What's the Answer?

Portable Phones

When using portable emergency telephones, what precautions can be taken to guard against possible injury, to persons using the phone, due to lightning discharge? Please explain.

Don't Use During Storm

By M. N. Zeller
Electronics Engineer
Northern Pacific
St. Paul, Minn.

Portable telephones, which can be connected to an open wire line by a line pole or other means directly onto the open wire conductors, should not be used during lightning storms. The reason for this is that it is not possible to insulate the induction coil in these telephones sufficiently to provide complete personnel protection. Moderate insulation requirements would be at least 20,000 to 25,000 volts, and in many cases this would not be sufficient during a severe electrical storm. Insulating transformers built to these standards would, of course, be large sized and much heavier than the present induction coils used in portable telephones, making the unit heavier and unwieldy.

It is true that lightning arresters can be installed in a portable phone; however, this would necessitate connecting the telephone to a ground rod or similar ground which, in this case, would give the operator a false sense of security. Thus, for the above reasons a portable telephone should not be used under any circumstances during an electrical storm. To further point this up, the personnel on this railroad are forbidden to use portable phones during electrical storms.

Only in Emergency

By Allen H. Fox
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St. Paul, Minn.

First, the telephone should never be placed on the ground due to exposed bolt heads grounding the set, thus setting up a good electrical path. Our forces are warned against use of portable telephones under such conditions, except in extreme emergency. It is then preferable for the user to stand under shelter, if available, and be on a dry spot to avoid ground contact. In some cases, portable sets have been equipped with lightning arresters and fuses for protection to the user. Again, the safest way under such conditions is "Don't use it."

Crossing Circuits

In non-signaled territory, what form of circuits can be used for highway crossing protection? Please send diagram as well as explanation.

Open-Circuit Method

By H. B. Garrett
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Southern Pacific
San Francisco, Calif.

On the Southern Pacific we use a scheme for non-signal territory, as shown in the diagram. The circuits shown on this diagram are for use of wigwags only. However, if an installation is to be made using flashing-light signals, it would be necessary to use a flashing relay in addition to the XR relay; otherwise, the control circuits would be identical.

We use what is commonly referred to as an "open circuit" for controlling the XR relay, which is different from the usual practice followed by the majority of railroads in the country. Our reasoning behind the use of this type of circuit is that it was found many years ago that in controlling the wigwag mechanism from drop contacts, vibration of trains caused excessive arcing of the drop contacts. To overcome this undesirable feature which often resulted in high contact resistance, we started using the so-called open-circuit principle for controlling the relay. In view of the fact that the relays are all housed in a suitable case, there is practically no hazard of failure of the apparatus to function as intended. We have no records of failure chargeable to the use of this type of circuit.

Watch Out for "Lock-Out"

By J. L. Weatherby
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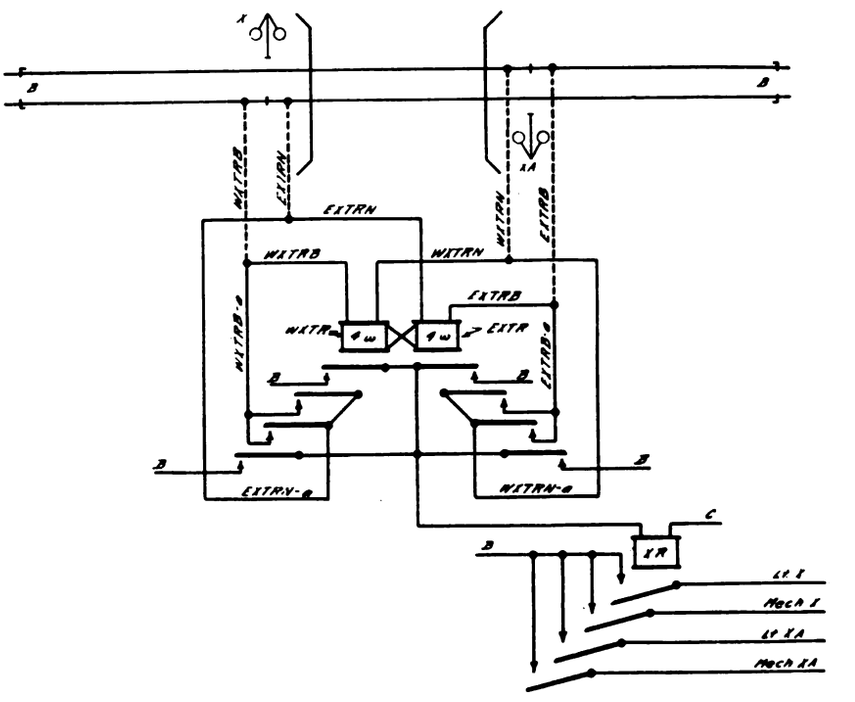
Texas & Pacific
Dallas, Texas

When circuits are being planned for highway crossing protection to be installed in nonsignaled territory, since there will be no block signal system to detect track circuit or other failures, it is important that the directional by-pass circuits be so designed as to not lock out



