

CENTRAL OFFICE CABLE VAULTS

CONSTRUCTION OF UNISTRUT FRAME

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1. GENERAL

1.01 This section describes the assembly of the Unistrut frame in a cable vault.

1.02 Piece parts, subassembly details and ordering information are covered in G55.145.1.

2. WORK ON DETAIL PLANS

2.01 Before ordering material the detail plans for the vault framework should be compared with the actual space allocated to check for any building variations, location of pipes or services in new positions, or other changes in plan that may affect the framework.

2.02 As the uprights and crosspieces should be ordered cut to the desired length, it is important to check the lengths shown for these pieces on the plans. In the case of the uprights, the construction of the footing will usually compen-

sate for irregularities in the floor, any remaining differences in level being taken care of at the crosspiece level.

2.03 The crosspiece length is determined by subtracting 1 inch from the minimum width of the vault. This allows 1/2 inch for the thickness of the two knee braces and 1/2 inch additional for clearance.

2.04 Use of the P-1346 Three Hole Corner Connection Angle as the knee brace gives sufficient adjustment to compensate for the difference between minimum and maximum distances between walls normally encountered. Crosspieces extending the full width of the vault are made to bear firmly against the wall by shifting the knee braces outward as required.

2.05 Rail straps and cable hanger supports should be ordered in lengths that will allow any splices in them to be located in the space between bays. It is not desirable to have the splice directly behind an upright or above a crosspiece, as the rail strap or cable hanger will be moved out of line by the thickness of the splice plate.

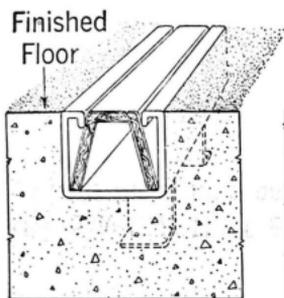
2.06 Where Unistrut inserts are specified, order the lengths sufficiently in advance of the construction date for the vault to have them on hand before the concrete is poured.

3. ORDERING UNISTRUT

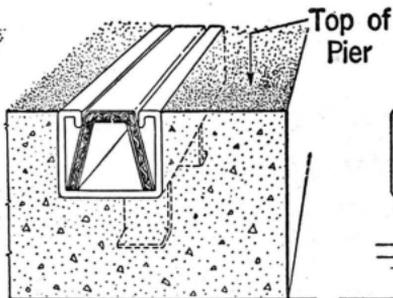
3.01 Make up the material list of all Unistrut required. List the quantity, name and Unistrut number of 10-foot, 20-foot and the cut lengths of each structural and secondary member required. List the quantity, name and Unistrut number of each piece, fitting, etc., and the nuts and bolts required. See Bell System Practice G55.145.1 for this information.

4. SURFACE ATTACHMENTS

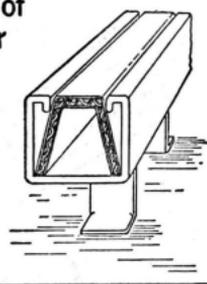
4.01 **Floor Inserts:** Use continuous concrete inserts of P-3000 Series Unistrut in lengths up to 20 feet. Butt together adjoining lengths of insert so that the joints will not interfere with locations for uprights. The filler strip should be in the insert until it must be removed to make an attachment.



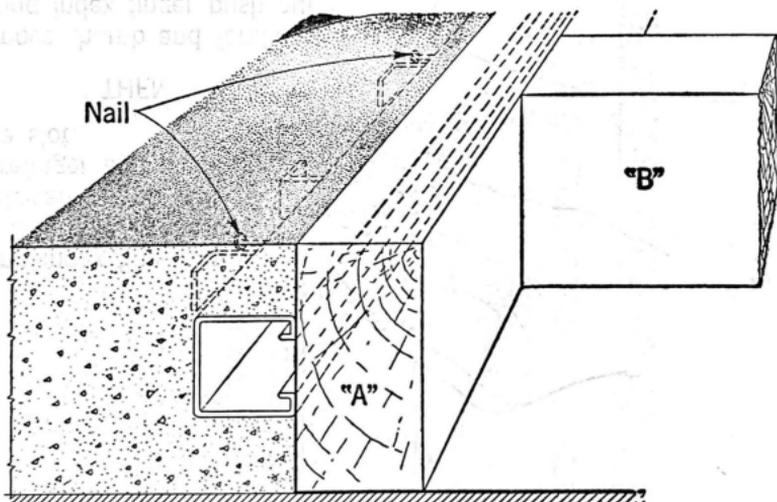
Level with the finished floor, placed during pouring operation.



