Section 2. ENGINE DETAILS.

(1) MOUNTING.

The A.E.C. engine is bolted up in one unit with the clutch and Meadows 22 type gearbox. 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 bevel box is bolted to the gearbox and supported by trunnions (one either side of bevel box).

(2) CRANKCASE, CRANKSHAFT AND CYLINDERS.

The crankcase houses the crankshaft and camshaft, the crankshaft being carried in seven lead bronze and white metal bearings and having hollow pins and journals to form oil passage.

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. An overflow pipe is taken from the oil canister to the timing case cover. The breather pipe leads from the timing case cover to the air intake pipe from the bulkhead.

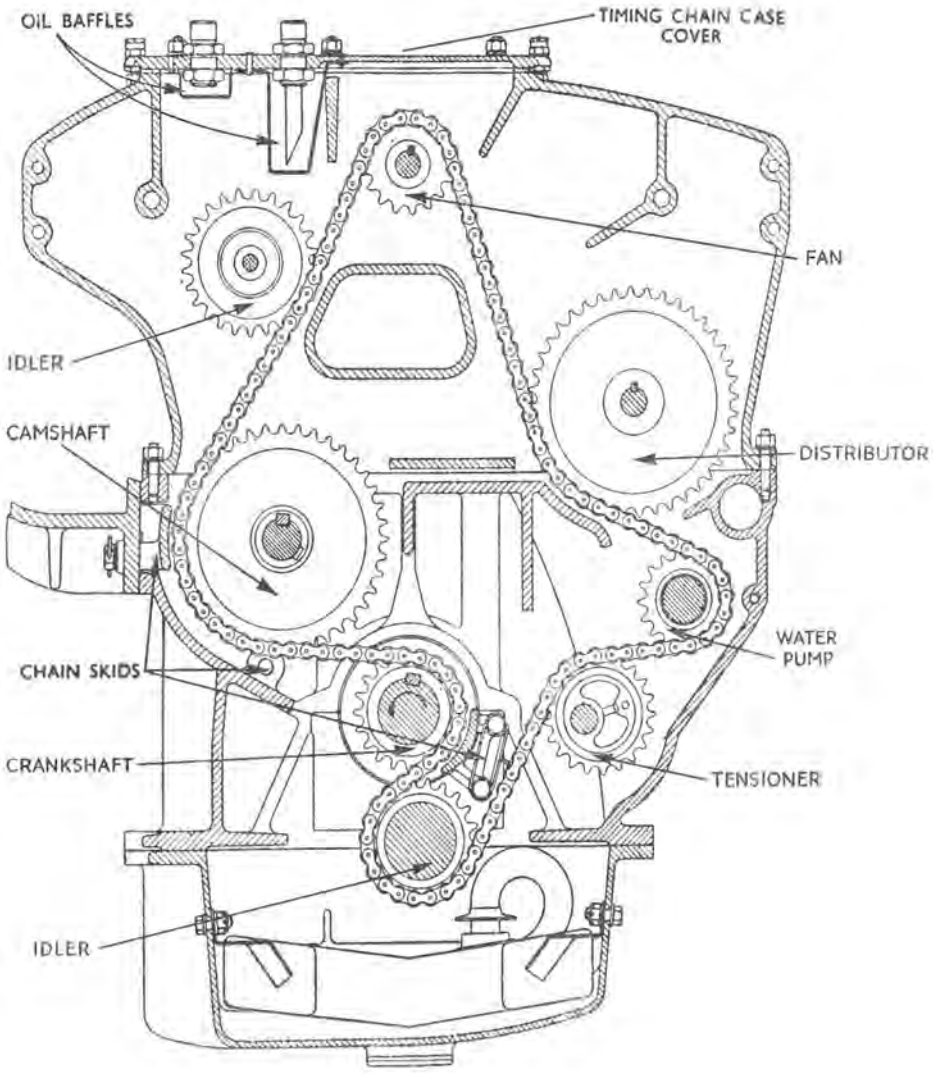

Fig. 1. **Timing Gears.**

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 integral type.

Section 9. ELECTRICAL SYSTEM.

(*Plates* 4, 5, 6 *and* 7)

Wiring diagrams for the hull and turret are shown on plates fitted to the vehicle.

(1) DYNAMOS.

The two dynamos are driven in tandem by a belt from the crankshaft pulley.

The front dynamo or one nearest the timing case is the service dynamo.

The rear is the turret dynamo.

Each is fitted with three terminals—positive, negative and field. The dynamo for the main system is of the voltage controlled type in which the charging rate is controlled by a carbon pile regulator housed in a separate control board. The charging rate varies according to the state of charge of the battery, being high (18 to 20 amps) when the battery is discharged, and low (3 to 4 amps) when it is charged.

(2) BATTERY.

