

EARTHQUAKE PROTECTION AND DISASTER BRACING
FOR CENTRAL OFFICE AND P.B.X. EQUIPMENT
EXCEPT FOR POWER EQUIPMENT

NEW INSTALLATION OF
AUXILIARY FRAMING AND CABLE RACK SUPPORTS, FASTENINGS AT TOPS OF FRAMES

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1. GENERAL

1.1 Scope of Section

1.1.1 This section contains the requirement and recommended supplementary measures to be followed in the supporting and fastening of telephone equipment in critical target areas, offices serving important military or atomic installations, and areas subject to earthquake shocks.

1.1.2 The requirements covered in this section should be followed except as modified by applicable specifications and drawings.

1.2 General Information Pertaining To Arrangement of Tools, Precautions, Verification, Specifications, Drawings and Figures, and Associated Information

1.2.1 Refer to Section 17A for information pertaining to the above subjects.

1.2.2 Reference should also be made to the specifications and drawings furnished to the job.

1.2.3 Earthquake and disaster protection information in this section supplements information contained in the other sections of this handbook. The equipment used in earthquake and disaster protection areas is usually the same as that installed in any other area. The method of installing equipment is also fundamentally the same as that employed in other areas. Earthquake and disaster protection areas differ from other areas in that equipment requires additional floor fastenings, overhead fastenings, bracing for auxiliary framing, cable rack, frames, etc. No effort will be made in this section to repeat methods which are covered in other sections of

this handbook.

2. INSTALLING EQUIPMENT

2.1 The tools required for the operations in this section are the same as those listed in the specific sections covering the type equipment being installed.

3. AUXILIARY FRAMING

3.1 Standard low-type auxiliary framing installed in accordance with the 11 Series of Sections in Handbook 30 (BSP 800-614-155) shall be used for the support of equipment, except that the special features outlined herein should be incorporated.

3.1.1 The 2" x 3/8" framing bars or 2" x 9/16" x 3/16" channels shall be furnished with 7/16" holes in each end to facilitate making the bolted splices required in earthquake and disaster protection areas. Where it is likely that the auxiliary framing will be extended on a future installation, the auxiliary framing bars or channels at the end of the initial run of bars or channels should be drilled before being placed into position with two 7/16" holes, 2-1/4" apart to facilitate splicing on any additions. The first hole should be located 1-7/32" from the end of the bars or channels. See Figure 1D.

3.1.2 In step-by-step office auxiliary framing may be located as follows:

- a. On A & M only where the auxiliary framing is 11'-6" above the floor and where "U" brackets per Figure 11 are specified for fastening the top of step-by-step frames to the over-frame cable racks, it is desirable to locate the regular auxiliary framing so that it can be fastened directly to the tops of the frame uprights, wherever it is possible to do

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so without shortening the main lines of framing that bracing will be complicated. In some cases, it may be possible to obtain a greatly strengthened structure by the employment of supplementary framing so placed as to catch certain other uprights.

- b. In offices where, Figure 12Q is specified for fastening top member channels of step-by-step frames to auxiliary framing, the auxiliary framing may be placed at the standard 6'-0" maximum spacing without regard to its being directly over the frame uprights.

3.2 Bracing: Special braces, as shown in Figures 1 and 2, shall be used for adding rigidity to the auxiliary framing structure. Each line of framing shall be braced at each end as near the ends as practicable and, in addition, intermediate double braces shall be located at approximately column spacing, as shown in Figure 3.

3.2.1 For fastening the braces at the ceiling, a 3" 5-lb. channel is provided and bolted to a row of ceiling inserts as shown in Figures 1 and 2. Where beams running at right angles to the channels project below the ceiling slab, the channels should be cut to such lengths as to permit them to be placed at the ceiling slab.

3.2.1.1 As an alternative to the use of short lengths of channels, the braces may be fastened to the ceilings by means of 5/8"-11 self drill anchors and threaded rods, hex nuts, and washers. These anchors should be located directly over the row of auxiliary framing to which the brace is attached.

3.2.2 Wherever practicable, the braces at the ends of the framing should be located at the row of ceiling inserts nearest the wall. In some cases, it will be necessary to use the second row of inserts in order to avoid interference between the lower end of the braces and cable racks, ladder tracks, etc. When the second row of inserts is used, the braces may be slanted in either or both directions as required. It will also be permissible to change the angle of slope of the braces slightly when necessary to facilitate fastening.

3.2.3 Where double braces are used, it will usually be more practicable to slant the braces in both directions from a common point at the ceiling as indicated in Figures 1 and 2. However, braces slanted from a common point at the framing (as shown in Figure 25A of Section 11B, of Handbook 30, covering low-type auxiliary framing) may also be used where it appears desirable to do so.

3.2.4 Where braces must be fastened to framing immediately above framing splices the attachments shall be made as shown in Figures 1 or 2. It is permissible to change the angle of slope of the braces slightly. Figure 1C illustrates a tool which may be used for this purpose. The projecting

screws on the tool are placed into the holes located on the short end of the brace and are fastened by means of 1/2"-13 H.H. Nuts run up finger tight. The other end is held by a bench vise while the brace is bent. In most instances it is necessary to bend two braces an equal amount. In this case, place both of the braces into the vise at the same time to compare the amount of bend.

NOTE: A 27/64" drill (decimal equivalent .422), and 1/2" x 13 tap should be purchased locally to prepare the holes. If these are unavailable, drill a clearance hole, 9/16" (R-1150 Drill), and secure the tool to the brace with 1/2" nut and bolt.

3.2.5 Where auxiliary framing is so located that it can be rigidly fastened to columns, as shown in Figure 3, the intermediate braces on column spacing may be omitted from the particular line of framing.

3.2.6 Where continuous rows of embedded ceiling channel (Unistrut) are provided, the braces shall be fastened as shown in Figure 2A.

3.3 Supplementary Stiffening Framing:

Where a row of frames is omitted, the regular framing shall be stiffened by means of a pair of supplementary framing bars or channels fastened at right angles to them. This supplementary framing shall be located under a row of ceiling inserts approximately over the location of the future row of frames, as shown in Figure 3. The bars or channels shall be braced at each end with standard threaded rod braces as shown in Figures 3 and 7. Where ceiling inserts are not available in a suitable location, 5/8"-11 self-drill anchors and threaded rods, hex nuts, and washers shall be used in the ceiling for fastening the braces.

3.3.1 Where two adjacent rows of frames are omitted or the framing is otherwise unsupported for a distance in excess of 8'-0", supplementary support for the regular framing is required in accordance with the 11 Series of Sections in Handbook 30 (BSP 800-614-155) covering the installation of standard low-type auxiliary framing. In the case of two adjacent rows of frames being omitted, the additional supporting bars or channels shall be combined with the supplementary stiffening framing, described above, by adding 5/8" threaded hanger rods, as required, to support one of the sets of stiffening framing as shown in Figure 3. Where possible, the stiffening framing chosen for this purpose should be those located under ceiling inserts.

3.3.2 Ladder-type cable racks over a row where frames are omitted may serve as stiffening in place of supplementary bars or channels, provided the rack is suitably braced. One brace shall be attached, as shown in Figures 9D, 9E or 9F, at each end of the cable rack and they shall slope in opposite directions. The two braces may be attached to the same cable rack stringer or to opposite stringers. The braces shall be fastened to

ceiling inserts or to 5/8"-11 self-drill anchors as shown in Figure 7.

3.3.2.1 Bar-type cable rack over a row where frames are omitted shall not serve as stiffening in place of supplementary bars of channels.

3.3.3 Where two adjacent rows of frames are omitted, or the framing is otherwise unsupported for a distance in excess of 8'-0", and cable racks, braced in accordance with Paragraph 3.3.2, are used as stiffening in place of supplementary bars or channels, support for the regular framing is required in accordance with 11 Series of Sections of Handbook 30 (BSP 800-614-155) covering installation of low-type auxiliary framing.

3.4 The ends of auxiliary framing bars or channels in buildings having flat ceilings which permit the use of braces as shown in Figure 7, should in no case be supported to the walls, as permitted by the 11 Series of Sections in Handbook 30 (BSP 800-614-155). Where ceiling inserts are not available for the support of the framing, 5/8"-11 self-drill anchors shall be used in the ceiling.

3.4.1 In buildings without ceiling suitable for the attachment of braces, such as unattended carrier stations, the major auxiliary framing crosswise of the equipment shall be continuous double bars or channels extending from wall to wall. At the wall lines, the bars or channels shall be bent at right angles and bolted to the wall with two 3/8" lag screws in boards provided at approximately the 11'6" level for that purpose. This construction shall be used rather than to allow the framing to rest on wall angles P-415057 and clamped with friction clamps. In buildings greater than 20-feet in width where splicing of the auxiliary framing is required, the bolted splice shall be used as shown in Figure 8 or 8A. In wider buildings which require the spliced bars or channels, both bars or channels shall be bent at right angles and bolted at the wall lines. For 20-foot buildings in order to avoid splices, the bars or channels of a pair may be allowed to telescope on each other, only one being bent over and bolted to the wall. Both bars or channels, however, shall extend as near the wall lines as a 20-foot stock length will permit, in order to provide maximum stiffness.

3.5 For new installations, high-type auxiliary framing is used for the support of distributing frames over 11'6" high and the mezzanine platforms rolling ladders, cable racks, etc., associated with them. The primary bars or channels of the high-type framing shall be made continuous wherever possible and shall be braced with flat-bar or angle-type braces per Figure 37, Handbook 30, Section 17A2 spaced in the same manner as for low-type framing.

3.6 Splices in Framing Bars or Channels:
The lengths of 2" x 3/8" bars or 2" x 9/16" x 3/16" channels used for the continuous auxiliary framing at right angles to the

frames shall be spliced together by means of splice bars and H.H. cap screws as shown in Figures 8 or 8A. When auxiliary framing channels are to be spliced in accordance with Figure 8A, a P-42E189 washer is required between the channel and head of H.H. Cap Screw if channel has 9/16" diameter punched holes. Separation of splices in adjacent pairs of bars or channels by at least one aisle, as called for in the 11 Series of Sections in Handbook 30, (BSP 800-614-511) is not necessary inasmuch as the bars or channels are positively bolted together at the splices. When an offset splice per Fig. 8B, 8C or 8D is required to junction auxiliary framing channels having 7/16" punched holes, the installer shall redrill holes to 9/16" to accommodate the standard offset splice bar.

3.6.1 Where support of equipment at auxiliary framing splices is required:

- a. Cable rack - shall be fastened to auxiliary framing channels as shown in Handbook 30, Section 11A, Fig. 5 and in BSP 800-614-155, Figure 5 - Auxiliary Framing Fastened to Underside of Cable Rack.
- b. Ladder Tracks - shall be fastened to auxiliary framing channels as shown in Handbook 30, Section 40B, Figure 11 and in BSP 800-614-159, Figure - Track Supported Directly From and at Right Angles to Auxiliary Framing.
- c. Secondary Auxiliary Framing - shall be fastened to auxiliary framing channel as shown in Figure 7 - Supplementary Framing and Braces at Unequipped Rows of Frames.

3.6.2 Where 11'-6" and 11'-8" auxiliary framing are junctioned, a P-30H130 Splice Plate shall be used to bolt the two levels of framing together as shown in Figure 8B.

3.6.3 Where two levels of auxiliary framing with 1-inch height difference are junctioned, a P-48J890 Splice Plate shall be used to bolt the two levels of framing together as shown in Figure 8C.

3.6.4 Where 11'-8" and 11"-9-1/2" high auxiliary framing are junctioned, a 840036792 Splice Plate shall be used to bolt the two levels of framing together as shown in Figure 8D.

4. SUPPORT OF CABLE RACKS

4.1 All main- and end-aisle cable racks and all other cable racks not attached directly to the frames or to regular auxiliary framing shall be supported by hanger rods from framing at the ceiling, as shown in Figure 9. Auxiliary framing used for the support of cable racks shall be supported from ceiling inserts, beam clamps, or hanger bolts in the floor above in accordance with the requirements for installing high-type auxiliary framing. Seld-Drill anchors in the ceiling shall not be used.

4.1.1 Where cable racks are at right angles to the rows of frames (cross-aisle racks), it will be necessary to support these racks by means of hanger rods from ceiling inserts if rows of frames have been omitted and the length of the cross-aisle racks exceeds 8'-0", the cross-aisle racks between rows of frames are less than 8'-0", the rack shall be supported as called for in the cable rack support section of Handbook 30 (BSP 800-614-155).

4.1.2 Because of the difference in construction, bar-type over-aisle cable racks will always require a pair of framing bars or channels under the racks for attachment to the hanger rods as shown in Figures 9H and 9J.

4.1.3 Supplementary stiffening framing above a line where frames have been omitted may be used to support bar-type cross aisle cable racks in No. 5 Crossbar offices. In such cases, and in cases where ladder-type cable racks are 2 inches above the auxiliary framing to clear conduit, etc., the racks shall be supported by 5/8"-11 threaded rods, clips, lockwashers, and tied together with a flat steel bar, as shown in Figure 9L.

4.2 Hanger rod supported cable racks shall be braced as required to prevent swaying and "whipping" both sideways and in an endwise direction.

