

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G31.142.1
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AT&T Co Standard

OPEN WIRE

TRANSPOSING ON

4-INCH POINT TRANSPOSITION BRACKETS

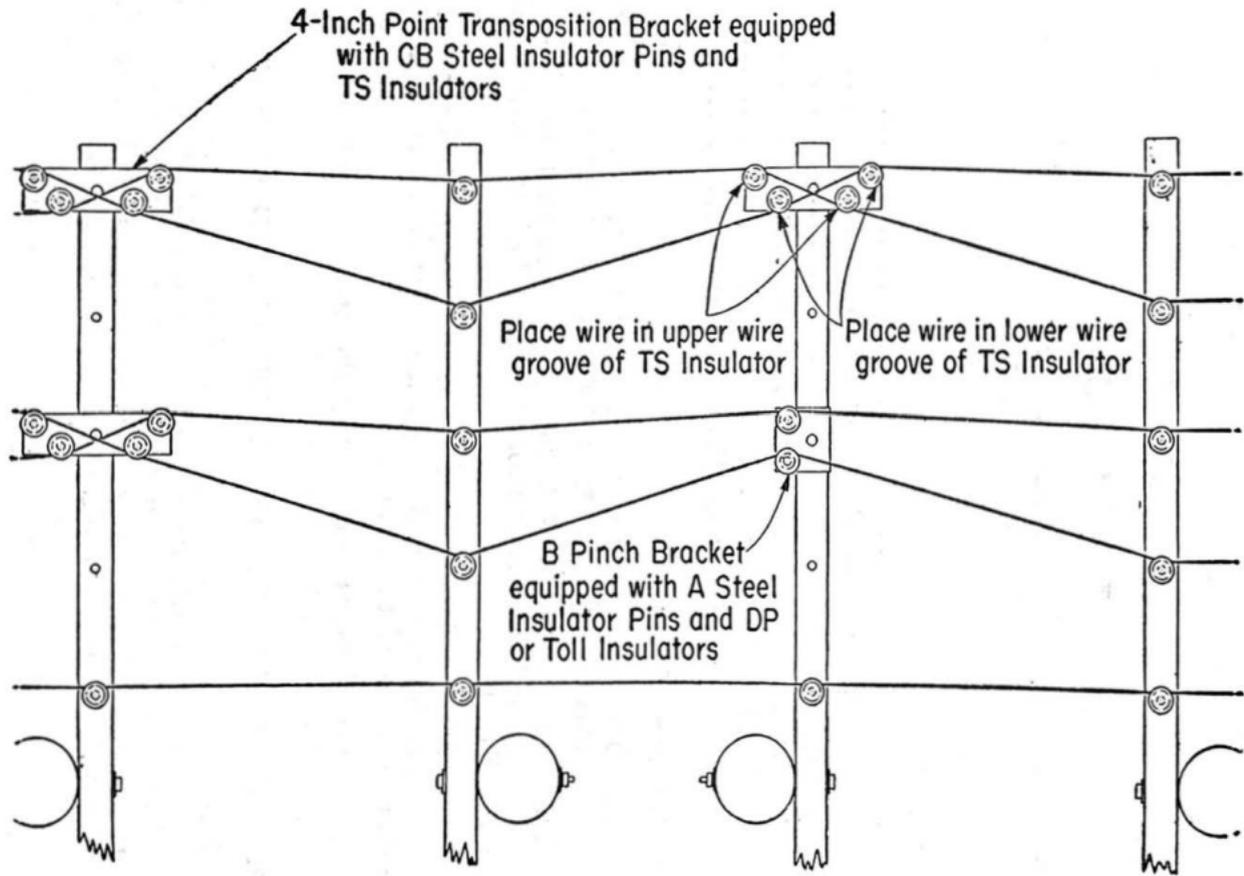
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1. GENERAL

- 1.01 This section provides instructions for transposing open wire circuits for type "O" carrier operation.
- 1.02 The methods of installing the different brackets discussed in this section are described in other sections of the Practices.
- 1.03 General instructions for wire stringing and precautions to be observed during such operations are outlined in other sections of the Practices.
- 1.04 Detail plans will specify the transposition scheme and the transposition poles.

