

## 20-, 21-, 30-, AND 31-TYPE SPLICE CASES

### DESCRIPTION AND INSTALLATION

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**1. GENERAL**

**1.01** This section covers the description and installation of the 20-, 21-, 30- and 31-type splice cases.

**1.02** This section is reissued to include requirements and precautions on the use of D sealing tape and cord. Revision arrows are used to emphasize the more significant changes.

**1.03** Two identical splice cases are required for a splice closure. The small aluminum cases (20- and 21-type) are shipped two in a carton and each carton contains all of the small hardware needed for a closure. The galvanized cast-iron cases (20-, 21-, 30-, and 31-type) are shipped in individual cartons, and each carton contains one-half of the hardware.

**1.04** Aluminum splice cases can be used aurally in areas where aluminum has proven satisfactory. In other areas, use galvanized cast iron. Aluminum splice cases must not be used in underground or in buried plant.

**1.05** Cast-iron splice cases in buried plant must be protected against corrosion as outlined in Section 633-020-205.

**1.06** The splice cases are coded with two numbers, a letter, and a single number which indicate the following:

- (a) Two numbers indicate the kind of splice.
  - 20- and 30-type cases are for straight splices
  - 21- and 31-type cases are for *Y* or *double-Y* splices.
- (b) A letter indicates the size.
  - A—For cables with sheath diameter between 0.3 and 1.0 inch
  - B—For cables with sheath diameters between 1.1 and 1.6 inches
  - C—For cables with sheath diameters between 1.7 and 2.2 inches
  - D—For cables with sheath diameters between 2.3 and 3.0 inches.
- (c) A single number at the end indicates the material used in construction.
  - 1 (Aluminum)
  - 2 (Galvanized cast iron).

As an example, a splice case coded 20C2 would be used for a straight splice on a cable with a sheath diameter between 1.7 and 2.2 inches, and the case is made of galvanized cast iron.

**1.07** Table A lists the splice cases with general information on the capacity and use of each one. For a complete description of each case, see Part 2.

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement

TABLE A

## SPLICE CASES-CAPACITY AND USE

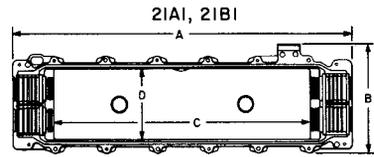
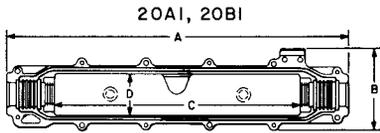
CASE NO.	CABLE SHEATH DIAMETER (INCHES)		USE	TYPE OF SPLICE
	MIN	MAX		
20A1	0.3	1.0	Aerial	Straight
20B1	1.1	1.6		
20C1	1.7	2.2		
20D1	2.3	3.0		
20A2	0.3	1.0	Aerial Underground or Buried	
20B2	1.1	1.6		
20C2	1.7	2.2		
20D2	2.3	3.0		
30D2	2.3	3.0		
21A1	0.3	1.0	Aerial	Y Splice or Double Y Splice
21B1	1.1	1.6		
21C1	1.7	2.2		
21D1	2.3	3.0		
21A2	0.3	1.0	Aerial Underground or Buried	
21B2	1.1	1.6		
21C2	1.7	2.2		
21D2	2.3	3.0		
31D2	2.3	3.0		

**1.08** The PASP sheath stub cables on 700-type load coil cases may be enclosed using either 20-, 21-, 30-, or 31-type splice cases by treating the inner polyethylene sheath as a core wrap and by treating the metallic sheath and the outer polyethylene sheath as the sheath of a single sheath cable.

## 2. DESCRIPTION

### SPLICE CASES AND FURNISHED HARDWARE

**2.01** Figures 1, 2, 3, and 4 illustrate the splice cases and the hardware furnished with each. Dimensions shown are approximate.



CASE	DIMENSIONS INCHES				WEIGHT (APPROX POUNDS)
	OUTSIDE		INSIDE		
	LENGTH (A)	WIDTH (B)	LENGTH (C)	DIA (D)	
20A1	21	4-3/4	14-1/4	2	2
20B1	24	5-1/2	17-1/4	3	2

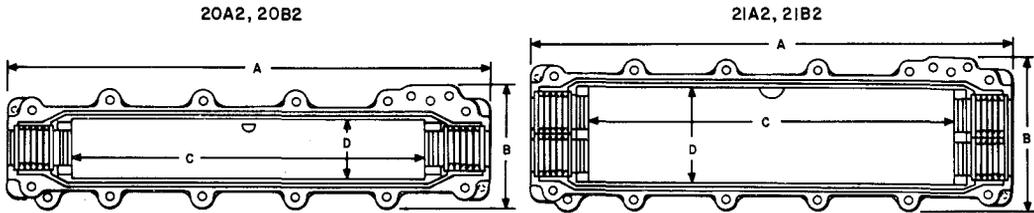
CASE	DIMENSIONS INCHES				WEIGHT (APPROX POUNDS)
	OUTSIDE		INSIDE		
	LENGTH (A)	WIDTH (B)	LENGTH (C)	DIA (D)	
21A1	23	5-5/8	17	3	4
21B1	25	7-5/8	19	5	5

PART	PART NO. (SEE NOTE)	NUMBER (QUANTITY) OF PARTS FURNISHED WITH EACH CASE				USED FOR
		CASE NUMBER				
		20A1	20B1	21A1	21B1	
 INNER SHEATH CLAMP	P-18E115 CLAMP	1		2		SLIDES UNDER SHEATH TABS FOR CLAMPING
	P-18E117 CLAMP		1		2	
 1/4 IN.-20X 1/2 IN. WASHER HEAD CAP SCREW	P-42E709 CAP SCREW	6		8		FOR JOINING SPLICE CASES
		2				FOR ATTACHING STRAND LUG
 1/8 IN. PIPE PLUG	P-13A314 PLUG	1				PRESSURE TESTING FITTING
 STRAND LUG	P-13A189 LUG	1				SUPPORTS CASE FROM STRAND

NOTE:

THIS INFORMATION SHOULD BE USED WHEN ORDERING PARTS.

