

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G31.155
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AT&T Co Standard

OPEN WIRE
CARRIER APPARATUS ON TERMINAL POLES

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1. GENERAL

1.01 This section covers methods of placing carrier apparatus (protectors, cable terminals, loading coil cases, retardation coils, and junction filters) on terminal poles.

1.02 The detail plans will specify the type of equipment and apparatus to be installed and will generally show its exact location.

2. INSTALLATION OF PROTECTORS AND RETARDATION COILS

2.01 Detail plans may call for use of one or more of the following types of protectors: 101A, 102A, 102B, 103A, 103C and 103D. Detail plans may also call for use of 262A or 264A Retardation Coils and 83A Protector Mounting.

(a) The 101A Protector provides protector drainage to reduce lightning interference with voice frequency telegraph superimposed on C or J carrier systems. One 101A Protector is required per pair wherever open-space cutout protection is provided on a drained circuit.

(b) The 102A Protector provides open-space cutout protection for one pair and the 102B Protector provides similar protection for two pairs. Their principal use is at the junctions of intermediate cables and open wire C or J pairs.

(c) The 103A Protector provides a longitudinal retardation coil as well as open-space cutout protection at the junction of a non-phantomed open wire non-J pair and entrance cable at repeater and terminal stations.

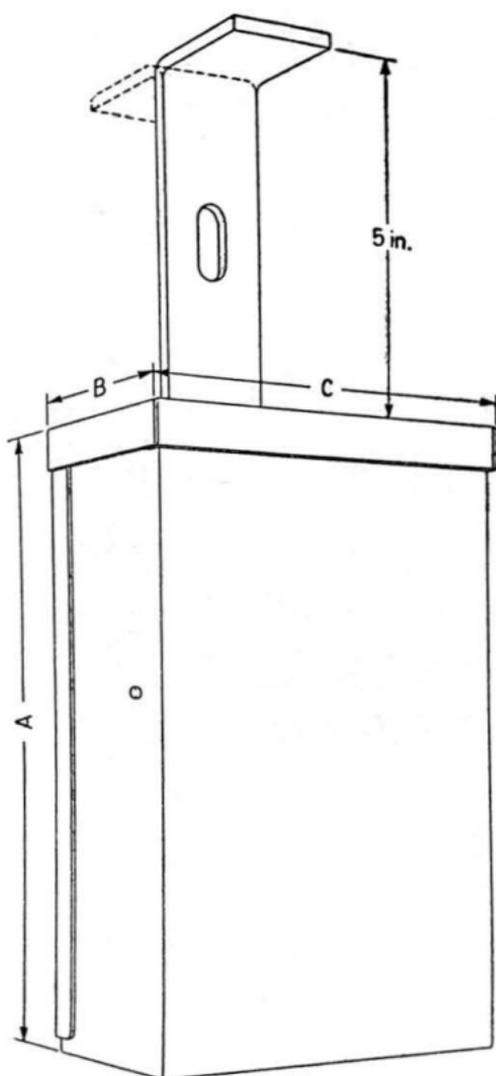
(d) 103C and 103D Protectors provide a longitudinal retardation coil as well as open-space cutout protection at the junction of open wire and entrance cable at repeater and terminal stations. Either protector provides protection for one J pair; the type specified depends on the gauge and spacing of the open wire.

(e) A 262A Retardation Coil may be required at the junction of each open wire phantom group and entrance cable used for type C or J carrier operation.

(f) A 264A Retardation Coil is used on each circuit equipped with one of the above protectors to provide drainage for reducing lightning interference with voice frequency telegraph superimposed on Types C and J carrier systems.

2.02 Protector mountings of the 83A type shall be installed in accordance with Section G31.140.

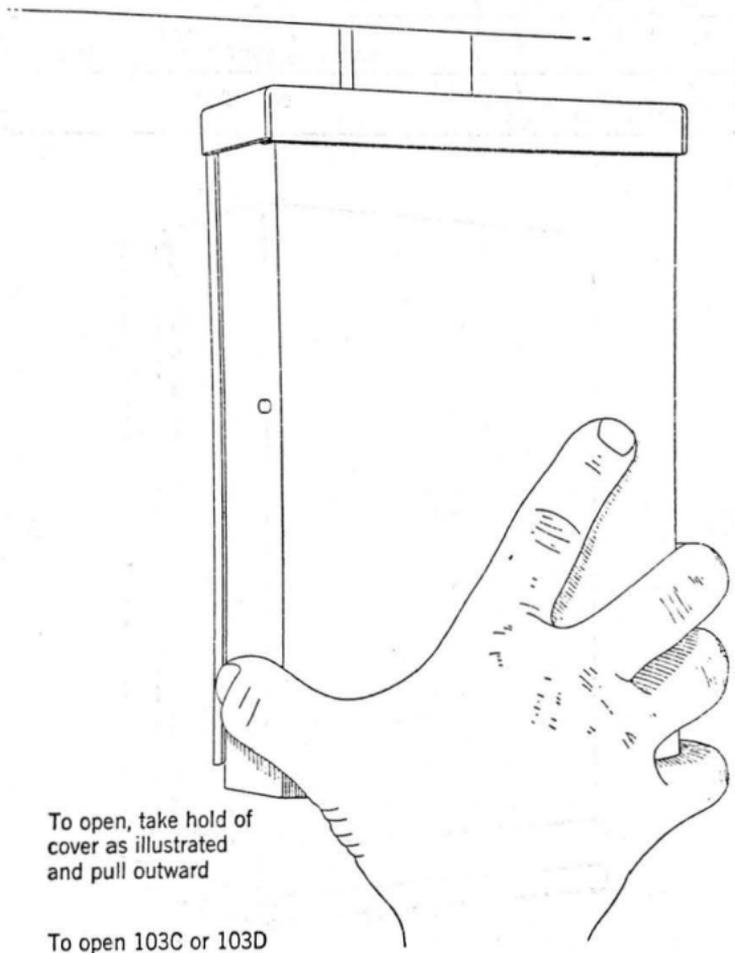
2.03 The over-all dimensions of the 101A, 102A, 102B, 103A, 103C and 103D Protectors and the 262A Retardation Coil are shown in the following sketch.



Apparatus	Dimension (Inches)		
	A	B	C
101A, 102A, 102B, 103A Protectors and 262A Retard. Coil	8 $\frac{1}{4}$	2 $\frac{7}{8}$	5 $\frac{1}{4}$
103C and 103D Protectors	11 $\frac{1}{4}$	3 $\frac{7}{8}$	6 $\frac{7}{8}$

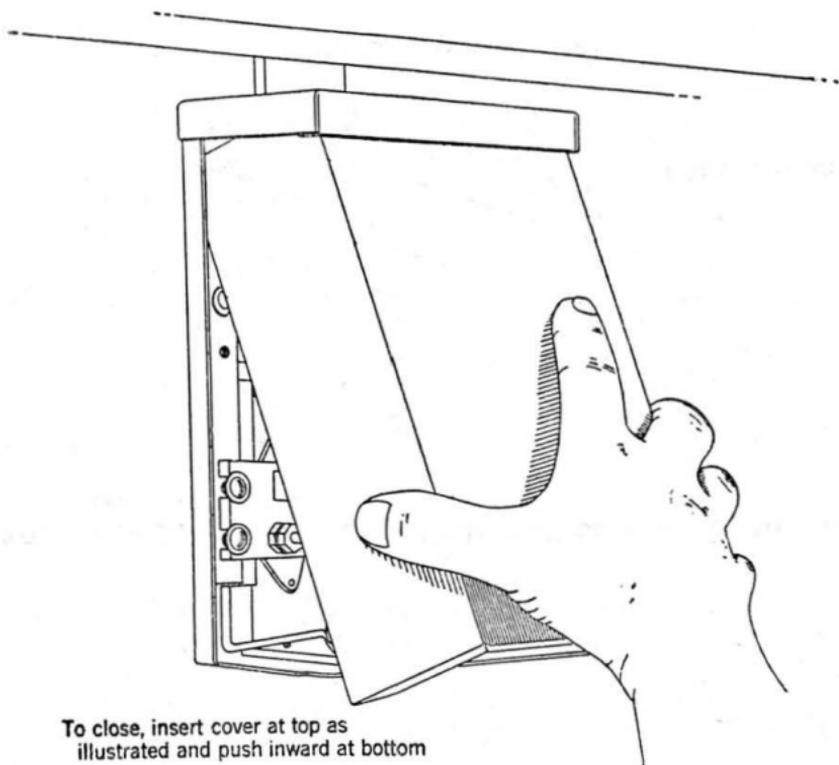
The above-mentioned items of apparatus are shipped with the mounting bracket detached. This bracket may be attached in either of two different positions (see above sketch).

