3.3. SPECIFIC GRAVITY

"Specific gravity" is a number which represents the ratio of the weight of a mineral to the weight of an equal volume of water. Thus a mineral with specific gravity 4.0 is four times as heavy as water. The specific gravity of common silicate minerals is about 2.65 and those of ore minerals varies between 4.5 to 10.0. A rough estimate about the specific gravity of minerals can be made by hefting them in our hand.

3.3.1. Determination of Specific Gravity

The common methods of determining specific gravity of solids are based on the fact that the loss in weight of a body immersed in water, is the weight of an equal volume of water. If W_1 is the weight of the mineral in air and W_2 its weight in water, its specific gravity will be as under.

$$\text{Specific Gravity} = \frac{W_1}{W_1 - W_2}$$

Walker's Steel Yard. Walker's steel yard is an instrument which is mainly used for determining the specific gravity of comparatively large mineral specimens. This instrument consists of a graduated long horizontal beam of steel which is supported near one end on a knife edge as shown in Fig. 3.2. At the end of the longer arm, a vertical post is placed. It bears an index mark which helps in aligning the beam in the horizontal position.

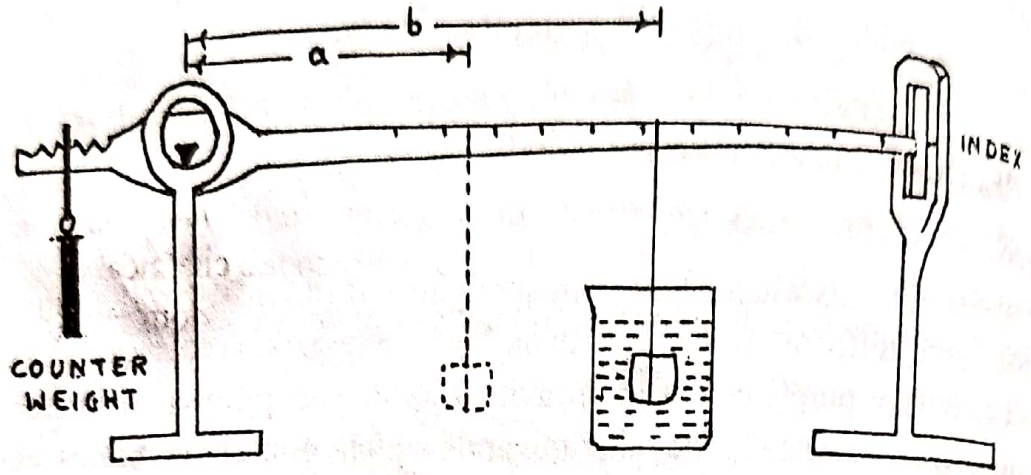

Fig. 3.2. Walker's steelyard balance.

The mineral specimen whose specific gravity is to be determined, is suspended by a very thin nylon thread from the longer arm. It is moved along the graduated arm so as to bring the end of the arm opposite the fixed index mark and the position of the specimen on the arm is noted. Let us assume that the reading is *'a'*.

Now the specimen is submerged under water. This is done by placing a beaker filled with water below the specimen. This will disturb the balance. The specimen is then moved away from the fulcrum unitll the beam again comes opposite the index mark. Les us assume that the new reading is now *'b'*. The specific gravity of the mineral is calculated as follows.

$$\text{Specific Gravity} = \frac{b}{b-a}$$

It may be noted that there is a *"counter weight"* on the shorter arm. This weight can be shifted from one notch to another on this arm, but it must remain in the same notch during any one experiment.

Jolly's Spring Balance. The specific gravity of small fragments of a mineral is determined by the Jolly's spring balance. The instrument consists of a weak spring suspended vertically against a graduated mirror scale. Two pans, one below the other

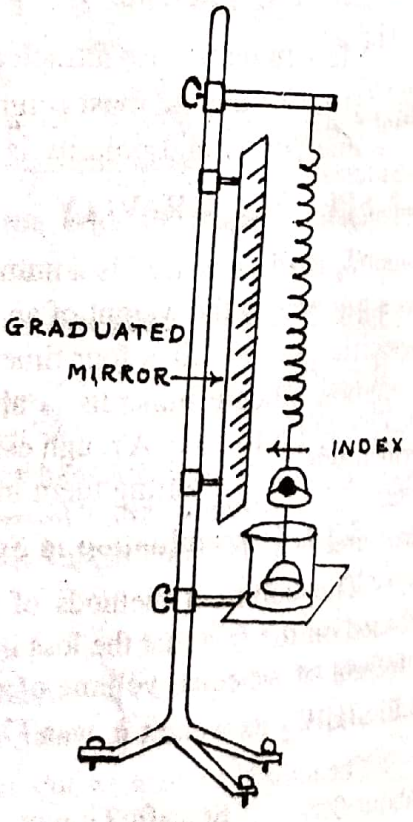

Fig. 3.3. Jolly's spring balance.

as shown in *Fig. 3.3*, are attached to the lower end of the spring. The lower pan is always immersed in water. The initial reading "*a*" of the pointer on the scale is taken without putting anything on the pans. A small piece of mineral whose specific gravity is to be determined, is placed on the upper pan and the second reading "*b*" is taken. The specimen is then transferred to the lower pan and the third reading "*c*" is noted. The specific gravity of the mineral is determined as follows.

$$\text{Specific Gravity} = \frac{(b-a)}{(b-c)}$$