Instruction Book for

BEDFORD

3-4 & 5 TON, BUS CHASSIS AND BEDFORD-SCAMMELL TRACTOR

Issued March, 1948

VAUXHALL MOTORS LTD., LUTON, BEDS

INDEX

1948

INSTRUCTION BOOK
for
BEDFORD

3-4 AND 5 TON, BUS CHASSIS
AND
BEDFORD-SCAMMELL TRACTOR

A copy of this book is issued free with every vehicle. Extra copies may be obtained (price one shilling and sixpence each net) from the address given below

T.S. 223/7

Issued March, 1948

VAUXHALL MOTORS LIMITED
LUTON, BEDFORDSHIRE, ENGLAND

BEDFORD MODELS
Covered by this Handbook

THE information and maintenance details given in this handbook apply to all Bedford vehicles of 3-4 tons and 5 tons carrying capacity; also to the Bedford-Scammell tractor unit and the Bedford 174 in. wheelbase bus and coach chassis.

The model designations or code letters by which these vehicles are identified are shown below. Each of the basic models, as will be seen, is subdivided into individual types. The OS for instance, is the 111 in. short wheelbase model. The 3-4 ton version bears the code letters OS*A*. The 5 tonner on the same wheelbase bears the code letters OS*B*. With a tipper body it becomes OSA*C* or OSB*C*; and so on.

In general, however, only the *basic* model references, shown in bold type below, are used in this book. The full list of models is as follows:

MODEL OS

This general reference covers all 111 in. short wheelbase models, and includes:

	Subdivisions
Model OSA—3-4 ton	OSAZ—Chassis only. OSAC—Chassis and Cab. OSAT—End Tipper.
Model OSB—5 ton	OSBZ—Chassis only. OSBC—Chassis and Cab. OSBT—End Tipper.

MODEL OL

This general reference covers all 157 in. long wheelbase models, and includes:

	Subdivisions
Model OLA—3-4 ton	OLAZ—Chassis only. OLAC—Chassis and Cab. OLAD—Dropside Truck.
Model OLB—5 ton	OLBZ—Chassis only. OLBC—Chassis and Cab. OLBD—Dropside Truck.

BEDFORD-SCAMMELL TRACTOR

111 in. wheelbase tractor unit for use with Bedford-Scammell articulated vehicles. This bears the code letters OSS, but is referred to by name in the following pages.

BEDFORD BUS CHASSIS

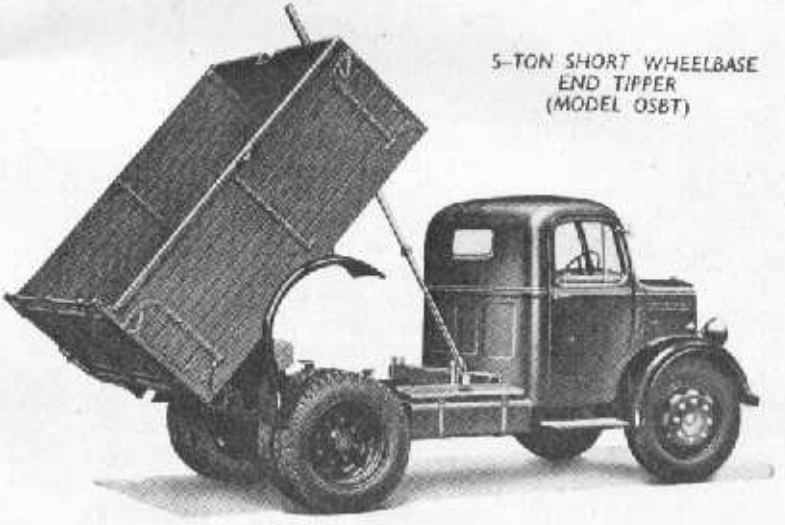
174 in. wheelbase special bus and coach chassis. This bears the code letters OB.

NOTE.—An identification plate bearing the model reference and the engine and chassis numbers is fitted on the left-hand side of the dash, under the bonnet.

5–TON LONG WHEELBASE TRUCK
(MODEL OLBD)

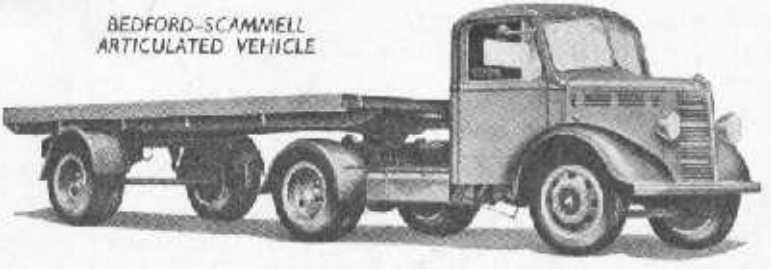
Model OLAD (the 3–4 ton long wheelbase truck) is identical in external appearance to the 5–tonner illustrated above.

5–TON SHORT WHEELBASE
END TIPPER
(MODEL OSBT)



Model OSAT (the 3–4 ton end tipper) is identical in external appearance to the 5-ton tipper illustrated above.

BEDFORD–SCAMMELL
ARTICULATED VEHICLE



This vehicle consists of the Bedford–Scammell tractor (Model OSS) plus a trailer and coupling gear supplied by Scammell Lorries Ltd.

FOREWORD

DETAILED instructions are given in this handbook for the operation, adjustment and general maintenance of the Bedford models listed on page 2. A booklet containing details of the coupling gear and modified braking system fitted to Bedford-Scammell articulated vehicles is issued with each such vehicle by Scammell Lorries Ltd.

Conscientious attention to the routine and general maintenance described in the following pages is essential. Providing the instructions are carried out regularly and thoroughly, the parts will be protected from unnecessary wear, the vehicle will continue to function efficiently for longer periods, and fewer repairs and replacements will be necessary.

As a general guide, the information given in this booklet is confined to operation, care and general maintenance. Repair procedure is dealt with in the Workshop Manual, copies of which may be obtained from the manufacturers at cost price. It is obviously wise, however, to entrust overhauls and repairs to authorised Bedford Dealers, who not only possess the specialised equipment and technical knowledge necessary to ensure skilled and efficient workmanship, but are always ready to assist Bedford owners in every possible way.

Finally, a word to the driver. The vehicle with which you are entrusted was built to stand up to hard work. It *will* stand up to hard work if you play *your* part in looking after it. Make it your business to learn all you can about it. Drive it as you would want someone else to drive it if it belonged to you. Don't neglect to do any of the things you know are necessary to keep it in good condition.

In a word, try to understand the vehicle and treat it sympathetically. Your care or lack of it can do a lot to determine its efficiency and length of service.

GENERAL DATA

CAPACITIES

Engine Oil	10 pints (refill)
Cooling System	27½ pints
Gearbox	4 pints (4¾ pints on bus chassis and hydraulic tipper vehicles)
Prior to Eng. No. 67748	6 pints (6¾ pints on bus chassis and hydraulic tipper vehicles)
Rear Axle	6 pints
Petrol Tank	16 gallons (20 gallons on bus chassis)

LEADING CHASSIS DIMENSIONS

Note.—Vehicle dimensions for chassis equipped with factory-built bodies, are shown on the vehicle diagrams on pages 6, 8 and 10.

	Short Wheelbase (Model OS)	*Long Wheelbase (Model OL)*	*Bus Chassis (Model OB)*
Wheelbase	9 ft. 3 in.	13 ft. 1 in.	14 ft. 6 in.
Track Front and Rear	5 ft. 4 in.	5 ft. 4 in.	5 ft. 4 in.
Overall Width	6 ft. 9⅛ in.	6 ft. 9⅛ in.	7 ft. 4 7/16 in.
Rear of Cab to Centre Line of Rear Axle	4 ft. 11½ in.	8 ft. 9½ in.	—
Rear of Cab to End of Frame	7 ft. 2⅜ in.	12 ft. 3½ in.	—

Overall Length—

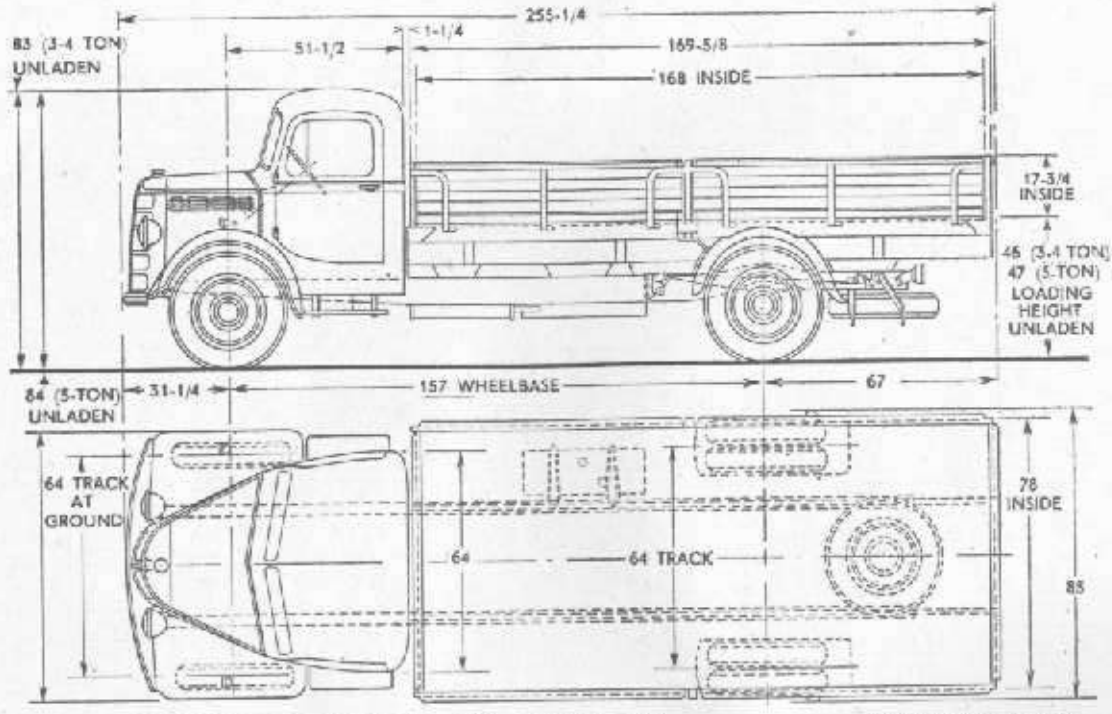
3–4 ton Short Wheelbase (Model OSA)	15 ft. 4½ in.
3–4 ton Long Wheelbase (Model OLA)	19 ft. 11 5/16 in.
5 ton Short Wheelbase (Model OSB)	15 ft. 7½ in.
5 ton Long Wheelbase (Model OLD)	20 ft. 0⅝ in.
Bus Chassis (Model OB)	24 ft. 1⅛ in.

WEIGHTS

Taxation Weights (Vehicles equipped with factory-built bodies)

Note.—The taxation weights given below are approximate only and should not be taken to represent the exact weight of any particular vehicle, as they are subject to manufacturing variations.

		Tons	*Cwts.*	*Qrs.*	*Lbs.*
3–4 ton Tipper Truck (Model OSAT)	*Front*	1	1	2	12
	Rear	1	5	2	4
	Total	2	7	0	16
5 ton Tipper Truck (Model OSBT)	*Front*	1	7	1	8
	Rear	1	2	0	6
	Total	2	9	1	14
3–4 ton Dropside Truck (Model OLAD)	*Front*	1	2	0	26
	Rear	1	6	1	20
	Total	2	8	2	18



TYRE SIZE FRONT AND REAR 3-4 TON 32 x 6 HD. 5-TON 34 x 7 HD. CAPACITY 6-04 CU. YDS.

Fig. 1. Dropside truck dimensions—3-4 ton (Model OLAD) and 5 ton (Model OLBD).

Approx. Taxation Weights (*contd.*)

		Tons	*Cwts.*	*Qrs.*	*Lbs.*
5 ton Dropside Truck (Model OLBD) ..	*Front*	1	2	3	12
	Rear	1	8	1	6
	Total	2	11	0	18
Bus Chassis (Model OB)	*Front*	1	0	1	12
	Rear	–	17	3	2
	Total	1	18	0	14
Bedford-Scammell Tractor (Model OSS)	*Front*	1	1	3	0
	Rear	–	19	2	0
	Total	2	1	1	0

Maximum Gross Laden Weights

Note.—The gross laden weights shown below are in accordance with the maximum domestic tyre loadings recommended by the Society of Motor Manufacturers and Traders, for the standard tyre equipment fitted to the individual vehicles.

3–4 ton Short and Long Wheelbase (Models OSA and OLA)	6 tons 15 cwt.
5 ton Short and Long Wheelbase (Models OSB and OLB)	8 tons 5 cwt.
Bus Chassis (Model OB)	7 tons
Bedford-Scammell Tractor (Model OSS) ..	6 tons 15 cwt.

BRIEF SPECIFICATION OF THE CHASSIS

ENGINE

Type of Engine	Six cylinders. Detachable cylinder head of high compression type, with overhead valves operated by push rods. Cast iron pistons with oval-ground, tin-plated skirts. Four main and four camshaft bearings. The main, camshaft and big end bearings are thin steel shell type, lined with white metal. Lubrication by pressure from gear-type pump to main, big end and camshaft bearings, pistons, timing chain and overhead valve rocker gear. Detachable oil strainer fitted in crankcase, and A.C. cartridge type filter mounted externally. Engine mounted in chassis at three points, insulated with rubber.
Bore and Stroke	$3\frac{3}{8}$ in. × 4 in.
R.A.C. and S.A.E. Rating ..	27.34 h.p.
Piston Displacement ..	214.7 cu. in.
Max. Brake Horse Power ..	72 at 3,000 r.p.m.

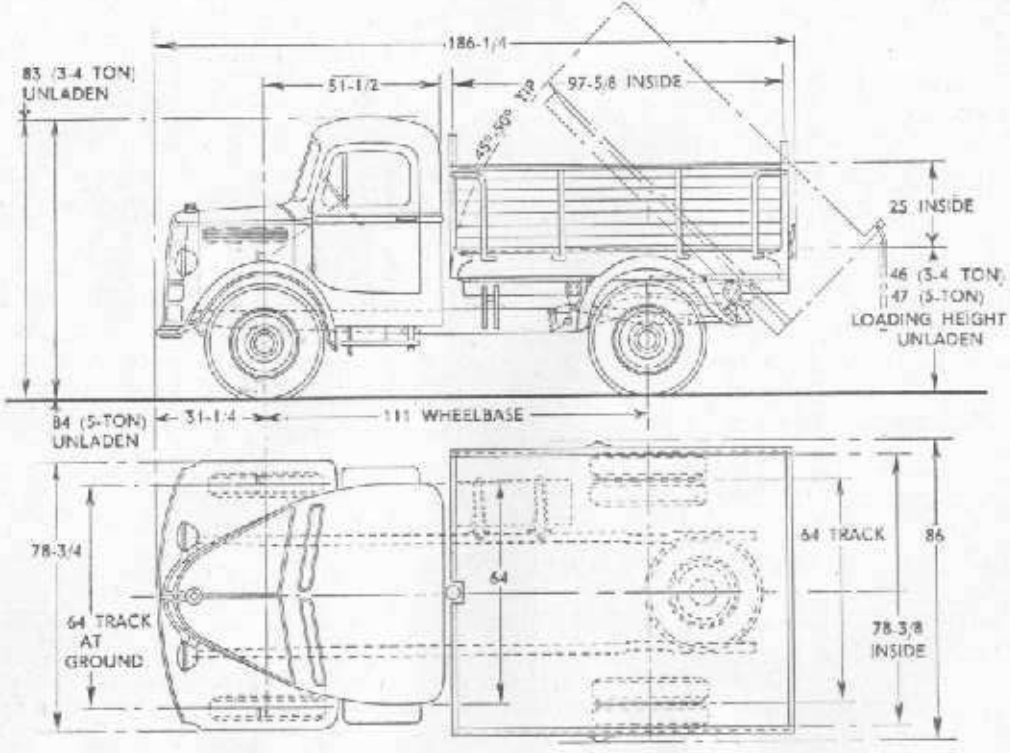


Fig. 2. Tipper truck dimensions—3–4 ton (Model OSAT) and 5 ton (Model OSBT).

Max. Brake Torque ..	161 ft. lbs. at 1,200 r.p.m.
Compression Ratio	6.22 to 1.
Valve Clearances (Hot) ..	Inlet valves .006 in. Exhaust valves .013 in.
Ignition	Lucas coil and distributor with fully automatic centrifugal governor and vacuum advance controls. Spiral gear driven from centre of camshaft.
Sparking Plugs	AC, Type VF9, 14 mm. thread. Gap .028 in. to .030 in. *(Note: This type replaces the AC K9V and VK8 plugs previously used.)*
Firing Order	1–5–3–6–2–4
Carburettor	Zenith type 30VIG-3, "Down-draught" with interconnected air strangler and throttle control, acceleration pump and part throttle economy device. Combined air cleaner and flame arrester fitted to air intake.
Petrol Feed	By A.C. petrol pump driven by camshaft.
Location of Petrol Tank ..	Mounted on right-hand side of chassis.
Petrol Tank Capacity ..	All Models except Bus Chassis: 16 gallons. Bus Chassis: 20 gallons.
Radiator and Cooling System	Film-type copper core. External filler with screw cap located in radiator top. Main drain tap in bottom water pipe right-hand side of radiator. Drain tap located in lower left-hand rear corner of cylinder block for complete drainage of water jackets. Thermostat incorporated in cooling system. Impeller water pump with self-adjusting gland. Four-bladed fan. Air flow assisted by cowl.
Generator (All Models except Bus Chassis)	Lucas, Model C.45WV-3, 6 volt. Belt-driven. Three charge rate, with third brush regulation. Low-charge device operated by lighting switch on instrument panel.
Generator (Bus Chassis) ..	C.A.V. Model D5-LFA-10. Compensated voltage control.

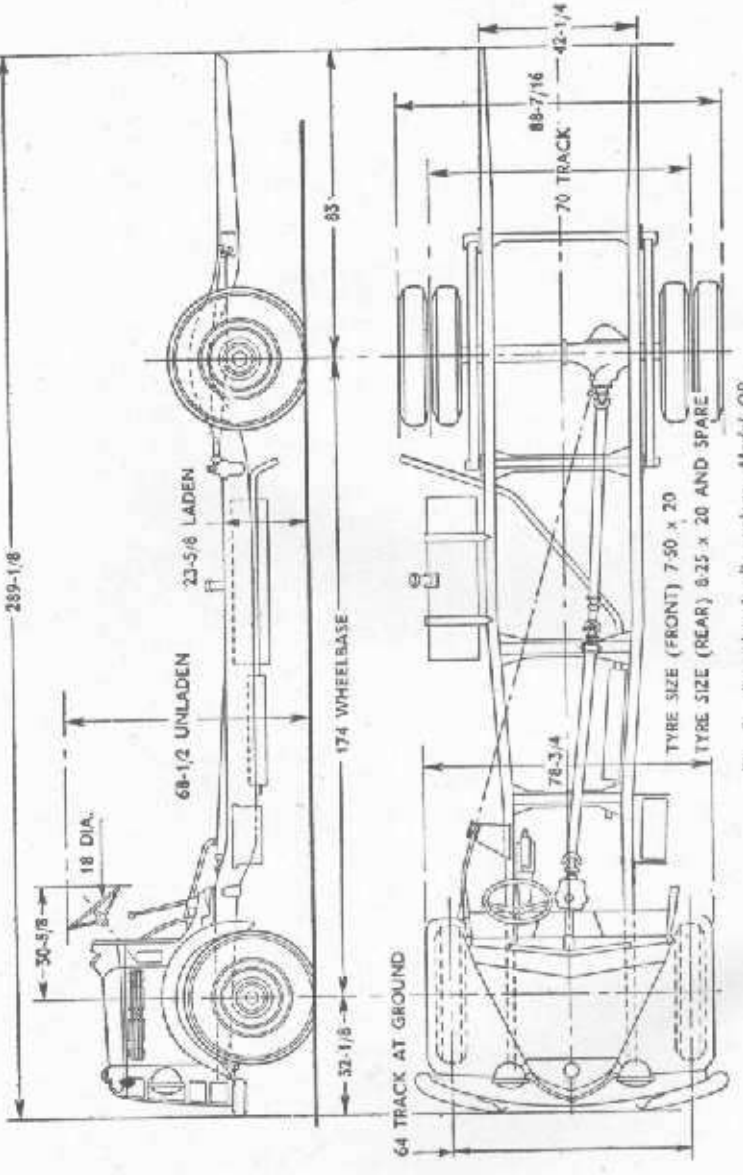


Fig. 3. Bus chassis dimensions, Model OB.

Starter Motor (All Models except Bus Chassis)	Lucas, Model C45G/P29, 6 volt.
Starter Motor (Bus Chassis)	Lucas, Model M45G Type P23 0, 12 volt.
Battery (All Models except Bus Chassis)	Exide Type 3XCZ-15M. 6 volt; 100 amp.-hour capacity at 20 hour rate.
Battery (Bus Chassis) ..	Exide type 6XCK 13M 12 volt; 85 amp.-hour capacity at 20 hour rate.

TRANSMISSION

Clutch	Single dry plate with flexible centre. Pedal adjustment to compensate for wear. Radial type clutch throw-out bearing requiring no lubrication.
Gearbox	Spur gears. Four forward speeds and one reverse.
Ratios:—	
First	7.22 to 1
Second	3.47 to 1
Third	1.71 to 1
Top	Direct
Reverse	7.15 to 1
Universal Joints—	
Type	Hardy Spicer needle roller bearing.
Number	Two on short wheelbase (Models OS) and three on long wheelbase (Models OL and OB).
Drive	Hotchkiss type. Two open tubular propeller shafts in tandem on long wheelbase (Models OL and OB); one on short wheelbase (Models OS). Drive and torque taken through rear springs.
Rear Axle	Fully floating shafts of nickel chrome steel. Built-up assembly, the brake anchor plates and spring pads being welded to large diameter tubes, which are pressed into a malleable cast iron differential carrier. Spiral bevel gears, with pinion straddle-mounted. Four-star type differential gear. Detachable pressed steel inspection cover with filler plug. Taper roller hub bearings.

Rear Axle Ratios

3–4 ton, 5 ton and Bus Chassis	5.86 to 1 (7/41), 6.17 to 1 (6/37), 6.83 to 1 (6/41), 7.4 to 1 (5/37).
Bedford-Scammell Tractor	7.4 to 1 (5/37).

Note.—The bracketed figures after each ratio give the number of teeth on the pinion and drive gear respectively, as stamped on the underside of the pinion housing.

Overall Ratios (Engine to Rear Wheels)

Axle Ratio	*First*	*Second*	*Third*	*Fourth*	*Reverse*
5.86 to 1 (7/41) ..	42.29	20.32	10.01	5.86	41.88
6.17 to 1 (6/37) ..	44.52	21.40	10.54	6.17	44.09
6.83 to 1 (6/41) ..	49.33	23.71	11.68	6.83	48.86
7.4 to 1 (5/37) ..	53.43	25.68	12.65	7.40	52.91

FRONT AXLE AND STEERING

Front Axle	Heat treated, drop forging of "I" section beam. Stub axle load taken by plain-type thrust bearings. Taper roller hub bearings.
Steering Gear	Semi-irreversible worm and wheel. Self-adjusting ball joints to tie-rod and steering connecting rod.

Turning Circle Diameter—

3-4 ton Short Wheelbase and Bedford-Scammell Tractor (Models OSA and OSS) ..	39 ft.
3–4 ton Long Wheelbase (Model OLA)	51½ ft.
5 ton Short Wheelbase (Model OSB)	42 ft.
5 ton Long Wheelbase (Model OLB)	59 ft.
Bus Chassis (Model OB) ..	59 ft.

FRAME

Type	Pressed steel channel section.
Dimensions of Side Members at Centre—	
Short Wheelbase (Model OS)	7 17/32 in. × 2½ in. × 7/32 in.
Long Wheelbase and Bus Chassis (Models OL and OB)	8 in. × 3 in. × 7/32 in.

Number of Crossmembers—	
Short Wheelbase (Model OS)	5
Long Wheelbase and Bus Chassis (Models OL and OB)	6

BRAKES

Type	Lockheed hydraulic, operating on all four wheels. Operation assisted by Clayton Dewandre vacuum servo. Handbrake operates rear brakes mechanically.
Size of Drums	Front and rear—14 in. diameter.

WHEELS AND TYRES

Wheels	Single front wheels, twin rear wheels, and one spare, with the following rims:—
3–4 ton and Bedford-Scammell Tractor (Models OSA, OLA and OSS)	4.33 flat base × 20—4½ in. off-set all round.
5 ton (Models OSB and OLB)	5.00 flat base × 20—4.9 in. off-set all round.
Bus Chassis (Model OB) ..	Front: 5.00 flat base × 20—4.9 in. off-set. Rear and Spare: 5.00 flat base × 20—4.9 in. off-set.
Standard Tyre Equipment	
3–4 ton and Bedford-Scammell Tractor (Models OSA, OLA and OSS)	32 × 6 heavy duty all round.
5 ton (Models OSB and OLB)	34 × 7 heavy duty all round.
Bus Chassis (Model OB) ..	Front: 7.50 × 20. Rear and Spare: 8.25 × 20.