Fig. 1—Splice Cases and Parts—20 and 21 Types—A1 and B1



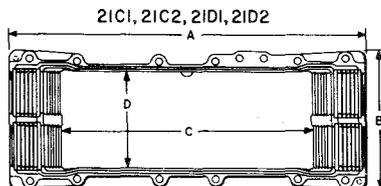
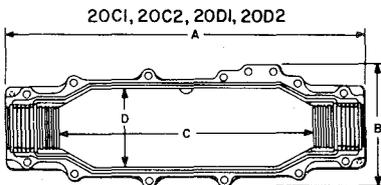
CASE	DIMENSIONS INCHES				WEIGHT (APPROX POUNDS)
	OUTSIDE		INSIDE		
	LENGTH (A)	WIDTH (B)	LENGTH (C)	DIAM (D)	
20A2	20-3/8	5	14-1/4	2	9
20B2	23-3/8	5-7/8	17-1/4	3	14

CASE	DIMENSIONS INCHES				WEIGHT (APPROX POUNDS)
	OUTSIDE		INSIDE		
	LENGTH (A)	WIDTH (B)	LENGTH (C)	DIAM (D)	
21A2	23	5-7/8	16-3/4	3	11
21B2	25	7-7/8	19	5	17

PART	PART NUMBER (SEE NOTE)	NUMBER (QUANTITY) OF PARTS FURNISHED WITH EACH CASE				USED FOR
		CASE NUMBER				
		20A2	20B2	21A2	21B2	
 INNER SHEATH CLAMP	P-18E115 CLAMP	1		2		SLIDES UNDER SHEATH TABS FOR CLAMPING
	P-18E117 CLAMP		1		2	
 BOLT 3/8 IN.-16 X 2 IN.	BOLT HEX H CAP 3/8 IN.-16 X 2 IN. P17E863	6				FOR JOINING SPLICE CASES
 NUT	NUT 3/8 IN.-16 X 9/16 IN. P17E868	6				
 GROUND LUG   CAP SCREW 3/8 IN.-16 X 1 IN.	P-18A678 GROUND LUG ASSEMBLY	1				FOR SECURING BONDING RIBBON TO SPLICE CASE, AND MOUNTING DETAIL FOR 50A HANGER
 1/8 IN. PIPE PLUG	P-13A314 PLUG	1				PRESSURE TESTING FITTING

NOTE:  
THIS INFORMATION SHOULD BE USED WHEN ORDERING PARTS.

Fig. 2—Splice Cases and Parts—20 and 21 Types—A2 and B2



CASE	DIMENSIONS INCHES				WEIGHT (APPROX POUNDS)
	OUTSIDE		INSIDE		
	LENGTH (A)	WIDTH (B)	LENGTH (C)	DIA (D)	
20C1	25-7/8	6-3/4	18-1/2	4-1/2	4
20C2		7-1/4			18
20D1		8-5/8		6	5
20D2		8-3/4		21	

CASE	DIMENSIONS INCHES				WEIGHT (APPROX POUNDS)
	OUTSIDE		INSIDE		
	LENGTH (A)	WIDTH (B)	LENGTH (C)	DIA (D)	
21C1	25-7/8	8	18-1/4	5-1/2	6
21C2		8-3/8			23
21D1		9-5/8		7	7
21D2		10		27	

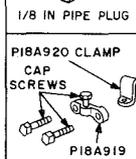
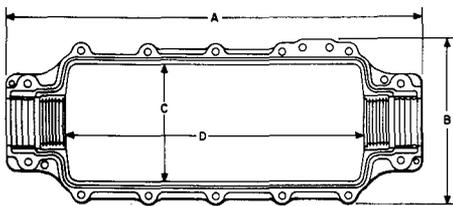
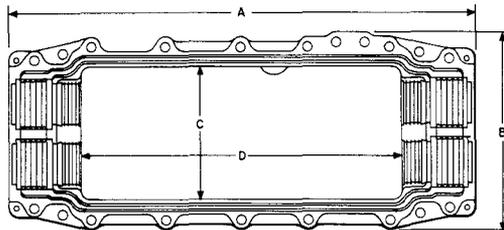
PART	PART NO. (THIS INFORMATION SHOULD BE USED WHEN ORDERING PARTS)	NUMBER (QUANTITY) OF PARTS FURNISHED WITH EACH CASE								USED FOR
		CASE NUMBER								
		20C1	20D1	21C1	21D1	20C2	20D2	21C2	21D2	
 INNER SHEATH CLAMP	P-18E119 CLAMP	1		2		1		2		SLIDES UNDER SHEATH TABS FOR CLAMPING
	P-18E834 CLAMP		1		2		1		2	
 BOLT 3/8 IN-16 X 2 IN.	BOLT HEX H CAP 3/8 IN.-16 X 2 IN. P17E863	6								FOR JOINING SPLICE CASES
 NUT	NUT 3/8 IN.-16 X 9/16 IN. P17E868	6								
 GROUND LUG	P-18A618 GROUND LUG ASSEMBLY	1								FOR SECURING BONDING RIBBON TO SPLICE CASE AND MOUNTING DETAIL FOR 50A HANGER
 CAP SCREW 3/8 IN-16 X 1 IN.	P-18A678 GROUND LUG ASSEMBLY	1								
 1/8 IN PIPE PLUG	P-13A314 PLUG	1								PRESSURE TESTING FITTING
 P18A920 CLAMP CAP SCREWS P18A919 KEEPER	50-A HANGER	1								FOR AERIAL INSTALLATION

Fig. 3—Splice Cases and Parts—20 and 21 Types



30D2



31D2

CASE NO.	DIMENSIONS (INCHES)				WEIGHT (POUNDS)
	A	B	C	D	
30D2	27-7/8	10-3/4	8	20	35
31D2	27-7/8	11-3/4	9	20	41

PART	PART NUMBER (THIS INFORMATION SHOULD BE USED WHEN ORDERING PARTS)	NUMBER (QUANTITY) OF PARTS FURNISHED WITH EACH CASE		USE
		CASE NUMBER		
		30D2	31D2	
 INNER SHEATH CLAMP	P-18E834 CLAMP	1	2	SLIDES UNDER SHEATH TABS FOR CLAMPING
 SCREW 3/8 IN. - 16 x 2 IN.	P-17E863 HEX HEAD SCREW (SPECIAL) 3/8 IN. - 16 x 2 IN.	7		FOR JOINING SPLICE CASES
 NUT	P-17E868 NUT 3/8 IN. - 16 x 9/16 IN.	7		
 GROUND LUG  CAP SCREW 3/8 IN. - 16 x 1 IN.	P-18A678 GROUND LUG ASSEMBLY	1		FOR SECURING BONDING RIBBON TO SPLICE CASE AND MOUNTING DETAIL FOR 50A HANGER
 1/8 IN. PIPE PLUG	P-13A314 PLUG	1		FOR PRESSURE TESTING FITTING

Fig. 4—Splice Cases and Parts—30 and 31 Types

**HARDWARE AND MATERIALS NOT FURNISHED**

2.02 The hardware and materials covered in paragraphs 2.03 through 2.08 are not furnished with the splice cases and must be ordered separately.