4.2.1 Sidewise braces, as shown in Figures 9A, 9B, 9C, 9G, and 9H on 5'-0" to 6'-0" spacing are satisfactory. In the case of main cross-aisle racks, sidewise bracing is unnecessary due to the bracing action obtained by the frame cable racks fastened to it at regular intervals on each side. End-aisle cable racks require bracing on the outside stringer only.

4.2.2 Normally one set of brace rods per run of cable rack is sufficient for bracing in an endwise direction as shown in Figures 9D, 9E, 9F, and 9J. Brace rods shall be installed on opposite stringers, not necessarily opposite each other, and slanted in opposite directions. Where a hanger rod supported cable rack is attached at some point to a frame, auxiliary framing or other cable racks, which is in turn so braced as to resist endwise movement of the cable rack, no additional endwise bracing shall normally be required.

4.2.3 Either standard threaded rod braces, flat-bar braces or angle-type braces may be used. Rod braces will be satisfactory for very short braces or those located so as to provide bracing in opposite directions. Other-wise bar- or angle-type braces should be used.

4.2.4 Hanger rod supported cable racks over distributing frames shall be braced in a sidewise direction as shown in Figure 9M.

4.3 Perpendicular Bracing: When two braces are installed at right angles to each other from a common insert or expansion shield, refer to Figure 9N.

4.4 Ladder-, and bar-type cable racks attached directly to the auxiliary framing shall be bolted to the framing bars or channels with two bolts, one at each cable rack stringer, using lockwashers under the nuts. Where ladder-type or bar-type cable racks are attached to isolated frames or frames that extend more than 2'-6" beyond the last framing bars through L or U brackets, or through the short pairs of framing bars or channels, "antislip" details, as shown in Figure 10A, shall be bolted to the adjacent regular auxiliary framing at each side of such supports. The 840372536 Antislip Detail shall be pushed snug against cable rack and securely fastened to the auxiliary framing using 1/2"-13 Hex Head Cap screw, hex nut and tooth type lock washer as shown in figure 10A. Where short pairs of framing bars or channels are used on frames, "antislip" details is to prevent the cable rack fastenings from slipping.)

4.4.1 When, in the case of cable rack supported frames, the framing is located directly over and attached to the frame uprights, the L or U frame support details and the "antislip" detail shall be omitted at the upright.

4.5 The standard arrangement of the L and U bracket fastenings between the frames and cable rack should be used, except that U brackets shall be used at each end of each single-sided frame and at the ends of "wing bays" of the panel-type double-sided frames.

4.5.1 Extra heavy I and U brackets arranged for clamps that enclose the cable rack stringers, as shown in Figure 11, shall be used in panel and step-by-step systems having auxiliary framing located 11'-6" above the floor.

4.6 "Studded-Up" cable racks, that is, cable racks supported by hanger rod studs from cable racks below, as shown in the Cable Rack Support Section of Handbook 30 (BSP 800-614-157), are not considered good practice in earthquake and disaster protection areas and shall not be used.

4.6.1 Where double-level cable racks are required due to separation of wiring, and ceiling heights do not permit the installation of high-level framing, "studded-up" cable racks are permissible and shall be braced downward to the lower level framing bars or channels.

5. FASTENING TOPS OF FRAMES

NOTE: Where cable racks are an integral part of the arrangement at the tops of frames, i.e., connected to L or U brackets or short pairs of framing bars, refer to the previous information in this section under "Support of Cable Racks."

5.1 No. 1 Crossbar and No. 4 Toll Angle-Type Switching Frames: The top angles and auxiliary framing in No. 1 Crossbar offices or in No. 4-Type toll switching offices shall be rigidly fastened together as shown in Figure 12A. In other toll offices, where the framing is at 11-foot 6" inch height, for any frames or racks provided with twin top angles, the P-423640 Tooth-Type Lock-washer shall be used instead of the P-428408 Bracket Assembly.

5.1.1 ON additions where the original frames were grouted and the auxiliary framing is located approximately 3" above the tops of the frames and frames are to be installed under the existing auxiliary framing, the fastening between the auxiliary framing and the frame top angles shall be made as shown in Figure 12B.

5.1.2 Adjacent frames shall be fastened together at the top as shown in figure 12L, using the 4-bolt clip, R-449079 and four 5/8"-11 T-bolts, P-449081.

NOTE: Junction plates P-449079 tend to distort when nuts are tightened excessively. While this distortion does not prevent the junction plate from functioning satisfactorily, it is recommended that, in order to prevent excessive distortion, the tightening of the nuts, be stopped when perceptible bending is noted.

5.1.3 Where the junctions between frames occur under or adjacent to the regular auxiliary framing so that there would be interference between the P-449079 Junction Plate and Bracket Assemblies per Figure 12A or 12B, the frame tops shall be junctioned in the usual manner using P-449079. The P-428408 or P-431157 Support Bracket Assembly shall then be located adjacent to one end of the junction plate and attached to the frame cable rack with a pair of short auxiliary framing bars or channels. In this case, flat bar antislip details described in Paragraph 4.4 shall be used to prevent slippage of the fastenings.

5.2 No. 5 Crossbar Frames: Instead of the usual pad assembly with 1/2"-13 T-bolt fastening, a U detail shall be used for attaching the tops of the frames to auxiliary framing as shown in Figure 12K. The U detail is fastened to the frame top members with a 5/8"-11 T-bolt and to the framing bars or channels with two 1/2"-13 bolts. The P-30A304 Bracket shall be used when the auxiliary framing passes over a P-30A349 Plate junctioning the tops of frames. The P-30A305 Bracket shall be used where the auxiliary framing passes over the top of a frame and there is no P-30A349 Bracket on the frame top below the auxiliary framing.

5.2.1 Framework Junctions: Adjacent frames in a line-up shall be fastened together at the top using the 4-bolt junction plate, P-30A349, and four 5/8"-11 HH cap screws, P-30A303 bars, lockwashers, and hex. nuts.

5.3 Step-By-Step Bulb-Angle-Type Frames: The lengths of 2" channel top members shall be spliced together by means of splice bars and HH Cap Screws as shown in Figure 8A. Extra clips, bolts and lockwashers, as shown in Figure 12Q, shall be used to fasten the channel top members to 11'-8" high auxiliary framing.

5.4 Bulb-Angle Relay Racks: Adjacent bulb-angle-type relay racks shall be fastened together at the top, as shown in Figure 12L using the 4-bolt clip, P-449079, and four 5/8"-11 T bolts, P-449081.

5.5 Bulb-angle frames with two top angles in a high framing area where the framing is more than 1'-6" above the frames shall be supported with angle-type braces as shown in figure 12R.

5.6 Cable-duct-type frames junctioned at the top with pipe, as shown in Figure 1A of Section 19E2 of Handbook 30 (BSP 800-614-154), and Figure 6F of Section 19E2 (BSP 800-614-155), shall have tooth-type lockwashers under the nuts of V and U bolts. V and U bolts fastening cable duct-type frames to auxiliary framing, as shown in Figures 6J, 6L, 6M, and 6P of Section 19E2 (BSP 800-610-155), shall have tooth-type lockwashers under the nuts of V and U bolts. A P-49C343 tooth-type lockwasher shall be used under the head of bolt P-36A673.

5.7 Distributing Frames and Protector Frames: Distributing frames and protector frames 11'-6" high or higher shall be braced in an end-wise direction. Provide a brace at each end and at about 40' intervals along the frame as shown in Figure 12J.

5.8 355A Community Dial Offices and Similar Equipments: These equipments which use cable racks (without auxiliary framing) to support the frames, and which may be installed in areas not provided with ceiling inserts, should be braced as indicated in Figures 12C and 12G inclusive.

5.8.1 Braces extending to the wall shall be used where the ceiling is unsuitable for the termination of braces. Braces terminating at the wall shall be attached to 2" x 6" timbers extending the full length of the equipment where practicable. A single brace shall be used for distances up to 7'-0". A double brace (two 1-1/2" x 1-1/2" x 3/16" angle) shall be used where distance to wall exceeds 7'-0". The double braces shall be arranged back to back for distributing frames and toe to toe for cable racks as shown in Figures 12D and 12E respectively.

5.8.2 Braces to the ceiling shall be attached to 2" x 6" timbers lagged to the ceiling as shown in Figure 12F.

5.8.3 Junctions between frame-aisle cable racks, at the same level, shall be made with bolted angle brackets as shown in Figure 12G instead of with corner clamps.

5.9 No. 1 AMA Accounting Center - Relay Cabinets: No. 1 AMA accounting center relay cabinets should be fastened together at the top as follows:

5.9.1 Accounting center machines located back-to-back shall have opposite relay cabinets connected together at the top by means of square tubing details bolted horizontally, as shown in Figures 12M and 12N.

5.9.2 Accounting center machines not arranged back-to-back shall be braced by means of square tubing bolted vertically to the side of the relay cabinet from which the upper-most spacer-bracket, P-255695, has been omitted and then connected to the ceiling with two angle brackets 3/8"-16 expansion shields and studs, as shown in Figures 12M and 12N.

5.9.3 Where an accounting center machine is added back-to-back with a machine previously installed with vertical bracing, it shall be braced to the former machine with horizontal bracing, as shown in Figures 12M and 12N.

5.9.4 For all arrangements, the number of pieces of horizontal or vertical tubing braces varies with the number of relay cabinets of the machine, as shown in Figure 12M and 12N.

5.9.5 For all arrangements, the tops of adjacent relay cabinets shall be bolted together with two 5/16"-18 RHM Screws, tubular separators and nuts, as shown in Figures 12M and 12N.

6. VERIFICATION ITEMS

6.1 General

6.1.1 The following contains the verification items for the equipment installed by operations covered in this section.

6.1.2 Where practical, the essentials of the requirement are included in the verification item. where this is not practical, a brief statement of the requirement appears as one or more subparagraphs of the verification item. In each case, reference is made to each requirement.

VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENTS		PAR.NO	FIG. NO.
6.2	Verification Items - Auxiliary Framing		
6.21	Bracing		
6.211	Lines of Framing Braced at Each End -	3.2	1,2

	VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENTS	PAR.NO	FIG. NO.
	Single Braces	3.21	
6.212	Intermediate braces at Column spacing - Double Braces	3.2 3.23	3
6.213	Rigid Fastening to Columns - Omit Intermediate Braces	3.25	3
6.22	Supplementary Stiffening Framing		
6.221	One Row of Frames Omitted	3.3	
6.2211	Bar of Channel Framing Support at Right Angles to Regular Framing		
6.2212	Proper Location Over Future Frames		3
6.2213	Threaded Rod Brace at each End of Framing Support	3.32,3.34	3.7
6.2214	Proper Fastening of Braces at Ceiling	3.3	7
6.222	Two or More Rows of Frames Omit	3.31	
6.2221	Standard Low-Type Auxiliary Framing Combined With Supplementary Stiffening		3
6.222	Ladder Type Cable rack Used as Stiffening Framing	3.32	
6.2223	Cable rack Bracing	3.32	9D, 9E, 9F
6.2224	Support for Regular Framing Per Handbook 30 - Section 11	3.33	
6.2226	End Support of Auxiliary Framing	3.4	7
6.223	Splices	3.6	
6.2231	Bar Type Framing	3.6	8
6.2232	Channel Type	3.6	8A
6.2233	Separation of Splices Not Required	3.6	
6.2234	Support of Equipment at Splices	3.61	
6.2235	Two-Level Splicing	3.62,3.63,3.64	8B,8C,8D
6.23	Support of Cable		
6.231	High Type Aux. Framing Support of Bar or Ladder Type Cable Rack Attached Directly To Auxiliary Framing	4.1	9
6.232	Cross Aisle rack Above Auxiliary Framing	4.13	9L
6.233	Bar Type rack Supported by Auxiliary Framing	4.12	9H,9J
6.24	Bracing of Cable rack		
6.241	Hanger Rod Supported Racks Braced in Two Directions	4.2	
6.2411	Sidewise	4.21	9A, 9B, 9C, 9G, 9H
6.2412	End Braces		9D, 9E, 9F, 9J
6.2413	Bracing Cable racks to Distributing Frame Verticals	4.24	9M
6.25	Two Braces Installed from Common Insert-Use Spacer	4.3	9N

	VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENTS	PAR.NO	FIG. NO.
6.26	Fastening of Cable rack to Auxillary Framing		
6.261	Anti-Slip Detail Properly Located	4.4,4.5	10A,11
6.27	Fastening Tops of Frames		
6.271	No. 1 and No. 4 Crossbar Frames	5.1,5.13	12A,12B
6.272	No. 5 Crossbar Frames	5.2	12K
6.273	Bulb angle Type Frames Where Distance to High Type Framing Exceeds 1'-6"	5.5	12R
6.274	Bulb Angle Relay Racks	5.4	12L
6.275	Cable Duct Type Frames	5.6	
6.276	Distributing and Protector Frames	5.7	12J
6.28	Community Dial Offices	5.8	
6.281	Cable rack Supported Frames	5.8	12C,12G
6.282	Wall Braces	5.81	12D,12E
6.283	Ceiling Braces	5.82	12F
6.284	Junctions Between Frame Aisle Cable Racks and Cross-Aisle Racks	5.83	12G
6.29	No. 1 AMA Accounting Centers Vertical and Horizontal Bracing Details Junctioning of Relay Cabinets	5.9 5.91,5.94 5.95	12M,12N 12M,12N

