SECTION G

OVERDRIVE

(Series BN4)

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Section G.1

LUBRICATION

The lubricating oil in the overdrive unit is common with that in the gearbox and the level should be checked with the gearbox dipstick.

It is essential that an approved lubricant be used when refilling. Trouble may be experienced if some types of extreme pressure lubricants are used because the planet gears act as a centrifuge to separate the additives from the oil.

Recommended lubricants are given in Section Q. It should be emphasised that any hydraulically controlled transmission must have clean oil at all times and great care must be taken to avoid the entry of dirt whenever any part of the casing is opened.

At the recommended mileage check the oil level of the gearbox and overdrive and top up if necessary through the gearbox dipstick hole.

In addition to the normal drain plug fitted to the gearbox the overdrive unit incorporates a plug at its base which gives access to a filter.

Occasionally remove the overdrive oil pump filter and clean the filter gauze by washing in petrol. The filter is accessible through the drain plug hole and is secured by a central set bolt.

Refilling of the complete system (gearbox and overdrive) is accomplished through the gearbox filler plug. The capacity of the combined gearbox and overdrive unit is 64 pints (7.5 U.S. pints; 3.5 litres).

After draining, ¼ pint of oil will remain in the overdrive hydraulic system, so that only 6 pints will be needed for refilling. If the overdrive has been dismantled the total of 64 pints will be required.

After refilling the gearbox and overdrive with oil, recheck the level after the car has been run, as a certain amount of oil will be retained in the hydraulic system of the overdrive unit.

Section G.2

WORKING DESCRIPTION

The overdrive unit comprises a hydraulically controlled epicyclic gear housed in a casing which is directly attached to an extension at the rear of the gearbox.

The synchronesh gearbox third motion shaft is extended and carries at its end the inner member of an uni-directional clutch (see Fig. G.1). The outer member of this clutch is carried in the combined annulus and output shaft.

Also mounted on the third motion shaft are the planet carrier G and a freely rotatable sun wheel. Splayed to a forward extension E of the sun wheel and sliding thereon is a cone clutch member D, the inner lining of which engages the outside of the annulus F while the outer lining engages a cast-iron brake ring sandwiched between the front and rear parts of the unit housing.

A number of compression springs is used to hold the cone clutch in contact with the annulus, locking the sun wheel to the latter so that the entire gear train rotates as a solid unit, giving direct drive. In this condition the drive is taken through the uni-directional clutch, the cone clutch taking over-run and reverse torque, as without it there would be a free-wheel condition.

The spring pressure can be overcome through the medium of two pistons, working in cylinders formed in the unit housing, supplied with oil under pressure from a hydraulic accumulator. This hydraulic pressure causes the cone clutch to engage the stationary brake ring (A Fig. G.2) and bring the sun wheel to rest, allowing the annulus to over-run the uni-directional clutch and give an increased speed to the output shaft, i.e. "overdrive".

When changing from overdrive to direct gear, if the accelerator pedal is released (as in a change down for engine braking) the cone clutch, being oil immersed, takes up smoothly. If the accelerator pedal is not
released, when contact between the cone clutch and brake ring is broken, the unit still operates momentarily in its overdrive ratio as engine speed and road speed remain unchanged. But the load on the engine is released and it begins to accelerate, speeding up the sun wheel from rest until, just at the instant when its speed synchronises with the speed of the annulus, the whole unit revolves solidly and the uni-directional clutch takes up the drive once more. The movement of the cone clutch is deliberately slowed down so that the uni-directional clutch is driving before the cone clutch contacts, ensuring a perfectly self-synchronised change.

Section G.3

CONSTRUCTION

The third motion shaft of the synchronmesh gearbox is extended to carry first a cam operating the oil pump and then a steady bearing with opposed plain bushes carried in the front housing. Next is the sun wheel of the epicyclic gear carried on a Clevite bush, and beyond this the shaft is splined to take the planet carrier and uni-directional clutch. The end of the shaft is reduced and carried in a plain bush in the output shaft. The latter is supported in the rear housing by two ball bearings. The clutch member slides on the splines of the sun wheel extension to contact either the annulus or a cast iron brake ring forming part of the unit housing.

