

ATTACHMENTS, FASTENERS, AND METHODS FOR RUNNING INSIDE WIRE AND CABLE

1.00 INTRODUCTION

This section identifies fasteners and methods generally employed in the installation of station wire, ground wire, and inside wiring cable in or on buildings.

2.00 GENERAL

Additional detailed information on methods for running station wire may be found in C Section entitled Selection of Route for Station Wire and Cable.

3.00 FASTENERS FOR STATION WIRE AND CABLE

3.01 When selecting station wire and cable fasteners:

- Use galvanized fasteners outdoors or where appearance is unimportant.
- Choose fastener color to match color of wire or cable indoors where appearance is important.

3.02 A *cable clamp* and a *cable clasp* are shown in Fig. 1. Table A indicates the fasteners to be used to attach cable clamps and cable clasps to various surfaces.

- Cable clamps and cable clasps are used for fastening cable or more than one station wire.

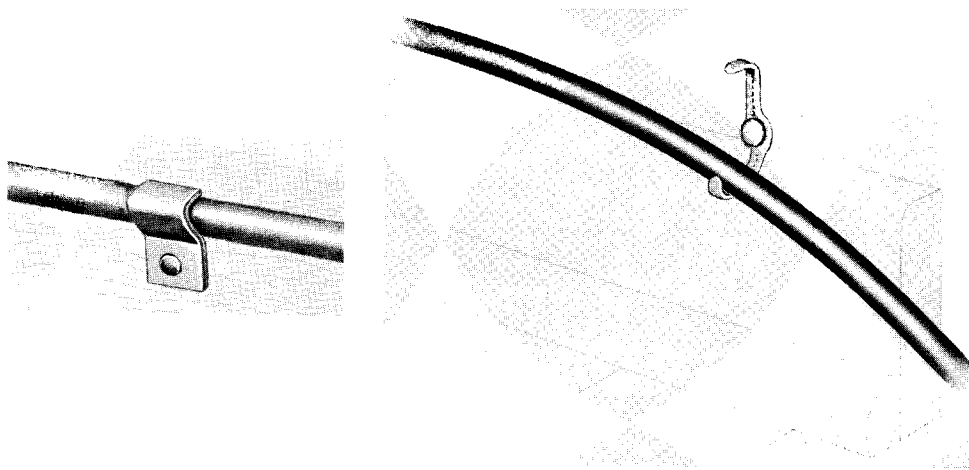


Fig. 1 — Cable Clamp and Cable Clasp

TABLE A
FASTENERS FOR CABLE CLAMPS AND CABLE CLASPS

Surface	Clamp No.	Clasp No.	Fastener	Remarks
	Color			
	Beige, Brown Ivory Galvanized	Beige Brown Ivory		
Woodwork	3 and 5	7	1-1/2 in. No. 6 RH blued wood screw or 1/2-in. inside wiring nail in hardwood or 7/8-in. inside wiring nail in softwood	No. 8 RH blued wood screws cannot be used without reaming the screw hole.
Woodwork Plaster on Wood Lath Plasterboard	6, 7, 8, 10, 12, 13, and 17*	9 and 14	1-1/2 in. No. 8 RH blued wood screw†	Inside wiring nail may be used to attach No. 9 clasp to wood.
Plaster on Wood Metal Lath, Plasterboard, Metal Sheathing	3 and 5	7	7/8-in. inside wiring nail or 3/8- or 5/8-in No. 6 self-tapping screw in metal	Place fasteners at stud locations or in solid wood backing. No. 8 RH blued wood screws cannot be used without reaming the screw hole. No. 6-D slating nail may be used to attach No. 9 and 14 clasps to studding if baseboard is not wood.
Metal Sheathing	6, 7, 8, 10, 12, 13, and 17*	9 and 14	3/8- or 5/8-in. No. 8 self-tapping screw in metal or 1-in. roofing nail	
Plaster on Masonry	3 and 5	7	P-210 drive pin or 1-1/2 in. No. 6 RH blued wood screw in 1-1/2 in. No. 6-8 screw anchor	
Plaster Block	6, 7, 8, 10, 12, 13, and 17*	9 and 14	P-210 drive pin or 2-in. No. 8 RH blued wood screw† in 1-1/2 in. No. 6-8 screw anchor	
Masonry	3 and 5	7	P-206 drive pin or 1-in. No. 6 RH blued wood screw in 3/4-in. No. 6-8 screw anchor	No. 8 RH blued wood screws cannot be used without reaming the screw hole.
	6, 7, 8, 10, 12, 13, and 17*	9 and 14	P-206 drive pin or 1-in. No. 8 RH blued wood screw† in 3/4-in. No. 6-8 screw anchor	A 3/16- by 7/8-in. hammer drive anchor may be used with No. 6, 7, 8, and 10 cable clamps.