In concrete pier poured before assembly of frame.



Placed on floor at time of assembly of frame. Concrete poured between forms at completion of work.



Insert nailed to 2 x 4 "A" at center line. Fill with concrete to top of 2 x 4. Brace with 2 x 4 "B".

In side of concrete pier poured before assembly of frame.

4.02 **Wall and Ceiling Inserts:** The same type of insert is used in concrete walls and ceilings. Before placing the concrete, fasten the inserts on the forms used for the structure. The fastening is done by attachment through the openings provided at the rear of the insert.

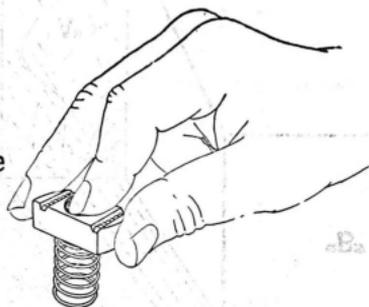
4.03 **End Caps:** P-3280 or P-3704 End Caps should be placed at the outer ends of the strip of inserts before the concrete is placed.

4.04 If it is not possible to place continuous inserts in the wall or ceiling, anchor a line of Z Supports (detail 5) to the surface using a maximum spacing of 6 feet between supports. If the continuity of the surface is broken by beams or pilasters treat each space between the projections as a single unit in spacing the Z Supports. The spacing of the supports should be so planned that they do not conflict with the location of uprights. Then secure the Unistrut strip in position.

5. UNISTRUT NUTS

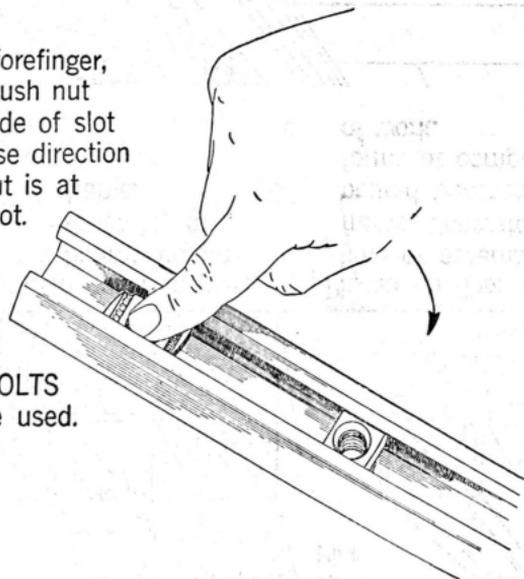
5.01 The fittings are assembled with special nuts designed to be inserted in the slot of the Unistrut member as shown below.

Using index finger as guide in bolt hole, grasp nut between thumb and forefinger and place in the slot.



THEN

Remove thumb and forefinger, using index finger push nut below grooves on side of slot and twist in clockwise direction until long axis of nut is at right angle to the slot. Spring will hold nut in position.



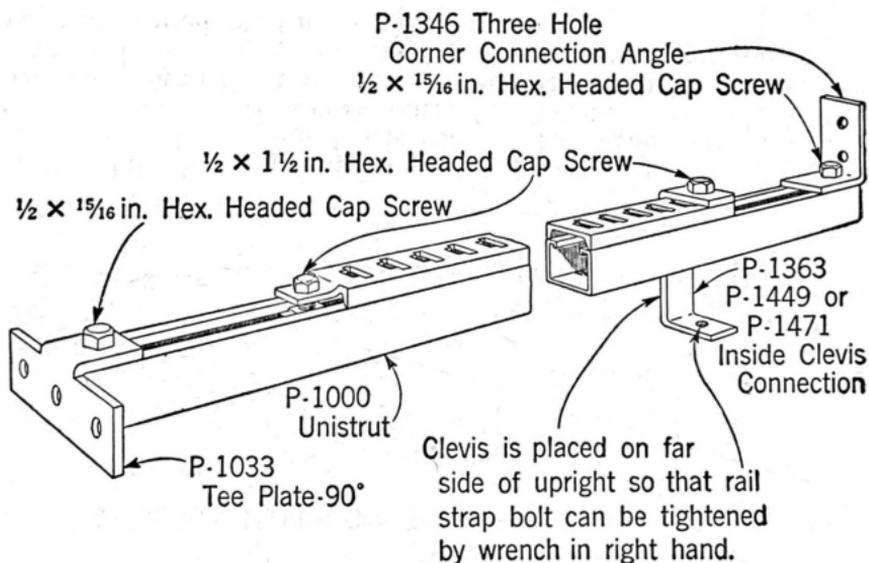
Use only UNISTRUT BOLTS where these nuts are used.