Note.—For tyre pressures see page 22.

LOCATION OF MODEL, CHASSIS AND ENGINE NUMBER

Stamped on plate fixed to left-hand side of dash under the bonnet. Engine number also stamped on crankcase adjacent to petrol pump. From Chassis No. O.63001, an additional means of chassis identification is provided by a plate attached to the top flange of the right-hand sidemember under the bonnet.

THE CONTROLS

LIGHTING SWITCH. The lighting switch is mounted in the centre of the instrument panel. On all models except the Bus (Model OB) it is provided with four switch control positions marked as follows:—

"LOW" With the switch in this position, the generator charges at approximately one-third of its maximum rate.

"HIGH" In this position, the generator charges at approximately *two*-thirds of its maximum rate.

"SIDE" This switches on the side and tail lamps. The generator output remains at two-thirds capacity.

"HEAD" In this position the switch operates head, side and tail lamps, and the generator charges at its maximum output.

On the Bus chassis the generator is provided with a system of compensated voltage control whereby the charging rate is automatically adjusted to suit the needs of the battery. The lighting switch, therefore, has only three positions—namely, "OFF" (all lamps off), "SIDE" (side and tail lamps on) and "HEAD" (head, side and tail lamps on).

IGNITION SWITCH. The ignition switch is mounted in the centre of the lighting switch and is operated by a Yale-type key. If at any time a replacement key is required, the number stamped on the switch should be quoted on the order.

HEADLAMP DIPPER CONTROL. The headlamps are equipped with double-filament bulbs and are dipped by operation of the dipper switch located on the right-hand side of the engine rear cowl. Alternate movements of the switch dip and raise the light beam.

STARTER SWITCH. The starter motor is operated by pulling the knob on the left-hand side of the engine rear cowl. If the engine fails to start at the first attempt, the switch should not be operated again until the engine and the starter motor are completely at rest.

IGNITION WARNING LAMP. This is the small red lamp (on the left-hand side of the petrol gauge) which glows when the ignition is switched on. It should go out as soon as the voltage output of the generator rises above the battery terminal voltage. This point is reached at a fast idling speed. The lamp serves as a reminder not to leave the ignition switched on when the vehicle is stationary; also as a warning if for any reason the generator ceases to charge the battery.

OIL PRESSURE WARNING LAMP. This is the small orange lamp (on the right of the petrol gauge) which glows when the ignition is switched on. It should go out when the engine is started and should remain out all the time the engine is running.

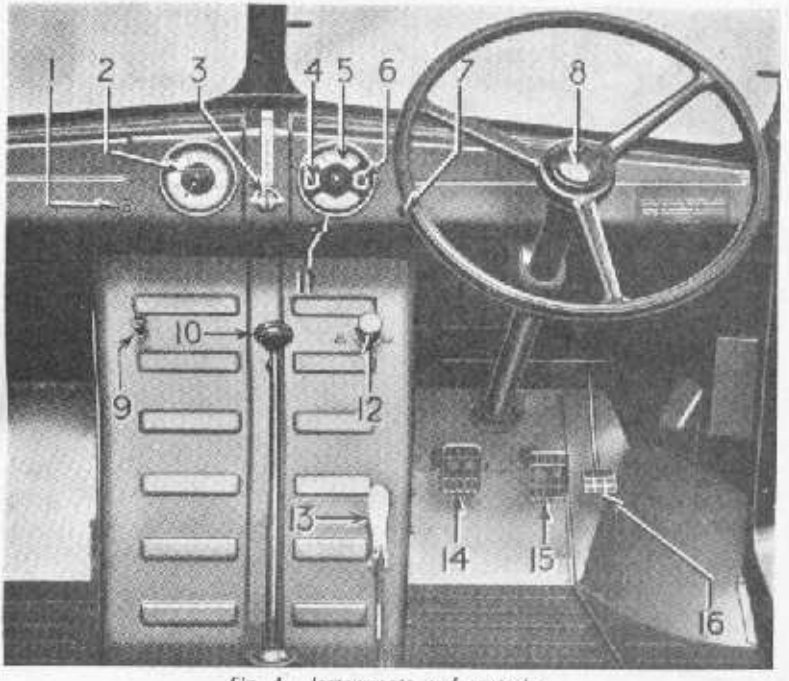


Fig. 4. Instruments and controls.
1. Choke Control. 2. Speedometer. 3. Ignition and lighting switch. 4. Ignition warning lamp. 5. Petrol gauge. 6. Oil pressure warning lamp. 7. Instrument lamp switch. 8. Horn button. 9. Starter control. 10. Gear lever. 11. Ammeter. (not fitted to Model OB.) 12. Headlamp dip control. 13. Handbrake lever (located to right of driving seat on Model OB.) 14. Clutch pedal. 15. Brake pedal. 16. Accelerator pedal.

The lamp is operated by oil pressure through a switch on the engine crankcase and will therefore light up as soon as the oil pressure falls below the safety limit.

AMMETER. (Fitted to Models OS, OL and Bedford-Scammell Tractor only.) The ammeter indicates whether the battery is being charged or is discharging and the rate at which the charge or discharge is taking place. At all speeds below about 10 m.p.h. in top gear the ammeter needle will remain on the discharge (—) side of the dial. This indicates that current is being taken from the battery.

Above a road speed of 10 m.p.h. in top gear the needle should move over to the charge (+) side of the dial. The rate of charge increases with the engine speed and should reach a maximum of 10–12 amps at about 25 m.p.h.

On the Bus chassis, which is provided with compensated voltage control, no ammeter is fitted.

PETROL GAUGE. The petrol gauge is electrically operated

and functions only when the ignition switch is turned to the "ON" position.

INSTRUMENT PANEL LIGHTING. Illumination of the instrument panel is provided by concealed lamps mounted behind the instruments. They are controlled by the small switch located on the right of the panel.

CHOKE CONTROL. The choke control is situated on the left of the instrument panel. It should be pulled right out when starting the engine from cold and pushed in again as soon as the engine will continue to run with the choke control released. Running with the control pulled out longer than is necessary will result in liquid petrol being drawn into the engine. This will cause excessive wear by washing lubricant from the cylinder walls and diluting the oil in the sump.

CLUTCH PEDAL. The clutch pedal is used for disengaging and re-engaging the drive between the engine and the transmission, when starting from rest or changing gear.

See page 34 for method of checking and adjusting free pedal movement.

BRAKE CONTROLS. The footbrake pedal is conventionally placed between the clutch and accelerator pedals. It operates brake shoes on all four wheels through a system of hydraulic pipe-lines and is "assisted" by a vacuum servo unit coupled to the inlet manifold.

The handbrake is of the horizontal pull-up type connected by rods and cables to the shoes on the rear wheels only. On all models except the Bus, it is located centrally and mounted in a bracket bolted to one of the frame crossmembers. On the Bus chassis the lever is located on the outer side of the driver's seat and is mounted on an outrigger bracket attached to the frame sidemember.

WINDSCREEN WIPER. The windscreen wiper, fitted to Models OS, OL and Bedford-Scammell Tractor, is operated by suction from the engine manifold and is controlled by the small knob on the motor itself. The motor is situated just above the top of the windscreen. As it depends upon engine suction for its operation, it will of course only function when the engine is running.

Bus and coach models are equipped with an electric screen wiper provided by the coachbuilders.

DRIVING

STARTING THE ENGINE. Always adopt the following procedure when starting the engine from cold.

1. Switch on the ignition. Immediately, the red ignition warning lamp and the orange oil warning lamp should glow.
2. Pull out the choke control knob as far as it will go.
3. Make sure that the gear lever is in neutral.
4. Operate the starter by pulling the starter control.
5. Push the choke control in *as soon as the engine will run without it.*

The same instructions apply when starting an engine which has already been warmed up, except that *the choke should not be used.*

If the engine fails to start at the first application of the starter, do not make a second attempt until the starter motor and the engine are at rest again.

It is important *not* to "pump" the accelerator pedal while starting, as this practice produces an excessively rich mixture and makes starting more difficult.

If the engine fails to start after several attempts, proceed as follows:—

Push the choke control right in. Press the accelerator pedal *slowly* down to the floorboard and keep it there. Operate the starter. The first few revolutions will clear away excess petrol sucked in by the repeated attempts at starting and the engine should fire as soon as the mixture is just right. (See also under "If the Engine Won't Start" on page 46.)

WHEN ENGINE STARTS. When the engine is running, the ignition and oil warning lamps will go out. The ignition lamp will glow now and again when the engine is idling (i.e. when the idling speed is not fast enough for the generator output voltage to rise above the battery terminal voltage), but the oil warning lamp should remain out all the time the engine is running (see page 42).

Important. Always push the choke control right home as soon as possible after starting. *Never leave it out or in the half-way position.*

WARMING UP. Do not allow the engine to "tick over" after a cold start. It is best to drive away immediately after starting and get into top gear as soon as possible. Speed should be moderate until the engine is fully warmed up.

ENGAGING GEARS. There are four forward speeds and reverse. The following procedure should be adopted when changing gear.

To change up when the oil in the gearbox is cold, release the

accelerator, depress the clutch pedal and pull the gear lever through unhesitatingly into the next gear. To change up when the oil is warm, release the accelerator and depress the clutch pedal; pull the lever into the neutral position; hesitate for a second and then move the lever into the next position.

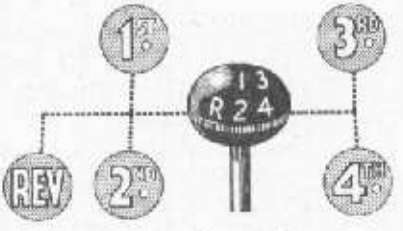


Fig. 5. Gear change diagram.

When changing down into a lower gear, it is advisable to double-declutch. Release the accelerator and depress the clutch pedal; move the lever into neutral; let the clutch pedal up, momentarily accelerating at the same time; depress the pedal again and move the lever into the lower gear.

USE OF CLUTCH. Avoid "riding the clutch"—i.e. resting the left foot on the pedal while driving. *This habit leads to rapid wear of the clutch linings and withdrawal bearing.* The pedal should have one inch of "free play"—i.e. the amount of travel before pressure of the clutch springs is felt. Details of the adjustment necessary when this dimension is reduced by wear are given on page 34.

USE OF BRAKES. Do not use any more force on the pedal than is necessary to bring the vehicle to rest in the desired distance. Heavy application of the brakes means increased tyre wear. The brake action is assisted by a vacuum servo unit. That is to say, the pressure applied to the pedal by the driver's foot is automatically augmented, *so long as the engine is running.*

Light, progressive pedal pressure is all that is necessary to retard the vehicle, but it is important to remember that the servo-assistance does not operate when the engine is at rest. When the vehicle is coasting with the engine switched off, for instance, increased pedal pressure is required. (See page 76.)

RUNNING IN. A little extra care and restraint in driving when the vehicle is new will be well repaid in subsequent performance and long life. The engine should be handled considerately, and speeds should be kept within reasonable limits so that the working parts will settle down smoothly and the bearing surfaces will acquire a hard, mirror-like finish.

For this reason, the following speeds should not be exceeded during the first 500 miles in the life of a new vehicle or a reconditioned engine:—

First gear	.. ..	4 m.p.h.
Second gear	.. ..	8 m.p.h.
Third gear	.. ..	15 m.p.h.
Top gear	.. ..	25 m.p.h.

After the first 500 miles, the speeds in the respective gears can be increased proportionately, but it is advisable not to demand the full power and performance until the vehicle has covered at least 1000 miles.

AFTER THE FIRST 500 MILES. A general check-over is necessary after the first 500 miles, when most of the working parts will have settled down. Details of the checks and adjustments which should be carried out at this stage are given under "Routine Maintenance" on page 20.

PETROL CONSUMPTION. The three things necessary to obtain good petrol consumption are: (*a*) a well-tuned engine, (*b*) low tractive resistance and (*c*) intelligent driving.

The essentials of a well-tuned engine are correct ignition setting, correct valve clearances, and a clean and properly adjusted petrol feed system.

Tractive resistance—i.e. the amount of drag on the vehicle—can be kept to a minimum by the driver watching the following points:

Make sure that the brakes are not rubbing. Check the tyre pressures daily. (Low pressures increase "drag".) Use the correct oil in engine, gearbox and axle.

Intelligent driving means a number of things.

Drive as smoothly as you can. Sudden acceleration and sudden braking are expensive in tyres and brake-linings as well as in petrol. The most economical speed of the vehicle is usually around 25 m.p.h. Switch off promptly whenever you pull up, except in traffic. Idling when you start up wastes petrol and is also bad for the engine.

Don't keep the choke control out longer than necessary. And blank off part of the radiator in cold weather to maintain "under-bonnet temperature".

These are all simple things. But it is by observing simple things that petrol can be saved.

ROUTINE MAINTENANCE

Instructions are given below for carrying out all the lubrication and general maintenance jobs which need regular attention. They apply to all models unless otherwise stated.

It is vitally important that each and every item be attended to conscientiously, as no motor vehicle can give of its best, either in performance or long life, unless it is properly maintained.

The mileage periods under which the various items are listed are intended to apply to vehicles engaged on normal main road transport. More frequent attention will be necessary to vehicles working under adverse conditions such as sand and gravel pit work.

NOTES ON LUBRICATION. Always use approved oils of the correct grade (see list on facing page).

It is essential to use Extreme Pressure Gear Oil for 5/37 and 6/41 ratio axles. (See page 12). A normal gear oil may be used with other ratios, but an Extreme Pressure Oil is recommended in all cases where the vehicle is engaged on exceptionally arduous work.

The lubrication points which need regular attention are listed in the following pages. They are also clearly shown on the lubrication charts at the end of this handbook.

Always wipe lubrication nipples clean before applying the oil gun.

AFTER THE FIRST 500 MILES

With the engine hot:

Check and tighten cylinder head bolts, manifold bolts and carburettor flange nuts.
Check and adjust valve clearances (see page 27).
Check tension of fan belt (see page 33).
Check distributor points and adjust if necessary (see page 25).
Drain sump and refill with fresh oil (see page 24).
Check engine mounting bolts and nuts for tightness.
Check all external oil pipe unions and water hose clips.

Other points which should receive attention are:

Check clutch and brake pedal clearance and brake action (see pages 34 and 78).
Check front and rear axle "U" bolt nuts and spring leaf clips for tightness (see page 30).
Check front and rear hub bearing adjustment (see page 35).
Check wheel nuts for tightness.
Lubricate all high pressure nipples and check oil levels (see charts at end of book).

Manufacturer	*Engine and Tipper Gear*	*Gearbox, Rear Axle, Steering Box and Chassis Lubrication*	*Extreme Pressure Oil for Steering Box and 5/37 & 6/41 ratio Rear Axle—see note on facing page)*	*Generator Bearings (Model OB only), and Front Hubs*
Prices	Motorine E	Motorine Battersea A	—	Belmoline C
Vacuum ..	Mobiloil Arctic	Mobilube C	Mobilube E.P.	Mobil Hub Grease
Anglo-American	Essolube 20	Essolube Gear Oil Heavy	—	Esso Grease
Wakefields ..	Castrolite	Castrol D Gear	Castrol HI-PRESS	Castrolease Heavy
Shell	Single Shell	Shell Spirax C (SAE 140)	—	Shell Retinax R.B.

Guide to the selection of Lubricant for the Overseas User

ENGINE

Climatic Temperature	*Viscosity or S.A.E. No.*
Below 15° F.	10
15° to 90° F.	20
Above 90° F.	30

GEAR BOX 140

REAR AXLE Viscosity or S.A.E. No. 140 (140 E.P. where extreme pressure lubricant is specified).

DAILY

1. Check Water Level in Radiator. Add water only if the level is more than ½ in. below the filler baffle.

2. Check Oil Level in Engine Sump. To ensure a correct reading, always wipe the dipper rod before checking, and make sure that the vehicle is on level ground. Replenish, if necessary, with one of the recommended oils listed on page 21, up to the "F" mark on the dipstick, *with the felt seal on the dipstick in place.*

3. Tyres. Check tyre pressures (including the spare) as listed below:—

Model	*Standard Tyre Equipment*	*Pressures (lbs. per sq. in.)*	
		Front	*Rear*
3–4 ton short wheelbase (Model OSA)	32 × 6 H.D.	50	80
3–4 ton long wheelbase (Model OLA)	32 × 6 H.D.	60	80
5 ton short wheelbase (Model OSB)	34 × 7 H.D.	55	85
5 ton long wheelbase (Model OLB)	34 × 7 H.D.	65	85
Bus (Model OB)	7.50 × 20	55	—
	8.25 × 20	—	60
Bedford-Scammell Tractor (Model OSS)	32 × 6 H.D.	45	80

EVERY 1,000 MILES

ENGINE

Lubricate Control Joints. Using the oil can (filled with engine oil) lubricate the joints of the controls from accelerator pedal to carburettor, *do not lubricate the carburettor control lever.*

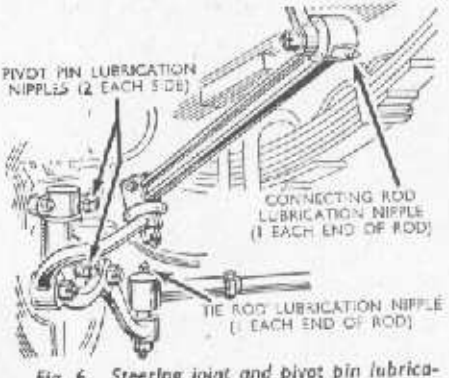


Fig. 6. Steering joint and pivot pin lubrication nipples.

Fig. 7. Brake fluid reservoir and servo cylinder oil cup.

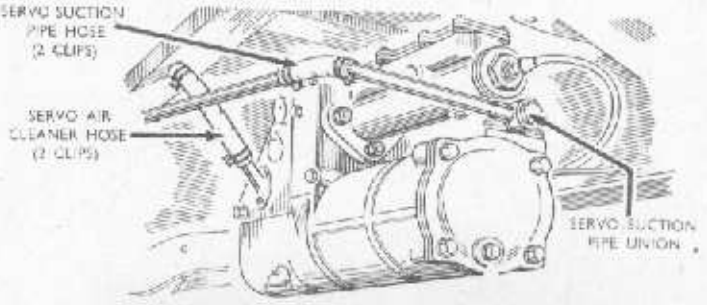


Fig. 8. Servo pipe connections.

STEERING AND FRONT AXLE

1. Lubricate Steering Joints. Apply the oil gun (filled with gear oil) to the lubrication nipple on each steering joint. There are 4 nipples in all (Fig. 6).

2. Lubricate Steering Knuckle Pivot Pins. Apply the oil gun (filled with gear oil) to the lubrication nipple on each pivot pin bearing. There are 4 nipples in all—2 on each steering knuckle (Fig. 6).

BRAKES

1. Check Fluid Level in Reservoir. The reservoir is accessible through a flap in the floor, just in front of the driver's seat. Wipe all dirt from and around the filler plug before removing it. The reservoir is divided into two sections by a cast-in baffle which can be seen through the filler plug hole. The level in both sections should be ¼ in. below the bottom of the hole. Top up, if necessary, with Lockheed Hydraulic Brake Fluid (Orange). Add only enough fluid to bring the level ½ in. below the bottom of the filler plug hole; *do not fill the reservoir to its full capacity.*

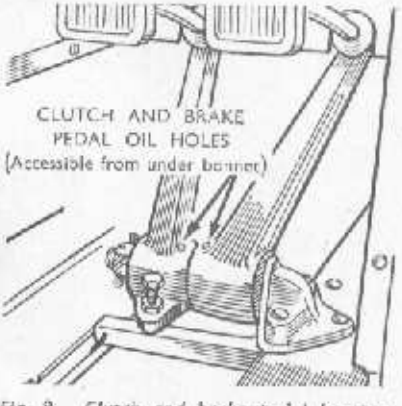


Fig. 9. Clutch and brake pedal bearing oil holes.

2. Lubricate Servo Cylinder. Inject a few drops of engine oil in the vacuum-servo cylinder oil cup, after turning the dust cover to line up the oil holes. Close the cover again to exclude dust (Fig. 7).

On Bedford-Scammell tractor, inject the oil through the hole in the top of the cylinder after removing the plug.

3. Check Servo Cylinder Mounting and Brake Pipe Connections. Check tightness of bolts securing the servo unit to the chassis frame;

also the suction pipe union on the servo, and the clips securing the servo suction pipe and air cleaner hose (see Fig. 8). Examine all hydraulic pipe lines for damage or deterioration.

4. Lubricate Controls. Inject a few drops of engine oil to the clutch pedal and footbrake pedal bearings (from under the bonnet—Fig. 9), and to the handbrake lever pivot bearing. Apply a few drops of oil to the handbrake cable and rod joints.

ROAD SPRINGS

1. Lubricate Spring Shackles. Apply the oil gun (filled with gear oil) to the shackle pin lubrication nipples. Total 12 nipples—3 on each spring. *Do not lubricate the spring leaves* (*see page* 72).

2. Check "U" Bolts and Spring Clips for Tightness. These items should be checked ever 500 miles during the first 2,000 miles, and every 2,000 miles afterwards (see page 30).

BATTERY

Check Electrolyte Level. The battery is accessible through a flap in the cab floor on the left-hand side. On the Bus it is accessible through a trap-door just in front of the left-hand front seat.

Remove the battery vent plugs and, if necessary, top up with distilled water until tops of the plates are just covered.

If the terminals are corroded, scrape them clean and smear them with vaseline. Make sure the terminals are tight, and that the battery is secure in its container.

WHEELS

Check Road Wheel Nuts. Check the nuts on all the road wheels for tightness, using the wheelbrace. Make sure that the spare wheel is mounted securely.

EVERY 2,000 MILES

Repeat the items listed under the 1,000 mile heading, plus the following:—

ENGINE

1. Change Engine Oil and Clean Strainer. The drain plug is at the bottom of the engine sump. Drain with the engine thoroughly hot after a long run, when the oil is warm and fluid and thoroughly agitated. The impurities will then be in suspension and will be drained out with the oil. While the oil is draining out, remove and clean the crankcase strainer. Remove the two setscrews securing the cap by the side of the dipper rod and pull out the gauze strainer. Pour about ½ pint of

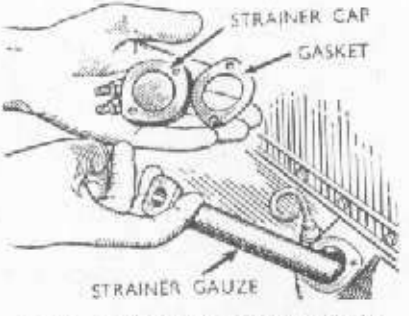


Fig. 10. *Crankcase oil strainer details.*

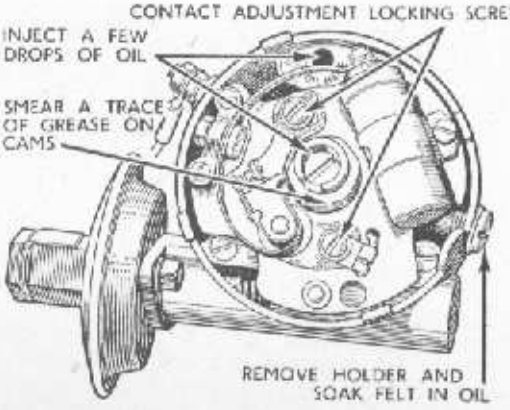


Fig. 11. (Right) The distributor (cap and rotor removed) showing details of lubrication and the locking screws which have to be slackened before the fixed arm point can be moved to adjust the contact breaker gap.

fresh oil down the tube to flush away any sludge at the bottom end. Clean the strainer gauze by swilling it about in a bath of paraffin. Shake off all traces of paraffin before replacing it. Use a new gasket under the cap if the old one is damaged, and tighten the setscrews evenly and securely to ensure an air-tight joint.

Refill the engine with 10 pints of fresh oil (see list on page 21) through the filler hole on top of the valve cover. Before replacing the filler cap, swill it in paraffin to clean the metal wool air filter inside.

2. Lubricate Ignition Distributor and Check Contact Points. Remove the distributor cover, pull off the rotor arm, and lubricate the following points:—

(*a*) Apply two or three drops of engine oil to the head of the screw on top of the cam; this oil will find its way past the screw and lubricate the cam bearing.

(*b*) Inject a few drops of engine oil through the hole marked "OIL HERE" in the contact breaker plate.

(*c*) Using a screwdriver, unscrew and remove the holder in the side of the distributor carrying the felt pad for lubrication of the contact breaker plate bearing. Take out the felt from the holder and soak it in engine oil. Insert the felt in the holder and refit it to the distributor, making sure that the spring washer is in position under the head of the holder.

(*d*) Smear just a *trace* of grease on the contact breaker cams.

Contact Breaker Points. The surface of the contact points should have a clean, greyish, frosted appearance. If they are pitted or blackened, clean them with a smooth file, taking great care to remove any dirt from between the points. If the points are oily, wipe them with a rag soaked in petrol.

