DRIVER'S INSTRUCTIONS

The driver is responsible for the general condition of the vehicle, and the following instructions must be carried out in order to obtain the best possible service from the Carrier.

It is the **duty** of the driver to become thoroughly familiar with all the controls before attempting to take the vehicle on the road, and even when actually driving, care should be taken to get the " feel " of the vehicle before taking it over rough country. Fig. 1 shows the driving controls and instrument panel.

Before driving the vehicle out :—

1. Examine petrol tanks to see there is sufficient petrol for the journey. A dipstick is provided for this purpose.
2. Check the oil level in the engine.
3. Check the water level in the radiator.

Starting the Engine from Cold

1. Make sure the gear lever is in the neutral position.
2. Turn on the petrol at the two-way cock.
3. During cold weather insert the starting handle and turn the engine over a few times to break the oil film.
4. Push the starter carburetter control lever forward into the catch.
5. Switch on the ignition, when warning light will show.
6. Press the electric starter switch button, and release it immediately the engine fires.

   In exceptionally cold weather depress the clutch pedal to ease the load on the starter motor caused by gearbox lubricant.
7. As the engine warms up, pull the starter carburetter control lever right back.

   This lever must be right forward or right back. Half-way is useless.
8. With the engine running, check the oil pressure; oil gauge should read 25/30 lb. per sq. in., and dynamo should show a charging rate of between 4 to 10 amps., according to engine revolutions.

If the engine fails to start at the first attempt, release the starter switch button, and wait a few seconds before repeating the operation. Excessive use of the starter will only run the battery down.

Starting the Engine when Warm

Do not use the starter carburetter or choke.

1. See that the gear lever is in neutral position.
2. Turn on the petrol at the two-way cock.
3. Press the starter switch button.

Some advantage will be gained by opening the throttle slightly, but do not " pump " the accelerator pedal. This will only produce an over-rich mixture.

Difficult Starting

The following points do not deal with every symptom that may be encountered, but cover the general possible faults :—

1. Engine fails to start. Test the high tension circuit by means of a wooden-handled screwdriver. Grasp the handle and place the metal portion on the cylinder head close to one of the sparking plugs. Hold the metal end about $\frac{1}{4}$ in. from the plug terminal. Get an assistant to rotate the engine by hand or by means of the starter motor.

   The spark should jump the gap so made.
2. If the above test is in order, remove all the sparking plugs one by one. They must be clean and free from carbon deposit or oil. Insulators must be free from cracks.

   Electrode gaps .025 in.
3. Should the engine still fail to start, check over the fuel system and make sure petrol is reaching the carburetter in sufficient quantities.
4. Insufficient cranking speed may be due to loose or corroded battery connections, a partially discharged battery, or incorrect lubricating oil in the engine.
5. If the engine still does not respond, insert the starting handle, and turn the engine over slowly in order to test the compressions.

   Sticking valves will cause difficult starting.

If after making these simple tests the engine refuses to start, **get expert advice.**

Driving

The following points must be understood, when driving the vehicle for the first time; they will assist drivers to become proficient in the handling of this type of vehicle.

The steering is controlled by a steering wheel, which is connected by rods and cams to a movable front cross tube. The cross tube carries the track bogie wheels, and the initial movement of the steering wheel throws the tracks out of alignment to cause a " slow " turn.

Further movement of the steering wheel applies the track brakes, causing the " sharper " turns.

The steering wheel centre spoke should be in the vertical downward position when the steering gear is free.

To move the vehicle from a standstill, start the engine but do not attempt to move the vehicle until the engine is warm enough to run on the main carburetter jets.

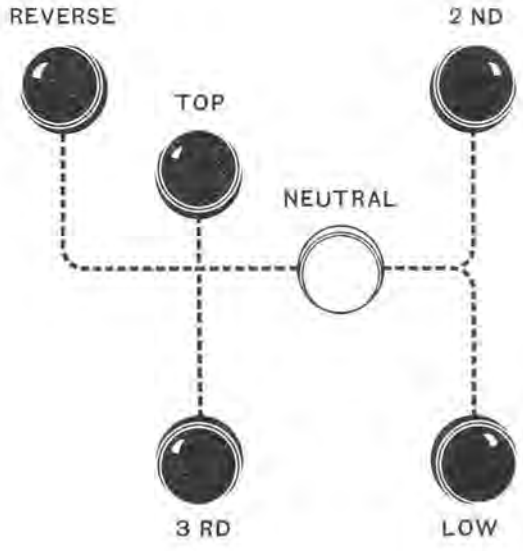


Fig. 2. GEAR POSITIONS.

