SECTION X

TRANSFORMER—VOLTAGE REGULATING

CSY-30815

TECHNICAL SUMMARY

ELECTRICAL CHARACTERISTICS—

Power Output ..... 350 va
Line Input Rating ..... 95 to 130 volts, 60 cycles
Output Voltage ..... 118 volts ±3%

MECHANICAL SPECIFICATIONS—

Dimensions:

Length ..... $15\frac{9}{16}$ inches
Width ..... $6\frac{15}{16}$ inches
Depth ..... $5\frac{5}{8}$ inches
Weight (approximate) ..... 52 pounds

DESCRIPTION

The voltage regulator is a constant frequency device used to maintain an essentially constant a-c voltage supply to the equipment to which it is connected. It is designated to maintain an output voltage constant to within ±3 per cent. This unit is entirely automatic in operation; as there are no moving parts, there is nothing to wear out. The voltage regulator depends for operation on a combination of a resonant electrical circuit wound over a high leakage-reactance magnetic field. The electrical circuit consists of a primary winding, a resonant winding across which is connected a capacitor, and a secondary winding which is connected series-opposed to a compensating winding. The primary and compensating windings are layer wound, the compensating winding being wound over the primary winding. Adjacent to the primary is the resonant winding over which is wound the compensating winding. All windings are wound on a closed core transformer provided with two magnetic-leakage gaps.

OPERATION

Constant voltage output, provided the input is single phase and of a fixed frequency, is obtained as follows: When a-c flows through the primary windings, a voltage is induced in the secondary, compensating, and resonant windings. The resonant winding, being a closed electrical circuit by virtue of its shunting capacitor, will have its induced voltage cause a flow of current therein which will attain its maximum value when the reactance of the resonant winding equals the reactance of the shunt capacitor. The resultant flux of the resonant winding, cutting the turns of the compensating winding will induce therein a value of potential which remains fixed as long as the cutting flux is fixed.

The compensating winding is connected to the secondary winding series-opposed, the two windings together comprising the output circuit of the voltage regulator. Should the primary voltage increase, the flux from the resonant winding increases, which in turn increases the induced voltage in the compensating winding. This induced voltage increases its opposing effect on the secondary, thus preventing any variation of secondary output which therefore remains fixed. Should the primary voltage decrease, the flux from the resonant winding decreases which in turn decreases the induced voltage in the compensating winding. The induced voltage decreases its opposing effect on the secondary, thus preventing any variation of secondary output which likewise remains fixed.

SERVICE

In the event of a power failure, first check the applied line voltage on the power supply unit by means of the voltmeter (M601). If no deflection occurs, check the fuses F601 and F602. Should line voltage be indicated on the meter, throw the meter switch over to the regulated voltage side. No meter deflection indicates probable trouble in the voltage regulator. To locate this trouble, first open the main a-c switch. Then by means of an ohmmeter, check the regulator for winding continuity, open or short circuits and ground. Unless the nature of any of these defects are such as to permit simple repair, the complete unit should be replaced by one of identical characteristics.