The gap between the point on the movable arm and the fixed arm point should be .010 to .012 in, when fully open.

To check the gap, turn the engine by means of the starting

handle until the peak of the distributor cam is in contact with the moving arm. It should then be just possible to insert a .010 in. to .012 in. feeler gauge between the points without springing the moving arm from the cam. If adjustment is necessary, slacken the two screws (Fig. 11) which hold the plate carrying the fixed contact point, and move the plate until the correct clearance is obtained. Finally, tighten the screws.

3. Lubricate Generator Bearings and Check Mounting for Tightness. On all models except the Bus, remove the lubricator fitted at the rear of the generator, and apply a few drops of engine oil to the wick. On the Bus chassis, screw down the generator grease

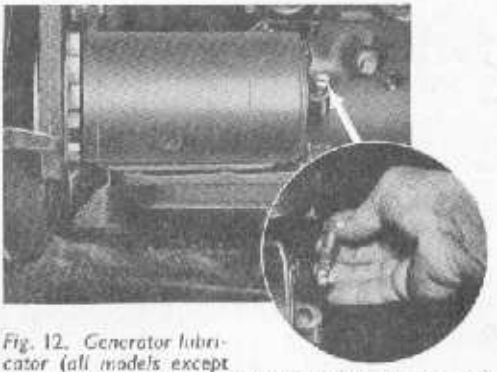


Fig. 12. Generator lubricator (all models except Bus). The inset picture shows the lubricator removed and the wick to which oil is applied.

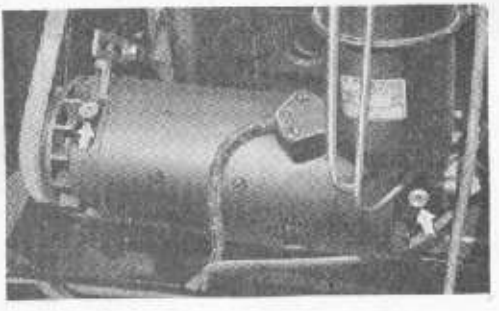


Fig. 13. Generator lubricators (Bus only). The arrows point to the two grease cups which, every 2,000 miles, should be screwed down one turn with the fingers.

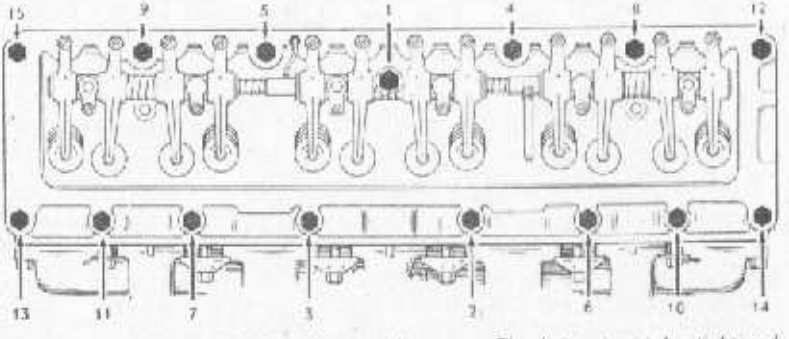


Fig. 14. Cylinder head bolt tightening diagram. The bolts should be tightened gradually and in the order shown.

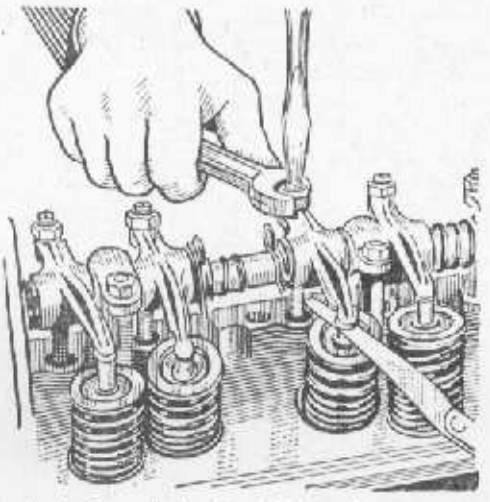


Fig. 15. Valve clearance adjustment. This picture shows the feeler gauge in position between the end of the valve stem and the rocker arm. The clearances should be adjusted when the engine is at normal working temperature and running slowly.

cups, one turn, and refill when necessary.

Check the generator mounting bolts for tightness. (See Fig. 25.)

4. Check Cylinder Head and Manifolds for Tightness, and Check Valve Clearances. Remove the valve cover, and with the engine thoroughly hot, check the cylinder head bolts for tightness in the order shown in Fig. 14. Check also the bolts securing the inlet and exhaust manifolds, and the nuts securing the carburettor. Check the nuts and bolts attaching the valve rocker shaft brackets to the cylinder head.

Check the clearances between the valve stems and rocker arms with the engine running slowly as described below. The engine must be thoroughly hot, and unless the job is to be done immediately after a run of at least 5 miles on the road, the engine should be run at a fast idling speed for 20 minutes. Push the choke control on the instrument panel right home, and unscrew the slow running screw (see page 51) until the engine is running as slowly as possible. Adjustment for valve clearance is provided by a screw and nut at the push rod end of each valve rocker. The correct clearances when the engine is hot are:—

Inlet valves	.006 in.
Exhaust valves	.013 in.

Dealing first with the inlet valves, which are vertical, insert a .006 in. feeler gauge between the end of the valve stem and the rocker arm. Slacken off the adjustment locknut (see Fig. 15) and turn the adjuster by means of a screwdriver until it is nipping the gauge; then slacken it off slightly until the gauge can just be withdrawn. Finally, tighten the locknut.

As a check on the setting, try to insert a .008 in. feeler gauge. If it is possible to do so without force, the clearance is too great and the previous operation must be repeated.

The exhaust valves, which are inclined, should then be dealt with in similar manner, using a .013 in. feeler gauge. As a final check in this case, try inserting a .015 in. feeler gauge.

When these adjustments have been carried out, screw in the slow running screw on the carburettor until the engine idling speed is fast enough to prevent the engine stopping under driving conditions. In addition, check the idling setting by depressing the footbrake while the engine is ticking over. If the engine stalls (due to the effect of the servo motor on the engine vacuum) slightly increase the idling speed.

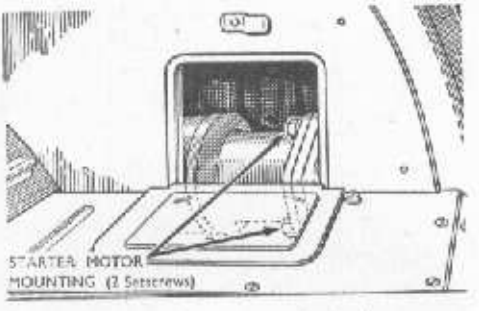


Fig. 16. Starter mounting bolts.

5. Check Mounting of Starter Motor for Tightness. The starter is attached to the clutch housing on the left-hand side by two bolts.

6. Examine for Oil Leaks. Tighten any joints that are leaking. If tightening does not stop the leakage, new gaskets may be required, but do not overtighten. When tightening the oil filter pipes, use one spanner to hold the union while another spanner is used to tighten the union nut. It is advisable to keep the engine clean so that oil leaks can be detected as soon as they develop.

7. Examine for Water Leaks. Check the cooling system for leaks from radiator, hoses and water pump. Tighten the hose clips if any of the hoses are leaking, but be careful not to overtighten.

8. Examine for Petrol Leaks. Check the pipes and unions from tank to carburettor for leaks.

GEARBOX

Check Oil Level in Gearbox. The level of oil should be up to

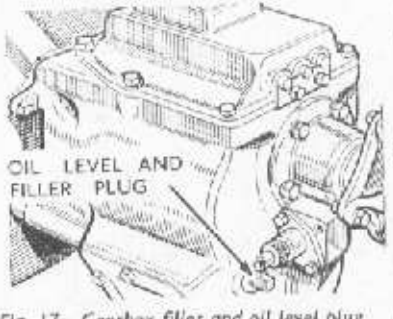


Fig. 17. Gearbox filler and oil level plug. The plug is accessible from underneath the vehicle and is located on the left-hand side of the gearbox casing.

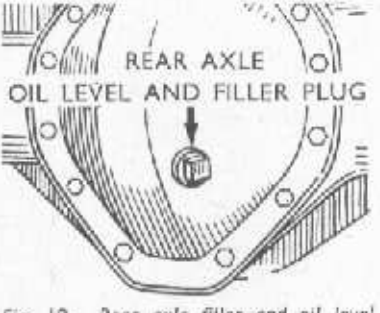


Fig. 18. Rear axle filler and oil level plug.

the bottom of the filler plug opening (see Fig. 17.) Replenish, if necessary, with gear oil (see list on page 21). Clean off all dirt from and around the filler plug, which is accessible from beneath the vehicle on the left-hand side, before removing it.

REAR AXLE

Check Oil Level in Rear Axle. The level of oil should be up to the bottom of the filler plug opening (see Fig. 18). Replenish, if necessary, with gear oil (see list on page 21). Clean off all dirt from and around the filler plug before removing it.

PROPELLER SHAFTS AND UNIVERSAL JOINTS

1. Lubricate Universal Joints and Shaft Splines. Apply the oil gun (filled with gear oil) to the lubrication nipples on the universal joint and shaft spline nipples. There are 3 nipples in all on short wheelbase models, and 5 on long wheelbase models and the Bus.

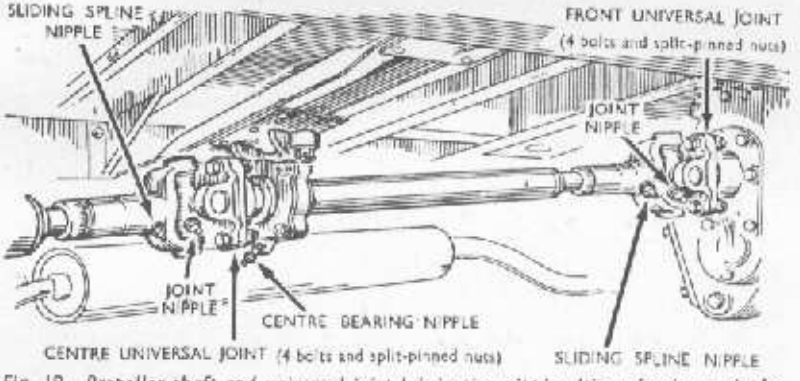


Fig. 19. Propeller shaft and universal joint lubrication nipples (there is also a nipple at the rear axle end of the shaft). The centre bearing and universal joint are fitted to long wheelbase (Model OL) and Bus only.

2. Lubricate Short Propeller Shaft Bearing (Fitted to Long Wheelbase and Bus Models only). Apply the oil gun (filled with gear oil) to the nipple on the bearing housing at the rear end of the front shaft (see Fig. 19).

3. Check Universal Joint Bolts for Tightness. These bolts should be dead tight. The nuts are split-pinned.

FRONT AXLE AND STEERING

1. Lubricate Steering Box. Apply the oil gun (filled with E.P. oil) to the lubrication nipple on the box until oil begins to ooze from the hole in the large nut at the top of the box (see Fig. 20).

2. Check Mounting of Steering Box for Tightness. Tighten the nuts securing the box to the frame if any slackness can be detected. The nuts are split-pinned and are accessible through an inspection plate held by two nuts under the offside wing. Check also the

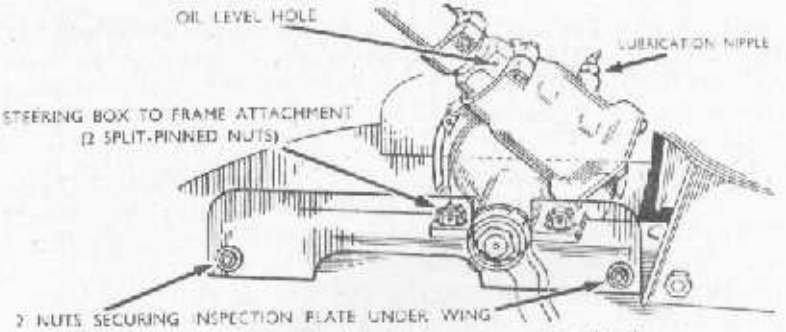


Fig. 20. Steering box lubrication and mounting details.

clamp securing the column to the dash panel and tighten the nuts if necessary. The amount of free movement on the rim of the steering wheel should not exceed 3 in.

3. Examine Steering Joints for Play. The joints are self-adjusting and no play should be present—just a slight resistance to twisting movement on the rods.

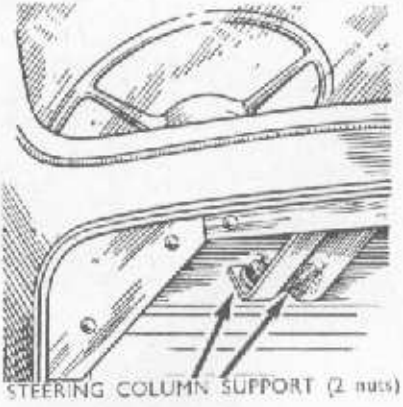


Fig. 21. Steering column support bracket nuts. These nuts are accessible from under the bonnet on the right-hand side.

BRAKES

Lubricate Handbrake Bell Crank and Cable Guide. Apply the oil gun (filled with gear oil) to the lubrication nipple on the bell crank located on the rear axle, and the cable guide attached to the rear spring front crossmember (Fig. 22). No nipple is fitted to the bell crank on the Bedford-Scammell tractor and the joint should therefore be lubricated with the oil can.

ROAD SPRINGS

Check "U" Bolts and Spring Clips for Tightness. Make certain that the "U" bolt nuts are dead tight. Locknuts are fitted, and these must be slackened before attempting to tighten the "U" bolt nuts. *Do not lubricate the spring leaves.*

CHASSIS AND BODY

1. Lubricate Cab and Body Locks and Hinges. Inject a few drops of engine oil into every hinge on the cab and body, using the oil can.

2. Check all Body and Chassis Nuts for Tightness. Include all bolts, nuts and brackets round the body, also the body holding-

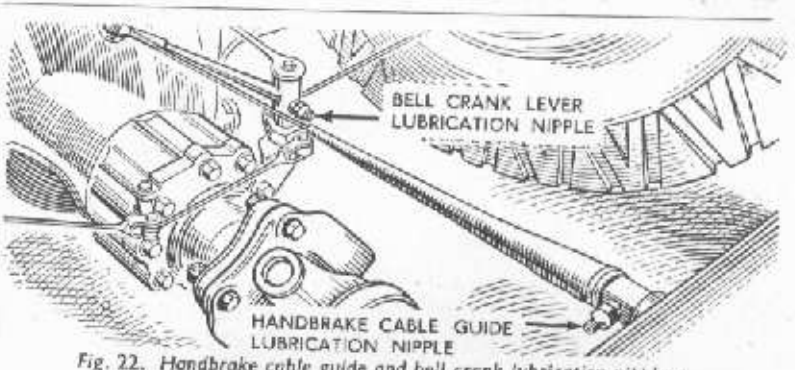


Fig. 22. Handbrake cable guide and bell crank lubrication nipples.

down bolts. The cab mounting bolts are spring-loaded and should not need attention.

TYRES

Inspect Tyres and Remove Flints. Jack up each wheel in turn and inspect the tyres. Dig out the flints and any other foreign bodies embedded in the tyre tread, using a blunt penknife or similar tool. Start and finish at the valve so that no part of the tread is missed. If there are any big pieces which leave an appreciable gap behind, fill the holes with tyre stopping or report them for attention. Unless the holes are plugged, there is a danger of the fabric being damaged by the entry of grit or moisture.

EVERY 5,000 MILES

Repeat items listed under 1,000 and (when due) 2,000 mile headings, plus the following:—

ENGINE

1. Clean and Re-Oil Carburettor Air Cleaner. Remove the cleaner from the air intake of the carburettor (after slackening the clamp screw) and swill it clean in petrol or paraffin. Shake it dry, and then saturate the metal wool with clean engine oil. Allow the surplus oil to drain, and refit the cleaner to the carburettor.

Oil bath type air cleaners have a detachable metal wool filtering element. Before replacing the element, clean out the oil bath and refill with engine oil to the level marked by the arrow on the inside of the container.

2. Clean and Adjust Sparking Plugs. When removing and replacing plugs, handle the box spanner carefully to prevent it from tilting and cracking the insulator. The A.C. type VF9 sparking plugs recommended for the Bedford engine cannot be dismantled for cleaning. The best results are obtained when the plugs are serviced in the A.C. plug cleaning and testing machine in which they can be thoroughly "blast-cleaned" and tested under pressure. Where this service is not available, clean with a stiff brush moistened

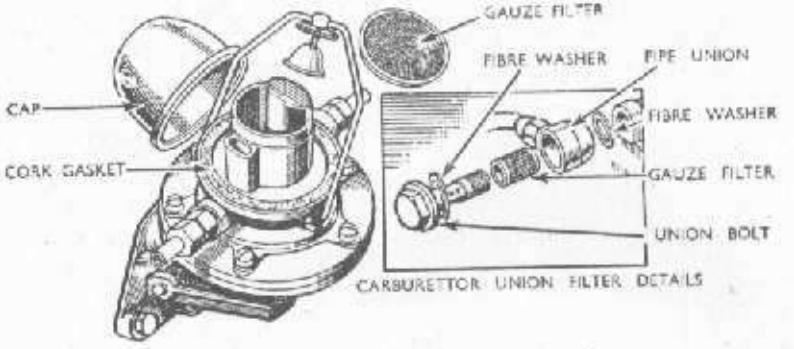


Fig. 23. Petrol pump and carburettor union filters.

with paraffin. After cleaning, check the point gap and reset if necessary to within .028 in. and .030 in. Adjust by tapping the end electrode towards the central one. If the gap is too close, do not use the central electrode as a support when levering up the end electrode or the insulator will be broken.

3. Clean Petrol Filters. Remove and clean the gauze filters in the petrol pump and carburettor union. Remove the petrol pump cap and lift out the gauze. Wash it clean in petrol or paraffin and remove any sediment in the body of the pump. If the cork gasket under the cap is damaged, fit a new one. Use finger pressure only when tightening the milled nut of the clamp ring.

Disconnect the petrol pipe from the carburettor by removing the union bolt, and wash the cylindrical gauze filter clean in petrol or paraffin. When reconnecting the pipe to the carburettor, make sure that the two fibre washers are in position, one on each side of the union.

4. Drain and Flush the Radiator (except when filled with anti-freeze). Open the drain taps (see Fig. 24) and insert a hose into the radiator filler. Allow water from the hose to flow through the radiator until the water running from the taps is clean. During the

Fig. 24. Cooling system drain taps. The cylinder block drain tap is at the rear end of the engine on the left-hand side, and is accessible through an inspection door inside the cab.

flushing process use a piece of stiff wire to keep the taps free from obstruction. After flushing, add corrosion inhibitor (see page 56).

5. Check Radiator Mounting for Tightness. There are seven bolts and nuts to check—two split-pinned insulated mounting bolts holding the radiator support bracket to the chassis crossmember; two bolts and nuts at each end of the support bracket, and one bolt and nut securing the brace rod to the top of the radiator.

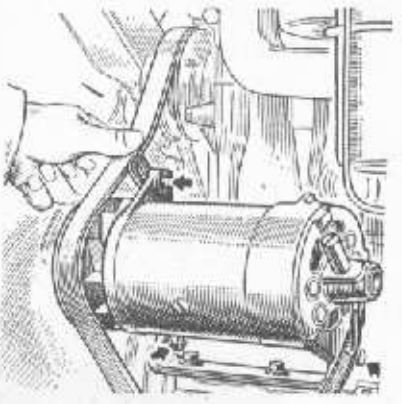


Fig. 25. Fan belt adjustment details.

6. Check Fan Belt Tension. The tension can be checked by pressing a thumb on the belt about midway between the fan and generator pulleys (when the engine is *not* running). There should be a "give" of about half-an-inch. To adjust, slacken the bolts and nuts indicated in Fig. 25 and pivot the generator bodily away from the engine—to remove slack—or towards the engine if the belt is too tight. When the tension is correct, tighten the bolts securely, including the bolts securing the slotted brace to the engine crankcase. Take care not to over-tension the fan belt as this will impose a heavy load on the water pump and generator bearings.

7. Check Engine Mountings for Tightness. There are four split-pinned nuts under the crossmember at the front of the engine (see Fig. 26). At the rear end, there are two mountings—one at each

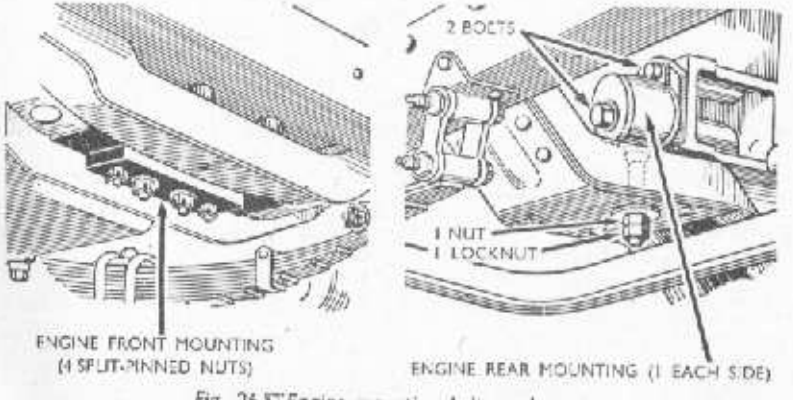


Fig. 26. Engine mounting bolts and nuts.

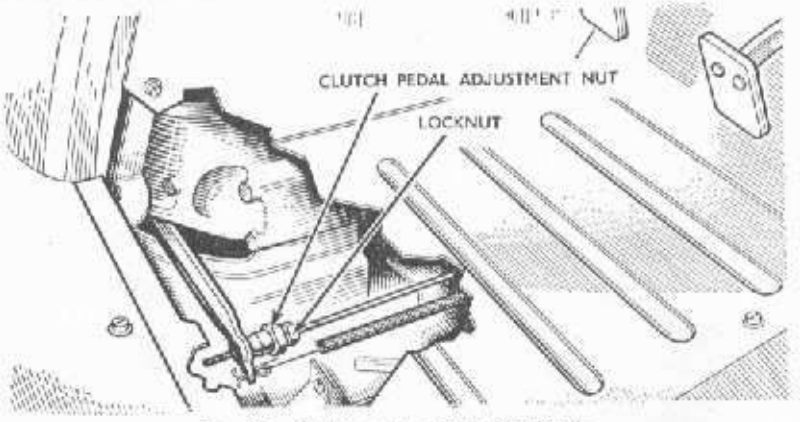


Fig. 27. Clutch pedal adjustment details.

side of the clutch housing. Each of these is secured by two bolts and two nuts under the chassis crossmember (see Fig. 26). All nuts must be kept dead-tight.

CLUTCH

Check Clutch Pedal Free Travel. The pedal should have one inch of free movement (measured at the top of the pedal) before the pressure of the clutch springs is felt. As wear takes place, however, this free travel will be reduced and it will become necessary to correct it. Adjustment is provided at the rear end of the clutch pedal connecting rod, immediately in front of the clutch fork lever through which the rod passes. It consists of an adjusting nut and lock nut on the rod itself. If the amount of free travel is less than 1 in., slacken the locknut and turn back the adjusting nut until an inch of free travel is obtained. Finally, thoroughly tighten the locknut (Fig. 27).

GEARBOX

Check Gearbox Mounting for Tightness. The two top bolts are external. If these are slack, the bottom two bolts inside the housing will also need tightening, after removing the housing bottom cover.

Fig. 28. Gearbox top mounting bolts.

FRONT AND REAR AXLE

1. Check Front Wheel "Toe-in." The front wheels should "toe-in" $\frac{1}{8}$ to $\frac{3}{16}$ in. If the setting is disturbed—by forcing the wheels against the kerb, or other misuse—excessive tyre wear will be caused. Check as follows:—

With the front wheels pointing straight ahead, measure the distance between the inside of the wheel rims—at the front and level with the centre of the wheel hubs. Mark the points on the rims between which the measurement is taken with chalk (line A, in Fig. 29), then push the vehicle forward until the marks are at the rear and level with the centre of the hubs again. Measure the distance between the inside of the wheel rims again (line B, in Fig. 29). This should be greater than the first measurement by $\frac{1}{8}$ to $\frac{3}{16}$ in. To adjust the track, slacken the two clamp bolts (one on each tie rod end) and turn the tie rod in the required direction. Turning the rod in the same direction as the wheels revolve when the vehicle is moving forward will lengthen the rod and therefore increase the amount of toe-in. Turning it backwards will shorten it and *decrease* the amount of toe-in. When the setting is finally correct, tighten the clamp bolts on the tie rod end, after making sure that the joints on the ends of the tie rod are in line with each other.