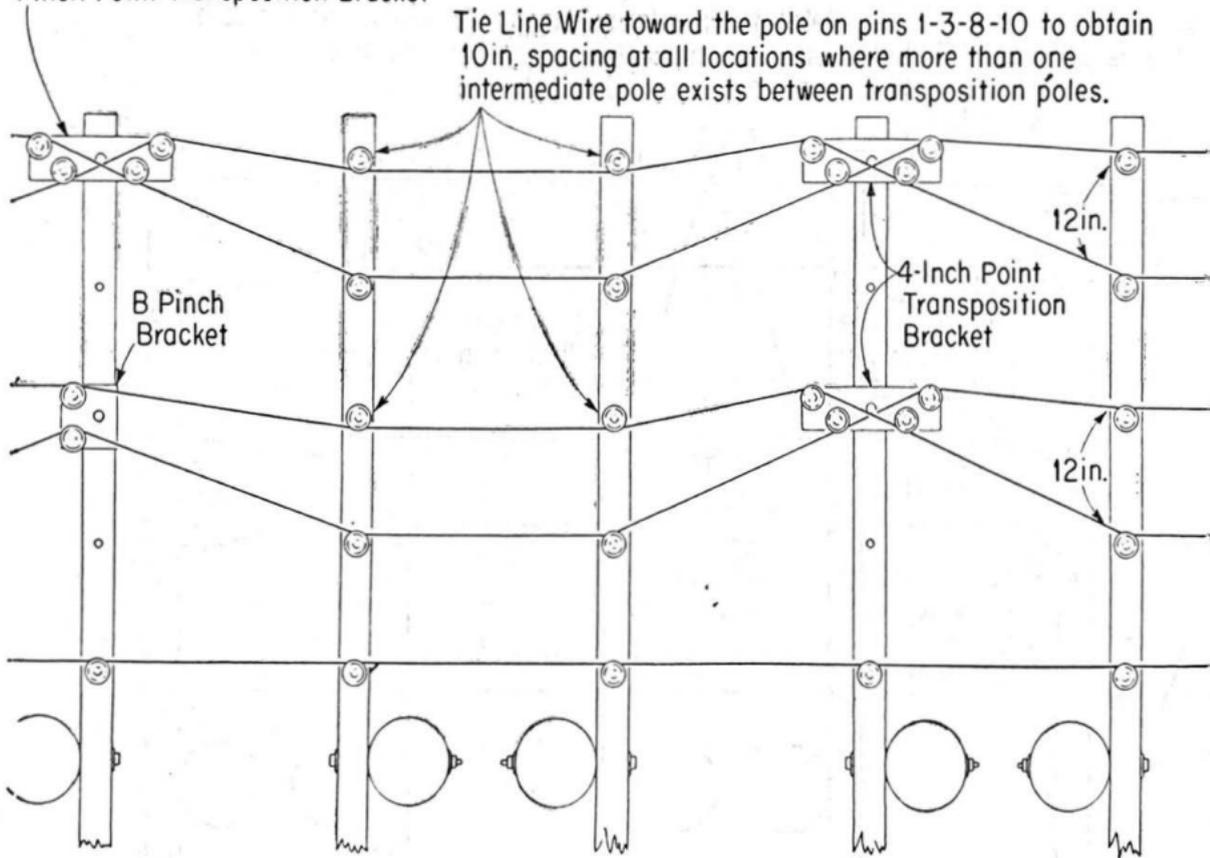
2. ARRANGEMENT OF BRACKETS AND PINS

2.01 When pole spacings are uniform, transpositions will be made at alternate poles using the 4-inch point transposition bracket. Standard pin spacing at the intermediate poles will provide 12-inch separation between wires. The following diagram illustrates a typical arrangement.



