

*Overall ratios :—*

5th—7·405 to 1.

4th—10·214 to 1.

3rd—19·71 to 1.

2nd—36·77 to 1.

1st—76·6 to 1.

Reverse—108·268 to 1.

*Suspension :—*Slow motion type, with 6 rubber-tyred bogie wheels on each side. Front and rear—24-in. diameter. Remainder—19½-in. diameter. Single springs, damped by shock absorbers.

*Shock absorbers :—*Newton & Bennett. Type V.T. 1. Hydraulic.

*Turret rotation :—*Power (hydraulic system), or hand, for main turret. Hand only for auxiliary turrets in A9 tanks.

*Vision arrangements :—*Commander : Vickers tank periscope. Driver : Bullet-proof glass block and, in A10, a periscope.

## Sec. 2. Engine Details

### (1) MOUNTING

The A.E.C. engine is bolted up in one unit with the clutch and Meadows 22 type gearbox, all the auxiliaries except the fan and starter motor being positioned on the near side. The engine is carried in the hull by a single resilient mounting at its front end and by similar mountings on each side of its clutch housing at the rear. In addition, the rear end of the gearbox is located in the transmission plate which extends across the hull, a torque stay being fitted.

### (2) CRANKCASE, CRANKSHAFT AND CYLINDERS

The crankcase houses the crankshaft and camshaft, the crankshaft being carried in seven white metal bearings and having hollow pins and journals to form oil passages. Behind the rear bearing is a filler block.

Outside the crankcase there are two unions for the oil pumps, also one for the oil pressure gauge and one for an oil relief valve. The oil filler cap on the front near side is sealed up and a breather pipe is taken from this point to the oil canister. Another breather pipe leads to the carburettor intakes through a flame trap.

The cylinder block is fitted with liners which are frozen into position and the block is secured to the crankcase by means of special lock nuts; these can be used again after removal. Two large detachable plates on the off side give access to the overhead valve push-rods and two small plates on the near side to the interior of the water jackets.

The two detachable cylinder heads each enclose three cylinders, the joints being made by copper and asbestos gaskets. The exhaust valve seats are of the screwed in type.

The sump is bolted to the crankcase, the front set bolt being prevented from falling down after it has been unscrewed by a small set screw in the front of the sump. The two sump wells are each fitted with a drain plug.

### (3) PISTONS AND CONNECTING RODS

The B.H.B. aluminium alloy pistons are fitted with four compression rings and one scraper ring. Provision is made for the fitting of a second scraper ring if it should be required. When new, the rings should have 0·003 to 0·004 in. side play and 0·012 in. gap.

The connecting rod big ends are fitted with split white metal shells and shims whilst the small ends have pressed in bronze bushes. The gudgeon pins are a push-fit in the pistons and connecting rods, location being by circlips.

carburettor. A hand throttle control of the "screwed knob" type is situated to the right of the driver in front of the off-side steering lever and operates direct on to the foot pedal arm.

### (3) STARTING FROM COLD

The U.D.D. carburettor has a very simple form of starting device which provides the necessary enrichment of the mixture to ensure immediate starting in all weathers.

In the starting position, the recess in the rotary disc permits the whole of the compensating emulsion of fuel and air to be drawn into the throttle chamber on the engine side of the throttle through a passage. The butterfly throttle must be in the idling position when attempting to start. The atomised mixture is drawn into the cylinders and, when the engine starts, an increasing amount of air will be drawn in, thus preventing any choking due to an over-rich mixture. The starting carburettor control is on the right of the driver and should be used only when the engine is cold. It should be returned to the normal running position as soon as the engine runs satisfactorily without it.

### (4) MAINTENANCE

The float chamber should be drained and the banjo union filter cleaned every 1,000 miles.

To ensure easy starting, the manifold joints must be kept tight. In particular, check the balance pipe connections.

## Sec. 7. Ignition system.

The 12-volt coil ignition system consists of a Delco Remy coil, type Delco 529 C, and a Simms contact breaker and distributor head, type C.S. 6 L. Advance and retard is both manual and automatic.

