STATION WIRE AND CABLE ATTACHING AND FASTENING

DESCRIPTION

CONTENTS PAGE

1. GENERAL

1.01 This section provides information for attaching and fastening station wire and cable. Attachments and fasteners should be selected depending on the surface encountered. Use galvanized fasteners outdoors and enameled or nongalvanized fasteners indoors. Plastic may be used either indoors or outdoors.

1.02 The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes.

- Add information on metal siding installations and on sticky backed fasteners
- Add information on the B baseboard clip, Fig. 7 and the B drive tie, Fig. 12.

1.03 Table A lists spacing of attachments and Table B clearance and lead holes for fasteners.

It is important to use correct size clearance and lead holes for wall fasteners to prevent wall damage and to obtain a secure fastening. To obtain secure attachments and to avoid damage to building surfaces, follow the instructions in this section for each type of surface.

1.04 The C wire loop replaces the B wire loop which is rated manufacture discontinued (MD) and will accommodate the same number of wires or cables.

1.05 The B adhesive clip is rated MD. Any existing stock is outdated and should be disposed of according to local regulations.

2. SURFACES ENCOUNTERED

TABLE A

SPACING REQUIREMENTS OF ATTACHMENTS

FASTENERS		SPACING				
		HORIZONTAL		VERTICAL RUN		FROM CORNER
		FEET	INCHES	FEET	INCHES	INCHES
Cable Clamps	more than 12-pair cable		16	4		2
	less than 12-pair cable				16	
Cable Clasps	more than 12-pair cable		14	3		
	less than 12-pair cable				14	
B Masonry Clips						
B Station Wire Clamps			16		16	
B Station Wire Nail						
B Wallboard Clamp						
B Baseboard Clip						
Staples	Station Wire		7-1/2		7-1/2	1
	25-pair D inside wiring cable		12		12	2
Bridle Rings		4		8		2 through 8-1/2*
Drive Rings						
Wire Loops						
Toggle Bridle Rings						
Insulator Supports						
B Support Clip	Used on Beams					
	Used on Hanger Wires	As Required				
E Adhesive Cable Tie						

* 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 B

CLEARANCE AND LEAD HOLES FOR FASTENERS AND SCREW-TYPE FIXTURES

FASTENER OR FIXTURE	CLEARANCE HOLE			LEAD HOLE		
	SIZE AND TYPE OF DRILL (NOTES 1 AND 2)					
	INSTALLER (NOTE 3)	POINT (NOTE 4)	CARBON STEEL TWIST (NOTE 5)	INSTALLER (NOTE 3)	POINT (NOTE 4)	CARBON STEEL TWIST (NOTE 5)
	INCHES					
Toggle Bolt 3/16	Clearance Hole 1/2 or 5/8					
1/4	5/8 or 3/4					
5/16	5/8 or 7/8					
Toggle Bolt Ring 5/8 and 1-1/4	3/4					
S and L Insulated Screw Eyes	3/16 by 5-1/2		No. 12 or 3/16		3/32	No. 42 or 3/32
C Bridle Rings 1-1/4—1-5/8—3					1/8	No. 30 or 1/8
7/8					3/32	No. 42 or 3/32
Drive Rings 5/8 and 7/8					3/32	No. 42 or 3/32*
1-1/4					11/64	
Angle Screw 5/16†	5/16 by 7-1/2		5/16		11/64	No. 18 or 11/64
3/8†	3/8 by 8		3/8	1/4 by 6-1/2		1/4
Tapping Screw‡ No. 7		11/64	No. 20		5/64	
No. 8†		No. 13	11/64		3/32 or No. 33	
No. 10†	3/16 by 5-1/2		No. 12 or 3/16		3/32	No. 42 or 3/32
No. 14†	1/4 by 6-1/2		1/4		1/8	No. 30 or 1/8

See notes and footnotes at end of table.

TABLE B (Contd)

CLEARANCE AND LEAD HOLES FOR FASTENERS AND SCREW-TYPE FIXTURES

FASTENER OR FIXTURE	CLEARANCE HOLE			LEAD HOLE		
	SIZE AND TYPE OF DRILL (NOTES 1 AND 2)					
	INSTALLER (NOTE 3)	POINT (NOTE 4)	CARBON STEEL TWIST (NOTE 5)	INSTALLER (NOTE 3)	POINT (NOTE 4)	CARBON STEEL TWIST (NOTE 5)
	INCHES					
B and C Masonry Fasteners	The maximum holding power of these anchoring devices in any given quality of masonry depends upon obtaining a drilled hole corresponding to the outside diameter of the unexpanded anchor and of sufficient depth to allow the nail to be driven its full length. The diameter and length are generally indicated on the anchor. The depth of hole required varies with the thickness of the fixture to be installed at the point of support. In all installations, the minimum depth of hole required is equivalent to the length of the anchor plus the distance the nail or screw will extend beyond the anchor (approximately 3/16 inch).					
B, C, and D Drive Anchors						
B and C Plastic Anchors						
D Plastic Anchor						
B Wall Screw Anchor						

Note 1: Use L masonry drills for drilling the seam between bricks.

Note 2: Use L masonry drills or star-faced stone drills in drilling holes for toggle bolts. Two sizes of holes are listed to cover the different types of approved toggle bolts. Drill the smaller hole if it will accommodate the toggle bolt.

Note 3: Installer drills are bit stock twist drills and are used in the ratchet brace.

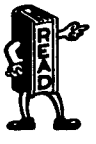
Note 4: Drill points are used in the automatic drill and will drill lead holes approximately 1-1/2 inches deep. Where deeper holes are required, use twist drills in the hand drill.

Note 5: Carbon steel twist drills are straight shank drills and are used in the hand drill.

* Do not drill lead hole in poles.

† Apply paraffin wax or soap to the threads of wood screw or screw-type fixtures to facilitate turning them into wood.

‡ Tapping screws have an AB thread suitable for sheet metal or wood and are available with flat or pan head.



Before fastening to any surface consideration should be given to any damage which may occur to the surface during installation or future removal of the fasteners.

A. Cement or Cinder Block

2.01 Recommended fasteners are as follows:

- B or C masonry fasteners
- B or C plastic anchors
- B, C, or D drive anchors
- D plastic anchors (used with galvanized wood screws)
- B masonry clips.

2.02 If the wall is old and the fastener is not secure, or where considerable weight is involved, use toggle bolts and B wall screw anchors.

B. Masonry or Substantial Brick Veneer

2.03 In general, the same fasteners apply in making attachments to masonry and substantial brick veneer. Veneering is considered substantial when the veneer thickness is 3-3/4 inches (as ob-

served at an outside corner) and the bricks are joined firmly with mortar.

▶***Note:*** If at all possible avoid fastening to brick veneer surfaces.◀

2.04 On masonry and substantial brick veneer, drill holes for all attachments as close to the center of bricks as practicable and exercise care to avoid damaging and loosening the bricks. In the case of face brick or ornamental types of brick, holes for intermediate and last attachments may be drilled in the seam to avoid breakage. Wear safety goggles when drilling or hammering.