**Sealing Washers**

2.03 The sealing washers AT-8583 listed in Table B are flat circular discs made of polypropylene. The F-O, G-O, H-O, J-O, HX, and JX sealing washers

**TABLE B**  
**SEALING WASHERS—AT-8583 (NOTE)**

CABLE SHEATH DIA (INCHES)	TYPE CASE				
	20A1, 20A2 21A1, 21A2	20B1, 20B2 21B1, 21B2	20C1, 20C2 21C1, 21C2	20D1, 20D2 21D1, 21D2	30D2 31D2
	WASHER NO.	WASHER NO.	WASHER NO.	WASHER NO.	WASHER NO.
0	F-0*†	G-0*†	H-0 or HX*	J-0 or JX	J-0 or JX
0.3	F-3	G-3	HF + F-3	JG + G-3	JG + G-3
0.4	F-4	G-4	HF + F-4	JG + G-4	JG + G-4
0.5	F-5	G-5	HF + F-5	JG + G-5	JG + G-5
0.6	F-6	G-6	HF + F-6	JG + G-6	JG + G-6
0.7	F-7	G-7	HF + F-7	JG + G-7	JG + G-7
0.8	F-8	G-8	HF + F-8	JG + G-8	JG + G-8
0.9	F-9	G-9	HF + F-9	JG + G-9	JG + G-9
1.0	F-10	G-10	HF + F-10	JG + G-10	JG + G-10
1.1		G-11	H-11	JG + G-11	JG + G-11
1.2		G-12	H-12	JG + G-12	JG + G-12
1.3		G-13	H-13	JG + G-13	JG + G-13
1.4		G-14	H-14	JG + G-14	JG + G-14
1.5		G-15	H-15	JG + G-15	JG + G-15
1.6		G-16	H-16	J-16	J-16
1.7			H-17	J-17	J-17
1.8			H-18	J-18	J-18
1.9			H-19	J-19	J-19
2.0			H-20	J-20	J-20
2.1			H-21	J-21	J-21
2.2			H-22	J-22	J-22
2.3				J-23	J-23
2.4				J-24	J-24
2.5				J-25	J-25
2.6				J-26	J-26
2.7				J-27	J-27
2.8				J-28	J-28
2.9				J-29	J-29
3.0				J-29	J-29

**Note:** K-0 sealing washers can be used with 849A sealing washer cutter to cut the appropriate sealing washer as outlined in Section 081-020-136.

\* The F-9, G-0, H-0, HX, J-0, and JX sealing washers are used for sealing vacant opening in end plate.

† The F-0 and G-0 sealing washers may be cut to fit 0.3 inch to 1.0 inch cable using the AT-7605 B washer cutter, and cutting along one of its concentric grooves.

**SECTION 633-400-200**

are solid discs for sealing unused splice case openings; the F, G, H, and J series sealing washers are provided with holes varying in 0.1-inch diameter increments to accommodate cable sizes from 0.3- to 2.9-inch diameter. The HF and JG sealing washers are recessed to accommodate the smaller H- and G-type washer, respectively, when sealing small size cables in the larger size end plates. Sealing washers may also be cut from K-O sealing washers, using the 849A sealing washer cutter as outlined in Section 081-020-136.

**2.04** The sealing washers are furnished four in a package with the exception of the HX and JX washers which are furnished two in a package. Each

package is marked with the name, size, and the diameter of the cable with which it is used.

**Sealing Tape and Cord**

**2.05** The B and D sealing compounds are available in both tape and cord. The B sealing tape and D sealing cord requirements for installation of splice cases are listed in Table C.

**Adapters**

**2.06** Adapter assemblies are required to install splice cases on cables which are considerably smaller in diameter than the opening in the end of the splice case.

**TABLE C**

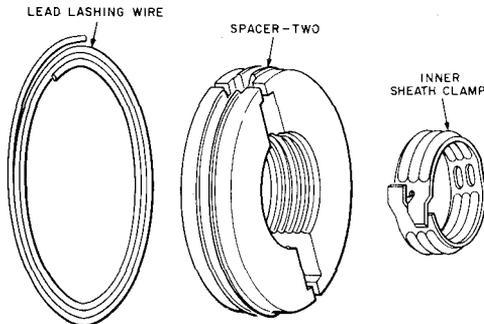
**B SEALING TAPE AND D SEALING CORD**

ITEM	USE	AMOUNT REQUIRED
B Sealing Tape (Package unit, three 10-in. strips or a 72-in. roll)	Sealing ends of splice cases	1 or 2 packages per seal
D Sealing Cord (Package unit two 32-in. lengths)	Sealing sides of splice cases	1 package required per installation

2.07 Adapter assemblies consist of an inner sheath clamp, two identical halves of a spacer, and a piece of lashing wire (Fig. 5).

**PIPETITE-Stik\* Compound**

2.08 PIPETITE-Stik compound, a commercial pipe joint compound in cylindrical form, is applied to the pipe plug threads before placing in a splice case. One stick will make several applications.



DIAMETER OF CABLE TO BE INSTALLED	ADAPTER USED IN SPLICE CASES		
	20B AND 21B	20C AND 21C	20D AND 21D 30D AND 31D
0.3 - 1.0 INCH	129A	133D	133A
1.1 - 1.6 INCHES	---	133E	133B
1.7 - 2.2 INCHES	---	---	133C

Fig. 5—Adapter Assemblies for Splice Covers

**50A Hanger**

2.09 Two 50A hangers are required to make an aerial installation. They must be ordered separately for all splice cases except the 20A1, 20B1, 21A1, and 21B1 with which they are furnished (Fig. 6).

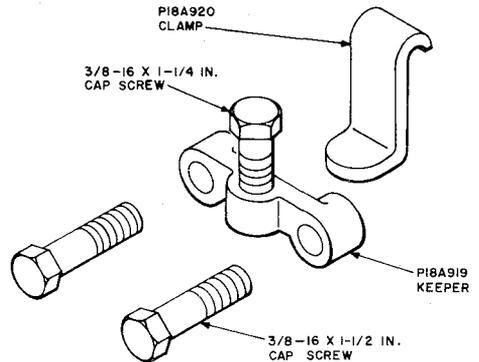


Fig. 6—50A Hanger Assembly for Aerial Use

2.10 The B connector (Fig. 7) is intended to provide a solderless ground connection on plain bonding ribbon. This bronze vise-type connector is tin coated to resist corrosion and can be tightened over the bonding ribbon with an AT-7511B ratchet wrench or equivalent.