2.04 The following sketches illustrate the procedure to be followed in opening and closing the housings of the apparatus mentioned in Paragraph 2.03.

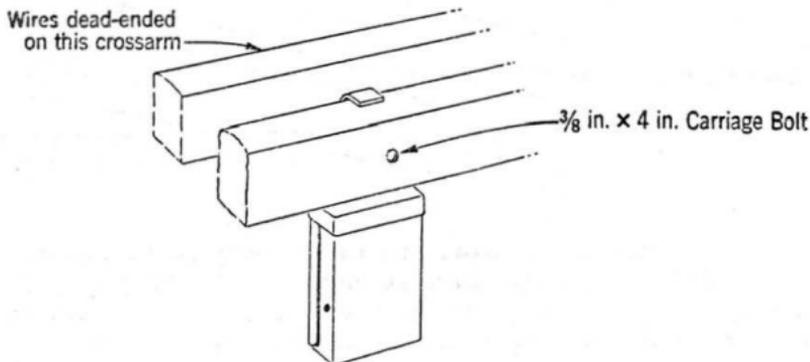


To open, take hold of cover as illustrated and pull outward

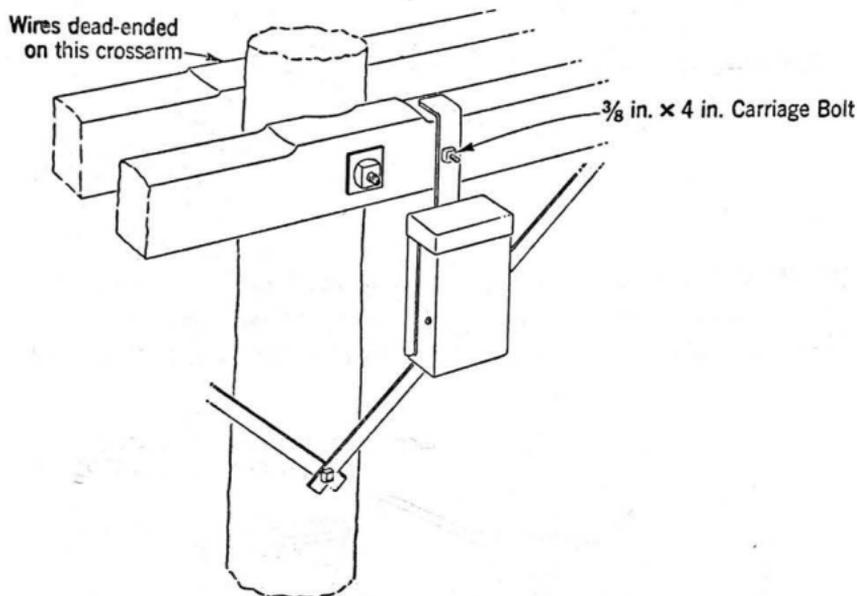
To open 103C or 103D Protector pull outward on tab located near front lower edge of cover



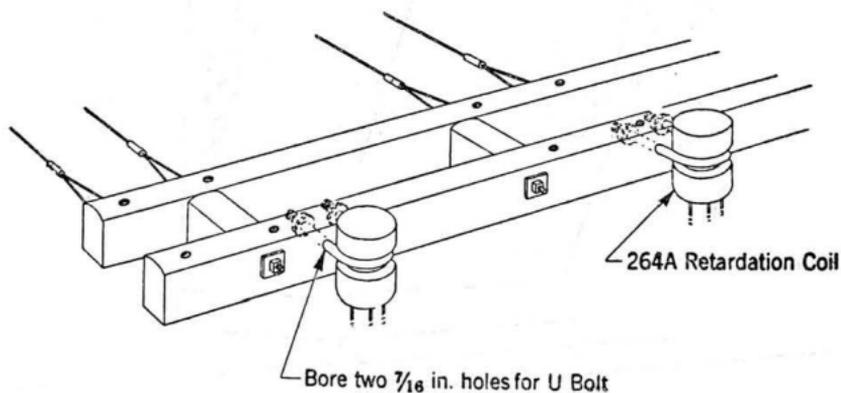
- 2.05** The 101A, 102A, 102B, 103A, 103C and 103D Protectors and 262A Retardation Coils shall be mounted as shown.
- (a) Where it is practical to do so mount them as illustrated below.

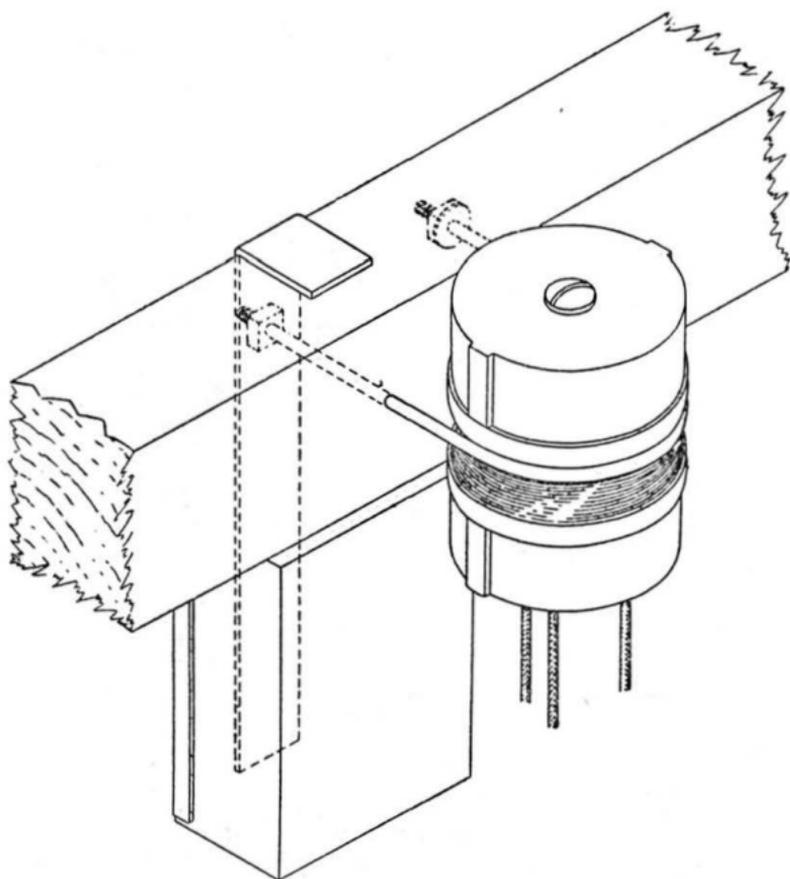


(b) Where crossarm braces or other apparatus such as loading coil cases or junction filter make it impractical to mount the protectors and retardation coils as illustrated in 2.05 (a), mount them as illustrated below by attaching the mounting bracket in the reverse position.



2.06 The 264A Retardation Coils shall be attached to cross-arms as shown.





As an alternative, these coils may be mounted between the crossarms, in order to avoid interference with cables or other equipment.