C. Thin Wall Brick Veneer

2.05 Thin wall brick veneer is considered as veneering having a thickness of less than 3-3/4 inches (as observed at an outside corner, some corners are mitered) or having bricks that loosen or crack easily when drilled. Make attachments to thin wall veneering as follows:

(a) ***First Attachment:*** Attach to suitable woodwork with galvanized wood screws. When suitable woodwork is not available, attach to the brick veneer surface by drilling a clearance hole in the seam to permit a galvanized wood screw to be passed through the brick portion of the wall and screwed into the wood backing or studding. The screw should penetrate at least 1-inch into the wood backing or studding.

(b) ***Intermediate and Last Attachments:*** Attach to brick veneer with suitable anchoring device. Drill holes in center of bricks; if bricks begin to crack or loosen, make the attachments in seams or to wood trim. On slab-type veneering (approximately 1-inch thick), secure intermediate and last attachments to the wood backing in the manner specified for first attachments.

D. Wood

2.06 Staples, ▶B drive ties,◀ galvanized wood screws, tapping screws, or nails are generally the standard fasteners on wood; however, B wall screw anchors, B and C plastic anchors, or toggle bolts are recommended as fasteners on plywood and masonite when a more substantial fastener is needed for heavier apparatus. The B masonry clips are also acceptable fasteners on wood surfaces.

2.07 On woodwork, drill lead holes for fasteners and screw-type fixtures to avoid splitting the wood and to obtain maximum holding power. Locate fasteners in studding where practicable.

2.08 Studs in buildings of wood frame construction may usually be located by one of the following methods:

(a) Buildings finished with clapboards by location of heads of nails used in fastening clapboards to studding, or where clapboards join.

(b) Buildings finished with shingles or stucco by sounding, locating studs in cellar or attic, and location of heads of nails used in fastening trim to studding.

E. Stucco on Wood

2.09 On stucco on wood building, attach to substantial wood trim with galvanized wood screws. Where required to install fixtures on stucco finished walls, drill a clearance hole for tapping screw or screw-type fixture, preferably by means of an installer drill in a ratchet brace. If there is a wood backing, the spring of a hammered drill will knock the stucco loose. Use care to avoid cracking the stucco. Locate screws in studding where practicable.

F. Plaster on Lath or Rock Lath, Dry Wall, or Plasterboard

2.10 Plastic anchors, B wall screw anchors, or toggle bolts are used to make attachments. However, when a substantial fastener is required for heavier apparatus, it will be necessary to locate the studding as in paragraph 2.08 and use tapping screws. The holding power of hollow wall fasteners is such that any movement or shifting of weight tends to loosen them. This must be considered at all times so that costly maintenance and hazards are not built into plant. If wood lath is used under plaster and can be entered by a slanting lead hole, a secure attachment can usually be made. Locate the lath before drilling the attachment hole.

2.11 The B wallboard clamp is used to attach jacketed station wire (D), inside wiring cable, and customer convenience cords to the dry wall or plasterboard surface.

G. Rigid Composition Shingles

2.12 In general, galvanized wood screws are required in making attachments through com-

position shingles. ▶Other screws may leave a rust mark on the shingles.◀

2.13 On buildings finished with rigid composition shingles, make attachments to substantial wood trim where practicable. If suitable wood trim is not available, locate the clearance holes for fasteners on the shingles as outlined in the following:

(a) Rectangular shaped shingles installed with the long dimension horizontal: Locate the hole midway between the vertical edges of the shingle and approximately 3/4-inch above the bottom edge.

(b) Rectangular shaped shingles installed with the long dimension vertical: Locate the hole at the midpoint of the visible shingle height and approximately 3/4-inch from either vertical edge.

(c) Shingles installed in diamond formation: Locate the hole near a nail hole and approximately 3/4-inch from either exposed edge of the shingle.

2.14 ***Warning: Rigid composition shingles may be damaged.*** Because of the brittleness of rigid composition shingles, and where mounting of attachments cannot be avoided, the following precautions shall be observed:

(a) Place ladder carefully against the shingles.

(b) Use only well sharpened drills.

(c) Never employ drills which require the use of a hammer on composition shingles.

(d) Do not apply excessive pressure to the brace when drilling clearance holes through the shingles.

(e) Wood screws should not be tightened excessively as the pressure on the shingle might cause it to break.

H. Metal Siding

2.15 ***DANGER: It is possible for foreign voltage to be present on buildings or mobile homes covered with metal siding.*** Test siding with B voltage tester or 188A test set. ▶(Paragraphs 2.16 through 2.18.)◀ Refer to Section 081-705-101 for use of the B voltage tester or Section 081-705-102 for the 188A test set.

2.16 ▶Aluminum siding requires special consideration. The customer should be contacted to determine the type of siding, method used to install it, and the type of materials (wood, composition, or masonry) underneath the aluminum siding. This will determine type of fastener or attachment to be used. Permission should be obtained at this time for proposed wire runs and any holes required. The preferred arrangement is to use fasteners which do not require holes to be drilled.◀

2.17 Be sure protrusion of fasteners will not cause damage or injury. Fasteners for siding can be of the following variety: tapping screw, B or C plastic anchor, toggle bolts, B wall screw anchors, or B siding clip (Fig. 1). ▶If the fasteners are to penetrate the under siding for strength, use the appropriate fastener required by the underlay.◀

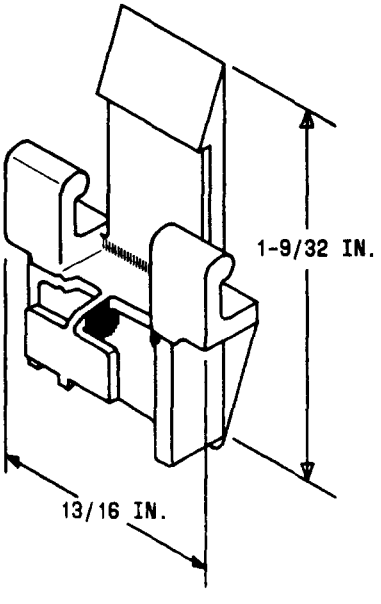


Fig. 1—B Siding Clip

2.18 When using an extension ladder against metal, vinyl, or aluminum siding, use a B ladder pad to prevent damage.

I. Metal Paneling or Desks

2.19 Be sure protrusion of fasteners will not cause damage or injury. Fasteners for paneling or desks can be of the following variety: tapping screw, B or C plastic anchor, toggle bolts, B wall screw anchors, or B or C cord clips. The B and C cord clips are shown in Fig. 2 and 3. ▶Permission from the customer is required before drilling any holes in metal paneling or desks.◀