Engineering Planning Manager
(Installation)

Attachment:
Figures

Reason for Reissue:

- 1) Update Figures 2A and 9N
- 2) Update Paragraph 4.3 by removing notation of P-49D449 Spacer

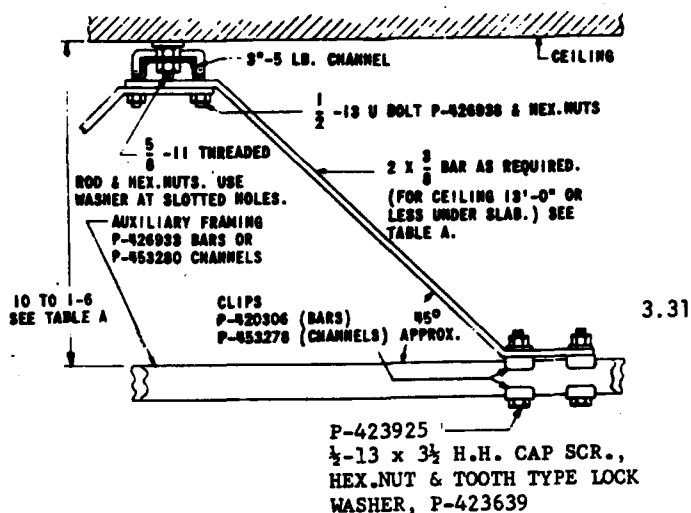
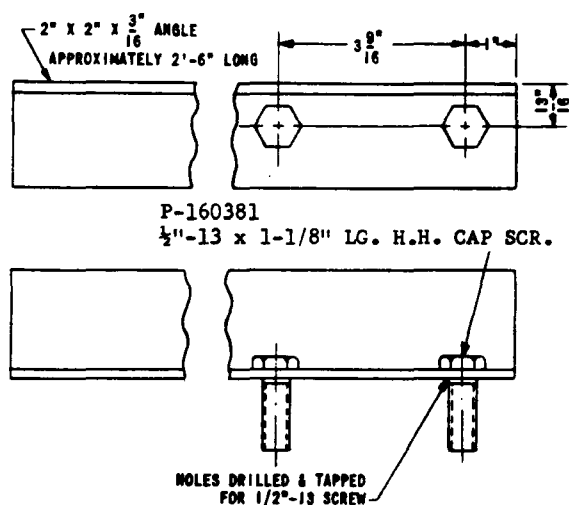
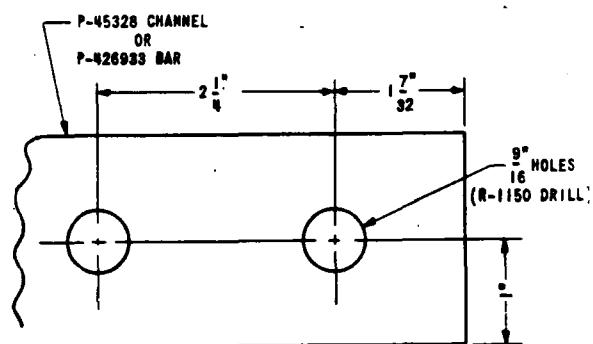


TABLE A	
DIM.	2 X 3/8 BAR PART NUMBER
10	P-429511
1-0	P-429512
1-2	P-429513
1-4	P-429514
1-6	P-429515

RP-0413

FIG. 1 AUXILIARY FRAMING BRACES FOR
USE IN LOW CEILING AREAS

RP-0372

FIG. 1C BRACE BENDING TOOL
(PAR. 3.2.4)

RP-0373

FIG. 1D LOCATING DRILLED HOLES IN
AUXILIARY FRAMEWORK FOR FUTURE
INSTALLATION
(PAR. 3.1.1)

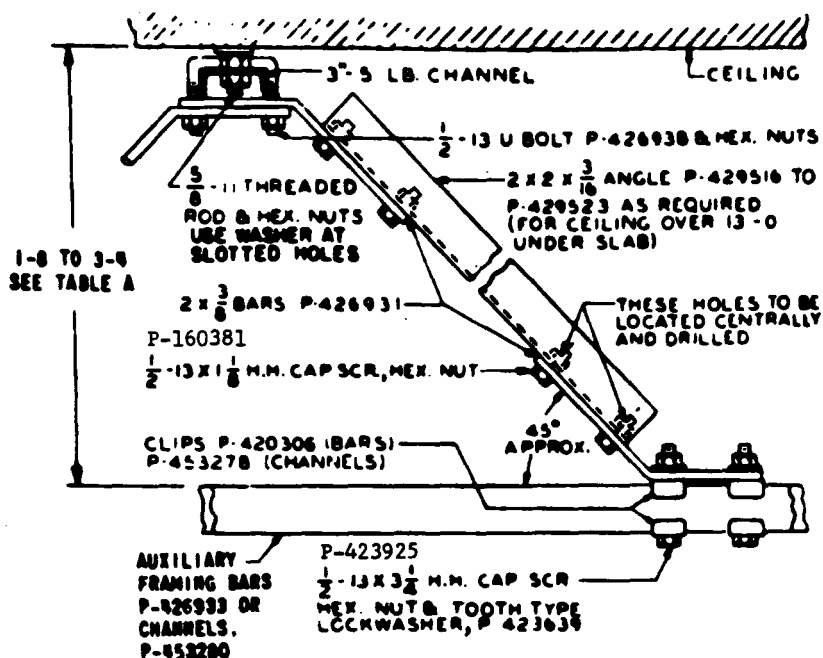
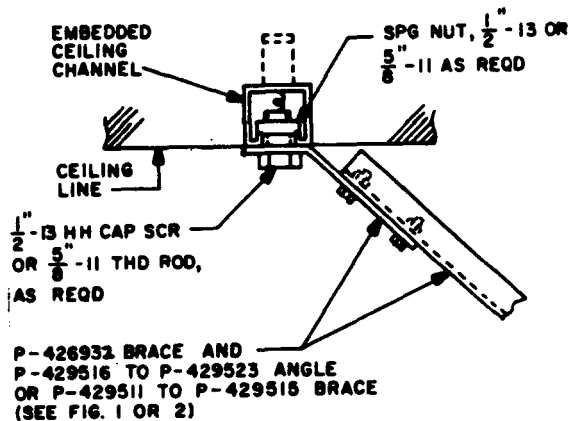


TABLE A	
DIM.	2X2X3/16 ANGLE PART NO.
1-8	P-429516
1-10	P-429517
2-2	P-429518
2-4	P-429519
2-8	P-429520
2-10	P-429521
3-2	P-429522
3-4	P-429523

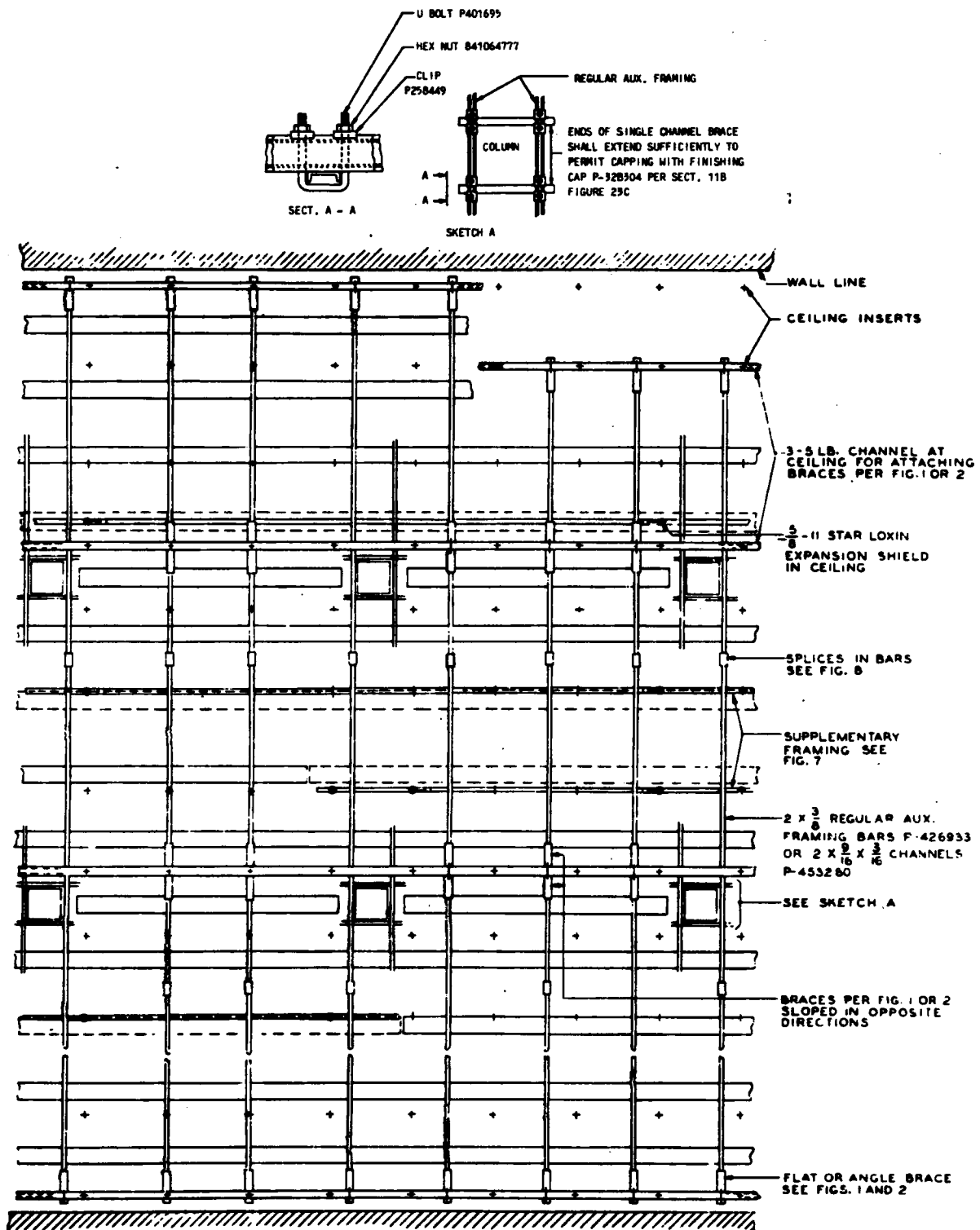
RP-0374

FIG. 2 AUXILIARY FRAMING BRACED FOR USE IN HIGH CEILING AREAS (PARS. 3.2, 3.2.1, 3.2.3)



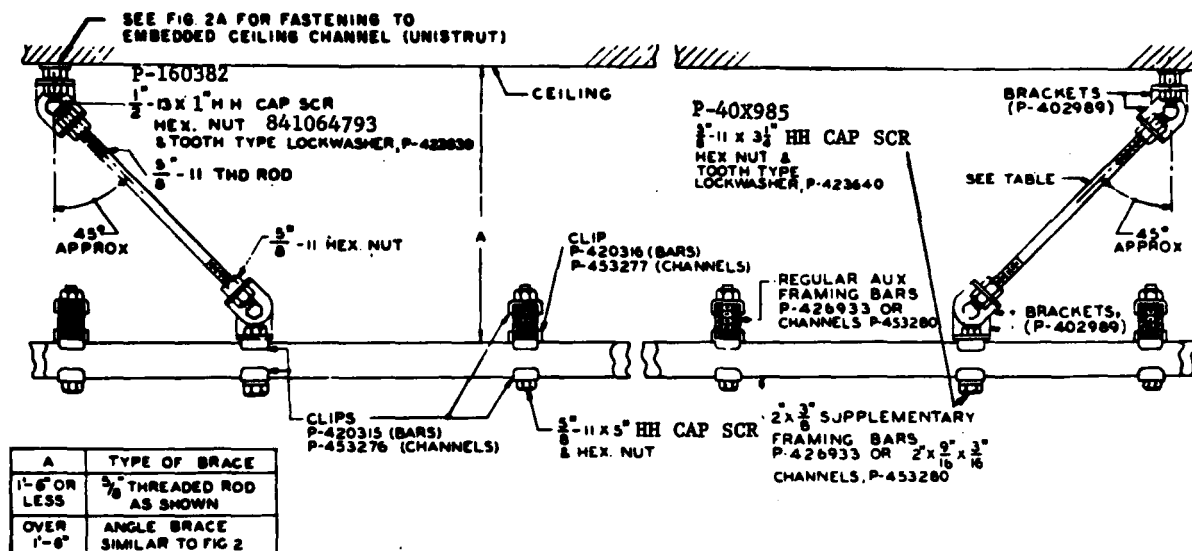
RP-0414

FIG. 2A FASTENING AUXILIARY FRAMING BRACE TO EMBEDDED CEILING CHANNEL (UNISTRUT) (PAR. 3.2.6)