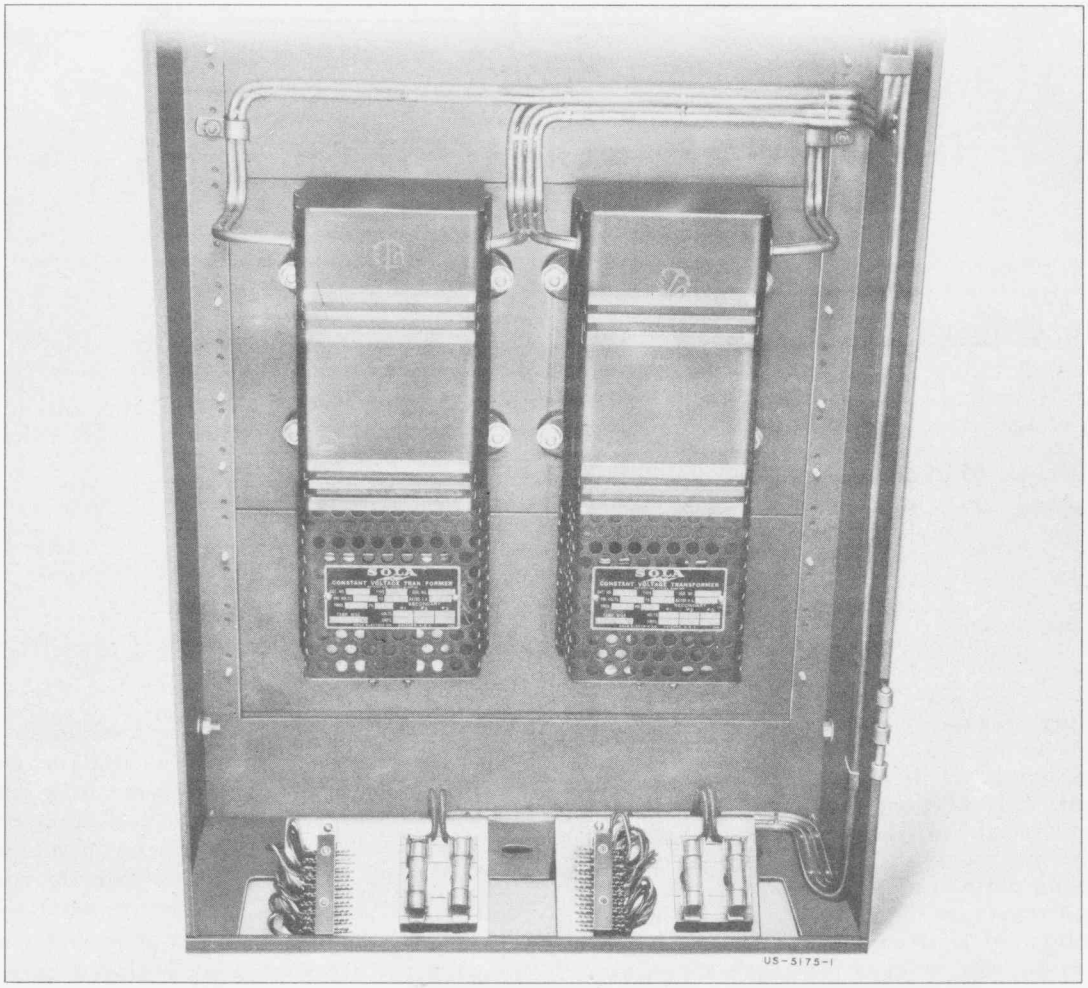

Figure 1—Type CSY-30815 Transformer—Voltage Regulating (Dual Unit Installation)

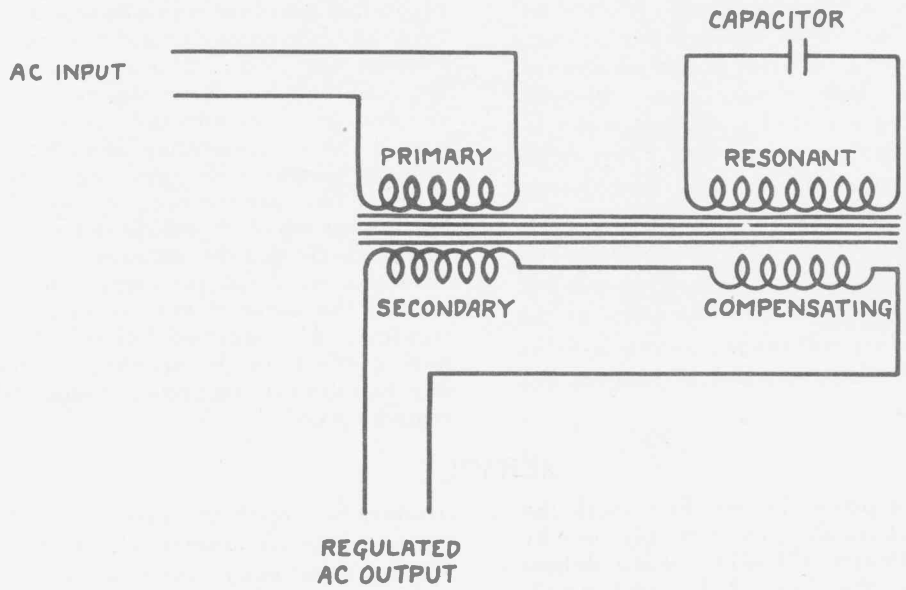

Figure 2—Type CSY-30815 Transformer-Voltage Regulating (Schematic, K-861224—Sub. 0)