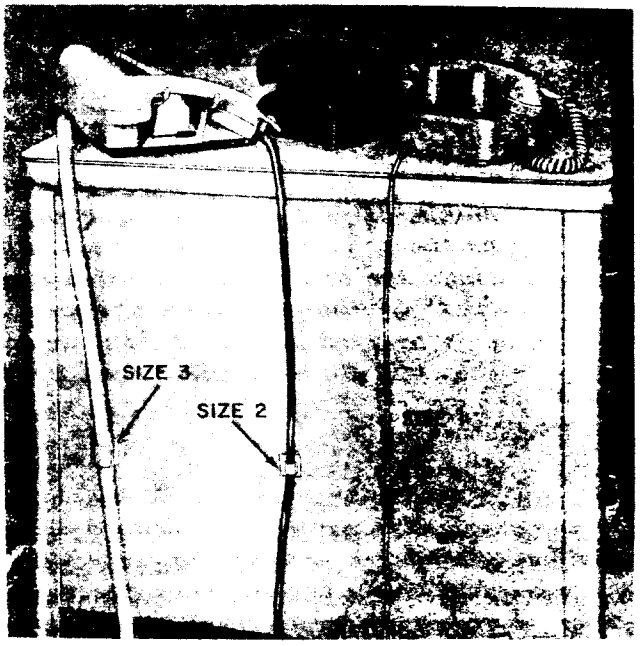
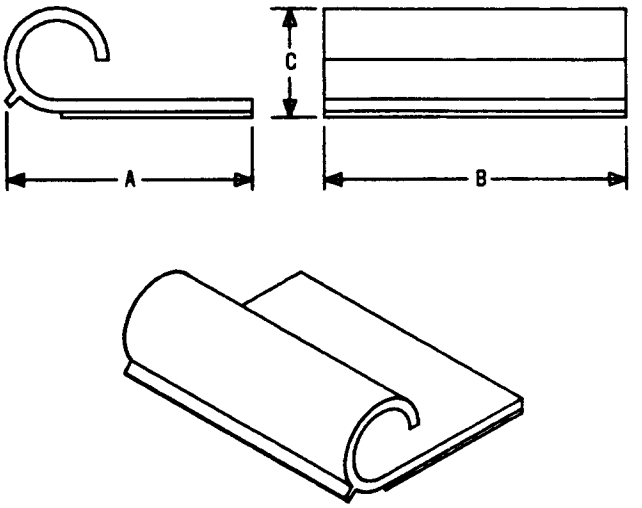


Fig. 2—B Cord Clip

2.20 ▶Always ensure that the surface on which sticky backed clips are used (paragraphs 2.21 through 2.23) will not be damaged when clip removal is required.◀

2.21 The B and C cord clips are made of molded plastic and can be used to fasten wire and cable or mounting cords to a clean, dry surface. The clips are attached by the use of double-sided pressure sensitive backing.



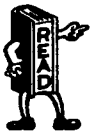
SIZE	DIMENSIONS (INCHES)			MAX. WIRE SIZE
	A	B	C	
C1	1	1	5/32	1/8
C2	21/32	1-1/4	3/8	3/16
C3	1	1-1/2	3/8	1/4
C4	1-7/32	1-25/32	15/32	5/16
C5	1-7/32	2	1/2	3/8
C6	1-13/64	2-17/64	1-11/32	1/2

Fig. 3—C Cord Clip

2.22 The B cord clip (size 1) provides a means of attaching D station wire to 2012-type transformers to prevent accidentally pulling the wire from the transformer screw terminals. ▶The B cord clips come 10 to a package and can be ordered as: Clip, Cord, B1-61 (one package).◀

2.23 Remove protective paper from adhesive of B cord clip and stick clip to bottom of 2012-type transformers as shown in Fig. 4. Terminate D station wire on screw terminals of 2012-type transformer and hook station wire through B cord clip as shown in Fig. 4.

3. ATTACHMENTS USED IN FINISHED ROOMS AND OFFICES



Choose color of attachment to match wire or cable; refer to Table A for spacing requirements.

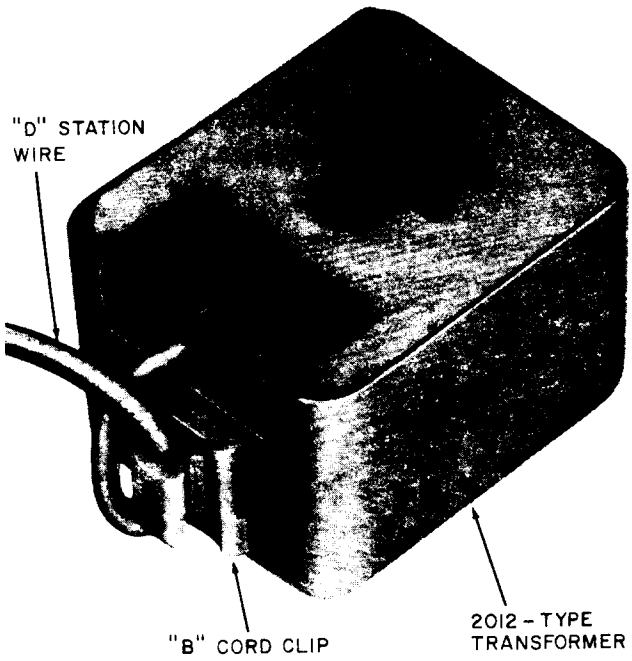


Fig. 4—Cord Clip Used to Secure Station Wire to 2012-Type Transformer

A. Staples

3.01 Table C shows the staples recommended for wood surfaces with finishes available and stapler machine used. Staples H (zinc or ivory), J, or G are available.

B. B Station Wire Nail

3.02 This nail is used to fasten station wire to plaster or wood surfaces. It can be used with D station wire if care is taken to ensure that the smaller diameter wire is sufficiently secured by the arm of the nail.

C. B Station Wire Clamp

3.03 This clamp is used to support station wire. Table D lists fasteners to be used with clamps.

D. Cable Clamps and Cable Clasps

3.04 These attachments are used to support inside wiring cable or one or more station wires. Table E lists fasteners to be used with clamps and clasps.

E. B Wallboard Clamps

3.05 This clamp (Fig. 5) is used to support station wire (D), inside wiring cable, and customer convenience cords. Refer to Fig. 6 for installation procedures for the B wallboard clamp.

▶F. B Baseboard Clip

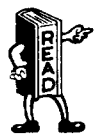
3.06 The B baseboard clip AT-9031 (Fig. 7) is used to support D station wire along moldings. The clip is depressed between the wall and the baseboard using either thumb pressure or a screwdriver.◀

4. CELLARS, FACTORIES, OR WHERE APPEARANCE IS GENERALLY LESS IMPORTANT

In general, the same types of attachments used in finished rooms apply for cellars, factories, or where appearance is unimportant. However, they should be of an appropriate finish. In addition to these attachments, drive rings, C wire loops, B masonry clips, and toggle bridle rings are also available for use at these locations. Drive rings should only be used above a height where they will not be a safety hazard.

A. Drive Rings

4.01 Drive rings are formed steel loops having a pointed shaft suitable for hammer-driven attachment to wood or masonry surfaces (masonry surfaces require D drive anchors). Drive rings should be used above a 6-foot height to avoid injury. Below the 6-foot height bridle rings or B drive ties can be used.



The B masonry clips or wire loops with B masonry fasteners are preferred over drive rings in masonry surfaces because the fasteners are driven directly into the masonry surface without a predrilled hole. They also do not have any protruding sharp surfaces to cause injury or damage.