Four 6 volt batteries, either Exide or C.A.V. type are provided, two being situated on the floor to the left of the driver and two in the engine compartment on the off-side.

The correct sp. gr. of a fully charged battery should be 1.270 to 1.285 at normal atmospheric temperatures and from 1.200 to 1.215 when temperatures usually exceed 90° F.

(3) CONTROL BOARD.

The control board for charging circuit is located adjacent to the driver's instrument panel. It is fitted with a carbon pile regulator, magnet and rotor unit, 3 ohm and 90 ohm resistances, a strip type 50 amp. fuse, a cut out and six terminals.

The carbon pile, which consists of a spring loaded pack of carbon rings, forms a resistance in the dynamo field circuit. If the compression on the pile is decreased, its resistance will increase; the dynamo field circuit will therefore decrease and, as a consequence, the dynamo output.

The pull of a rotor, which is actuated by an electro magnet, is used to vary the compression of the carbon pile and so its resistance. The electro magnet is fitted with two windings, a shunt (voltage) winding across the dynamo positive and negative terminals and a series (current) winding which carries the dynamo output current. The pull of the rotor therefore varies with dynamo voltage and current, the maximum charging rate being controlled and varying according to the state of the battery charge. The movement of the rotor is damped by a dashpot.

The board is fitted with a regulator which has a self-compensating carbon pile. There is no external re-setting knob and the setting only requires checking by the mechanist staff after the first 1,000 miles, and then at 2,000-mile intervals, as described in Section 21, page 36.

The 90-ohm resistance is in series with the magnet shunt coil for temperature compensation. The 3-ohm resistance is in parallel with the dynamo field windings.

The 50-amp. strip fuse carries the dynamo output and will blow if the charging rate exceeds this figure, the probable cause being a short circuit across the battery.

The cut-out, in addition to the usual shunt (voltage) and series (current) windings, has an auxiliary winding. There are two instead of the usual one pair of contact points. When the dynamo reaches its cutting in speed, current round the shunt coil causes the primary contacts to close in the first place and complete the circuit for the auxiliary coil which assists the shunt coil in closing the main contacts. The dynamo output current then flows through the series coil.

(4) INSTRUMENT PANELS.

There are two instrument panels. The N.S. is fitted with an ammeter, starter switch, heater plug switch, near side head lamp switch, off side head lamp switch, side lamps switch, tail lamp switch, oil pressure gauge, fuse box, inspection lamp socket and panel light. The O.S. panel is fitted with panel light and thermometer.

(5) STARTER MOTOR (*Plate* 7).

The starter motor is a C.A.V. 24-volt, Type B.S.624.H—17, special features being that the main switch is solenoid actuated, and starter pinion engagement is effected by axial movement of the armature itself.

The motor has four pole pieces and three field windings—an auxiliary shunt winding to move the armature axially, and auxiliary series winding to rotate the armature slowly, and the main series winding.

outer ring, corresponding with these bolts, are an equal number of set-bolts. If these are removed and a "Forcing screw" is screwed into each tapped bush, the outer ring is forced off the wheel, provided the 12 ring bolts have first been removed.

(*d*) The tyre is held in position by the grip of the inner and outer retaining rings. This is sufficient to prevent any "creep" taking place, provided the rings are fitted correctly and are bolted fully home.

NOTE.—On some machines Timken taper roller bearings are fitted as alternative to the ball and roller bearings described above. See *Figs.* 26 and 27, page 43.

(6) IDLER WHEELS.

The idler or track adjusting wheels are similar to the 24" bogie wheels, the tyre, rims and bearings being interchangeable.

(7) TRACK ADJUSTER. (*Fig.* 15).

The track adjusting bracket is mounted on, and free to rotate about, a support bracket which is bolted to the hull of the machine. It carries the spindle for the track adjusting wheel, which projects eccentrically from it. Sockets are located on the front for insertion of the track adjusting lever, and a semi-circular rack is bolted to a portion of the circumference. This rack also forms part of the lip holding the track adjuster bracket to the support bracket.