2. Check Adjustment of Front and Rear Hub Bearings. Jack up each wheel in turn and check for slack hub bearings by trying to rock the wheel top and bottom. If excessive movement can be felt, adjust as follows:—

Front Hubs. Remove the hub cap and the split pin from the slotted nut on the end of the steering knuckle. Screw the nut right

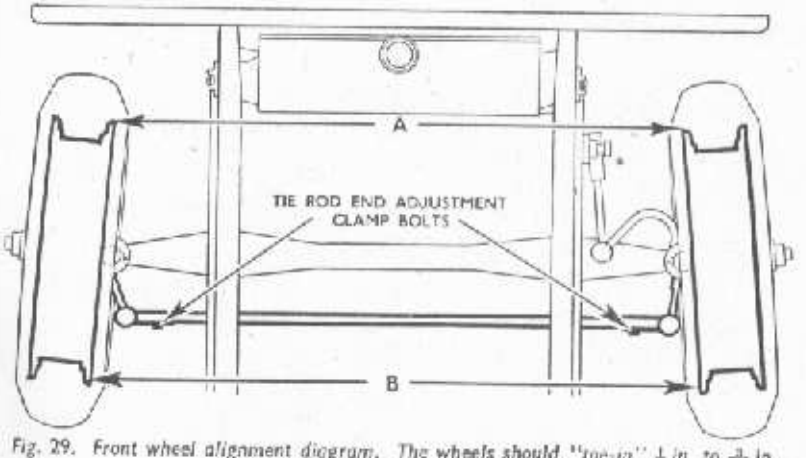


Fig. 29. Front wheel alignment diagram. The wheels should "toe-in" $\frac{1}{8}$ in. to $\frac{3}{16}$ in., measured at points "A" and "B".

home; at the same time rotate the hub to settle all parts of the bearings. Slacken the nut off two flats and insert a new split pin.

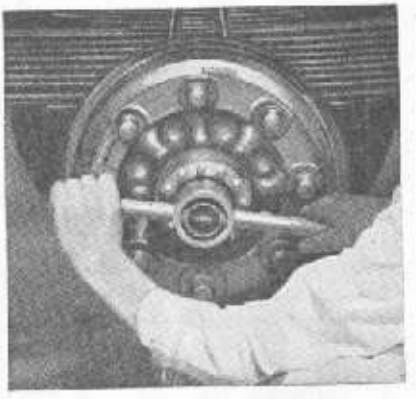


Fig. 30. Rear hub bearing adjustment, using the special "Britool" wrench.

Rear Hubs. Unscrew the nuts securing the flange of the axle shaft to the hub, and remove the shaft. Knock back the locking tab securing the outer nut and remove the nut. (A special wrench for removing and replacing the hub nuts is obtainable from Messrs. Jenks Bros. of Wolverhampton.) After removing the tab washer, screw the adjustment nut right home, at the same time rotating the hub to settle all parts of the bearings. Now slacken the nut back two slots—i.e. one-third of a turn. Place the tab washer in position again and turn over one of the flat tabs into an adjacent slot. If necessary, alter the position of the nut slightly to bring the tab and slot into line. Screw on the locking-nut tightly, and secure it by turning over one of the right-angled tabs of the washer. Renew the paper gasket between the axle shaft flange and the hub, and tighten the flange nuts evenly and securely.

BRAKES

Drain Moisture from Servo Cylinder. Remove the hexagon head drain plug at the bottom of the cylinder end cover, and allow any water or surplus oil to drain out. Replace the plug securely.

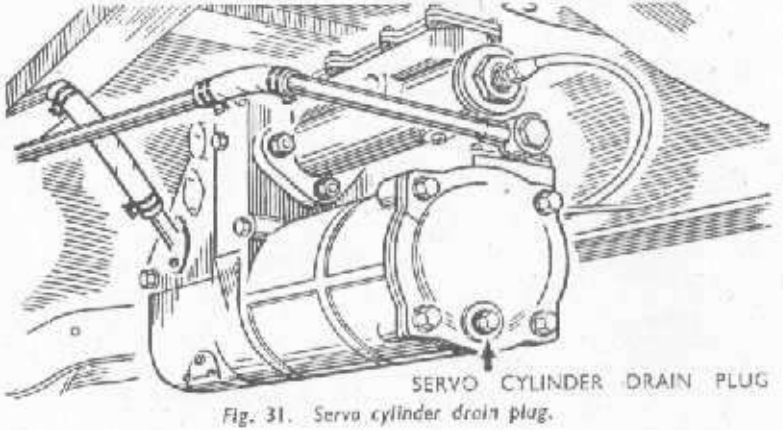


Fig. 31. Servo cylinder drain plug.

ELECTRICAL

1. Check Specific Gravity of Battery. Check the specific gravity of the electrolyte in each cell with a hydrometer.

Specific Gravity Readings at 60° F.

	All models except OB	*Model OB (Bus)*
Fully charged ..	1.290–1.300	1.275–1.290
Half charged ..	1.205–1.210	1.204
Discharged ..	1.070	1.113

The readings for each cell should be approximately the same. Any appreciable variation should be investigated promptly.

If electrolyte is spilled from the battery, it should be replaced by sulphuric acid solution, diluted to the same specific gravity as the acid in the cells.

2. Check Wiring and Terminals. Examine all wiring for chafing. Check electrical terminals for tightness, but do not overtighten.

EVERY 10,000 MILES

Repeat items listed under 1,000, 2,000 and 5,000 mile headings, plus the following:—

ENGINE

Renew Oil Filter Cartridge. The average life of the A.C. oil filter is 8,000 to 10,000 miles, after which it must be renewed. When disconnecting the oil pipes, hold the union with one spanner while using another spanner to unscrew the union nuts. Remove the two setscrews holding the filter support strap to the induction manifold, and lift away the filter. Make sure the pipes and unions are free from sludge before fitting the new filter, and take the same precautions against twisting the pipes as when unscrewing them. Scratch the speedometer reading on the white space provided for this purpose on the filter, as a guide to when the next change is due. After fitting the new filter, start the engine and check for oil leakages.

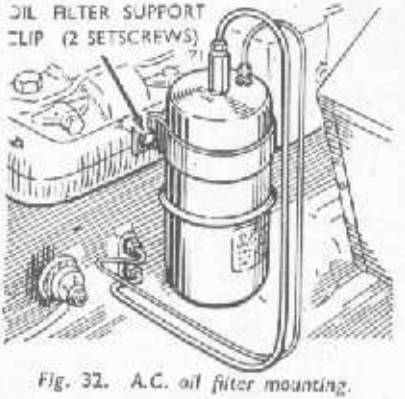


Fig. 32. A.C. oil filter mounting.

GEARBOX

Drain and Refill Gearbox. Drain the gearbox after a long run so that the oil is thoroughly warm and fluid, to ensure that foreign

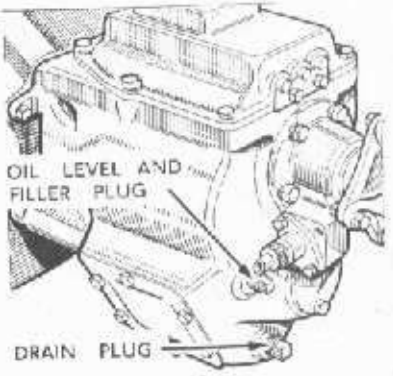


Fig. 33. *Gearbox drain and oil filler plugs.*

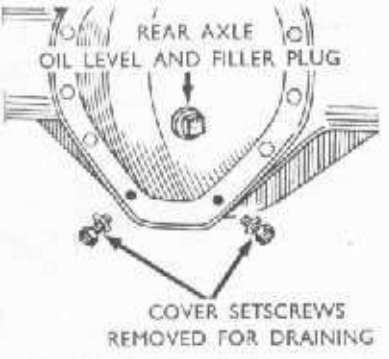


Fig. 34. *Housing cover bottom setscrews removed from rear axle for draining.*

matter is removed with the oil. The drain plug is located at the rear of the casing (see Fig. 33). Replace the drain plug and refill with gear oil (see list on page 21) through the filler plug hole, until the level is up to the bottom of the hole. Do not overfill. Make sure both plugs are replaced securely.

REAR AXLE

Drain and Refill Rear Axle. Drain the rear axle after a long run by removing two of the lowest setscrews securing the axle housing cover (see Fig. 34). Replace the setscrews and refill with gear oil (see list on page 21) through the filler plug hole, until the level is up to the bottom of the hole. Do not overfill.

Note: It is not necessary to repack the rear hub bearings with grease as they are automatically lubricated by the oil in the rear axle.

FRONT AXLE

Repack Front Hub Bearings with Grease. Jack up one front wheel and remove the wheel and hub cap. Take out the split pin and remove the hub bearing nut. Withdraw the hub from the steering knuckle and repack the bearings with fresh grease. After replacing the hub, follow the instructions for hub bearing adjustment given under item 2 on page 35. Repeat the foregoing operations on the other front hub.

ELECTRICAL

Clean Commutator and Inspect Brushes of Generator and Starter. Remove the commutator cover band, after slackening the clamp screw. The commutator should be clean, free from oil or dirt, and should have a highly polished appearance. The best way to clean a dirty or blackened commutator is by pressing against it a fine dry duster whilst the engine is turned over by hand. If the commutator is very dirty, the duster may be moistened with petrol. Inspect the brushes for wear and make sure that the brush springs

have sufficient tension to keep them in firm contact with the commutator. The brushes are held in boxes by the springs. Check each brush by holding back the spring while moving the brush to check that it is free in the holder. If there are any signs of sticking, remove the brush and clean it with a cloth moistened in petrol. When the brushes have become worn to such an extent that they will not "bed" properly on the commutator, it will be necessary to remove the generator, or starter, in order to fit new brushes. The generator brushes can be removed from the holders after disconnecting the brush leads. On the starter, the brush leads are soldered and it will be necessary to remove the commutator end plate. New brushes must be properly bedded to the commutator as follows:—

Pass a thin strip of very fine glass-paper between the commutator and the brushes with the abrasive side against the faces of the brushes. Turn the commutator in the normal direction of rotation for about half-a-dozen revolutions, and then remove the glass-paper, carefully clearing away all carbon and glass-paper dust.

TYRE PUMP

Drain moisture from tyre pump filter and renew filter cloth (Bus models only). Unscrew the drain plug at the bottom of the filter casing and allow moisture to drain out. Remove the four setscrews holding the top plate and lift out the plate and filter tube.

Remove the retaining wires at the end of the tube (see Fig. 35) and take out the cotton filter cloth. If a new piece of cloth is not available, wash the old cloth and dry it. There are two perforated discs fitted inside the filter tube (only the outer disc is shown in Fig. 35). Make sure that the inner disc is in position before inserting the cloth. After the cloth has been inserted, replace the outer disc and refit the retaining wires. Replace in the casing and tighten the setscrews evenly. Finally, replace the drain plug.

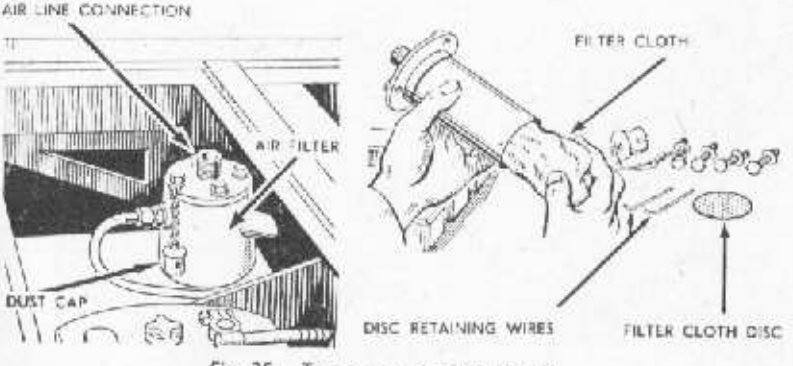


Fig. 35. Tyre pump air filter details.

ENGINE

DESCRIPTION. Six-cylinder, overhead-valve unit. Push rod operated valves. Camshaft supported in four detachable, steel-backed white metal bearings and driven by duplex roller chain from crankshaft. Four main bearings of removable liner type. Cast iron pistons with oval-ground, tin-plated skirt; three piston rings all above gudgeon pin. Forced feed lubrication throughout.

Oil Distribution. Circulation of the oil is effected by a gear-type oil pump consisting of two small gears enclosed in a close-fitting housing and driven by an inclined shaft engaged with the distributor shaft. The latter is driven through spiral gears from the camshaft.

The suction pipe of the pump is submerged, the end being surrounded by a cylindrical gauze strainer fitted in the right-hand side of the crankcase.

Oil is fed through a drilled gallery in the crankcase to the main bearings, and the connecting rod big end bearings are lubricated through holes drilled in the crankshaft. The cylinder bores are lubricated from the big end supply through holes drilled in the big ends.

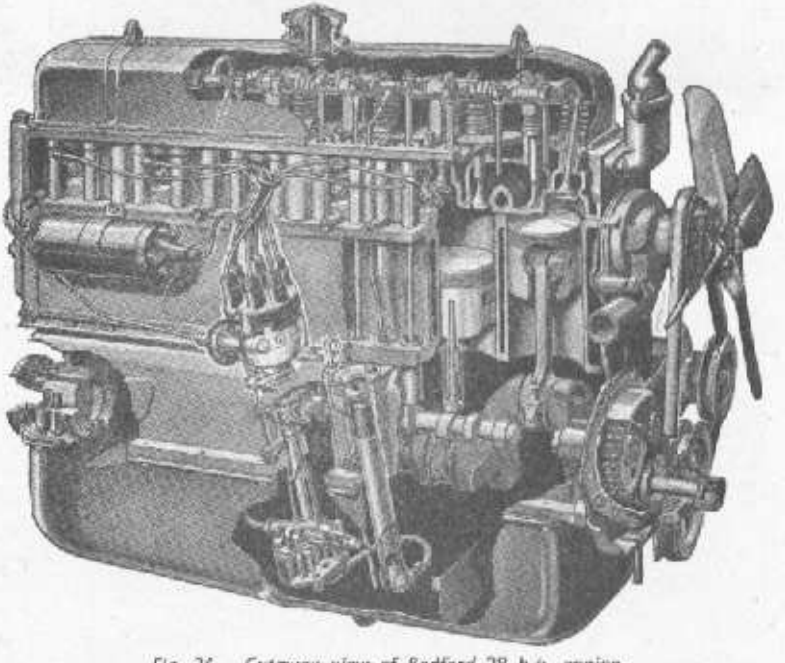


Fig. 36. Cutaway view of Bedford 28 h.p. engine.

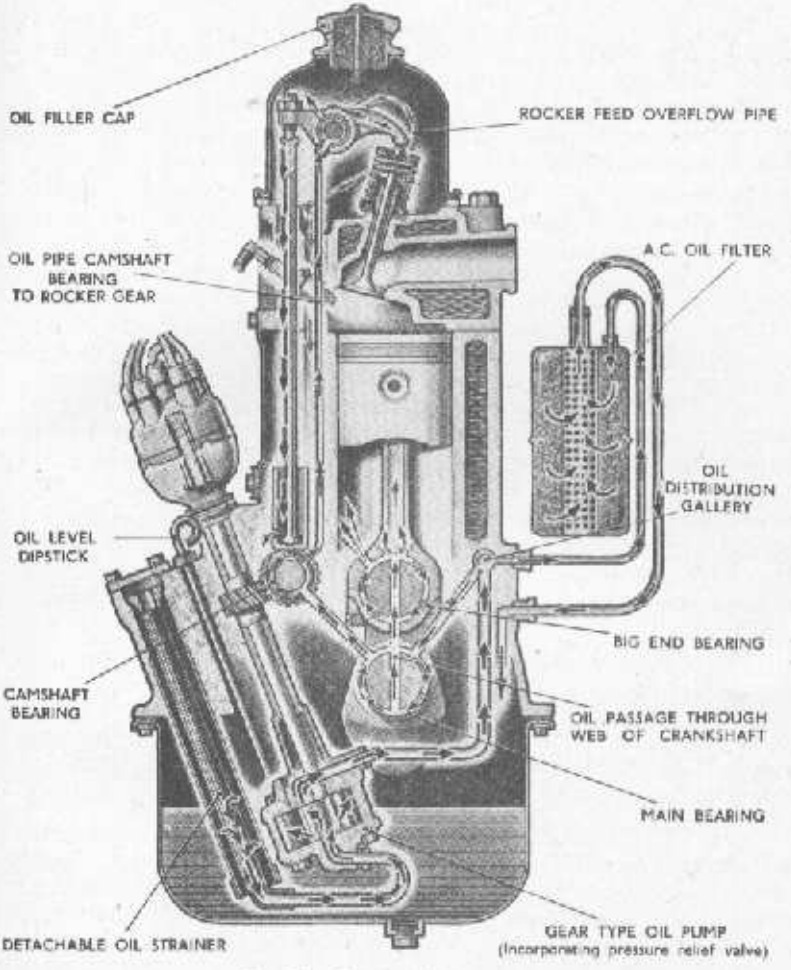


Fig. 37. Engine lubrication system.

The camshaft bearings are supplied with oil from the main bearings, the crankcase and main bearings being drilled for this purpose. The supply to the timing chain is taken from the camshaft front bearing.

For lubrication of the overhead valve rocker bearings, a supply is taken from the front intermediate camshaft bearing by means of a metering union and a vertical pipe which is connected to the hollow valve rocker shaft. An overflow pipe is provided to control the quantity of oil escaping over the valve gear.

The oil is returned to the sump from the rocker gear chamber partly by a vertical tube and partly past the push rods, thus giving lubrication to the tappets as it flows down.

To give relief to any excess pressure existing in the system, an oil regulator valve of the spring and plunger type is incorporated in the body of the oil pump.

Oil Pressure. No oil pressure gauge of the conventional type is fitted. There is, instead, a warning lamp located on the instrument panel, to the right of the petrol gauge. This lamp (coloured orange) should light up when the ignition is switched on, and go out when the engine is started. It should remain out all the time the engine is running. Should the pressure fall below the safe limit (8 to 10 lbs. per sq. in.) the lamp will light and so give visual warning. When checking for loss of oil pressure, first examine the level of oil in the sump. If the level is satisfactory, the trouble may be caused by the regulator valve in the oil pump sticking open, in which case it will be necessary to lower the sump before the valve can be examined and freed.

Oil Filtration. The cylindrical gauze strainer attached to the end of the oil pump suction pipe filters the oil being drawn into the pump from the sump. *It is very important to remove and clean this strainer every time the engine oil is changed.* (*See page* 24 "*Routine Maintenance*".)

External Filter. Additional filtration of the engine oil is provided by an external cartridge-type oil filter mounted on the side of the induction manifold. The average life of the filter is 8,000 to 10,000 miles (see page 37 "Routine Maintenance".) If the filter becomes clogged, oil circulation is automatically maintained, the oil passing direct without flowing through the filter.

OIL PUMP. Should it be necessary at any time to remove the oil pump, proceed as follows. Remove the engine sump, detach the suction pipe at the point where it is attached to the crankcase strainer, and disconnect the delivery pipe at the point where it is attached to the crankcase. (Never attempt to disconnect the pipes from the pump body while the latter is in position, or fracture of the pipes will result.) Remove the pump location screw situated on the outside of the crankcase below the distributor. (The lower of the two screws is the one locating the pump; the upper one locates the distributor.) The pump can then be pulled downwards, and the driving spindle disengaged from the distributor spindle.

ENGINE TOP OVERHAUL

DECARBONISING AND GRINDING VALVES. From time to time, depending on the way in which the truck is driven and on the petrol and oil used, it will become necessary to decarbonise the engine. The usual symptoms are a falling off in liveliness and power, and an increasing tendency to "pink".

The procedure is as follows:—

Drain the cooling system (see page 56 for location of drain taps).

Disconnect the following:—

(*a*) Top water hose (at the lower end).

(*b*) Petrol pipe, distributor suction pipe, and controls from the carburettor.

(*c*) Low tension leads from the ignition coil, and high tension leads from the sparking plugs.

Remove the valve rocker cover and the sparking plugs. Remove the setscrews securing the crankcase ventilator pipe and the push rod cover. Lift the cover away complete with the ignition coil. Disconnect the oil feed pipe to the rocker gear.

Unscrew the set-screws and nuts attaching the rocker gear to the cylinder head. Press the rear oil connector as far as possible towards the front, and lift off the rear section of the rocker gear, which will allow the centre and front sections to be removed together with the oil feed connector. Lift out the push rods. Remove the four set-screws and large flat washers attaching the end branches of the exhaust and inlet manifolds to the cylinder head, slacken the four centre setscrews so that the clamps can be turned through an angle of 90°, and pull the manifolds away from the head sufficiently to clear the head.

Unscrew the fifteen bolts from the cylinder head in the reverse numerical order to that shown in Fig. 14, releasing them evenly to avoid distortion. If the cylinder head sticks, tap it gently at alternate corners using a block of wood and a hammer. Lift off the head.

Next, temporarily replace the rocker shaft assemblies, and depress the valve springs with the aid of a valve spring compressor, as shown in Fig. 38. Remove the tapered locating collars. Remove the valve spring caps, the valve springs, the oil seal retainers and the felt seals. Do not lose the seating washers fitted under the exhaust valve springs. Withdraw the valves from the guides and place them in a suitable stand. (The stand can be made up from a piece of wood approximately 1 in. wide, $\frac{1}{4}$ in. thick and 26 in. long. Drill twelve $\frac{1}{4}$ in. holes equally spaced 2 in. from centre to centre numbering the holes 1 to 12. This will obviate the necessity of numbering the valves, and ensure replacement in their original positions.)

Clean away all carbon from the cylinder head, valves and induction and exhaust passages, and grind in the valves in the usual way. Before replacing the valves, check each one for correct seating, as follows:—

Thoroughly clean the grinding compound from the valve and valve seating in the cylinder head. Smear marking compound lightly on the valve face and replace the valve in the cylinder head. Using a heavy screwdriver, or suitable tool, apply pressure to the valve and give it about half a turn only.

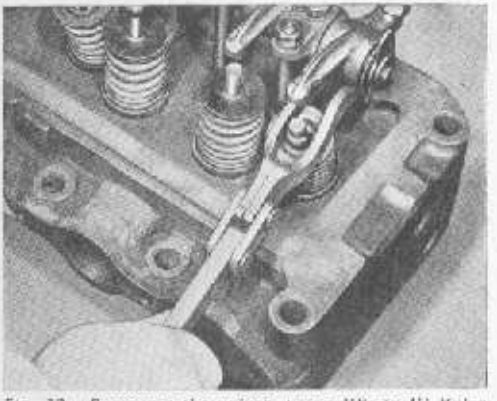


Fig. 38. Removing the valves, using "Britool" Valve Spring Compressor No. 838. The spring must be compressed with the tool as shown, before the tapered collars can be removed.

If the valve is seating correctly, a complete reproduction of the valve seating will be found in the cylinder head when the valve is removed again.

This done, re-assemble the valves and springs in the *reverse* order to the instructions given for removal (see Fig. 39). Make sure the valves are replaced in their correct positions in the cylinder head. Use new felt oil seals on the inlet valve guides, and take care to see that the valve springs are fitted with the closer coils towards the cylinder head.

Before replacing the head, plug the water passages and bolt holes in the cylinder block with waste rag, turn the engine round by the starting handle and scrape off the carbon from the top of each piston as it reaches the top of the stroke. Do not polish the tops of the pistons with emery cloth. Be particularly careful to clean the particles of carbon away as you go along; also when you remove the temporary rag plugs from the water passages and bolt holes.

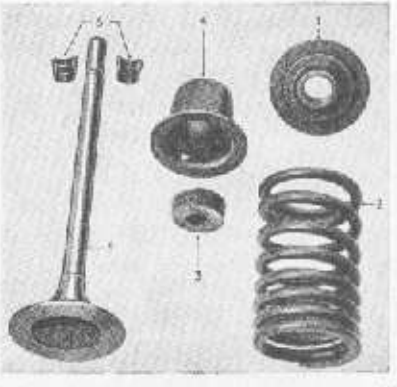


Fig. 39. Inlet valve details.
1. Valve spring cap. 2. Valve spring. 3. Valve stem oil seal felt. 4. Oil seal retainer. 5. Valve. 6. Valve retaining collars. When replacing the inlet valves, replace the valve in the head; then fit the felt seal on top of the valve guide, followed by the seal retainer, the valve spring—close coiling against the cylinder head—the valve cap and (with the spring compressed) the two tapered collars. The exhaust valves are assembled in the same way, except that no oil seal felt is used, and the seating washer is fitted under the spring instead of the oil seal retainer.

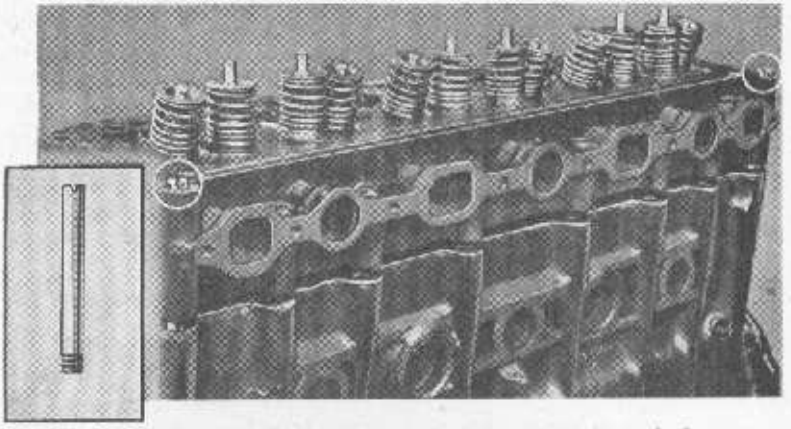


Fig. 40. Cylinder head guide studs. These studs, which can be made from spare cylinder head bolts, should be used to prevent damage to the gasket whenever the cylinder head is refitted.