2.02 Where irregular pole spacing results in more than one pole between transposition poles, tie wires at intermediate poles as shown:

4-Inch Point Transposition Bracket

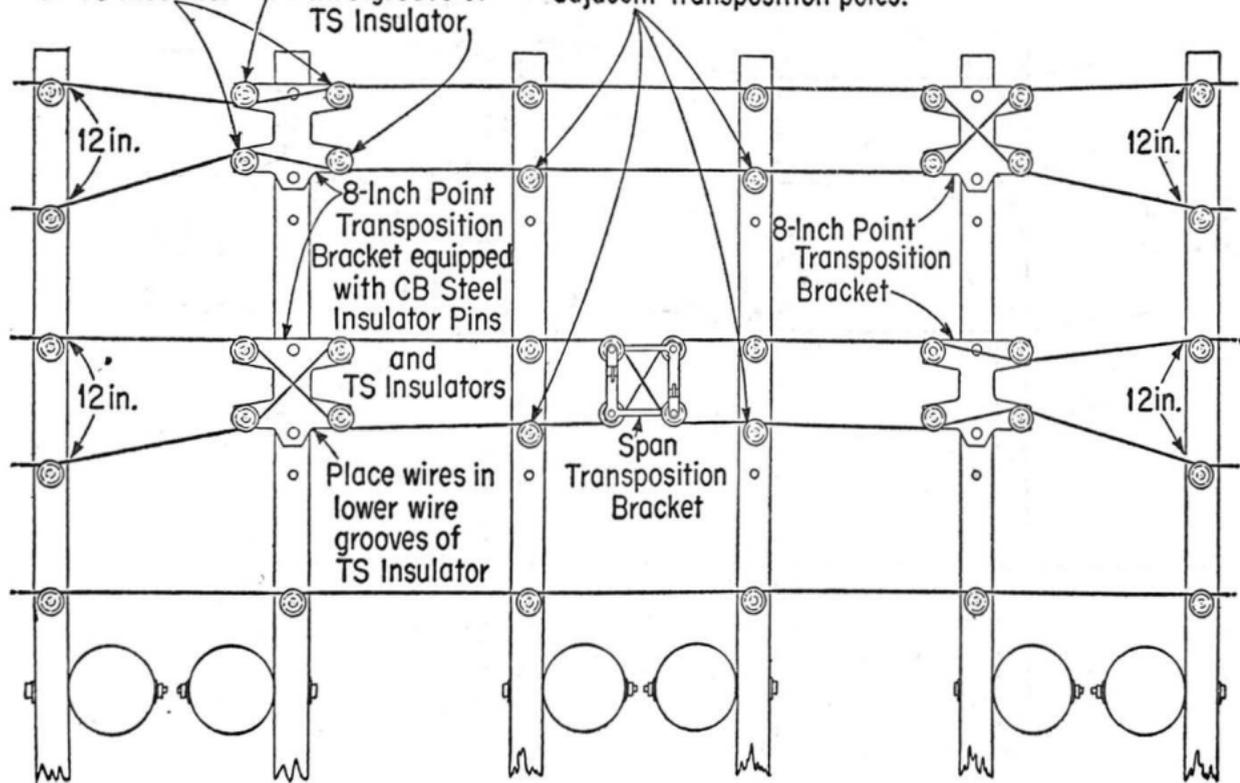


2.03 Where span transposition brackets are required, place span brackets, 8-inch point transposition brackets, and wire as shown:

Place wire in upper wire groove of TS Insulator

Place wire in lower wire groove of TS Insulator

Relocate pin holes to provide 8in. pin spacing in both directions from Span Transposition Bracket to adjacent transposition poles.



3. SAGGING WIRE

3.01 The line wire must not be placed on the point transposition brackets until the wire has been properly sagged. When the wire is placed on a transposition bracket, the extra wire required will decrease the sag in the span; it will, therefore, be necessary to place wire at sags slightly greater than the standard stringing sags specified in the G31.116 Series of Practices. When placing wire the stringing sags shown in the proper sag tables shall be increased by 25 per cent. For example:

