

3.3.1 Sliding mesh gear box:

- It is the simplest type of gear box.
- In this type, gears of the main shaft slide to mesh with pairs of the lay shaft. Hence it is known as sliding mesh gear box.

Construction:

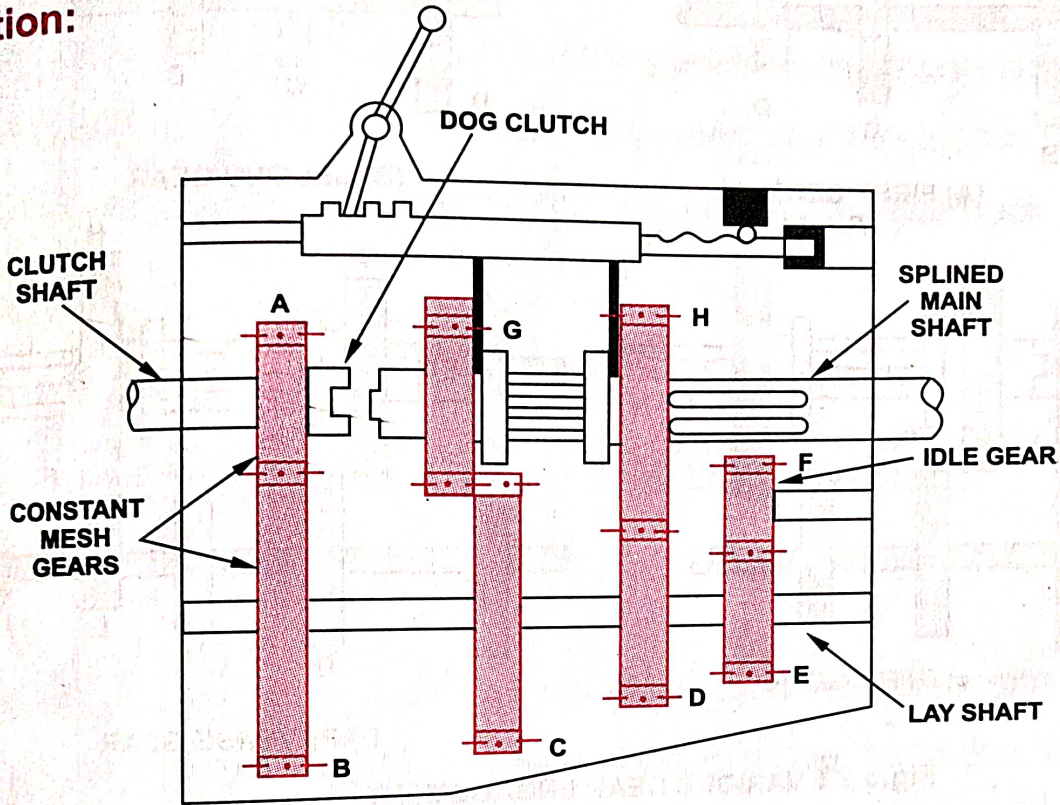


Fig.3.21 SLIDING MESH GEAR BOX (1ST GEAR ENGAGEMENT)

- It consists of four shaft namely clutch shaft, counter or lay shaft, idler shaft and splined main shaft.
- The clutch shaft has a clutch on one end and the other end of the shaft has clutch gear A.
- The clutch shaft receives the power from the engine during engaged position.
- The lay shaft has four gears B, C, D and E and are rigidly mounted on the lay shaft.
- The idler shaft has a gear F. It is mounted on the idler shaft and always meshed with gear E on lay shaft. The main shaft has two gears G and H. They can slide and mesh with the gears on lay shaft. Hence, it is called as sliding mesh gear box. A spring loaded ball is provided to lock the position of selector rod.

