

5.10 LOCKING ARRANGEMENTS FOR NUTS

The bolted joints, though removable in nature, are required to stay firm without becoming loose, of their own accord. However, the joints used in the moving parts of a machinery, may be subjected to vibrations. This may slacken the joint, leading to serious breakdown. To eliminate the slackening tendency, different arrangements, as discussed further, are used to lock the nuts :

5.10.1 Lock Nut

This is the most commonly used locking device. In this arrangement, a second nut, known as lock nut is used in combination with a standard nut (Fig. 5.27a). The thickness of a lock nut is usually two-thirds D , where D is the major diameter of the bolt. The lock nut is usually placed below the standard nut. To make the joint, the lock nut is first screwed tightly and then the standard nut is tightened till it touches the lock nut. Afterwards, the locknut is then screwed back on the standard nut, which is held by a spanner. The threads of the two nuts become wedged between the threads of the bolt.

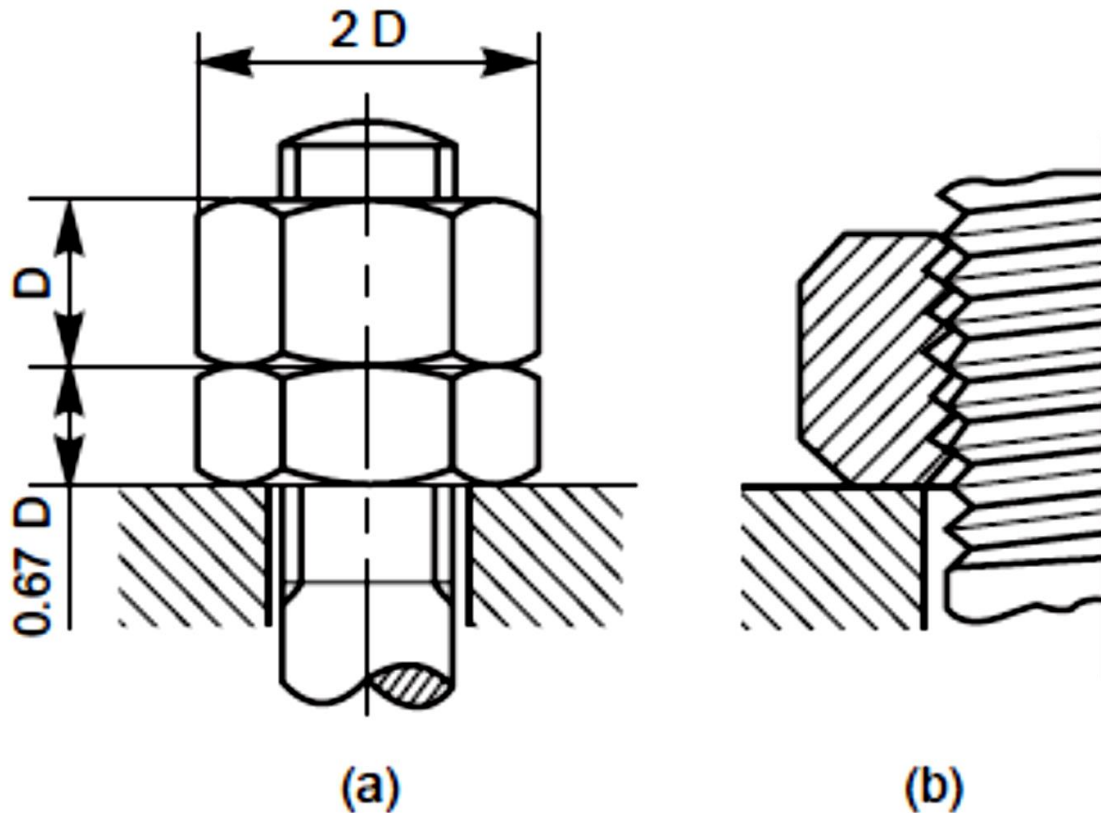


Fig. 5.27 Lock nut

5.10.2 Locking by Split Pin

A split pin, made of steel wire of semi-circular cross-section is used for locking the nut. In this arrangement, the split pin is inserted through a hole in the bolt body and touching just the top surface of the nut. Then, the ends of the pin are split open to prevent it from coming out while in use (Fig. 5.28).