To the hub of the cone clutch member is secured a ball bearing housed in a flanged ring. This ring carries on its forward face a number of pegs acting as guides to compression springs by which the ring, and with it the clutch member, is held against the annulus. The springs prevent free-wheeling on over-run and are of sufficient strength to handle reverse torque. Also secured to the ring are four studs picking up two bridge pieces against which bear two pistons operating in cylinders formed in the unit housing. The cylinders are connected through a valve to an accumulator in which pressure is maintained by the oil pump. The operating pistons are fitted with synthetic rubber sealing rings, and the accumulator piston with three piece cast iron rings.

When the valve is open, oil under pressure is admitted to the cylinders and pushes the pistons forward to engage the overdrive clutch. Closing the valve cuts off the supply of oil to the cylinders and allows it to escape. Under the influence of the springs the clutch member moves back to engage direct drive position. The escape of oil from the cylinders is deliberately restricted so that the clutch takes about half a second to move over.

The sun wheel and pinions are cyanide case-hardened and the annulus heat-treated. Gear teeth are helical. The pinions run on needle roller bearings on a case-hardened pin.

The outer ring of the uni-directional clutch is pressed into the annulus member. The clutch itself is of the caged roller type, loaded by a lock-type spring made of round wire.

The hydraulic system is supplied with oil by a plunger type pump operated by a cam on the gearbox third motion shaft. The pump body is pressed into the front housing and delivers oil through a non-return valve to the accumulator cylinder, in which a piston moves back against a compression spring until the required pressure is reached when relief holes are uncovered. From the relief holes the oil is led through drilled passages to an annular groove between the two steady bushes on the gearbox third motion shaft.

Radial holes in the shaft collect the oil and deliver it along an axial drilling to other radial holes in the shaft from which it is fed to the sun wheel bush, thrust washers, planet carrier and planet pins.

From the accumulator, oil under pressure is supplied to the operating valve chamber. This forms an enlargement at the top of a vertical bore and contains a ball
valve, the ball seating downwards thus preventing oil from circulating to the operating cylinders. The valve is a hollow spindle sliding in the bore, its top end reduced and carrying a seating for the ball, which is then lifted, admitting oil to the operating cylinders and moving the pistons forward to engage the overdrive clutch.

When the valve is lowered the ball is allowed to come on to its seating in the housing, cutting off pressure to the cylinders.

Section G.4

SERVICING IN POSITION

When the overdrive does not operate properly it is advisable first to check the level of oil and, if below the requisite level, top up with fresh oil and test the unit again before making any further investigations.

Before commencing any dismantling operations it is important that the hydraulic pressure is released from the system. Do this by operating the overdrive 10 to 12 times.

As the unit is fitted with a speed responsive control it will be found more convenient to carry out this operation by moving the valve setting lever manually.

Section G.5

GUIDE TO SERVICE DIAGNOSIS

Overdrive does not engage
(1) Insufficient oil in unit.
(2) Failure of switches or wiring (check solenoid operation visually).
(3) Solenoid setting out of adjustment.
(4) Insufficient hydraulic pressure due to pump non-return valve setting incorrectly (probably dirt on the seat).
(5) Insufficient hydraulic pressure due to worn accumulator.
(6) Damaged parts within the unit requiring removal and inspection of the assembly.

Overdrive does not release
(1) Control mechanism out of adjustment.
(2) Solenoid sticking.
(3) Blocked restrictor jet in operating valve.
(4) Solenoid setting out of adjustment.
(5) Clutch sticking.

NOTE:—Do not attempt to reverse the car; severe damage to the overdrive may result.

Clutch slip in overdrive
(1) Insufficient oil in unit.
(2) Solenoid setting out of adjustment.
(3) Insufficient hydraulic pressure due to pump non-return valve setting incorrectly.
(4) Insufficient hydraulic pressure due to worn accumulator piston, worn accumulator housing, or leaking 'O' ring.
(5) Operating valve seating incorrectly.
(6) Worn or glazed clutch lining.