Assume copper line wire, heavy loading area, 120-foot span, stringing temperature 50° F. The recommended sag, under these conditions, from Table No. 1 is 7-1/2 inches. Increase this amount by 25 per cent as follows:

$$7.5 \times 1.25 = 9.375 \text{ inches}$$

Place wire with 9-1/2 inch sag

3.02 Wires should be sagged to a value within 1 inch (plus or minus) of the desired sag. It is also of importance in carrier operation to have the sags of the two wires of a pair as nearly equal as practicable. A quick method of determining if the sags of two wires are sufficiently close is to "pair oscillate" the wires. With the wires resting on the crossarm, about 6 inches apart at the near end and not crossed in the span, pluck the two wires simultaneously. This will start a wave traveling in each wire toward the far end of the span. These waves will be reflected back and forth several times and will travel in step if the two wires have equal sags. If waves return in step for at least three returns, the sag equality is satisfactory. To pluck the wires, engage the wires with the thumb and middle finger, and then pull the hand straight down smartly, so that the fingers release the two wires at the same instant.

4. TYING

4.01 Line wire should be tied in at nontransposition poles before it is placed in the wire groove of the insulators mounted on the point transposition brackets. This may be done by tying the wire in on the alternate nontransposition poles and then placing the wire in the transposition brackets on the intermediate poles.

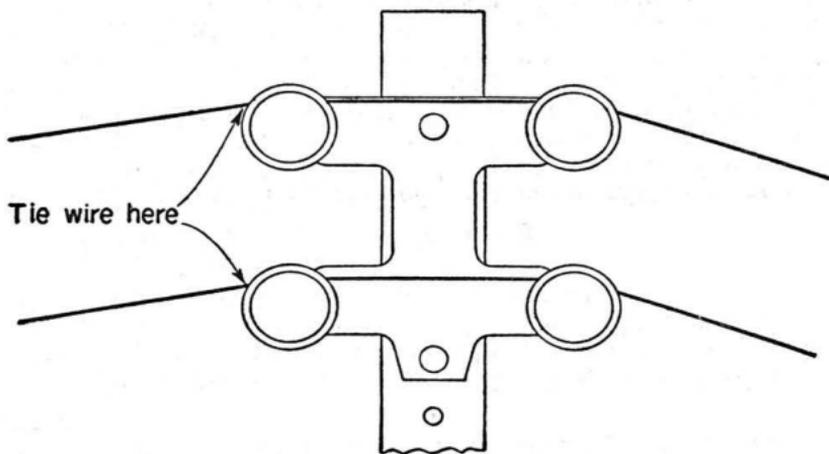
4.02 The kind of ties to be used and locations at which the line wire should be tied on point transposition brackets are discussed in other sections of the Practices covering open wire tying.

4.03 At straight line nontransposition poles and at B pinch brackets the wire should be tied to the side of the insulator away from the pole except where more than one pole exists between transposition poles as shown in Part 2, Paragraph 2.02. At such locations the wire should be tied to the side of the insulator towards the pole on pins 1, 3, 8, and 10.

4.04 At corner nontransposition poles and at B pinch brackets located on a corner pole the wire should be tied so that the wire pulls against the insulator. Under the following conditions it will be necessary to relocate pins and place wire as shown.

(a) Where the corner pole is located in that section of line consisting of more than one pole between transposition poles as shown in Part 2, Paragraph 2.02, it will be necessary to move pins 2, 4, 7, and 9 two inches closer to pins 1, 3, 8, and 10, respectively.

(b) Where the 8-inch point transposition bracket is used at a point where the wires are not transposed (see sketch in Paragraph 2.03) and is located on a corner pole the following tie and wire arrangement should be used.

