pump becomes less and less efficient as ambient air density decreases. Using a vacuum system in aircraft that routinely operate at higher altitudes results in shortened pump life because the pump has to work harder in the thin air. Smaller aircraft require less vacuum action from the pump because it usually only powers the gyros. A typical twin-engine vacuum system is shown in Figure 15-4.

Pressure systems can move more air at higher altitudes than their vacuum counterparts. Air enters the pressure system through a cabin inlet filter, goes directly into the intake (vacuum) port of the pump, and out the pressure port to the pressure-regulating valve. After going through another filter, the air is routed to the gyro instruments, past the gauge, and finally is released overboard.

Twin-engine aircraft have one pressure pump per engine and, as in the vacuum systems, they share common tubing and valves. The problem is that pressure systems tend to create moisture, especially in high-humidity locations such as operating near oceans, lakes, rivers, and in areas with heavy rain. Because moisture in the lines and gyros can cause significant problems, filters of aircraft operated in high-humidity areas should be changed more frequently than recommended by the manufacturer.

The dry-air pump is the heart of the modern pneumatic system. The pump rotor has self-lubricating carbon vanes that are specially designed to wear and lubricate the pump

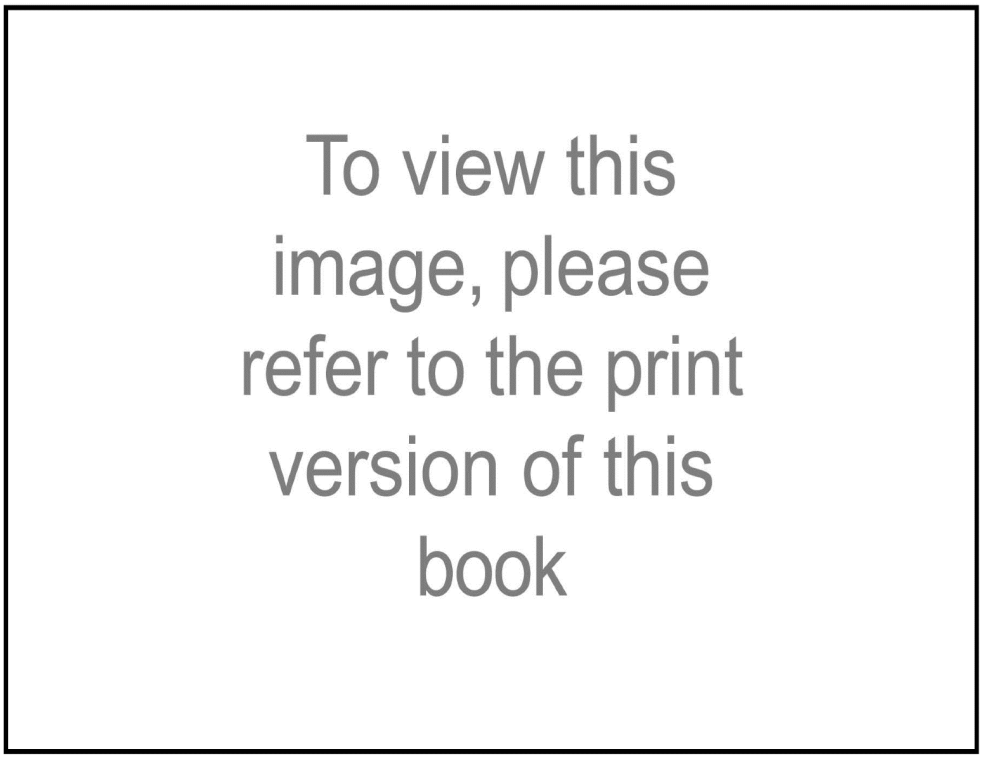

Fig. 15-4. *Multiengine aircraft vacuum system.*