

## INDUCTION COILS, NETWORKS, AND EQUALIZERS

### 1.00 INTRODUCTION

**1.01** This section covers the identification and use of these components. It also describes general transmission features of common battery antisidetone sets. This section is reissued to:

- Add information on 425D, 425E, 425F, 4010A, and 4010B networks.
- Change Fig. 12.
- Delete information on transformers.

**1.02** For information regarding transformers refer to section entitled Station Transformers.

**1.03** Due to extensive changes marginal arrows have been omitted.

### 2.00 GENERAL

#### 2.01 Antisidetone Induction Coils

- Antisidetone induction coils are used in telephone and subscriber sets employing an antisidetone circuit. An antisidetone coil has a primary, secondary, and tertiary winding. The tertiary winding acts to reduce sidetone.

#### 2.02 Sidetone

- Sidetone is the transmission and reproduction of sound through a local path from transmitter to receiver of the same telephone set.
- With a sidetone set, user tends to lower his voice to reduce objectionable effect of sidetone. Also, room noise picked up by the transmitter and reproduced in the receiver masks the incoming speech.

#### 2.03 Antisidetone

- Reduction in sidetone obtained by an antisidetone circuit provides a receiving improvement because of reduction in room noise reproduced in receiver. Reduced sidetone also results in a transmitting gain, inasmuch as it influences telephone user to talk at a more nearly normal volume.

- **Local station receive (Fig. 1):** Distant-station transmitted voice currents are induced in the primary, secondary, and tertiary windings of the induction coil at the received station. Two parallel voice currents exist through:

- a. Local transmitter and primary of induction coil or
- b. Capacitor, secondary of induction coil, and either receiver and primary winding or tertiary and primary windings. Tertiary winding is of higher resistance than the secondary winding. Therefore, most voice currents will flow through capacitor, secondary winding, receiver, and primary winding circuit, allowing receiver to operate.

- **Local station transmit (Fig. 1):** Local station transmits voice currents which flow in primary and secondary windings and induce voice currents in tertiary winding. This induced voice current is approximately equal in amplitude, and opposite in polarity, to the voice currents flowing in receiver. This cancellation eliminates receiver operation.

- The difference between local station transmitting and local station receiving is:
  - a. In transmitting, the induced voice currents from the secondary to the tertiary windings are very strong and cancel.
  - b. In receiving, there is no cancellation of the induced voice currents, and receiver operates.

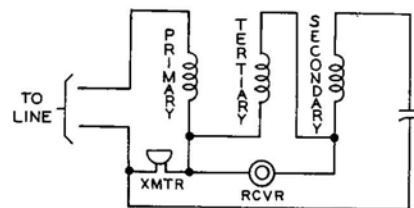


Fig. 1 — General Form of Antisidetone Circuit

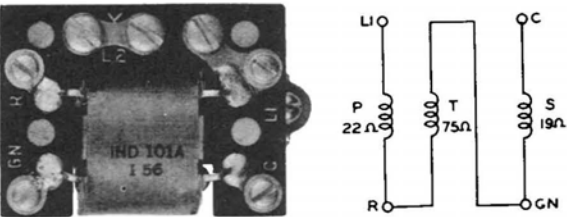


Fig. 2 – 101A Coil and Circuit Diagram

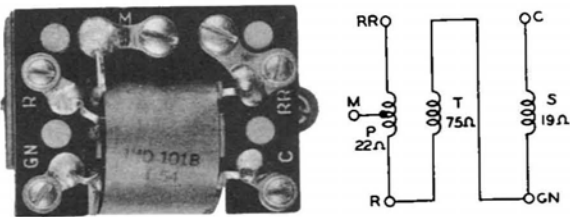


Fig. 3 – 101B Coil and Circuit Diagram

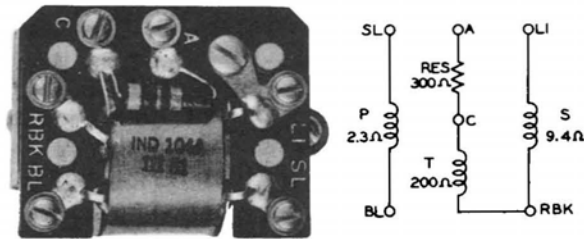


Fig. 4 – 104A Coil and Circuit Diagram

TABLE A

Coil Code No.	Replaced by
62*	181
113D*	104A
120; 146B, C; 155B	101A

\* Change subscriber set when necessary to replace 62 or 113D coils.

