

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G31.145
Issue 1, December, 1933
Standard

OPEN WIRE
TRANSPOSITIONS

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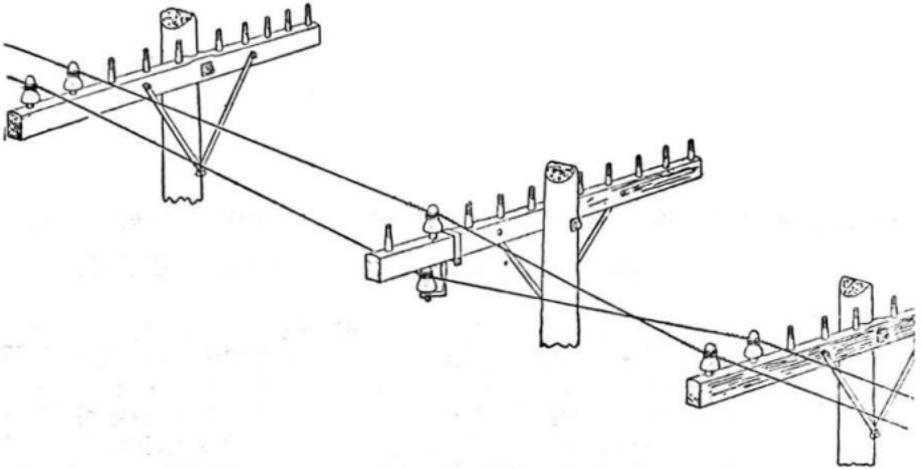
1. GENERAL

- 1.01 Detail plans or diagrams will furnish information as to type and location of transpositions.
- 1.02 All transpositions shall be made so that the wires cross left over right. At phantom transposition points the left hand pair of wires should cross over the right hand pair.
- 1.03 When the wires are being strung in a direction opposite to the direction of transposition, operate the running board to transpose the wires in the usual manner as given in Part 3, with the lineman facing in the direction in which the wire is being strung. When tying in the wires under such conditions, however, arrange the wires on the transposition bracket and adjacent poles as given in the tables for each type of transposition facing in the direction in which the line is transposed.

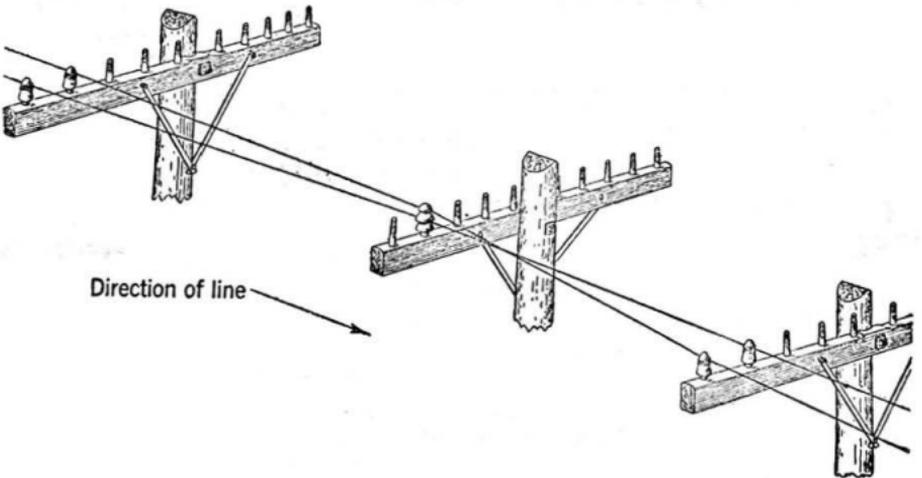
2. SINGLE CIRCUIT TRANSPOSITIONS

- 2.01 Make point transpositions as shown in Section G31.190.

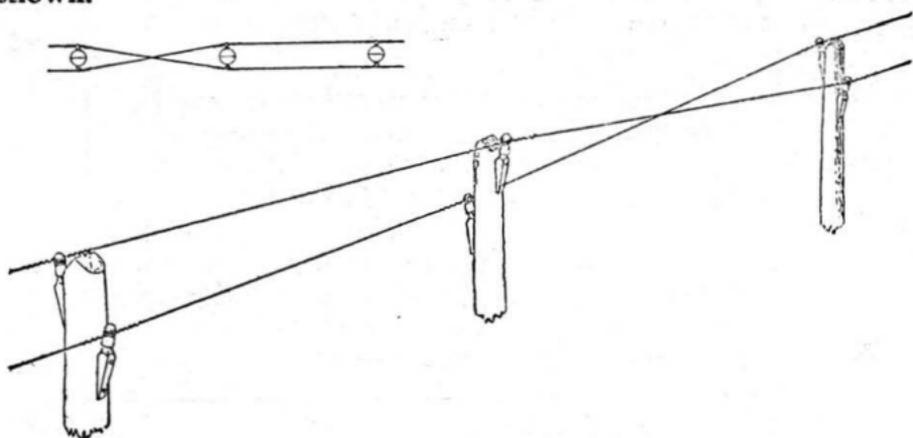
2.02 Make transpositions on drop brackets as shown.