5.02 It is advisable to tighten the bolts just enough to hold the parts in position until all adjustments, minor changes in position, etc., have been made. To shift one of these fittings slightly, unscrew the bolt two full turns and press it toward the slot before sliding the part to its new position. If the bolt has been drawn up tight, the teeth of the nut will be embedded in the flanges of the slot, but a sharp rap on the bolt after it has been backed off two turns will free the nut.

6. ASSEMBLY OF UPRIGHTS

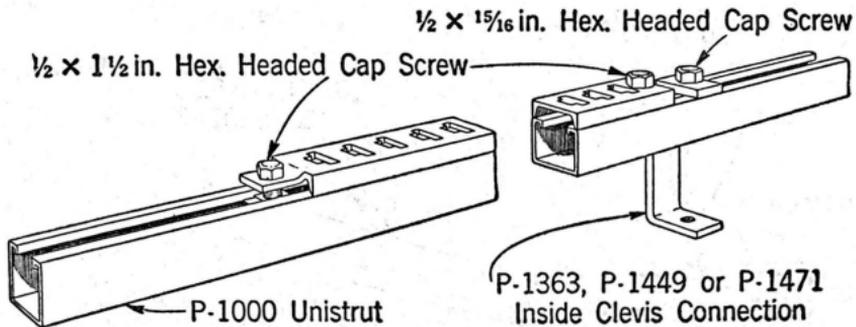
6.01 The cable racks and angles, clevises, etc., to be placed on the uprights will vary from one job to another, but with few exceptions the same spacing and the same fittings will be used throughout one vault framework. Thus, one upright can be assembled and used as a sample in making up the remainder.

6.02 Using the fittings called for in the detail plans of the vault framework, assemble the sample upright by fastening the bottom and top fittings, cable racks, rail strap clevis or clevises at their correct level. Assemble all uprights having these fittings.



Note: It may be desirable, where cable racks will not be placed under the clevis at the time the upright is assembled, to provide shims 1/2 inch deep having 5/8-inch holes to allow for the thickness of the rack.

6.03 Where space is available on the upright, the clevis may be mounted above the cable rack and directly to the P-1000 upright.



6.04 The illustration above, also illustrates the upright when details 1 and 4 will be used at the base and top, respectively. These pieces must be fastened securely on the base insert and the top insert or member, NOT on the upright, as there is no way to fasten them at the base and top if they are first placed on the upright.

7. SINGLE-SIDED FRAME

7.01 Lay the rail straps on the floor behind the position of the line of uprights at the start of the work or before the last 20 feet of vault length will be closed off by the uprights.

7.02 Starting at the duct entrance end, mark the position of each upright on the base insert. Set the first upright in vertical position, using a spirit level or a plumb line. Tighten the bolts holding the upright so that it is secure.

7.03 Using a spacer cut to 1-5/8 inches less than the width of the bays (bay width is usually 36 inches but may be 32 inches in small vaults), set each succeeding upright in position and secure it.