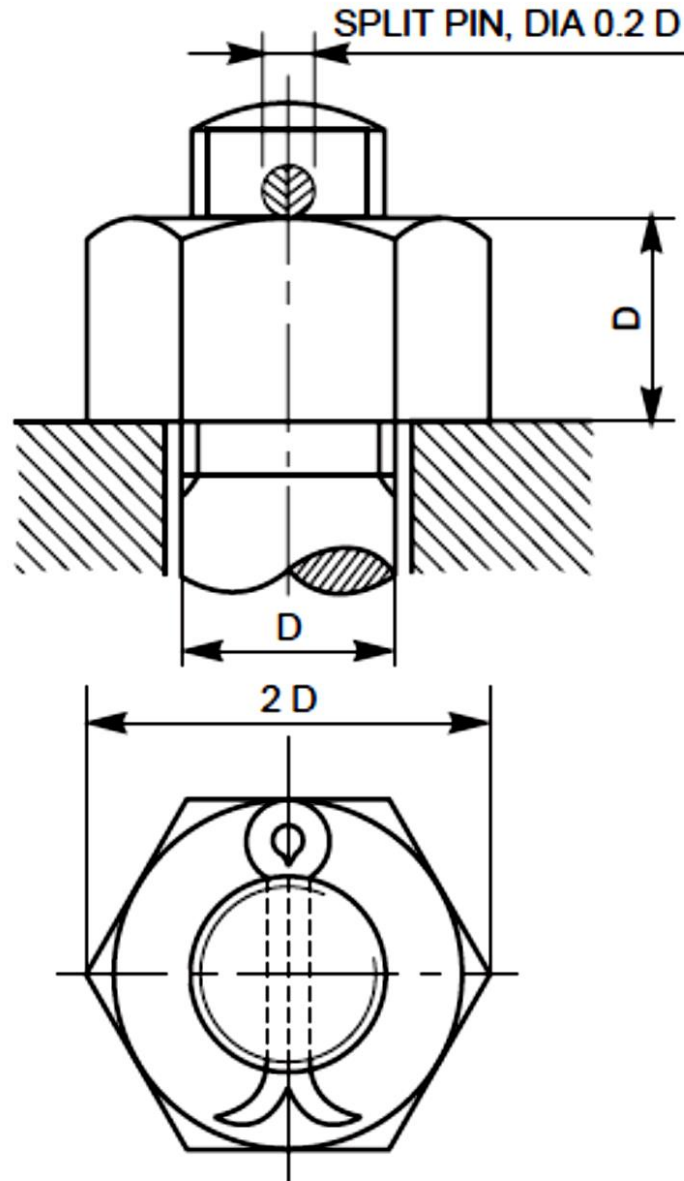


Fig. 5.28 Locking by split pin

5.10.3 Locking by Castle Nut

A castle nut is a hexagonal nut with a cylindrical collar turned on one end. Threads are cut in the nut portion only and six rectangular slots are cut through the collar. A split pin is inserted through a hole in the bolt body after adjusting the nut such that the hole in the bolt body comes in-line with slots. This arrangement is used in automobile works (Fig. 5.29).