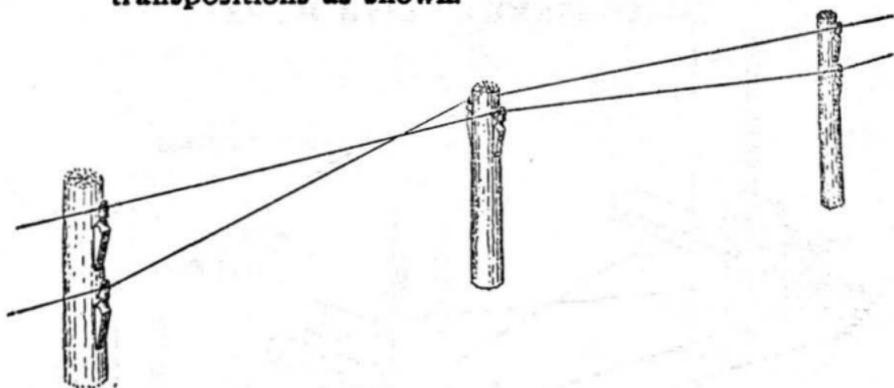
2.03 Make transpositions on transposition insulators as shown.



2.04 On bracket leads where the wooden pole brackets are on opposite sides of the poles, make transpositions as shown.



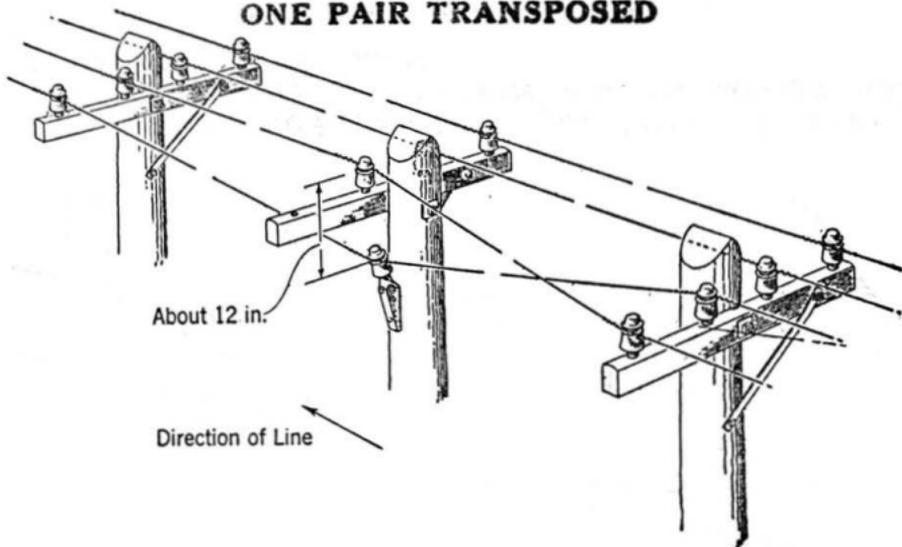
2.05 When brackets are placed on one side of the pole, make transpositions as shown.



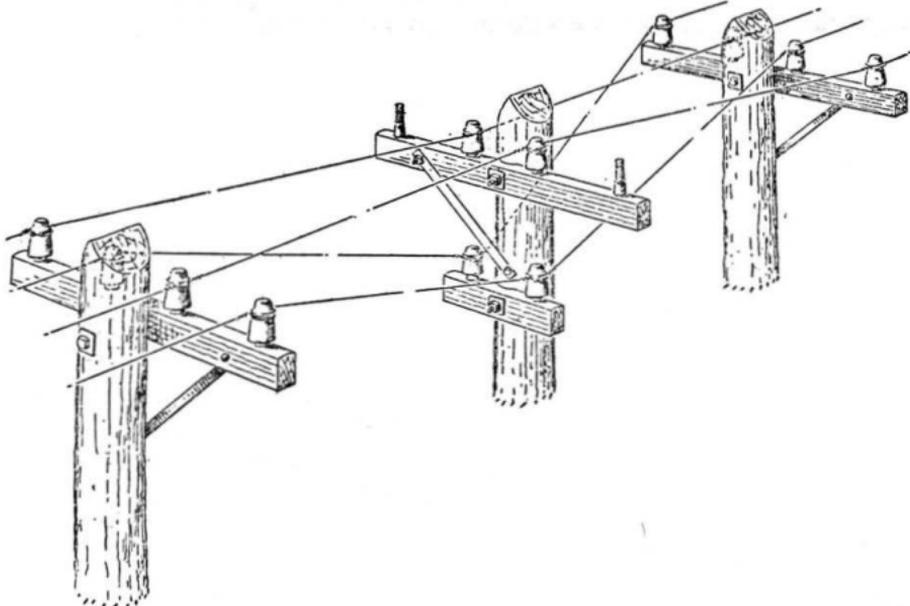
2.06 For spans 200 feet and longer, place brackets for making transpositions in accordance with the arrangements provided for in Section G22.125.

