FLUID FLYWHEEL

DESCRIPTION

40. The fluid flywheel, or coupling, is of the open circuit type and is contained within a bell housing at the rear of the crankcase.

41. Three main components comprise this flywheel: the front casing, which is bolted to the crankshaft and also carries the starting ring; the rear casing which is bolted to the front casing and is the driving member; the runner, or driven member, which is splined to the input shaft of the gearbox (gearbox driving shaft).

42. The bell housing is located on two hollow dowels and secured to the crankcase by two bolts in conjunction with six studs fitted to the housing. At the opposite end, two solid dowels and sixteen studs are fitted to the housing for the location and attachment of the gearbox front cover and the gearbox support plate. Four bolts are used, in addition, to secure the front cover to the support plate. Screwed into a boss at the top of the front cover is an engine timing pointer which is used in conjunction with timing marks engraved on the periphery of the rear casing.

Note: *Six pre-production Mk 1 vehicles (Nos. 32-BA-75 to 32-BA-80 inclusive) were fitted with a flywheel bell housing for use in conjunction with an engine starter type 524SGR41B/3 having a non-standard fixing flange. Further reference to this subject is made in the paragraphs dealing generally with the electrical equipment.*

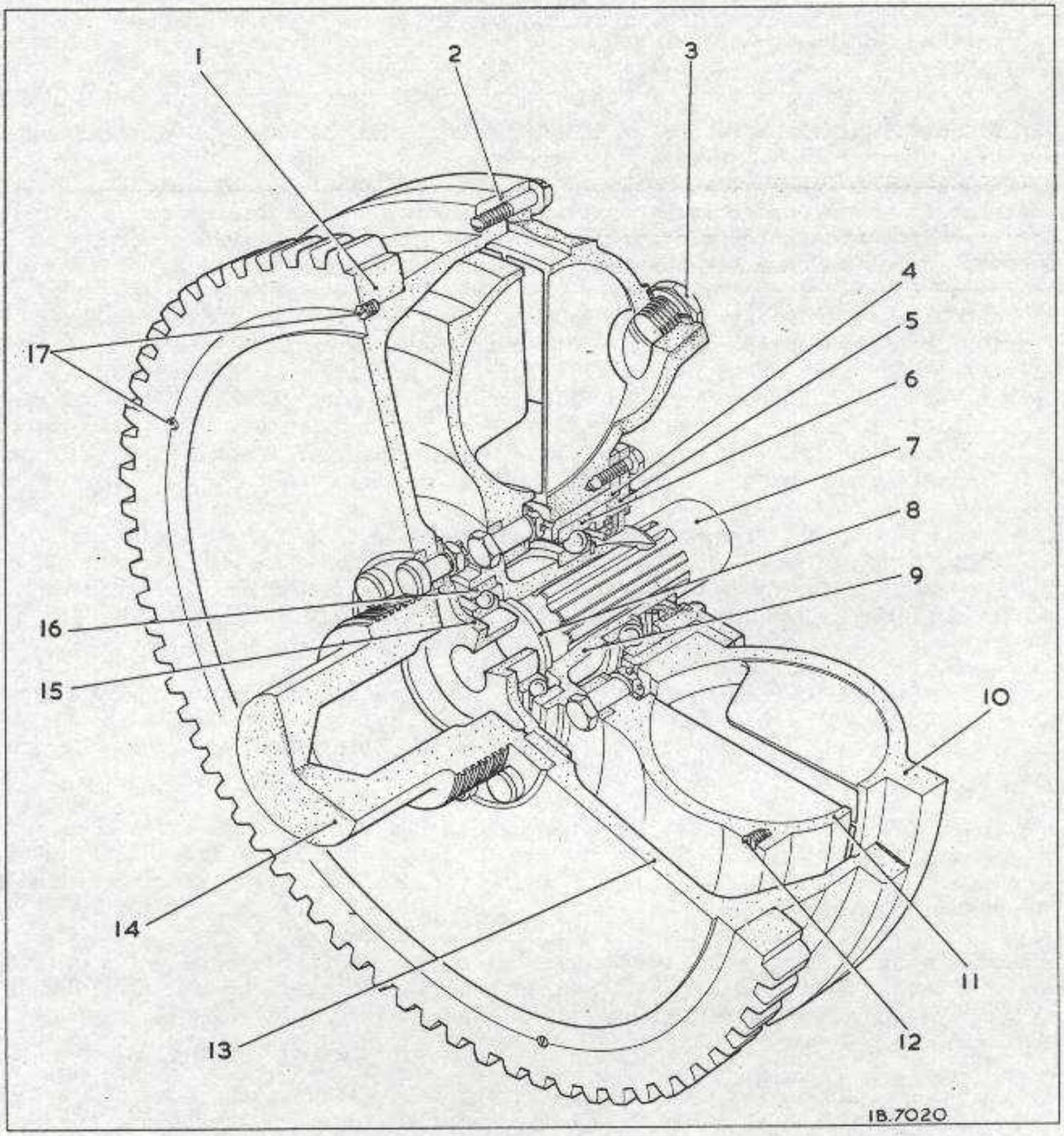
43. A late modification of the gearbox front cover provides for a guard over the aperture giving access to the flywheel plugs. This front cover guard (Fig 21(2)) has been designed to prevent loose parts falling into the housing and is of wire mesh construction reinforced by a riveted-on frame through which pass two bolts securing the whole.