Lay the tracks side by side on the ground. Stretch them out to take up all play and wear. Carefully compare for actual length.

Detach each track into sections and change over alternate sections, as already mentioned.

If the track has become elongated for the first time to such an extent that no further adjustment can be made on the track adjusting wheel, then one link will have to be removed.

Always fit the joint pins with the heads outside the track (Fig. 16).

Tracks must be fitted so that the links on the top run, as they pass over the guide roller, have the double lug to the front and the triple lugs to the rear. Thus the centre indentation is at the bottom of each link when the tracks are viewed at the front of the vehicle.

When replacing the tracks, proceed as follows:

Lay the tracks out in front of the vehicle.

Roll the vehicle on to the tracks so that the rear bogie wheels are approximately 1 ft. away from the track ends.

Insert a joint pin half-way into the last link and pull the tracks over the adjusting wheels and guide rollers on to the sprocket wheels, so that the tracks are engaged with the sprocket teeth.

Insert a suitable piece of wood between the track and the rear of the front bogie wheel to lock the track temporarily.

Turn the steering wheel to lock the sprocket wheel on the opposite side to which the track is being fitted.

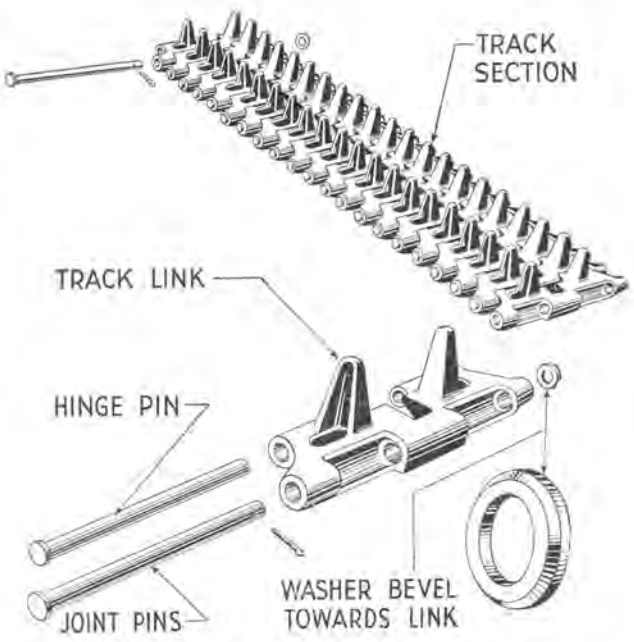


Fig. 16. TRACK SECTION.

Engage reverse gear and gently operate the starting handle to pull the tracks round until the two ends meet. Then insert the joint pin and secure with the washer and split pins. See that the bevel of the washer faces the track link.

The two front nuts of the adjusting bracket should be kept tight. This will prevent damage to ratchet and pawl.

CHAPTER III A

SUSPENSION

Part 1

LUBRICATION

The four bogie assemblies which comprise the vehicle's suspension system require very little maintenance attention during the course of service. **Regular lubrication, however, is vitally important.**

On both front and rear assemblies the guide rods must be lightly lubricated. But be absolutely certain that no grease is allowed on the bearings of the cups.

Lubrication is by grease nipples, as shown on Lubrication Chart, for secondary fork bearings, bogie wheels, guide rollers, spindles and front bogie brackets.

Examine the ball-shaped ends, into which the guide rods fit, for wear and length.

Examine fabric bearings of ball sockets for wear or breakage.

Examine all inner and outer springs.

A direct oil feed lubricates the camshaft bearings, and oil grooves are machined in the camshaft to facilitate the lubrication of these parts.

Incorporated in the main oil gallery is an oil relief valve, which consists of a spring-loaded plunger with a hemispherical base, held in tension by a coil spring and registering on a suitable seating.

A screwed plunger guide permits adjustment of the coil spring, so that the pressure can be varied to suit existing conditions.

When the internal oil pressure builds up to over 35 lb. per sq. in., the spring tension on the relief valve plunger is overcome, and oil is allowed to by-pass into an oil-way directly connected with the **timing cover,** surplus oil draining back into the oil sump. As the oil pressure decreases to normal, the relief valve closes and oil circulates in the normal manner.

An oil pressure gauge is fitted on the left-hand side of the instrument panel below the speedometer in the driver's compartment, and enables the driver to check oil pressure from time to time when the vehicle is on the move. The oil gauge is connected to the engine by means of a copper pipe, passing through the division plate along the right-hand engine cover support to a union in the oil cooler relief valve assembly.

Owing to the fact that the engine is almost totally enclosed, it has been found necessary to fit an oil cooler, and it will be readily appreciated that if oil is allowed to over-heat, it breaks down and a large proportion of its lubricating qualities are lost.