2.07 Make single circuit transpositions for wires supported on four pin crossarms as shown below.

ONE PAIR TRANSPOSED



BOTH PAIRS TRANSPOSED

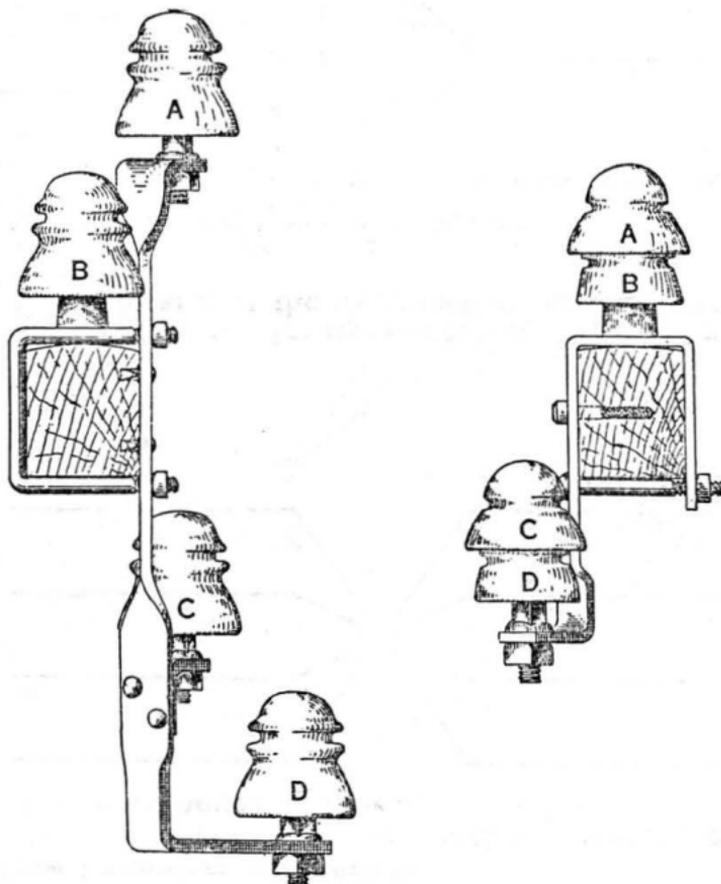


Note: In making phantom circuit transpositions for wires supported on four-pin crossarms, a section of a standard 3-1/4" x 4-1/4" crossarm can be used for supporting the brackets.

A. PHANTOM CIRCUIT TRANSPOSITIONS

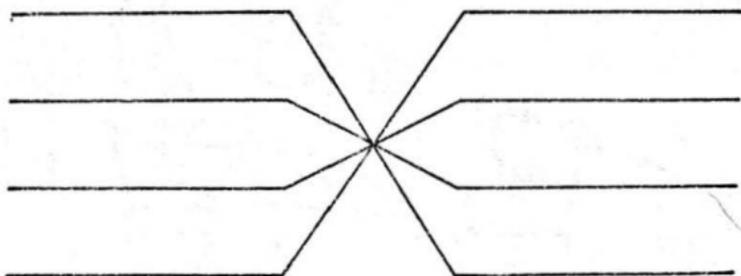
3.01 As a convenient means of reference, phantom bracket pins and transposition insulator grooves are designated by letters as shown.

Position of Pin or Insulator Groove	Letter
Bracket pin above the crossarm or top groove of transposition insulator on crossarm pin.	A
Crossarm pin or bottom groove of transposition insulator on crossarm pin.	B
First bracket pin below the crossarm or top groove of transposition insulator on bracket pin.	C
Lowest bracket pin below the crossarm or bottom groove of transposition insulator on bracket pin.	D



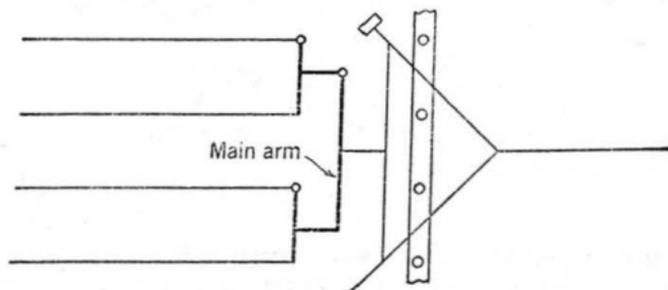
(a) Type 1 phantom transposition.

3.02 At Type 1 phantom transpositions positions of wires are interchanged as shown.

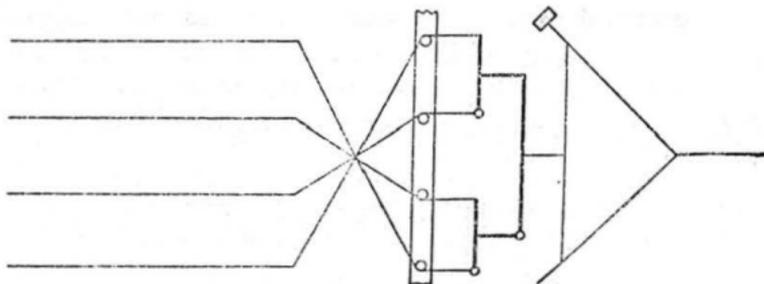


3.03 Type 1 Phantom Transpositions may be made by giving the main arm of the transposition running board one-half turn (180°).

1. Starting position of wires on transposition running board.



2. Turn main arm clockwise (left over right) facing in the direction in which the wire is being strung.



3.04 The following tables give the position of wires at the pole preceding the transposition pole, at the transposition pole and at the pole following for a type 1 phantom transposition.

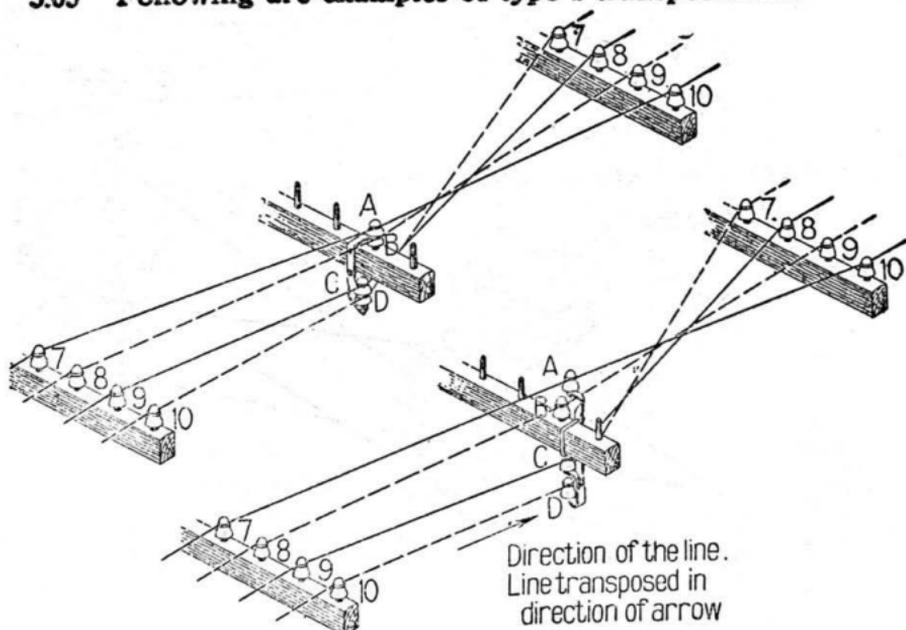
PIN POSITIONS OF WIRES - TYPE 1 TRANSPOSITION