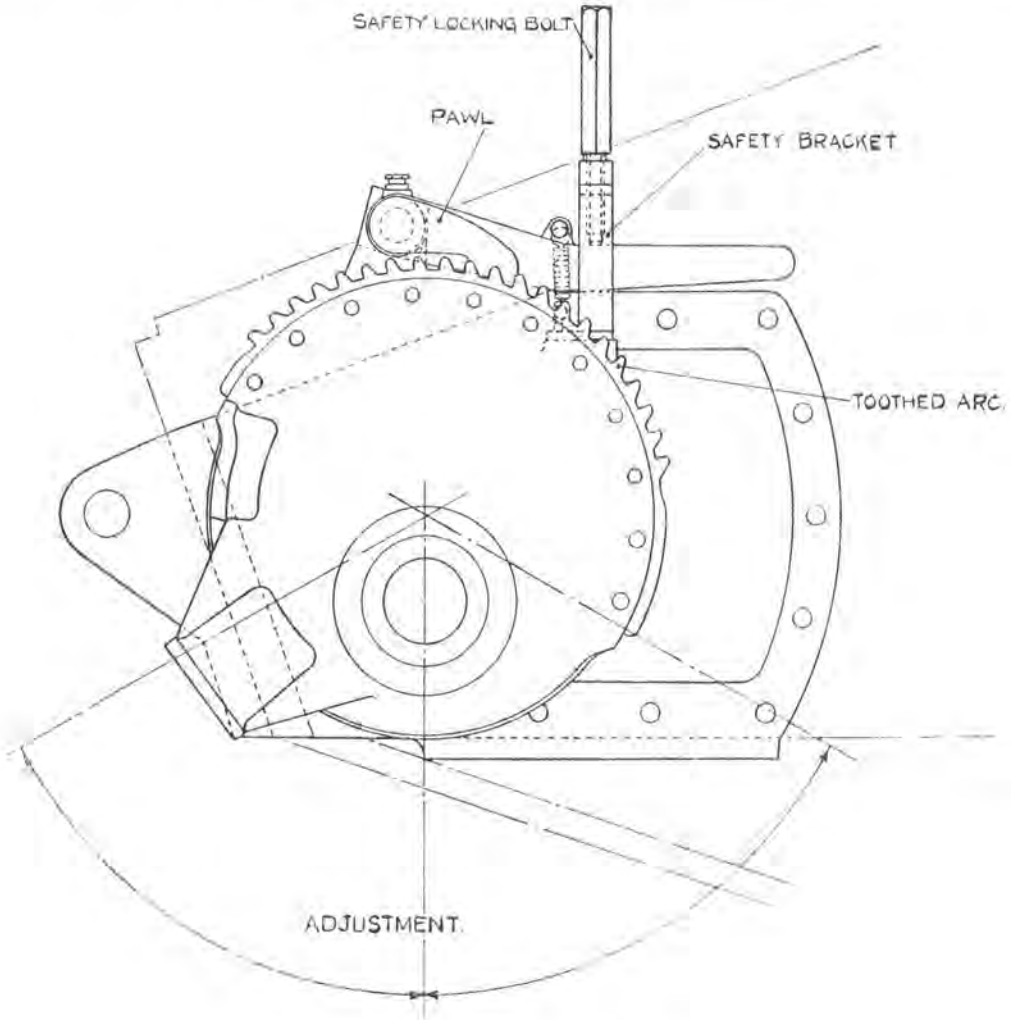

Fig. 15. **Track Adjuster.**

A pawl is mounted on the hull support bracket and its end engages with the teeth of the rack, preventing rotation of the bracket unless the pawl lifts against a coil spring. A safety locking bolt is fitted to prevent the pawl from accidentally becoming disengaged from the teeth.

The base of support bracket is flattened to form a jacking pad.