Clutch slip in reverse or free-wheel condition on overrun
(1) Solenoid setting out of adjustment.
(2) Blocked restrictor jet in operating valve.

Section G.6

OPERATING VALVE

Having gained access to the unit through the floor, unscrew the valve plug and remove the spring and plunger. The ball valve will then be seen inside the valve chamber. The ball should be lifted $\frac{1}{8}$ in. (8 mm.) off its seat when the overdrive control is operated.

As the unit is fitted with a speed responsive control the appropriate parts of the electrical circuit must be shorted out in order to operate the control.

If the ball does not lift by this amount the fault lies in the control mechanism. Located on the right-hand side of the unit and pivoting on the valve operating cross shaft, which passes right through the housing, is a valve setting lever. In its outer end is a $\frac{1}{8}$ in. (4-7 mm.) diameter hole which corresponds with a similar
The pump (Fig. G.6) described above, is of the plunger type and delivers oil via a non-return valve to the accumulator. Possible sources of trouble are (1) failure of the non-return valve due to foreign matter on the seat or to a broken valve spring and (2) breakage of the spring holding the pump plunger in contact with the cam.

The pump is self priming, but failure to deliver oil after the system has been drained and refilled indicates that the air bleed is choked causing air to be trapped inside the pump.

In the unlikely event of this happening it will be necessary to remove the pump and clean the flat on the pump body and the bore of the casting into which it fits.

Section G.8

PUMP VALVE

Access to the pump valve is gained through a cover on the left-hand side of the unit. Proceed as follows:—

1. Remove drain plug and drain off oil.
2. Remove solenoid.
3. Slacken off clamping bolt in operating lever and remove lever, complete with solenoid plunger.
4. Remove distance collar from valve operating shaft.
5. The solenoid bracket is secured by two \( \frac{3}{16} \) in. (7.9 mm.) studs and two \( \frac{5}{32} \) in. diameter bolts.

Section G.7

HYDRAULIC SYSTEM

If the unit fails to operate and the ball valve is found to be seating and lifting correctly check that the pump is functioning.

Jack up the rear wheels of the car, then with the engine ticking over and the valve plug removed, engage top gear. Watch for oil being pumped into the valve chamber. If none appears then the pump is not functioning.
Section G.10

DISMANTLING AND REASSEMBLING UNIT

Dismantling

Should trouble arise necessitating dismantling of the unit to a degree further than has already been described, it will be necessary to remove the unit from the car.

Whilst it is possible to lift out the overdrive alone from the car, it is advised that the gearbox and overdrive be removed as a single unit. It is far easier to refit the overdrive to the gearbox when the assembly is on a bench as the extended third motion shaft must be lined up with the splines of the uni-directional clutch.

The unit is split at the adaptor plate which is attached to the front casing by six 5/16 in. (7.9 mm) studs, two of which are extra long. The four nuts on the shorter studs should be removed before those on the longer ones are touched. The latter should be unscrewed together releasing the compression of the clutch springs. The unit can then be drawn off the mainshaft, leaving the adaptor plate attached to the gearbox.

Remove the clutch springs from their pins. The two bridge pieces against which the operating pistons bear can now be removed. Each is secured by two 3/16 in. nuts locked by tab washers. Withdraw the two operating pistons.

As the adaptor plate is now separated from the unit the pump valve can be dismantled without removing the side cover (solenoid bracket) from the casing and there is no need to disturb the latter unless it is necessary to remove the accumulator piston and spring.

Remove the six 5/16 in. (7.9 mm.) nuts securing the two halves of the casing and separate them, removing the brake ring which is spigoted into the two pieces. Lift out the planet carrier assembly. Remove the clutch sliding member complete with the thrust ring and bearing, the sun wheel and thrust washers. Take out the inner member of the uni-directional clutch, the rollers, cage, etc.

If it is necessary to remove the planet gears from the carrier the three split pins securing the planet bearing shafts must be extracted before the latter can be knocked out to release the gears and needle roller bearings.