The next job is to replace the head and the gasket. The old gasket may be used again *providing it is in good condition* and is replaced the same way up. Smear each side lightly with grease before placing it in position.

The simplest method of positioning the cylinder head and gasket is to use two temporary location studs, which can be made from spare cylinder head bolts by cutting off the hexagon heads. Shorten the threaded end of the bolt to three threads only, and cut a slot in the other end so that a screwdriver can be used to remove them after the cylinder head is in position. Screw these temporary studs into the cylinder block at the front and rear on the manifold side—to correspond with two close fitting holes in the gasket. Guide the cylinder head into position and insert the cylinder head bolts.

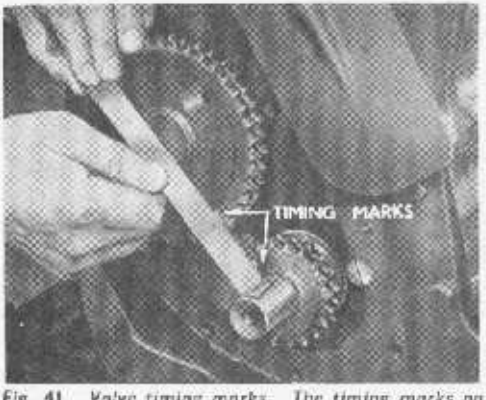


Fig. 41. Valve timing marks. The timing marks on the crankshaft and camshaft sprockets should be lined up as shown.

Tighten the cylinder head bolts gradually, and in the order shown in Fig. 14, page 26. This will ensure even pressure on the gasket, and prevent strain and possible distortion of the cylinder head casting.

To re-assemble, re-

verse the procedure described at the beginning of this section.

Set the valve clearances roughly before starting the engine. Finally, re-tighten the cylinder head bolts after the engine has been thoroughly warmed up, and reset the valve clearances. (See page 27.)

VALVE TIMING. The only accurate method of checking the valve timing is to remove the timing cover and examine the relative positions of the markings on the camshaft and crankshaft sprockets.

Lines are marked on the faces of the crankshaft and camshaft sprockets, and when the engine is turned there should be a point at which they meet. This is made clear in the illustration (Fig. 41).

IF THE ENGINE WON'T START

The engine of a modern commercial vehicle seldom refuses to start for any serious reason. Nine times out of ten, the cause will be traced to something having become dirty or out of adjustment. The object of this chapter is to explain how to locate the trouble, and how to remedy it. Occasionally, of course, the failure may arise from some more serious defect, in which case skilled attention will be necessary to put it right.

"OVER-CHOKING." The most frequent reason for a refusal to start is over-choking. It is caused by whirring the starter round and round with the choke control pulled out. Failure to switch on the ignition is a likely cause. A heavy, wet mixture is sucked into the combustion chamber and on to the sparking plug points, and this wet mixture will not fire.

"The cure is "scavenging". Push the choke home. Push the accelerator down slowly to the floorboards and keep it there while you operate the starter. This sucks a weak mixture into the combustion chamber, in place of the over-rich mixture produced by the choking, and the engine usually fires within a few seconds.

TESTING FOR SPARKS. If the "scavenging" process fails, the trouble is generally due either to a fault in the ignition circuit or in the petrol feed system. It is a simple matter to determine which.

Disconnect one of the sparking plug leads and hold it close to an unpainted part of the engine while someone operates the starter or hand-cranks the engine—say half-a-dozen turns. If strong, blue sparks jump the gap between the lead and the engine, the trouble is almost certainly in the petrol system. If the sparks are weak or non-existent, the fault lies in the ignition system. The two possibilities are dealt with separately below.

IGNITION SYSTEM. If the plug-lead test reveals weak sparks or no sparks at all, the trouble may be—and probably is—in the distributor. The most likely causes are (*a*) dirty contact breaker points and (*b*) points not opening properly.

Remove the distributor cap and lift off the rotor. Examine the rotor carefully for cracks, as this is another possible but less likely cause, and replace it again. Attention to the contact breaker points is dealt with in the "Routine Maintenance" section on page 25. Care should be taken to ensure that the gap is just right and that the point surfaces are clean, dry and smooth.

This done, test for sparks again with the plug lead. In most cases of ignition trouble it will be found that the attention to the distributor just described has effected a cure. If there are still no sparks, however, check the connections to the coil and the distributor and examine the low tension wiring for signs of loose connections or broken leads. Check also the rotor arm carbon contact in the cap.

Should all these tests and examinations fail, the defect will probably be due to a fault in the coil or condenser, or to an obscure failure in the wiring system. Such faults are unlikely to happen, but when they do, it is obviously necessary to enlist skilled assistance.

PETROL FEED SYSTEM. If the original test with the plug lead showed that the ignition circuit was in order, the petrol feed system should be systematically checked. Make sure, first of all, that there is petrol in the tank (and that the cut-off tap on the Bus chassis is not turned off).

This done, remove the carburettor float chamber and check whether petrol flows through the needle valve when the engine is turned over. If it does not, work the needle valve up and down to ensure that it is not sticking.

If petrol *does* flow through the needle valve, but is not getting to the engine, the only explanation possible is a choked jet. Instructions for removing and cleaning the jets are given on page 50.

Let us assume, however, that *no* petrol flows from the needle valve, and that the valve itself is not sticking. This will indicate a stoppage somewhere between the tank and the carburettor, and the procedure for locating it is as follows:—

Disconnect the petrol pipe at the point where it enters the carburettor and clean the filter thus exposed in the bulge of the union. If this does not effect a cure, reconnect the union and disconnect the other end of the same pipe—i.e. at the petrol pump end. Blow through the pipe to check whether there is any obstruction, and, when satisfied that it is clear, reconnect it.

Failure to get petrol through to the carburettor after these checks can only be due to (*a*) a fracture or blockage in the pipe from the tank to the pump, or (*b*) a defect in the pump itself. The pipe can be checked by disconnecting it from the petrol pump and blowing into the petrol tank filler. If it is unobstructed, petrol will flow from the end of the pipe. If it *is* clear, examine the pipe carefully for fractures or leaks which would enable the petrol pump to suck air instead of petrol.

The pump can be checked after removing it from the engine, by placing a finger over the inlet union and working the rocker arm by hand; an appreciable suction should develop after a few strokes. After repeating the process with a finger placed over the delivery union, the pump should hold pressure for a few seconds.

Unskilled attention to the petrol pump should be limited to cleaning the filter (as described on page 32) and ensuring that the gasket between the pump body and the cap makes an air-tight joint. Any other trouble located in the petrol pump will involve a call for skilled assistance.

IF THE ENGINE STOPS. If the engine "cuts out" while on the road remember these general rules:—

1. A sudden and complete stoppage suggests ignition trouble, in which case the electrical system should be examined as described above.
2. A stoppage preceded by spluttering and misfiring suggests a fault in the petrol feed system.
3. Any unusual and serious mechanical trouble will usually be preceded by unusual and serious noises. In these circumstances—which are unlikely to arise if routine maintenance is carried out conscientiously—skilled assistance is obviously necessary.

PETROL SUPPLY SYSTEM

PETROL TANK. The petrol tank on all models is carried in two metal straps attached to brackets riveted to the chassis frame on the right-hand side. The tank capacity on all models except the Bus is 16 gallons. On the Bus chassis the capacity is 20 gallons, and a cut-off cock with an extension handle is provided on top of the tank.

PETROL GAUGE. The petrol gauge is electrically operated and has two units:—

(*a*) The indicator unit mounted on the instrument panel. This consists of an indicator dial, graduated between "Empty" and "Full," two magnet coils and an armature and pointer.

(*b*) The petrol tank unit which consists of a housing enclosing a rheostat and a moving contact brush actuated by a float arm.

The gauge is connected to the ignition circuit and operates only with the ignition switched on. When the petrol tank is empty the tank unit float is at its lowest position and the rheostat in the tank unit is completely earthed. The current through the dash unit then flows through the coil at the "Empty" side of the indicator and the pointer is moved to the "Empty" position.

As the tank is filled with petrol the float rises. This moves the brush on the rheostat introducing resistance into the circuit so that part of the current flows through the "Full" coil and the pointer is attracted away from "Empty" to a position of balance between the two coils, depending on the level of the petrol. The movement of the pointer is reversed, of course, as the petrol level goes down.

No attention is required other than maintaining a good electrical contact at the various terminals. In case of failure to operate, the tank unit should be detached and any corrosion or deposits on the gears or pivots cleared away. It is essential that the float be sufficiently free to fall by its own weight.

PETROL PUMP. Petrol is supplied to the carburettor from the petrol tank by means of a pump situated on the right-hand side of the engine, and driven from the camshaft. Apart from cleaning the gauze filter and sediment space every 5,000 miles (see page 32, "Routine Maintenance"), no attention or adjustment to the pump is necessary, and it is unwise to interfere with it.

PETROL PIPE FILTER. As additional protection for the carburettor jets, a cylindrical gauze filter is incorporated at the point where the pipe from the petrol pump joins the carburettor body (Fig. 23). It can be removed for cleaning by unscrewing the union in the carburettor body to which it is attached, and should receive attention at intervals of 5,000 miles, when the petrol pump filter is cleaned. (See page 32, "Routine Maintenance".)

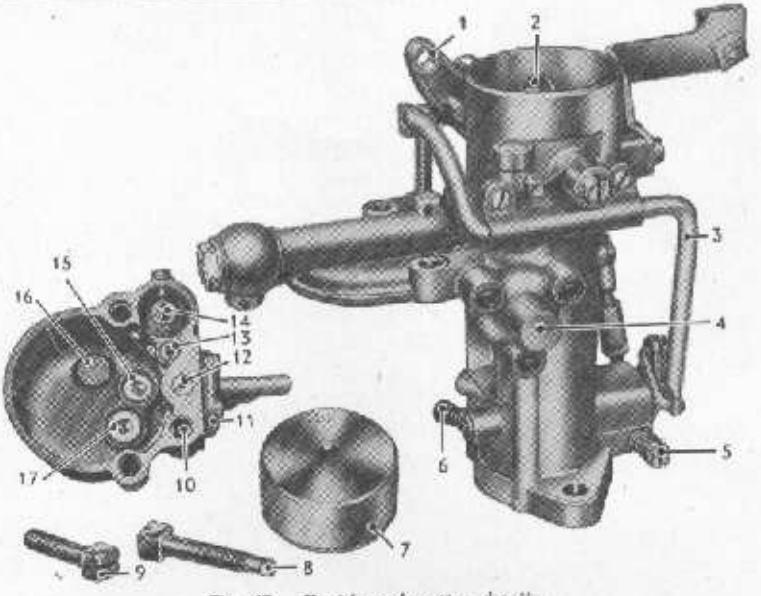


Fig. 42. Zenith carburettor details.

1. Choke shutter lever. 2. Choke shutter. 3. Pump operating rod. 4. Economy device housing. 5. Idling speed control screw. 6. Idling mixture control screw. 7. Float. 8. Float bowl attachment bolt and jet key. 9. Float bowl attachment bolt. 10. Air vent. 11. Emulsion block. 12. Slow running jet. 13. Pump release valve. 14. Pump piston. 15. Main jet. 16. Pump check valve filter. 17. Compensating jet.

CARBURETTOR. The Zenith "down-draught" carburettor embodies a coupled choke and throttle control to simplify the operation of starting the engine from cold. An acceleration pump is fitted to provide instantaneous and powerful acceleration, and an automatic part throttle economy device ensures economical petrol consumption.

One of the many advantages of the Zenith carburettor is the ease with which it can be dismantled. The bowl containing the jets and float can be lifted away after removing the two attachment bolts (see Fig. 42). One of these bolts has a squared end which can be inserted in the jets and used as a "key" to unscrew them. A screwdriver should be used in the slotted head of the bolt to turn the "key".

Cleaning the Jets. The jets are clearly shown in Fig. 42. They should be removed for cleaning and blown through with compressed air (a tyre pump will do) in the opposite direction to the petrol flow. Never use wire to clear jets and never ream them. Before replacing the jets, make sure the seatings are clean.

Jet Settings. The settings detailed below were determined after

considerable experiment and research and should therefore not be altered:—

Choke Tube	27 mm.
Main Jet	102*
Compensating Jet	90
Slow Running Jet	55
Pump Jet	80
Needle Seating (shrouded)	2.0 mm.

* *Main jet size* 100 *prior to Engine No.* 38568.

Acceleration Pump. Poor acceleration may be due to sticking of the acceleration pump piston. If this is suspected, remove the carburettor bowl and examine the piston (see Fig. 42) to make sure that it is free to move in its cylinder.

Slow-running Adjustment. The idling speed control screw (see Fig. 42) controls the minimum speed at which the engine idles. Turning the screw in a clockwise direction increases the idling speed.

The idling *mixture* screw (Fig. 42) varies the volume of petrol delivered through the discharge hole and thus varies the mixture ratio as a whole. Turning this screw in a clockwise direction *weakens* the mixture.

The two controls mentioned in the previous paragraph should be adjusted alternately *with the engine at normal running temperature.* It will be found that they are not entirely independent. When the mixture is altered, the speed of the engine will probably be affected too, and adjustment to compensate this must be made with the other screw.

The ideal to aim at is a smooth "tick-over", just fast enough to keep the engine running in normal conditions of operation. A check may be made on the setting by depressing and releasing the accelerator pedal quickly. If the engine stalls, give the idling speed control screw a quarter-turn inwards and test again.

Bear in mind in making this adjustment, that the use of the footbrake, which is assisted by engine vacuum, alters the mixture strength slightly. Test by applying the brake pedal while the engine is idling. If the engine stalls, increase the idling speed slightly and test again.

FLOODING. The following are the most likely causes of carburettor flooding and the measures which should be taken to overcome them:—

Grit in the Needle Seating. The needle valve can be unscrewed for cleaning after removing the carburettor bowl. Do not omit the metal shroud when replacing the valve.

Punctured Float. If petrol enters the float, the weight of the float is increased, the petrol level is raised and flooding occurs.

If a new float is not available, the hole can be sealed with solder, after evaporating the petrol inside by immersing the float in boiling water. This, however, is an emergency measure only. The solder may unbalance and over-weight the float. A new float should be obtained as soon as possible. When replacing the float, make sure that it is placed the right way up. (The upper face is stamped "TOP".)

AIR CLEANER. The A.C. air cleaner attached to the carburettor intake has an oil-damped metallic wool type filtering element to remove particles of dirt before the air enters the engine. At intervals of 5,000 miles the filter should be cleaned and re-oiled (see page 31, "Routine Maintenance").

MANIFOLD THERMOSTAT. A thermostatic valve is fitted in the exhaust manifold to promote rapid warming up and to ensure correct carburation. When the engine is cold, the hot exhaust gases are deflected in such a way that they warm up the ingoing mixture. When the engine reaches normal operating temperature, the valve closes automatically, and the exhaust gases pass straight through into the exhaust pipe.

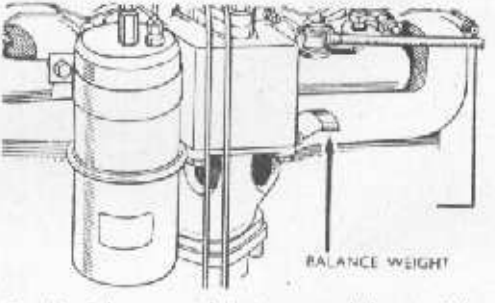


Fig. 43. Exhaust manifold thermostat balance weight.

The thermostat requires no attention. A check can be made to determine whether it is operating efficiently, however, by noting the position of the balance weight (see Fig. 43). This weight should be away from the engine when it is cold and towards the engine when thoroughly hot.

IGNITION

DISTRIBUTOR. The distributor has an automatic centrifugal governor and vacuum control unit. These controls automatically advance or retard the spark in accordance with the engine speed, thus ensuring maximum power and performance throughout the range.

Contact Breaker Points. The gap between the point on the movable arm and the fixed arm point should be .010 to .012 in. when fully open, and should be checked and adjusted if necessary at intervals of 2,000 miles. At the same time the surface of the contact points should be cleaned. (See page 25, "Routine Maintenance.")

Lubrication. Provision is made for lubrication of the cam bearing, the governor mechanism under the contact breaker plate, and the contact breaker plate bearing. The attention necessary (at 2,000 mile intervals) is described under "Routine Maintenance" on page 25.

Ignition Timing. The firing order of the cylinders is 1.5.3.6.2.4, No. 1 being the cylinder nearest the radiator. If available, use a neon timing light to check the timing, as described below:—

(*a*) Open the timing pointer hole cover on the right-hand side of the clutch housing.

(*b*) Connect one lead of the timing light to No. 1 spark plug. Earth the other lead to a convenient point on the engine.

(*c*) Start the engine, and slacken the throttle stop screw on the carburettor until the engine runs as slowly as possible without being uneven.

(*d*) Hold the neon light close to the timing pointer hole and observe the position of the steel ball in the flywheel as the neon light flashes.

(*e*) If the timing is correct, the reflection of light from the steel ball will occur exactly under the pointer. (See Fig. 44.) Any error in the setting will be shown by the ball appearing to rest at one side or the other of the pointer. To correct the setting, slacken the distributor clamp bolt and turn the distributor body slightly as required. Rotate the distributor in a clockwise direction if the ball has passed the pointer at the time of

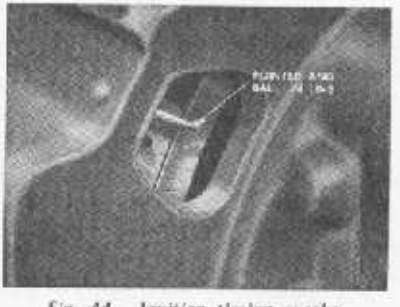


Fig. 44. Ignition timing marks.

the flash, and anti-clockwise if the ball has not reached the pointer.

(*f*) When the setting is correct, tighten the distributor clamp bolt and readjust the carburettor stop screw.

If a neon timing light is **not** available, a check can be made with an ordinary test lamp (fitted with a sidelamp bulb) as follows:—

(*a*) Remove the distributor cap.

(*b*) Connect the test lamp in parallel with the distributor points by connecting one lead of the lamp to the low tension terminal on the side of the distributor body, and earthing the other lead to a convenient point on the engine.

(*c*) Open the timing pointer hole cover on the right-hand side of the clutch housing.

(*d*) Switch the ignition on.

(*e*) Turn the engine with the starting handle until No. 1 cylinder is on the compression stroke (both valves closed) and the contact breaker points are about to open. Continue to turn the engine very slowly, **and stop at the exact instant the test lamp lights.**

(*f*) Inspect the timing marks. If the timing is correct, the steel ball in the flywheel will be in line with the pointer in the clutch housing. If the timing marks are *not* in direct line with each other, the setting requires adjustment as follows:—

(i) Turn the engine with the starting handle, and bring the timing ball in line with the pointer.

(ii) Slacken the distributor clamp bolt.

(iii) If the timing was early, it will be necessary to rotate the distributor body anti-clockwise until the lamp goes out.

(iv) Now slowly rotate the distributor in a clockwise direction, and stop immediately the lamp lights.

(v) Tighten the clamp bolt—be careful not to over-tighten it—then make a final check to make sure the setting is correct.

CONDENSER. If the contact breaker points require constant cleaning, the condenser is probably at fault, and this will eventually give rise to weak sparking and difficult starting.

To replace the condenser, remove the distributor cap; remove the nut securing the low tension connecting lead to the condenser; remove the screw securing the condenser to the base plate, and lift off the condenser. (See Fig. 11 on page 25.)

SPARKING PLUGS. The sparking plugs should be removed and examined at intervals of 5,000 miles. Details of cleaning and adjustment are given under "Routine Maintenance" on page 31.

IGNITION WARNING LAMP. This is the small red lamp mounted on the left-hand side of the petrol gauge. It should light up immediately the ignition is switched on, and go out again when the engine is running at a fast idling speed.

Should it light up when the engine is running (indicating that the generator has ceased to charge) the cause may be dirty or faulty commutator or brushes, or an open circuit in the generator field coils.

Failure of the lamp itself is unlikely as the bulb has an exceptionally strong filament. To check, switch on the ignition, and the bulb should light up. It it does not, examine the bulb.

COOLING SYSTEM

For efficient engine cooling, the passages in the cylinder block, cylinder head and radiator core must be kept clean. It is therefore of primary importance to use only clean water to replenish the radiator as any foreign matter in it may block the passages in the radiator and give rise to overheating.

Care should be taken not to overfill when topping up the water level, or loss of water (and consequent dilution of anti-freeze solution in the winter) will result. To allow for expansion when hot, the level when cold should be half-an-inch below the level of the filler baffle.

A thermostat is embodied in the cooling system to enable the engine to warm up rapidly. While the engine is cold, the thermostat valve remains closed, thus restricting circulation of the water through the radiator. (*NOTE.*—Sufficient water is allowed to by-pass the valve to prevent the circulation from becoming stagnant.) When the temperature of the water surrounding the block and head reaches approximately 160° F., the thermostat valve begins to open, thereby permitting normal circulation to take place.

To Drain. The radiator can be drained by opening the tap below the radiator bottom pipe. This, however, does not empty the cylinder block. For this purpose, another drain tap is provided at the left-hand side of the cylinder block behind the starter, and is accessible through the inspection plate attached to the engine cover.

It is advisable to push a piece of stiff wire through these taps when they are opened to clear away any sediment which may be obstructing the flow of water.

To Clean the Cooling System. At intervals of 5,000 miles, the radiator and cooling system should be flushed out with clean water. (See page 32, "Routine Maintenance".)

Radiator Corrosion Preventative. To prevent corrosion of the cooling system a special preparation is added to the water in the cool-

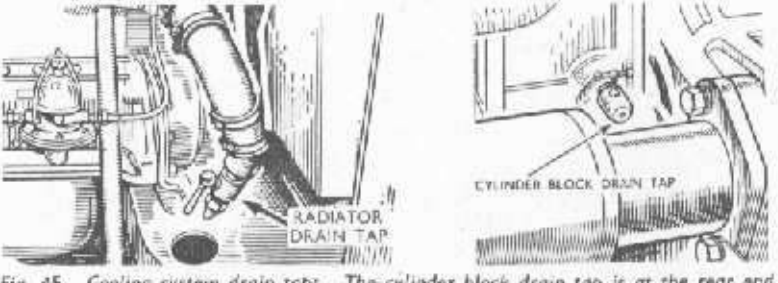


Fig. 45. Cooling system drain taps. The cylinder block drain tap is at the rear end of the engine on the left-hand side and is accessible through an inspection door inside the cab.

ing system before the vehicle leaves the factory. Further supplies of this corrosion preventative are obtainable from Bedford Dealers, and it is advisable to add about a quarter of a pint to the water (or anti-freeze solution *providing this is a glycerine type*) whenever the system is drained and refilled.

Important: Corrosion preventative should not be used with ethylene glycol anti-freeze, as the mixture forms a soapy sediment which may block the radiator and lead to overheating troubles. If in doubt, have a word with your Bedford Dealer.

Care of the Cooling System in Winter. An anti-freeze solution should be used during the winter months to prevent damage to the engine due to freezing of the water. Before using anti-freeze it is essential to clean the cooling system as the scouring tendency of anti-freeze mixture loosens any rust and dirt on the walls of the water passages, and this may cause blockage of the radiator.

Start by draining all water from the cooling system (page 56). Close the drain taps and fill up with 27½ pints water in which has been dissolved 1 lb. of common washing soda. Take care not to splash the paintwork. Run the vehicle in the normal way for a couple of days. After this, drain and flush with clean water until the water running out of the taps is clear, then close the taps.

Remember to use warm water for flushing or filling the cooling system of a warm engine.

This completes the cleaning process, but before filling with anti-freeze mixture, it is advisable to check the following: (*a*) Water hoses for deterioration—renew if necessary; (*b*) water hose connections for tightness; (*c*) cylinder head bolts for tightness. *Any leakage of anti-freeze solution past the cylinder head gasket will result in a "gummed-up" engine and necessitate expensive repairs.*

When warm weather returns, the system should be drained and the process of cleaning and flushing repeated.

Overheating. Overheating is usually indicated by boiling and loss of water. In such circumstances, *never fill up right away with cold water as the sudden change of temperature may crack the cylinder head.* Always allow the engine to cool down first.

Probable reasons for boiling are (1) topping up the radiator has been neglected; (2) water has been lost from the drain taps or a faulty hose; (3) the fan belt may be too slack to operate the water pump; (4) flow through the radiator may be restricted due to the use of dirty water.

