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for the same diameter cable is relatively small.

Various types of rings have been developed in an effort to eliminate ring cutting. These take the form of double-contact rings, rings having saddles to give greater contact area, and various kinds of flexible straps. The development of these special

TABLE FOR RECOMMENDED RING SPACING

| Cable Diameter (Inches) | Ring Diameter (Inches) | Spacing (Inches) |
|-------------------------|------------------------|------------------|
| 1                       | 1½                     | 20               |
| 1⅜                      | 2                      | 20               |
| 1⅞                      | 2½                     | 20               |
| 2⅛                      | 3                      | 15               |
| 2⅝                      | 3½                     | 15               |

For intermediate size, use next larger size.

rings indicates that considerable trouble has been experienced from ring cutting, and it is interesting to note that the telephone company has practically given up the use of rings in favor of cable spun to the messenger. The primary reason for their changing their installation procedure was the difficulties experienced due to cable movement and ring cutting. We have carried this one step further by binding cables to the messenger in the factory, so as to facilitate installation. These messenger cables, having the cable bound tightly to the messenger, prevent excessive movement at the poles, and eliminate movement along the span, and we believe, will largely eliminate past troubles with ring cutting.

## Weight of Cable Basically

By E. T. SIMPER  
Assistant Signal Supervisor  
Canadian Pacific, Calgary, Alta.

THE basic factor in spacing of hangers or wire ties for aerial cable on a messenger is determined by the weight of the cable to be suspended. For the average signal cable, these are usually spaced 15 to 18 in.

We use No. 14 Style-B wire for tying aerial drops between the line and signals. The insulation is left on this wire, and it is cut in lengths of 25 in., separated, and two turns made around the cable, and then twisted three times vertically. The loose ends are wrapped around a No. 8 galvanized iron wire messenger. The cable then hangs about 3 in. below the messenger. A guage is used for proper spacing of tie wires, such as a piece of galvanized iron

wire, 15 in. long, with a hook on one end. One tie is made, and the guage is hooked on this tie and then the second tie made, etc.

## Cable Weight and Type of Strap and Hanger

By G. J. CROWDES  
Chief Engineer  
Simplex Wire & Cable Company  
Cambridge, Mass.

THIS is a very old subject and one which commonly is answered by standard practice of many years. The factors involved are usually the weight of the cable and the type of strap and hanger involved. The purpose of the hanger is to hold the cable underneath and close to the messenger. The hanger, therefore, must carry the weight of the

cable without injury to the cable itself. Standard practice was developed early for lead-covered and braided cables. With the lead-covered cables it was, of course, necessary to space the hangers close together where, for the lighter braided cables, they could be further apart.

It should be borne in mind, however, that it is possible to place hangers too far apart, which would allow the cable to whip and move around, causing wear at the rings. It seems, therefore, to be an optimum spacing which is sufficient to carry the weight of the cable without injuring or indenting, and also close enough to prevent excessive movement of the cable. There are tables of this such as given in many of the handbooks on telephone practice, also given in the N.E.L.A. Overhead Systems handbook.

## HIGH-SPEED TURNOUT SIGNALING

*"Where long turnouts and crossovers are designed for diverging train movements at speeds such as 40 to 50 m.p.h., which is higher than medium speed as authorized by the Clear-Medium aspect, what kind of a marker or special aspect could be used on the home and approach signals, so that when a diverging route is lined and signals are cleared accordingly, enginemen of trains would be informed that the turnouts and crossovers which he is to use are good for a speed greater than medium speed."*

### Yellow Triangle

By J. I. KIRSCH  
Superintendent Telegraph & Signals  
Pennsylvania, Philadelphia, Pa.

AS ordinarily applied on our road, the Approach-Medium aspect, Rule 282, on an approach signal and the Medium-Clear aspect, Rule 283, on the associated home signal, indicates that an engineman is to bring his train up to and through interlocking limits at 30 m.p.h. However, at certain locations, we have crossovers and turnouts which are designed and constructed for higher train speeds on diverging routes, such as the No. 20 with 45-ft. switch points, which are good for 45 m.p.h.

In such instances, we have installed a special marker on the approach and home signals which, when the Approach-Medium and the Medium-Clear aspects are displayed, authorizes an engineman to bring his train up to and through interlocking limits at not exceeding 45 m.p.h. This marker consists of a simple sheet-metal triangle 13 in. wide and 17½ in. high. It is yellow with a 1-in. black border, and is mounted to the left of the second "arm" of the sig-

nals. Trains are thus kept moving over turnouts and crossovers at the speeds for which they are designed and constructed.

## SPRING SWITCH SIGNALING

*"What special arrangement and aspects do you install at spring switches equipped with facing-point locks, to provide protection in case the lock plunger is in 'overthrow?' Please furnish sketch if practicable."*

### Definite Instructions

By E. T. GARRISON  
Supervisor of Signals  
Chesapeake & Ohio  
Richmond, Va.

