For instance, if the load requirement from two systems were 60 amps, the voltage regulator would allow sufficient current through the field circuits to meet that requirement. The charging circuit with the lesser amount of resistance will use more current than the other, but between the two, they will produce the necessary 60 amps, and that's all that matters.

If the output fluctuates or there is no output at all, the most likely cause is a loose or broken alternator belt. If you recently have added an alternator or made some related system change and you find that the aircraft lights flicker, you detect poor alternator voltage regulation, you see the instruments oscillate, or you hear radio interference, you may have an excessive voltage drop. The most probable causes are improper conductor diameter or length. Aircraft with alternators are more prone to have radio interference because of the constant change of voltage and current signals conducted along and radiating from conventional wiring. These fluctuations are picked up by the avionics equipment either through their power source or antenna wires. The static almost always can be reduced dramatically, if not eliminated completely, by the strategic placement of a capacitor and installation of shielded conductors between the regulator and the alternator.

ELECTRICAL GROUNDING

Those of you who like to poke around inside the aircraft, more than that afforded by just a preflight, probably have already noticed a significant difference between the way your household electricity is distributed and aircraft power distribution systems. If you look closely at the cord leading to your table lamp, you will notice there are actually two wires, bound together, running from the lamp to the power source (wall outlet). Then take a look at an aircraft component; there is only one wire.

Years ago when aircraft covered with fabric were standard, the electrical systems had two wires. Today's modern, all-metal fuselage allows the airframe to act as one of the conductors, eliminating one of the wires. A single wire supplies electricity to the component, which is grounded to the airframe. The battery is also grounded to the airframe, completing the circuit. The advantages of eliminating half the wiring are obvious: lighter weight, less complexity, lower construction costs, and reduced potential problems.

THE ELECTRICAL BUS

All power distribution points, also called buses, are essentially the same. Figure 8-14 shows that a bus is a metal strip to which parallel circuits are connected. They are typically named for their source of power or the function they serve. For instance, a bus that is directly connected to the battery through the master switch is usually called the battery bus. One that is always connected to the battery with no method of disconnection is a hot battery, or essential, bus because the bus is always "hot" with electricity.

Items on a hot battery bus will deplete the battery even when the master switch is turned off. Therefore, it is important to assure that all such equipment is individually turned off. While most commonly found on larger aircraft, a limited hot battery bus is installed in some lighter aircraft. The Beech 58 Baron uses one to activate baggage and courtesy lights and the stall indicator. The Cessna 172RG uses it to run a clock and flight hour recorder.