B. B Masonry Clips (Fig. 8)

4.02 The B masonry clips are clear plastic fasteners having hardened steel pins which

TABLE C

SELECTION OF STAPLES (SEE NOTE)

STAPLES						STAPLER
TYPE	FINISH	SIZE (INCHES) LENGTH	SIZE (INCHES) WIDTH	SHAPE OF CROWN	USE	
H*	Zinc or Ivory	3/8	5/32	Rounded	With D station wire and small gauge ground wire in all type wood	E or Heller TMN conversion
J†	Copper Coated					
G*	Zinc Coated	5/8	1/2	Flat	Inside wire cables up to 1/2 inch in diameter	D or T-75

Note: Staples are not recommended for use in plaster.

* For indoor use.

† For outdoor use or where appearance is unimportant.

can be driven into brick, block, or wood using a 1-1/4 pound drilling hammer. The clips are supplied in three forms. The B1 clip is for D station wire. The B2 is for straight runs of IW cable up to 25 pairs. The B3 is also for cable up to 25 pair but has one pin rather than two and is used at corners where lack of space prohibits the use of the B2 clip.

C. C Wire Loop

4.03 The C wire loops are formed sections of wire used with B masonry fasteners as an intermediate support for station wires and inside wiring cables attached to masonry surfaces. Table G shows sizes of C wire loops.

D. Toggle Bridle Ring (Fig. 9)

4.04 This attachment, available in two sizes, 5/8-inch and 1-1/4 inch, is used to attach station wire and cable to hollow surfaces. A predrilled 3/4-inch clearance hole is required.

Note: For best results and a secure installation, clearance holes should be restricted to 3/4-inch diameter, ▶and a washer used where required (Fig. 9).◀

5. ATTACHING TO STEEL STRUCTURES

A. B Insulator Support (Fig. 10)

5.01 The B insulator support, equipped with a B, K, or M bridle ring, is used to support wire runs on I beams, angle irons, etc, on beam thickness up to 3/4 inch.

B. B Support Clip (Fig. 11)

5.02 The B support clip provides a means of attaching drive rings or bridle rings to hanger wires and rods used in false ceiling construction. It can also be used to grip the flanges of structural steel framework. It replaces the B beam clip and B hanger clip.

5.03 This notched spring steel clip has two loops, each providing a fit for the drive rings. In addition, two holes are provided in the face of the clip which will accommodate either a No. 10-24 threaded bridle ring, machine screw, or bolt, or a 1/4-20 threaded machine screw or bolt. The clip is intended for inside use only.

5.04 This clip can be used on wire and rod from No. 12 through 3/8-inch diameter and on flanges from 1/8-inch thick to 3/8-inch thick.

5.05 Early B support clips had only one hole in the face for a No. 8 tapping screw.

TABLE D

FASTENERS FOR B STATION WIRE CLAMP

SURFACE	FASTENER
Metal or Asbestos Siding	No. 7 by 1/2-inch pan head tapping screw
	No. 6 by 5/8-inch galvanized wood screw and C plastic anchor, 3/16 by 1 inch
Wood, Indoors	No. 7 by 1/2-inch pan head tapping screw
Wood, Outdoors	No. 6 by 5/8-inch roundhead galvanized wood screw
Stucco (Wire and Paper Backing)	No. 8 by 1-inch pan head tapping screw or wall screw anchor (correct size)
Masonry	No. 2 B masonry fastener

6. CABLE TIES

6.01 Cable ties are plastic or nylon straps or mounting devices designed for use in customer telephone and switchboard installations to group wires, cords, and inside wiring cables into orderly harnesses.

6.02 ▶The B drive tie (Fig. 12) is a one piece plastic tie with a number 4 galvanized flathead nail protruding from one end. To install, drive the nail into a wood surface or plastic anchor. The tie can secure one or more cables.◀

6.03 Adhesive cable ties are intended for use where mounting by adhesion may be desirable or the only acceptable means. The E adhesive cable tie (Fig. 13) replaces both the B adhesive cable tie and the C adhesive cable tie.

▶***Note:*** Adhesive ties may cause damage or discoloration to tone surfaces.◀

6.04 The E adhesive cable tie consists of a molded plastic, self-locking, nonreleasing strap slipped through a fitment on a molded plastic, 1-inch square base. The base has a foam adhesive backing on the mounting surface. Screw holes are provided in the base where additional attaching strength is required. The tie is shipped with KS-20986, List 4 straps which will accommodate bundles up to 5/8-inch in diameter. Where larger bundles are encountered, a KS-20986 strap of the proper length may be substituted. The E adhesive cable tie is available in ivory and light olive gray colors.

6.05 Observe the following precautions in mounting adhesive cable ties:

(a) The temperature of the plate and mounting surface should be ***above*** 45 degrees fahrenheit.

(b) Initially, the plate must be located accurately as the adhesive backing may damage the mounting surface if removed.

(c) Mount only on clean, dry surfaces (remove wax or grease), ▶and where removal will not leave surface damage.◀

(d) Avoid touching foreign objects with adhesive side of plate to prevent picking up dust and lint; do not touch adhesive with hands.

(e) Apply plate to mounting surface and press firmly.

6.06 The C (MD) cable ties and D (MD) cable ties are plastic straps having ratchet buckle and tapered point ends. Detents allow a range of adjustments and permit easy release and reuse. The C cable ties are used as straps for the B adhesive cable tie. The C and D cable ties have been replaced by the KS-20986, List 4 cable ties (Fig. 14). The KS-20986, List 4 cable ties are used as straps for the E adhesive cable ties.

6.07 The KS-20986, Lists 1 through 8 cable ties are nylon self-locking straps which may be tightened over variable sizes of cable groups. They are available in eleven colors with natural and light olive gray (not requiring an ordering code suffix) as basic. Consult Table H for size, color availability, and ordering code suffix information. Their intended use is as follows:

- Lists 1, 2, and 3 — Banding and securing switchboard cables and vertical and horizontal cables on distributing frames.
- Lists 4 and 5 — Banding cables on power equipment. Fastening cover on B, C, or D customer service closures.
- List 6 — Reusable ties for securing switchboard cables on duct-type frames.

