 1,000 ohms per volt makes for highly accurate readings, and easy calculation of the effect of the instruments on the circuits can be made since the resistance of each current scale of the ammeter is shown on the instrument dial. A potentiometer-rheostat and series resistances are conveniently mounted. These total 300 ohms with the potentiometer of 75 ohms resistance having 150 watts capacity. Necessary toggle switches for setting up various test circuits are provided, as are rotary switches for selecting desired scale ranges on each independent meter. Binding posts are also provided so that the voltmeter and ammeter are made available for use in making ordinary voltage or current readings independent of the other test set equipment. This test set can be furnished with instruments having any desired scale combinations. The entire assembly is mounted on a black bakelite panel housed in a substantial polished wood case with slip-hinge cover and shoulder strap.

#### Model-200 Set for Relay Tests

The third new set made by this company is the Model-200 a-c. test set, which is for use in determining drop-away, pick-up and working values of a-c. relays, either single-element or two-element, line or track, except those few types of double-element relays which have high power-factor locals or are of the resonated vane types (with condenser).

Two ammeters having ranges 0-1 and 0-5 amp. and a voltmeter having a range of 0-150 volts permit accurate readings of the values encountered. Two 45-ohm fixed resistances enclosed in the case are used when testing track relays, so as never to have less than 90 ohms in series with the track element. These resistances also protect the meters, but are short circuited, by means of toggle switches, when testing line relays or single-



The Model-200 Type-C test set

element relays. Two non-inductive variable resistors each of 200 ohms total resistance, and having a carrying capacity of 1.4 amp., are conveniently located. One is connected directly across the supply line, as a potentiometer, while the other is connected as a variable series resistance. The potentiometer gives a coarse, wide-range adjustment and the series resistance gives a fine adjustment for accurate determination of the values for the relay under test.

The pole-changing switch is of the special design having a definite-center off position and contacts with negligible contact resistance. Other tumbler switches are used for short circuiting the ammeters. Binding posts are located on the right of the panel for connecting to the power supply, while those ranged along the left side are for connections of devices under test. They permit the use of the meters for direct measurements of current or voltage, and provide for the connection of an external wattmeter when required. An accessible fuse in the power supply circuit is located near the power supply terminals.

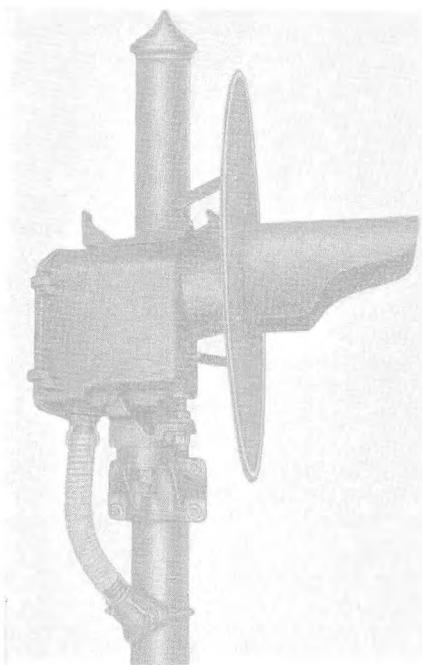
It is claimed that this test set can be used to take operating readings without introducing errors sometimes due to improper connection of voltmeters and ammeters. When testing two-element relays with the Model-200 test set, the values obtained are at the inherent phase angle of the relay, i.e., the phase angle between the local element volts and current, since the

large amount of resistance in series with the track winding gives a power factor very closely approaching service conditions.

The apparatus of the test set is mounted upon a black bakelite panel 15 in. by 18 in., and is housed in a polished hardwood case measuring 15 $\frac{1}{2}$  in. by 18 $\frac{3}{8}$  in. by 5 in. with cover in place. Metal corner plates, strap handle fittings, hinges and locks are of brightly polished nickel, enhancing the appearance. Slip-hinges allow the cover to be easily removed for convenience.

## Improved Searchlight Signal

THE Union Switch & Signal Company announces an improved searchlight signal, the H-5, which is easily installed and maintained, and which has a quickly detachable operating unit. The H-5 searchlight signal incorporates all the basic principles and



Signal with mast mounting

the major advantages of popular searchlight signals, yet is a radical departure from the types familiar for the past 15 years. Its outstanding characteristics are as follows: The operating unit is quickly detachable and plug connected; the reflector and lamp bulb are independent of the operating unit, and are also quickly detachable on the plug-in principle; the reflector assembly and both lenses of the doublet combination are mounted in the signal case inde-