3.00 INDUCTION COILS

3.01 101A Coil

- A closed core antisidetone coil for use in common battery sets (Fig. 2).

3.02 101B Coil

- Same as 101A, except for a center tap on the primary winding. Center tap is used when needed as part of ground resistance circuit for tip party identification or in the coin relay circuit for coin collector service (Fig. 3).

3.03 104A Coil

- A closed core antisidetone coil with a network resistance for the sidetone balancing winding. It is used in local-battery talking, common-battery signaling sets and magento sets (Fig. 4).

3.04 Replacement

- Coils which are no longer manufactured and their replacements are shown in Table A.

3.05 Induction Coil, 500-Type Telephone Set

- An antisidetone induction coil is included as part of 425-type network used in 500-type telephone subscriber sets.

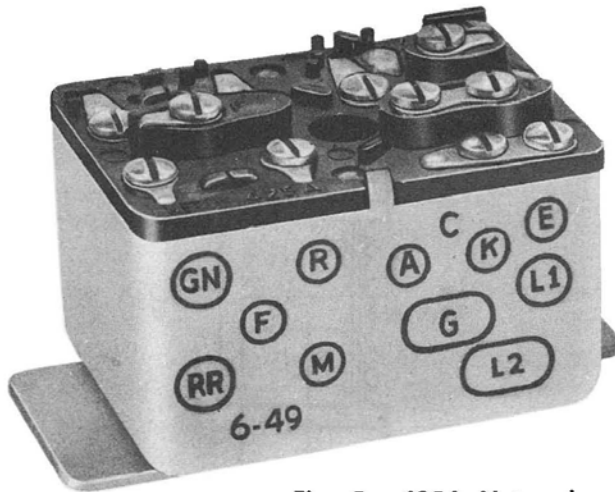
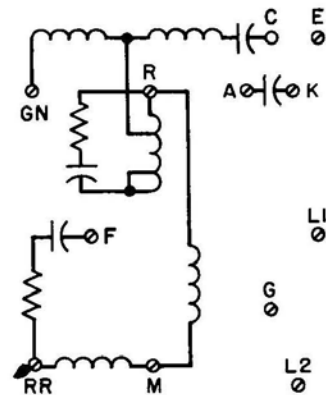


Fig. 5 — 425A Network and Circuit Diagram



## 4.00 NETWORKS

### 425A Network

#### 4.01 The 425A network (Fig. 5):

- Contains resistors, capacitors, and induction coil assembled in a protective metal case and wired to a terminal block which serves as the cover. A protective insulating compound surrounds network components.
- Provides transmission circuit elements, including sidetone balancing network, for an antisidetone telephone set.
- Provides ringing capacitor and dial radio interference-suppression filter.
- Forms part of 500A, B, J, K; and 501A, B, J, and K telephone sets.