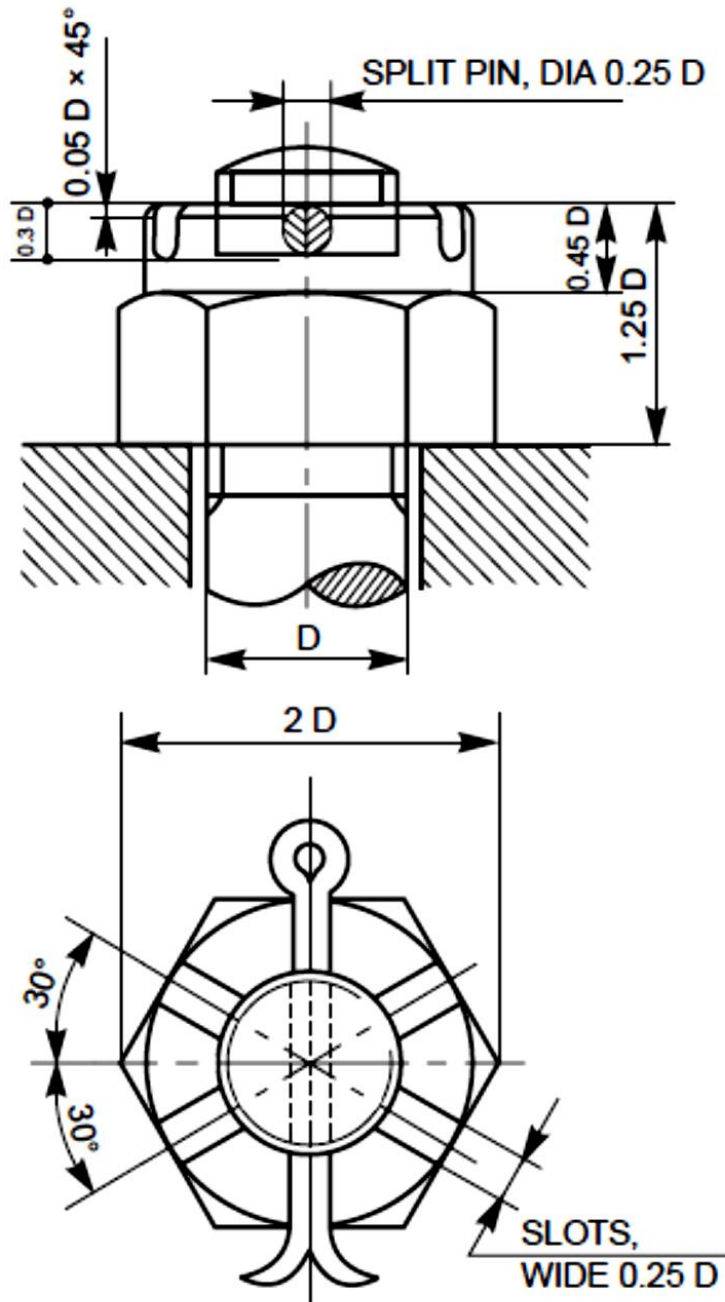


Fig. 5.29 Castle nut

5.10.6 Grooved Nut

It has a cylindrical grooved collar, integrally provided at the lower end of the nut. This collar fits into a corresponding recess in the adjoining part. In this arrangement, after tightening the nut, a set screw is inserted from one end of the upper part, so that the end of the set screw enters the groove, preventing the loosening tendency of the nut (Fig. 5.32).

