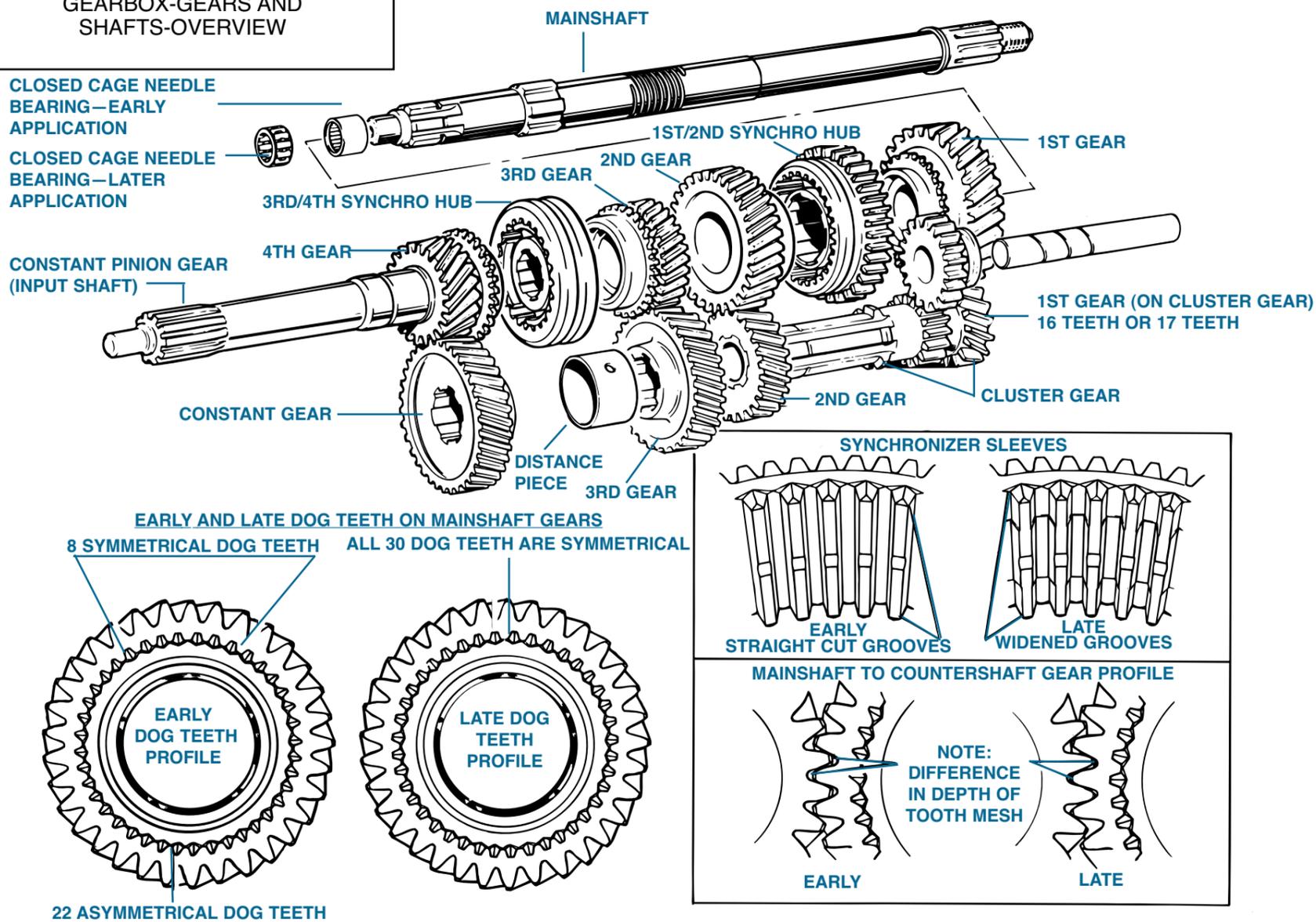


PLATE CM

GEARBOX-GEARS AND
SHAFTS-OVERVIEW



GEARBOX —GEARS AND SHAFTS—OVERVIEW

SOME THEORY AND BACKGROUND ON TRIUMPH GEARBOX DESIGN

A number of fairly major changes were made in the TR6 gearbox during its production run. Although the listings of gears and other components in the factory spare parts catalogues seem fairly complete, the points at which changes were made are not always well documented. This problem is further complicated when working on a particular gearbox since gearboxes are often switched from one car to another as replacement units, and replacements of worn or broken parts may not have been made according to "the book" by mechanics who worked on a particular gearbox in the past. For these reasons it is necessary to carefully examine the gearbox in hand in order to ascertain which components it contains before any attempt is made to repair it or to order parts for the repair. **Things to look for include:**