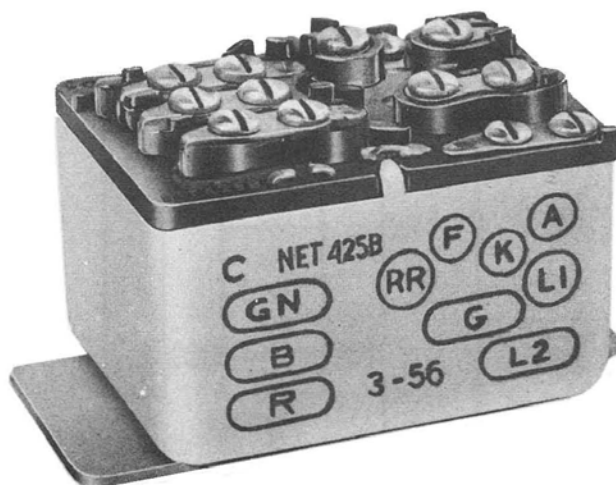
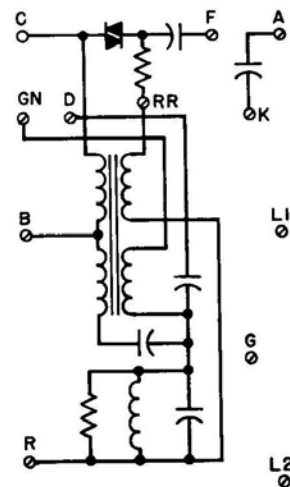


Fig. 6 — 425B Network and Circuit Diagram

### 425B Network

#### 4.02 The 425B network (Fig. 6):

- Consists of resistors, capacitors, varistors, and induction coil wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides transmission circuit elements, including sidetone balancing network, for an antisidetone telephone set.
- Provides transmission equalization for varying loop lengths, ringing capacitor, and dial radio interference-suppression filter.
- Forms part of 500-type telephone sets (except types mentioned in 4.01, 4.03, and 4.05), 630-, 631-, 632-, 634-, and 635-type telephone sets.





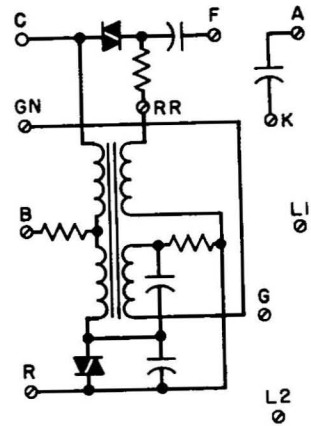
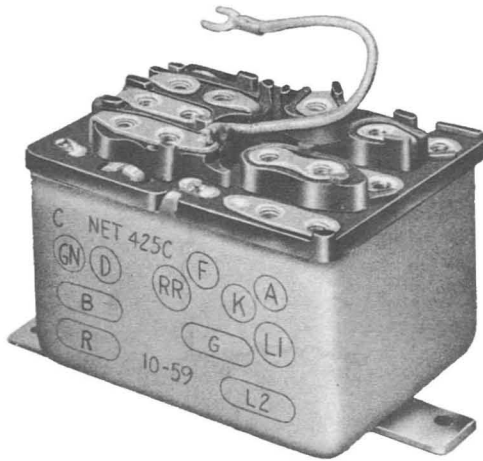


Fig. 7 – 425C Network and Circuit Diagram

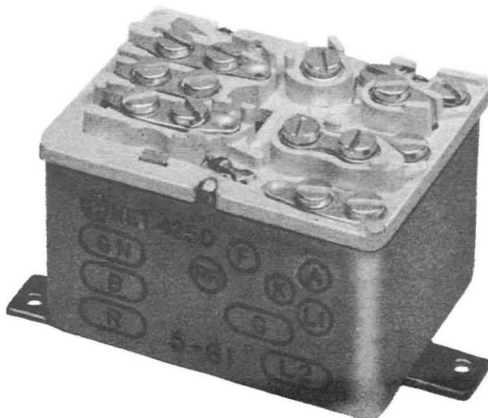
#### 425C Network

##### 4.03 The 425C network (Fig. 7):

- Consists of resistors, capacitors, varistor, inductor, and induction coil assembled in a protective metal case and wired to a terminal block which serves as the cover. A protective insulating compound surrounds network components.
- Provides transmission circuit elements for antisidetone telephone set, including a sidetone balancing network having an optional connection arrangement.