3. CABLE TERMINALS

3.01 The detail plans will specify which of the following types of cable terminals will be used.

F Type Cable Terminal.

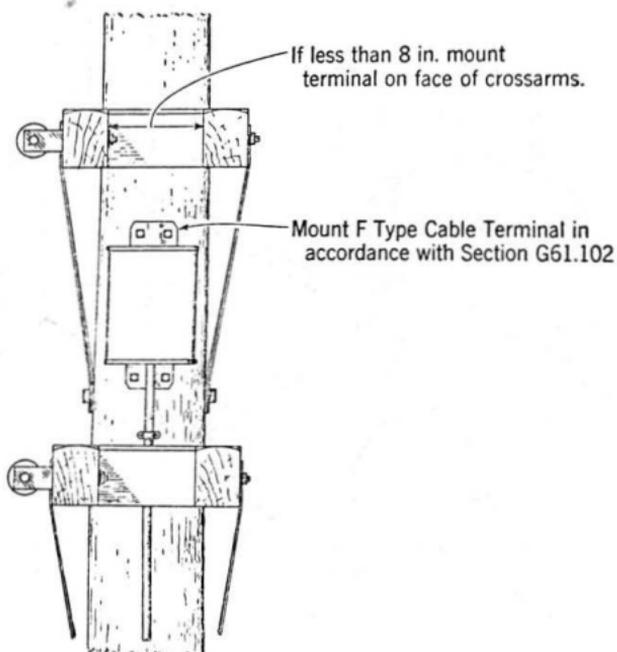
D-130255 Cable Terminal (A gas-tight F-10 cable terminal, with a 22 gauge quadded stub).

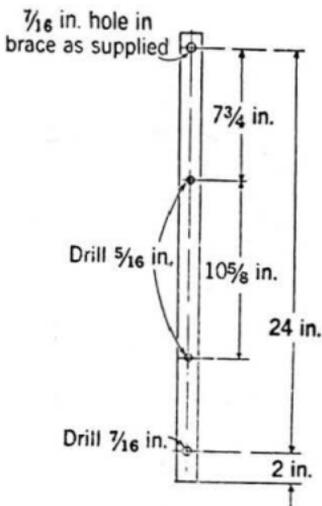
D-130256 Cable Terminal (A gas-tight F-16 cable terminal, with a 22 gauge stub).

29A Cable Terminal.

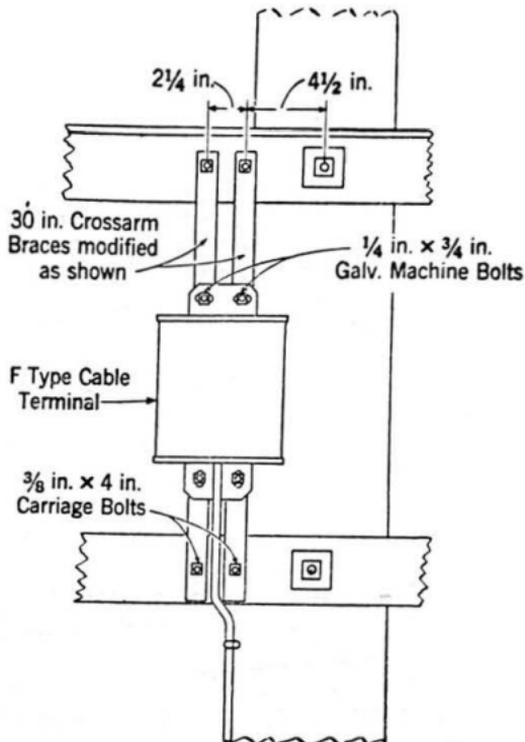
3.02 Detail plans will generally indicate the locations at which cable terminals are to be installed. Methods of mounting Type F Terminals are covered in Section G61.102.

3.03 In some cases it may be necessary to mount F Type Cable Terminals on the sides of poles between cross-arms, or on the face of crossarms in order to keep the amount of bridle wire in each circuit at a minimum. Details of mounting the terminals in this way are shown below.

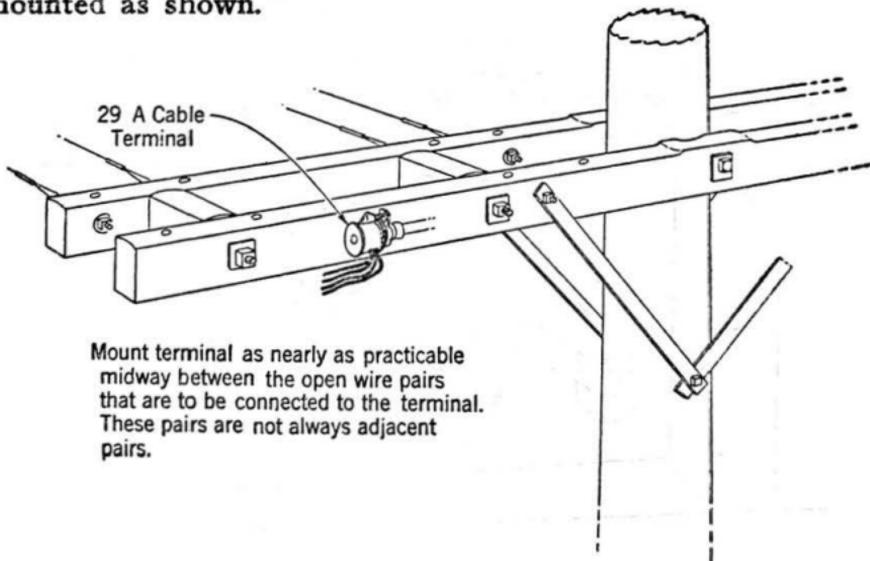




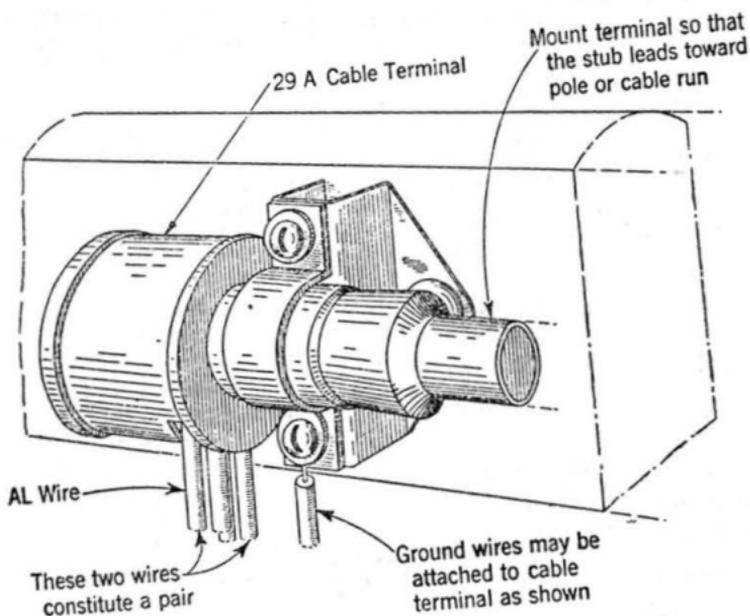
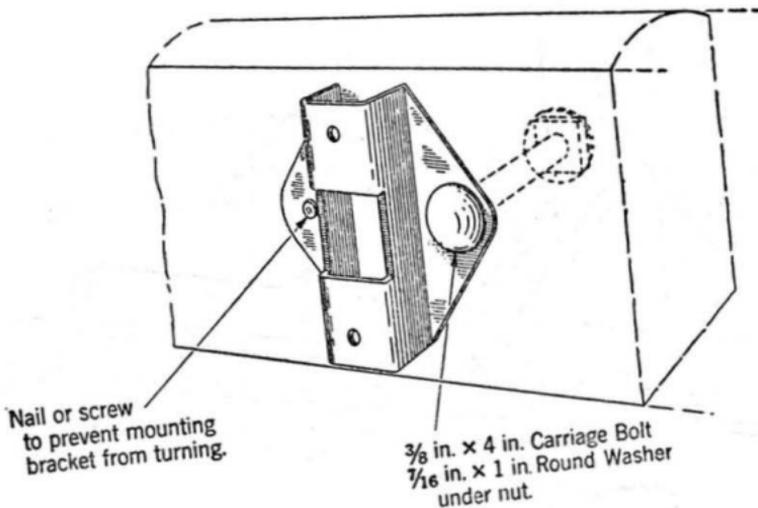
Details of Modified
30 in Crossarm Brace



3.04 The No. 29A Type Cable Terminal is used to terminate disc-insulated quadded cables on poles. One terminal is required for each quad. Terminals of this type shall be mounted as shown.