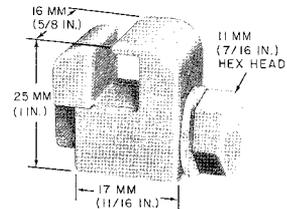
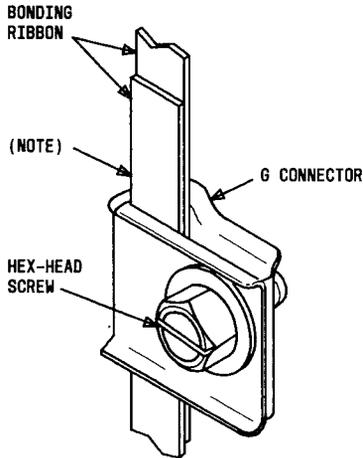


Fig. 7—B Connector

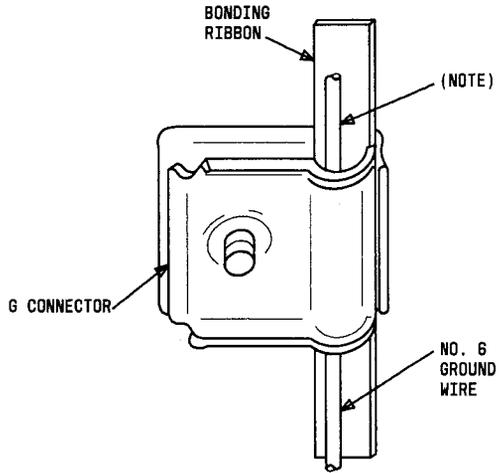
\* Registered trademark of Lake Chemical Company.

2.11 ♦The G connector (Fig. 8) supersedes the B connector and is used to make solderless connections of plain bonding ribbon to plain bonding ribbon or No. 6 AWG ground wire to plain bonding ribbon. The G connector can be used in manholes and cable entrance facilities. See Section 081-852-126.♦



NOTE:  
BE SURE RIBBON END(S) EXTEND  
BEYOND CONNECTOR EDGE

A. CONNECTING BONDING RIBBON  
TO BONDING RIBBON



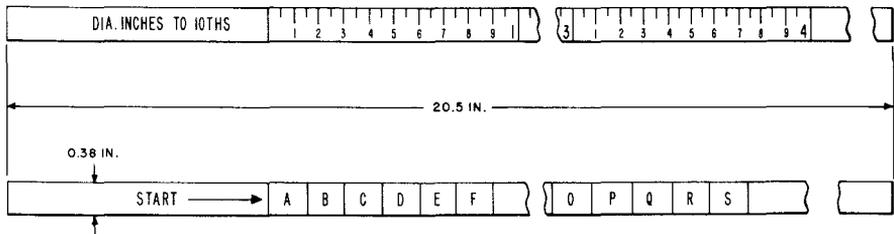
NOTE:  
BE SURE GROUND WIRE END EXTENDS  
BEYOND CONNECTOR EDGE

B. CONNECTING BONDING RIBBON  
TO NO. 6 GROUND WIRE

Fig. 8—G Connector

**B Measuring Tape**

2.12 The B measuring tape (Fig. 9), made of flexible plastic, is used for measuring cable diameters. One side of the tape is calibrated to indicate cable diameters up to 4 inches, to the nearest one-tenth inch. The reverse side of the tape is calibrated with letters to indicate the associated knockout size in a future splice closure end plate.



**Fig. 9—B Measuring Tape**

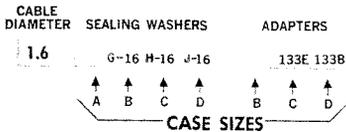
Splice Case Guide Form E-4805

2.13 The Splice Case Guide provides, in pocket form, all the information required to install the various 20-, 21-, 30-, and 31-type splice cases (Fig. 10).

# SPLICE CASE GUIDE

## DIRECTIONS

1. DETERMINE THE CABLE DIAMETERS FROM THE TABLES ON THE REVERSE SIDE.
2. SELECT TYPE OF CASE FROM "CODING."
3. SLIDE INNER CARD UNTIL THE LARGER CABLE DIAMETER APPEARS IN THE SLOT.
  - (A) THE NUMBER WHICH APPEARS OPPOSITE THE CASE SIZE SELECTED IN 2 IS THE PROPER SEALING WASHER.
4. FOR MULTIPLE TYPE CASES RESET INNER CARD TO DIAMETER OF THE SMALLER CABLE.
  - (A) THE TYPE ADAPTER WILL APPEAR OPPOSITE THE CASE SIZE SELECTED IN 2.
  - (B) THE TYPE SEALING WASHER WILL APPEAR OPPOSITE THE CASE SIZE SELECTED IN 2.



5. ON REVERSE SIDE DETERMINE THE SHEATH OPENING, TAB LENGTH AND DISTANCE BETWEEN SEALING WASHERS FOR THE TYPE CASE BY SETTING THE SLIDE TO THE LARGER CABLE DIAMETER.

## CODING

- 20 OR 30 STRAIGHT SPLICE
- 21 OR 31 MULTIPLE SPLICE
- A CABLE 0.3-1.0 DIAMETER
- B CABLE 1.1-1.6 DIAMETER
- C CABLE 1.7-2.2 DIAMETER
- D CABLE 2.3-3.0 DIAMETER
- 1 ALUMINUM
- 2 GALVANIZED CAST IRON

## PLASTIC

	ALPETH					PAP OR PASP			
	GA	BIKA	BKMA	BHAA	BHBA	BKT	BKM	BHA	BHB
26	24	22	19		26	24	22	19	
11	4	.4	.5	.6	.5	.5	.6	.7	
16	4	.5	.6	.7	.5	.6	.7	.8	
25	.5	.6	.6	.8	.6	.7	.7	1.0	
50	.6	.7	.8	1.1	.7	.8	1.0	1.2	
75	.7	.8	1.0	1.3	.8	1.0	1.1	1.4	
100	.8	1.0	1.1	1.5	.9	1.1	1.2	1.7	
150	.9	1.1	1.3	1.8	1.0	1.2	1.4	2.0	
200	1.0	1.2	1.5	2.0	1.1	1.4	1.7	2.3	
300	1.2	1.5	1.8	2.5	1.3	1.6	2.0	2.6	
400	1.4	1.7	2.1		1.5	1.8	2.2		
600	1.7	2.0	2.5		1.8	2.1	2.6		
900	2.0	2.4			2.1	2.6			