* Washers are required under head of screw when No. 13 and 17 cable clamps are used.

† Use galvanized screws for galvanized clamps. For No. 13 and 17 clamps use No. 10 RH galvanized wood screws and No. 10-14 screw anchors.

TABLE B
FASTENERS FOR B STATION WIRING CLAMP

Surface	Color	Fastener
Metal or Asbestos Siding	Beige Brown Ivory Galvanized	5/8-in. No. 6 self-tapping screw
		5/8-in. No. 6 RH galvanized wood screw
Wood (Indoors)		5/8-in. No. 6 RH blued wood screw or Inside wiring nail
Wood (Outdoors)		5/8-in. No. 6 RH galvanized wood screw
Stucco (Wire and Paper Backing)		1-in. No. 6 self-tapping screw (cadmium plated) or wall screw anchor (correct size)

3.03 The *B station wiring clamp* is shown in Fig. 2. Table B indicates the fasteners to be used to attach these clamps to various surfaces.

3.04 *Staples* used for fastening jacketed wire do not have rust- and corrosion-resistant properties and are not to be used outside (see Fig. 3 and Table C).

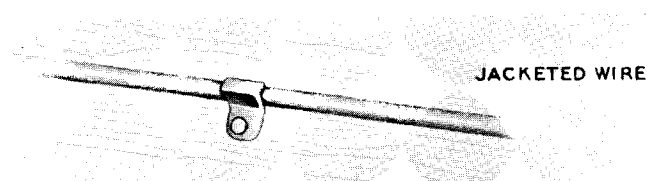


Fig. 2 — B Station Wiring Clamp

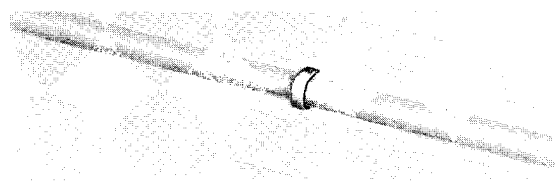


Fig. 3 — Staple

TABLE C
SELECTION OF STAPLES

Staple	Color	Stapler		Remarks
LP	Brown or Ivory	HELLER	T2	TM staples can be used in the M stapler.
M			M	
TM	Copper Oxide		TM	
L3B	Tin Finish	MARKWELL L3T		For use in hardwood.
L3M				For use in softwood.
L3D				
L3DTC				
3/8 in.	Zinc-tin Finish	ARROW T-25		For use in hardwood.
7/16 in.				For use in softwood.
9/16 in.				

Note: Staples are not recommended for use in plaster.

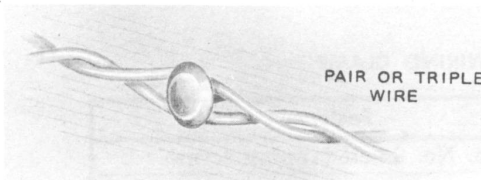


Fig. 4 — Inside Wiring Nail

3.05 Inside wiring nail (Fig. 4)

- The inside wiring nail is used generally to fasten GS-type and other types of twisted wire.
- It is available in brown, ivory, or beige.
- It is available in 1/2- and 7/8-inch sizes (use nail of sufficient length to fasten wire securely).

3.06 Inside wiring cleats (Fig. 5)

- Inside wiring cleats are used on surfaces where staples or inside wiring nails cannot be placed securely.
- They are fastened with a No. 8 RH blued wood screw of sufficient length to mount securely.