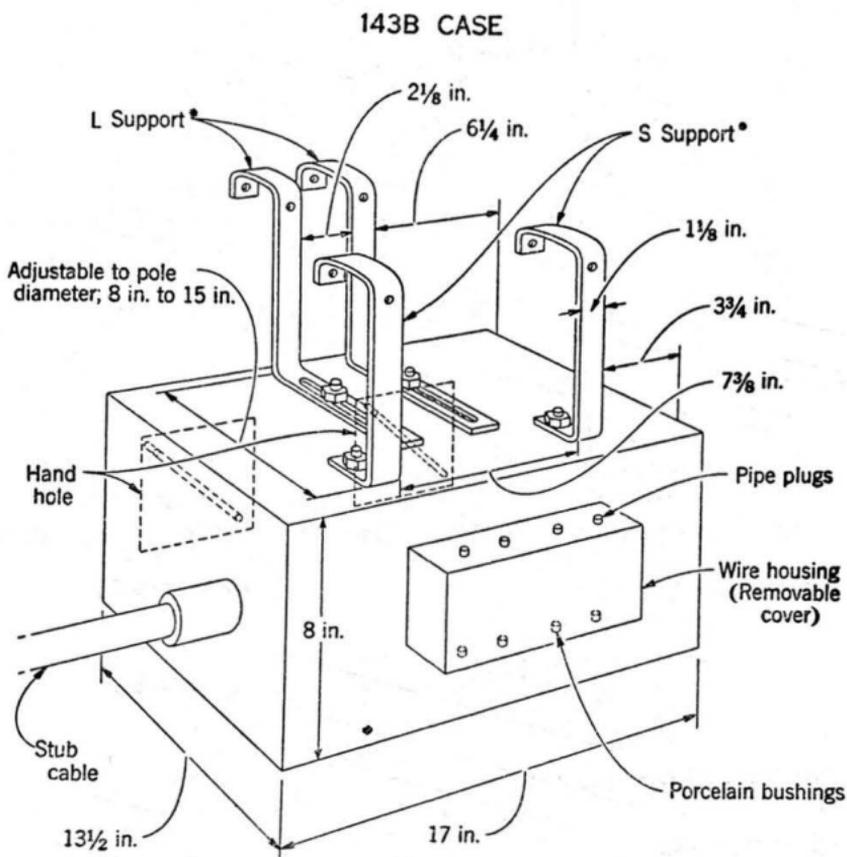


Mount terminal as nearly as practicable midway between the open wire pairs that are to be connected to the terminal. These pairs are not always adjacent pairs.



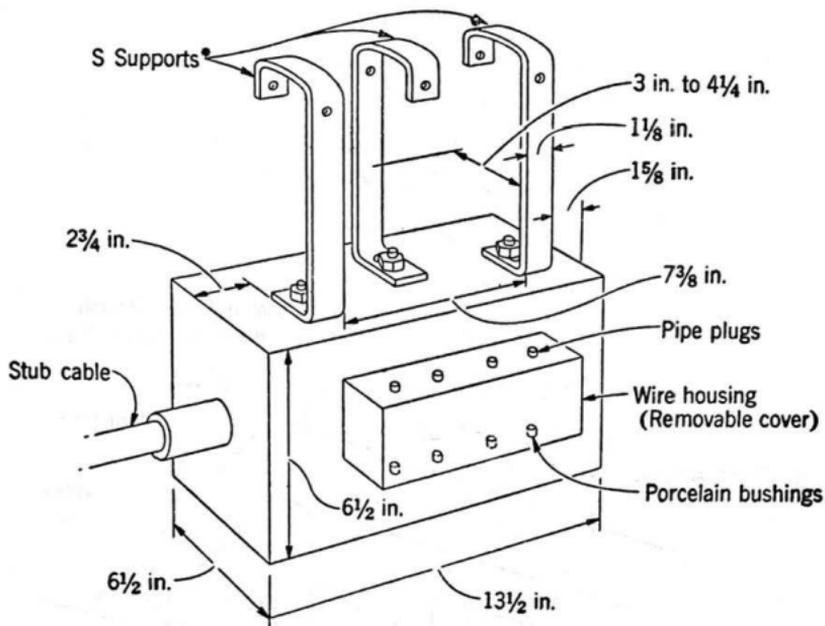
4. LOADING COIL CASES

4.01 Detail plans may call for placing 143B or 144B Loading Coil Cases, the principal dimensions of which are shown below.



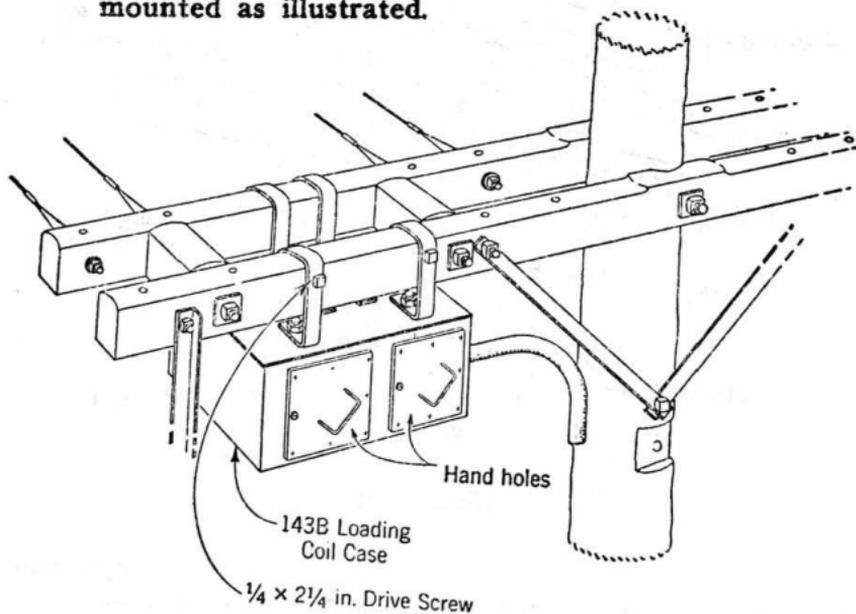
* L and S Supports are not supplied with case