FAN BELT ADJUSTMENT. The tension of the fan belt should be adjusted after the first 500 miles running to compensate for initial "stretch", and should be checked thereafter at intervals of 5,000 miles. The tension is correct when, with a thumb pressed against the belt mid-way between the fan and generator pulleys, there is a "give" of about half-an-inch. Adjustment is made by

movement of the generator on its mounting—see under "Routine Maintenance" on page 33.

Removal and Replacement. To remove the fan belt, proceed as follows:—

Loosen the generator bracket bolts and swing the generator inwards as far as it will go. Turn the engine over slowly with the starting handle and slip the belt over the generator pulley. Avoid pulling on the fan blades to turn the pulley, as this is liable to fracture the blades. Remove the starting handle and draw the belt up past the starting handle guide sleeve. Remove the belt from the fan pulley and draw it away between the radiator and the fan blades.

To replace the belt, reverse the foregoing operations. See previous paragraph for adjustment instructions.

WATER PUMP. Water circulation is maintained through the cooling system by a rotor which is driven by a belt encircling the crankshaft, fan and generator pulleys. The spindle carrying the rotor and fan runs in a sealed ball bearing which requires no lubrication. It is fitted with a self-adjusting gland to prevent water leakage.

To Remove. Drain radiator, slacken off generator and remove belt. Disconnect hoses, remove the fan from the pulley, and remove the three bolts which secure the water pump to the cylinder block.

ELECTRICAL EQUIPMENT

MODELS OS, OL, AND BEDFORD-SCAMMELL TRACTOR

(See page 63 for Bus Equipment)

BATTERY. Bedford 3-4 and 5 ton trucks, and the Bedford-Scammell tractor, are provided with an Exide type 3XCZ. 15M 6-volt battery of 100 amp-hour capacity at 20-hour rate. It is located under a detachable cover in the left-hand side of the driving compartment floor.

The *positive* (+) terminal is connected to earth, and care should be taken to reconnect the leads correctly whenever the battery is replaced after removal for charging or repairs.

Battery Care. The importance of regular attention to the battery cannot be over-stressed, as the operation of the starter motor, the lighting of the lamps and the running of the engine all depend on its condition. The main points needing attention are as follows:—

1. Keep the level of the electrolyte just above the top of the plates.
2. Add only distilled water, never tap water.
3. Take frequent readings of the specific gravity of the electrolyte with a hydrometer.
4. Do not allow the battery to remain discharged. If it is run down, recharge at once.
5. Keep the terminals tight and clean, and apply a coating of vaseline occasionally to prevent corrosion.
6. Keep the top of the battery clean and dry.

Maintenance of the battery is detailed on pages 24 and 37, under "Routine Maintenance".

GENERATOR. The generator is a "three-charge" rate machine and requires little attention to ensure satisfactory service. A few drops of engine oil should be applied to the lubricator wicks every 2,000 miles, and the commutator and brushes should be inspected every 10,000 miles. (For details see under "Routine Maintenance" on pages 26 and 38.)

Adjustment of Generator Output. The three rates of charge provided to meet varying driving requirements are controlled by the lighting switch on the instrument panel. With the switch in the "LOW" position, the charging rate will be sufficient to maintain the battery during the summer months when lights are infrequently used. The switch should be kept in the "HIGH" position if the vehicle is used constantly for short journeys necessitating frequent

use of the starter, and during the winter months when lights are more frequently used. Immediately the headlamps are switched on, the charging rate is again automatically increased to meet the greater load on the battery.

The generator is despatched from the works with the control brush set to give ample output to keep the battery in a fully charged condition, and, if the three rates of charge are used as described above, there should be no need to alter the position of the control brush.

If, however, the vehicle is run under unusual conditions—for example, used regularly for long periods at night and with very little day-time running, causing the battery to be continually in a low state of charge—it may be advisable to have the generator output increased, in which case a Bedford Dealer should be consulted.

STARTING MOTOR. The starter is operated by a pull-out control located on the engine rear cowl.

If the engine fails to start at the first application of the starter, do not operate the switch a second time until both the engine and starter motor are completely at rest, or the starter motor may jam in gear with the flywheel.

Starter Jammed. If this does happen, provision is made for easy release. At the end of the starter motor, near the exhaust pipe, there is a small cylindrical cover held in position by two screws (Fig. 46). Remove this cover, thereby disclosing the squared end of the starter motor shaft, and turn the shaft in a clockwise direction with a spanner until the gear has been wound out of mesh with the flywheel.

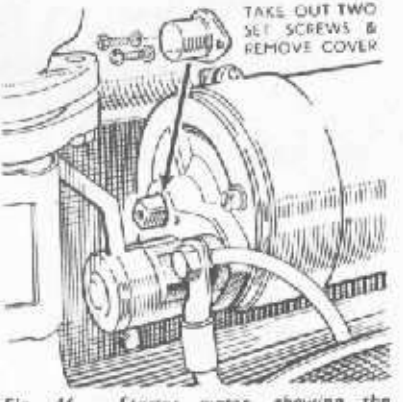


Fig. 46. Starter motor, showing the squared end of the shaft which can be turned with a spanner in the event of the starter jamming.

Maintenance. Every 10,000 miles inspect the commutator and brushes as described under "Routine Maintenance" on page 38.

LAMPS. The headlamps are held by a single attachment nut and may be swivelled to the required position when the nut is slackened. If the original setting is disturbed, the lamps should be reset to provide a straight ahead beam parallel to the road surface in the undipped position.

Focus adjustment is provided by a screw in the back of the lamp

body. Turning the screw clockwise will bring the bulb closer to the reflector.

To remove a headlamp bulb, it is necessary to detach the lamp front, which is secured by a clip and clamping screw. Slacken the clamping screw at the bottom of the lamp rim and push it downwards out of the clip. The front of the lamp, together with the reflector and bulb, can then be removed. The bulb holder is attached to the reflector by a bayonet connector and can easily be withdrawn to give access to the bulb.

For access to a sidelamp bulb, slacken the clamping screw at the bottom of the lamp rim, and remove the lamp front.

The tail and stop lamp bulbs are accessible after removing the lamp front, which is secured by two screws.

Details of the bulbs (for replacement purposes on Models OS OL and Bedford-Scammell tractor) are listed below:—

Headlamps	6-8 volt, 36–36 watt, S.B.C.
Side lamps	6-8 volt, 3 watt, S.C.C.
Tail and stop lamps	6–8 volt, 6 watt, S.C.C.

IGNITION WARNING LAMP (RED). OIL PRESSURE WARNING LAMP (ORANGE). These two warning lamps, located on the instrument panel, should light up immediately the ignition is switched on. The oil warning lamp should go out as soon as the engine is running, but the ignition lamp will remain alight until the generator commences to charge. (See page 14.)

To remove the bulbs for replacement, pull out the bulb-holders from the back of the instruments with which they are combined. The bulbs are 8–9 volt, 4 watt, M.C.C.

FUSES. The distribution and fuse box is mounted on the engine side of the dash, under the bonnet. It carries five 25 amp. fuses side by side and a 4.5 amp. fuse located at right-angles. The respective circuits protected by these fuses are indicated in Fig. 47.

If the generator ceases to charge—indicated by the ignition warning lamp remaining alight when the engine is running at speed—the 4.5 amp. fuse should be examined. Two spare 4.5 amp. fuses are clipped inside the moulded cover.

Similarly, failure of one of the 25 amp. fuses may be remedied by substituting one of the five spares carried in a holder in the distribution box.

A "blown" fuse should not be renewed, however, until the cause has been traced and eliminated.

AMMETER. The ammeter should show a reading on the charge (+) side of the scale at speeds above 10 m.p.h. in top gear. Below this speed the needle will remain on the discharge (−) side and the ignition warning lamp will glow, indicating that current is being taken from the battery.

If the ammeter records a discharge (and the ignition warning

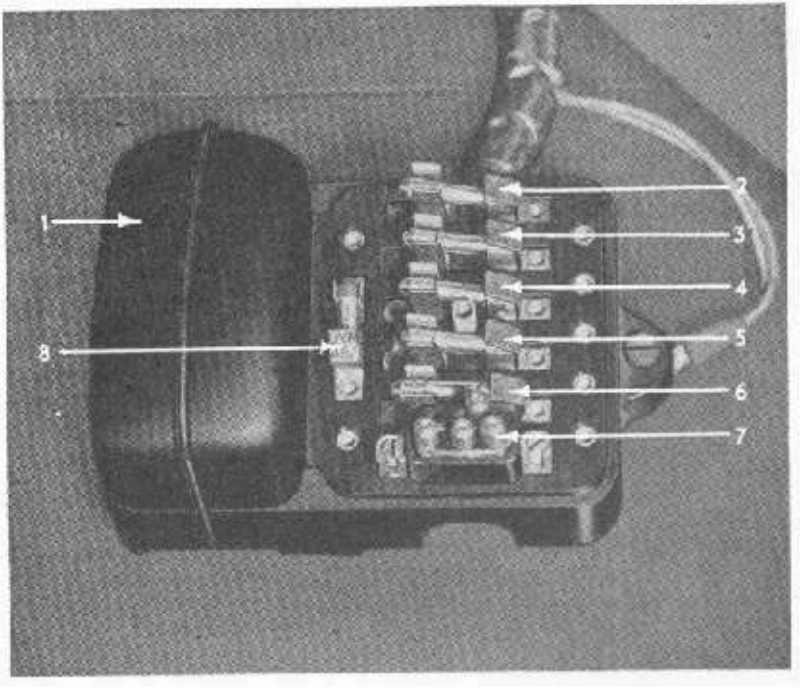


Fig. 47. Fuse box—Models OS, OL and Bedford-Scammell Tractor.
1. Cut-out cover. 2. Two side and tail lamp fuse. 3. Headlamp fuse. 4. Petrol gauge, ignition and oil pressure warning lamp fuse. 5. Stop lamp fuse. 6. Panel lamp and horn fuse. 7. Spare 25 amp. fuses. 8. Generator fuse, 4.5 amp. (Note: Two spare generator fuses are clipped inside the fuse box cover).

lamp continues to glow) when the engine is running at speed, suspect the generator fuse or the generator brush gear. In normal conditions the ammeter reading will reach a maximum of 10 to 12 amps. on the charge side of the dial at about 25 m.p.h.

HORN. Adjustment is provided on the horn to compensate for wear of the moving parts, indicated by roughness and loss of power. It is effected by turning the adjustment screw at the back of the case. The screw should be turned to the left until the note is on the point of falling off. When making this adjustment the push should not be used continuously if the horn is not sounding or damage may be caused to the internal wiring.

WIRING. Diagrams of the electrical equipment and wiring circuits are provided inside the back cover.

ELECTRICAL EQUIPMENT

MODEL OB BUS CHASSIS

BATTERY. The Bus chassis (Model OB) is provided with an Exide 6XCK.13M 12-volt battery of 85 amp.-hour capacity at 20 hour rate. It is located in a carrier secured to the left-hand side-member and is accessible through a detachable cover in the floor of the body, forward of the left-hand front seats.

The *positive* (+) terminal is connected to earth, and care should be taken to reconnect the leads correctly whenever the battery is replaced after removal for charging or repairs.

Battery Care. See instructions under this heading on page 59.

GENERATOR. The generator fitted to the Bus (Model OB) is a compensated voltage control machine designed to meet the varying requirements of bus and coach operation.

The output varies according to the state of the battery. When the battery is in a low state of charge (as, for instance, when external and internal lights are in frequent use) the generator output is high. As the battery becomes fully charged the generator output gradually falls to the "trickle" necessary to keep the battery in healthy condition.

These variations in output are entirely automatic. Provision for brush adjustment is therefore rendered unnecessary and no ammeter is fitted to record the charging rate. Failure of the generator to charge is indicated by the ignition warning lamp. If this lamp glows when the road speed in top gear exceeds 10 m.p.h., the respective fuses and the generator to battery circuit should be examined.

Lubrication. Once every 2,000 miles the bearing grease cups (one at each end of the generator) should be screwed down one complete turn. (See under "Routine Maintenance" on page 26).

STARTING MOTOR. See details under this heading on page 60.

LAMPS. See general details under this heading on page 60. Replacement lamp bulbs for Model OB are as follows:—

Headlamp	12 volt, 36/36 watt, S.B.C.
Side lamps	12 volt, 6 watt, S.C.C.
Tail and stop lamps ..	12 volt, 6 watt, S.C.C.
Instrument lamps ..	16/18 volt, 3 watt, M.C.C.
Warning lamps ..	16/18 volt, 3 watt, M.C.C.

FUSES. The distribution and fuse box mounted on the engine side of the dashboard under the bonnet carries four 25-amp fuses and two spares. The respective circuits protected by the four fuses are indicated in Fig. 48.

An open wire fuse, to protect the windings of the generator, is carried in a separate box, also mounted on the engine side of the dashboard under the bonnet. This fuse should be suspected if the

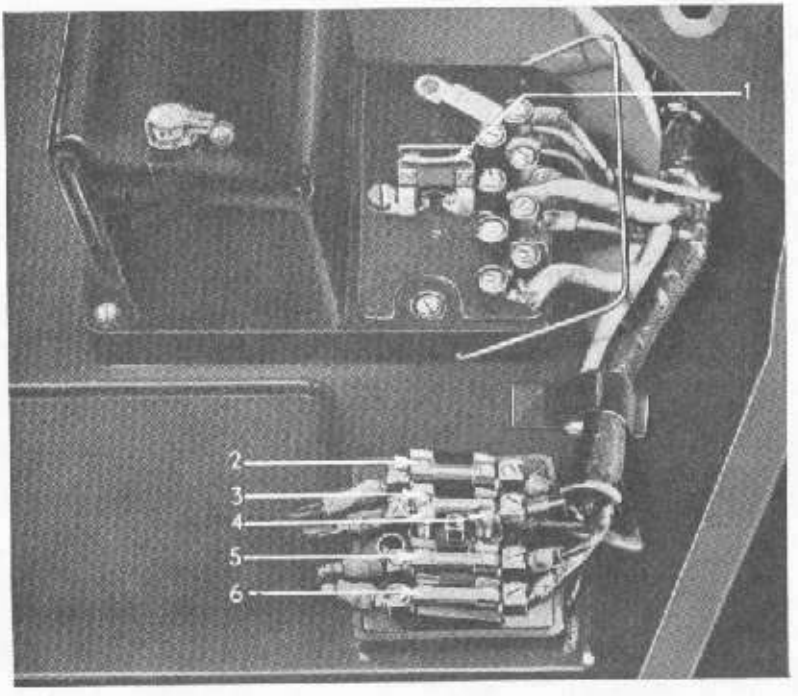


Fig. 48. Fuse Box—Bus models.
1. Generator fuse. 2. Petrol gauge, stop lamp, and oil and ignition warning lamp fuse. 3. Horn, panel lamp and windscreen wiper fuse. 4. Two spare fuses. 5. Headlamp fuse. 6. Side and tail lamp fuses.

ignition warning lamp remains alight when the engine is running at speed. It consists of a single strand of 30 gauge tinned copper wire. A spare length is wound round the fuse carrier.

WIRING. A diagram of the electrical equipment and wiring circuits is provided inside the back cover.

TRANSMISSION

CLUTCH. The clutch is of the single-plate, dry friction type. Driving pressure is provided by nine coil springs located between the inside face of the clutch cover and an internal pressure plate through which the pressure is applied to the friction plate. (See Fig. 49.)

Pressure applied to the clutch pedal is transmitted to the withdrawal mechanism by means of a special ball bearing which is packed with grease on assembly and requires no further attention.

Clutch Pedal Free Travel. The pedal should have an inch of free movement before pressure of the clutch springs is felt. As wear takes place, however, this free travel will be reduced and it will become necessary to correct it, to avoid clutch slip. (See instructions on page 34, under "Routine Maintenance".)

Lubrication. Inject a few drops of engine oil to the clutch pedal bearing every 1,000 miles. (See page 24, under "Routine Maintenance".)

GEARBOX. The gearbox is equipped with four forward speeds and reverse, operated by a central change-speed lever.

Provision is made on the left-hand side of the box for a power take-off, and on tipper trucks this power take-off is utilised to drive the hydraulic tipping pump. Instructions covering the tipping mechanism are given in a separate booklet supplied with the vehicle.

On the Bus, the power take-off drives a mechanical tyre pump,

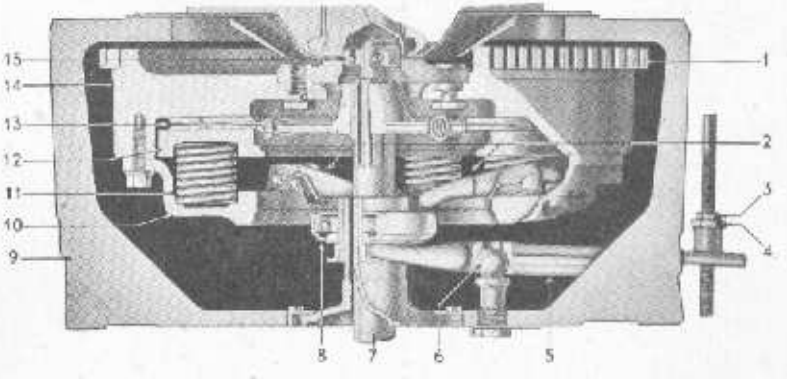


Fig. 49. Sectioned drawing of clutch.

1. Flywheel ring gear. 2. Pressure levers. 3. Pedal adjustment lock nut. 4. Pedal adjustment nut. 5. Clutch fork lever. 6. Clutch fork ball. 7. Clutch shaft. 8. Release bearing. 9. Clutch housing. 10. Clutch cover. 11. Clutch pressure spring. 12. Pressure plate. 13. Friction disc. 14. Flywheel. 15. Clutch shaft spigot ball bearing.

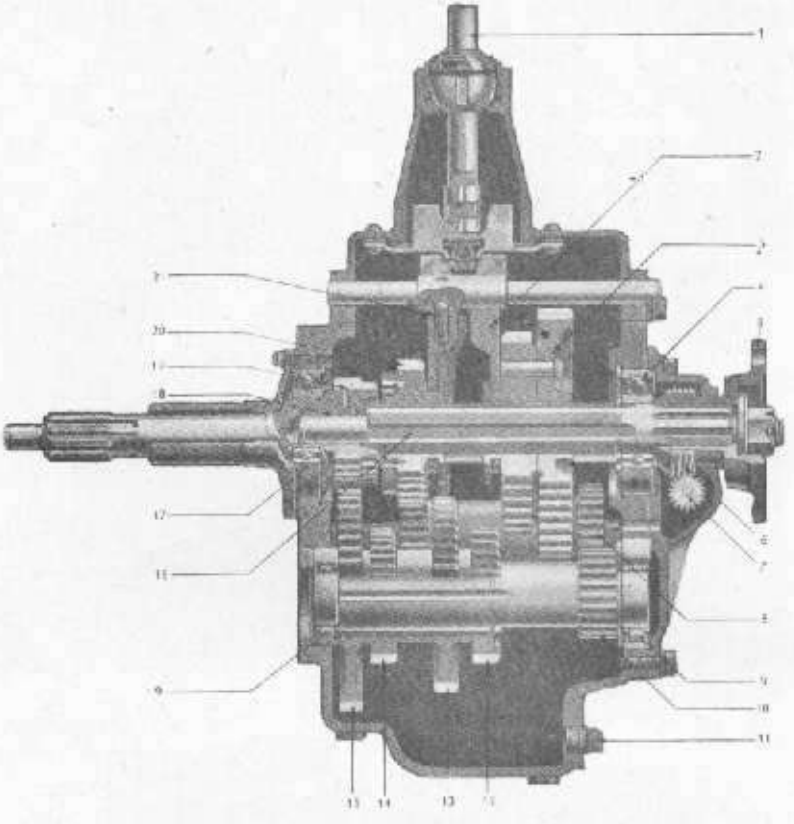


Fig. 50. Sectioned drawing of gearbox.

1. Change speed lever. 2. Striking fork—first and second speed sliding gear. 3. Mainshaft sliding gear assembly—first and second speed. 4. Mainshaft ball bearing. 5. Universal joint flange. 6. Speedometer driving gear. 7. Speedometer driven gear. 8. Reverse gear. 9. Layshaft roller bearings. 10. Layshaft first speed gear (integral with shaft). 11. Drain plug. 12. Layshaft second speed gear. 13. Layshaft third speed gear. 14. Layshaft reverse gear. 15. Layshaft drive gear. 16. Mainshaft. 17. Main drive pinion ball bearing. 18. Mainshaft spigot bush. 19. Main drive gear. 20. Mainshaft sliding gear—third and top speed. 21. Ball and spring—third and top speed striking fork.

the operation and maintenance of which are described on page 85.

Lubrication. The level of oil in the gearbox should be checked regularly every 2,000 miles. The oil should be changed after the first 2,000 miles, and thereafter every 10,000 miles. (See under "Routine Maintenance" on pages 28 and 37.)

PROPELLER SHAFT. On Models OS (short wheelbase) and Bedford-Scammell tractor the drive is taken from the gearbox to the rear axle by means of an open tubular propeller shaft. **Models OL and the Bus** have two open propeller shafts in tandem.

The forward or short shaft on the long wheelbase models is supported at the rear by a bearing carried in a housing attached to a chassis frame crossmember. An intermediate universal joint couples the two shafts.

Removal. The propeller shafts on all models can be removed without disturbing the rear axle assembly.

On short wheelbase models and the Bedford-Scammell tractor, disconnect the universal joints from the gearbox and axle flanges, and lift the shaft away.

On long wheelbase models and the Bus, remove the rear shaft as described in the previous paragraph. To remove the front shaft, remove the bolts attaching the support bearing to the crossmember, and disconnect the univeral joint from the gearbox.

On all models, for correct running balance, it is essential to reassemble the propeller shafts with the arrows stamped on the shafts and joints in line. This will ensure that the universal joint yokes are in proper alignment. (See Fig. 51.)

Lubrication. The universal joints are of the needle roller bearing type. Once every 2,000 miles gear oil should be added, through the oil gun nipples provided. There is also a nipple for the splines on the front end of the propeller shaft (two shafts on long wheelbase models and the Bus) and a nipple for the centre bearing on all models fitted with two propeller shafts in tandem. These should be lubricated at the same time. (See under "Routine Maintenance" on page 29.)

REAR AXLE. The rear axle is of the fully floating type. The casing is a built-up assembly consisting of a malleable cast-iron differential housing with steel tubes pressed into it, and provided

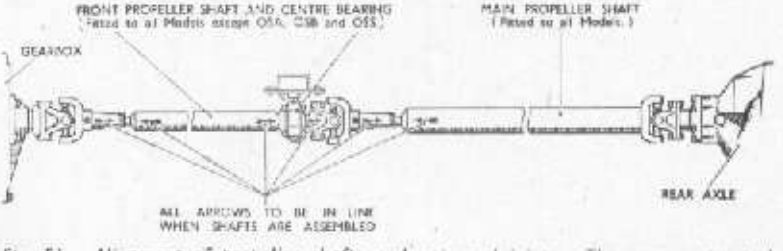


Fig. 51. Alignment of propeller shafts and universal joints. The arrows stamped on the shafts and joints must be lined up—as shown above—to bring the universal joint yokes in correct alignment and so ensure running balance. The front shaft and centre bearing is fitted to Model OL and Bus models only.

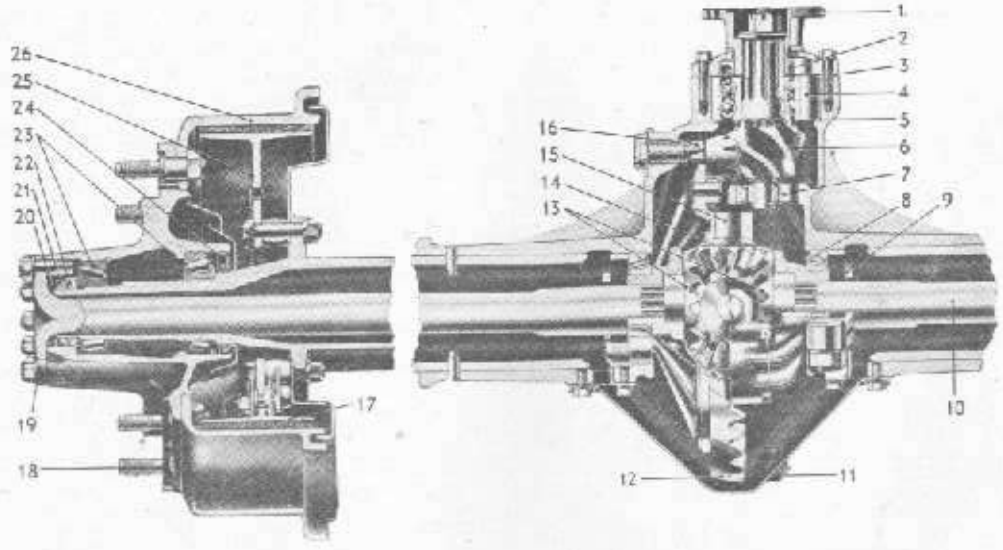


Fig. 52. Sectioned drawing of rear axle.