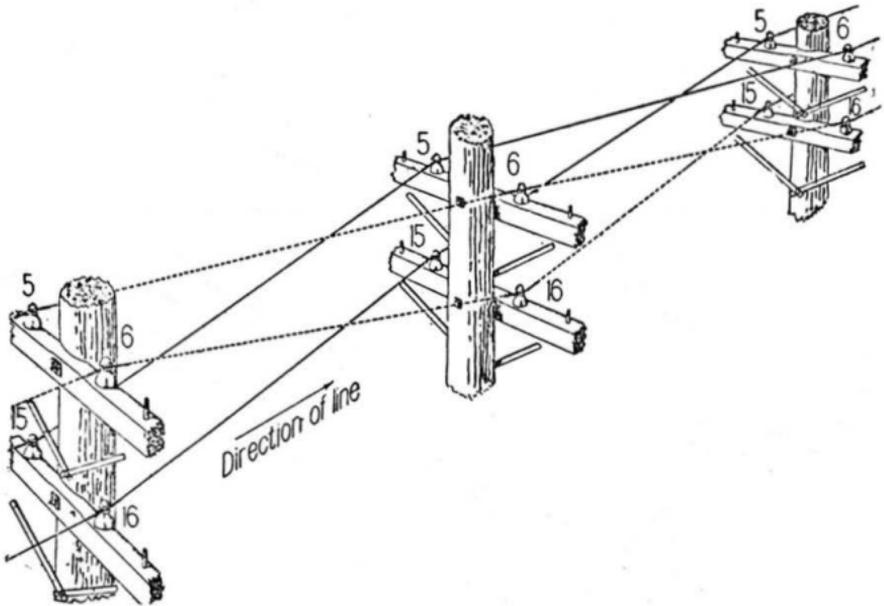
HORIZONTAL TRANSPOSITION																
Pole	Phantom Group															
	1 - 4				3 - 6				5 - 8				7 - 10			
	Pin Position															
Preceding Pole	1	2	3	4	3	4	5	6	5	6	7	8	7	8	9	10
Transposition Pole	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Following Pole	4	3	2	1	6	5	4	3	8	7	6	5	10	9	8	7

VERTICAL TRANSPOSITION		
Location of Wire on Pole Preceding Transposition	Location of Wire on Transposition Pole	Location of Wire on Pole beyond Transposition
5	6	16
6	16	15
15	5	6
16	15	5

Note: The above pin positions obtain when facing in the direction of transposition.

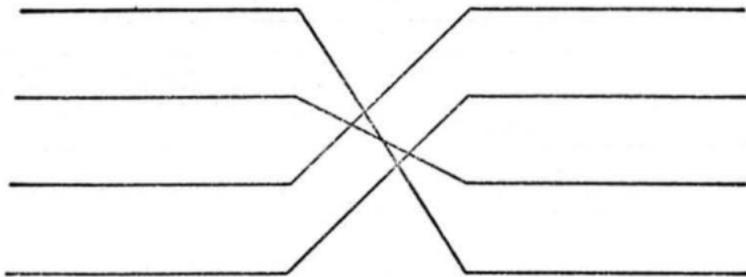
3.05 Following are examples of type 1 transpositions.





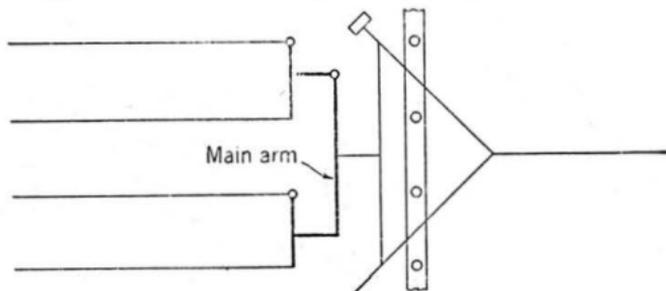
(b) Type 2 phantom transpositions

3.06 At Type 2 Phantom Transpositions positions of wires are interchanged as shown.

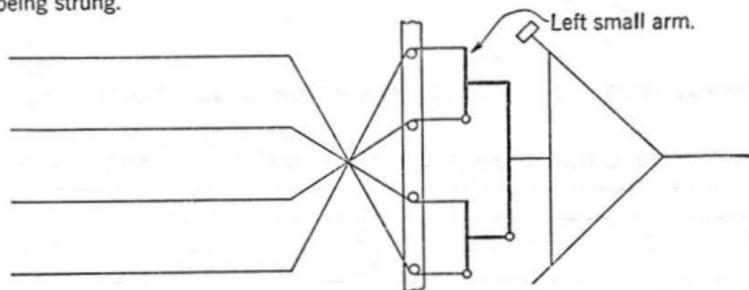


3.07 Type 2 Phantom Transpositions may be made by giving the main arm of the transposition running board one-half turn, left over right, and then giving the small arm on the left one-half turn in the opposite direction.