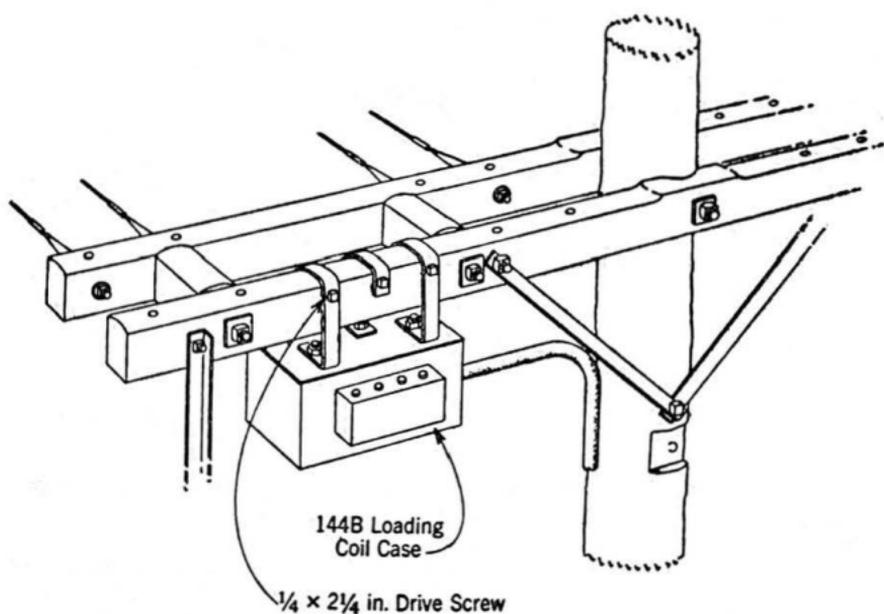
144B CASE



* S Supports are not supplied with case

4.02 The 143B and 144B Loading Coil Cases shall be mounted as illustrated.

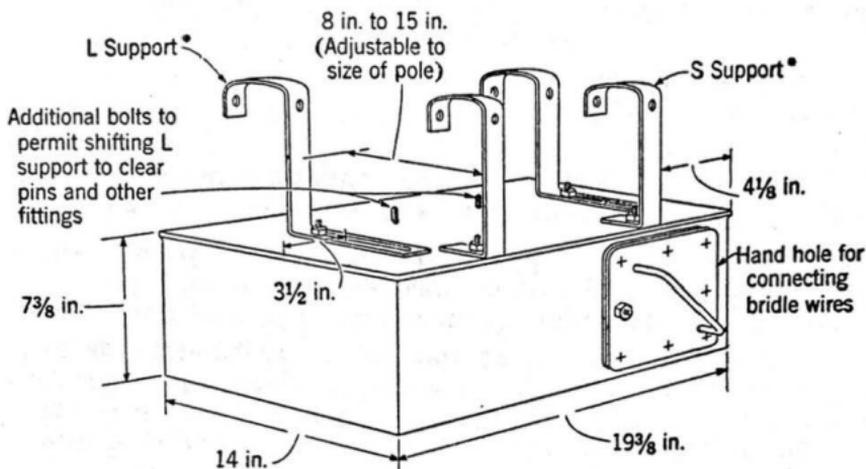




- 4.03 The loading coil cases should be mounted so that**
- (a) The stub cable feeds toward the pole or cable rack to which it is to be attached. Studs for attaching the L and S Supports are provided on the under side of the loading coil cases as well as on the side shown. The direction in which the stub cable feeds may be reversed by shifting these supports from one side of the case to the other.
 - (b) The wires will enter from the under side of the removable cover. If necessary interchange the positions of the pipe plugs and porcelain bushings.
- 4.04 The handhole on the 143B case is equipped with a replaceable gasket.**

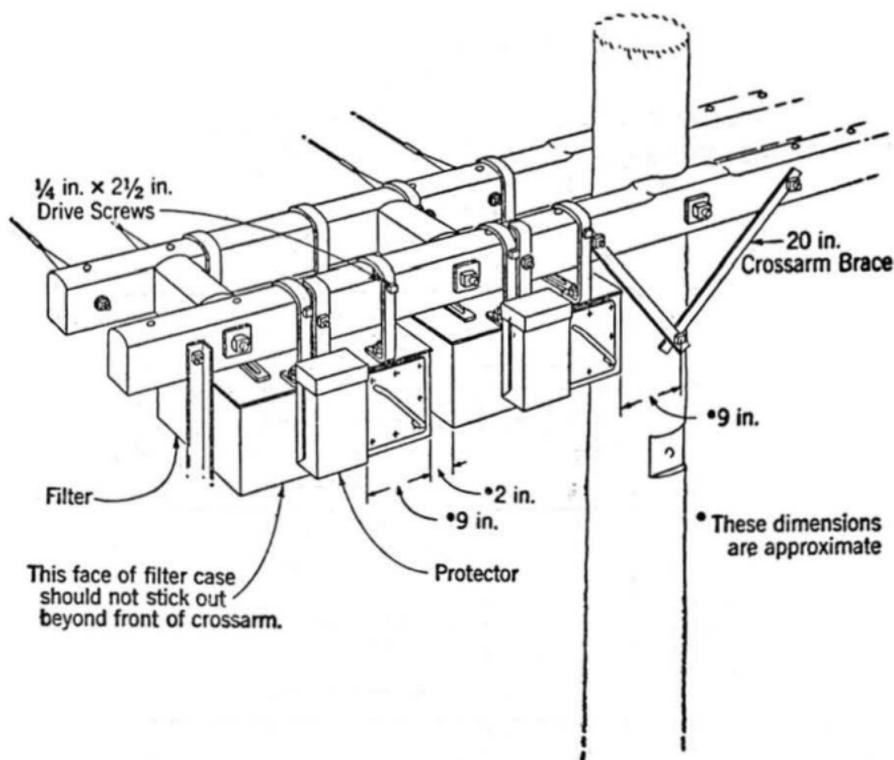
5. JUNCTION FILTERS

5.01 Detail plans may provide for placing Junction Filters. The principal dimensions of these filters and the method of mounting them are shown below.



Bottom of case may be removed to change connections to adapt filters to different sizes of cable pairs

* L and S Supports are not supplied with case



5.02 The bottom of the filter case, and the handhole cover are provided with replaceable gaskets. Use one P-470603 Gasket for each handhole; use one ES-62960 Gasket along each end of bottom of filter case and one ES-629621 Gasket along each side of bottom of filter case.

6. BRIDLING

6.01 Following are points to be observed in bridling wires used for carrier circuits.

- (a) Use single AL wire unless otherwise specified.
- (b) In the case of wires used for J carrier operation
 - (1) maintain as much separation as practicable between each two individual bridle wires. Use a separate ring run for each wire.
 - (2) choose locations for apparatus which will keep the amount of bridle wire in each circuit to a minimum.
 - (3) locate apparatus used for two pairs of wires so that equal amounts of bridle wire are required for each pair.

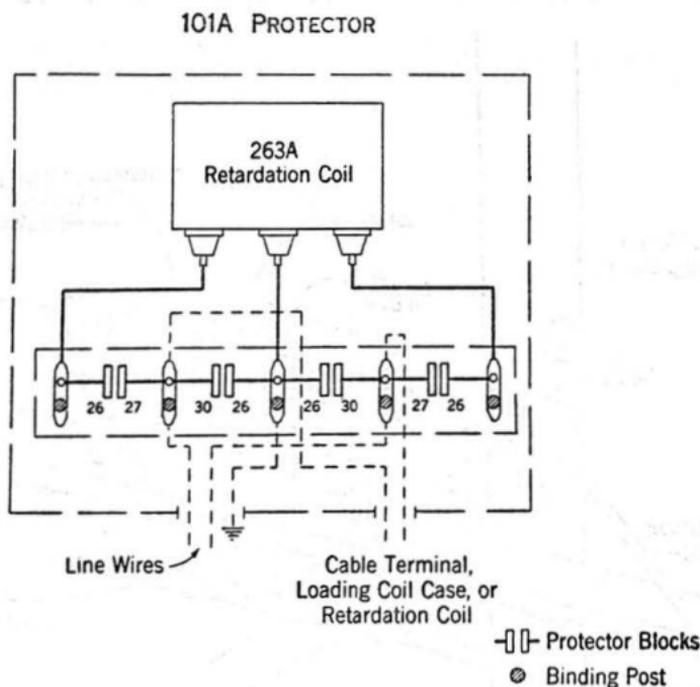
(4) changes in apparatus layouts which increase the amount of bridle wire should not be made without specific approval.