Southern Pacific uses open circuit method in non-signaled territory

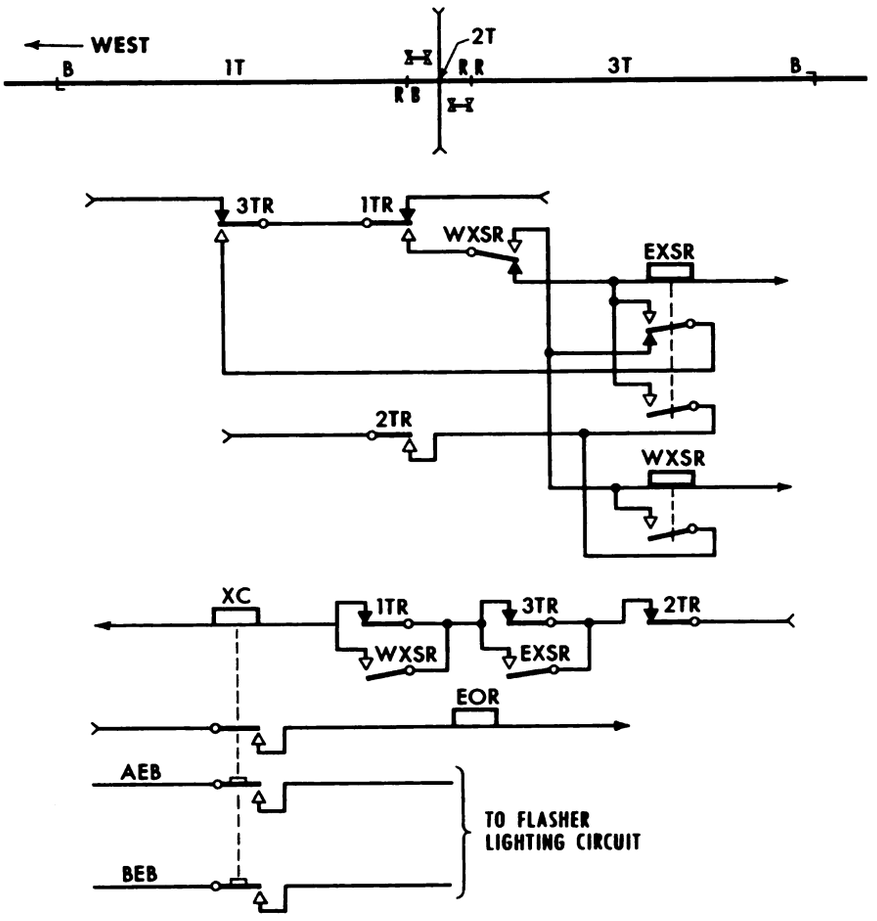


Fig. 1 shows Texas & Pacific scheme for non-signaled territory

the protective device operation in the event of a track circuit or track relay failure. The circuit shown in Fig. 1 will, if track relay of circuit in the receding direction fails for any reason to pick up after a train movement over the crossing, lock out the protective device operation for one movement in the opposing direction. That movement, however, will release the lock-out, and devices will then operate continuously until repairs are effected.

Generally, crossing protection in nonsignaled territory is located some distance from maintenance headquarters, and the intervals between inspections and tests are considerably longer than for such facilities in signaled territory. For that reason, it is advisable to use commercial power, where available, with a primary battery stand-by for the operating power, to provide the maximum practical capacity of stand-by reserve.

On the Texas & Pacific, to preclude the necessity for installing power circuit to the battery ends of the approach track circuits, or using straight primary batteries on these circuits, we have used at numerous locations a storage battery and charged it by alternating current transmitted through the rails from the crossing to the end of the approach circuit. The circuit is shown in Fig. 2. At the battery end, the transformer used is a 110/3.5 volt track transformer, connected as shown in the diagram, and the rectifier is a 5-volt a.c. to 3 volt d.c. track rectifier. The capacitor at the relay end is a 400-mfd., 110-volt a.c. motor starting capacitor. Circuit operates satisfactorily for 2,600 ft. and battery can be charged at rates up to 500 milliamperes at that distance.

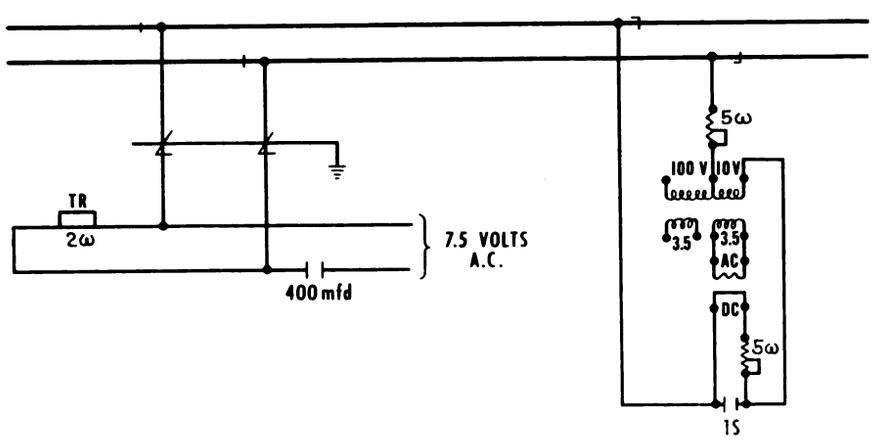


Fig. 2 shows method of charging battery from a.c. in rails

Speaker Circuits

As applying to yard loudspeaker installations, what are the advantages and disadvantages of ground-return signaling circuits between the loudspeakers and control panel, to enable crew members notifying the yardmaster that they wish to speak with him? In contrast, what are the advantages and disadvantages of using metallic circuits?

Ground Return Preferred

By A. E. DeMattei
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Ground Return: Advantages: (1) Simplifies installation. (2) Eliminates additional cable conductors. (3) Can be incorporated for lightning protection. Disadvantage: Soil condition in some instances may not be suitable for grounding.

Metallic Return: Would have opposite description of advantages and disadvantages of ground return. Under the circumstances the ground-return signaling is preferred.

Ground Return Economical

By J. I. Kirsch
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Pennsylvania
Philadelphia, Pa.

Ground return signaling is more economical in that it permits savings in labor and cost of wire for providing an additional circuit. The use of the two conductors, for signaling via ground return, should permit the operation of speakers several times the distance from the