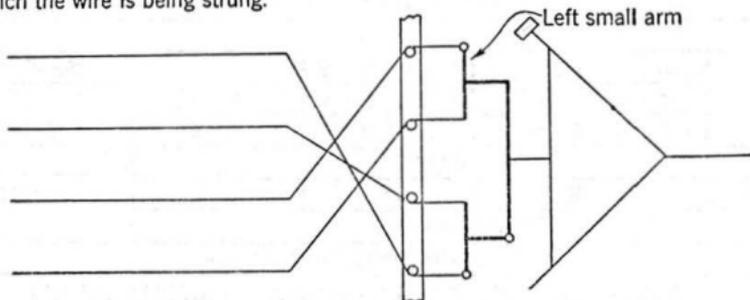
1. Starting position of wires on transposition running board.



2. Turn main arm clockwise (left over right) facing in the direction in which the wire is being strung.



3. Turn left small arm counter clockwise (right over left) facing in the direction in which the wire is being strung.



3.08 The following tables give the position of wires at the pole preceding the transposition pole, at the transposition pole, and at the pole following for a type 2 phantom transposition.

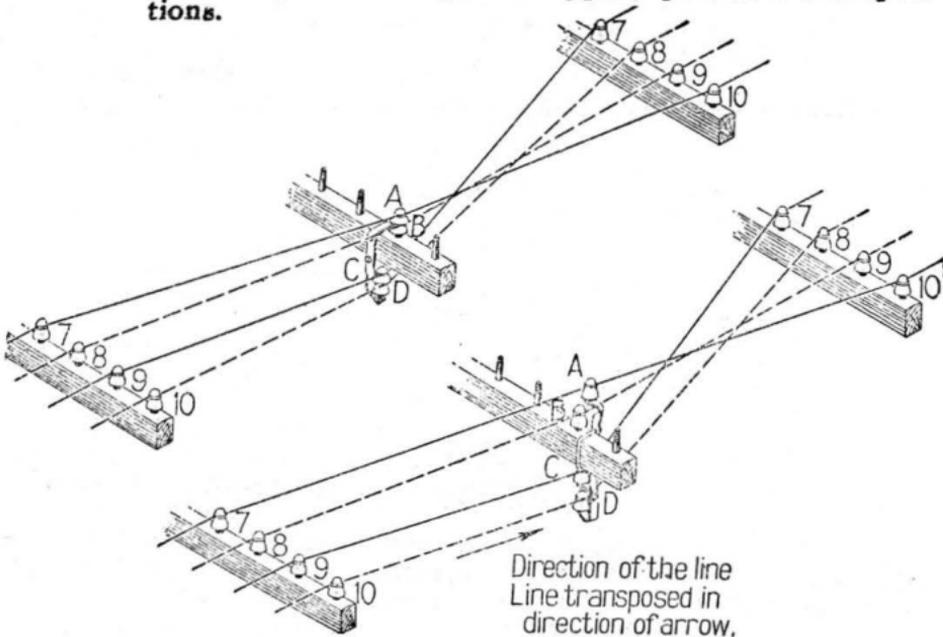
PIN POSITIONS OF WIRES - TYPE 2 TRANSPOSITION

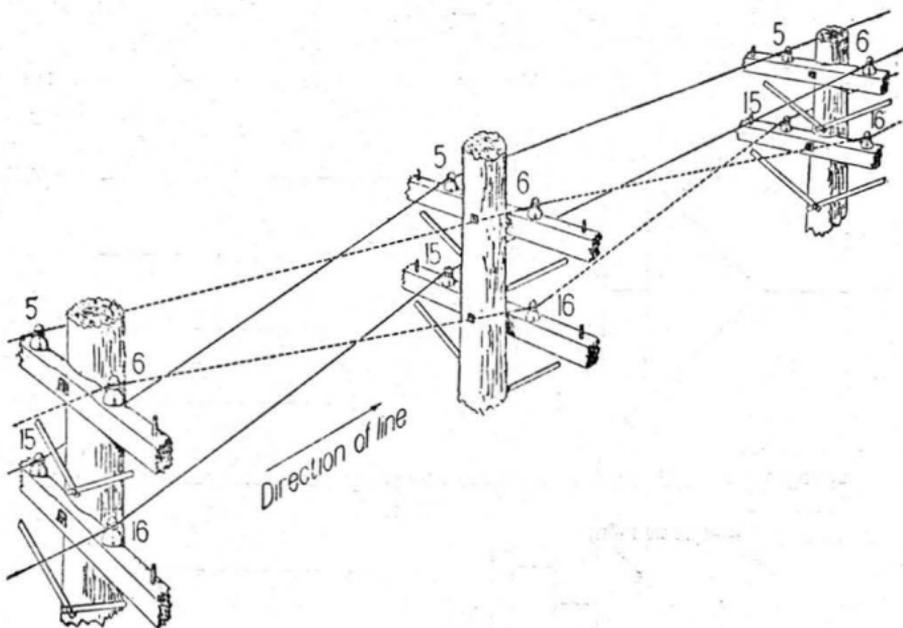
HORIZONTAL TRANSPOSITION																
Pole	Phantom Group															
	1 - 4				3 - 6				5 - 8				7 - 10			
	Pin Position															
Preceding Pole	1	2	3	4	3	4	5	6	5	6	7	8	7	8	9	10
Transposition Pole	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Following Pole	4	3	1	2	6	5	3	4	8	7	5	6	10	9	7	8

VERTICAL TRANSPOSITION		
Location of Wire on Pole Preceding Transposition	Location of Wire on Transposition Pole	Location of Wire on Pole beyond Transposition
5	6	16
6	16	15
15	5	5
16	15	6

Note: The above pin positions obtain when facing in the direction of transposition.