*This differs from the 425B network in having a different sidetone balancing network and in having an external strap lead to be used for the optional connection arrangement.*



#### 425D Network

##### 4.04 The 425D network (Fig. 8):

- Consists of resistors, capacitors, varistors, and induction coil wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides transmission circuit elements, including sidetone balancing network, for an antisidetone telephone set.

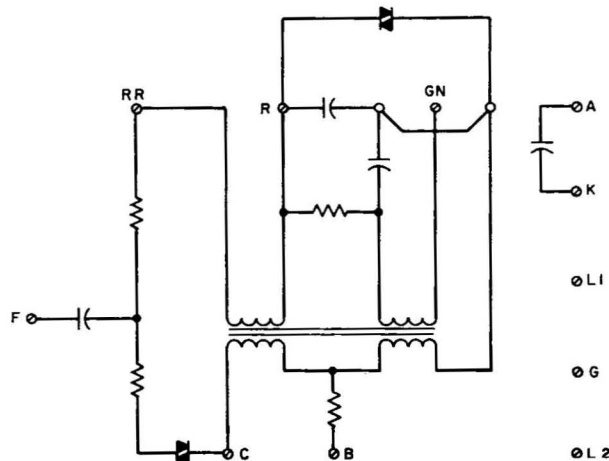


Fig. 8 – 425D Network and Circuit Diagram

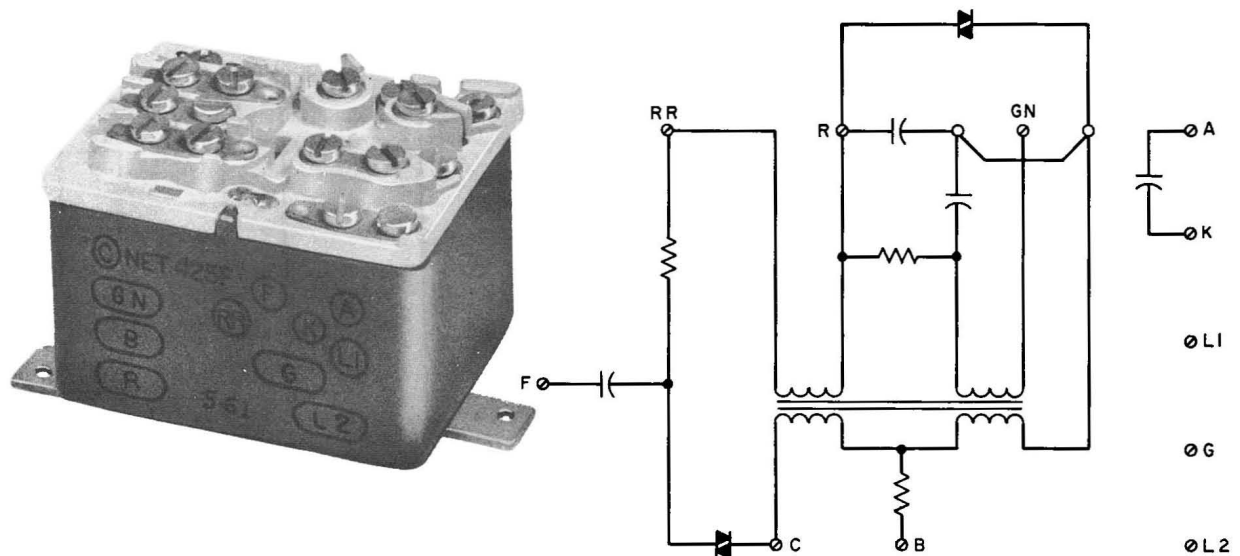


Fig. 9 - 425E Network and Circuit Diagram

- Provides transmission equalization for varying loop lengths, ringing capacitor, and dial radio interference-suppression filter.
- Forms part of 636-, 637-, 638-, and 639-type telephone sets.