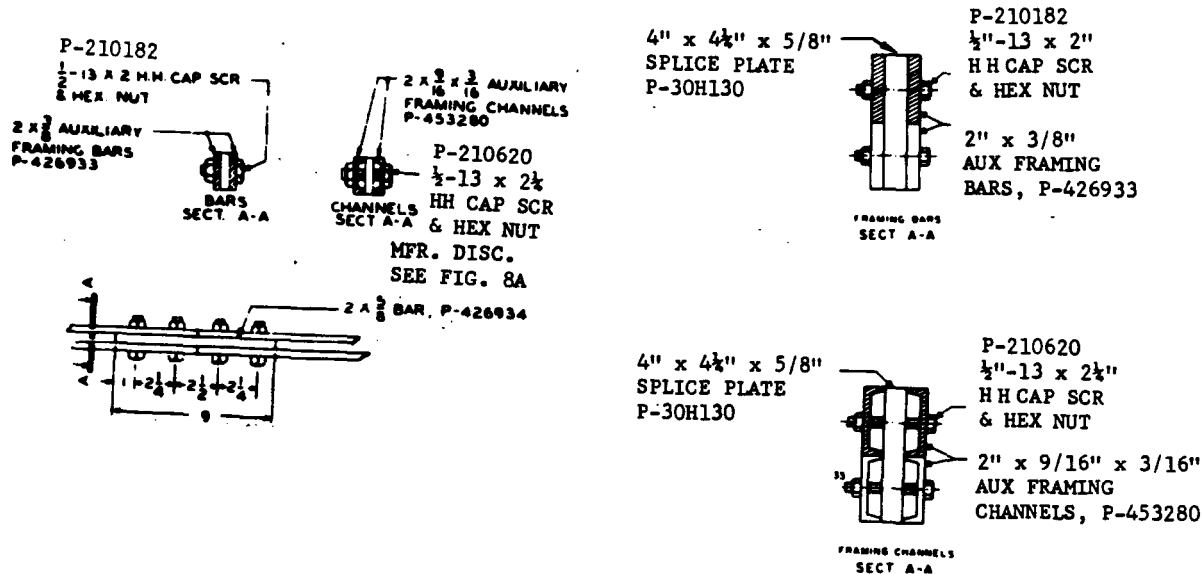
RP-0376

FIG. 3 TYPICAL AUXILIARY FRAMING ARRANGEMENTS
(PARS. 3.2, 3.2.5, 3.3, 3.3.1)



RP-0379

FIG. 7 SUPPLEMENTARY FRAMING AND BRACES AT YNEQUIPPED ROWS OF FRAMES (PARS. 3.3, 3.3.2, 3.4)



RP-0380

FIG. 8 AUXILIARY FRAMING SPLICES (PARS. 3.4.1, 3.6, 5.3)

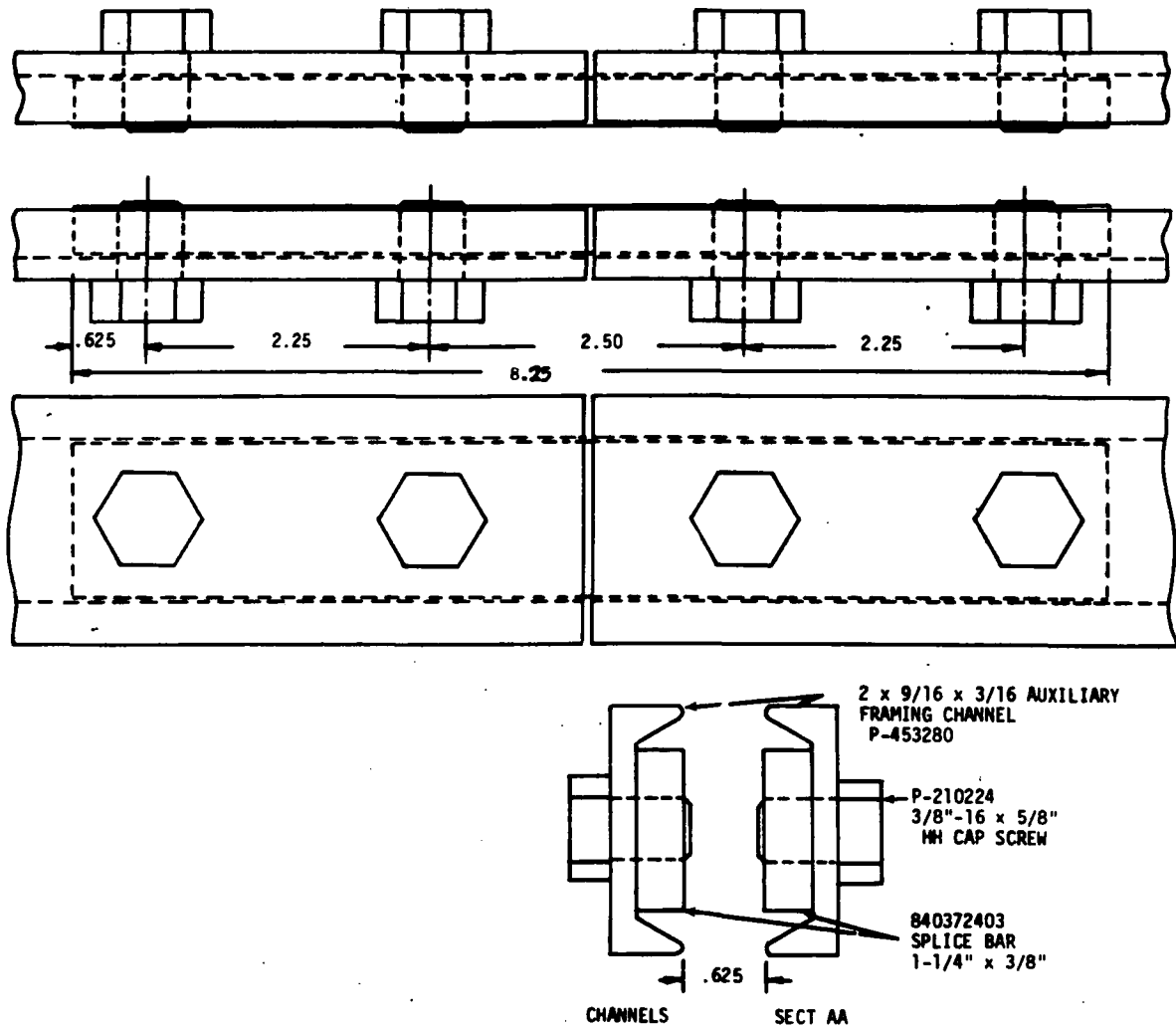


FIG. 8A AUXILIARY FRAMING SPLICES
(PARS. 3.4.1, 3.6, 5.3)

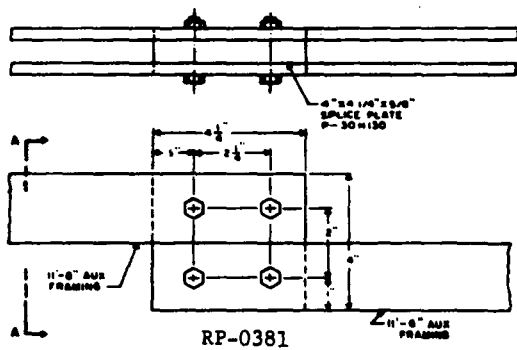


FIG. 8B AUXILIARY FRAMING SPLICES 11'-6" AND 11'-8" FRAMING (PAR. 3.6.2)

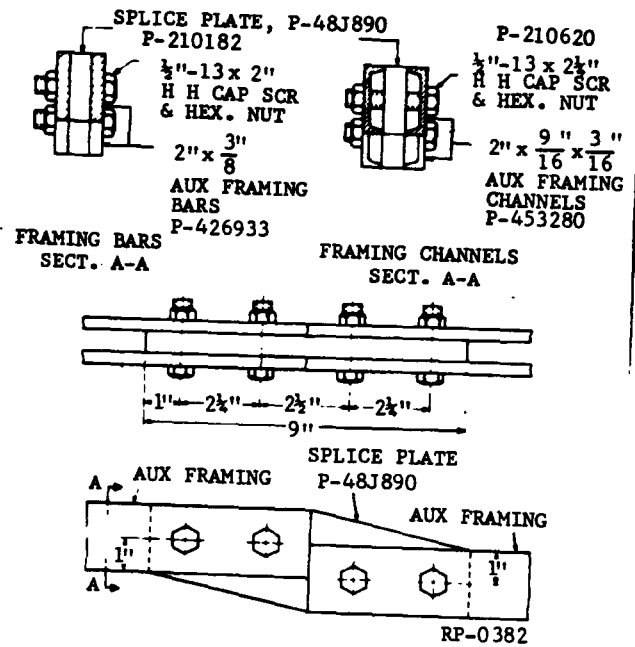
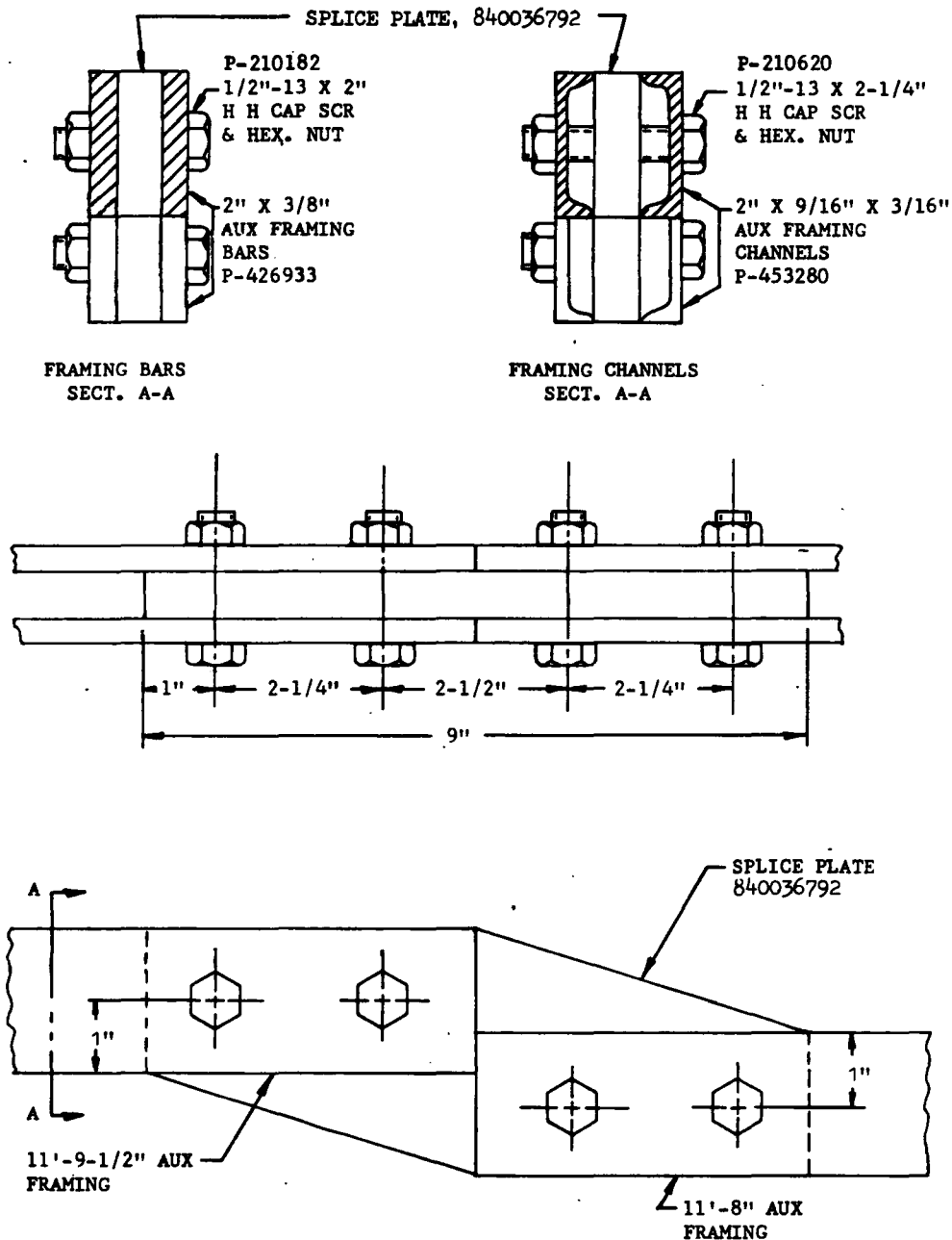


FIG. 8C AUXILIARY FRAMING SPLICE - 1-INCH DIFFERENCE IN FRAMING LEVELS (PAR. 3.6.4)



RP-0383

FIG. 8D AUXILIARY FRAMING SPLICES - 11' 8"
AND 11' 9 1/2 " FRAMING
(PAR. 3.6.4)