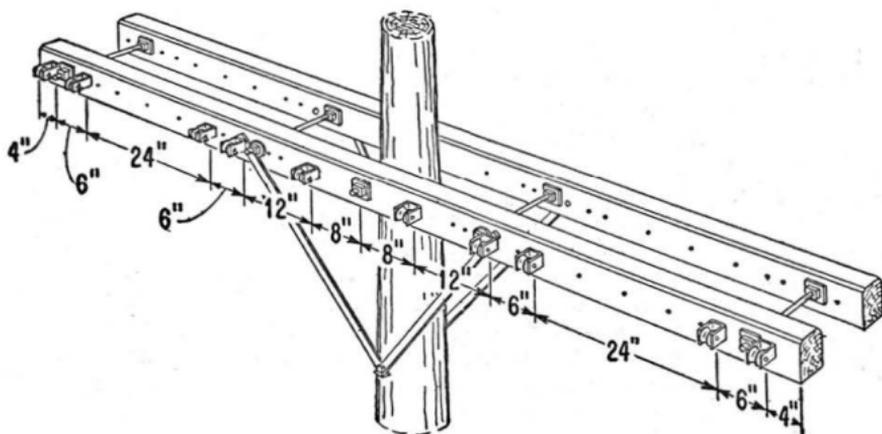


5. DEAD-END POLES

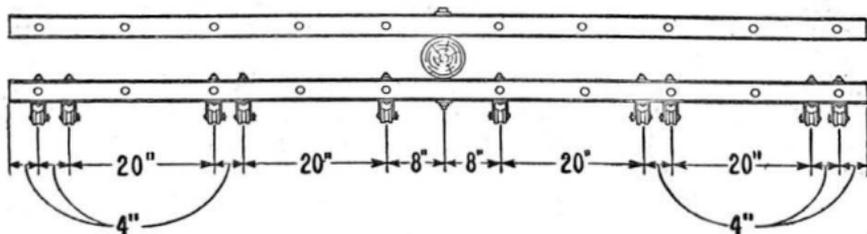
5.01 At nontransposition dead-end poles, such as at buck-arm corners, the open wire circuits should be terminated on B dead-end brackets with 12-inch separation between all wires except the pole pair which will have 16-inch separation.

5.02 At transposition dead-end poles, B dead-end brackets should be placed to provide separation between wires as shown in the following illustrations, using the sketch covering the type of crossarm involved. If the wires at a transposition pole are dead-ended at a buck-arm corner, transpositions shall be made in the bridle wire.

BDE CROSSARMS



10A CROSSARMS



Crossarm braces and spacer bolts omitted for clarity.

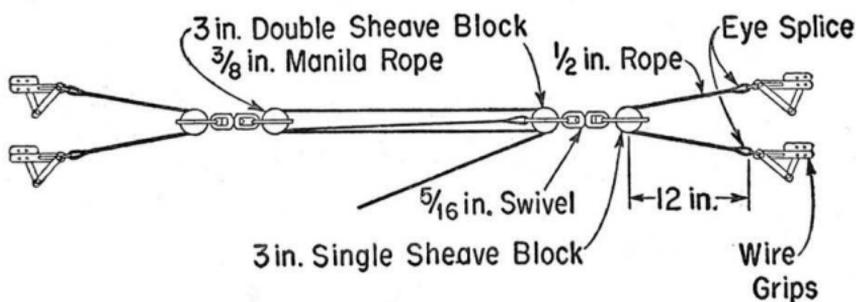
6. RETRANSPOSING OPEN WIRE CIRCUITS

6.01 The following outline of work operations may serve as a general guide for retransposing open wire circuits.

(a) A preliminary survey of the line should be made to determine the number of sections into which it may be divided for retransposing and resagging the open wire circuits. In general, a section should consist of twenty to thirty spans. At locations in the line where there are several consecutive corners or where reverse corners exist it may be necessary to reduce the length of the section. The end poles of a section should be nontransposition poles. A nontransposition pole in a suitable location near the middle of each section should be selected as a wire tensioning pole.

(b) Work operations should start from the ends of a section and progress toward the wire tensioning pole. At the end poles the line wires should be secured with spiral ties in their proper position on the insulators. Proceeding toward the tensioning pole, the line wires should be untied, phantom transpositions removed, all wires placed on top of crossarms, phantom and drop transposition brackets removed and point transposition brackets and pinch brackets installed at the proper locations on the crossarms. At each transposition point a left-over-right transposition should be placed in the wire in the span away from the tensioning pole. The buck or twist in the pair which results when the transposition is made should be pushed ahead to the wire tensioning pole.