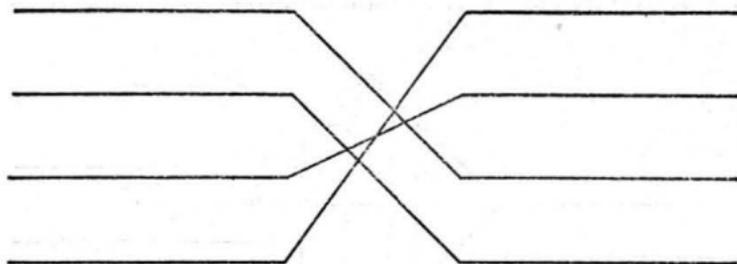
3.09 Following are examples of type 2 phantom transpositions.





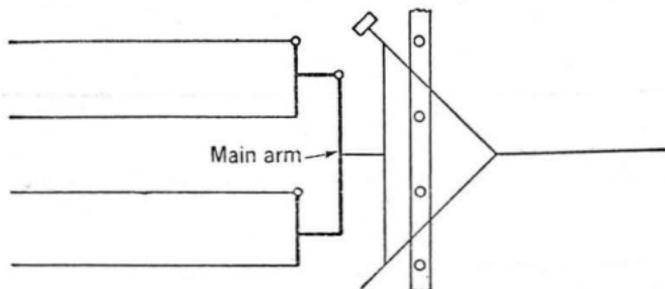
(c) Type 3 phantom transpositions

3.10 At type 3 phantom transpositions the positions of wires are interchanged as shown.

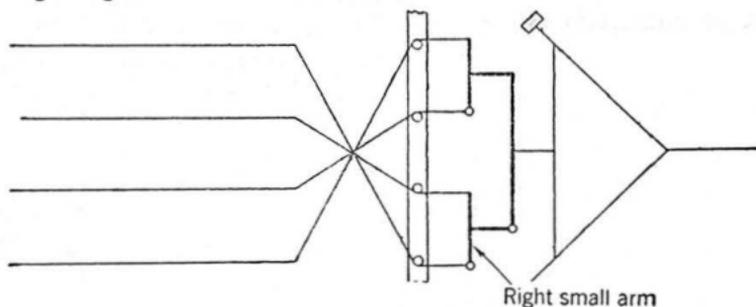


3.11 Type 3 phantom transpositions may be made by giving the main arm of the transposition running board one-half turn, left over right, and then giving the small arm on the right one-half turn in the opposite direction.

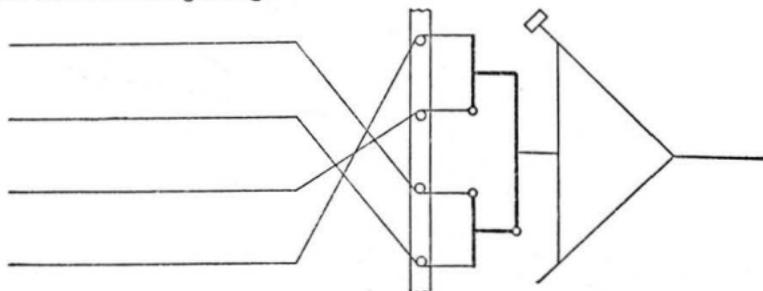
1. Starting position of wires on transposition running board.



2. Turn main arm clockwise (left over right) facing in the direction in which the wire is being strung.



3. Turn right small arm counter clockwise (right over left) facing in the direction in which the wire is being strung.



3.12 The following tables give the position of wires at the pole preceding the transposition pole, at the transposition pole, and at the pole following for a type 3 phantom transposition.

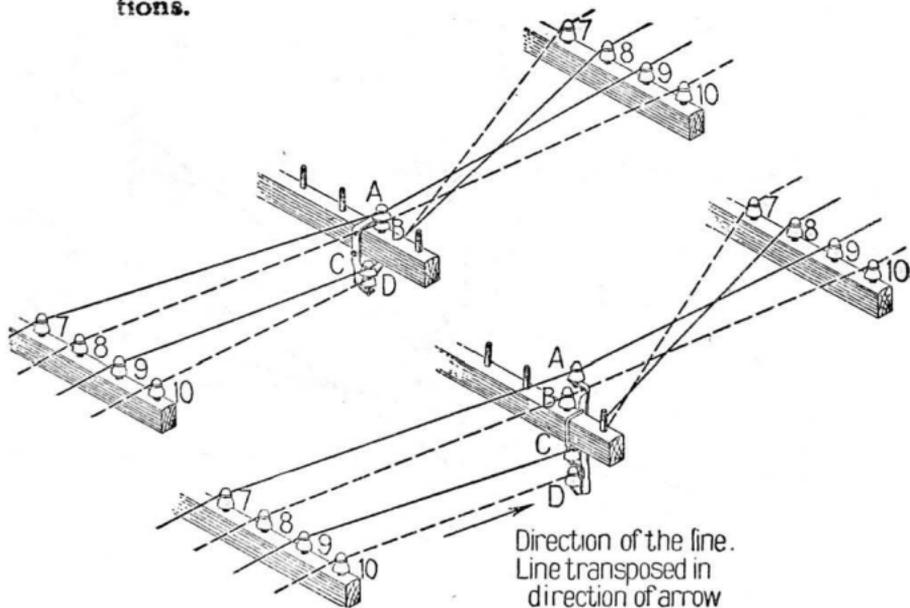
PIN POSITIONS OF WIRES - TYPE 3 TRANSPOSITION