1. *Universal joint flange.* 2. *Oilseal.* 3. *Pinion paper shims.* 4. *Pinion ball bearing.* 5. *Pinion adjustment steel shims.* 6. *Spiral drive pinion.* 7. *Pinion roller bearing.* 8. *Taper roller bearing—differential.* 9. *Differential bearing adjustment nut.* 10. *Axle shaft.* 11. *Oil filler and level plug.* 12. *Spiral drive gear.* 13. *Differential side gears.* 14. *Differential pinion.* 15. *Differential spider.* 16. *Spiral gear thrust pad.* 17. *Leading brake shoe.* 18. *Road wheel attachment bolt.* 19. *Axle shaft flange.* 20. *Hub bearing lock nut.* 21. *Hub bearing nut tab washer.* 22. *Hub bearing adjustment nut.* 23. *Taper roller hub bearings.* 24. *Oil seal.* 25. *Trailing brake shoe.* 26. *Brake drum.*

with a detachable rear cover. On the Bus chassis, the pinion is off-set 11 in. to the left-hand side of the chassis centre line, to enable a low-level passenger gangway to be included in the layout of the body.

The axle ratio (listed under "General Data" on page 12) is stamped on a boss on the lower face of the pinion housing.

The rear axle "U" bolts must be kept tight. Check them every 500 miles during the first 2,000 miles, and thereafter every 2,000 miles. (See under "Routine Maintenance" on page 30.)

Lubrication. The level of oil in the rear axle should be checked regularly every 2,000 miles. The oil should be changed after the first 2,000 miles, and thereafter every 10,000 miles. (See under "Routine Maintenance" on page 38.)

Axle Shaft Removal. As the axle is of the fully floating type, the shafts may be removed without raising the road wheels off the ground. Unscrew the nuts and remove the lockwashers at the outer end of each rear hub. Insert a screwdriver in the recess provided in the hub behind the axle shaft flange, and prise out the shaft. The axle shaft can then be withdrawn.

Rear Hub Bearings. The rear hubs should be checked for slackness after the first 500 miles, and thereafter every 5,000 miles. (See under "Routine Maintenance" on page 35.) The rear hub bearings do not require any periodic lubrication attention as they are lubricated automatically from the rear axle.

STEERING AND FRONT AXLE

STEERING BOX (Fig. 53). The steering gear is of the worm and wheel type, thus ensuring long life and allowing ample adjustment.

If the column develops excessive vertical movement after a considerable mileage, the play can be taken up by means of the adjusting sleeve, which is provided with a large octagon at the top of the box casting. To make the adjustment, slacken off the column support clamp bolt and the clamp bolt in the top of the box, and screw down the adjusting sleeve until no vertical movement is apparent. Avoid screwing the sleeve down too much or the steering will be stiff in operation.

Lubrication. The lubrication nipple in the steering box casing should receive attention every 2,000 miles, as described under "Routine Maintenance", on page 29.

STEERING JOINTS. The steering joints of both the tie rod and connecting rod are of the self-adjusting, spring-loaded ball and socket type, capable of long service without any attention other than lubrication.

Lubrication. The oil gun should be applied to the nipple on each joint every 1,000 miles (see under "Routine Maintenance" on page 23).

STEERING KNUCKLES (Fig. 54). The pivot pin of each steering knuckle is located in the boss at the end of the axle beam by a location bolt. A phosphor-bronze bearing is provided in both the upper and lower jaw of the steering knuckle.

A plain-type thrust bearing is interposed between the boss of the axle beam and the lower jaw of each steering knuckle to carry the load.

Lubrication. The oil gun nipples on the pivot pin bearings should receive attention every 1,000 miles, as described under "Routine Maintenance" on page 23.

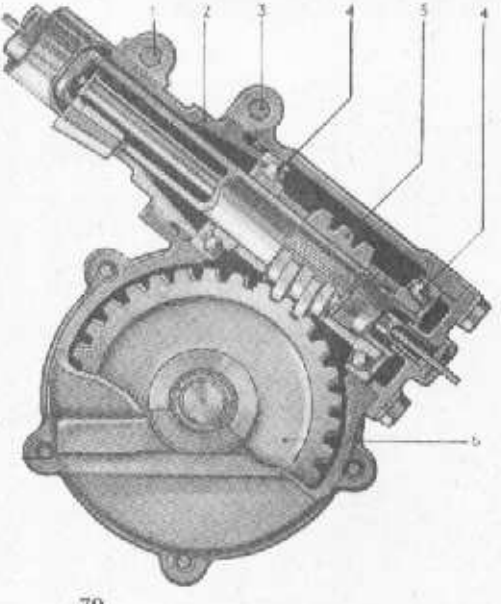


Fig. 53. Sectioned drawing of steering box.
1. *Column support clamp bolt.* 2. *Adjustment sleeve nut.* 3. *Adjustment sleeve clamp bolt.* 4. *Ball bearings—steering worm.* 5. *Steering worm.* 6. *Steering worm wheel.*

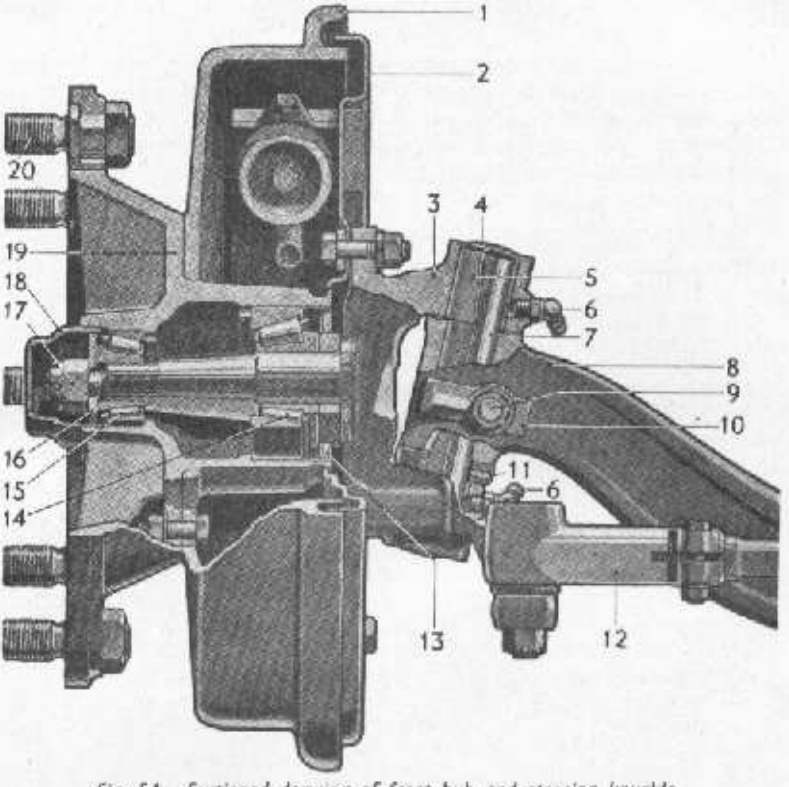


Fig. 54. Sectioned drawing of front hub and steering knuckle.
1. Brake drum. 2. Flange plate. 3. Steering knuckle. 4. Expansion plug—steering knuckle. 5. Bush—pivot pin. 6. Lubrication nipples—pivot pin. 7. Pivot pin. 8. Axle beam. 9. Lock pin—pivot pin. 10. Stop—steering knuckle. 11. Thrust bearing. 12. Tie rod end. 13. Hub bearing oil seal. 14. Taper roller hub bearing—inner. 15. Taper roller hub bearing—outer. 16. Steel washer. 17. Bearing adjustment nut. 18. Hub cap. 19. Front hub. 20. Road wheel attachment bolt.

FRONT HUBS. The front hubs are mounted on two large taper-roller bearings, which should be checked for slackness after the first 500 miles, and thereafter every 5,000 miles. They should also be repacked with grease every 10,000 miles as described under "Routine Maintenance" on pages 35 and 38.

FRONT WHEEL ALIGNMENT. The alignment of the front wheels should be checked every 5,000 miles as described under "Routine Maintenance" on page 35. Misalignment of the front wheels causes steering troubles and excessive tyre wear. It is important, therefore, if the setting is disturbed—by forcing the wheels against the kerb or other misuse—to correct it as soon as possible.

ROAD SPRINGS

Long, semi-elliptic leaf springs of silico-manganese steel are fitted to the front of the vehicle. They are provided with rebound plates.

The rear springs are also semi-elliptic, with progressive or secondary leaves—and helper springs on the 5-ton models—which come into action automatically as the load is increased.

General Care. The front and rear springs require little routine attention, but it is important to examine the spring clips and U-bolts at regular intervals to ensure that they are kept tight. Check them every 500 miles for the first 2,000 miles; and thereafter every 2,000 miles as described under "Routine Maintenance" on page 30.

Lubrication. The shackle pin nipples should be lubricated at intervals of 1,000 miles as described under "Routine Maintenance" on page 24. On the Bus, the nipples for lubrication of the rear shackles are grouped together on the rear spring front crossmember and are accessible through a trap door in the floor of the body. The spring leaves should *not* be lubricated as correct operation depends on interleaf friction. They must not be sprayed with penetrating oil or other lubricant as this has the effect of making the springs too flexible, resulting in impaired suspension and failure of the spring leaves.

BRAKING SYSTEM

DESCRIPTION. The four-wheel internal-expanding brakes are operated by the Lockheed hydraulic system, assisted by a Clayton Dewandre vacuum-servo unit which automatically augments the pressure applied to the pedal by the driver's foot.

This servo action depends for its operation on the vacuum existing in the induction manifold. That is to say, it is operative only *when the engine is running*. It is advisable, therefore, to avoid stalling the engine when the clutch and gears are disengaged, and to refrain from "coasting" with the engine switched off.

The brakes, of course, are still effective *without* the servo assistance, the only difference being that greater foot pressure is necessary to operate them.

The foot-brake acts on all four wheels. The hand-brake operates, by mechanical means, the same pair of shoes in each rear drum as the foot-brake.

On Bedford-Scammell vehicles, the servo, although mounted on the tractor, operates the trailer brakes only. A description of the brake modifications made to the Bedford-Scammell tractor unit for this purpose is given in the booklet supplied by Messrs. Scammell Lorries, Ltd.

TOPPING UP THE LOCKHEED SYSTEM. The reservoir for the hydraulic brake system is located on the off-side of the frame, approximately underneath the driver's feet, and is divided into two sections by a cast-in baffle which can be seen through the filler plug hole.

These two sections feed the front and rear brakes respectively so that a failure in one part of the system is localised, and either the front or the rear brakes still remain effective.

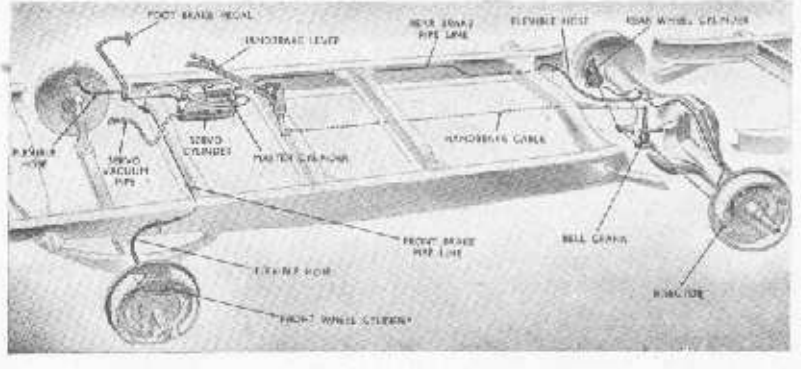


Fig. 55. Layout of hydraulic braking system.

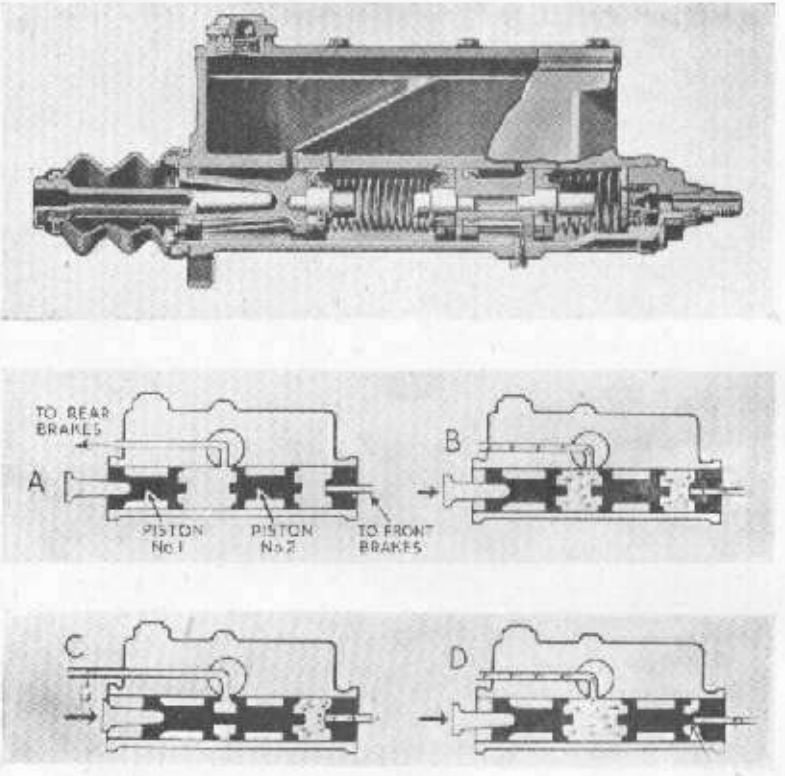


Fig. 56. Hydraulic brake master cylinder.

The above sketches show how the tandem master cylinder works. In sketch A the brakes are not being used, and no pressure is being transmitted along either pipe line. In sketch B, the brakes are in normal use. The footbrake pedal forces piston No. 1 along the cylinder. This transmits hydraulic pressure to the rear brakes, and vic piston No. 2 to the front brake. Sketch C shows what happens if a leak occurs in the pipe line leading to the rear brakes. Piston No. 1 slides along to make contact with piston No. 2, which then transmits hydraulic pressure to the front brakes. Should a leak develop in the pipe line to the front brakes, piston No. 1 transmits hydraulic pressure to the rear brakes (see sketch D), and piston No. 2 slides along to form a buffer against the stop at the end of the cylinder.

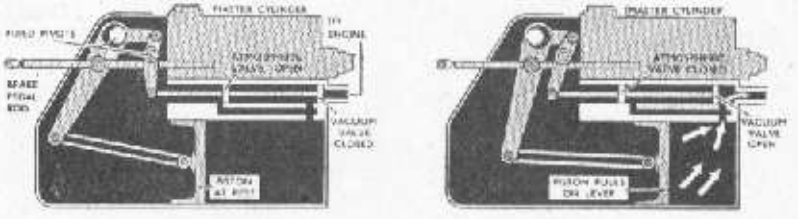


Fig. 57. Brake servo operation. In the diagrammatic sketch on the left, the foothrake is not in use and the vacuum valve leading to the engine is closed. The sketch on the right illustrates what happens when the brake pedal is depressed. The atmospheric valve is closed and the vacuum valve is opened. The engine suction acts on the servo piston, and, as the piston is linked to the master cylinder push rod, helps to apply the brakes.

The level should be checked at intervals of 1,000 miles as described under "Routine Maintenance" on page 23.

SERVO CYLINDER MAINTENANCE. At intervals of 1,000 miles the vacuum servo cylinder should be lubricated as described under "Routine Maintenance" on page 23.

Once every 5,000 miles the cylinder should be drained of moisture and surplus fluid. This is also dealt with under "Routine Maintenance".

GENERAL LUBRICATION. The handbrake lever pivot and brake pedal bearings, and the joints of the handbrake cable and rods, should be lubricated at intervals of 1,000 miles. Once in every 2,000 miles, the handbrake cable guide and the bell crank lever nipples should be lubricated with gear-oil. These points are dealt with under "Routine Maintenance" on pages 24 and 30.

BRAKE ADJUSTMENT

PEDAL ADJUSTMENT. The brake pedal should always have about a quarter of an inch of free travel (measured at the top of the pedal). This margin leaves the piston in the Lockheed master cylinder free to return to its full extent, and thus ensures replenishment of the cylinder from the fluid reservoir.

To adjust the pedal, loosen the locknut "B" (Fig. 58) and remove the clevis pin which connects the rod to the pedal. Shorten the rod by screwing in the yoke end ("A") and test by re-inserting the clevis pin. When the pedal has the required quarter of an inch of free travel, tighten the locknut and replace the split pin in the clevis pin.

FOOT-BRAKE ADJUSTMENT (see Fig. 59). Adjust front and rear brakes in turn as follows. The front brakes are provided with cam type adjusters (one on each shoe) operated from the outside of the brake back plate by a hexagon-headed bolt.

To adjust, jack up the front wheels and turn the cam nuts "A" and "B" to the "off" position (see arrows in Fig. 59) as far as they will go. Then turn the cam nut "A" in the opposite direction until the front brake shoe lightly rubs the inside of the drum when the wheel is revolved. Slacken back sufficiently to ensure that the drum is perfectly free, and repeat the operation with the cam nut "B".

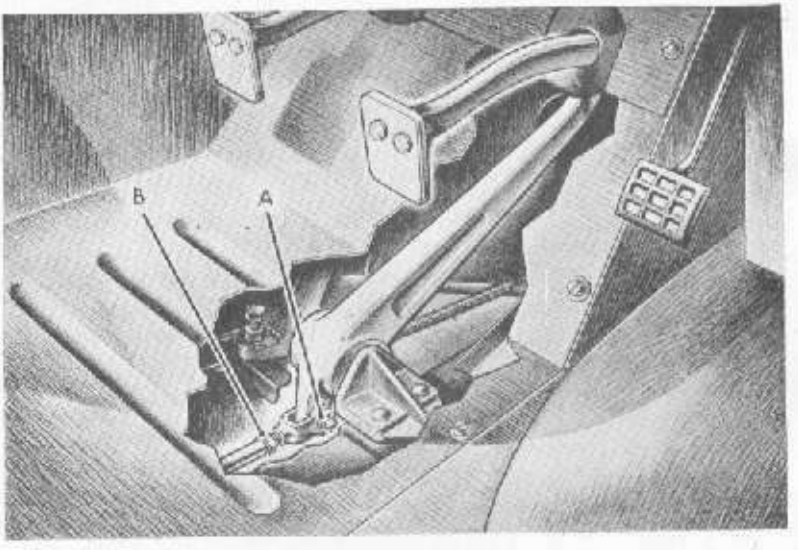


Fig. 58. Footbrake pedal adjustment details.

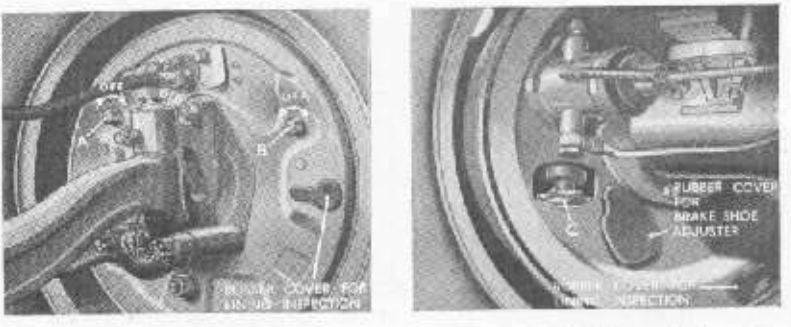


Fig. 59. Brake shoe adjusters—(left) front brakes; (right) rear brakes.

After the adjustment, both front wheels should rotate freely without any drag.

Jack up the rear wheels, scotch the front wheels and release the handbrake. Remove the rubber covers underneath each wheel cylinder, which gives access to the brake shoe adjusting wheels "C" (Fig. 59). Turn the adjusting wheels anti-clockwise (viewed from above) as far as they will go without straining. Apply heavy pressure to the footbrake pedal to centralise the shoes in relation to the drums—this centralisation is automatic through the bisector unit—and attempt to turn the adjusting wheels again to ensure that the shoes are still in complete contact with the drum. Finally, slacken the adjustment back until the road wheels rotate freely, *and replace the rubber covers.*

HANDBRAKE ADJUSTMENT. No attempt should be made to adjust the handbrake independently. The adjustment of the rear brake shoes described under "Footbrake Adjustment" serves for the footbrake *and* the handbrake unless any part of the handbrake mechanism has been dismantled.

SHOE LINER INSPECTION. From time to time the brake linings should be inspected to determine whether or not they are due for renewal. An accurate indication of the amount of wear can be obtained by examining the liners on the leading brake shoes. Detachable rubber covers are fitted to each wheel for this purpose (see Fig. 59—at the lowest part of the back plate on the rear brakes, and at the most forward point of the back plates at the front. To expose the leading brake linings, lift the larger end of the cover away from the back plate and swing the cover round. Always replace the covers.

BLEEDING THE LOCKHEED SYSTEM. (See Fig. 60.) If at any time air finds its way into the Lockheed system, the efficiency of the brakes will be impaired. The usual symptoms are a variation in the amount of travel of the footbrake pedal and a feeling of "sponginess" when the brakes are applied.

The cure is "bleeding". A clean glass jar and two feet of thick-walled $\frac{3}{16}$ in. bore rubber tubing are required. The operation is carried out as follows:—

On the inside of each front brake back plate, just above the connection to the Lockheed brake hose, is a small hexagon with a tapering extension resembling a grease nipple. These are the front brake bleeder screws. The bleeder screws for the rear brakes are located on the top of the wheel cylinders, just opposite to the point where the brake pipes are connected. All four screws are fitted with rubber dust caps which must be removed for the bleeding operation.

Fill the brake reservoir with Lockheed Hydraulic Brake Fluid (Orange) to within a quarter of an inch of the bottom of the filler plug hole. Slip one end of the rubber tube over one of the front

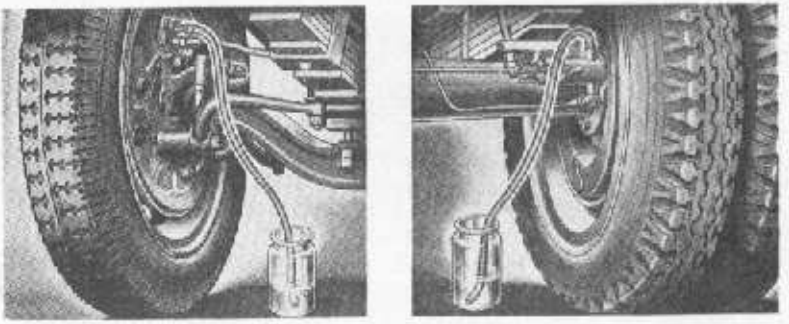


Fig. 60. Bleeding the hydraulic brake system—(left) front brakes; (right) rear brakes.

bleeder screws and allow the other end to hang in the glass jar. Pour sufficient brake fluid into the jar to cover this free end. Then slacken the bleeder screw about two turns.

Next, get an assistant to depress the brake pedal—quickly—and allow it to return. This will pump fluid through the system; the air will be carried with it through the open bleeder screw, and bubbles will show at the free end of the rubber tube.

Keep the reservoir topped up with fluid and repeat the "pumping" —with a slight pause between each stroke—until no more bubbles appear. Finally, tighten the bleeder screw before removing the tube.

This operation should be repeated on the three remaining wheels, in each case with the free end of the tube submerged in fluid so that no air is allowed to leak back into the system.

Do not use the fluid in the glass jar for topping up the reservoir while it is still in an aerated condition. Cover the top of the jar and leave it to stand for some time so that the air may escape, and filter it to remove dirt before use.

CAB AND BODY

MODELS OS, OL AND BEDFORD-SCAMMELL TRACTOR

The driving cab is built up of pressed steel sections welded into a one-piece structure and mounted on a hard-wood frame.

The complete cab is flexibly mounted at three points—one on each side of the front end and one in the centre of the rear end.

Door Glass Balance Mechanism (Fig. 61). To adjust the balance of the drop glass, remove the inspection cover from the inside door panel. Slacken the locknut at the back end of the barrel which houses the tension spring. Adjust the set-screw until the glass slides easily, but not so easily that it will drop by its own weight. This done, hold the adjusting screw with a spanner to prevent it moving and tighten the locknut. Finally, replace the inspection cover.

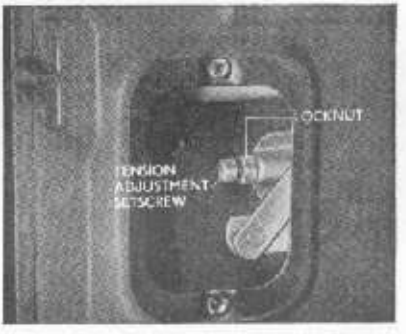


Fig. 61. Door glass balance tension adjustment. (All models except Bus.)

Door Drop Glass. To remove the door drop glass, remove the window moulding. Remove the two screws at the top of the door-glass division. Swivel the fixed glass and weather strip assembly away from the door and out of the door glass division run channel. Then remove the two screws holding the window balance lever to the door panel, and carefully guide the glass, complete with the balance mechanism, out towards the top of the door (Fig. 62).

Fig. 62. Removing door drop glass. (All models except Bus.)