7.04 Raise the straps into position and secure them to the clevises which have been placed on each upright.

8. DOUBLE-SIDED AND MULTI-ALLEY FRAMES

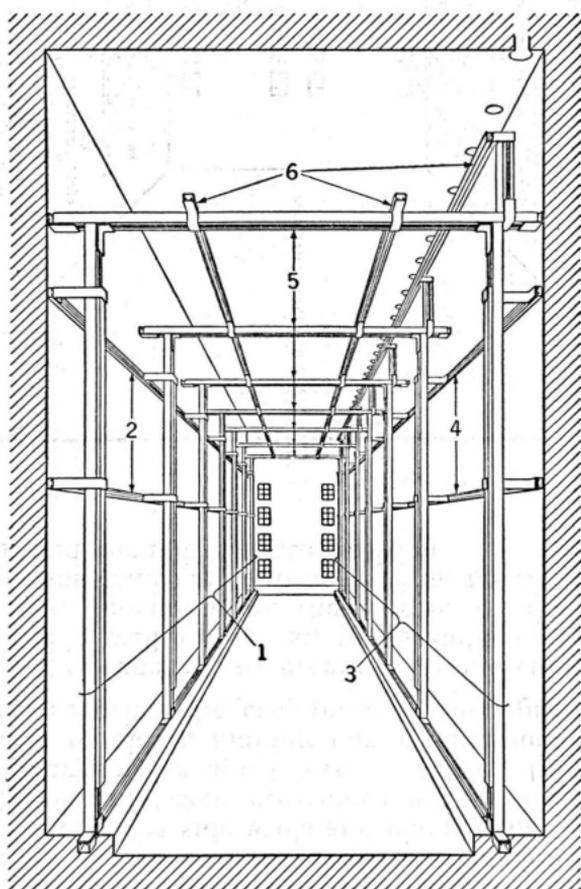
8.01 Unistrut frames of this type are self-supporting, that is, their own rigidity plus the knee braces placed at the ends of the crosspieces and bearing on the walls, make

unnecessary any attachment of the frame proper other than at the floor.

8.02 Using a sample, assemble each upright as outlined in Part 6.

Double-Sided Frame

8.03 A convenient way to assemble the frame is to erect the uprights on both sides for a length of about 6 bays. Tie the uprights together with their rail straps, then add the crosspieces, the top cable hanger supports and top rail straps.



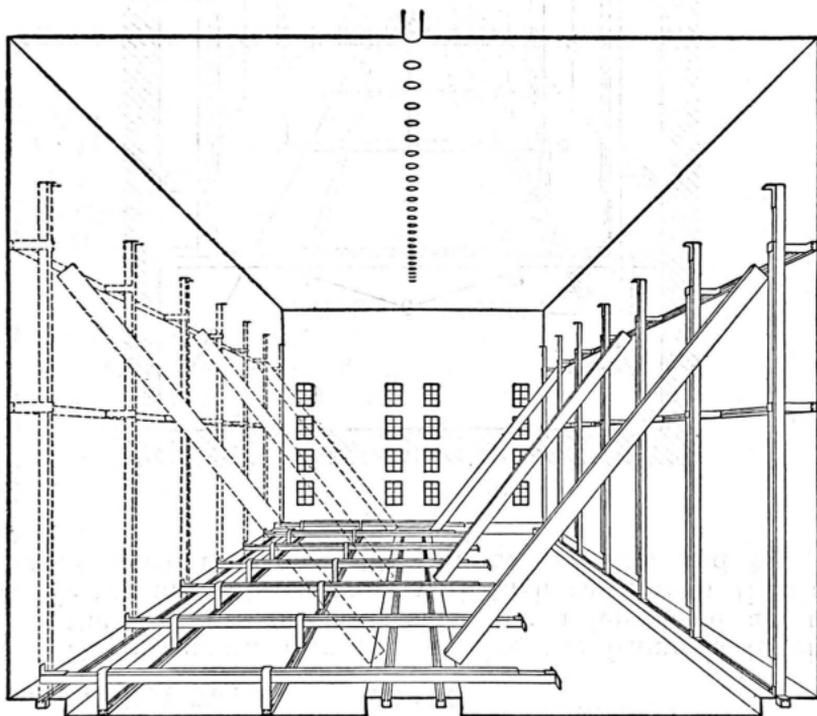
Assemble and erect parts of framework in the sequence shown by numbers.

8.04 As each new group is added to the completed 6 bay section, tie the rail straps together.

Multi-alley Frame

8.05 The procedure outlined above may be followed, working first on the side walls and placing the double center uprights at the time each crosspiece is raised into position. Where necessary, use a spirit level in setting the crosspieces horizontal and to aid in making minor adjustments in height to the angles securing the crosspiece to the uprights.