(5) solder all bridle wire connections in protector mountings, retardation coils, 143B and 144B loading coil cases, junction filters and other like equipment. Connections of C pairs which are on the same pole line as J pairs should also be soldered.

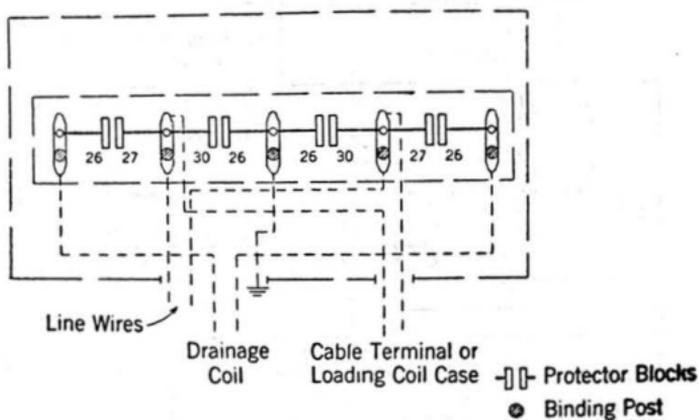
(6) use a separate wire entrance hole for each wire.

(7) use cable clamps, not bridle rings, for attaching wires to crossarms. The size of clamp used should be such that the bridle wire is held firmly in place on the pole and crossarm.

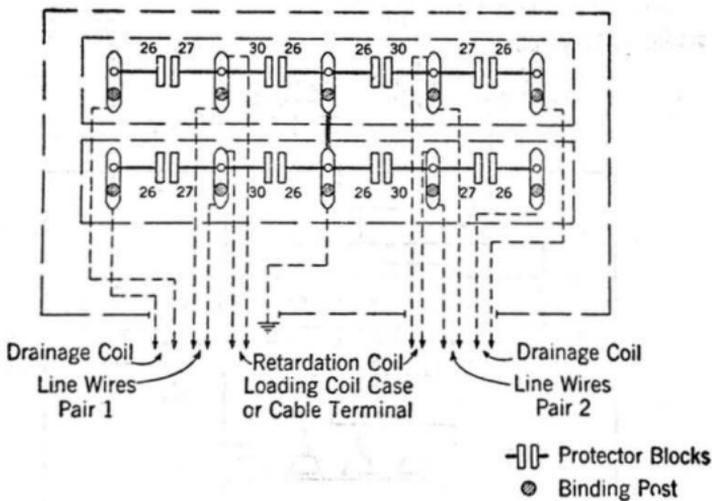
6.02 Wiring diagrams for the various retardation coils, protectors, and junction filters are shown below. These diagrams may be found inside the cover of protectors and retardation coils; on junction filters the wiring diagram is on the inside of the handhole cover.