WHERE spring switches are equipped with facing-point locks, no additional signal protection or unusual aspects are provided to show when the lock plunger might be in the "overthrow" position. Should

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this occur, the signals would display Stop or Stop-and-Proceed indications, such as in A.P.B. territory.

When the original spring switch is placed in service, it is covered by a bulletin with full instructions and, as a constant reminder for train crews, etc., every spring switch location on each division is listed in the current time table, along with the following instructions (which protect against the plunger "overthrow," etc.):

"Where Automatic Block System Rules or Interlocking Rules are in effect and 'Stop' Rule 292, or 'Stop and Proceed', Rule 291, is indicated,

a train or engine, after complying with these rules, must not make facing move over a spring switch until it has been carefully examined to insure that it is lined and facing properly, nor enter on or foul a main track, or obstruct another main track, until the spring switch has first been operated by hand to proper position for the movement and has then waited a sufficient length of time to secure full benefit of signal protection as provided by Rule 505 (b).

"The spring switch must not be restored to normal position until the movement has been completed. The same trainman who operates the switch must restore it to normal position."

## GATE-ARM STRIPE COLORS\*

*"What color combination of stripes on highway crossing gate arms are most effectively seen by vehicle drivers and pedestrians approaching the gates when they are lowered, e.g., black on yellow, black on white, or other?"*

### Reflective Sheeting

By D. O. OPSTAD

General Sales Manager  
"Scotchlite" Division

Minnesota Mining & Manufacturing Co.  
St. Paul, Minn.

REFLECTIVE sheeting in various colors, to improve visibility during darkness, is finding a number of applications in the railroad field, included among which are highway crossing gate arms. Trademarked "Scotchlite", the material has the principal objective of making crossing gate arms brightly visible at night. This in turn has two purposes: (1) to reduce costs of replacing gate arms damaged by motorists running into them at night, and (2) to provide increased protection of motorists and safety of train movements.

Installation of the material enables the natural day-time appearance of a gate arm to be reproduced identically in a night-time reflection. It can be applied to the entire surface, cut in any shape, and reflect any desired color. The sheeting consists of a plastic with a coating of millions of tiny glass spheres, of which there are 30,000 p.s.i. These spheres function as lenses, focusing reflected light directly back towards the source, with a minimum of diffusion. Controlled reflection up to

225 times brighter than white paint at night is thus provided. Virtual immunity to vandalism results from the absence of any single units. The sheeting is applied with back-coated adhesive or special "vacuum applicators", and can be applied to any painted metal or wood, and to any unpainted clean non-corroding metal such as aluminum, stainless steel, galvanized iron, brass, or porcelain enamel.

In addition to its use on crossing gate arms, the material is also being used in many other instances in the railroad field. A few of these are crossing signs for grade crossing protection, wayside signs, switch-stand targets, and semaphore signal blades.

## NEW BOOK

*The Safety and Special Radio Services. Federal Communications Commission. 37 pages, 5 7/8-in. by 9 1/2-in. Bound in paper. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 15 cents.*

THIS publication is the latest edition to the Public Primer series of the Commission, and sketches in layman's language the growth and development of these nonbroadcast radio services, with brief description of the individual services and their over-all regulation.

# KINKS

## Emergency Keys for Screw Type Signal Locks

By D. F. MORRISON

Signal Helper  
Boston & Maine, Melrose, Mass.

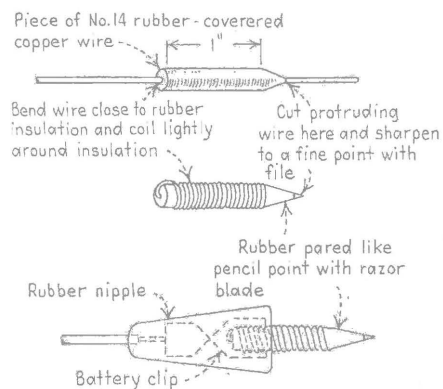
SIGNAL locks of the screw variety may be opened easily when either the socket wrench or standard key has been misplaced. Simply clip the points off of a 1 1/2-in. by 3/4-in. staple and bend the prongs to fit the lock's slots. Should the lock turn hard, a screwdriver may be inserted between the prongs to provide leverage.

## Meter Lead Pointer

By M. E. CARBERRY\*

Techuantepec Lumber Company  
Jesus Carranza, Ver., Mexico

A maintainer's voltammeter should have the leads tipped with stout grips, each protected by rugged rubber sleeves or nipples. In using such a meter, a good maintainer is careful not to put the reading on a voltage too high, or the ammeter on any short. The negative terminal of the meter can be snapped on a negative post—say the incoming terminal—and the positive grip used to "feel" for current. This, however, is



The meter lead pointer is made from piece of No. 14 rubber-covered wire

generally clumsy, so I made up a pointer for insertion in the grip snap, as shown in the accompanying sketch, which proved quite practical.

\*Formerly signal maintainer, Northern Pacific, Puyallup, Wash.—Editor.

\*Other answers on this subject were published on pages 179 and 180 of the March issue.—Editor.