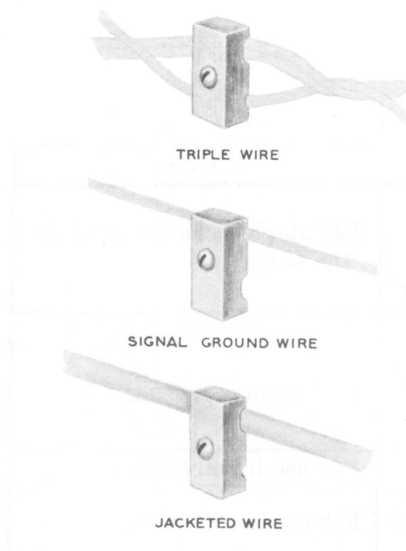


Fig. 5 — Inside Wiring Cleats



Fig. 6 — B Station Wiring Nail

3.07 B station wiring nail (Fig. 6)

- This nail is used to fasten jacketed station wire to plaster or wood surfaces.
- It is available in beige, ivory, or dark brown.
- It comes in 1/2- and 7/8-inch lengths.

3.08 B insulator support (Fig. 7)

- This support is used to fasten station wire and cable on metal structures.
- It may be equipped with M bridle rings.

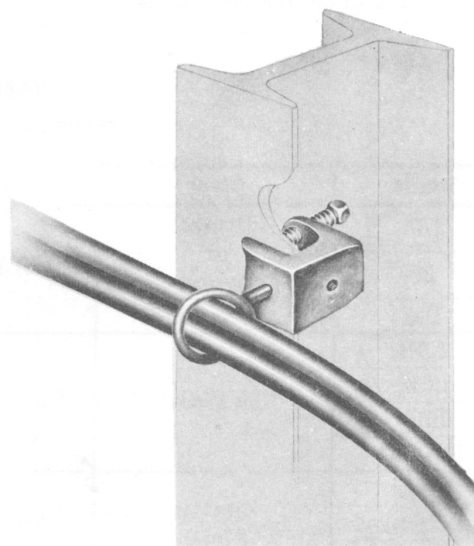
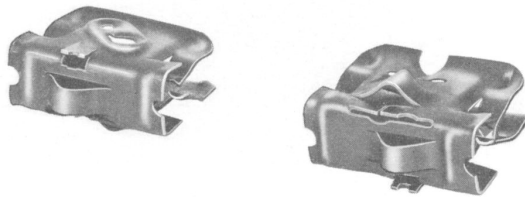
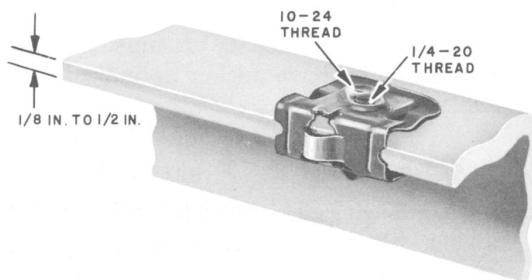
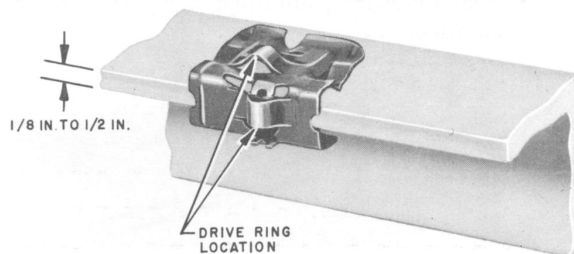
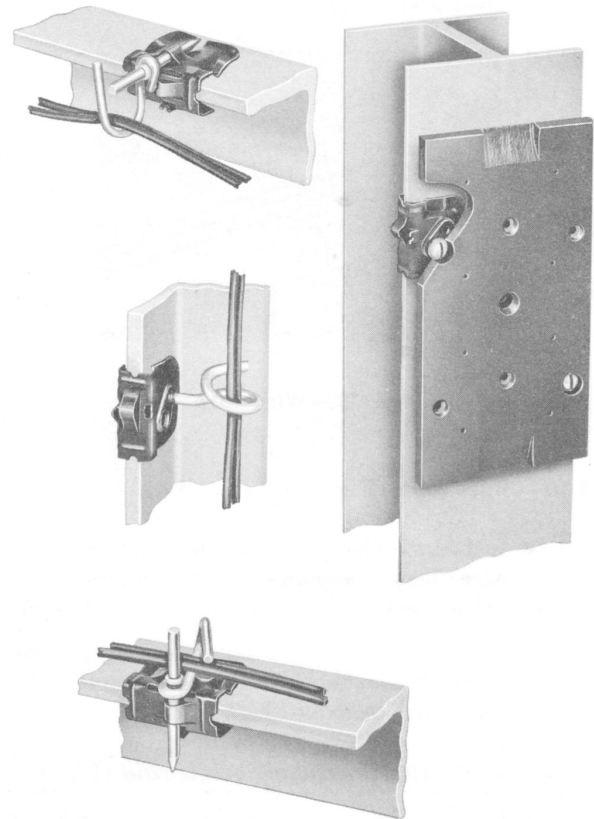