TABLE E

FASTENERS FOR CABLE CLAMPS AND CABLE CLASPS

SURFACE	CLAMP NO. / CLASP NO. COLOR		FASTENER	REMARKS
	LIGHT OLIVE GRAY GALVANIZED	LIGHT OLIVE GRAY		
Woodwork	No. 3 and 5*	No. 7	No. 7 by 1/2-inch pan head tapping screw	
	No. 6, 8, 10, and 12*	No. 9 and 14	No. 7 by 1/2-inch pan head tapping screw	
	No. 13 and 17		No. 10 by 1-inch galvanized wood screw	
Plywood, Masonite	No. 3 and 5*	No. 7	No. 7 by 1/2-inch pan head tapping screw B wall screw anchor 1/8-inch by 3-inch toggle bolt	Make tapping screw attachments at stud locations. Use No. 1 B wall screw anchor on wall thickness 1/16 inch to 1/4 inch. Use No. 2 B wall screw anchor on wall thickness 1/4 inch to 3/8 inch. Use No. 3 B wall screw anchor on wall thickness 3/8 inch to 3/4 inch.
	No. 6, 8, 10, and 12*	No. 9 and 14	No. 7 by 1/2-inch pan head tapping screw 3/16-inch by 1-inch C plastic anchor B wall screw anchor 1/8-inch by 3-inch toggle bolt	
	No. 13 and 17		No. 10 by 1-inch galvanized wood screw 1/4-inch by 1-inch C plastic anchor B wall screw anchor 3/16-inch by 3-inch toggle bolt	
Plasterboard, Plaster on Wood Lath, and Plaster on Metal Lath	No. 3 and 5*	No. 7	No. 7 by 1/2-inch pan head tapping screw B wall screw anchor	
	No. 6, 8, 10, and 12*	No. 9 and 14	No. 8 by 1-inch pan head tapping screw 3/16 by 1-inch C plastic anchor B wall screw anchor	
	No. 13 and 17		No. 10 by 1-inch roundhead galvanized wood screw 1/4-inch by 1-inch C plastic anchor B wall screw anchor No. 10 by 1-inch pan head tapping screw	

* Inside wiring clamp only.

- List 7 — Securing keyshelf cable(s) in switchboards.

- List 8 — Binding and securing cables in switchboards, equipment cabinets, and central offices. Equipped with a tab on the buckle end having a No. 10 screw hole for securing the tie to woodwork, backboards, etc.

7. ATTACHING AND FASTENING GROUND WIRE (Fig. 14)

Note: When nails or tapping screws are used

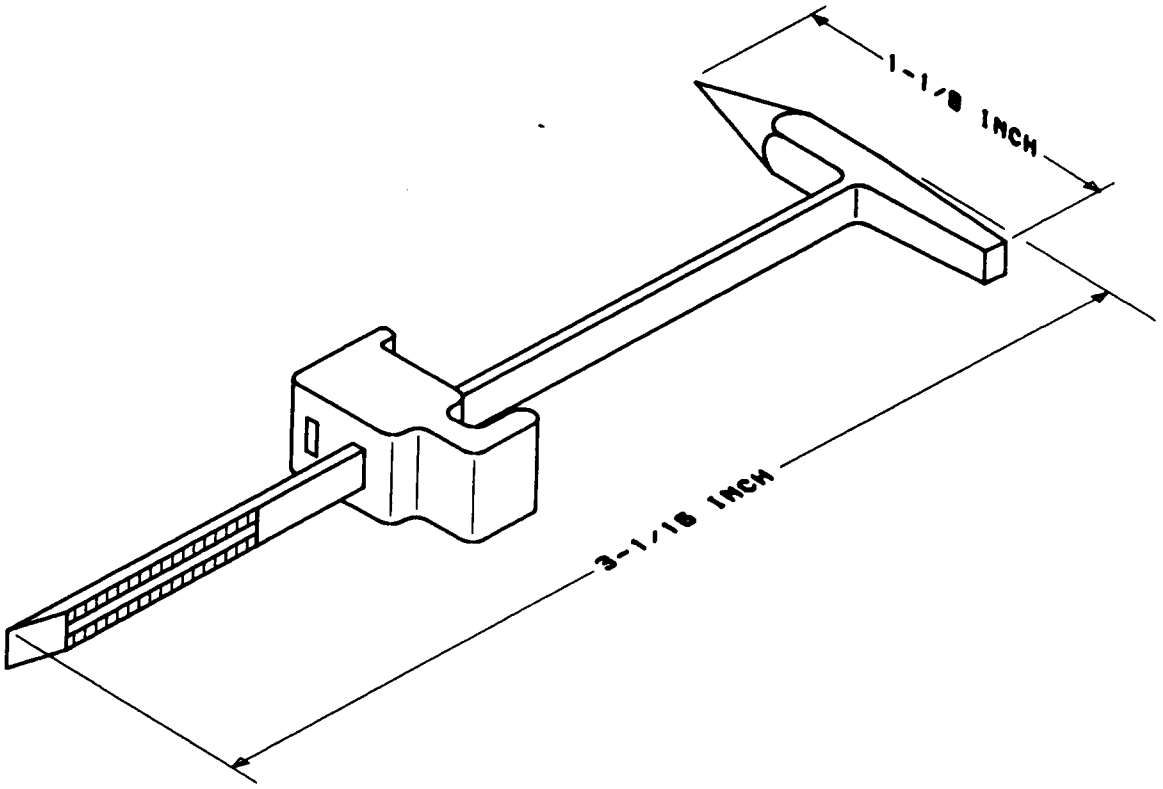


Fig. 5—B Wallboard Clamp

for fasteners, locate so they will enter studding if possible.

7.01 Space ground wire fasteners as follows:

- Space 21 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 (to discourage articles being hung on wire).

Note: Staples are not recommended for use in plaster. The H and J staples replace the E- and F-type staples; the G staple replaces the T-75 staple.