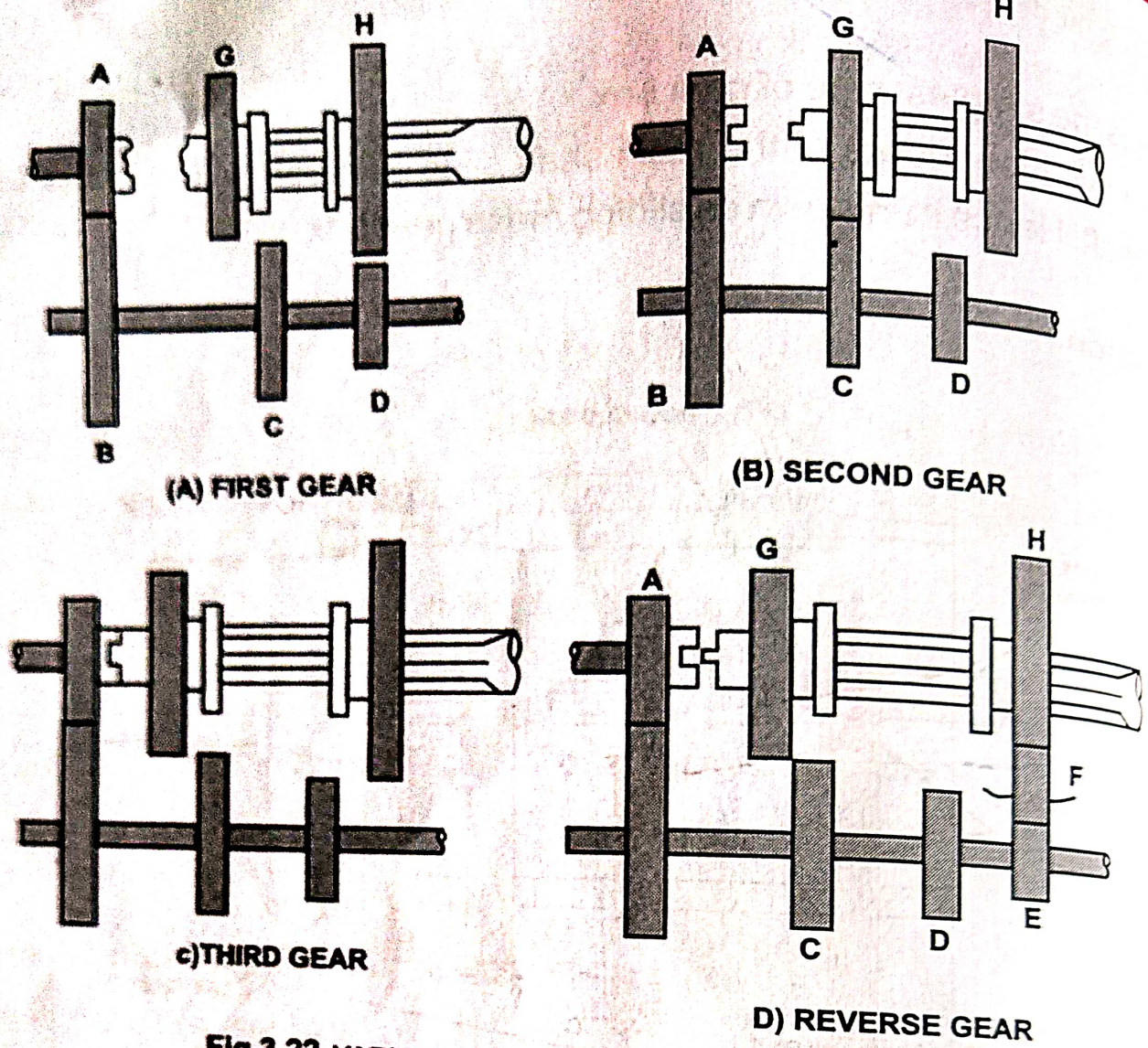


Fig.3.22 VARIOUS GEAR ENGAGEMENT

First gear:

By using the gear shift lever, the gear H on the main shaft is mesh with gear D on lay shaft. Now the power is transmitted through A, B, H to main shaft. Here, two sets of gears are engaged. So main shaft revolve in the same direction of clutch shaft. Since smaller gear D is engaged with gear H on the main shaft, a gear reduction of 3:1 is obtained

Second gear:

The gear H is moved to right. So the gear is in neutral position. The gear G on the main shaft is made to mesh with gear C on lay shaft. Now the power is transmitted through A, B, C and G to the main shaft. Since the gear G is smaller than the gear C, a gear reduction of 2:1 is obtained.

Third gear or top gear:

The gear G on main shaft is moved to right. So the gear is in neutral position. Then the main shaft is moved to left to engage with clutch shaft through dog clutch. As clutch and main shaft are linked directly a speed of 1:1 is obtained.

Reverse gear:

The gear G is moved to right So the gear is in neutral position. Then the gear H is moved to right to mesh with idle gear. As three sets of gears are engaged reverse direction is achieved. The vehicle moves back at very low speed.

Constant mesh gear box:

This type of gear box can be used in TATA1210 vehicles.

Construction:

In this gear box, dog clutches are provided on the main shaft to engage or disengage the gears. Hence there is no need to move the main shaft gears for engaging and disengaging.

In this type, all the gears on main shaft are in constant mesh with corresponding gears on lay shaft. So it is called as constant mesh gear box.

The main shaft is splined and all the gears are free on it. The dog clutch can slide on the main shaft and rotates with it. All gears on lay shaft are rigidly fixed with it. The reverse gears are spur gears and all other gears are helical gears.

Neutral gear: When the engine is running and clutch is engaged, the clutch gear A drives the gear B on lay shaft in opposite direction. All the gears on main shaft and lay shaft are rigidly fixed to their position and revolve at their own axis. The dog clutches M and N are in disengaged position. Hence no power is transmitted to propeller shaft.