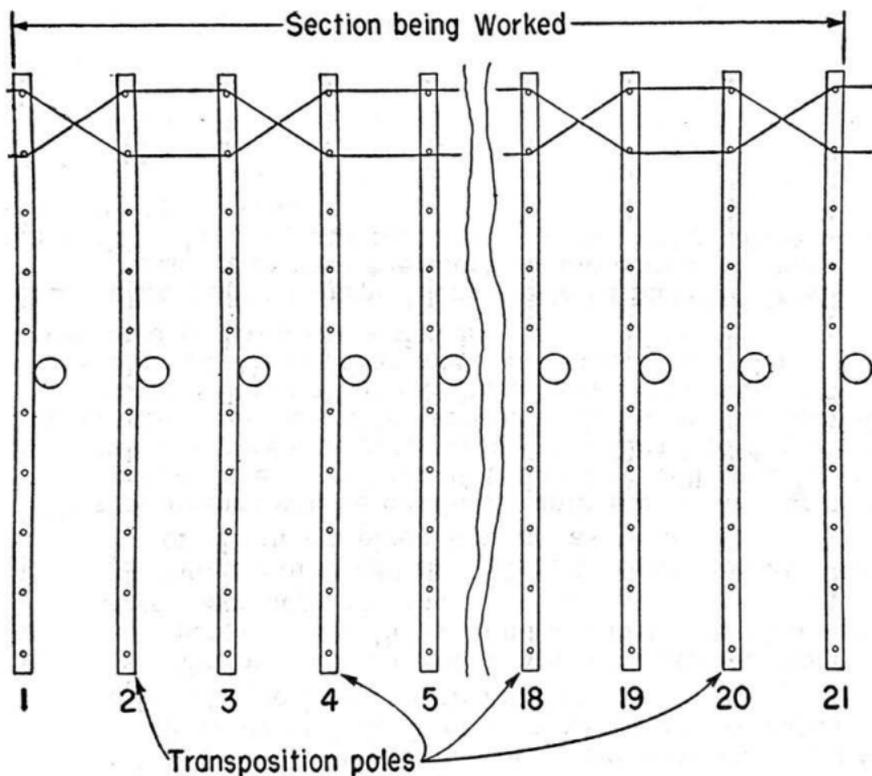
(c) At the wire tensioning pole, place tensioning tackle on the two wires of a pair, using pulley equalizers, made up as shown in the following sketch.



Cut the wires and untwist all the accumulated bucks. Pull the wire tighter than required, then slack off to the

required sag, as determined in Paragraph 3.01. Shake the line wire by raising the tackle and letting it drop on the crossarm. The vibration thus induced in the wire tends to overcome the friction drag of the line wire on the crossarms, and results in more nearly uniform wire tension throughout the spans being sagged. During the tensioning operations the line wire should be watched at corners, grades or other locations which might cause irregular wire sags.

(d) After the wires have been pulled to proper sags, the wires may be tied and mounted on the transposition brackets. Two workmen begin at one end of the section being sagged and work toward the tensioning pole.