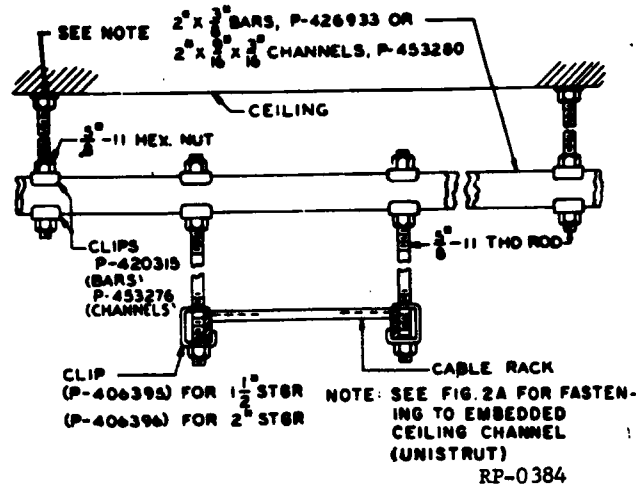


FIG. 9 SUPPORT OF LADDER TYPE OR BAR TYPE CABLE RACK NOT ATTACHED DIRECTLY TO AUXILIARY FRAMING (LADDER-TYPE SHOWN) (PAR. 4.1)

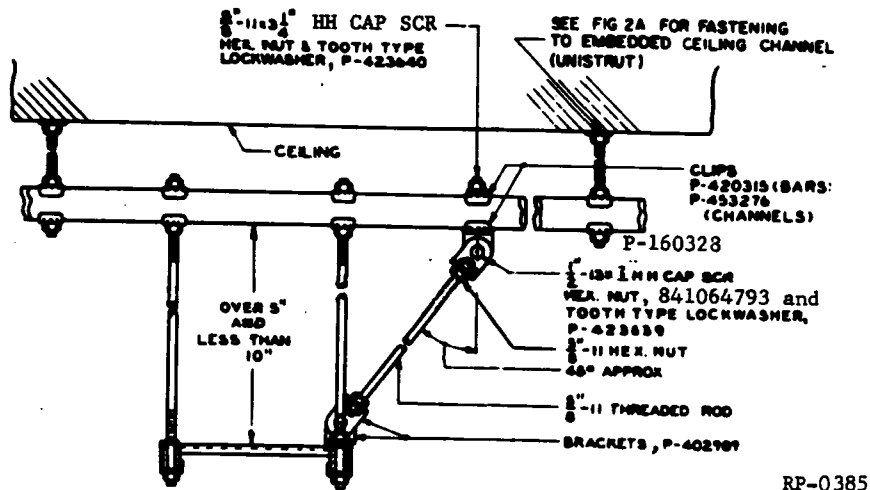
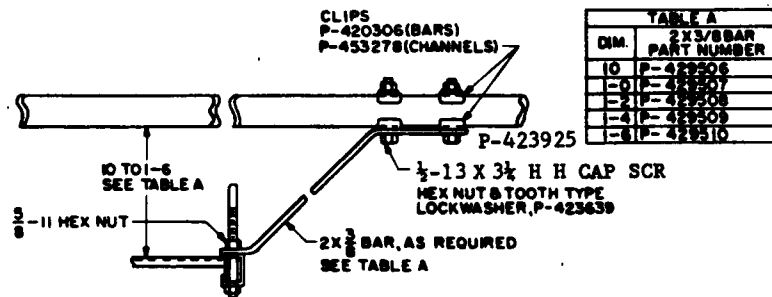
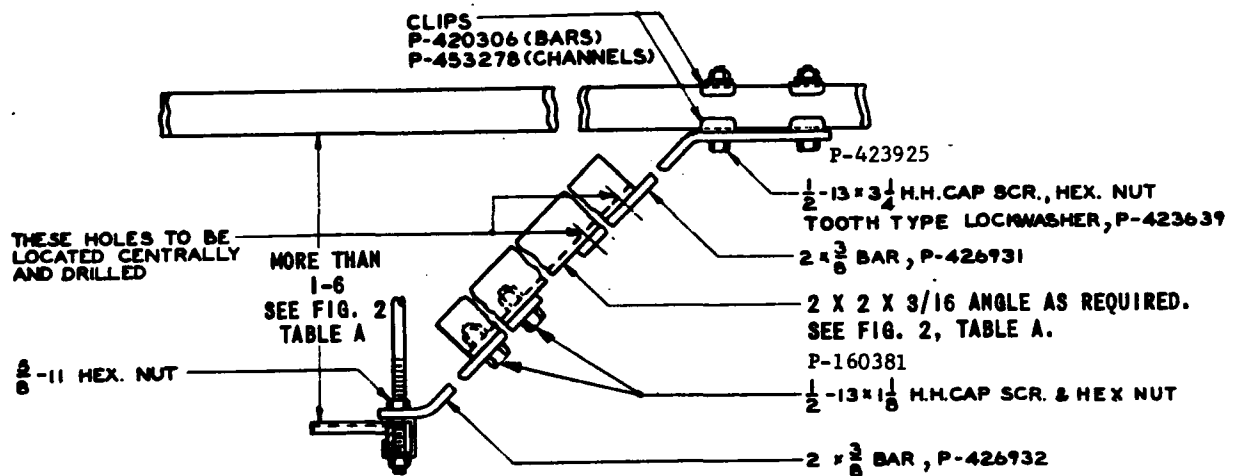


FIG. 9A SIDEWISE BRACING OF LADDER-TYPE OR BAR-TYPE CROSS-AISLE CABLE RACKS WITH THREADED ROD BRACES (LADDER-TYPE SHOWN)



RP-0386

FIG. 9B SIDEWISE BRACING OF LADDER-TYPE OR BAR-TYPE CROSS-AISLE CABLE RACKS WITH FLAT BAR BRACES (LADDER-TYPE SHOWN)
(PAR. 4.2.1)
(BSP 800-610-155, Fig. 9B)



RP-0387

FIG. 9C SIDEWISE BRACING OF LADDER-TYPE OR BAR-TYPE CROSS-AISLE CABLE RACKS WITH ANGEL BRACES (LADDER-TYPE SHOWN)
(PAR. 4.2.1)

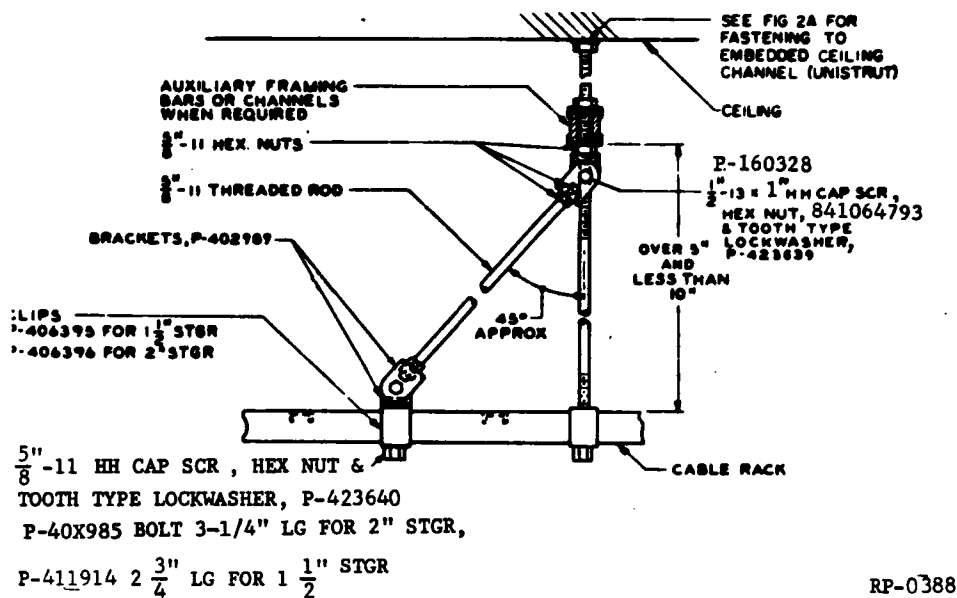


FIG. 9D ENDWISE BRACING OF LADDER-TYPE OR BAR-TYPE CROSS-AISLE CABLE RACKS WITH THREADED ROD BRACES (LADDER-TYPE SHOWS) (PARS. 3.3.2, 4.2.2)

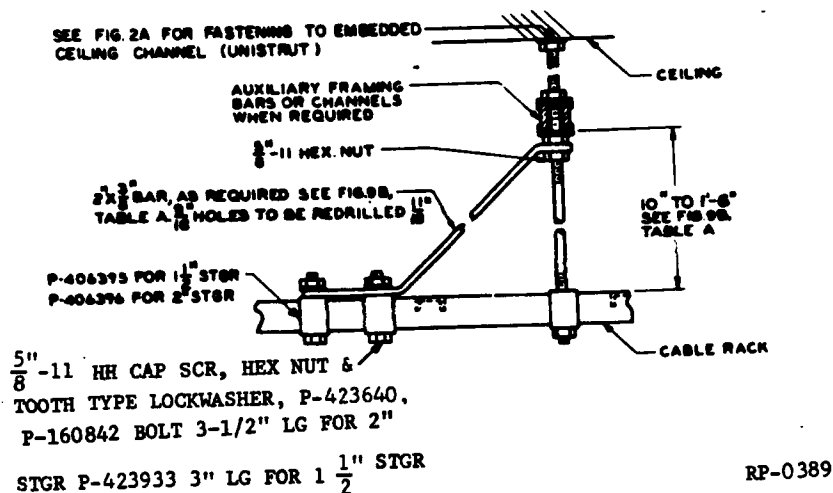


FIG. 9E ENDWISE BRACING OF LADDER-TYPE OR BAR-TYPE CROSS-AISLE CABLE RACKS WITH FLAT BAR BRACES (LADDER-TYPE SHOWN) (PARS. 3.3.2, 4.2.2)

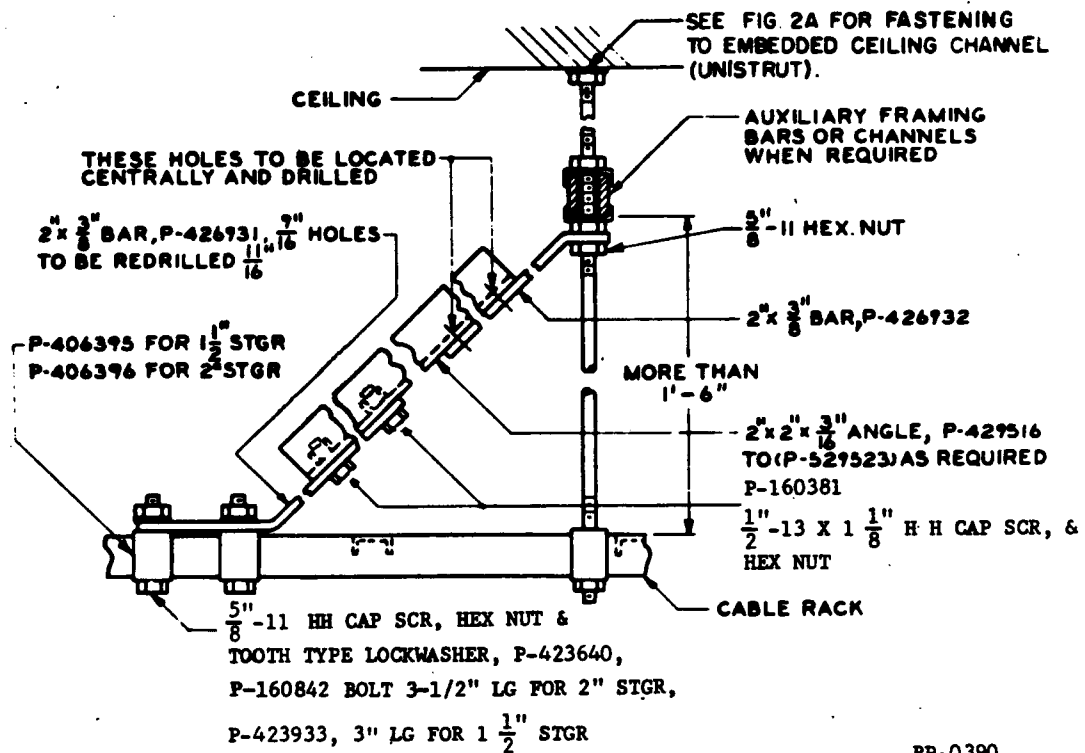


FIG. 9F ENDWISE BRACING OF LADDER-TYPE ON BAR-TYPE CROSS-AISLE CABLE RACKS WITH ANGLE BRACES (LADDER-TYPE SHOWN) (PARS. 3.3.2, 4.2.2)

