

SCRIET(AGRICULTURE DEPARTMENT),CCSU MEERUT

MACHINE DESIGN(UNIT 2ND, KEYS LECTURE 4)

Introduction

1. A key is inserted between the shaft and hub or boss of the pulley and gears to connect these together in order to prevent relative motion between them.
2. It is always inserted parallel to the axis of the shaft.
3. It is temporary fastenings.
4. A keyway is a slot or recess in a shaft and hub of the pulley to accommodate a key.
5. It is made of mild steel

Types of Keys

The following are the types of keys

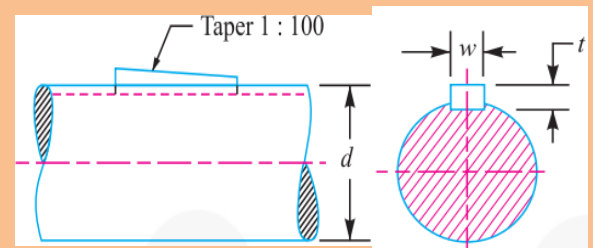
1. Sunk keys
 - a) Rectangular sunk key
 - b) Square sunk key
 - c) Parallel sunk key
 - d) Gib-head key
 - e) Feather key
 - f) Woodruff key
2. Saddle keys
 - a) Flat saddle key
 - b) Hollow saddle key
3. Tangent keys
4. Round keys
5. Splines

1. Sunk keys

a) Rectangular sunk key

The usual proportions of this key are :

Width of key, $w = d / 4$; and thickness of key, $t = 2w / 3 = d / 6$
where d = Diameter of the shaft or diameter of the hole in the hub.



b) Square sunk key

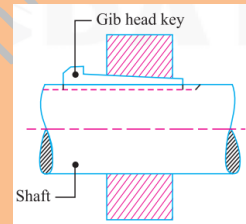
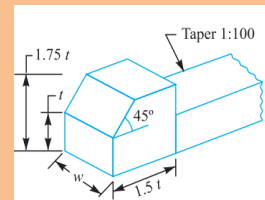
The only difference between a rectangular sunk key and a square sunk key is that its width and thickness are equal, i.e. $w = t = d / 4$.

c) Parallel sunk key

The parallel sunk keys may be of rectangular or square section uniform in width and thickness throughout. It may be noted that a parallel key is a taperless and is used where the pulley, gear or other mating piece is required to slide along the shaft.

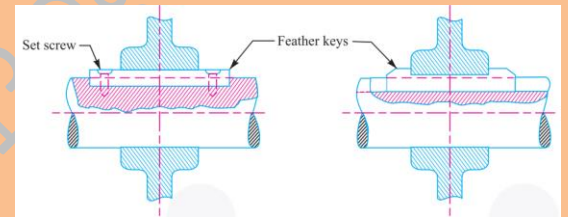
d) Gib-head key

It is a rectangular sunk key with a head at one end known as gib head. It is usually provided to facilitate the removal of key.



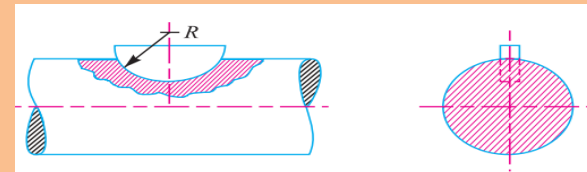
e) Feather key

A key attached to one member of a pair and which permits relative axial movement is known as feather key. It is a special type of parallel key which transmits a turning moment and also permits axial movement. It is fastened either to the shaft or hub, the key being a sliding fit in the key way of the moving piece.



f) Woodruff key

The woodruff key is an easily adjustable key. It is a piece from a cylindrical disc having segmental cross-section in front view as shown. A woodruff key is capable of tilting in a recess milled out in the shaft by a cutter having the same curvature as the disc from which the key is made. This key is largely used in machine tool and automobile construction.



The main advantages of a woodruff key are as follows :

1. It accommodates itself to any taper in the hub or boss of the mating piece.
2. It is useful on tapering shaft ends

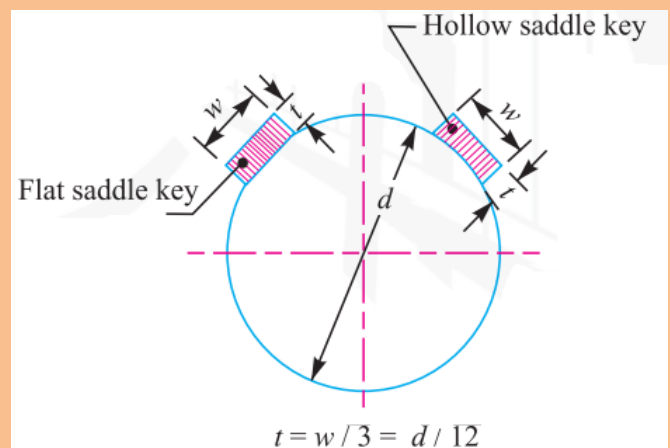
The disadvantages are :

1. The depth of the keyway weakens the shaft.
2. It can not be used as a feather.

2. Saddle keys

a) Flat saddle key

A flat saddle key is a taper key which fits in a keyway in the hub and is flat on the shaft. Therefore it is used for comparatively light loads.

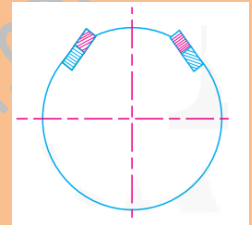


b) **Hollow saddle key**

A hollow saddle key is a taper key which fits in a keyway in the hub and the bottom of the key is shaped to fit the curved surface of the shaft. Since hollow saddle keys hold on by friction, therefore these are suitable for light loads. It is usually used as a temporary fastening in fixing and setting eccentrics, cams etc.

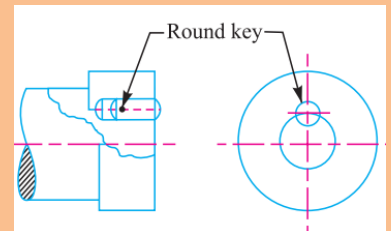
3. **Tangent Keys**

The tangent keys are fitted in pair at right angles as shown in Fig. 13.6. Each key is to withstand torsion in one direction only. These are used in large heavy duty shafts.



4. **Round Keys**

The round keys are circular in section and fit into holes drilled partly in the shaft and partly in the hub. They have the advantage that their keyways may be drilled and reamed after the mating parts have been assembled. Round keys are usually considered to be most appropriate for low power drives.



5. **Splines**

Sometimes, keys are made integral with the shaft which fits in the keyways broached in the hub. Such shafts are known as splined shafts

