$$\text{Reading I} = \text{Friction} + \text{force}.$$
$$\text{Reading II} = \text{Friction} - \text{force}.$$
$$\text{adding them, } 2\ \text{Friction} = \text{Reading I} + \text{Reading II}.$$
$$\text{Friction} = \frac{\text{Reading I} + \text{Reading II}}{2}.$$

Is the friction greater than the force that would balance the weight if there were no friction?

Suggestions for experiments at home:

Make experiments similar to 1 and 2 with a jack-screw, if you have one. If not, you can make experiments with an ordinary bolt and nut as follows: Clamp nut in vise or other support. Screw in bolt part way with head above nut. Attach a weight to the bolt below the nut with a wire. Attach wrench to head as handle. Measure length of handle, pitch of screw and weight. Calculate the force, then find it experimentally.

Similar experiments may also be made with a revolving piano stool.

Exercises

1. The handle of a jack-screw is 21 in. long, the pitch is $\frac{1}{2}$ in., the head weighs 28 lbs., and a weight of 500 lbs. is on the head. What force would just balance the weight, if there were no friction?

Ans.

Force × distance force travels = weight × distance weight is raised.

Force $\times 2 \times \frac{22}{7} \times 21 = 528 \times \frac{1}{2}$ or Force $= 2$ lbs.

2. The handle of a jack-screw is 14 in. long and the pitch is $\frac{1}{2}$ in., the head weighs 28 lbs., and the weight on it is 500 lbs. What is the force that would support the weight, if there were no friction?

3. In finding the force experimentally, we find that the reading when raising the weight is 13 lbs., and when lowering it is 7 lbs. What is the force and what is the friction?