### (1) DISTRIBUTOR

This is driven by a shaft at 30° to the vertical on the front near side of the engine. The sleeve portion below the timing lever is clamped in the driving shaft housing by two bolts, the distributor spindle having an off-set tongue which engages with

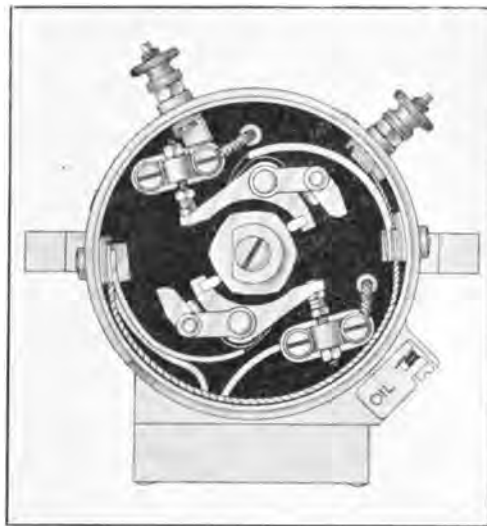


FIG. 6.—DUAL CONTACT BREAKER

## (3) MAINTENANCE

(a) Glasses. Keep all lenses clean, using chamois leather. If wet, clean with cotton cloth and polish with chamois. Do not finger the glass. To avoid clouding over, smear some anti-dimming compound on the surface of the glass. "Clarocit" is suitable for this purpose.

(b) To clean the supplementary prism, it must first be removed after unscrewing the stop screws. Poor vision to the rear will be caused by a dirty or stained supplementary prism.

(c) All moving surfaces should be kept very lightly oiled, as surplus lubricant will get on to the glass and spoil the vision. A small amount of grease should be injected into the nipple, provided in the lower bearing, weekly, if the periscope is in regular use.

## APPENDIX I

## INTERNAL COMMUNICATION EQUIPMENT

## (1) DESCRIPTION

The Tank is normally fitted with a Telephone Set, A.F.V., which enables the Commander to communicate with members of the crew whether wireless is or is not fitted. It is possible that in the case of later vehicle issues, this telephone equipment may be replaced by Tannoy crew-control equipment which employs loud-speakers.

## TELEPHONE SETS A.F.V.

## SCHEMATIC LAYOUT OF APPARATUS.

## TANK, CRUISER, A.9., MARK I.

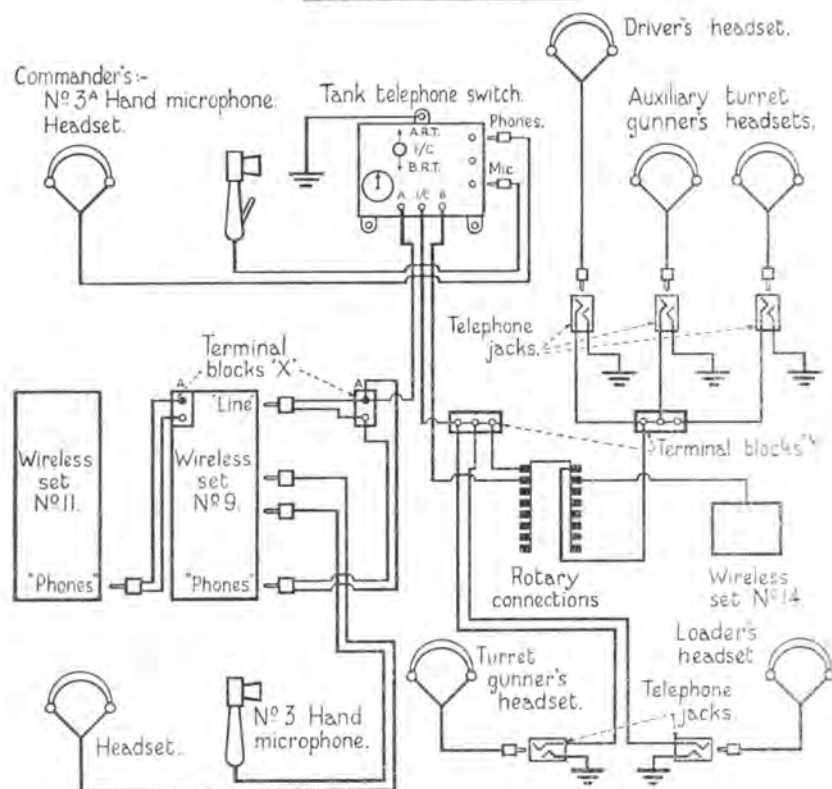


FIG. 12.—TELEPHONE SETS A.F.V.

TANK, CRUISER, A.9., MARK I.  
TURRET ELECTRICAL WIRING DIAGRAM.