1.6	16	17 $\frac{1}{2}$	—	1 $\frac{1}{2}$	19	20 $\frac{1}{2}$	—
CABLE DIA.	20	21	30-31	TAB SHEATH OPENING	20	21	30-31
				LENGTH			DISTANCE BETWEEN SEALING WASHERS

## PULP

	LEAD				STALPETH				PASP			
	ADTL	ADMJ	ADAL	ADBL	ADTC	ADMC	ADAC	ADBC	ADTH	ADMH	ADAH	ADBH
GA	26	24	22	19	26	24	22	19	26	24	22	19
300	1.0	1.3	1.6	2.2	1.1	1.3	1.7	2.3	1.3	1.5	1.9	2.6
400	1.2	1.4	1.8	2.5	1.3	1.5	1.9	2.7	1.4	1.7	2.1	2.9
450	—	—	—	2.7	—	—	—	2.8	—	—	—	3.0
600	1.4	1.7	2.2		1.5	1.8	2.3		1.7	2.2	2.5	
900	1.7	2.1	2.6		1.8	2.2	2.7		2.0	2.4	2.9	
1100	—	—	2.9		—	—	3.0		—	—	—	
1200	1.9	2.4			2.0	2.5			2.3	2.7		
1500	2.2	2.6			2.3	2.8			2.5	3.0		
1800	2.4	2.9			2.5	3.0			2.7			
2100	2.5				2.6				2.9			
2400	2.7				2.8				3.0			
2700	2.9				3.0							

DIAMETERS OF CABLES NOT COVERED IN THE ABOVE TABLES SHOULD BE DETERMINED USING THE 8" MEASURING TAPE AT 8234

Fig. 10—Splice Case Guide, Form E-4805

**Note:** The guide lists AD cables which have been superseded by CD cables; however, the cable dimensions are the same.

### 3. PREPARATION OF SHEATH OPENING AND INSTALLATION

**3.01** The methods described in this section are for use on aerial, buried, and underground installations.

#### Sheath Preparation

**3.02** The cables must be set up and secured firmly in position with the cable sheaths straight and in line for a minimum length of 8 inches back from the sheath butt. This is required to prevent movement of the sheath and cable while splicing the conductors.

**3.03** Determine the diameters of the cables to be spliced, using the B measuring tape or Splice Case Guide, Form E-4805.

**3.04** Select the proper size sealing washers or combination of sealing washers from Table B and slip two on each cable away from the sheath opening. For cables which have not been cut, place these washers over the cables and slip out of the way.

**Note:** The tightness of the end seals is dependent upon the correct washer size.

The circular hole in the washer should fit as close to the cable as possible. The packages containing the washers specify the size of cable for which they were designed. However, if the cable is oversize or undersize, a better fit can be obtained by using the next larger or smaller size washer. Cables that are oval or flattened will become rounded by the pressure of the sealing washers during the installation of the splice cases.

**3.05** Table D lists the dimensions required for sheath preparation and installation of splice cases.

TABLE D  
SHEATH PREPARATION (DIMENSIONS IN INCHES)

SPLICE CASE NO.	SHEATH OPENING	FINAL TAB LENGTH (NOTE)	DISTANCE BETWEEN OUTER MARKERS OR INNER SEALING WASHERS	DISTANCE BETWEEN INNER CLAMPS (APPROX)	MAXIMUM CABLE SHEATH DIAMETER
20A1 20A2	13	1-1/2	16	14-3/8	1.0
21A1 21A2	15-3/4	1-1/2	18-3/4	17	1.0
20B1 20B2	16	1-1/2	19	17-1/4	1.6
21B1 21B2	17-3/4	1-1/2	20-3/4	19	1.6
20C1 20C2 21C1 21C2	17	2-1/4	21-1/2	19	2.2
20D1 20D2 21D1 21D2	17	2-1/4	21-1/2	19	3.0
30D2 31D2	19	2-1/4	23-1/2	21	3.0

**Note:** Tabs are initially cut one inch longer, then trimmed to final length after taping.

3.06 Mark the center of the splice; then place B paper tape markers on the jacket as illustrated in Fig. 11. In aerial installations where the slack puller is used, follow instructions in the 632 Division of the Bell System Practices. Pull the slack before marking the sheath opening. Complete the splice case installation before removing the slack puller.

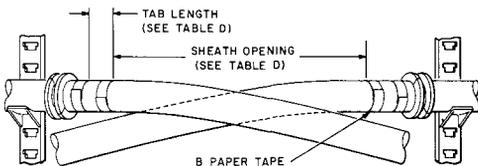


Fig. 11—Paper Tape Markers Placed

3.07 **DANGER:** The sharp edges of the metal shield must be handled carefully to avoid injury. Remove the polyethylene jacket and metal shield as outlined in Section 632-315-200 and as shown in Fig. 12.

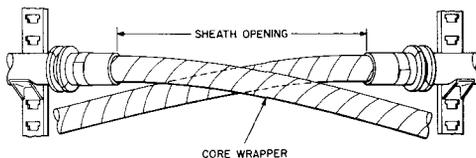


Fig. 12—Sheath Removed From Cable

3.08 **Warning:** On alpeith or stalpeith cables, the cuts should be made through the polyethylene and metal layers. To avoid damaging the core, it is desirable to tab the polyethylene jacket first and then tab the underlying metal. On plain lead sheath, care must be exercised to avoid damaging the core. Carefully bend the tabs away from the core and remove any metal burrs or slivers. Cut the required number of tabs for each cable end through the sheath to the edge of the tape as shown in Fig. 13. The cuts should be made to make the resulting tabs

approximately the same width. Tabs are utilized on all types of single sheath cables for bonding to the splice cases.