#### 425E Network

##### 4.05 The 425E network (Fig. 9):

- Is electrically the same as the 425B network but is equipped with a screw-type C terminal.
- Consists of resistors, capacitors, varistors, and induction coil wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides transmission circuit elements, including sidetone balancing network, for an antisidetone telephone set.

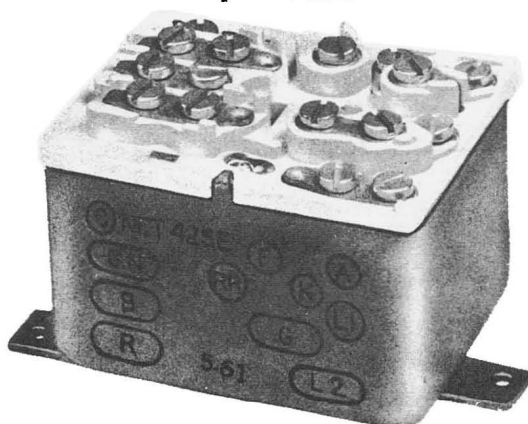


Fig. 10 - 425F Network and Circuit Diagram

- Provides transmission equalization for varying loop lengths, ringing capacitor, and dial radio interference-suppression filter.
- Forms part of 568-type telephone set.

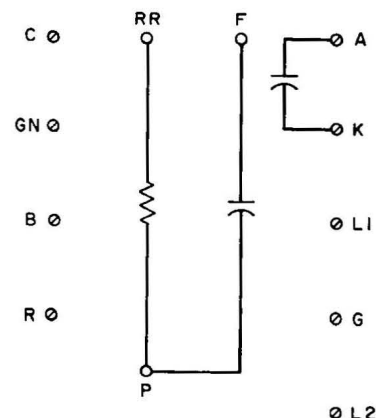
#### 425F Network

##### 4.06 The 425F network (Fig. 10):

- Consists of two capacitors and a resistor wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides ringing capacitor and dial radio interference-suppression filter.
- Forms part of 691A-3 subscriber set.



*Differs from 425E network in that it does not contain transmission circuit elements nor any antisidetone balancing network.*



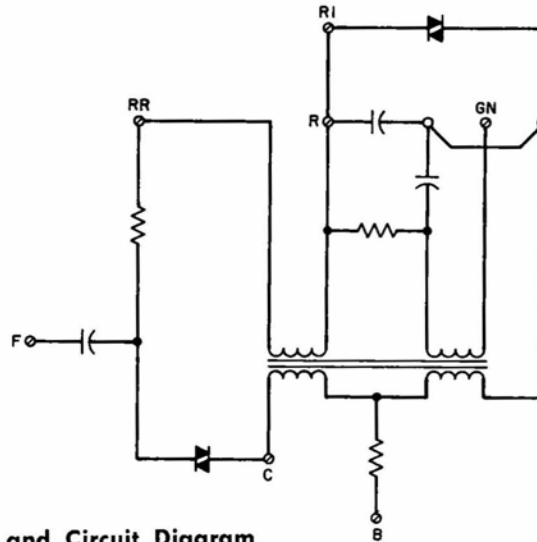
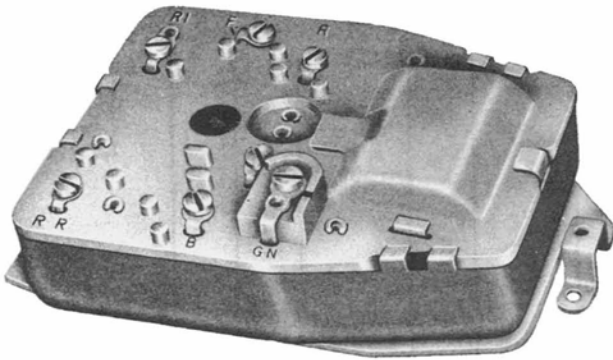


Fig. 11 — 495A Network and Circuit Diagram

#### 495A Network

##### 4.07 The 495A network (Fig. 11):

- Consists of resistors, capacitors, varistors, and induction coil wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides transmission circuit elements, including sidetone balancing network, for an antisidetone telephone set.
- Provides transmission equalization for varying loop lengths and dial radio interference-suppression filter.