44. Projecting from the crankcase into the bell housing is the engine crankshaft, (Fig 19(14)) the end of which is flanged. Secured to this flange by special bolts, slotted nuts and split pins are the front casing (13) and the front bearing centre (15). Shrunk on to the front casing is the starting ring (1) which is also pegged by grub screws (17) for further security. The rear casing is flanged and spigoted to the outer rim of the front casing and held there by bolts. A fibre joint (2) is fitted between the two casings and shakeproof washers are fitted under the hexagonal heads of the bolts except in late flywheels where these washers are replaced by lock plates linking two bolts.

45. Two plugs (3) each sealed by a copper or copper asbestos washer (see notes following this para) are screwed into the rear casing at 180° to each other and either is utilized as a filler or a drain plug when in the appropriate position. The oil (OM-13) in the flywheel has reached its correct level when filling, when it flows from the bottom of the filler orifice, provided that this orifice is at top dead centre. It should be noted that a new type of plug is now fitted to fluid flywheels. This plug, Part No.FV51972, replaces the plug with the square hole in the centre of its head. Instead of the square hole, the new plug has a tapped hole for use with extracting spanner FV55683 to ensure that the plug is not inadvertently dropped into the housing.

Notes:

1. *There are three known types of washer in use on fluid flywheel plugs. These types are as follows:-*
   - *(a) Rolled-in copper asbestos washer (commercial pattern), having a hole with two flats.*



1 Starting ring
2 Joint
3 Flywheel plug
4 Bearing housing
5 Oil seal housing
6 Rear casing bearing
7 Gearbox driving shaft
8 Runner hub insert
9 Runner hub
10 Rear casing
11 Runner
12 Balancing plug
13 Front casing
14 Engine crankshaft
15 Front bearing centre
16 Runner pilot bearing
17 Grubscrews

Fig 19 Fluid flywheel

(b) Rolled-in copper asbestos (Pt. No. FV50203) having a circular hole with four V-shaped tangs projecting inwards. This is the original pattern.

(c) Rolled-out copper washer (Pt. No. FV51892). This is the latest pattern.

2. In future, all commercial pattern washers will be discarded. Washer (Pt. No. FV50203) will be fitted until stocks are exhausted and, thereafter, washer (Pt. No. FV51892) will be fitted.

46. The rear casing or driving member (10) is bowl-shaped with recesses formed in the bowls. These recesses are sub-divided into compartments when the component is cast. Prior to initial assembly the casing is tested for dynamic balance, balancing screws being fitted where and as required. These screws will be replaced in later flywheels by lead fillings to facilitate the fitting of the linked lock plates described in para 44.

47. The rear casing is supported by a ball bearing (6) mounted on a runner hub (9) retained by a circlip. The bearing is held in a bearing housing (4) which, together with an oil seal housing (5), is bolted to the rear casing. The oil seal housing retains an oil seal which is held in position by a backing washer and an outer circlip. The oil seal, comprising a sharp-lipped spring-loaded rubber ring, is fitted with the lip turned inwards to prevent oil leakage. The backing washer has a conical boss at one side for mating with the back of the sealing member and is selected according to the thickness between its parallel faces to give slight axial pressure to the oil seal. It is available in three thicknesses i.e., 0.120 in., 0.130 in., and 0.145 in. respectively.

48. Being the driven member, the runner (11) is splined to the gearbox driving shaft via the runner hub (9). This runner hub is fixed to the runner by means of eight bolts, a washer plate, slotted nuts and split pins. As with the rear casing, plugs (12) in the runner are used to achieve correct balance; similarly, the member is bowl-shaped with compartments, or cells, formed by vanes. Support for the shaft is given by a pilot ball bearing (16) that fits between a front bearing centre (15) bolted to the front casing and the runner hub.

Note: *Early production Mk 1 vehicles were fitted with a B60, No.1, Mk 3A engine. When fitting a B60, No.1, Mk 6A engine as a replacement it is first essential to modify the existing front bearing centre to eliminate interference with the crankshaft spigot in accordance with Whld. Veh. V 627 Mod. Inst. No.3.*

OPERATION

49. The fluid coupling is completely automatic in action and, when filled to its correct level with oil, forms a flexible coupling between the engine and the gearbox which will transmit from no power at engine tick-over to 98% power at maximum r.p.m.

50. When the rear casing (driving member) is rotated by the engine its vanes carry the fluid around with them; the fluid is thus subjected to centrifugal force and is flung outwards from the wheel. Consequently it shoots into the corresponding cells of the runner (driven member), impinging on the sides of its vanes. This impact, directed at a tangent, causes the driven wheel to turn in the same direction as its neighbour. When the engine is idling and the vehicle is at rest with the brakes applied, the energy imparted to the fluid is negligible. If the brakes are released the vehicle will barely creep forward but as the engine is accelerated the fluid will exert a progressively greater pressure on the vanes of the driven member and therefore a greater proportion of the drive will be transmitted. On further increase of speed more energy is passed to the driven member until eventually driving and driven members rotate approximately as one.