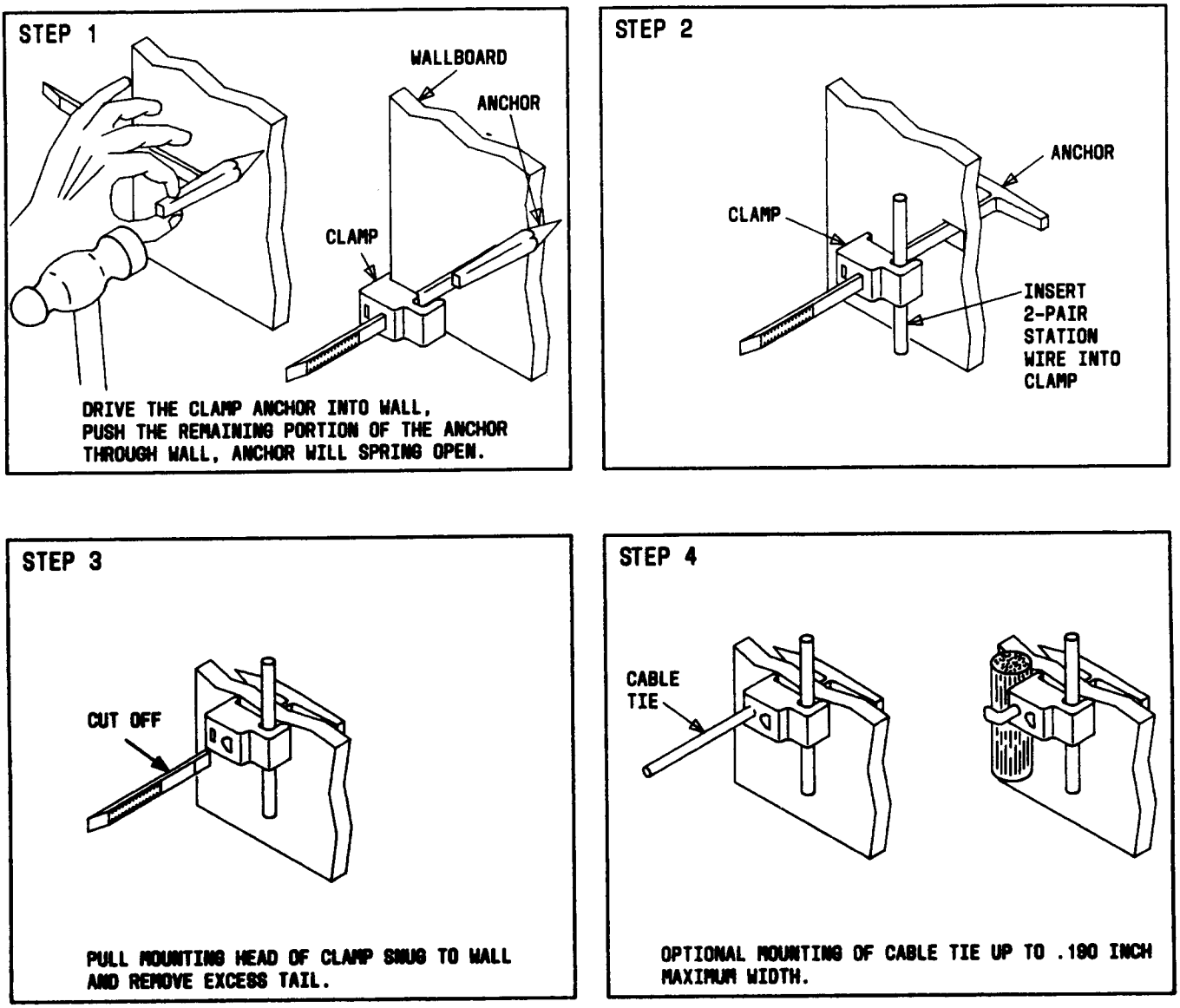


Fig. 6—Installation Instructions for B Wallboard Clamp

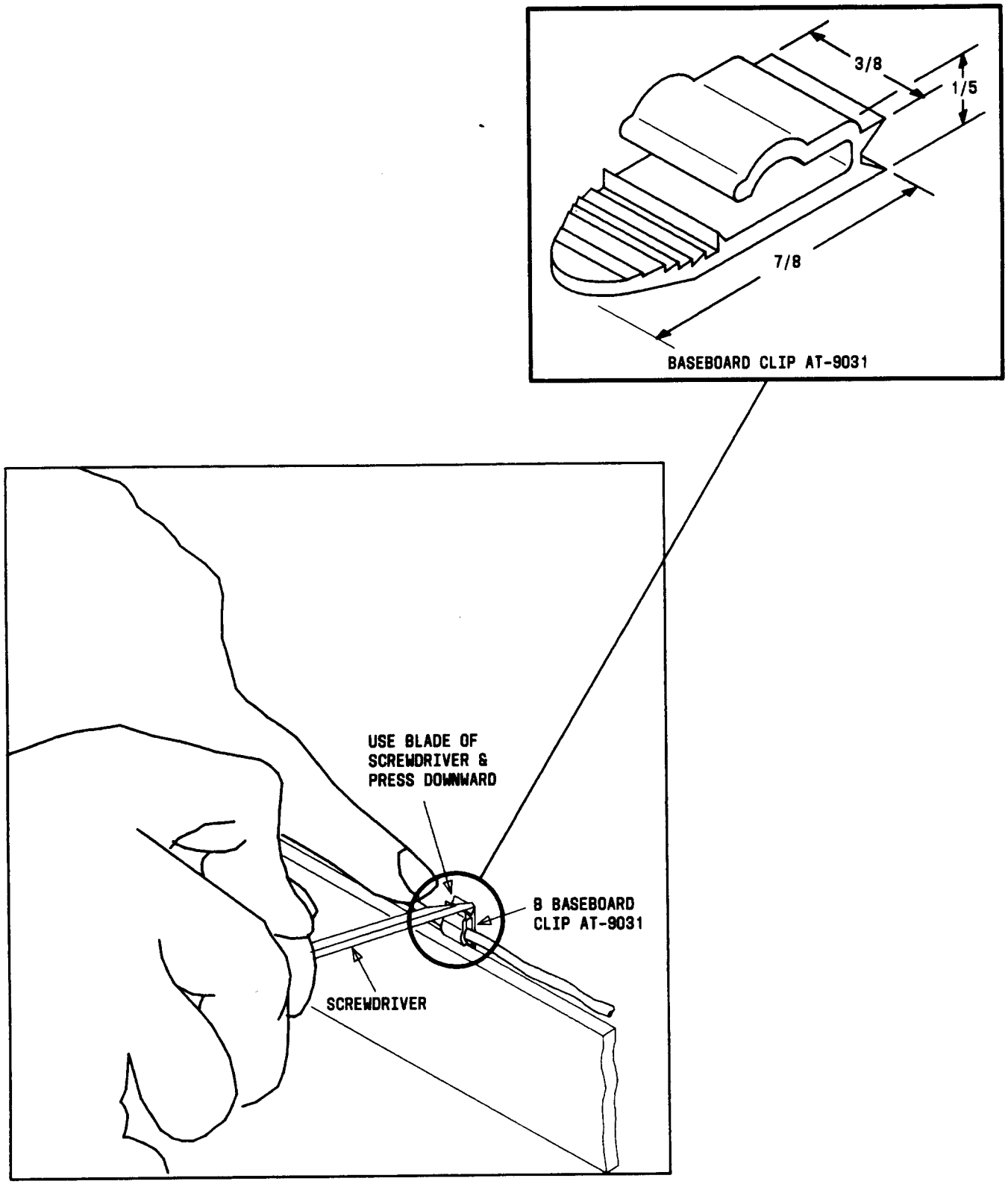


Fig. 7—Installing a B Baseboard Clip AT-9031 Using a Screwdriver

TABLE F

DRIVE RINGS

DIMENSIONS IN INCHES				ANCHOR SIZE (INCHES)	
SIZE	D	W	L (NOTE)	DIAMETER	L (NOTE)
1/2	1/2	1/2	2-1/16	3/16	7/8
5/8	5/8	3/4	2-1/4	1/4	1
5/8L	5/8	3/4	2-3/4		
7/8	7/8	1-1/2	2-9/16	1/4	1
7/8L	7/8	1-1/2	3-1/16		
1-1/4	1-1/4	2-3/8	2-15/16	5/16	1-1/4
1-1/4L	1-1/4	2-3/8	3-7/16		

Note: The L sizes have extra long shafts and cannot be used with B drive anchors.

