## **Synchromesh Operation**

The synchronising unit is mounted on the main shaft between the main drive gear (1<sup>st</sup> motion shaft) and the second speed gear. It consists of an inner hub and an outer ring. The outer ring can move axially on splines on the inner hub, and the inner can move axially on splines on the main shaft. The whole unit consequently will always rotate with the main shaft.

There is a cone shaped protrusion and a ring of serrated teeth on both the main drive gear and the second speed main shaft gear. There is a corresponding female cone on either side of the inner hub and internal teeth on the outer ring to mate it to those on the main drive gear and second speed gear respectively. A number of spring loaded balls are radially positioned in the inner hub – these register in a groove in the outer ring.

As the driver moves the gear change lever forward to engage second gear, the synchronising unit will be pressed rearwards on to the cone on the second gear. The two cones will mate and, acting as a clutch, will ensure that the revolutions of the synchro unit and gear synchronise. Finally, as the driver moves the change speed lever right home, the pressure from the spring loaded balls is overcome. The outer sleeve then slides on the inner hub and its internal teeth mesh into the corresponding teeth on the gear. The gear is then locked positively to the main shaft, for despite the fact that the parts of the synchronising unit slide axially, it is still compelled to rotate as one with the main shaft.

For top gear, the synchro units is pushed against the main drive gear and a similar sequence of operations is repeated, the main drive gear and the shaft being finally locked as one to the main shaft.

From the foregoing, it will be noted that the revolutions of the members to be ultimately positively engaged, are first synchronised by friction contact before being finally locked, in this case, by meshing teeth.