- Forms part of 700-type (PRINCESS) telephone set.

#### 498A Network

##### 4.08 The 498A network (Fig. 12):

- Consists of a resistor, capacitors, and diode wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides the circuit elements for chime and ringer operation of the F1A (BELL-CHIME) ringer.

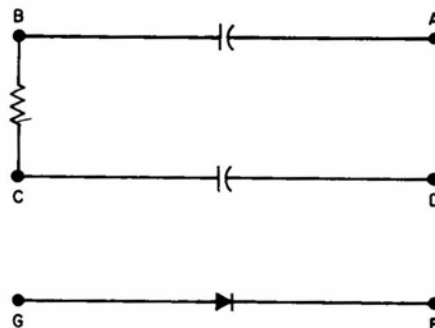
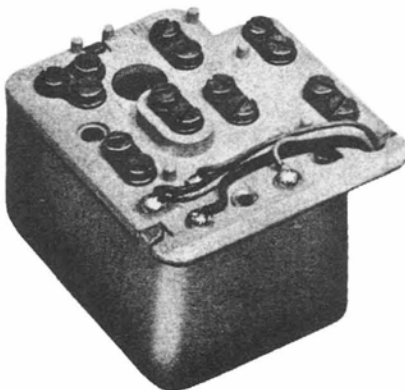


Fig. 12 — 498A Network and Circuit Diagram

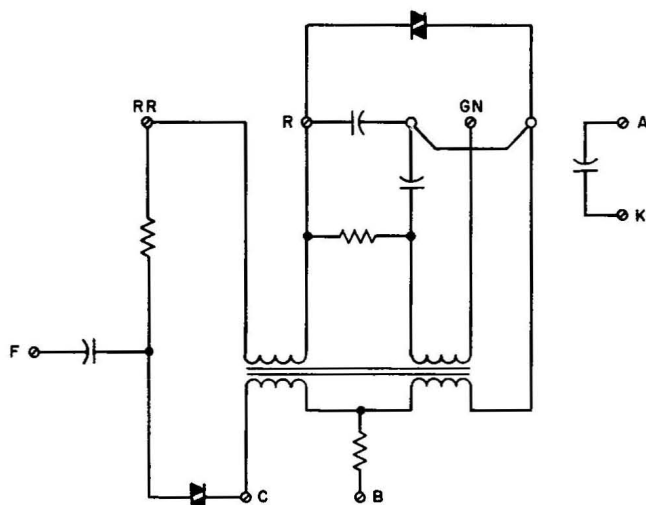
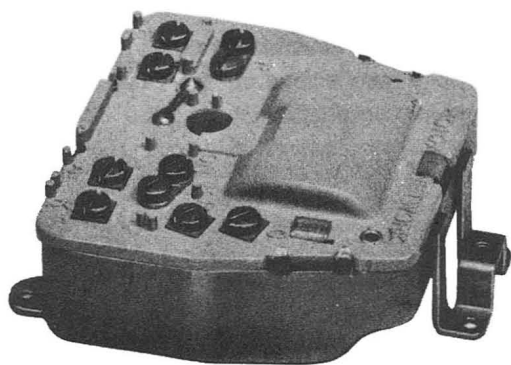


Fig. 13 — 4010A Network and Circuit Diagram

**4010A Network****4.09 The 4010A network (Fig. 13):**

- Consists of resistors, capacitors, varistors, and induction coil wired to a terminal block which serves as the cover for metal case. A protective insulating compound surrounds network components.
- Provides transmission circuit elements, including sidetone balancing network, for an antisidetone telephone set.
- Provides transmission equalization for varying loop lengths, ringing capacitor, and dial radio interference-suppression filter.