Fig. 7 — B Insulator Support

3.09 B beam clip (Fig. 8)

- This support is used at indoor locations to fasten station wire and/or cable on metal structures. The B beam clip may be installed on I beams, angle irons, etc, on beam thicknesses of from 1/8 inch to 1/2 inch, inclusive. It is an intermediate attachment and is not to be used as a first attachment for drop and block wire.
- Two holes are provided on one side of clip (Fig. 9). One hole accepts a 10-24 machine thread and the other a 1/4-20 machine thread. Clip may be equipped with, such material as M bridle ring, backboard, cable terminal box, etc.

**Fig. 8 — B Beam Clip****Fig. 9 — B Beam Clip, Top View****Fig. 10 — B Beam Clip, Bottom View****Fig. 11 — B Beam Clip, Installations**

- A projection is provided on the opposite side and base of clip to accommodate all sizes of drive rings except the 1/2-inch (Fig. 10).

THINK → Avoid personal injury by protecting eyes and hands when installing clip.

THINK → Ascertain that fastener mounted less than 8 feet above floor level does not present a hazard.

- To install, place open end of clip against flange and tap opposite corners of clip until seated firmly.
- Spacing of fasteners is indicated in Table H.
- Various installation arrangements for the B beam clip are shown in Fig. 11.

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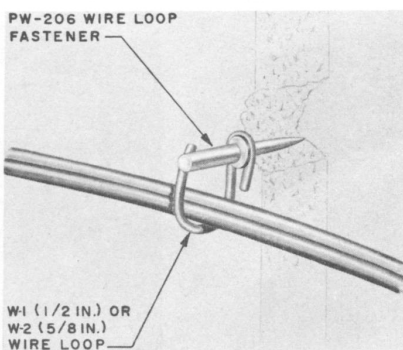


Fig. 12 — Wire Loop

3.10 Wire loop (Fig. 12)

- Install wire loops on masonry surfaces with wire loop fasteners by using the stud driver, see C Section entitled Stud Driver.
- Wire loops have the advantage over drive rings because they need no anchors. It takes less effort to drive them in masonry.

3.11 Bridle ring and toggle bridle ring (Fig. 13)

- Bridle rings are installed on brick or masonry surface with wood screw anchors.
- Toggle bridle rings are used to fasten station wire and cable to hollow surfaces.

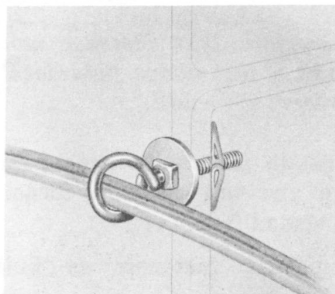
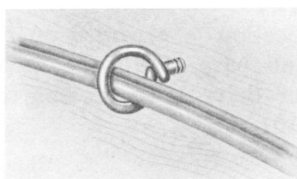


Fig. 13 — Bridle Ring and Toggle Bridle Ring

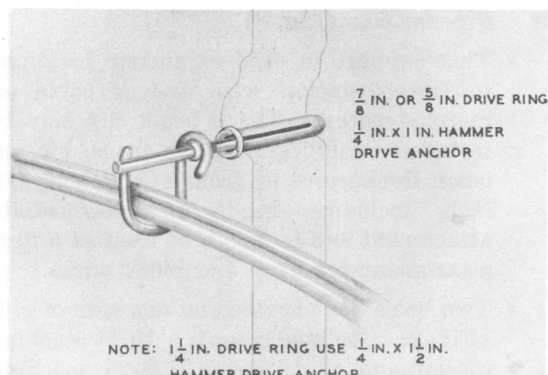


Fig. 14 — Drive Rings

3.12 Drive rings (Fig. 14)

- Install rings on brick or masonry surfaces with hammer drive anchor as indicated in Table A.