To remove the annulus, take off the coupling flange at the rear of the unit, remove the speedometer gear, centrifugal switch, etc., and drive out the annulus from the back. The front bearing will come away on the shaft leaving the rear bearing in the casing.

Inspection

Each part should be thoroughly inspected after the unit is dismantled and cleaned to ensure which parts should be replaced. It is important to appreciate the difference between parts which are worn sufficiently to affect the operation of the unit and those which are merely "worn in".

(1) Inspect the front casing for cracks, damage, etc. Examine the bores of the operating cylinders and accumulator for scores and wear. Check for leaks from plugged ends of the oil passages. Ensure that the welch washer beneath the accumulator bore is tight and not leaking. Inspect the support bushes in the centre bore for wear and damage.

(2) Examine the clutch sliding member assembly. Ensure that the clutch linings are not burned or worn. Inspect the pins for the clutch springs and bridge pieces and see that they are tight in the thrust ring and not distorted. Ensure that the ball bearing is in good condition and rotates freely. See that the sliding member slides easily on the splines of the sun wheel.

Fig. G.9. Using tool 18G 178 for assembling the roller clutch.

(3) Check the clutch springs for distortion or collapse.

(4) Inspect the teeth of the gear train for damage. If the sun wheel bush is worn, the gear will have to be replaced since it is not possible to fit a new bush in service because it has to be bored true to the pitch line of the teeth.

(5) Examine the steel and bronze thrust washers.

(6) See that the rollers of the uni-directional clutch are not chipped and that the inner and outer members of the clutch are free from damage. Make sure that the member is tight in the annulus. Ensure that the spring is free from distortion.

(7) Inspect the ball bearings on the output shaft and see that there is no roughness when they are rotated slowly.

(8) Ensure that there are no nicks or burrs on the mainshaft splines and that the oil holes are open and clean.

(9) Inspect the oil pump for wear on the pump plunger and roller pin. Ensure that the plunger
the heads of which are painted red, remove the nuts from the studs before touching the bolts. This is important. The two bolts should now be slackened off together, releasing the tension on the accumulator spring.

(6) Remove the solenoid bracket.

(7) Unscrew the valve cap and take out the spring, plunger and ball.

Clean the valve ball and seat with non-lint rag. Reseat the ball by tapping it on its seat with a light hammer and drift. Reassembly is the reverse of the above operations. Ensure that the soft copper washer between the valve cap and pump housing is nipped up tightly to prevent oil leakage.

It will now be necessary to reset the valve operating lever. Proceed as follows:

Before clamping up the valve operating shaft rotate the shaft until a \( \frac{\pi}{4} \) in. (4-7 mm.) diameter pin can be inserted through the valve setting lever on the offside of the unit into the corresponding hole in the casing. Leave the pin in position. Energise the solenoid by pulling off the snap connector at the solenoid terminal and connecting up with a short lead direct to the negative terminal of the battery. Check that the plunger travels the full extent of its stroke. Hold the solenoid lever lightly against the bottom shoulder on the solenoid plunger. Relighten the lever clamping bolt taking care that there is -008 to -010 in. (20 to 25 mm.) end float in the cross shaft. Remove the locating pin from the setting lever. Operate the solenoid several times to check for correct working.

To Dismantle the Pump

Proceed as follows

(1) Remove the drain plug and drain off oil.

(2) Remove pump valve as previously described.

(3) Remove the filter after unscrewing the securing bolt.

(4) Take out the two cheese head screws securing the pump body flange and extract the pump body. A special extractor tool (18G 183) is available for this purpose. This screws into the bottom of the pump body in the place of the screwed plug.

Assembly of the Pump

Line up the pump body so that the inlet port and holes for securing screws register with the corresponding holes in the housing, and tap the pump body home. Use service tool 18G 184.

The pump plunger is prevented from rotation when in position by a guide peg carried in the front casing. When assembling the pump the plunger should be inserted with the flat on its head facing the rear of the unit. It is possible to guide it past the guide peg by means of a screwdriver inserted through the side of the casing.

Replace the plug in the bottom of the pump body, ensuring that it is screwed home tightly.

