

scale, and the end of the cap *C* is divided into a number of equal parts. By turning the cap the end *A* moves forward until it reaches the stop *B*. When this is the case the graduations on *D* and *C* both read zero.

In order to measure the diameter of a wire, the end *A* is screwed up until the wire is just held between *A* and *B*. Then from the scales on *D* and *C* we can find the diameter required.

There are other devices for accurate measurement of lengths, but in every case the scale, or the screw, or whatever is the essential part of the instrument, must be carefully compared with a good standard before our measurements can be of real value.

12. Measurement of Mass. In Fig. 8 is shown a balance. The pans *A* and *B* are suspended from the ends of the beam *CD*, which can turn easily about a "knife-edge" at *E*. This is usually a sharp steel edge resting on a steel or an agate plate. The bearings at *C* and *D* are made with very little friction, so that the beam turns very freely. A long pointer *P* extends downwards from the middle of the beam, and its lower end moves over a scale *O*. When the pans are balanced and the beam is level the pointer is opposite zero on the scale.

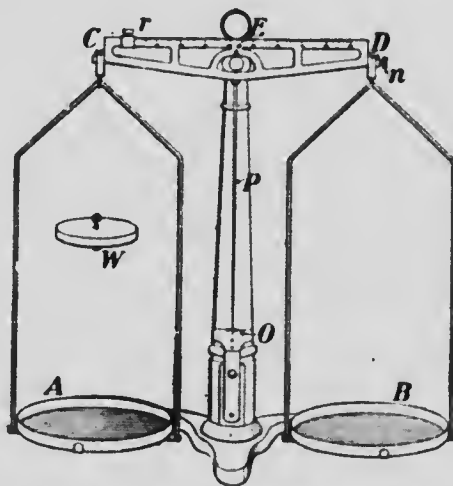


FIG. 8.—A simple and convenient balance. When in equilibrium the pointer *P* stands at zero on the scale *O*. The nut *n* is for adjusting the balance and the small weights, fractions of a gram, are obtained by sliding the rider *r* along the beam which is graduated. The weight *W*, if substituted for the pan *A*, will balance the pan *B*.

Suppose a lump of matter is placed on pan *A*. At once it descends and equilibrium is destroyed. It goes downwards