The oil cooler takes the form of a copper tubing, which is heavily finned to present the greatest possible surface to the air, and the cooler is connected to the main oil gallery by means of suitable pipe lines (Fig. 24).

Hot oil therefore passes from the engine through the oil cooler and is returned into the oil sump.

A second relief valve is incorporated in the oil cooler circuit, so that before the engine is thoroughly warmed up the oil pressure is sufficiently high to open the valve, so diverting the oil through the normal oil circuit, but as the oil heats up, pressure will decrease until the valve closes, and hot oil passes through the cooler.

Part 2

GENERAL DESCRIPTION

The power unit is a four-stroke side-valve V.8 petrol engine, and the cylinders are arranged in two banks of four, at 45° from the vertical centre line.

The cylinder and crankcase are an integral casting, the lower half constructed to carry the main bearings, and by reference to Fig. 25 it will be seen that the crankcase webs serve as main bearing housings and stiffen the crankcase to prevent distortion.

The oil sump is bolted to the lower half of the crankcase, and an oil sealing gasket is fitted between the machined faces. The sump is constructed to cause the maximum depth of oil to be at the rear of the engine, thus ensuring that the oil pump suction pipe is always immersed in lubricant. The sump is fitted with a large drain plug screwed into a boss, to facilitate changing oils.

The Crankshaft

The crankshaft rotates in three main bearings of the shell-backed type, positioned by main bearing caps fitted into the crankcase webs. The crankshaft is balanced, and has four throws inclined at 90° from one another. Each throw accommodates two connecting rods, one from a cylinder in each bank.

Big end bearings are also of the shell-backed type, and are held in position by big end caps, bolts and split pin nuts.

Connecting Rod and Piston

Each connecting rod terminates in an alloy split skirt piston, fitted to the small end by a fully floating gudgeon pin, passing through a bronze small end bush. The gudgeon pins work directly in the piston bosses, and are held in position by circlips.

Each piston has two compression rings and one scraper ring, and all these rings are fitted on the piston crown—that is to say, above the gudgeon pin.

Camshaft

The single camshaft rotates in three bearings arranged centrally between the cylinder banks, and it is driven by a fabric type gear wheel from the crankshaft drive gear wheel situated vertically below it.

The camshaft operates the sixteen side valves through non-adjustable tappets, and it also operates the petrol pump, oil pump and distributor drive.

Valves

All the valves are of the mushroom type, with 45° seatings, and the valve heads fit in corresponding valve seats cut in the cylinder block.

The exhaust valve ports are machined to allow hardened steel valve inserts to be fitted, a procedure which lengthens the life of the exhaust valves, which it will be appreciated are subjected to greater heat than the inlets.

Valve Guides

Both inlet and exhaust valves are interchangeable, and they all work in split valve guides. Valve guides are pressed into the cylinder block, and are machined in such a manner as to form flanges suitable for a valve spring register. The valve guides are in two halves, forming one complete whole when inserted into the cylinder block, and are machined to suitable internal diameters to give a working clearance for the valve stems.

Valve Springs

Valve springs are of the single coil type, and the top of the valve spring registers against the flange of the valve guide mentioned above, whilst the lower end of the spring registers on the valve collar, the latter being held in position on the valve stem by means of

ments are guided and restricted within predetermined limits by the gate (C). This is mounted to the floor on brackets (D).

The hand lever is positioned between two plates (E), which are pin jointed to the lever just below the gate. When the lever is moved sideways the plates turn with it. When the lever moves forward or backward, a similar motion is transferred to the plates through the pin joint. The plates are riveted to the forward end of the front actuating rod (F). This rod is bolted at its rear end to a tube (G) which in turn is bolted to the rear actuating rod (H). The whole actuating rod assembly is moved as a unit by the driver's movements of the hand lever. The rear actuating rod slides and rotates on balls in a spherical bearing (J), free to move in a trunnion bracket (K) bolted to the floor.

The rear of the actuating rod terminates with an upward bend and a ball working in the tubular end of the gear lever extension from the gearbox. This extension, pivoted on the ball-mounted lever of the selector housing, is provided with a slotted guide bracket on the left-hand side of the gearbox; in this way correct reception of gear-change motions is maintained.

Part 3

THE GEARBOX AND FINAL DRIVE COUPLING

This unit is fitted between the gearbox output shaft and the final drive axle pinion, and by referring to Fig. 37 the general arrangement can be seen. The prime object of the coupling is to transmit power from the gearbox to the final drive axle.