Section G.9

HYDRAULIC PRESSURE

A working oil pressure of 470 to 490 lbs. per sq. in. (33-04 to 34-45 kg./cm.2) is required.

A hydraulic pressure gauge complete with fittings (Service Tool 18G251) is obtainable from B.M.C. Service Ltd.
spring is not distorted. Its free length is 2 in. (5.08 cm.). Inspect the valve seat and ball and make sure that they are free from nicks and scratches.

(10) Check the operating valve for distortion and damage and see that it slides easily in its bore in the front casing.

![Diagram of Overdrive Mechanism]

**Fig. G.10.** Before assembling the planet carrier to the sun wheel, rotate the planet wheels until the punch marks are in the position shown.

Reassembling the Unit

The unit can be reassembled after all the parts have been thoroughly cleaned and checked to ensure that none are damaged or worn.

Assemble the annulus into the rear casing, not forgetting the spacing washer which fits between a shoulder on the shaft and the rear ball bearing. This washer is available in different thicknesses for selective assembly and should allow no end float of the annulus (output shaft) and no pre-loading of the bearings.

Selective washers are available in the following sizes:

- 0.146 in. ± 0.0005 in. (3.7 mm. ± 0.01)
- 0.151 in. ± 0.0005 in. (3.83 mm. ± 0.01)
- 0.156 in. ± 0.0005 in. (3.96 mm. ± 0.01)
- 0.160 in. ± 0.0005 in. (4.06 mm. ± 0.01)
- 0.161 in. ± 0.0005 in. (4.09 mm. ± 0.01)

Replace the thrust washer and uni-directional clutch inner member with its rollers and cage. The fixture (Fig. G.9) is for retaining the rollers in position when assembling the clutch. Ensure that the spring is fitted correctly so that the cage urges the rollers up the ramps on the inner member.

Fit the pump cam on to the gearbox mainshaft, offer up the front housing to the cover plate and secure temporarily with two nuts. In order to determine the amount of end float of the sun wheel, which should be 0.008 in. to 0.014 in. (0.2 mm. to 0.35 mm.) an extra thrust washer of known thickness should be assembled with the two normally used in front of the sun wheel.

The gear train must be assembled in the following way so that the planet wheels will mesh with the sun wheel and at the same time allow their compound teeth to mesh correctly with the annulus. One tooth on each planet wheel is punch-marked, and the planet wheels must be turned in the carrier so that the punch marks are radially outwards as shown in Fig. G.10. With the planet wheels aligned in this way, fit the planet carrier over the sun wheel. The position of the planet wheels in relation to each other ensures that the second set of teeth on the planet wheels will mesh with the annulus teeth. Offer up the assembly to the annulus turning the planet carrier until the locating peg on the inner member of the uni-directional clutch enters the corresponding hole in the planet carrier. This lines up the splines in the two members.

Assemble the brake ring to the front casing then offer up the front and rear assemblies, leaving out the clutch sliding member with its springs, etc. The gap between the flanges of the brake ring and rear casing should be measured. This gap will be less than the thickness of the extra thrust washer by the amount of end float of the sun wheel. If this is between the limits specified the unit may be stripped down again and re-assembled without the extra thrust washer. The clutch sliding member bridge pieces, etc., must now be replaced. The compression of the springs is taken up on the two long studs between the front casing and adapter plate.

If the indicated end float is more, or less, than that required it must be adjusted by replacing the steel thrust washer at the front of the sun wheel by one of less or greater thickness, as required. Washers of varying thickness are stocked for this purpose.

Seven sizes are available, as follows:

- 0.113 in. to 0.114 in. (2.85 mm. to 2.9 mm.)
- 0.106 in. to 0.107 in. (2.72 mm. to 2.74 mm.)
- 0.101 in. to 0.102 in. (2.56 mm. to 2.59 mm.)
- 0.095 in. to 0.096 in. (2.4 mm. to 2.44 mm.)
- 0.089 in. to 0.090 in. (2.26 mm. to 2.28 mm.)
- 0.083 in. to 0.084 in. (2.11 mm. to 2.15 mm.)
- 0.077 in. to 0.078 in. (1.9 mm. to 1.98 mm.)