- Forms part of 661A (Card Dialer) telephone set.

**4010B Network****4.10 The 4010B network (Fig. 14):**

- Is electrically the same as the 4010A network, with the addition of the L1, L2, G, and H terminals.
- Forms part of 702B- and D-type telephone sets and 1A- and 1B-type coin telephone sets.

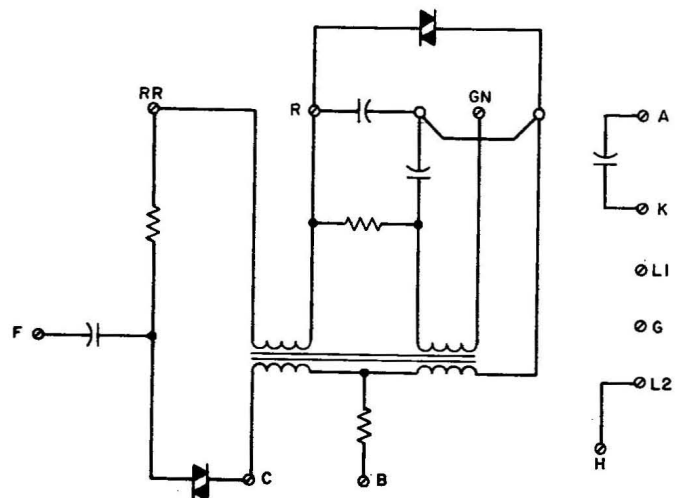
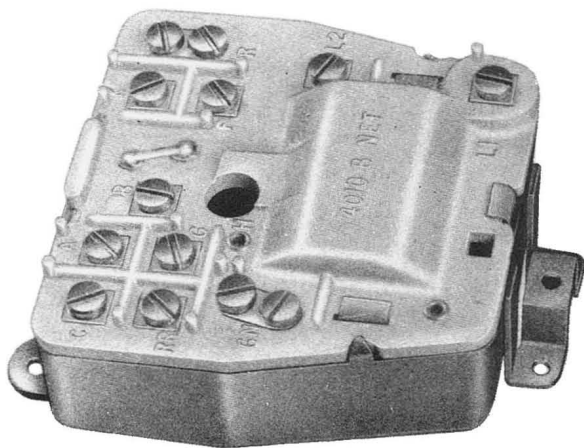
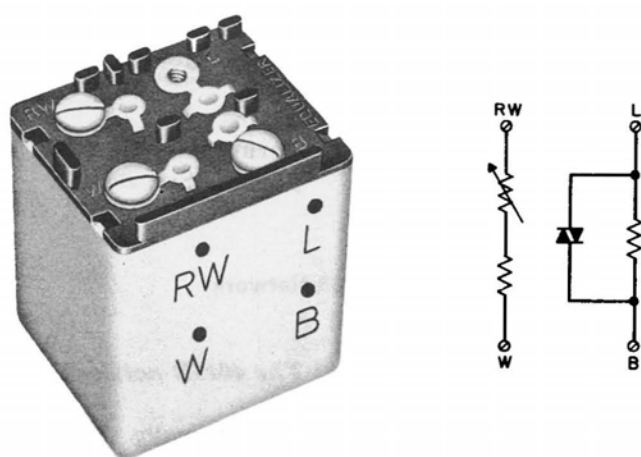


Fig. 14 — 4010B Network and Circuit Diagram

**5.00 311A EQUALIZER**

*The 311A equalizer (Fig. 15):*

- Consists of tungsten ballast filament, silicon carbide varistor, thermistor bead, and resistor assembled in a protective metal case and wired to a terminal block which serves as the cover.
- Forms, together with 425A network, a part of 500A, B and 501A, B telephone sets to equalize transmission on customers' lines under various loop conditions.



**Fig. 15 — 311A Equalizer and Circuit Diagram**