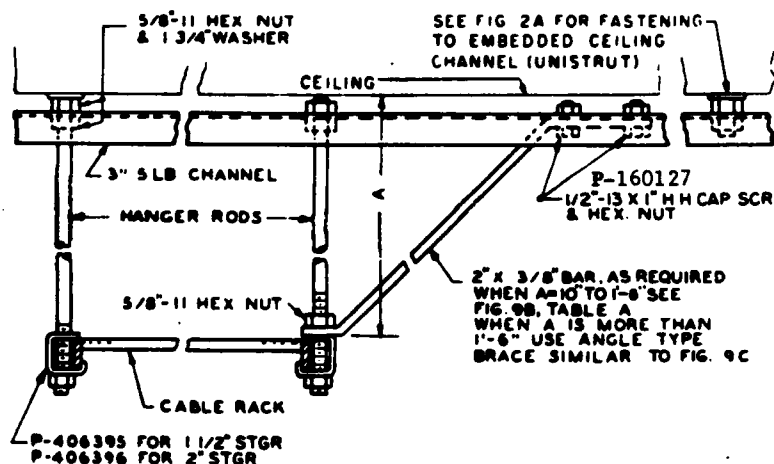
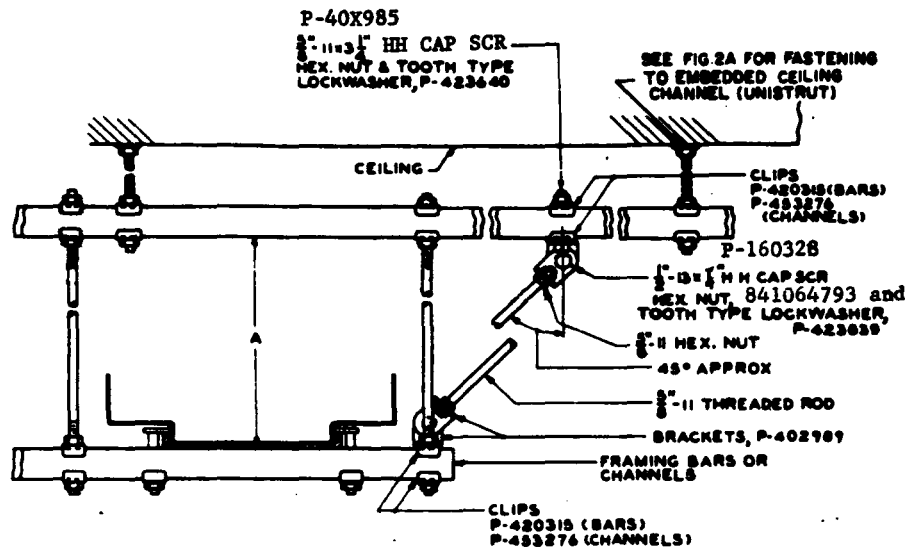


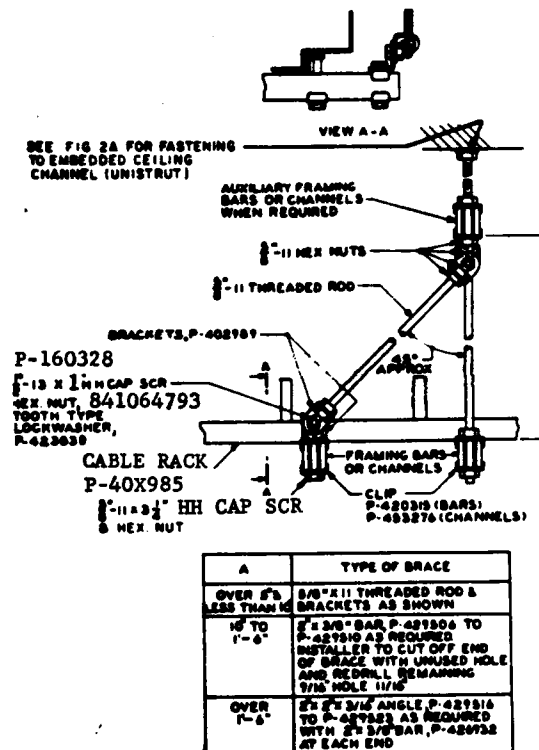
FIG. 9G SIDEWISE BRACING OF LADDER-TYPE CABLE RACKS IN POWER AND OPERATING ROOMS (PAR. 4.2.1)



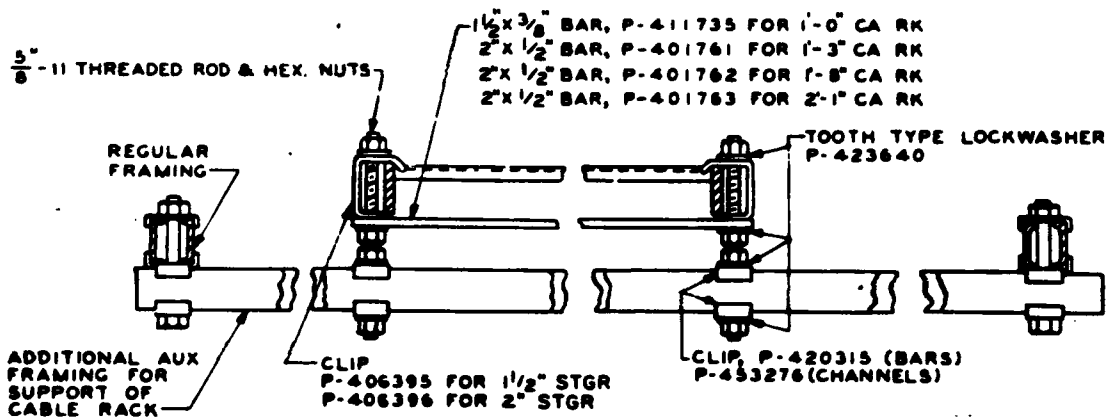
A	TYPE OF BRACE
OVER 5' & LESS THAN 10'	3/8"-11 THREADED ROD & BRACKETS AS SHOWN
10' TO 1'-6"	2" X 3/8" BAR, AS REQUIRED SEE FIG. 9B, TABLE A
OVER 1'-6"	2" X 2" X 3/16" ANGLE, P-429516 TO P-429523 AS REQUIRED WITH 2" X 3/8" BAR P-426932 AT EACH END

RP-0392

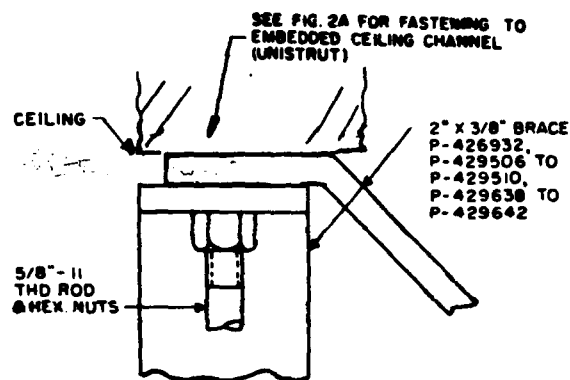
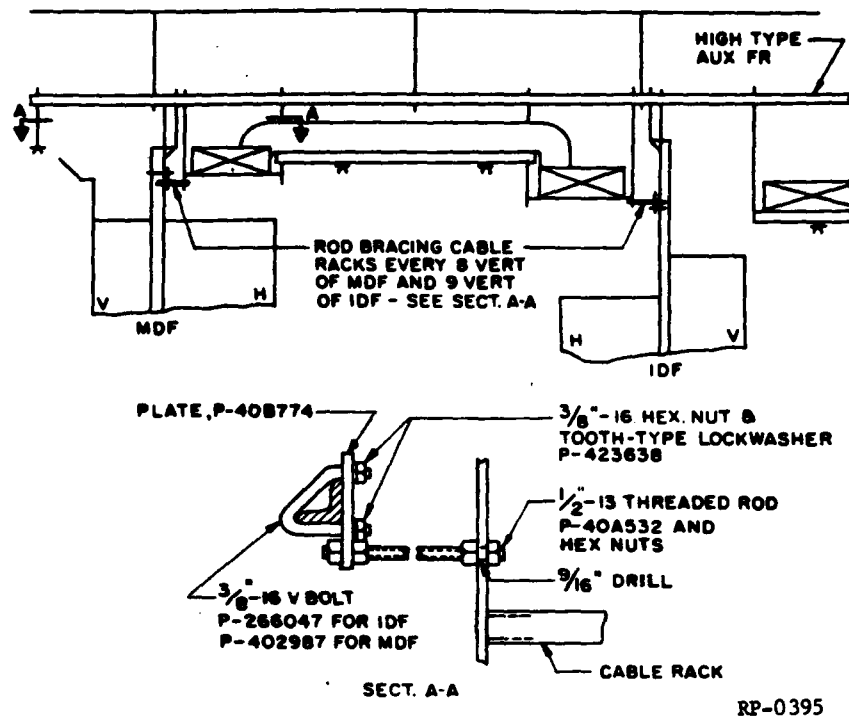
FIG. 9H, SIDEWISE BRACING OF BAR-TYPE OVER-AISLE
CABLE RACKS
(PARS. 4.1.2, 4.2.1)



RP-0393
FIG. 9J ENDWISE BRACING OF BAR-TYPE
OVER-AISLE RACKS
(PARS. 4.1.2, 4.2.2)



RP-0394
FIG. 9L SUPPORTING LADDER-TYPE OR BAR-TYPE CROSS-AISLE CABLE
RACKS 2" ABOVE AUXILIARY FRAMING (LADDER-TYPE SHOWN)
(PAR. 4.1.3)



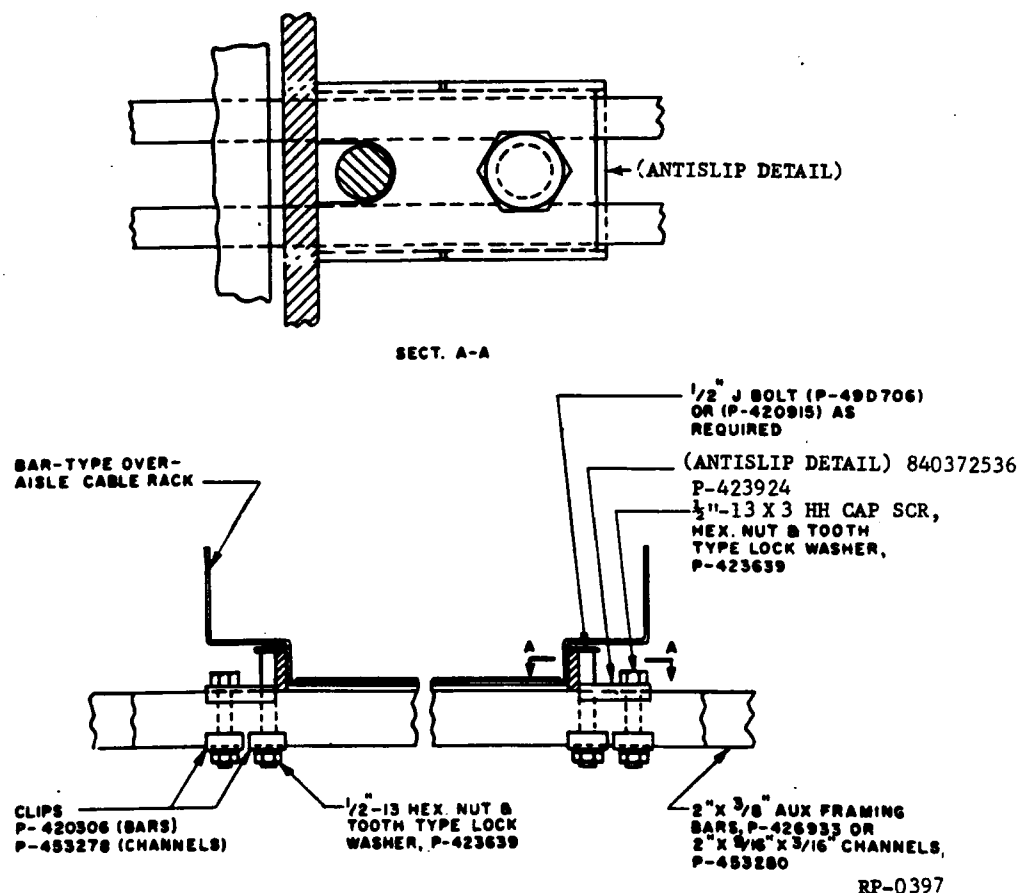


FIG. 10A FASTENING LADDER OR BAR-TYPE CABLE RACK TO AUXILIARY FRAMING WHERE CABLE RACKS SUPPORT FRAMES-USE OF ANTI-SLIP DETAILS BAR TYPE OVER AISLE RACK SHOWN (PAR. 4.4)