Care must be taken to ensure that the thrust washers at the front and rear of the sun wheel are replaced in their correct positions. At the front of the sun wheel the steel washer fits next to the head of the support bush in the housing and the bronze washer between the steel one and the sun wheel. At the rear, the steel washer is sandwiched between the two bronze washers.
Grip the mounting flange of the overdrive unit in a vice, so that the unit is upright, and insert a dummy shaft 18G 185 or a spare mainshaft if the dummy shaft is not available, so that the sun wheel and thrust washers, planet carrier and roller clutch line up with each other; a long thin screwdriver should be used to line by eye the splines in the planet carrier and the roller clutch before inserting the dummy shaft. Gently turn the coupling flange to and fro while holding the dummy shaft, to assist in feeling the shaft into the splines of the planet carrier and roller clutch. Make sure that the dummy shaft has gone right into the spigot bush, checking this by using the screwdriver blade as a depth gauge.

Make quite sure that the clutch springs are in their correct positions—the 4¼ in. (108 mm.) long springs are the inner ones, and the 4½ in. (115 mm.) ones are the outer. This is most important because if any of the springs are in the wrong position they will become “coil bound” when the adapter plate is in place and restrict the movement of the sliding clutch so that overdrive will not engage.

Place the oil pump operating cam in position on top of the centre bushing with the lowest part of the cam in contact with the oil pump plunger and also place the paper joint washer in position.

The gearbox, with top gear engaged, should now be lifted by hand on to the overdrive unit, carefully threading the mainshaft through the oil pump cam and into the centre bushing in the body of the overdrive unit. Gently turn the first motion shaft to and fro to assist in “feeling” the mainshaft into the splines of the planet carrier. When the mainshaft is sufficiently entered for the gearbox to come to rest against the clutch springs with the two long studs just protruding through the holes in the overdrive body, put the spring washers and nuts on to the end of the studs. Before commencing to tighten the nuts, use a long thin screwdriver to guide the ends of the clutch springs on to the short locating pegs which are cast into the face of the adapter plate—this is very important because if the springs are not properly located they may become “coil bound” and prevent overdrive engaging. Now commence simultaneously to tighten the nuts on the two long studs, compressing the clutch springs and drawing the gearbox and overdrive together evenly. As the gearbox and overdrive come together watch carefully to see the splines on the mainshaft enter the oil pump operating cam and that the cam remains properly engaged with the oil pump plunger. If the two units do not pull together easily with only the resistance of the clutch springs being felt as the two nuts are tightened, stop tightening immediately. Gently rotate the gearbox first motion shaft in a clockwise direction whilst holding the overdrive coupling flange stationary until the mainshaft is felt to enter the roller clutch. The tightening of the nuts on the two long studs can then be completed, and the nuts fitted and tightened on to the four short studs.

NOTE: The gearbox mainshaft should enter the overdrive easily, provided that the lining-up procedure previously described is carried out and the unit is not disturbed. If any difficulty is experienced it is probable that one of the components has become misaligned, and the gearbox should be removed and the overdrive realigned with the dummy shaft.

Section G.11

OVERDRIVE RELAY SYSTEM

Description

Engagement of overdrive is controlled electrically through a manually operated toggle switch. The circuit shown in Fig. G.11 includes the following components:

(i) Relay, model SB40. An electro-magnetic switch used with item (ii) to enable an interlocking...
safeguard to be incorporated against changing out of overdrive with throttle closed.

(ii) Throttle Switch, model RTS1. A lever-operated semi-rotary normally closed switch used in conjunction with item (i) to override the toggle switch under closed throttle conditions.

(iii) Gear Switch, model SS10. A small plunger-operated switch allowing overdrive to be engaged only in the two highest forward-gear positions.

(iv) Solenoid Unit, model TGS1. An electromagnetic actuator to engage overdrive mechanism by opening hydraulic control valve.