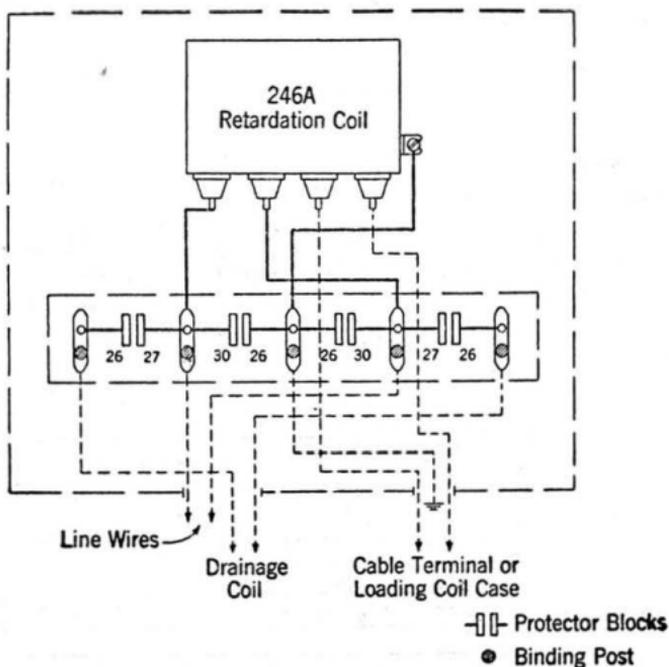
102A PROTECTOR



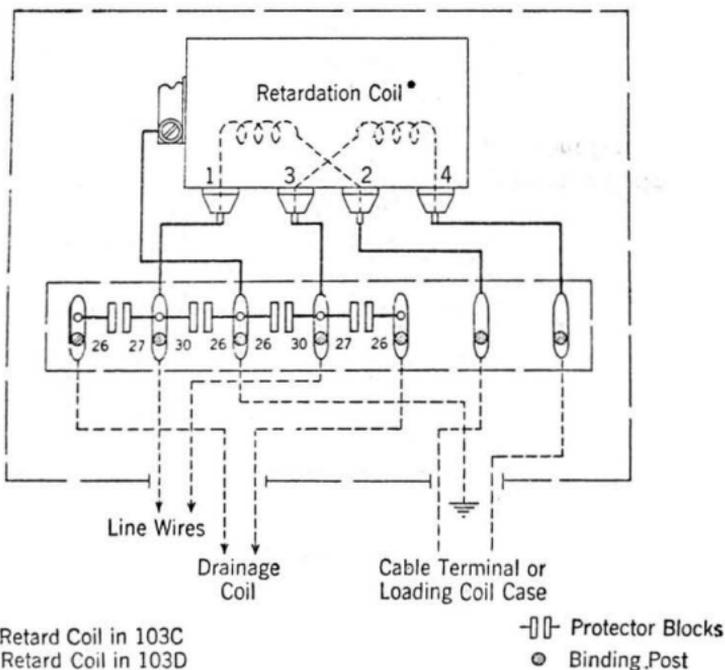
102B PROTECTOR



103A PROTECTOR

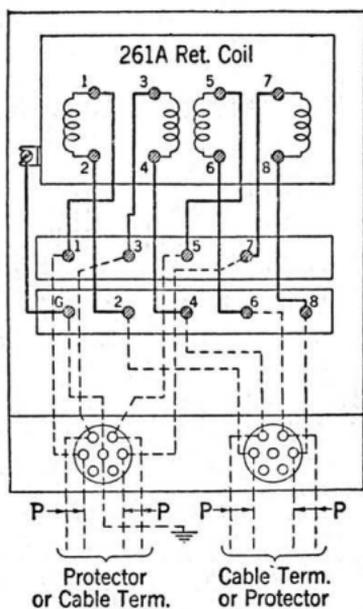


103C AND 103D PROTECTORS

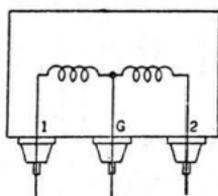


• 276A Retard Coil in 103C
276B Retard Coil in 103D

262A RETARDATION COIL



264A RETARDATION COIL



Leads 1 and 2 go
to protector
Markings are shown
on bottom of coil

JUNCTION FILTERS

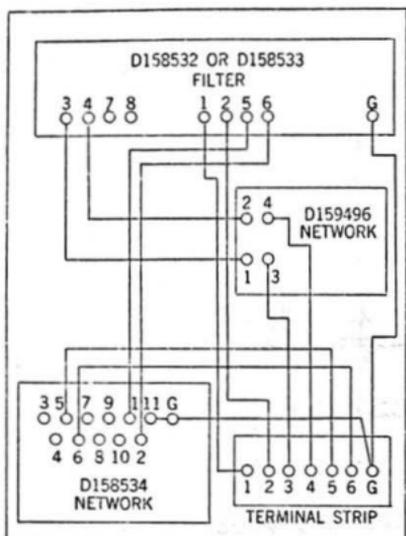


FIG. 1

CONNECTIONS FOR 16 GA. CABLE PAIRS

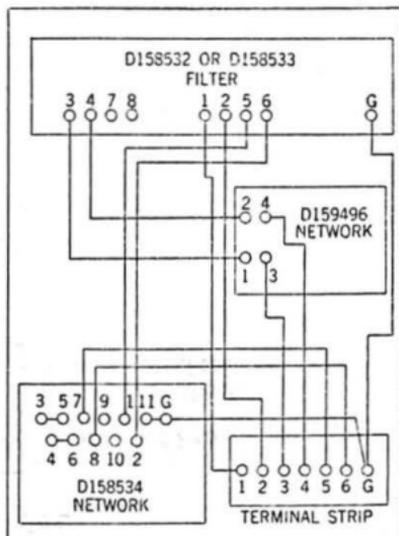


FIG. 2

CONNECTIONS FOR 13 GA. CABLE PAIRS

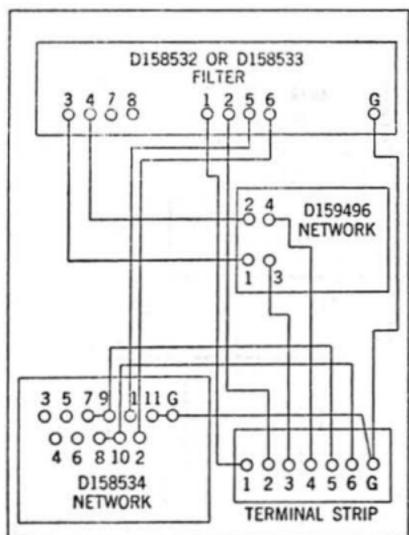


FIG. 3

CONNECTIONS FOR 19 GA. CABLE PAIRS

Filters when shipped have connections as shown in figure 1.

For use with 13 or 19 gauge cable pairs change connections as indicated in figure 2 or 3.

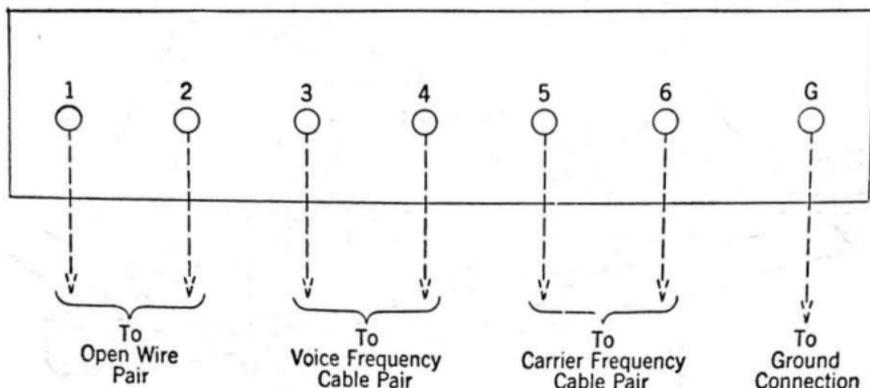
Connections are reached by removing bottom of filter case.

Changes should be made before installing the filter on pole.

Replacement of internal connections may be made with 20 gauge bridle wire.

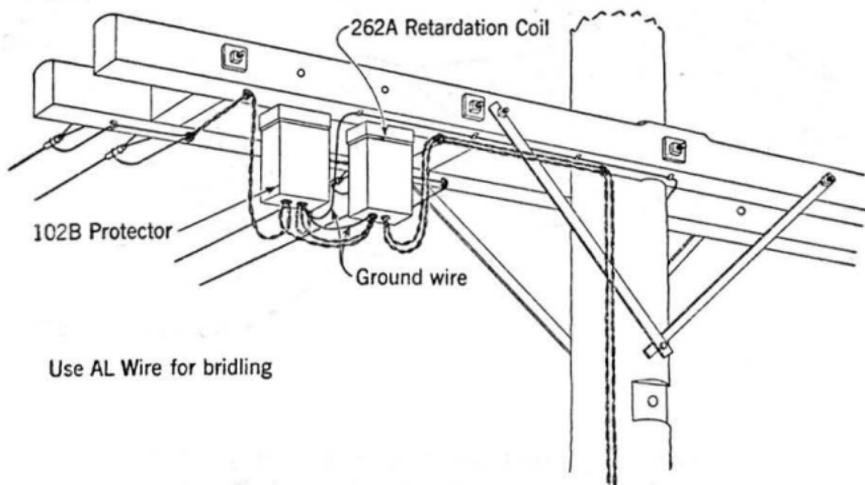
Bridle wire connections from a junction filter to open wire and cable pairs shall be made at the terminal strip of the junction filter as shown below.

JUNCTION FILTER TERMINAL STRIP

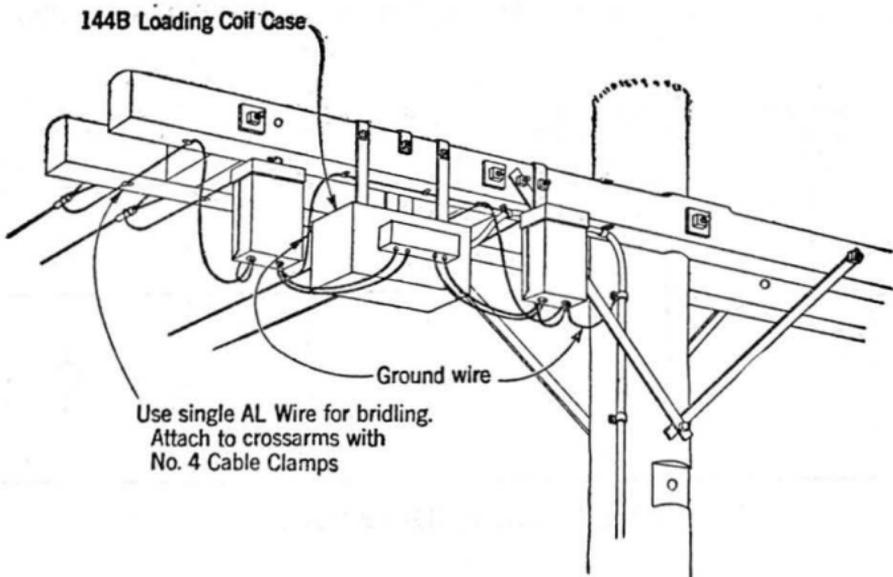
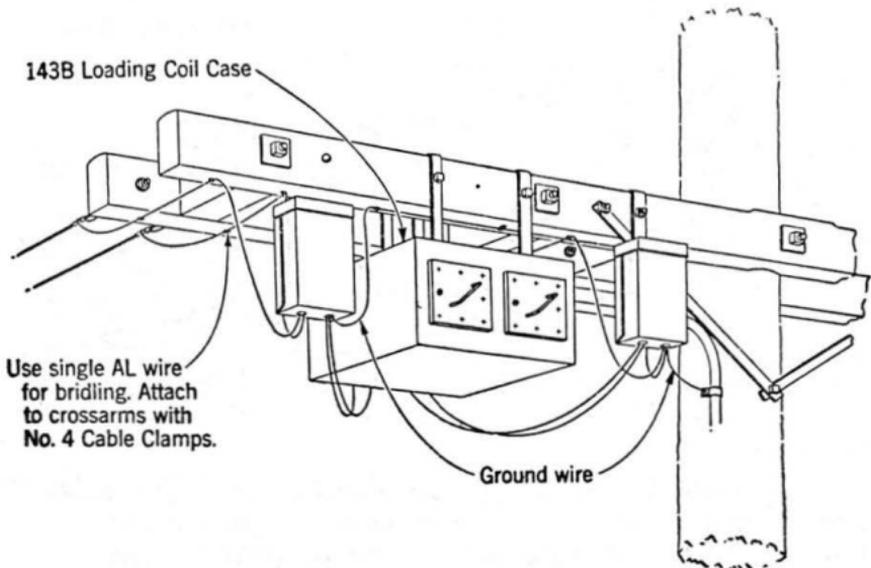