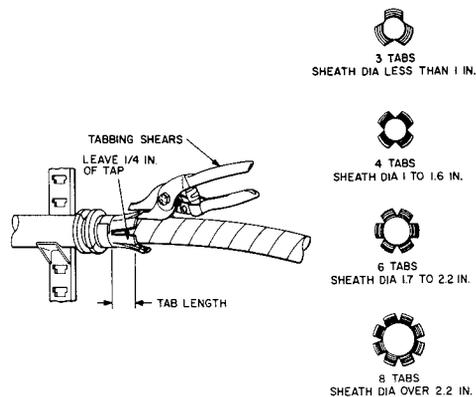


Fig. 13—Cutting Tabs

3.09 If the completed splice is to be mounted with the joint between the cases horizontal, remove half of the tab on the top of the cable. If this joint is to be vertical, remove half of one of the tabs on the side of the cable. The necessary cuts should be made through any metal layers as shown in Fig. 14. This space is required for clearance of the inner sheath clamp ears.

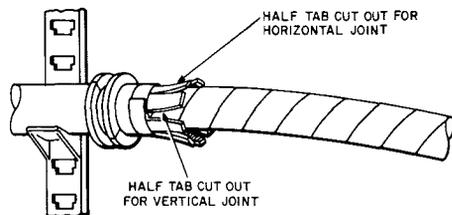


Fig. 14—Cutout for Inner Sheath Clamp Ears

3.10 Make a collar over the cable core with two layers of vinyl tape for each cable end. Place the first layer with adhesive side out, lapped about 1/4 inch; then, one layer with adhesive side in. Slide the collars back under the tabs and recheck the distance between outer markers (Fig. 15). Remove the outer markers.

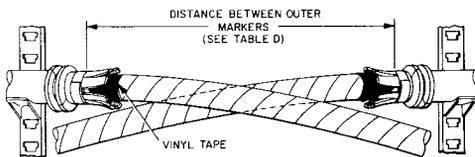


Fig. 15—Vinyl Tape Collars Placed

3.11 Shield continuity across the splice opening will be maintained during splicing by the use of B bond clips and B appliance wire (Fig. 16). The method of preparing, installing, and pressing the clips is covered in Section 081-852-120. The B appliance wire must be of sufficient length not to interfere with the splice bundle.

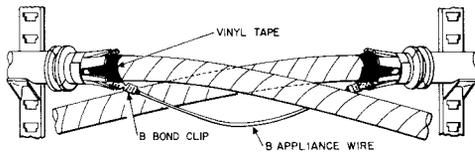


Fig. 16—B Bond Clips and B Temporary Bond Wire Installed

3.12 Slip the inner sheath clamp under the tabs with the ears extending from the slot from which the half tab was removed (Fig. 17). If a small cable is to be installed in the splice case, an inner cable sheath clamp of the proper size will be furnished with the adapter assembly. The table for adapter sizes is shown in Fig. 5.

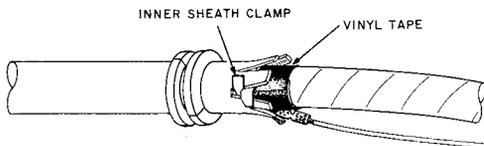


Fig. 17—Inner Sheath Clamps Positioned

3.13 Position one inner sheath clamp in the center of the tab slot. Bind down the tabs with at least two layers of vinyl tape to hold the clamp firmly in place. Position the other inner sheath clamp at correct spacing and bind down the tabs to hold it in place. Do not cover the projecting ears of the clamps

because this will prevent electrical connection with the splice case and permanent bonding of the metal shield (Fig. 18). Do not wrap tape over the clamping area. Tape buildup will interfere with the seating of the inner sheath clamp in the splice case halves. After tabs are taped down, approximately 1 inch should be trimmed off of the tab length.

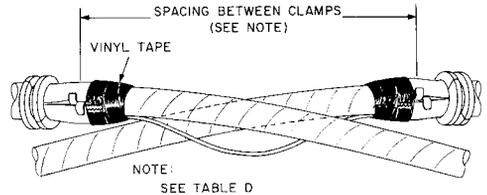


Fig. 18—Tabs Taped Down

#### Installation

3.14 After completion of the wire joining, wrap the completed splice in the usual manner. Muslin, loose desiccant, or any other water-absorbent materials must not be used in splices containing all plastic-insulated conductors. The B appliance wire across the opening should be left in place to provide sheath continuity in the event the splice case is reopened.

3.15 In the area where sealing tape will be placed, thoroughly clean the sheath with a clean, dry, lint-free, KS-14666 cloth soaked with a small quantity of B cleaning fluid. With a file, remove any deep scratches caused in the placing operation.

3.16 **Caution: Do not scuff the sheath lengthwise as this could produce leak channels.** Thoroughly scuff around the sheath for a distance of about 2 inches, starting at the outside end of the inner sheath clamps (Fig. 19).

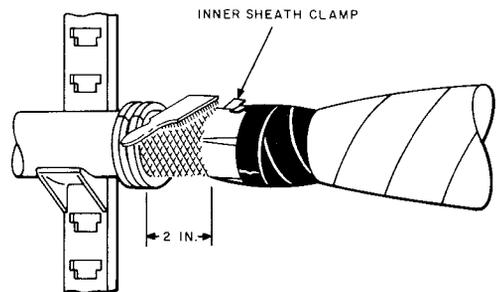


Fig. 19—Scuffing Sheath

3.17 Position the cable in the splice case and slide the inner sealing washers in place as shown in Fig. 20. Mark the position of the washers on the jacket. Make sure that the sheath clamps are aligned with the grooved seat of the splice case.

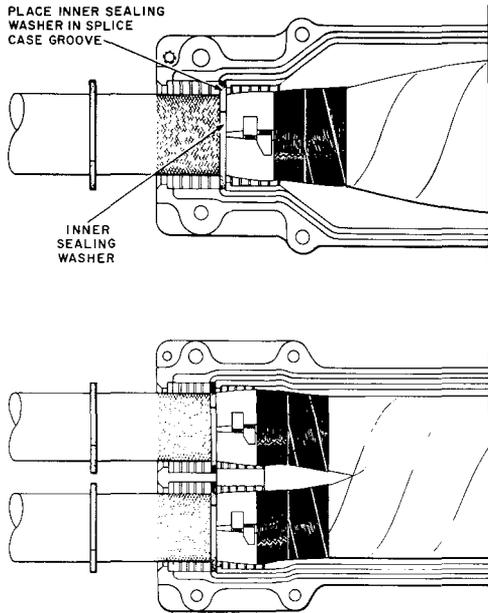


Fig. 20—Inner Sealing Washers Placed

3.18 **Caution:** The B sealing tape and D sealing cords should be kept clean and should not be stretched (Fig. 21). Do not handle tape with damp or oily hands. Do not heat B or D sealing tape or cord directly in the airflow of a heater or blower. This reduces the adhesion to the cable sheath. If heating is required, place in a warm location prior to use. Remove the cables from the splice case. Then, build up collars of B sealing tape on the sheath adjacent to the washers to a diameter equal to or slightly larger than that of the washers. On cables larger than 2.9 inches in diameter, sealing washers are *not* required. In such cases, build up the collar of B sealing tape to 3.4 inches in diameter.