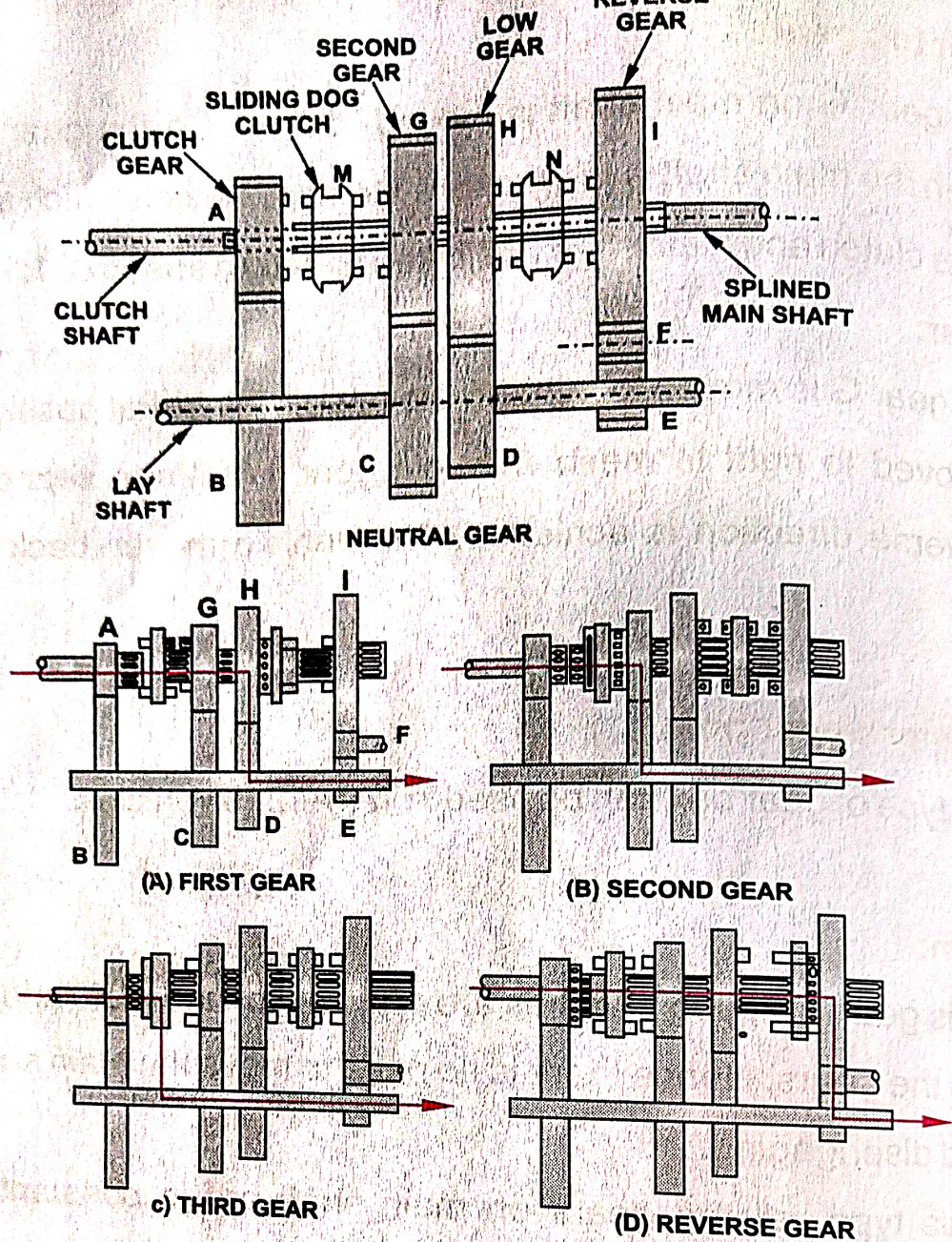


Fig.3.23 CONSTANT MESH GEAR BOX

First gear: The dog clutch N is shifted to left to engage on gear H. Now the power is transmitted through A, B, D, H and dog clutch N to main shaft. Now the main shaft rotates at first gear speed.

Second gear: The dog clutch N is disengaged. The dog clutch M is shifted right to lock with gear G. Now the power is transmitted through A, B, C, G and dog clutch M to main shaft. Hence the main shaft rotates at second gear speed.

Third gear or top gear: The dog clutch M is moved to left and lock with gear A on clutch shaft. Now the engine speed is directly connected to main shaft. Hence top gear speed is obtained.

Reverse gear: First the dog clutch M is disengaged. Then the dog clutch N is moved to right to lock with gear I on main shaft. The idler gear makes the main shaft to rotate in opposite direction.