the ties or rails; (4) note cranks, pins and jaws for wear or lost motion, and replace missing or worn cotter keys; (5) examine pipe lines, noting condition of rollers, couplings, cotters and foundations; (6) take switch point obstruction tests monthly.

▼▼▼

Leaving-Siding Signal

"What objections are there, if any, to making the starting or head-block signal in A.P.B. territory a permissive signal for a following movement from the siding? It is claimed that a saving of one to two minutes' time would thus be made for each train making such a movement from a siding."

A Time Saver

J. H. Oppelt
Signal Engineer, New York, Chicago & St. Louis, Cleveland, Ohio

In A.P.B. territory, any provisions that will permit a train on a siding to start as soon as a train on the main track moving in the same direction has passed, would prove valuable as a time saver. We have all seen a freight train stand idly on a siding until a passenger train had cleared the first automatic signal, thus allowing a proceed indication on the head block signal. One, two or three valuable minutes are lost to the waiting train.

If the head-block signal should be arranged to give automatically a restrictive indication as soon as the passing train has cleared the head block, the waiting train could start immediately, and no time would be lost. While it would, in most cases, be necessary to provide an additional operative unit on the head-block signal, circuits for its control could easily be provided.

If it should be considered objectionable to display this indication for a main-track movement, the operation could be made selective and displayed only when the passing track switch is open. The movement of a train out of a siding is necessarily slow and, with proper circuit arrangement, it appears to be entirely safe to allow such movements.

Control Can Be Arranged

A. R. Whitehorn
Commercial Engineer, General Railway Signal Company, Rochester, N. Y.

It is presumed the purpose of such an arrangement is to let the train on the siding move immediately after the train on the main has passed into this absolute block. If this was done by rule only, confusion might result. Therefore, it requires alteration of the indication displayed in order properly to identify the signal and this aspect must conform to other aspects now in use. If the absolute signal is now equipped with a marker to identify it, then it would be a simple circuiting matter to extinguish the marker for a following move, but a check must be provided to avoid an improperly displayed signal by a lamp being burned out, which would automatically make it a permissive signal.

If the absolute signals are not now equipped with markers, then by placing a marker normally extinguished on it, it would be a simple circuiting arrangement to light it on this particular permissive move. It is questionable if the benefit gained is worth the expenditure, and it is not unusual to see trains pass this signal at block in pulling out of a siding after clearing the main to let another train pass, thus getting rid of the delay without materially jeopardizing the safety of the system.

▼▼▼

Track-Relay Tester

(Continued from page 303)

S =Rotary switch with terminals for half scale reading, full scale and shunt

Voltmeter V, resistor R, and rotary switch S are mounted on a bakelite panel, together with the four terminals lettered BX, NX, RB and RN. The latter are provided with flexible leads and colored clips to facilitate their attachment to the 110-volt supply and the appropriate relay terminals. The transformers and condensers are placed under the panel, together with the necessary wiring. The whole assembly is placed in a wooden box with carrying handle and nomographic chart in the lid.

Method of Testing

Testing on the track is carried out as follows: 1. Track under test must be clear of traffic for a minute or so. 2. Clips are connected to appropriate terminals. 3. Resistance R is operated to give pick up, drop away and working conditions, the corresponding readings of voltmeter V being taken and the figures noted and recorded. 4. Percentage ratio of "drop away" to "pick up" is taken direct from the percentage chart and recorded.

The theory of the method may easily be followed by means of the ordinary vector analysis or the use of the Steinmetz symbolic method. The accuracy of the test is of a higher order than can be obtained from any voltmeter of the type used, since the phase angle during test does not vary more than 2 deg. from quadrature, and, in the vicinity of 90 deg., the rate of variation of the sine of the angle is very small.

Attention may be directed to the method of taking a large leading current by coupling the condenser by means of a transformer of high step-up ratio. According to Steinmetz' "Alternating Current Phenomena," the effective condenser capacity is increased by this means in the square of the ratio of transformation, i.e., 29^2, or some 840 times—the 4-m.f. condenser being made equivalent, by this device, to a condenser of 3,360 m.f. capacity.

The resistance R would be better designed with an inverse square characteristic, so that the rate of change of resistance would be inversely proportional to the square of the amount of resistance left in circuit—but a rheostat of this type would be expensive, and it has been found that the ordinary wireless type is good enough for all practical purposes.

It will be noted that the components of this relay tester are inexpensive and easily obtainable. T_1 is a 5-v.a. indication transformer designed for a working primary voltage of 110 volts at 25 cycles and a secondary pressure of 6 volts. Transformer T_2 is similar to T_1, with the exception that secondary turns have been taken off to reduce the ratio to 110/3.8. Voltmeter V is a "Weston" Model-476, having a resistance of 3 ohms per volt. It is not necessary in this circuit to specify voltmeters of high sensitivity, and therefore an inexpensive instrument may be used. This voltmeter has been arranged to read half scale or full scale, as required, by means of rotary switch S.