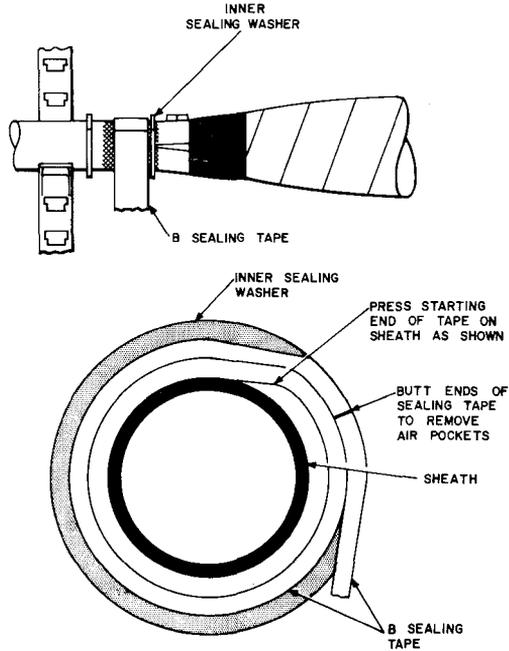


Fig. 21—Sealing Tape Collars

3.19 Position the outer sealing washer with the slit about 90 degrees from that of the inner washer. Butt the outer washer against the sealing tape (Fig. 22).

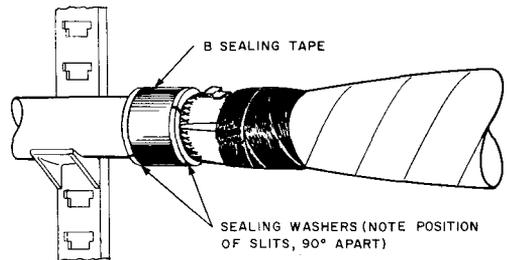
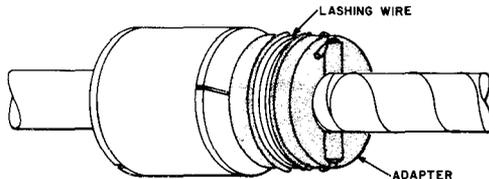


Fig. 22—Outer Sealing Washers Placed

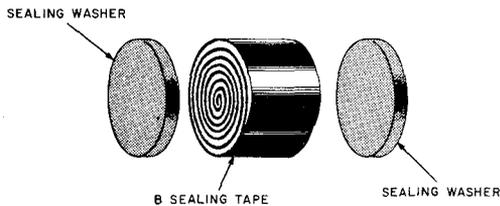
**3.20** Remove the B temporary bond. Where adapter assemblies are used, fasten the two spacers over the inner sheath clamp with the lead lashing wire provided. Use three turns of lashing wire and terminate as shown in Fig. 23.



**Fig. 23—Adapter Assembly Installed**

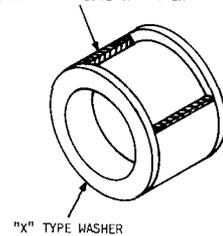
**3.21** Thoroughly clean the sealing surface of the splice case with a clean, dry, lint-free, KS-14666 cloth soaked with a small quantity of B cleaning fluid. This will ensure the removal of any oil, grease, dirt, filings, moisture, desiccant, etc. Place the bottom (or back) splice case with the inner sealing washers on the cable flush against the shoulder of the housing. In an aerial installation, attach the case to the strand, using a 50A hanger if the case is not equipped with a strand clamp.

**3.22** Fill any unused opening in the splice case with a solid plug of B sealing tape, with a solid sealing washer of the proper size placed at each end of the plug (Fig. 24) or with an HX or JX sealing washer as shown in Fig. 25.



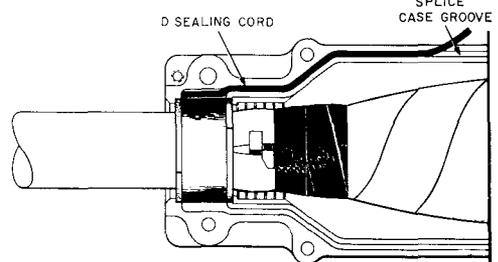
**Fig. 24—B Sealing Tape Plug and Sealing Washers**

2-3 LAYERS OF 1-1/2 IN. B SEALING TAPE TO BUILD UP TO A DIAMETER EQUAL TO OR SLIGHTLY LARGER THAN EDGE OF WASHER



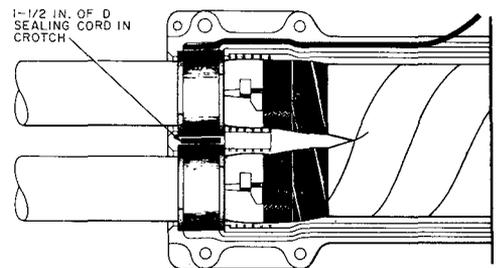
**Fig. 25—HX or JX Sealing Washer for Sealing Vacant Opening in End Plates**

**3.23** Place B or D sealing cord in the side grooves, being careful to avoid making flat spots or dents in the cord. Do not stretch. Do not handle with damp or oily hands. Inspect to ensure that the cord is in the grooves and free from moisture or dirt. If moisture or dirt is present, replace the cord (Fig. 26).



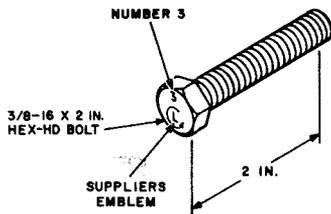
**Fig. 26—Placing Sealing Cord**

**3.24** On 21- and 31-type cases, place a 1-1/2 inch length of sealing cord in each crotch (Fig. 27).



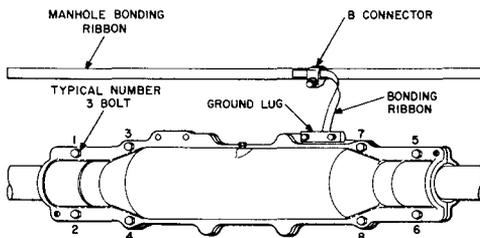
**Fig. 27—Sealing Cord Placed Between Cables**

- 3.25** Place the other case in position, being careful not to disturb the sealing cord.
- 3.26** Check the bolts or capscrews furnished for joining the splice cases. Satisfactory bolts and capscrews have the numeral "3" on the head (Fig. 28). The approved bolt is 2 inches long and the capscrew has a captive washer under the head. No other bolt or capscrew shall be used.