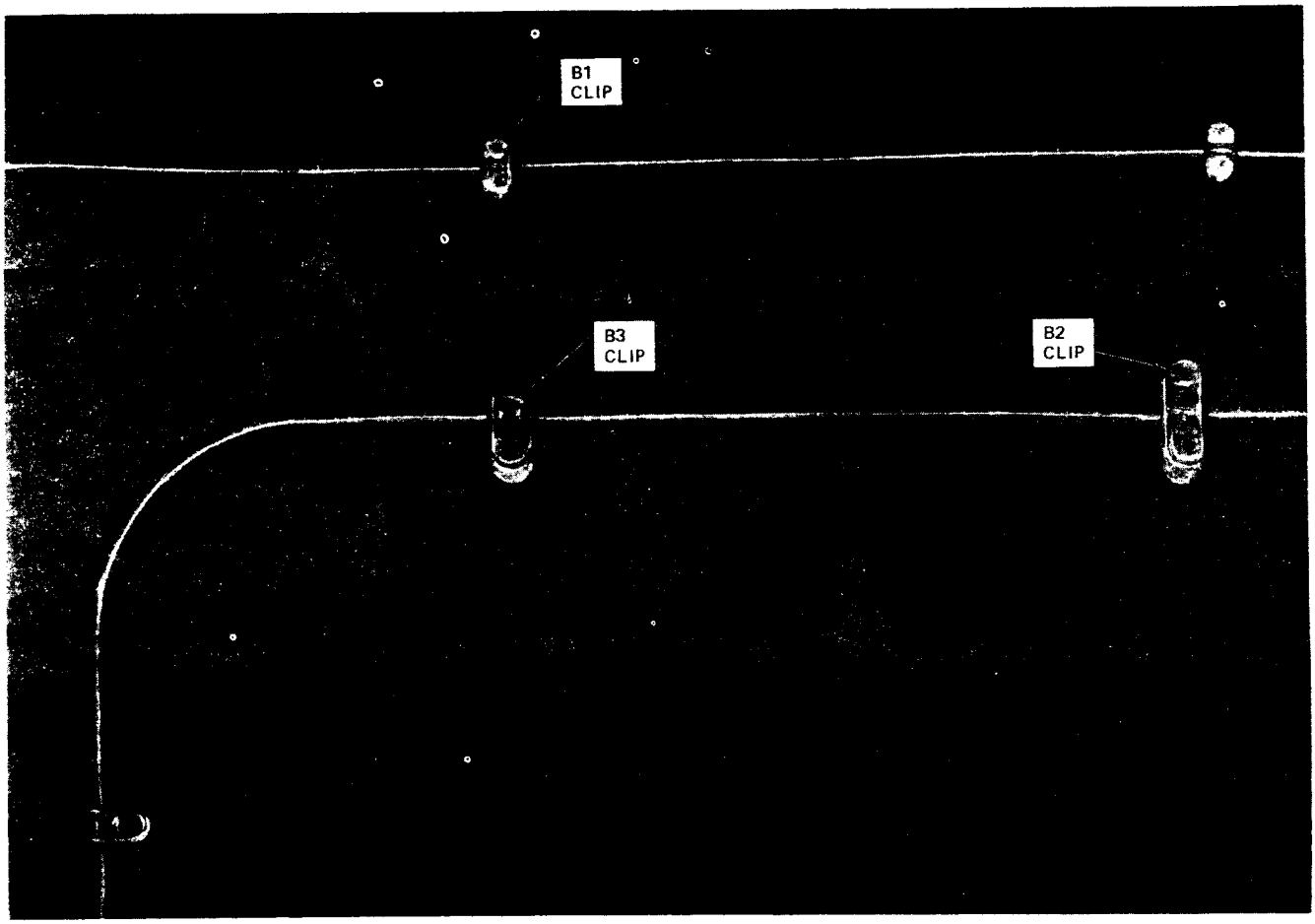


Fig. 8—B Masonry Clips

TABLE G

C WIRE LOOP

C WIRE LOOP SIZE NO.	INSIDE DIAMETER	LENGTH OF LOOP (OUTSIDE)	B MASONRY FASTENER FOR		
			CONCRETE	MORTAR	BLOCK (NOTE)
1/2	1/2 inch	15/16 inch	3	4	5
5/8	5/8 inch	1-1/4 inches			
7/8	7/8 inch	2-1/4 inches			
1-1/4	1-1/4 inches	2-7/8 inches			

Note: Cement or cinder blocks.