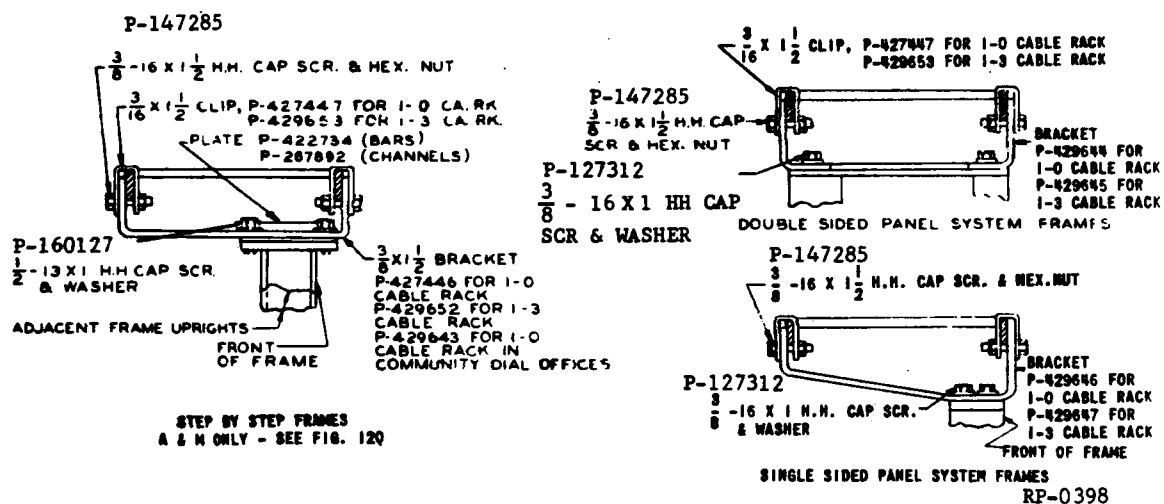
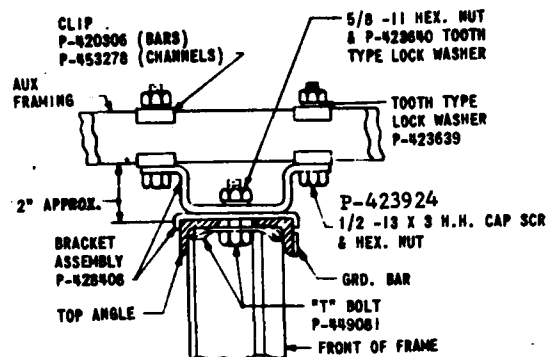
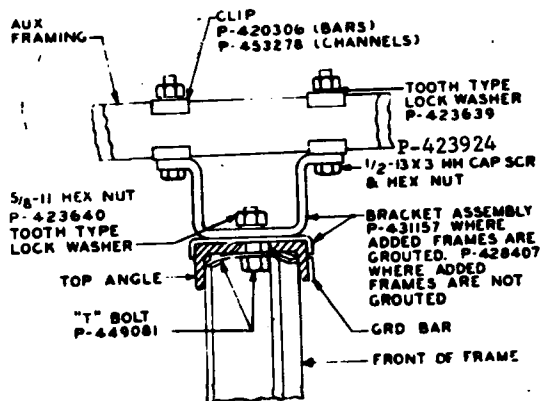


FIG. 11 FASTENING OF LADDER-TYPE CABLE RACKS TO FRAMES IN PANEL AND SXS OFFICES WITH 11'-6" AUXILIARY FRAMING (PARS. 3.1.2A, 4.5)



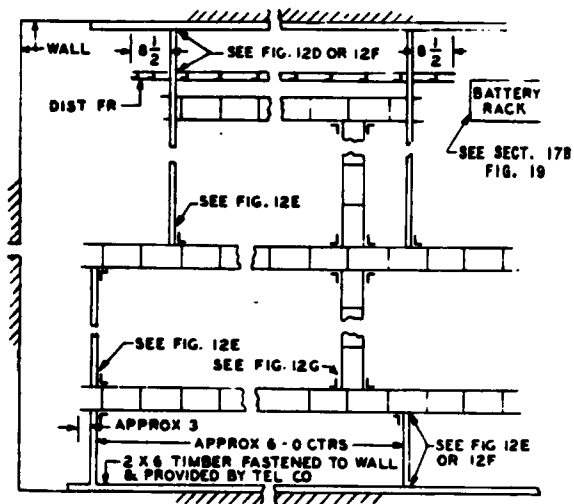
RP-0399

FIG. 12A AUXILIARY FRAMING FASTENED TO THE TOPS OF BULB-ANGLE FRAMES (PARS. 5.1, 5.1.3)



RP-0400

FIG. 12B ADDITIONS WHERE AUXILIARY FRAMING IS FASTENED 3\"/>



RP-0401

FIG. 12C TYPICAL ARRANGEMENT OF LADDER-TYPE CABLE RACKS AND BRACES FOR A COMMUNITY DIAL OFFICE (PARS. 5.1, 5.8)

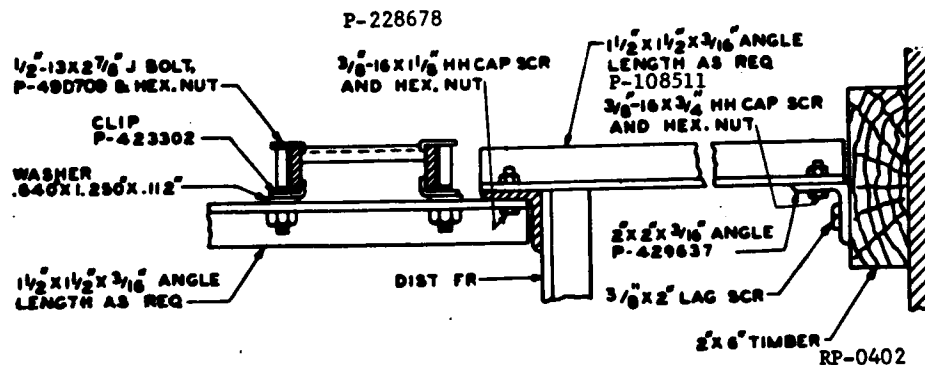


FIG. 12D WALL BRACES FOR COMMUNITY DIAL OFFICE
DISTRIBUTING FRAME
(PARS. 5.8, 5.8.1)

NOTE: Single brace shall be used for distances up to 7'-0". Where distance to wall exceeds 7'-0", a double brace (two 1-1/2" x 1-1/2" x 3/16" angles back to back) shall be used. Each brace shall be fastened to the wall and distributing frame as shown.

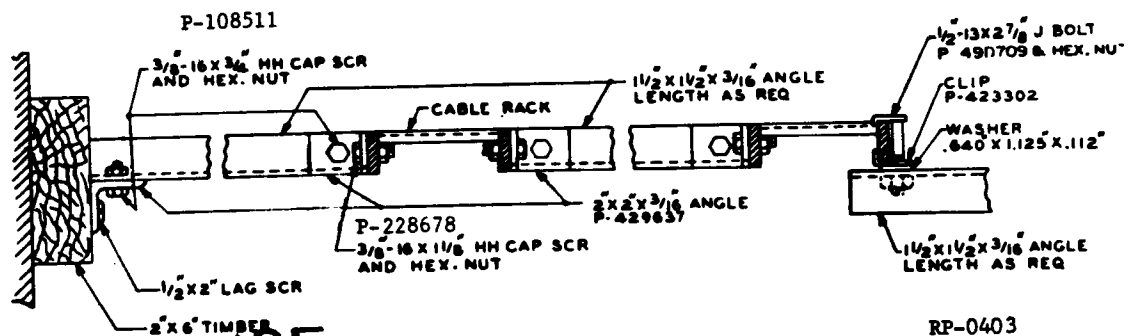


FIG. 12E WALL BRACES FOR COMMUNITY DIAL OFFICE FRAME CABLE
RACKS (PARS. 5.8, 5.8.1)

NOTE: Single brace shall be used for distances up to 7'-0". Where distance to wall exceeds 7'-0", a double brace (two 1-1/2" x 1-1/2" x 3/16" angles toe to toe) shall be used. Each brace shall be fastened to the wall and cable rack using P-429637 as shown.

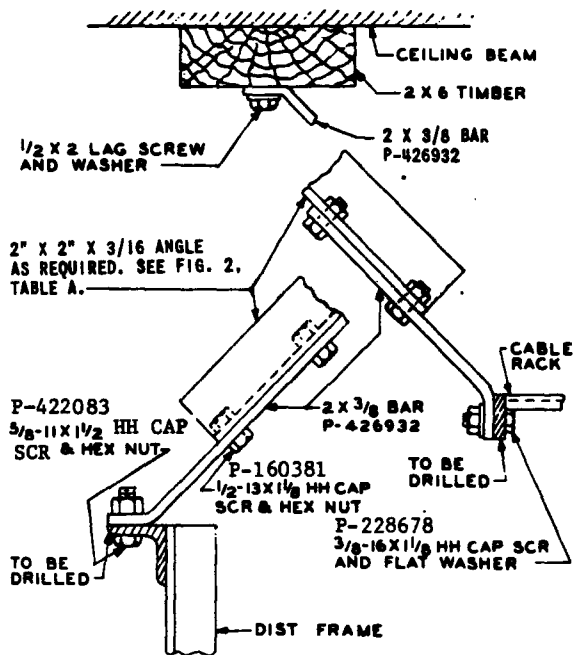


FIG. 12F CEILING BRACES FOR COMMUNITY DIAL OFFICES DISTRIBUTING FRAME AND CABLE RACKS (PARS. 5.8, 5.8.2)

RP-0404

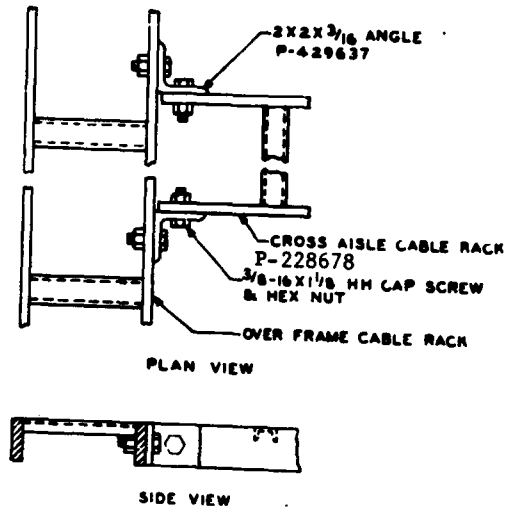
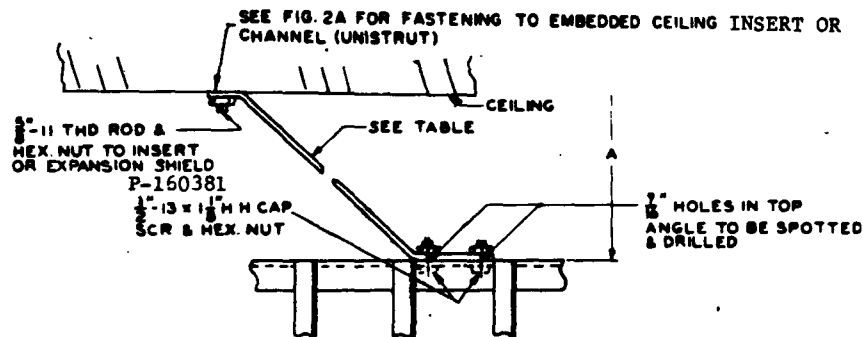


FIG. 12G FASTENING LADDER-TYPE CROSS AISLE CABLE RACK TO OVER FRAME CABLE RACK - COMMUNITY DIAL OFFICES (PARS. 5.8, 5.8.3)

RP-0405



A	TYPE OF BRACE
OVER 5' & LESS THAN 10'	2' x 3/16" BAR, P-429636 TO P-429642 AS REQUIRED
10' TO 1'-6" INCLUSIVE	2' x 3/8" BAR, P-429506 TO P-429510 AS REQUIRED
OVER 1'-6"	2' x 2' x 3/16" ANGLE, P-429516 TO P-429523 AS REQUIRED WITH 2' x 3/8" BAR P-426932 & P-426931 AT TOP AND BOTTOM RESPECTIVELY

FIG. 12J ENDWISE BRACING OF DISTRIBUTING FRAMES AND PROTECTOR FRAMES (PAR. 5.7)

RP-0406

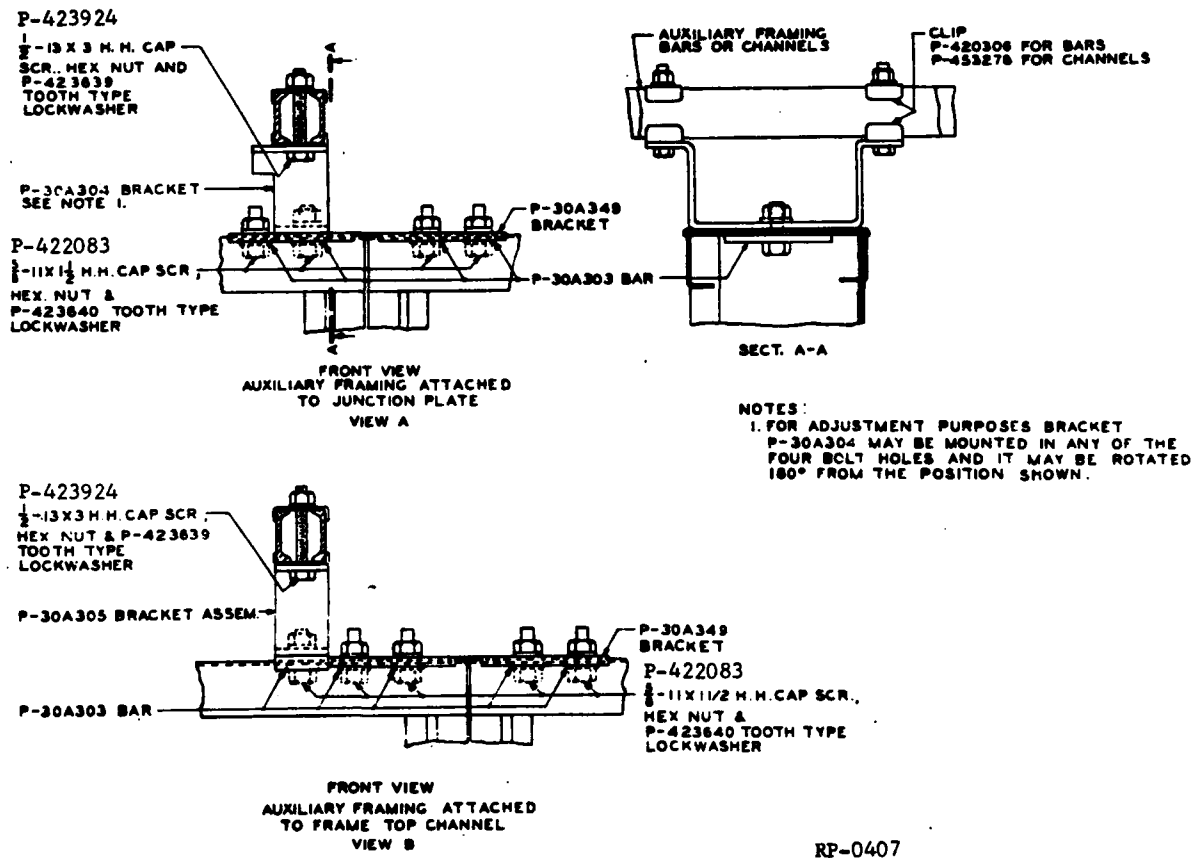


FIG. 12K FASTENING AT TOPS OF NO. 5 CROSSBAR FRAMES
(PAR. 5.2)