8.06 As an alternative to erection by individual uprights, each side wall frame can be assembled in sections of 20 feet or less, depending on the lengths of the rail straps used. The section made up of 6 bays (7 uprights) is assembled on the floor and then lifted into position.



Place temporary bracing on both sides until end crosspieces are bolted in place. Middle brace keeps 20 ft. rail strap from sagging before uprights are tied in.

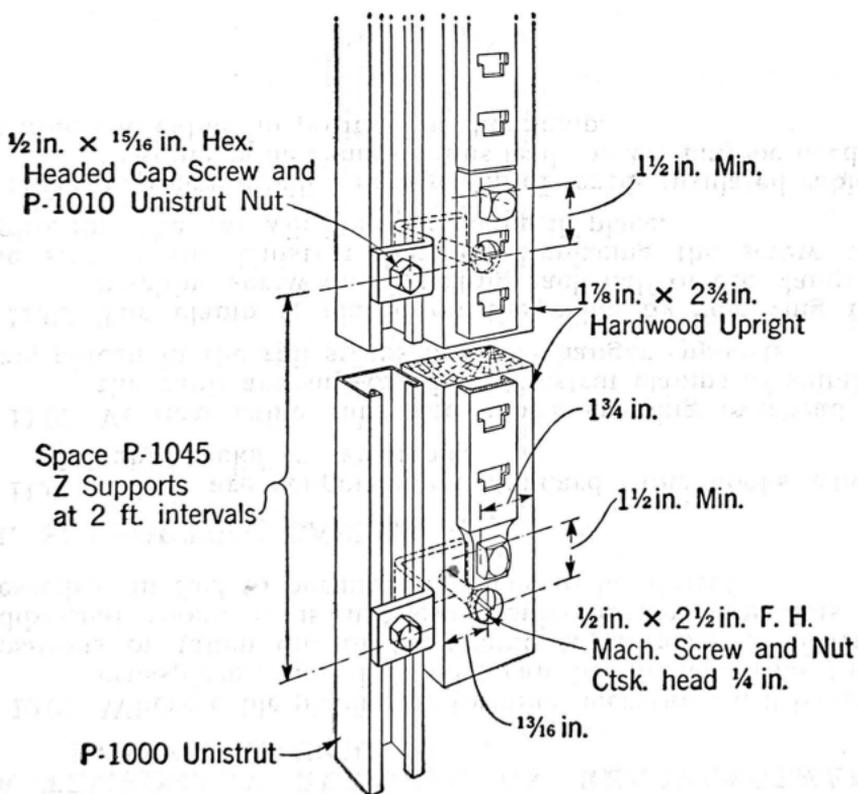
8.07 After the side wall frames have been moved into position and secured by the end crosspieces, erect the center line of uprights. The weight of a 20-foot center section will exceed 500 pounds and it may be desirable to assemble only one side on the floor and add the uprights comprising the other side after the assembled portion has been set vertical and secured.

8.08 Add the remainder of the crosspieces, followed by the overhead cable hanger supports and the top rail straps.

8.09 As each section is added, tie all longitudinal members together with the splice plates. Minor adjustments, setting of the knee braces against the walls, alignment of longitudinal members and finally, tightening of all loose bolts completes the installation.

9. INSULATING JOINTS IN FIRST BAY

9.01 Where insulating joints are placed between the first and second upright from the duct entrance, mount hardwood uprights on the first steel upright as shown.



10. TEMPORARY REMOVAL OR REARRANGEMENT DURING PLACING

10.01 Where cable placing or forming operations will benefit, crosspieces, uprights, etc., can be shifted from their positions or taken out of the frame temporarily to provide additional room. It is necessary only to free the nuts as described in 5.02 to permit a member to be shifted.

11. SUPPORTING CABLES

11.01 Cables are supported on standard cable hooks where cable racks are available.

11.02 Vertical cable runs and cables crossing overhead in the vault are supported by Unistrut clamps of suitable size, placed in the rail straps or cable hanger supports.

11.03 The clamp is placed on the cable by removing the machine screw and inserting each half of the clamp in the slot of the Unistrut member. Replacing the screw and tightening the nut will hold the clamp in place.

11.04 One clamp will hold a group of textile insulated cables. In some cable combinations lead spacers may be needed to hold the cables in position in the clamp.