Operation
When the toggle switch contacts are closed, current flows by way of the ignition switch and fuse unit supply terminal A3 to energize the relay operating coil. Closure of the relay contacts connects terminal A3 to the gear switch and, providing one of the two higher ratio gears is engaged, will energize the solenoid unit and effect a change from direct drive to overdrive.

Overdrive will be maintained until the solenoid unit is de-energized.

Change from overdrive to direct drive is effected either by selecting a low gear (when the gear switch contacts will open) or by turning the toggle switch to off with open throttle (when the relay contacts will open).

If effected with closed throttle, a change from overdrive to direct drive could result in a shock to the transmission. An interlocking circuit is therefore incorporated to override the toggle switch under closed throttle conditions. Under these conditions, the throttle switch contacts provide an alternative supply circuit to the relay operating coil.

Maintenance
Regular attention should be paid to wiring and connections. Damaged cabling must be replaced and loose terminals tightened, including the relay and solenoid unit earthing connections.

Section G.12

FAULT TRACING

The Solenoid Unit
With the engine stopped, neutral gear engaged, and the ignition switched on, disconnect the solenoid connection. Using a jumper lead, momentarily connect the solenoid to fuse unit supply terminal A3. The solenoid should be heard to operate. If no sound is heard, the solenoid is defective or incorrectly adjusted to the operating linkage. Remake the connection.

The Gear Switch
Engage top gear, depress the throttle pedal and momentarily connect relay terminal C2 to terminal A3. The solenoid should be heard to operate. If no sound is heard, the gear switch is defective. Re-engage neutral gear.

The Relay Coil
Momentarily connect relay terminal W1 to terminal A3. The relay should be heard to operate. If no sound is heard, the relay is defective.

The Toggle Switch
Operate the toggle switch. The relay should be heard to operate. If no sound is heard, the toggle switch is defective.

The Relay Contacts
With top gear engaged, toggle switch closed and throttle switch open, the solenoid should be heard to operate. If no sound is heard, the relay is defective.

The Throttle Switch
Engage top gear and close the toggle switch. Open the toggle switch and slowly depress the accelerator. The solenoid should be energized from zero to one-fifth throttle. If the solenoid is heard to release under one-fifth throttle, the throttle switch must be checked.
Throttle switch adjustment

The setting of the throttle switch is critical and incorrect adjustment will result in the overdrive disengaging when the car slows down with the throttle closed, accompanied by a noticeable braking effect.

The switch will normally only require adjustment after the carburettor or accelerator controls have been adjusted. The method of switch checking and adjustment is as follows.

Connect a low consumption test lamp (a 12 volt 2.2 watt fascia panel light bulb is suitable) between the top terminal "A" (Fig. G.13) and a convenient earthing point.

The bulb should light when the overdrive and the ignition are both switched on, and the gear lever is set in the third or top gear position.

When the overdrive is switched off, the bulb should remain alight with the throttle still closed.

Progressively open the throttle by means of the accelerator pedal until the light goes out. Check the position of the throttle opening when this occurs: it should be one-fifth open. This position of the throttle has been reached when a 1/8 in. (5 mm.) diameter rod can be just passed between the throttle stop screw and the stop lever on the HD type of carburettor, or when a feeler gauge of 0.048 in. (1.22 mm.) thickness can be inserted between the throttle stop screw and the stop on the H4 type of carburettor used on earlier engines.

Fig. G.13. The overdrive throttle switch showing:
A. Switch terminal.  C. Lever clamping bolt.
B. Switch body.    D. Operating shaft.

If the switch requires adjustment, slacken the lever clamping bolt "C" (Fig. G.13) and turn the switch operating shaft "D" (Fig. G.13) with a screwdriver until the setting is correct: the end of the shaft is slotted for this purpose.
SECTION GG

OVERDRIVE

(Series BN6)

For details of the overdrive unit fitted to BN6 cars refer to Section G.
SECTION GGG

OVERDRIVE

Mk. I and II (SERIES BN7 and BT7)
AND Mk. II and Mk. III (SERIES BJ7 and BJ8)

Section No. GGG.1 Overdrive unit
Section GGG.1

OVERDRIVE UNIT

The overdrive unit is basically similar to that described in Section G. The following changes have, however, been made:

1. A re-designed filter has been fitted and is retained in the body by a boss on the inside of the drain plug. The filter is accessible through the drain plug hole.

