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Fig. 2-1. *Simple airspeed indicator.*

change of pitch or power is implemented. If the problem is the result of pitot-static blockage, the error will continue to increase without any sign of the correction having been made. Similarly, always maintain a complete instrument scan; all instruments should agree that there is an airspeed problem; otherwise there is an indicator problem.

The airspeed indicator is designed to be most accurate at sea level on a standard 59-degree Fahrenheit day. At best, indicated airspeed is fraught with errors. It is subjected to various system errors, leaks, and problems associated with improper pitot tube and static source placement. To compensate, the airframe manufacturers give us calibrated airspeed (CAS), which is corrected for system errors. Appropriate airspeed corrections are presented in the pilot's operating handbook (POH) for different conditions of flight—most commonly gear and/or flaps up and down.

Because we seldom operate at sea level, and occasionally fly higher-speed aircraft, pilots must also understand the effect of compressibility on CAS. As density decreases, compressibility error increases. At approximately 10,000 feet an aircraft flying at 250 knots or faster begins to display a serious airspeed error. At that point it is necessary to correct CAS for density variation to compute equivalent airspeed (EAS).

High-speed, high-altitude airplanes encounter such high-ram air pressures that the "ram effect" causes the air to compress, affecting the airspeed indication. This is a well-known phenomenon that affects all aircraft in the same way. Charts provide compressibility factors based on altitude and CAS. Incidentally, this compressibility error applies only to the standard airspeed indicator. True airspeed (TAS) indicators and Machmeters automatically correct for air compression. All aircraft are affected by decreased atmospheric