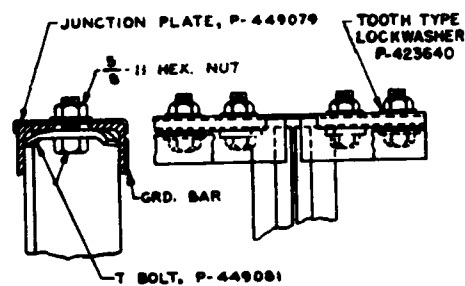
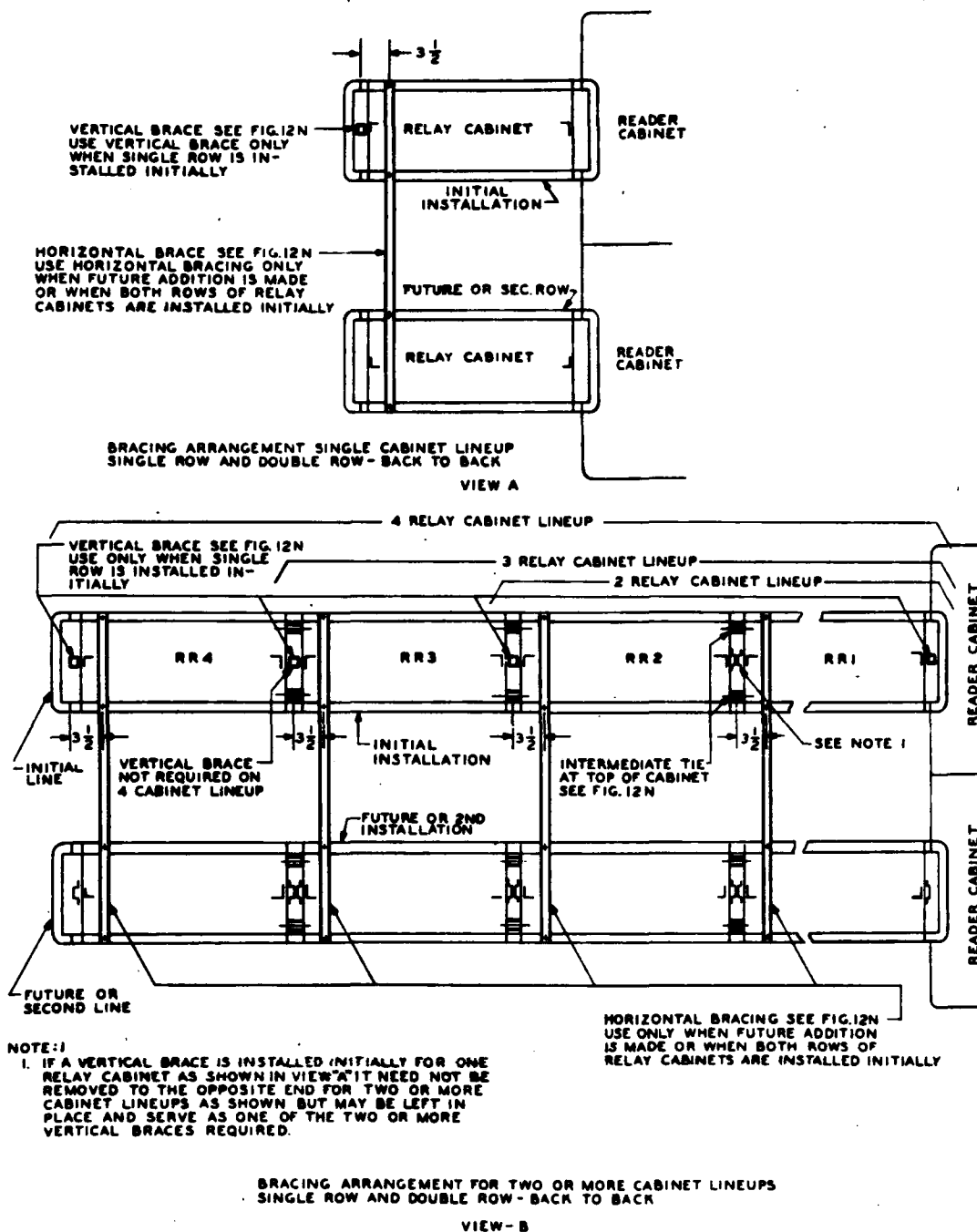
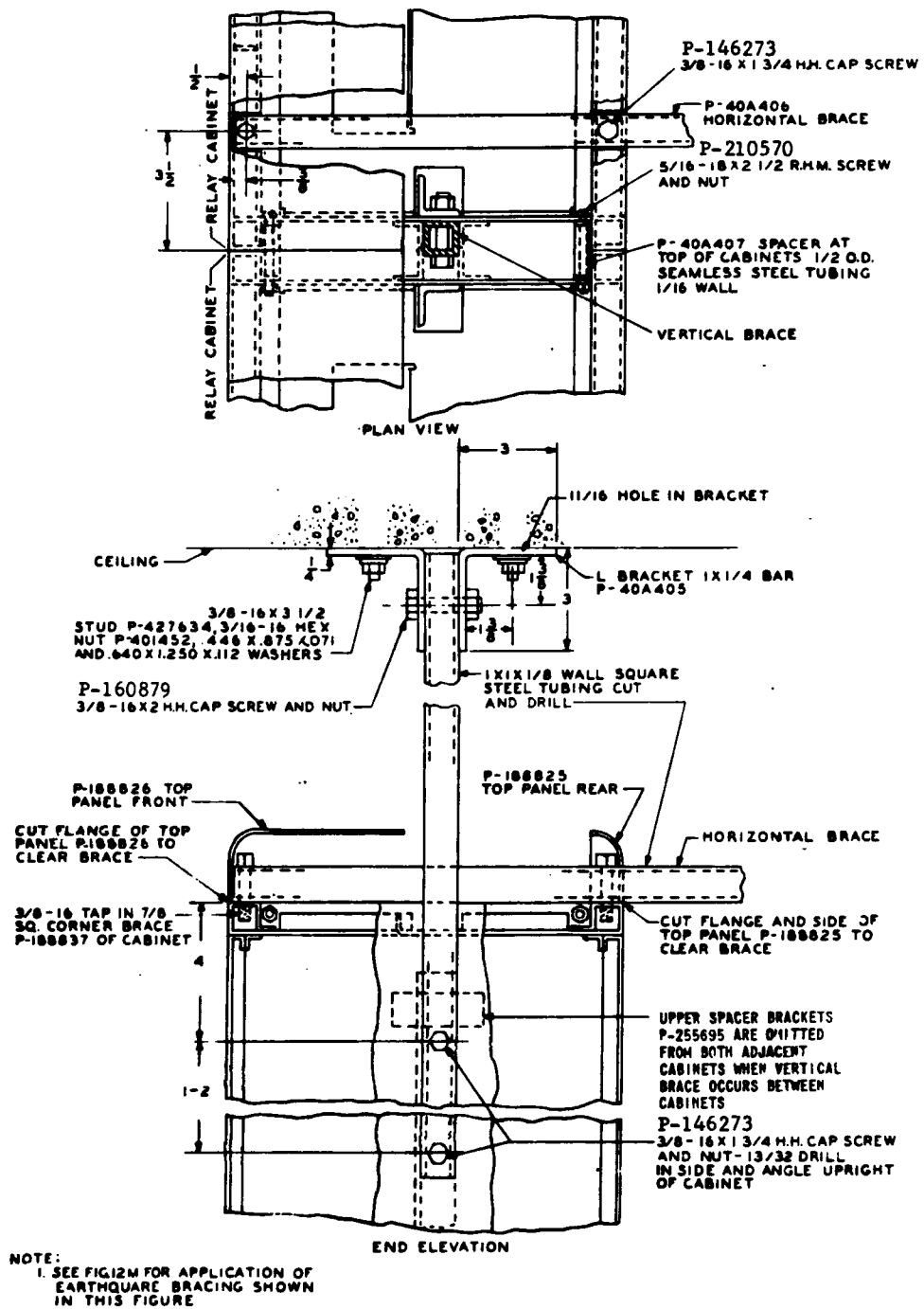


FIG. 12L JUNCTIONING TOP ANGLES OF
ADJACENT BLUB-ANGLE FRAMES
(PAR. 5.1.2, 5.4)



RP-0409

FIG. 12M FASTENINGS AT TOPS OF RELAY CABINETS - NO. 1 AMA
ACCOUNTING CENTER MACHINES SINGLE-ROW OR BACK-TO-
BACK ARRANGEMENTS - BACK-TO-BACK SHOWN
(PARS. 5.9.1, 5.9.2, 5.9.3, 5.9.4, 5.9.5)



RP-0410

FIG. 12N NO. 1 AMA ACCOUNTING CENTER MACHINES, RELAY CABINETS -
VERTICAL AND HORIZONTAL BRACING DETAILS
(PARS. 5.9.1, 5.9.2, 5.9.3, 5.9.4, 5.9.5)

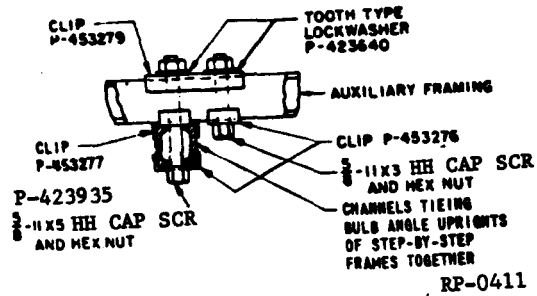


FIG. 12Q FASTENING TOP MEMBER CHANNELS OF STEP-BY-STEP FRAMES TO AUXILIARY FRAMING (PARS. 3.1.2(b), 5.3)

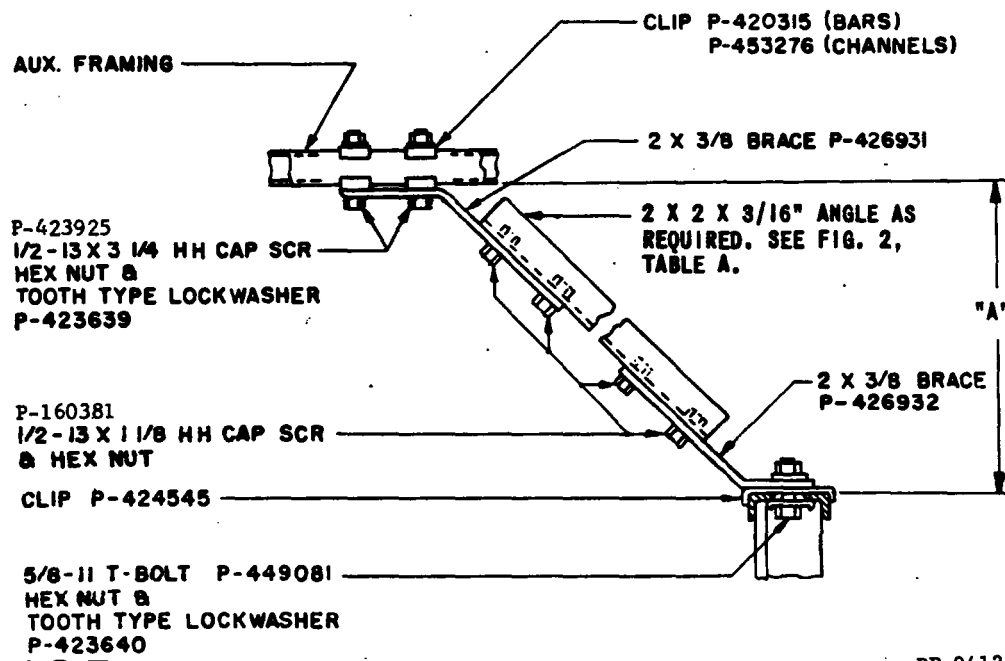


FIG. 12R FASTENING BULB-ANGLE-TYPE FRAME TO HIGH-TYPE AUXILIARY FRAMING WHERE "A" IS OVER 1'-6" (PAR. 5.5)