3.13 B adhesive clip (Fig. 15)

- The B adhesive clip is used to fasten station wiring where it is undesirable to mar surfaces.
- It is available in beige, ivory, or dark brown.
- Best adhesion is obtained on a clean, smooth surface.

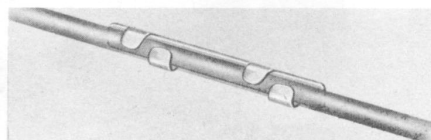


Fig. 15 — B Adhesive Clip

TABLE D
CAPACITY OF FASTENERS FOR CABLE

Size of Cable Pair	Clamp No.		Clasp No.
	Galvanized Cable Clamps For Lead-covered Cable	Beige Brown Ivory	Beige Brown Ivory
6	6	5	7
11	7		
12		6	7
16	8	8	9
21	10	8	9
25		8	9
26	10		
31	10		
41	13		
50		10	14
51	13		
75		12	14
76	13		
100		12	14
101	17		

- High temperatures may deteriorate B adhesive clips during storage; therefore, those not used before date on container should be tested for tackiness.

- Install B adhesive clip as follows:

1. Thoroughly moisten adhesive surface with trichloroethylene.
2. Allow sufficient time for adhesive to become tacky—about the consistency of fly paper.
3. Press clip to bonding surface for about 5 seconds.
4. Allow clip to set for 15 minutes.
5. Place station wire in clip and form tabs over wire.

3.14 *Capacity of fasteners* for cable and station wire is indicated in Tables D and E.

TABLE E
CAPACITY OF FASTENERS FOR STATION WIRE

Type of Wire		Capacity							
		Clamp No.					Clasp No.		W-1 Wire Loops and 1/2-in. Drive Rings
		5	6	7	8	10	7	9	
JK (Jacketed)	Paired	3	4	5	6	6	2	4	6
	Triple	2	3	4	5	6	2	3	5
	Quad		3	3	4	5	2	3	5
GS	Paired	4	6	8	9	10	3	6	10
	Triple	3	4	5	6	7	2	4	7
	Quad		3	4	4	5	2	3	5
D Block	Paired			3	4	5			4
	Triple				3	4			3

WALL SCREW ANCHORS

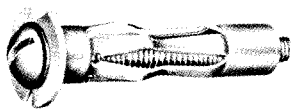


Fig. 16 — Molly and Star Anchor



Fig. 17 — Diamond Anchor

3.15 *The wall screw anchor* is used for attaching various items of station apparatus, inside wire, and cable to interior wall surfaces of hollow construction. They can be used in plywood, wallboard, masonite, and hollow plaster wall.

- A disposable wrench for use in facilitating anchor attachment on soft-textured walls is included in each box of Molly and Star anchors, Fig. 16.
- A wrench is not furnished with the Diamond anchor, Fig. 17.
- To obtain maximum holding power, the wall thickness should first be determined and then the correct size anchor should be selected. See Table F for selection.

TABLE F

SELECTION OF WALL SCREW ANCHORS

No.	Wall Thickness	Anchor Size	Drill Size	
			D and E	Masonry
inches				
1	Up to 1/2	1-1/2	1/4	1/4
2	5/8 to 3/4	2	1/4	1/4
3	3/4 to 1-1/4	2 (Fig. 12)	3/8	5/16
		2-1/4 (Fig. 13)		
4	1-1/4 to 1-3/4	2-1/2 (Fig. 12) *	3/8	5/16
5	1-1/4 to 1-3/4	3-1/2 (Fig. 12) †	1/2	7/16

* Size 2-1/2 in. anchors are used for light loads, eg, 554-type sets, etc.

† Size 3-1/2 in. anchors are used for heavy loads, eg, control unit for speakerphone.