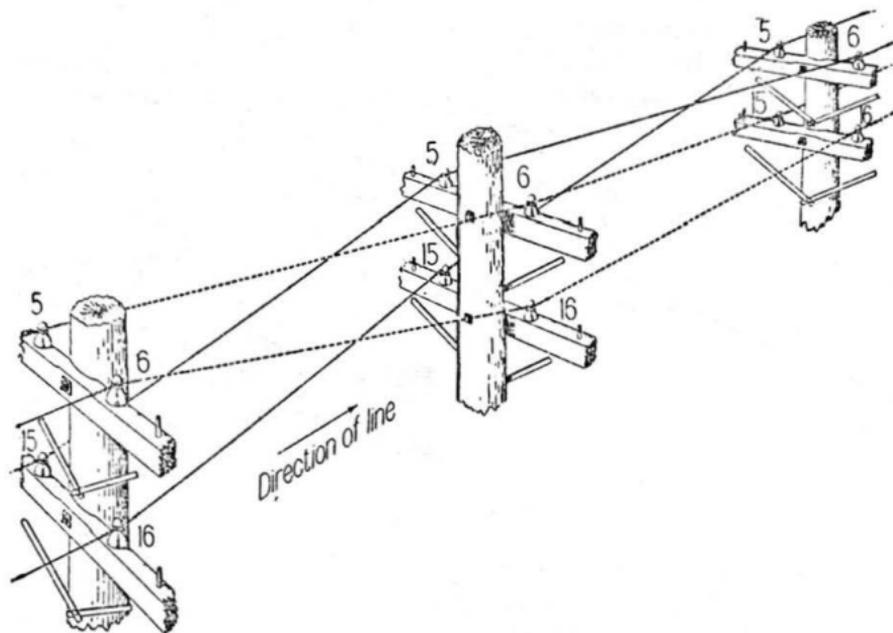
HORIZONTAL TRANSPOSITION																
Pole	Phantom Group															
	1 - 4				3 - 6				5 - 8				7 - 10			
	Pin Position															
Preceding Pole	1	2	3	4	3	4	5	6	5	6	7	8	7	8	9	10
Transposition Pole	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Following Pole	3	4	2	1	5	6	4	3	7	8	6	5	9	10	8	7

VERTICAL TRANSPOSITION		
Location of Wire on Pole Preceding Transposition	Location of Wire on Transposition Pole	Location of Wire on Pole beyond Transposition
5	6	15
6	16	16
15	5	6
16	15	5

Note: The above pin positions obtain when facing in the direction of transposition.

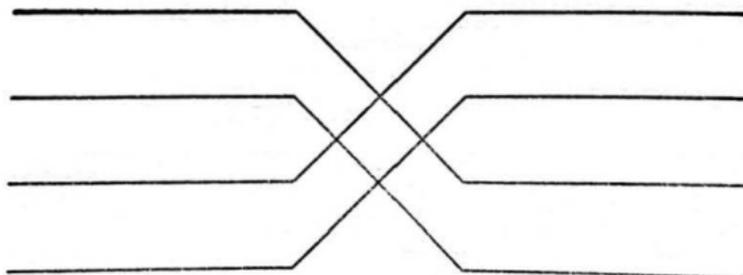
3.13 Following are examples of type 3 phantom transpositions.





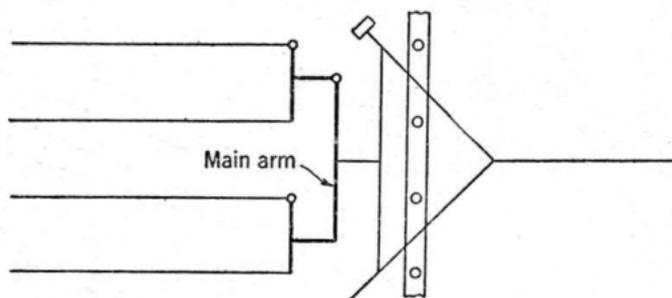
(d) Type 4 phantom transpositions.

3.14 At type 4 phantom transpositions the positions of wires are interchanged as shown.

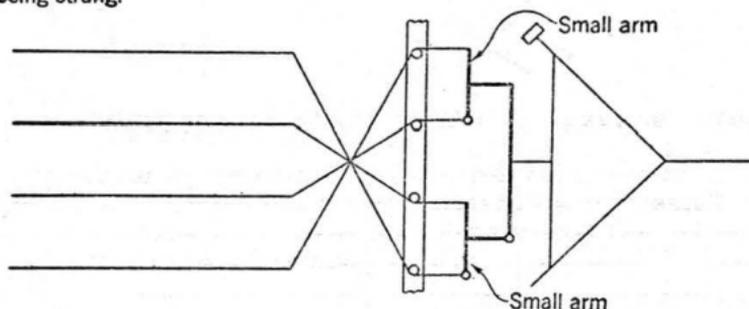


3.15 Type 4 phantom transpositions may be made by giving the main arm of the transposition running board one-half turn, left over right, and then giving each of the two small arms one-half turn in the opposite direction.