2. New operating pistons have been fitted with synthetic rubber sealing rings and the accumulator piston with three piece cast iron rings.

3. The pistons are fitted with needle roller bearings in lieu of "Clevite" bushes.

4. The outer ring of the uni-directional clutch is not riveted.

5. An additional selective washer 0.160±.0005 in. thick is available.

6. A re-designed solenoid bracket and adapter plate has been fitted.
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<th>Description</th>
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<td>Stud—overdrive unit.</td>
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<td>3</td>
<td>Washer for stud (spring).</td>
</tr>
<tr>
<td>4</td>
<td>Nut for stud.</td>
</tr>
<tr>
<td>5</td>
<td>Plate—adaptor.</td>
</tr>
<tr>
<td>6</td>
<td>Stud—adaptor to casing.</td>
</tr>
<tr>
<td>7</td>
<td>Joint—adaptor to casing.</td>
</tr>
<tr>
<td>8</td>
<td>Nut—plate stud to casing.</td>
</tr>
<tr>
<td>9</td>
<td>Washer for stud (spring).</td>
</tr>
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<td>10</td>
<td>Casing—front.</td>
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<td>11</td>
<td>Plug.</td>
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<td>12</td>
<td>Shalf—valve operating.</td>
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<td>13</td>
<td>Lever for shaft.</td>
</tr>
<tr>
<td>14</td>
<td>Pin—lever to shaft.</td>
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<tr>
<td>15</td>
<td>Cam—valve operating.</td>
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<td>16</td>
<td>Pin for cam.</td>
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<td>17</td>
<td>Seal for shaft.</td>
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<td>Peg—oil pump plunger guide.</td>
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<td>23</td>
<td>Nut—front casing to adaptor plate.</td>
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<td>Washer for nut (spring).</td>
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<td>25</td>
<td>Breather.</td>
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<td>Bracket solenoid.</td>
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<td>Stop (rubber).</td>
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<td>28</td>
<td>Joint—bracket to case.</td>
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<td>Nut—bracket to casing.</td>
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<td>30</td>
<td>Washer for nut (spring).</td>
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<td>31</td>
<td>Screw—bracket to casing.</td>
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<td>Washer for screw.</td>
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<td>Washer for screw (spring).</td>
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<td>Washer for screw (spring).</td>
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<td>Seal, oil—valve operating shaft.</td>
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<td>39</td>
<td>Distance coll.</td>
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<td>Lever—solenoid.</td>
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<td>Screw—lever to spindle.</td>
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<td>Washer for screw (spring).</td>
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<td>43</td>
<td>Nut for screw.</td>
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<td>Housing assembly—accumulator.</td>
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<td>Ring, rubber.</td>
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<td>Plunger, ball.</td>
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<td>Spring for plunger.</td>
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<td>Plug for valve—screw.</td>
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<td>Washer for plug.</td>
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<td>Cam—oil pump.</td>
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<td>59</td>
<td>Plunger assembly—oil pump.</td>
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<td>Spring for plunger.</td>
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<td>Body—oil pump.</td>
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<td>Plug for body—screw.</td>
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<td>63</td>
<td>Screw—body to front casing.</td>
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<td>64</td>
<td>Washer for screw (spring).</td>
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<td>Ball valve.</td>
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<td>Washer for valve plug (copper).</td>
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<td>Plug—valve.</td>
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<td>Distance tube for strainer.</td>
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<td>Washer for bolts.</td>
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<td>Washer for bolt (spring).</td>
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<td>Plug—oil drain.</td>
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<td>Washer for plug.</td>
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<td>Washer, steel.</td>
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<td>Washer—phosphor bronze.</td>
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<td>79</td>
<td>Stud for solenoid bracket.</td>
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<td>80</td>
<td>Joint for cover plate.</td>
</tr>
<tr>
<td>81</td>
<td>Ring—piston.</td>
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</tbody>
</table>

Key to the overdrive front casing components.