6.03 Some typical bridling arrangements are illustrated in the following sketches.

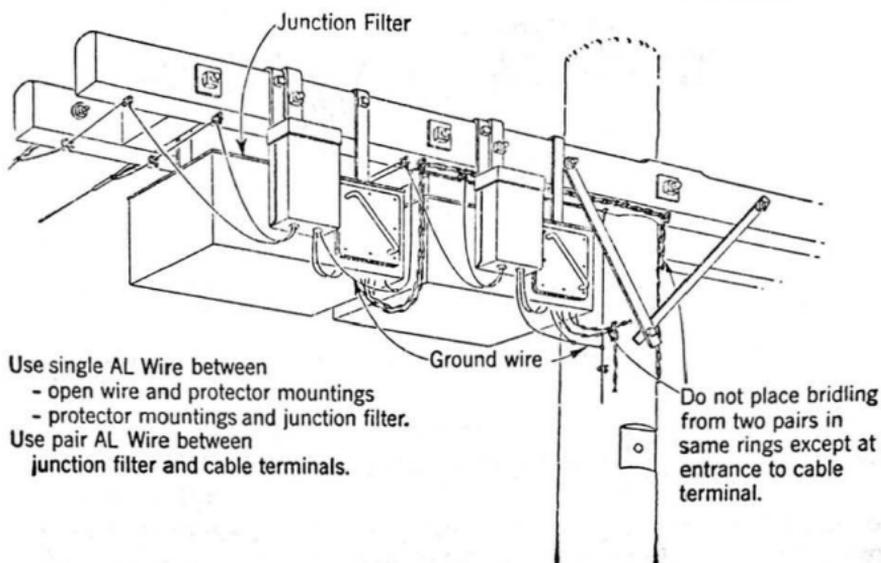
(a) Where 102B Protector and 262A Retardation Coil (or equivalent) are used on phantom pairs carried on the same pole line as pairs used for J carrier operation.



(b) Where 143B or 144B Loading Coil Case is used on pairs used for operation of Type J carrier.

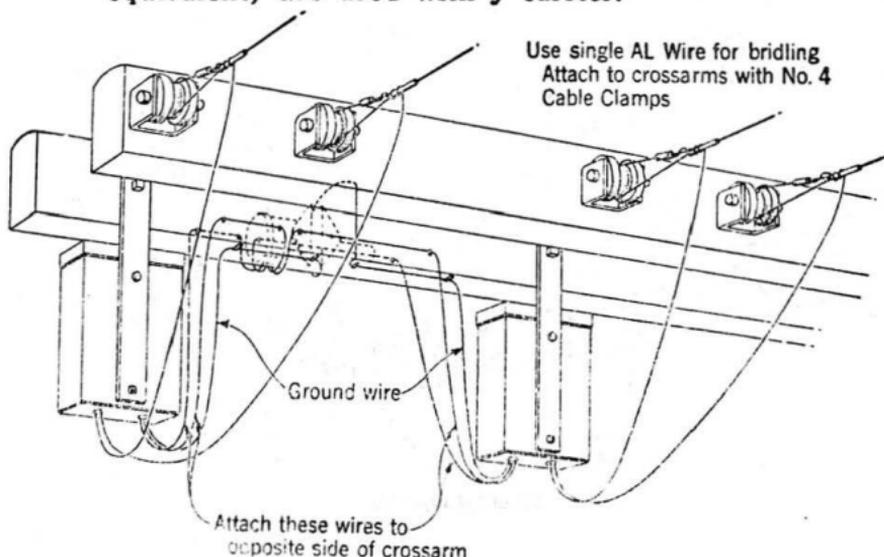


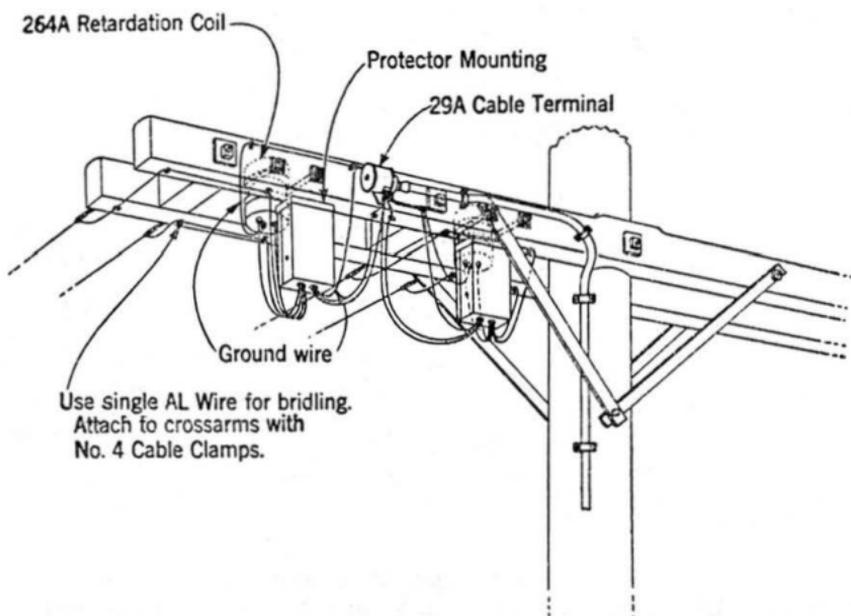
(c) Where junction filters are used with C carrier



When pairs used for J carrier operation are involved, an F Type Cable Terminal shall be mounted on or near the pole immediately below or just above the crossarms supporting the junction filters. See Paragraph 3.03 for method of mounting this terminal. Bridling for J carrier operation shall be run as indicated in Paragraph 6.01(b).

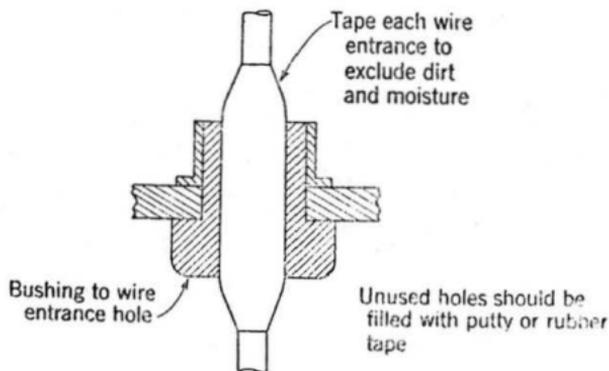
(d) Where 29A Cable Terminal and 103D Protector (or equivalent) are used with J carrier.





6.04 All wire entrance holes in junction filters, loading coil cases, and protectors should be plugged tightly to exclude dirt and moisture.

- (a) Wire entrance holes in protectors are generally filled with putty when shipped from the factory. Holes from which putty has been removed may be plugged, using small corks provided for 14 Type Cable Terminals, putty, or rubber tape.
- (b) Wire entrances in loading coil cases and junction filters shall be plugged as shown.



7. GROUND WIRE CONNECTIONS

7.01 Use AL Wire or No. 12 Solid R Wire for connecting ground plates to cable sheath or other ground connections.

7.02 Place the ground wire in accordance with the following:

- (a) Use one piece of wire without joints. Clean ends of wire, removing all traces of dirt, grease, or other foreign matter.
- (b) Ground wires from separate pieces of equipment may be connected with No. 5006 Fargo Connector.
- (c) Run as directly as practicable from ground plates to cable sheath or other ground connections.
- (d) Attach ground wire to poles or bottom of crossarms with Guy Staples or No. 4 Cable Clamps spaced about 18 in. apart.
- (e) Ground wires shall be connected to one of the following:
 - cable suspension strand. See G31.140.
 - 29A Cable Terminal. See Paragraph 3.04.
 - cable terminal stub. See G32.180.
 - casting of F Type Cable Terminal. See G32.180.