1. Discover whether the gearbox in hand has an early or a later mainshaft and input gear (constant pinion gear) combination. The bearing inside the rear of the input gear will determine this for you. The early combination has a pressed-in, closed-cage needle bearing which is very difficult to remove, while the later type has an open cage bearing which will slide out easily. Early and late mainshafts are not interchangeable, as the machined ends which fit inside the needle bearings are of different diameters. **See illustration.**
2. Discover whether the gearbox in hand has an early or a late first speed countershaft gear (cluster gear). The early gear will have sixteen teeth on the first gear portion, and the later gear will have seventeen teeth. **See illustration.**
3. Discover the type of dog teeth found on the first, second, third, and fourth speed mainshaft gears. There are thirty dog teeth on each gear, and later dog teeth are larger, stronger, and more symmetrical than earlier dog teeth. Earlier gears have only eight out of thirty symmetrical dog teeth, while all thirty dog teeth are symmetrical on later gears, which were actually taken from the Triumph Stag. **For a better understanding of this concept, see the illustration above.** Note that it is the dog teeth which take most of the stress of shifting and acceleration.
4. Discover whether the bushes inside first, second, and third speed mainshaft gears are bronze or steel. Steel bushes were used only on the very latest gearboxes, and the steel second gear bush is part of a redesign of the second speed mainshaft gear and spacer arrangement which was effected to solve the problem of the flange's sheering off of the bronze second gear bush, a common problem with earlier gearboxes, particularly if they are assembled without attention to proper clearances. Gearboxes with the latest second speed gear will also have a thicker shim washer between the rear of the gear and the shoulder on the mainshaft. In addition, the thicker washer is prevented from spinning on the mainshaft by fitment of a steel ball in a groove in the washer and in an indentation in the shaft.
5. Examine the two synchronizer hubs and sleeves to discover whether the grooves cut into the sleeves are straight-cut or if they are widened at each end to accommodate the larger dog teeth used on the later mainshaft gears. This is a fine point that requires a good eye, but it is worth checking since problems will result if the sleeves are not compatible with the gears that are used. Use the straight cut sleeves only with the early gears with asymmetrical dog teeth, and use the sleeves with widened grooves only with the later gears having symmetrical dog teeth.
6. A very fine point is that the profile of the meshing teeth of some of the mainshaft and countershaft gears changed during the production run of the late TR6. Earlier gears seem to have a blunter tooth profile and, perhaps, not so deep a mesh; later gear teeth appear a little more pointed and mesh, perhaps, a little more deeply.

However, even though new gears were introduced with the later tooth profile on their meshing teeth, some gears, notably third speed, were not changed through the end of production. We mention this point here because we have noted several gears with different part numbers which were indistinguishable from one another apart from this difference in tooth profile. **See illustration.**

A lot of games can be played with the gearboxes if you know enough about them. Gears can be interchanged between early and late gearboxes, and slight changes in gear ratios are possible. Very knowledgeable rebuilders can interchange components from different gearboxes, early and late, to produce units which function perfectly. Compatibility of the various components is the key, and the information provided in this section, along with that provided in the next four sections on Gears and Shafts, will give you the equivalent of an undergraduate degree in Triumph gearbox rebuilding if you study it carefully and add an appropriate amount of practical experience.

FORWARD GEARS

Our research has disclosed, essentially, four different sets of gears used during the production run of the TR6. Some gears are interchangeable between sets, and some are not. Most gears are interchangeable if both the mainshaft gear and the countershaft gear are interchanged together, although care must be taken to also match the internal teeth in synchronizer sleeves to the external dog teeth on the mainshaft gears. The latest second gear setup is not interchangeable with any other, however.

Although it may be a slight oversimplification, we have broken down the large number of production changes made during the manufacturing run of the TR6 gearbox into four different gear sets, which we list exhaustively in the next four sections of this catalogue. These break down as follows:

Section CN	Up to Gearbox No. CD20281
Section CP	From Gearbox No. CD20282 up to CD21768
Section CQ	From Gearbox No. CD21769 up to Comm. No. CF12500/CR5000
Section CR	After Comm. No. CF12500/CR5000 (After 1973)

REVERSE GEARS

A reverse idler gear operates along with a reverse countershaft gear, which is integral with the first speed countershaft gear, and a mainshaft gear, which is integral with the first and second gear synchro sleeve. Although the first speed countershaft gear was changed once during the production run and the first and second gear synchro sleeve was also changed once, the reverse idler gear, shaft, and shifting details remained the same through the entire production run.