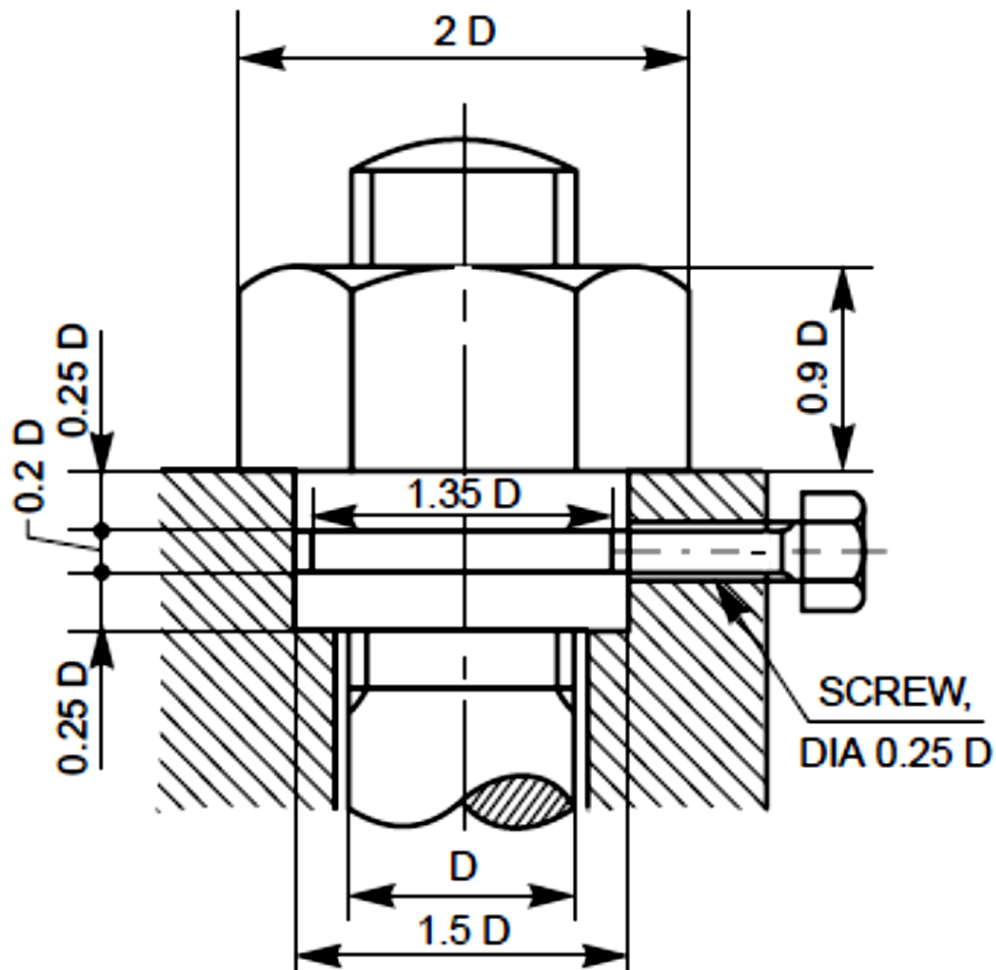


Fig. 5.32 Grooved nut

5.10.8 Locking by Plate

A locking plate is grooved such that it fits a hexagonal nut in any position, at intervals of 30° of rotation. It is fixed around the nut, by means of a machine screw, as shown in Fig. 5.34.