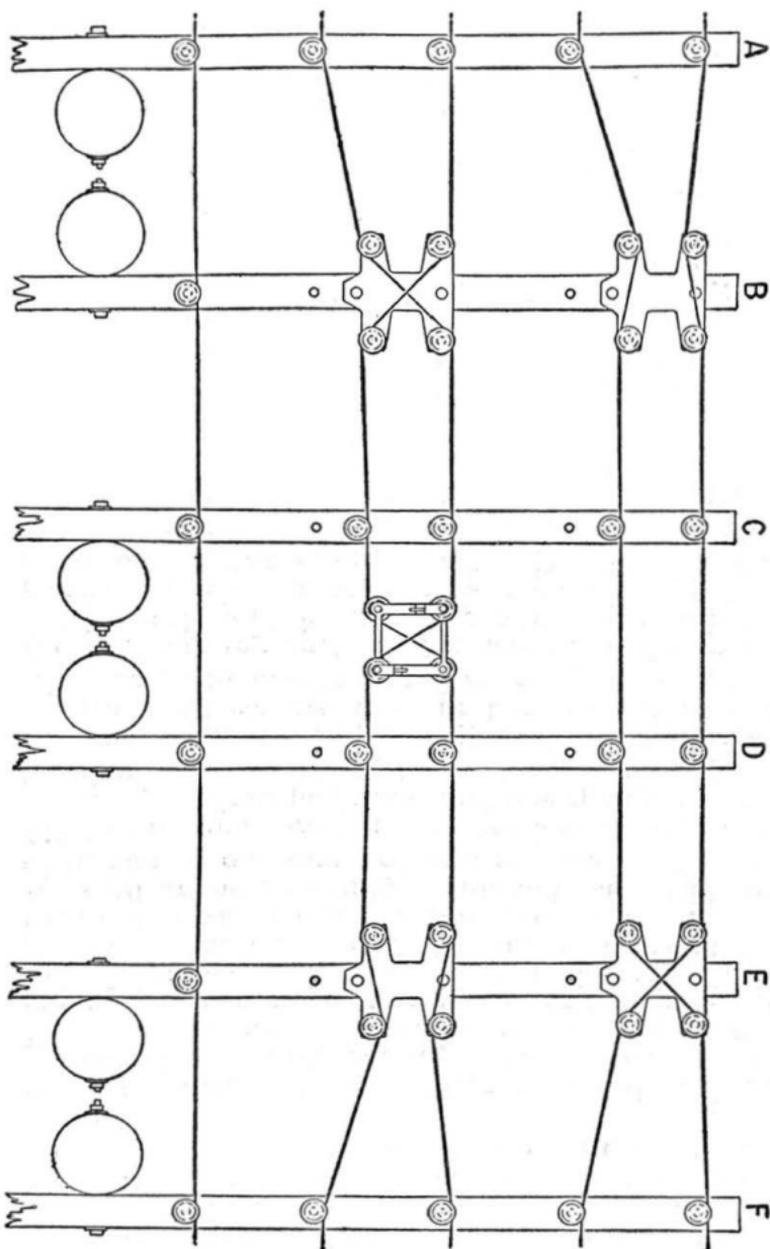


Referring to the preceding sketch proceed as follows:

- (1) Workman A, on Pole 3, will pair oscillate wires in span between Poles 2 and 3. If sags are not equal, push down on tight wire and check again. When sags are equal, tie both wires at this pole.
- (2) Workman B will then place wires on transposition bracket at Pole 2, or if wires do not transpose at this pole, tie in on pinch bracket.
- (3) Workman A, on Pole 5, will pair oscillate wires in span between Poles 4 and 5, and tie in, after equal sags have been obtained.
- (4) Workman B will then place transposition at Pole 4 or tie in on pinch bracket as required.

This procedure will be continued until the tensioning point is reached. The other half of the section will then be tied in and transposed, as outlined in operations 1 to 4, working from the other end of the section back toward the tensioning point. When both halves have been completed the wires are sleeved through at the tensioning pole, the tackle removed and the wires tied in.

6.02 Where span transpositions are to be installed, it will be necessary to treat the short section containing the span transposition bracket and the two adjacent transposition poles as a working section.



WORKING SECTION

- (a) Referring to the preceding sketch, it is assumed that work has been progressing from left to right, and that all work up to Pole A has been completed and that wires have been tied at this pole with spiral ties.
- (b) Untie wires at Poles B to F, inclusive, remove existing transposition brackets, place 8-inch point brackets at Poles B and E, place wires on top of crossarms, and pass any transpositions or bucks in the wire along to the span between Poles E and F.
- (c) Place wire tackle (see Paragraph 6.01 (c)) at Pole F, cut wires and roll out any bucks between Poles E and F. Pull wires to the sag specified in the proper sag table (do not add 25 per cent) then place wire snubbing clamps at Pole B, as shown in the following illustration. The clamp should be firmly seated in the wire groove of the insulator before it is clamped to the wire. After clamping both wires, slack off at the tensioning point, and place wires in grooves of insulators on point brackets at Pole B.
- (d) Install span bracket (see section of practices relating to Span Transpositions) and tow span bracket to proper location.
- (e) Pull wires to proper sag, as in (c), and place wire snubbing clamps at point brackets on Pole E. Place wires on point brackets at Pole E.
- (f) Roll out any bucks which may be in the span between Poles E and F, sag wire and sleeve wires through, piecing the wire out with extra lengths, if necessary. Place spiral ties at Pole F, and remove clamps at Poles B and E.