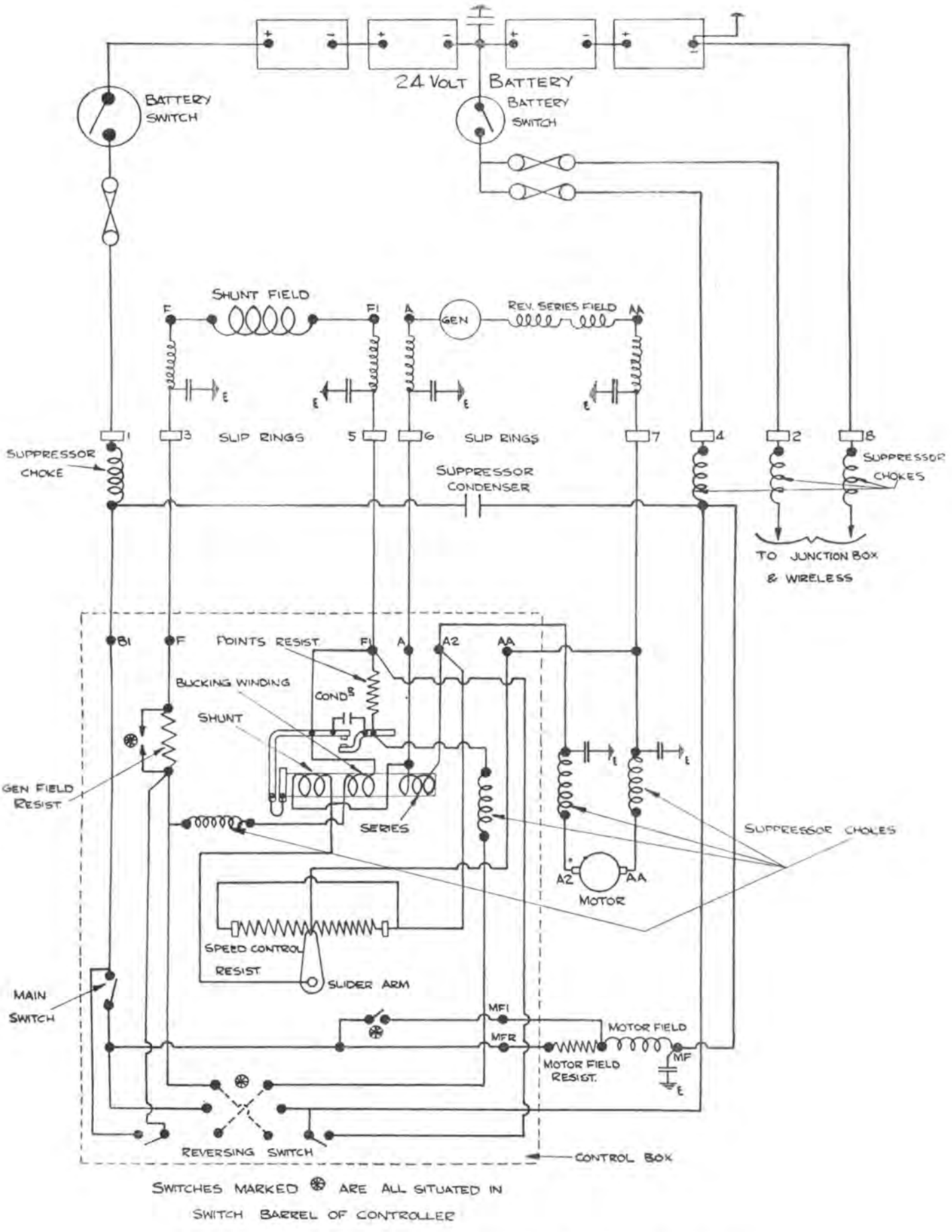

Fig. 18. **Theoretical Wiring Diagram of Traverse Equipment.**

PLATE No. 2.

FUEL LIFT PUMP (C.A.V.)

B Tappet Roller.
E Fuel Outlet.
F Outlet Valve.
G Plunger Spring.
H Inlet Valve.
J Inlet.
L Plunger.
N Guide Spindle.
P Preliminary Filter Gauze.
Q Clamping Nut.
R Fixing Strap.
S Packing Washer.
T Valve Plugs.
U Copper-asbestos Sealing Washers.
V Spring Chamber Cap.
W Feed Pump Body.
X Preliminary Filter Gauze Container.
Y Spindle Guide.
Z Hand Priming Device.
AC Inlet Plug Filter Gauze.

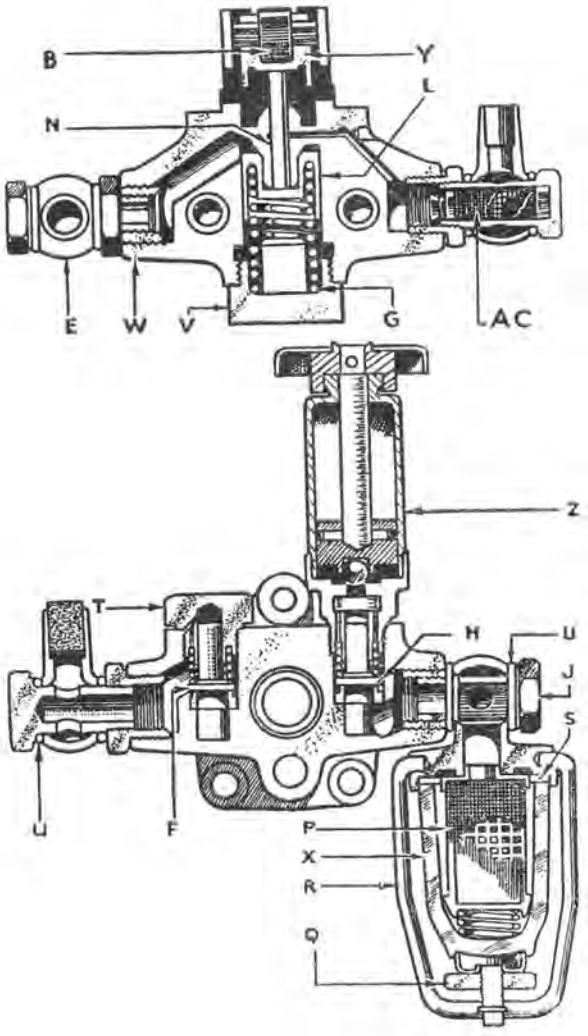

Plate No. 2

FUEL LIFT PUMP (C.A.V.)