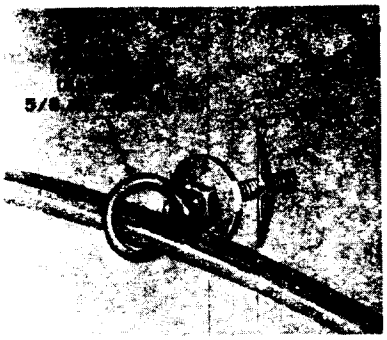


Fig. 9—Toggle Bridle Ring

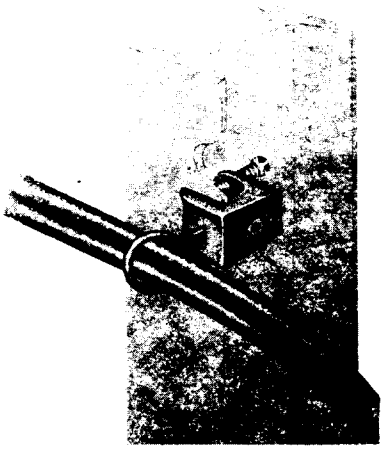


Fig. 10—B Insulator Support

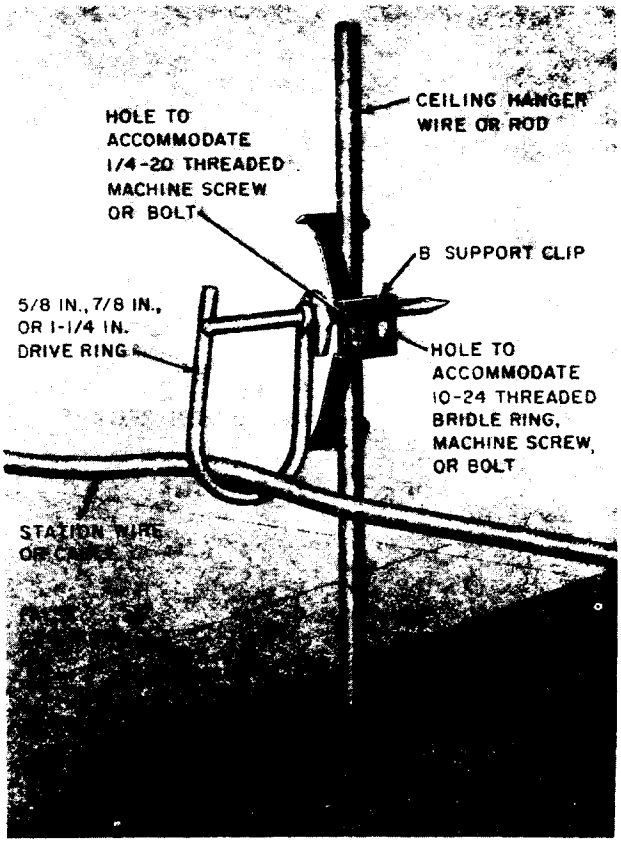


Fig. 11—B Support Clip, Installed

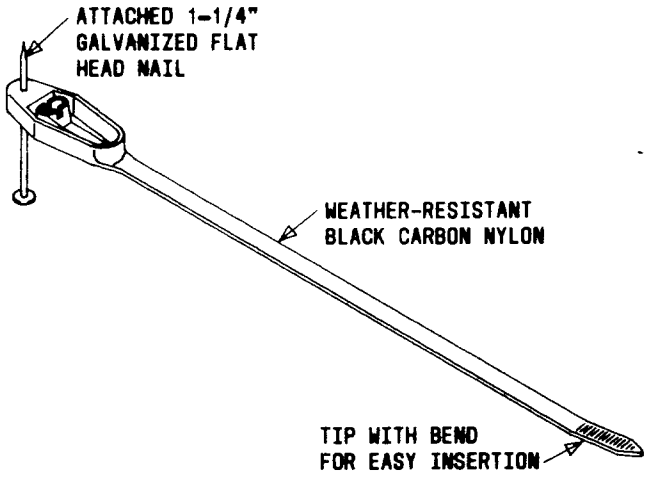


Fig. 12—◆B Drive Tie◆

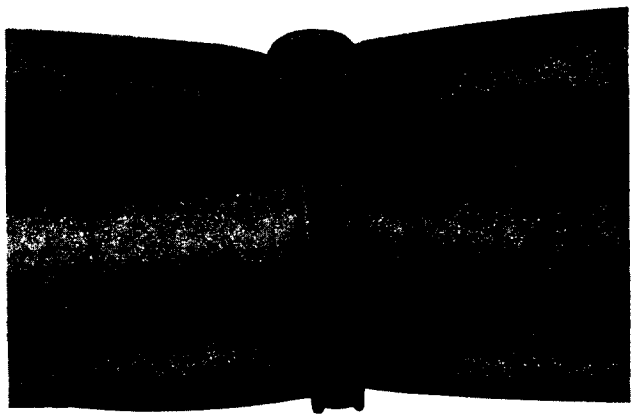


Fig. 14—KS-20986 Cable Tie

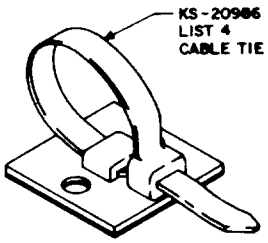


Fig. 13—E Adhesive Cable Tie

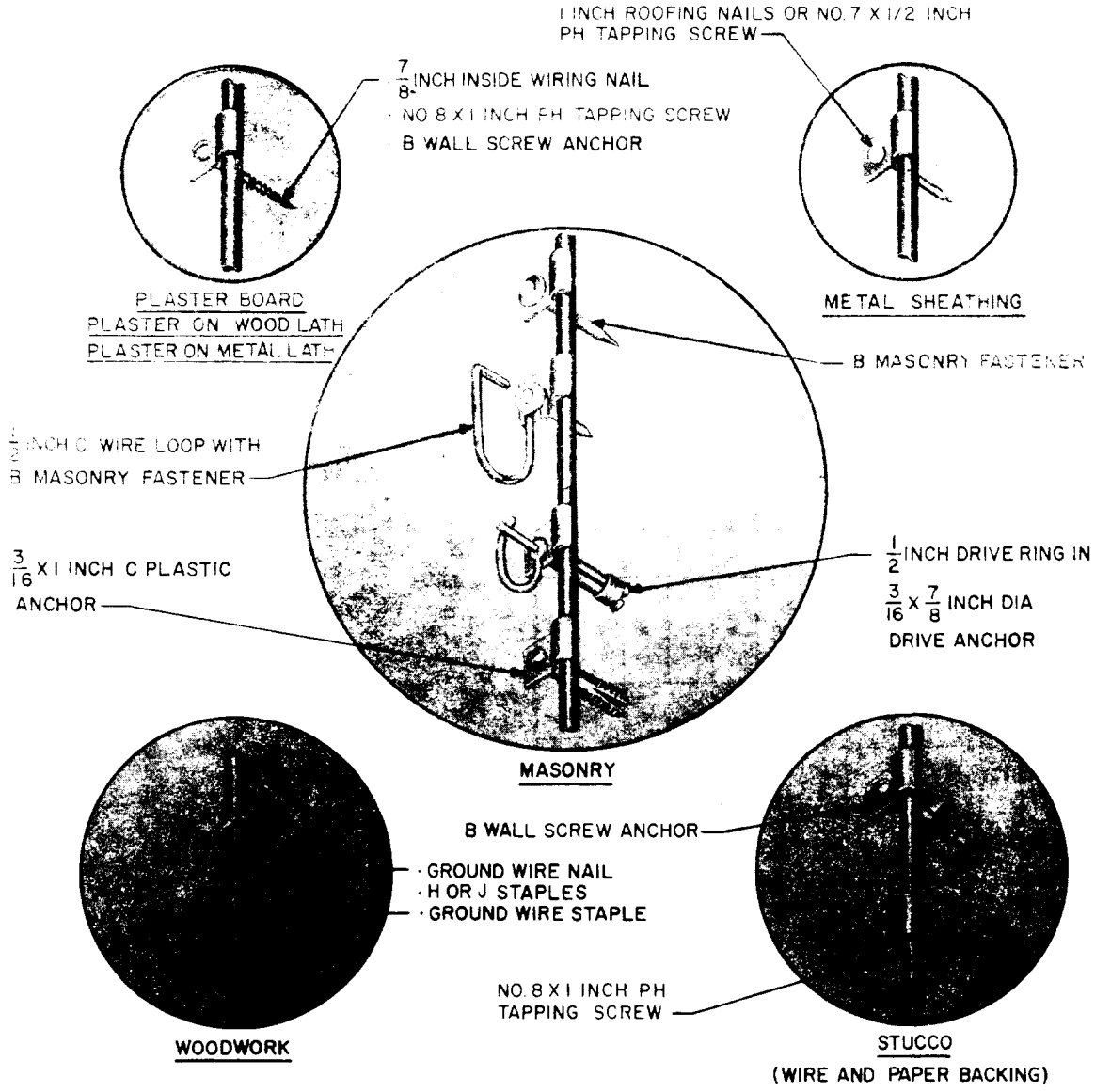


Fig. 15—Fasteners for Ground Wire

TABLE H

KS-20986 CABLE TIES — COLOR AVAILABILITY

LIST NUMBER	MAXIMUM BUNDLE DIAMETER (IN INCHES)	BASIC COLOR (NOTE 1)		OPTIONAL COLORS (NOTE 2)								
		NATURAL	LIGHT GRAY	BLACK —0	BROWN —1	RED —2	ORANGE —3	YELLOW —4	GREEN —5	BLUE —6	PURPLE —7	CARBON BLACK —X
1	2		•	•	•	•	•	•	•	•	•	*
2	3		•	•	•	•	•	•	•	•	•	
3	4		•	•	•	•	•	•	•	•	•	
4	5/8		•	•	•	•	•	•	•	•	•	*
5	1-1/4		•	•	•	•	•	•	•	•	•	
6	1-3/4		•	•	•	•	•	•	•	•	•	
7	4	•		•	•	•	•	•	•	•	•	*
8	1-3/4		•	•	•	•	•	•	•	•	•	

Note 1: No suffix required.

Note 2: Add color suffix if other than basic is required, eg, if List 2 in red is wanted, order as KS-20986, List 2-2.

* Weathering type (sun resistant).