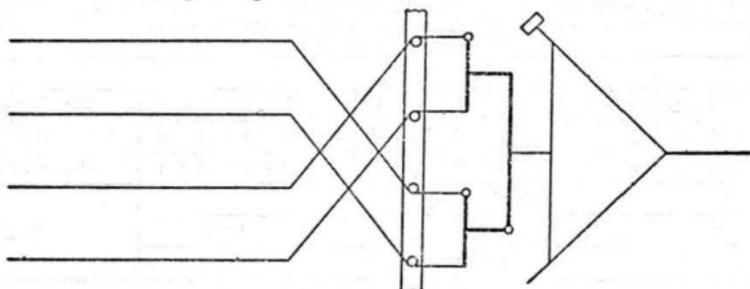
1. Starting position of wires on transposition running board.



2. Turn main arm clockwise (left over right) facing in the direction in which the wire is being strung.



3. Turn both small arms counter clockwise (right over left) facing in the direction in which the wire is being strung.



3.16 The following tables give the positions of wires at the pole preceding the transposition pole, at the transposition pole, and at the pole following for a type 4 phantom transposition.

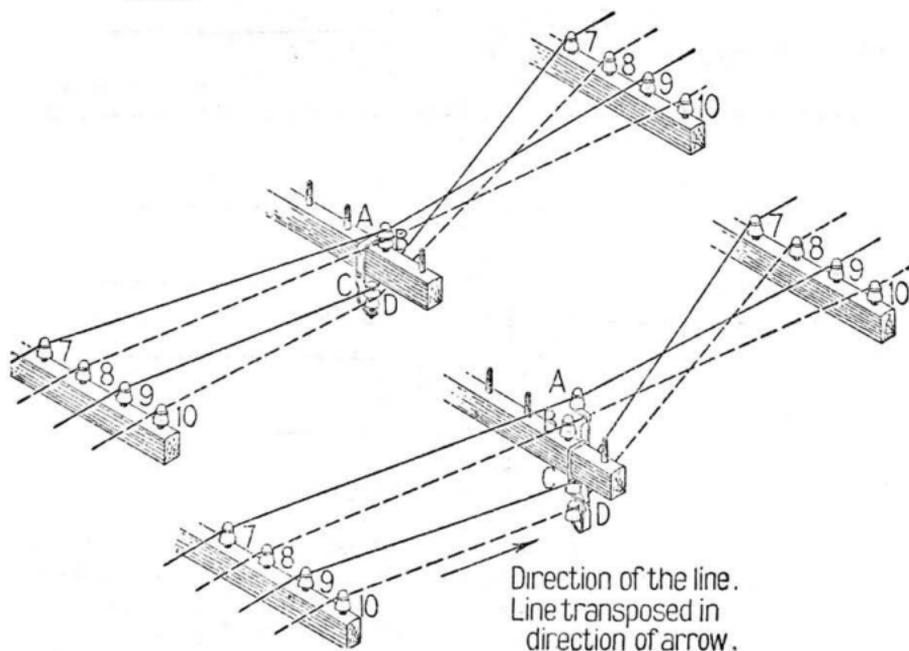
PIN POSITIONS OF WIRES - TYPE 4 TRANSPOSITION

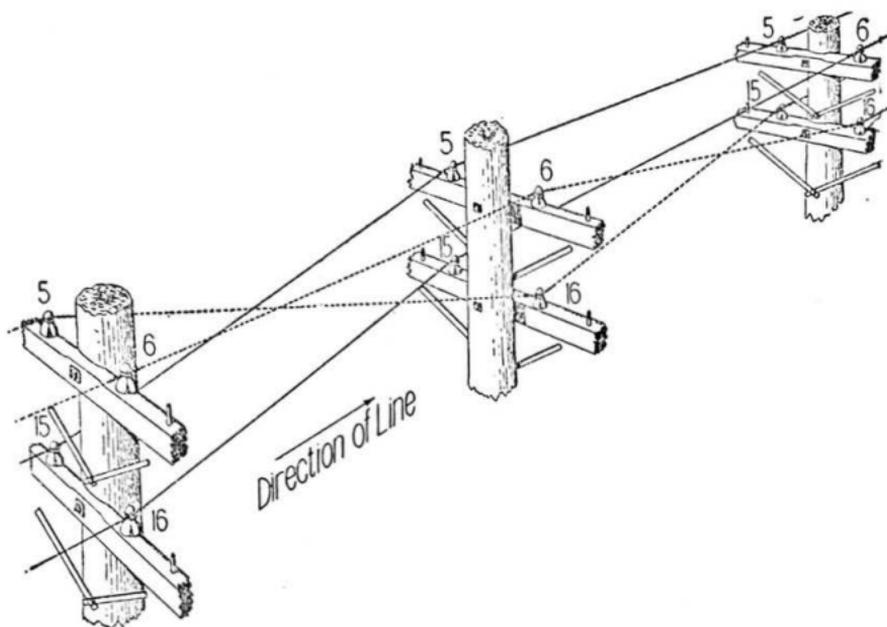
HORIZONTAL TRANSPOSITION																
Pole	Phantom Group															
	1 - 4				3 - 6				5 - 8				7 - 10			
	Pin Position															
Preceding Pole	1	2	3	4	3	4	5	6	5	6	7	8	7	8	9	10
Transposition Pole	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Following Pole	3	4	1	2	5	6	3	4	7	8	5	6	9	10	7	8

VERTICAL TRANSPOSITION		
Location of Wire on Pole Preceding Transposition	Location of Wire on Transposition Pole	Location of Wire on Pole beyond Transposition
5	16	15
6	6	16
15	5	5
16	15	6

Note: The above pin positions obtain when facing in the direction of transposition.

3.17 Following are examples of type 4 phantom transpositions.





4. TRANSPOSITION GUIDE

4.01 The Transposition Guide furnishes complete information with regard to the pin positions for the wires in all types of phantom transpositions and can be used by the lineman as a guide in making transpositions.