Door Fixed Glass. To remove the door fixed glass, remove the door window moulding, then swivel the glass and weatherstrip assembly

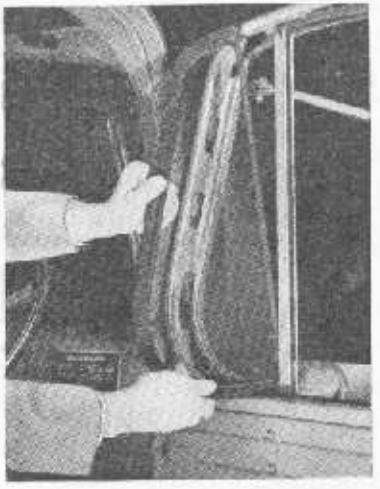


Fig. 63. Removing door fixed glass. (All models except Bus.)

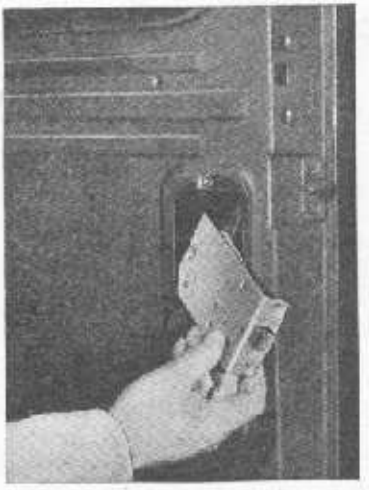


Fig. 64. Removing door lock. (All models except Bus.)

away from the door and out of the glass division run channel. (Fig. 63).

Door Locks (Fig. 64). To withdraw the door lock from the door proceed as follows. Remove the outside handle. Remove the two set-screws securing the lock to the rear edge of the door; also the screw on the inside of the door, just above the inspection cover. Remove the inspection cover, push the lock assembly towards the front of the door and guide it out through the inspection aperture.

Fixed Windscreen. To detach the fixed windscreen glass, remove the windscreen centre division fillet from inside the cab; remove the screws and nuts securing the windscreen moulding, and lift the moulding away; press the windscreen glass and glazing channel firmly forward, while supporting it at the front, until it is clear of the windscreen frame.

Hinged Windscreen. To remove the hinged windscreen assembly, take off the wiper blade, close the windscreen and fully tighten the wing nuts. Remove the three screws securing the trim fillet to the header bar, thus giving access to the screws which hold the windscreen hinges to the roof panel. Disconnect the adjusting links and lift the assembly clear.

Windscreen Wiper. The suction-operated wiper fitted to all models except the Bus is connected to the engine manifold, and the pipe unions and rubber connections should be examined from time to time to make sure that they are air-tight.

Body and Fittings. The body and fittings should be kept clean and well secured to avoid the damage and deterioration caused by mud, rust and rattles. Lubricate the locks and hinges every 2,000 miles. (See under "Routine Maintenance" on page 30).

Tipping Gear. Details of the tipping gear fitted to short wheelbase models are given in a separate booklet issued by the manufacturers and supplied with the vehicle. Efficient operation can be safeguarded by instructing the driver to pay particular attention to the following points:—

(*a*) Keep the oil tank full.
(*b*) Avoid racing the engine when tipping.
(*c*) Report any irregularity in the operation of the gear, such as jerky operation of the ram, and any signs of oil leakage.

WHEELS AND TYRES

The road wheels are of the steel disc detachable type held in position by conical-ended nuts shaped to fit the countersunk portion of the holes in the wheels.

To Remove Wheels. Jack up the vehicle, unscrew the nuts (left-hand thread on the left-hand side of the vehicle) and lift the wheel clear of the studs. Take care when replacing the wheel to locate the conical ends of the nuts snugly in the counter-bored holes. A spot or two of oil should be smeared on to the threads of the studs before the nuts are replaced.

To Remove Tyres (see Fig. 65). The tyres are secured in position by a split ring located round the edge of the wheel rim. To remove, deflate the tyre and lay the wheel on the ground, split ring uppermost. Insert a tyre lever in the split ring opening, hold the tyre in position with the foot and prise the ring off by working the lever round under it. The tyre will lift off as soon as the ring is free.

TYRE PRESSURES. It is important to maintain the tyres at the correct pressures listed under "Routine Maintenance" on page 22.

MECHANICAL TYRE PUMP (Model OB only)

The mechanically-operated tyre pump on the Bus chassis is fitted to the left-hand side of the gearbox, and is driven from the layshaft. It is lubricated automatically from the gearbox. The pump air filter unit is attached to the chassis sidemember—just in front of the battery. The pump hose is included in the tool kit.

Inflating a Tyre. Remove the detachable floorboard to the left of the gear lever. This will disclose the pump engagement lever and air filter. Remove the pull-off cap on the top of the air filter. With the engine running slowly, depress the clutch pedal and turn

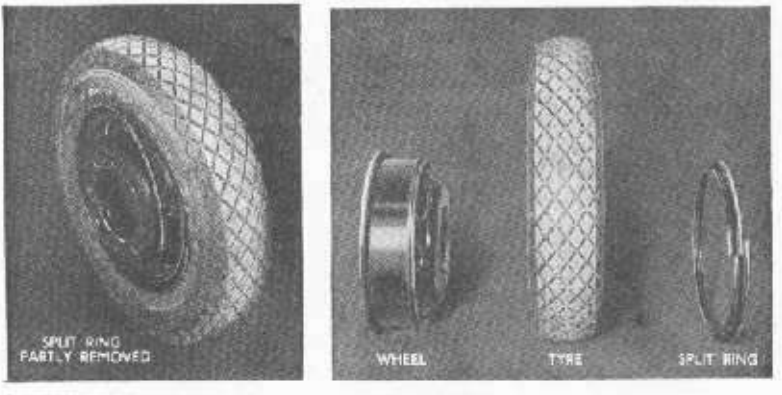


Fig. 65. Wheel and tyre details.

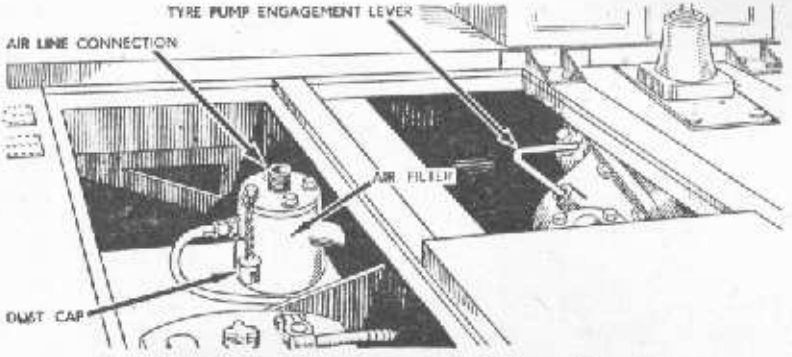


Fig. 66. Mechanical tyre pump and air filter. (Bus only.)

the pump engaging lever towards the engine. Release the clutch pedal and the pump is then working.

Run it like this for a few seconds to clear away impurities, and then connect the hose to the union on top of the filter—the one which was covered by the cap. Again leave it for a few moments to clear impurities from the hose. Then connect the free end of the hose to the tyre valve and speed up the engine to approximately quarter throttle. Do not race the engine, and do not forget to replace the air filter cap when you have finished with the pump.

The pipe line and tyre gauge should be handled carefully and kept away from oil, petrol and other penetrating fluids. Make sure it is clean before putting it away.

Tyre Pressure Gauge. The gauge fitted to the hose registers with reasonable accuracy while the pump is working, but it is advisable to take a "static" reading to verify it. For this purpose an air release valve is fitted behind the gauge. Give this valve a complete turn (anti-clockwise) and the air from the pump will escape while the reading is being taken.

Pump Maintenance. The pump mechanism is lubricated automatically from the gearbox. The air filter unit contains cotton cloth which should be replaced every 10,000 miles. At the same time the filter chamber should be drained of moisture by removing the drain plug at the bottom of the filter casing. (See under "Routine Maintenance" on page 39.)

CARE OF TYRES. The rubber situation makes care of the tyres a subject of national importance. Most of the things which affect tyre wear are within the control of the driver, and the following suggestions are offered as a guide to the more important precautions to observe.

(*a*) Check the tyre pressures daily. Maximum mileage from the tyres can be obtained only if they are maintained at the

recommended pressures. (See page 22.) Both under-inflation and over-inflation tend to increase tread wear.

(*b*) Every 2,000 miles remove flints from the treads as described under "Routine Maintenance" on page 31.

(*c*) Make a note of any irregular wear and report it for further investigation; there may be some maladjustment in need of correction.

(*d*) Drive smoothly at all times. Harsh use of the clutch, accelerator or the brakes wears the tyres rapidly.

(*e*) Remember that high-speed driving wears tyres out quickly. The best tyre mileage is obtained when speeds are kept moderate.

(*f*) Avoid crushing the tyres against the kerb or similar obstacles. Damage to the cord fabric may be unseen but many good tyres are ruined by this kind of carelessness.

Note.—Substitution of larger (or smaller) wheels and tyres for those originally fitted to the rear of the vehicle will affect the accuracy of the speedometer readings. If any such substitution is made, therefore, it is advisable to ask your Bedford Dealer to alter the speedometer driven gear—at the rear of the gearbox—to compensate for the change.

COLD WEATHER HINTS

During cold weather, extra care and attention are necessary to ensure easy starting and efficient running. Routine maintenance should be carried out conscientiously, and the following important points should be particularly watched.

The battery should be in good condition and fully charged.

The starting handle should be used to free the engine when it is cold.

The generator commutator, contact breaker points and spark plug points should be clean, and the point gaps correctly adjusted.

The generator and starter brushes should be free to slide in their sockets, and the connections to them should be clean and tight.

The carburettor should be properly adjusted, the jets unobstructed, and the petrol filters free from grit and water.

The manifolds and other gas-tight joints should be free from leaks.

The wiring connections and all high tension and low tension terminals should be clean and tight.

The choke control should be used intelligently (see page 16) and the radiator should be covered for the first few minutes of running.

Frost precautions, so far as they affect the cooling system, are dealt with on page 57.

INDEX

PARTS SERVICE

What it Means to You as an Owner

When your vehicle was designed, the manufacturers' engineers and metallurgists laid down stringent specifications for every one of its thousands of parts. That is one of the reasons for the smooth, powerfully efficient performance it is capable of giving. Every component has been built to fine limits for the work it has to do, and each works in harmony with the others.

It is vitally important not to impair this balance and efficiency when replacements become necessary. The replacement parts must be as suitable and as reliable as those which were fitted when the vehicle was new—and that is possible **only if genuine Bedford parts are used.**

Genuine parts are *exactly* similar to those originally built into your Bedford at the factory. They are made on the same machines, of the same materials; they are tested in the same way, and inspected at identical stages in the course of manufacture. In fact, when they are made it is not known whether they will be used in a new vehicle or supplied as spares.

Good repair work can be wasted by using unsuitable parts. Always insist on genuine Bedford spares, and—to make *sure* that you get the right parts—always entrust your repair commissions to authorised Bedford Dealers. Bedford Dealers stock and supply genuine parts only, and their specialised equipment and knowledge of the vehicle are additional safeguards.

One other point. All orders for replacement parts should quote the model, the chassis number and the engine number of the vehicle for which they are required. These particulars are given on the plate attached to the engine side of the dash (under the bonnet) on the left-hand side.

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LUTON · BEDFORDSHIRE

(Manufacturers of Bedford Commercial Vehicles)

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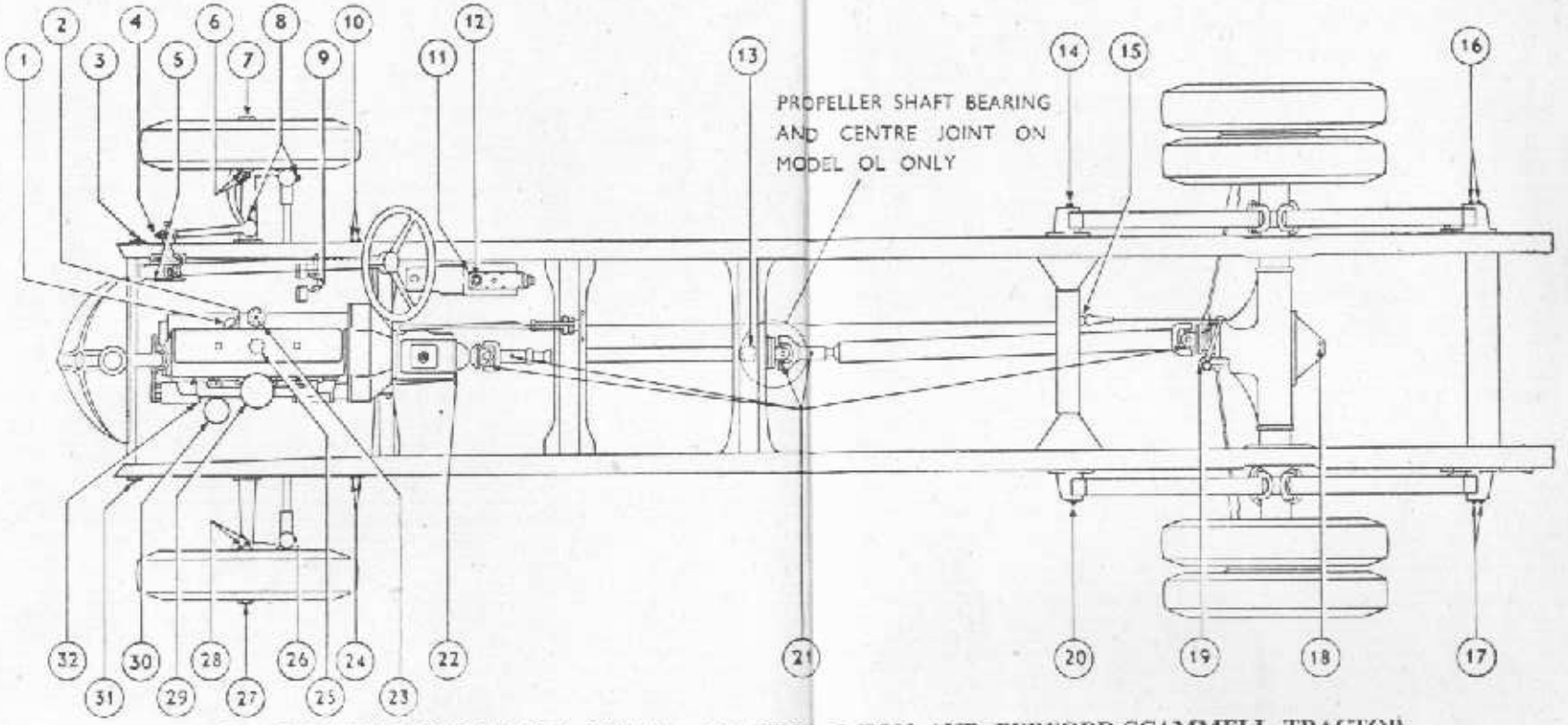

Fig. 67. CHASSIS LUBRICATION CHART — 3 4 TON, 5 TON AND BEDFORD-SCAMMELL TRACTOR

(See page 21 for recommended lubricants; also pages 20 to 39 for complete maintenance routine)

DAILY

Check Oil Level in Engine Sump. Use dipstick (2). Replenish through filler (25).

EVERY 1,000 MILES

Lubricate Spring Shackles (3, 10, 14, 16, 17, 20, 24, and 31). Give each nipple several strokes with oil gun. (12 nipples in all.)

Lubricate Steering Joints (4, 8, and 26). Give each nipple several strokes with oil gun. (4 nipples in all.)

Lubricate Steering Knuckle Pivot Pins (6 and 28). Give each nipple several strokes with oil gun. (4 nipples in all.)

Lubricate Servo Cylinder. Inject a few drops of engine oil through oil cup (11).

Check Fluid Level in Brake Reservoir (12). Maintain level at ½ in. below bottom of filler plug hole. Top up with Lockheed Brake Fluid (Orange).

Lubricate Controls. Inject a few drops of engine oil to clutch and brake pedal bearings (9). Apply a few drops of oil to the hand brake cable and rod joints; also to the engine control joints.

EVERY 2,000 MILES

Change Engine Oil and Clean Strainer (1). Replenish with new engine oil through filler (25).

Lubricate Ignition Distributor (23).

Lubricate Generator (32).

Lubricate Propeller Shaft Splines and Universal Joints (21). Give each nipple several strokes with oil gun. (3 nipples on OS, and 5 on OL.)

Lubricate Short Propeller Shaft Bearing (Model OL only). Give nipple (13) several strokes with oil gun.

Lubricate Steering Box (5). Apply oil gun, filled with Extreme Pressure oil, to nipple until oil exudes from hole in adjustment sleeve.

Lubricate Handbrake Bell Crank and Cable Guide (15 and 19). Give each nipple several strokes with oil gun. (No nipple is fitted to the bell crank on the Bedford-Scammell Tractor and the joint should therefore be lubricated with the oil can.)

Check Oil Level in Gearbox (22) and Rear Axle (18). Replenish, if necessary, to lower edge of filler plug hole.

Lubricate Cab and Body Locks and Hinges.

EVERY 5,000 MILES

Clean and Re-oil Carburettor Air Cleaner (29).

EVERY 10,000 MILES

Renew Oil Filter Cartridge (30).

Re-pack Front Hub Bearings with Grease (7 and 27).

Drain Gearbox and Refill with Fresh Oil (22).

Drain Rear Axle and Refill with Fresh Oil (18).

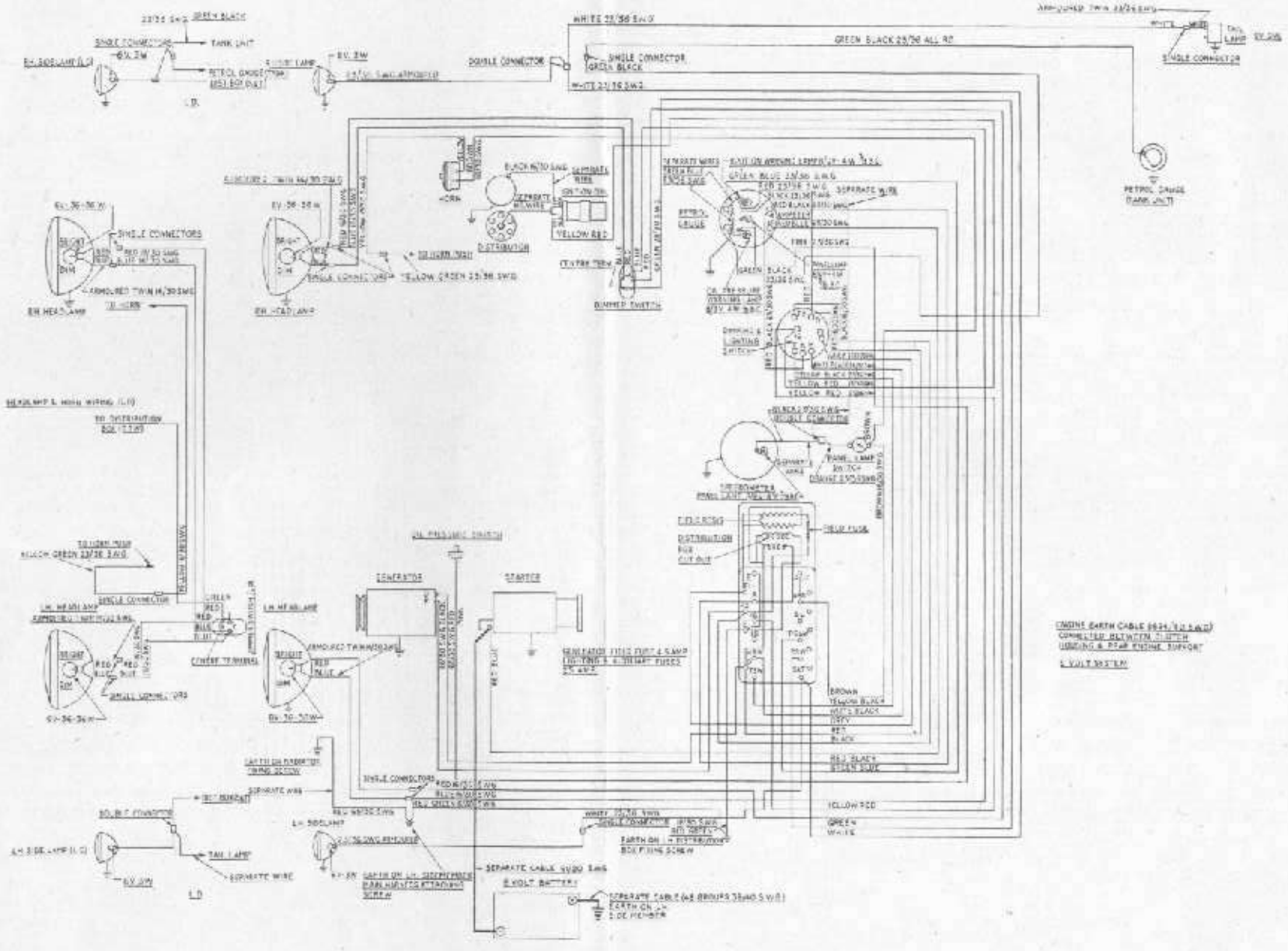

Fig. 70. WIRING DIAGRAM (BEDFORD-SCAMMELL ONLY)

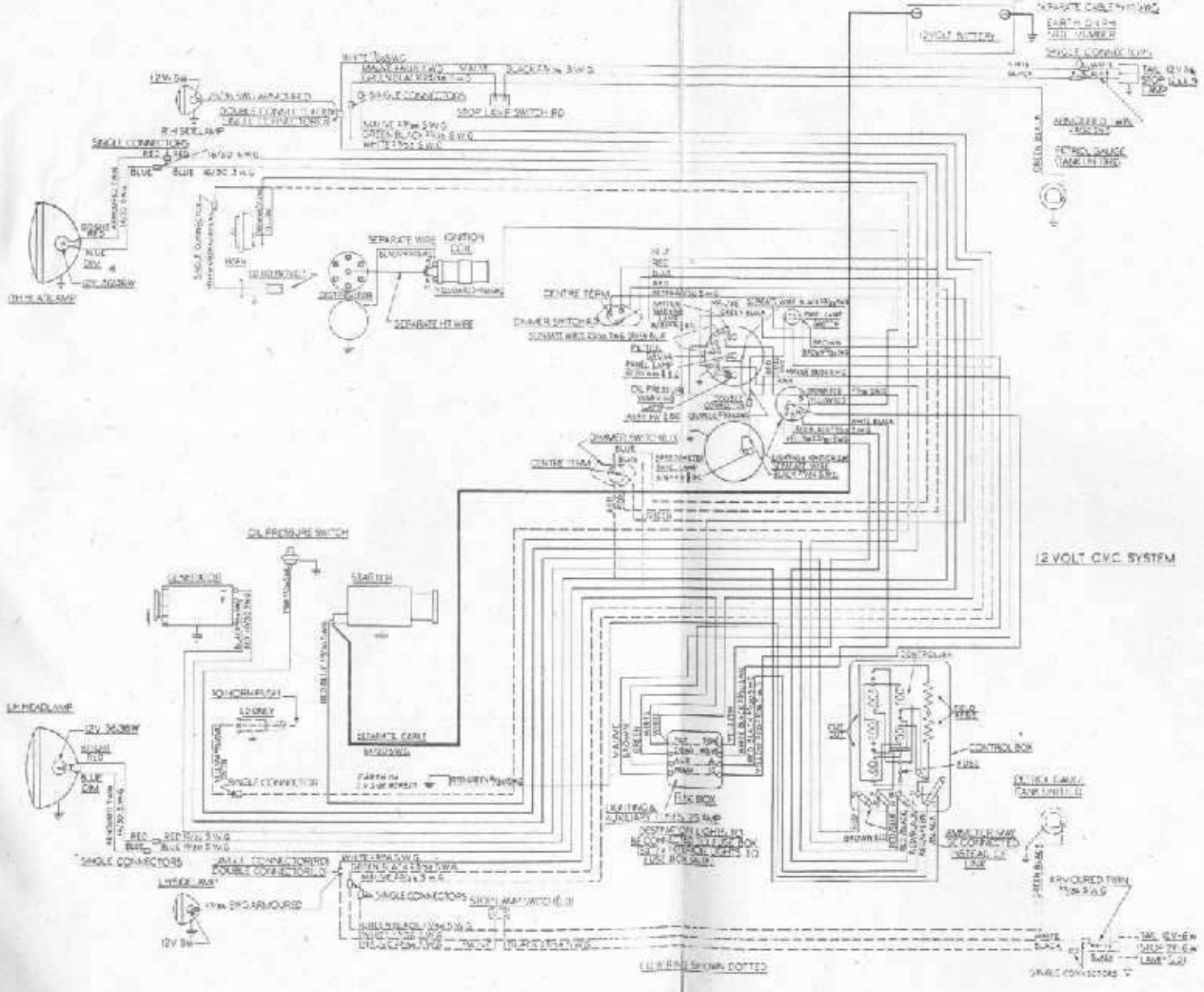

Fig. 71. WIRING DIAGRAM (BUS ONLY)

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