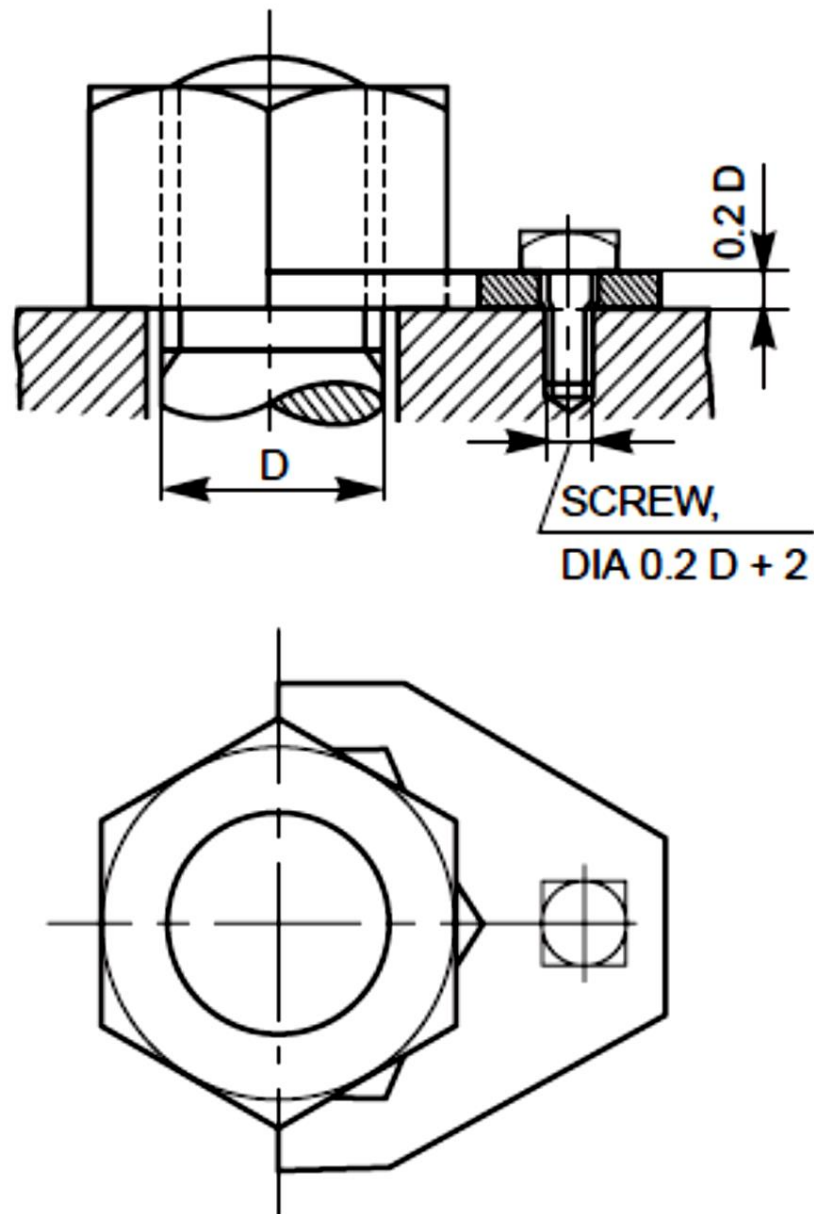


Fig. 5.34 Locking by plate

5.10.9 Locking by Spring Washer

In this arrangement, a spring washer of either single or double coil is placed under the nut and tightened. The spring force of the washer will be acting upwards on the nut. This force makes the threads in the nut jammed on the bolt threads; thus preventing the nut from loosening (Fig. 5.35).

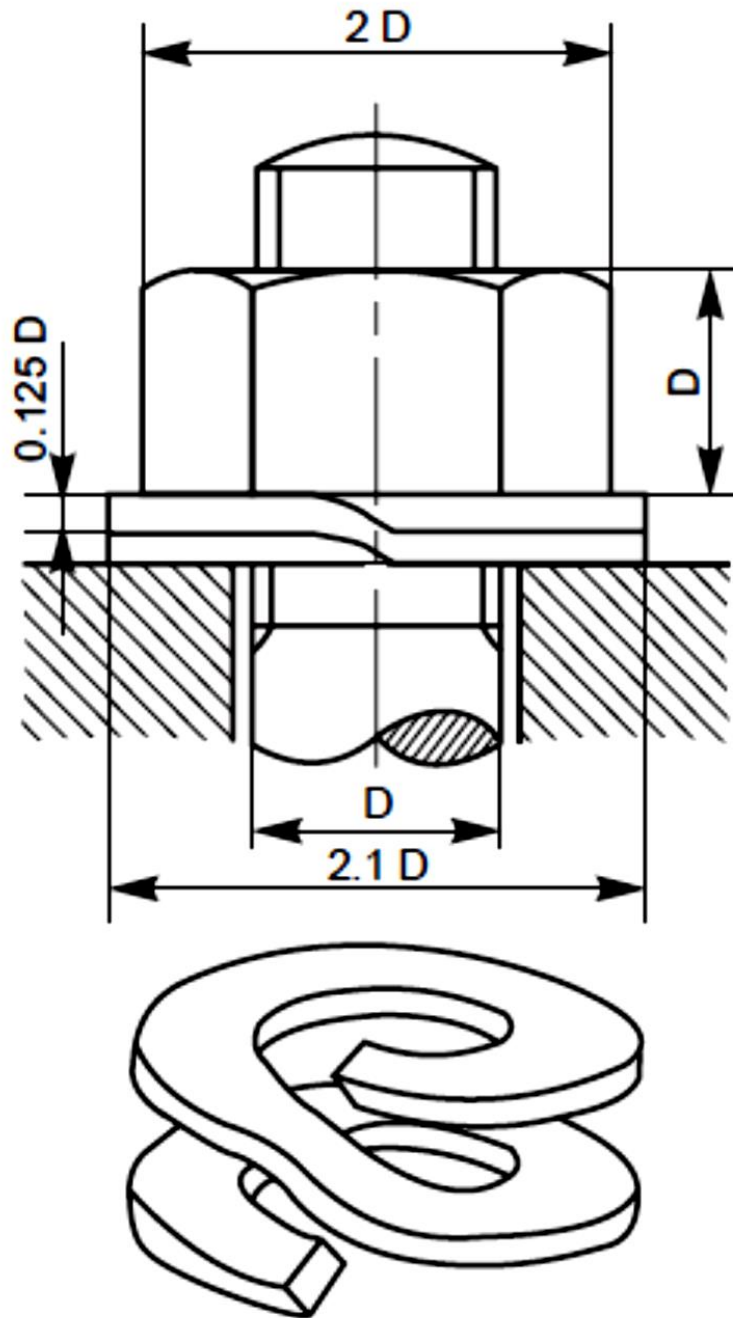


Fig. 5.35 Locking by spring washer