3.16 *To install a wall screw anchor* after the proper anchor has been selected, proceed as follows:

1. Mark spot where anchor is desired.
2. Drill hole in wall corresponding to diameter of anchor body (see Table F).
3. Insert anchor, and tap anchor gently until cap prongs are embedded and cap is firmly set against wall surface.
4. Tighten screw while pressing firmly in order to prevent anchor from rotating.
5. In soft-textured walls it will be necessary to use wrench to hold the anchor body from rotating while turning the screw until the anchor is in its fully expanded position.
6. When anchor is fully expanded, remove screw and attach hardware. (There is some resistance to turning the screw when the anchor is fully expanded.)
7. Hold equipment in position; replace screw and tighten.

3.17 *The plastic anchor* is intended for use with wood screws when making attachments to masonry, see Fig. 18. Table G gives the sizes.



Fig. 18 — Plastic Anchor

TABLE G
SELECTION OF PLASTIC ANCHORS

Anchor Size	Wood Screw No.	Drill Size, Inch
10	8 or 10	3/16
12	10 or 12	1/4
16	14 or 16	5/16

3.18 *Spacing of fasteners for station wire and cable* is indicated in Table H. Where appearance is not a controlling factor, the spacing between the fasteners may be increased. If wire must be run across joists in cellars, fasten to each joist with staples or to every other joist when using drive rings.

TABLE H
SPACING OF FASTENERS FOR STATION WIRING AND CABLE

Fasteners		Spacing				
		Horizontal Run		Vertical Run		From Corner
		inches	feet	inches	feet	inches
Cable Clamps	more than 12-pair cable	16			4	2
	less than 12-pair cable	16		16		2
Cable Clasps	more than 12-pair cable	14			3	2
	less than 12-pair cable	14		14		2
B Adhesive Clips		12		12		2
B Station Wiring Clamps		16		16		2
Inside Wiring Nails		16		16		2
B Station Wire Nails		16		16		2
Inside Wiring Cleats		16		16		2
Staples		7-1/2		7-1/2		1
Bridle Rings			4		8	2 thru 8-1/2*
Drive Rings			4		8	2 thru 8-1/2*
Wire Loops			4		8	2 thru 8-1/2*
Toggle Bridle Rings			4		8	2 thru 8-1/2*
Insulator Supports			4		8	2 thru 8-1/2*
B Beam Clip			4		8	2 thru 8-1/2*

* When changing direction of wire or cable runs where wire loops, bridle rings, drive rings, toggle bridle rings, insulator supports, and B beam clips are used, the fasteners should be spaced to hold the wire or cable at approximately a 45-degree angle.

TABLE J
SIZES OF HOLES FOR STATION WIRE

Type of Wire		Wire Hole Sizes, Inch							
		Number of Wires							
		1		2		3		4	
		Not Taped	Taped*	Not Taped	Taped*	Not Taped	Taped*	Not Taped	Taped*
JK (Jacketed)	Paired	1/4	3/8	3/8	1/2	3/8	1/2	1/2	3/4
	Triple	1/4	3/8	3/8	1/2	1/2	3/4	1/2	3/4
	Quad	1/4	3/8	3/8	1/2	1/2	3/4	1/2	3/4
GS	Paired	1/4	3/8	3/8	1/2	3/8	1/2	3/8	1/2
	Triple	1/4	3/8	3/8	1/2	3/8	1/2	1/2	3/4
	Quad	1/4	3/8	3/8	1/2	1/2	3/4	1/2	3/4
D (Block)	Paired	3/8	3/8	1/2	1/2	3/4	3/4	3/4	3/4
	Triple	3/8	1/2	3/4	3/4	3/4	3/4	3/4	3/4

* Two layers of friction tape.

TABLE K
SIZES OF HOLES FOR STATION CABLE

No. of Pairs	Cable Hole Size, Inch		
	OUA	D Inside Wiring	
		Not Taped	Taped*
6	3/8	3/8	1/2
11	1/2		
12		3/8	3/4
16	5/8	3/8	3/4
21	5/8	3/4	3/4
25		3/4	3/4
26	5/8		
31	3/4		
41	3/4		
50		3/4	7/8
51	7/8		
75		7/8	1
76	1		
100		1	1-1/8
101	1-1/8		

* Two layers of friction tape.

