tain operating efficiency. Hence, transformers designed for 25-cycle line operation are larger and heavier than the more familiar 50-60 cps units. Since higher frequency transformers require less iron, military equipment transformer frequencies may range from 400 to 1000 cps.

Unless you live in an area supplied with 25-cycle power (a common frequency of hydroelectric power plants), the chances are you use 60-cycle transformers in all your projects. However, 400-cycle (or other high frequency) transformers are encountered on the surplus market. As a general rule, a transformer will overheat, and may burn out, if used at frequencies appreciably lower than those for which it was designed. Thus, a 60-cycle transformer may overheat if connected to a 25-cycle line, as will a 400-cycle transformer connected to a 60-cycle source.

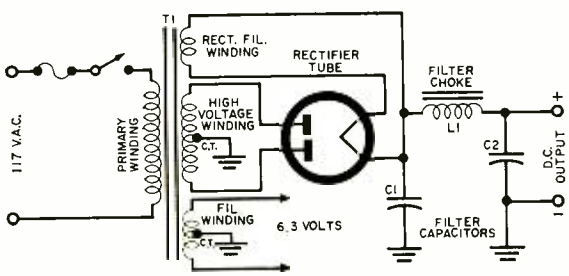

Fig. 1. Schematic wiring diagram of a typical power supply.

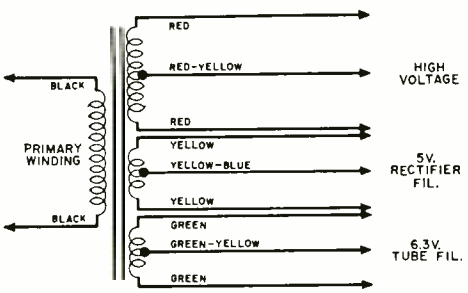

Fig. 2. Standard color coding for power transformer leads.

Specifications. Aside from operating frequency, a power transformer's electrical specifications are given in terms of primary voltage, secondary voltages and rated currents. In some cases, the unit's power-handling capacity may be indicated in watts or *volt-amperes* (*va.*=primary voltage multipled by current in amperes).

A typical filament transformer may have the following specifications: *Primary,* 105-120 volts, 60 cycles; *Secondary,* 6.3 volts, CT, 2 amps. Such a transformer is designed for operation on a standard 60-cycle power line. Although line voltage is nominally 115 volts, it may vary from 105 to 120 volts, depending on local conditions.

This unit's center-tapped (CT) secondary winding has a nominal rating of 6.3 volts, and is capable of delivering a current of 2 amperes without overload. The exact secondary voltage will vary with the applied primary winding voltage and the secondary load. If overloaded, the transformer will supply *more* than 2 amperes, but the voltage will be low and the unit may overheat. Conversely, if less than 2 amperes are drawn, the secondary voltage may be somewhat higher than 6.3 volts.

Frequently, the presence of a center tap is indicated in the secondary voltage specification rather than the abbreviation of "CT". For example, a transformer might carry the following specs: *Primary,* 105-120 volts, 60 cycles; *Secondary,* 350-0-350 volts, 50 ma. This transformer has a standard primary winding and a secondary winding delivering 350 volts *on each side* of its center tap; rated secondary current is 50 milliamperes. The secondary winding could also be described as 700 volts—CT, 50 ma.

Where a multi-winding power transformer is used, such as in Fig. 1, the voltage and current rating of *each* secondary winding are listed separately. A typical set of specs reads as follows: *Primary,* 105-120 volts, 60 cycles; *Secondary* No. 1, 300-0-300 colts, 50 ma.; *Secondary* No. 2, 5.0 volts, 2 amps; *Secondary* No. 3, 6.3 volts, CT, 3 amps.

Lead Identification. Connections to transformers are made to fixed terminal