**Fig. 28—Typical Approved Splice Case Bolt**

- 3.27** Place the bolts in positions 1, 2, 3, 4, 5, 6, 7, and 8 (Fig. 29). **Warning: A heavy pull on the wrench will cause the cast-iron type case to break.** Only a very light pull on the wrench is required to bring the two splice case halves together. If the bolts do not tighten with an easy pull, the washers are jamming or the sheath clamp is causing the interference. Only when two splice case halves are metal to metal is it safe to apply seating torque on the bolts.



**Fig. 29—Bolts Placed in Splice Case**

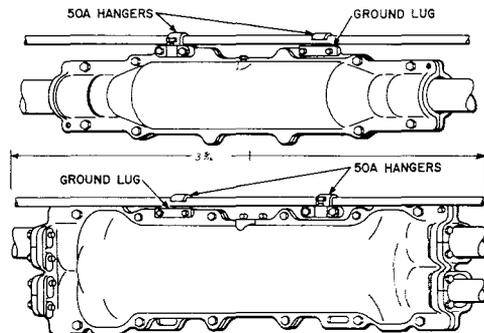
- 3.28** Tighten bolts 1, 2, 5, 6, 3, 4, 7, and 8 in that sequence until the splice cases are about 1/8 inch apart. Bring the cases together evenly, tightening each bolt no more than two turns at a time. If at any time a bolt requires more than an easy turning effort, go to the next bolt. Then, if turning is still difficult, check for misalignment of cases and washers.

- 3.29** Place the remaining bolts in the sides of the cases and tighten hand tight. Then, tighten all bolts no more than one turn at a time until metal-to-metal contact is obtained at each bolt location.

- 3.30** After the splice cases are in metal-to-metal contact, the capscrews of small aluminum cases must be tightened with a B torque wrench to a torque of 75 inch-pounds minimum to 100 inch-pounds maximum. Tighten the bolts on galvanized cast-iron and large aluminum splice cases to a torque of 300 inch-pounds minimum to 450 inch-pounds maximum.

- 3.31** Place a ground lug and bonding ribbon where required. For an underground installation, insert the bonding ribbon through the space between the ground lug and the splice case. Tighten the lugs evenly to secure the bonding ribbon. Use a B or G connector to attach the bonding ribbon from the splice case to the manhole bonding ribbon (Fig. 29). On an aerial installation, make the remaining strand attachment with strand lugs or 50A hangers as required.

- 3.32** The 50A hanger may be fastened to the splice case while on the ground, one hanger to each splice case. Position the P-18A920 clamp under the keeper. Insert the 1-1/2 inch long capscrews through the holes in the P-18A919 keeper, through the holes in the flange of the splice case, and into the holes in the ground lug. Tighten these bolts (Fig. 30).



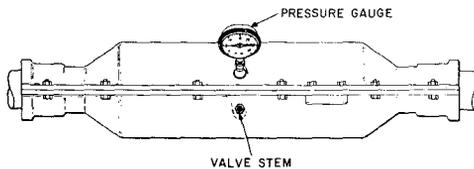
**Fig. 30—Strand Attachment Using 50A Hangers**

- 3.33** After completing the splice, lock the back splice case to the strand by tightening the vertical capscrew.

**3.34** During the assembling of the splice case, lock the front splice case to the strand in a similar manner.

#### 4. PRESSURE TESTING

**4.01** Flash test each splice case installation after a back pressure of 5 pounds has been reached. Use B or C pressure testing solution as appropriate for the test (Fig. 31).



**Fig. 31—Splice Case—Flash Testing**

**4.02** Before replacing the P-13A314 plug in the splice case, apply PIPETITE-Stik compound to the threads of the plug. The plugs on the aluminum splice cases should be tightened to a torque of 50 inch-pounds minimum to 75 inch-pounds maximum. Tighten the plugs on galvanized cast-iron splice cases to a torque of 35 inch-pounds minimum to 50 inch-pounds maximum.

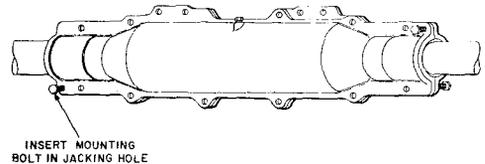
**4.03** Bolts may loosen due to the presence of sealing compound at the bolt locations. Relaxation of this compound will completely occur during the pressure testing interval. After pressure testing is completed, recheck and tighten all nuts and bolts with the B torque wrench to the limits specified in paragraph 3.30. Further relaxation of sealing compound is normal and no further retightening of bolts should be required during the normal service closure.

#### 5. OPENING AND REASSEMBLING

##### Using the D Wrench Kit

**5.01** Remove the bolts from the sides of the cases.

**5.02** Insert four mounting bolts in the jacking holes provided near the ends of each case as shown in Fig. 32. Tighten, alternately, about two turns on each bolt, until one or both cases are free from the cable.



**Fig. 32—Splice Case Jacking Holes With Mounting Bolts in Place**

**Note:** The 20A1 and 20B1 cases are not equipped with separate jacking holes. These cases are jacked apart by inserting mounting bolts from a C or D size case approximately four turns into the four large mounting holes at the ends of the case. The case is then opened by jacking against these mounting bolts.

**5.03** Remove the splice cases from the cable. If a permanent bond for maintaining shield continuity was not placed across the opening when the case was put in initially, install B bond clips and B appliance wire across the opening connected to the aluminum shield as outlined in paragraphs 3.11 and 3.12.

**5.04** Remove the sealing tape and sealing washers from the cable sheath and discard.

**5.05** Examine each splice case bolt for the numeral 3 on the head. (Fig. 28). No other bolts should be used. Do not remove the bond installed in paragraph 5.03. Reinstall the splice cases as covered in paragraph 3.15 through 3.32. Pressure test the completed closure as outlined in Part 4.

**5.06** The splice case which was removed from the cable should be returned to the local Western Electric Distributing House for cleaning and for any necessary repair.