4.00 SIZES OF HOLES FOR STATION WIRE AND CABLE

Tables J and K indicate the sizes of holes needed to accommodate various types and numbers of station wires and cables.

5.00 FASTENERS FOR GROUND WIRE

5.01 Fasteners for ground wire and their use are shown in Fig. 19.

5.02 Ground wire fasteners should be spaced and placed as follows:

- Space 24 inches apart on ordinary ground wire runs.
- Space 16 inches apart when wire is subject to displacement.
- Place on every beam when spanning beams.
- Place within 3 inches of wall when run parallel to wall on beams.

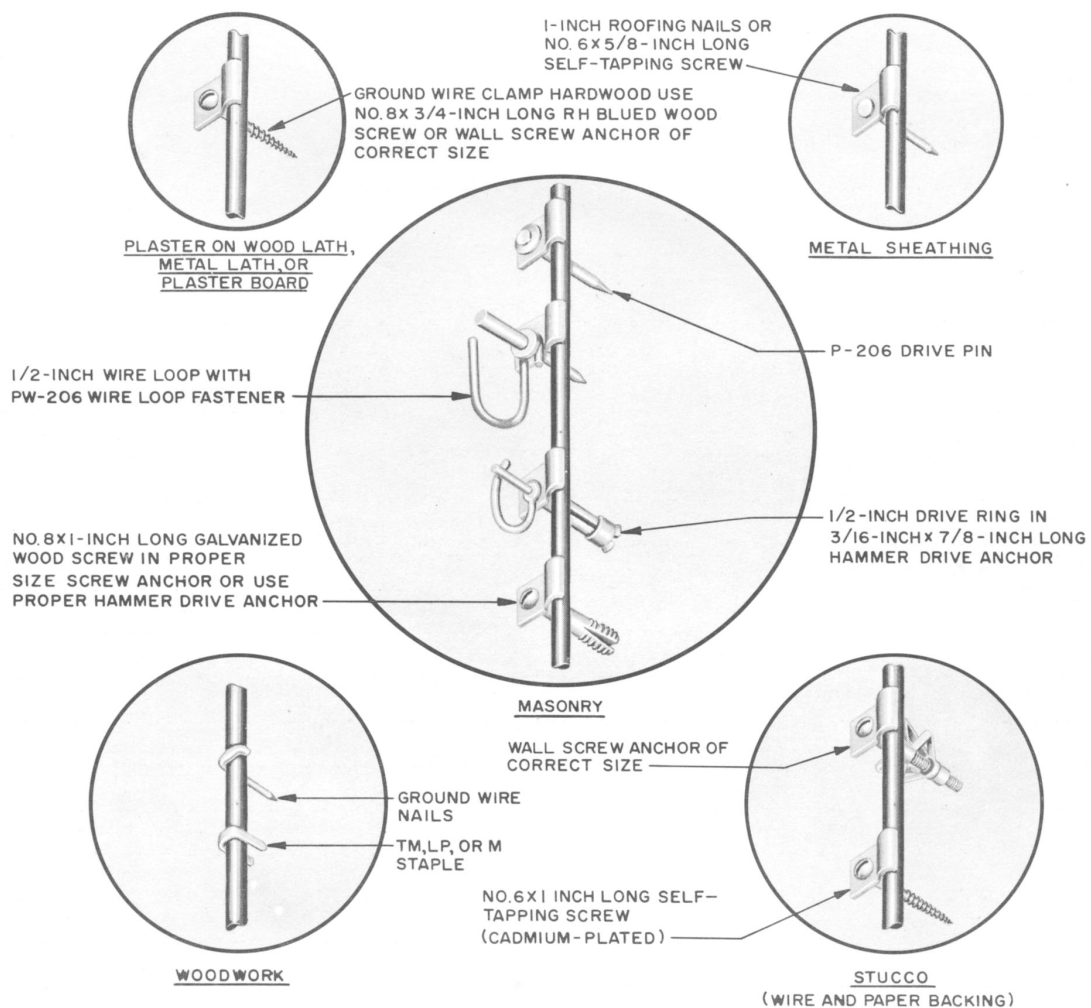


Fig. 19 — Fasteners for Ground Wire