The coupling consists of a short metal casting, carrying a short shaft, one end of which is constructed to form an internal gear, which engages in a male gear projecting from the rear of the gearbox housing, and fitted to the gearbox mainshaft. The other end of the shaft is splined to receive the rear axle pinion. Thus it will be seen that when the unit is fitted together a complete drive from gearbox to axle is made. The rear axle pinion shaft is secured in position in the short coupling shaft by means of an axial set screw, which in turn is secured by a retaining plate and locking washer. This arrangement prevents the movement of the pinion in the coupling shaft.

The complete coupling is bolted through the rear division plate on to the final drive axle flange, and the forward end of the coupling is sealed with a gaiter secured to the housing flange by means of screwed metal clips.

The coupling shaft is machined to form a spiral gear on its outside diameter, and forms the drive for the speedometer flexible shaft which fits on to the coupling, the small worm drive meshing with the spiral gear.

Provision is made for lubrication by fitting a grease nipple on the outside of the coupling case.

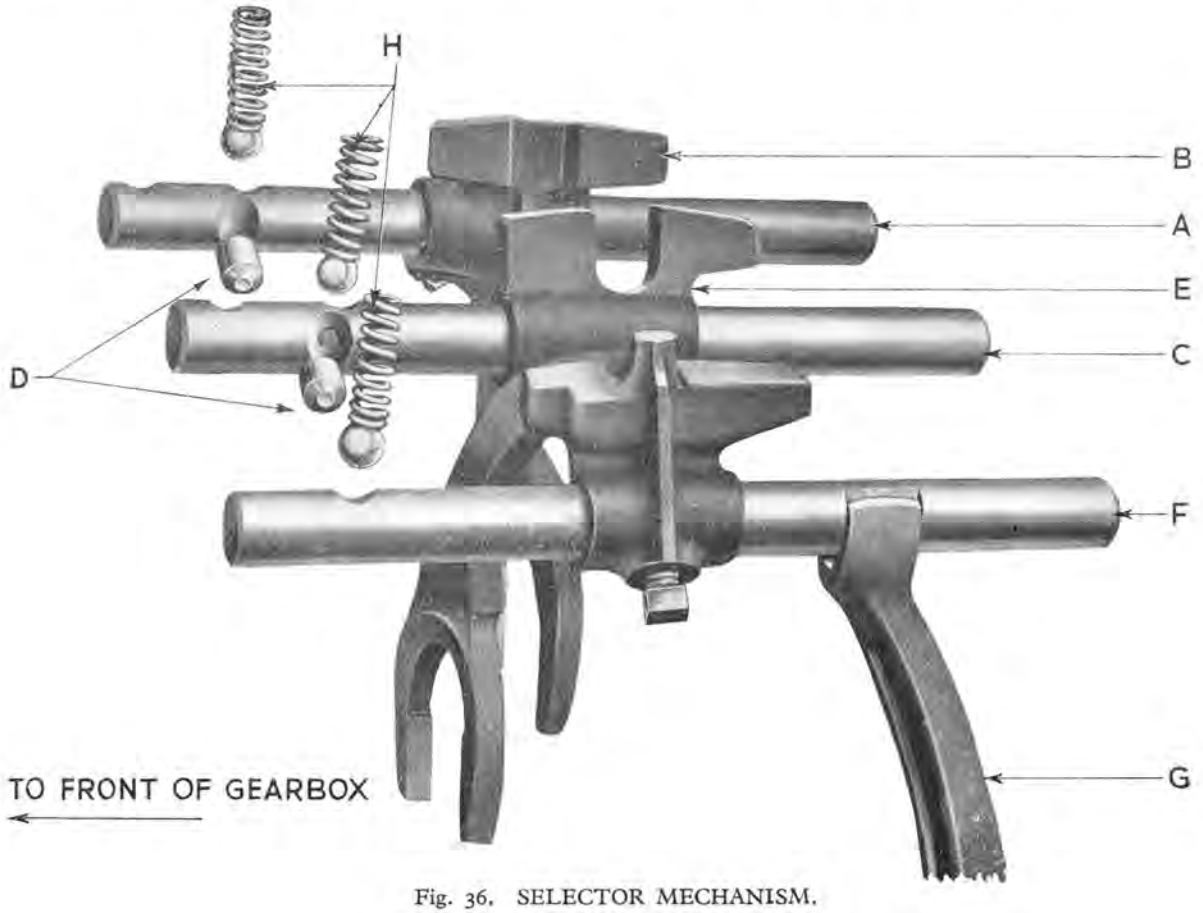
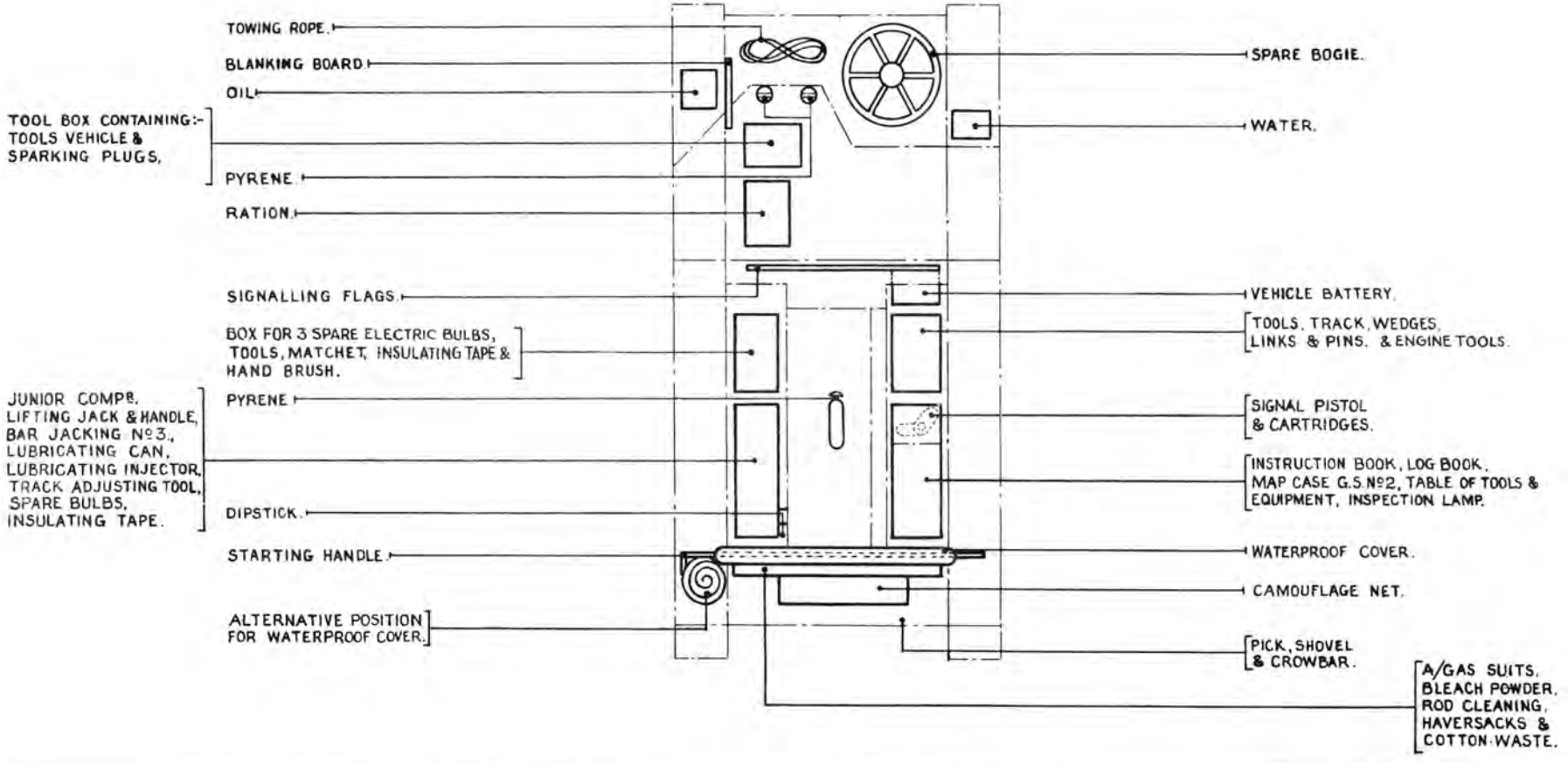


Fig. 36. SELECTOR MECHANISM.

NOTE:-
MIDDLE EAST EQUIPMENT—
4-2 GALLON P.O.W CANS CARRIED L.H SIDE OF L.H REAR COMPARTMENT.
CONDENSER CARRIED REAR OF R.H REAR COMPARTMENT.

STANDARD VEHICLE.
SHOWING STOWAGE (OTHER THAN ARMS & AMMUNITION) COMMON TO ALL ROLES. THIS IS ADDITIONAL TO SPECIAL EQUIPMENT.



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					FOR:- CHIEF INSPECTOR OF MECHANIZATION		I.F.V.(PD.)S.4.
					BASED ON C.I.M.(A.F.V.) SKETCH		Nº A.144.

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PROVISIONAL STOWAGE DIAGRAM