

**workshop manual**

**MORRIS 8**

**SERIES E**

**MORRIS 10**

**SERIES M**



SUPPLIED BY  
WHITES MOTOR CENTRE LTD.  
407 COLOMBO ST. SYDENHAM

# Workshop Manual

FOR

## **MORRIS EIGHT** Series "E"

1939 TO 1948

## **MORRIS TEN** Series "M"

1939 TO 1949

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**GROUP 1**

**GENERAL DATA, SERIES E & M**

**SPECIFICATIONS, SERIES E**

Model .....	Series E (Eight-forty)
Year of manufacture .....	1939 to 1948
Serial number prefix .....	SE/E/
Turning circle:	
Right hand .....	35' 11"
Left hand .....	32' 7"
Location of serial number .....	Plate on bulkhead.
Track: Front .....	3' 8 $\frac{3}{8}$ "
Rear .....	3' 10 $\frac{1}{4}$ "
Wheelbase .....	7' 5"
Ground clearance .....	6 $\frac{3}{8}$ "
Height .....	5' 2"
Width .....	4' 8"
Length .....	12' 0"

**TORQUE SPANNER FIGURES**

Cylinder head .....	525 in/lb
Connecting rod .....	320 in/lb
Gudgeon pin clamp .....	150 in/lb
Main bearing .....	500 in/lb
Flywheel securing .....	500 in/lb
Manifold nuts .....	350 in/lb

**CAPACITIES**

<b>Lubricants</b>	<b>Quantity</b>	<b>SAE No.</b>
Crankcase .....	6 pints	Over 32° F SAE 30 0° F to 32° F SAE 20 Under 0° F SAE 10
Gearbox .....	1 $\frac{1}{2}$ pints	Over 10° F SAE 140 EP Under 10° F SAE 80 EP
Rear axle .....	1 pint	Over 10° F SAE 140 EP Under 10° F SAE 80 EP
Steering gearbox .....		Over 10° F SAE 140 EP Under 10° F SAE 80 EP
Fuel tank .....	5 $\frac{1}{2}$ gals	
Cooling system .....	15 pints	

**WHEELS**

Type .....	Pressed disc
Make .....	Dunlop

**TYRES**

Tyre size .....	4.50 × 17
Tyre pressure:	
Normal .....	Front, 24 lb; rear, 27 lb
Fully loaded .....	Front, 26 lb; rear, 29 lb

## 1-2 General Data

### SPECIFICATIONS — SERIES M

Model .....	Series M (Ten)
Year of manufacture .....	1939 to 1949
Turning circle .....	RH, 39' 0"; LH, 37' 3"
Track: Front .....	4' 2"
Rear .....	4' 2"
Wheelbase .....	7' 10"
Ground clearance .....	6½"
Height, unladen .....	5' 5"
Width .....	5' 1"
Length .....	13' 2"
Weight .....	2,072 lb

#### CAPACITIES

Lubricants	Quantity	SAE No
Crankcase and oil filter .....	9 pints	30
Gearbox .....	1¼ pints	EP 140
Rear axle .....	1½ pints	EP 140
Fuel tank .....	7 gals	
Cooling system .....	14 pints	

#### TYRES

Size .....	5.00 × 16	
Normal tyre pressure .....	Front	Rear
Fully laden with passengers .....	23 lb	25 lb
	25 lb	27 lb

**GROUP 2**

**ENGINE, SERIES E**

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**SPECIFICATIONS**

Type .....	USHMI
Bore .....	2.244 (57 mm)
Stroke .....	3.543 (90 mm)
Capacity .....	57.04 cu ins (918.6 cc)
Number of cylinders .....	4
Firing order .....	1, 3, 4, 2
Nominal HP .....	8
Compression ratio .....	6.6 to 1
Torque .....	39 ft/lb at 2,400 rpm
BHP .....	27.6 at 4,400 rpm
Cylinder head gasket .....	Copper-asbestos
Ignition timing .....	TDC full retard

**CYLINDER BLOCK**

Type of material .....	Cast iron
Bore diameters .....	2.244"
Bore for oversizes .....	+ .010" to + .060" max
Number of main bearings .....	3

**CRANKSHAFT**

Material .....	Steel
Type .....	Counter-balanced
Thrust taken at .....	Centre bearing
Main bearing journal diameter .....	1.654"
Main journal bearing minimum regrind diameter .....	1.604"
Main bearing journal length:	
Front .....	1.338"
Centre .....	1.378"
Rear .....	1.437"
Method of sealing oil:	
Front end of shaft .....	Asbestos packing
Rear end of shaft .....	Cork strip and oil scroll
Crankpin diameter .....	1.575"
Crankpin minimum diameter for regrind .....	1.525"
Crankpin fillet radius .....	2.5 mm ± .15 mm
Main journal fillet radius .....	2.5 mm ± .15 mm

**MAIN BEARINGS**

Type .....	Thin shell
Material .....	White metal
Number of main bearings .....	Three
Diametrical clearance .....	.001" to .0015"
End clearance .....	.0015" to .0038"

**CONNECTING RODS**

Type .....	Forged steel
Length .....	6.496" between centres.
Type of bearing .....	Shimless, steel backed, white metal lined
Side clearance .....	.004" to .006"
Diametrical clearance .....	.001" to .0015"



**SPECIFICATIONS (Continued)**

**GUDGEON PINS**

Type .....	Semi-floating
Method of securing .....	Clamped in little-end
Diameter: Outside .....	15 mm + .000 mm — .005 mm
Inside .....	4.00 mm ± .10 mm
Length .....	47.5 mm + .00 mm — .10 mm
Fit in piston .....	— .003 mm to + .008 mm
Fit in connecting rod .....	+ .01 mm to + .035 mm before fitting pinch bolt

**PISTONS**

Type .....	Aluminium alloy
Method of removal .....	Downward
Piston clearance (top) .....	.016" top land; .012" bottom land
Piston clearance (bottom) .....	Slotted .0024"

**PISTON RINGS**

Number of compression .....	2
Number of oil control .....	1
Width of compression rings .....	.100"
Width of oil control rings .....	.118"
Ring gap .....	.0025" to .0065"

**VALVES**

Type .....	Poppet
Position .....	Side
Operation .....	Barrel tappets
Timing:	
Inlet valve opens .....	8° BTDC
Inlet valve closes .....	52° ABDC
Exhaust valve opens .....	52° BBDC
Exhaust valve closes .....	20° ATDC
Markings (location of) .....	T marks on wheels and bright links on chain
Exhaust valve head diameter .....	1.102"
Exhaust valve stem diameter .....	.276"
Inlet valve head diameter .....	1.102"
Inlet valve stem diameter .....	.276"
Valve seat angle .....	45°
Clearance at tappets .....	.017" hot
Clearance for setting valve timing .....	.023" cold

**VALVE GUIDES**

Material .....	Cast iron BS/1452/12
Length .....	48 mm
Outside diameter .....	12 mm + .04 mm + .02 mm
Inside diameter .....	7.08 mm to 7.06 mm
Interference fit .....	.01 mm to .05 mm

**SPECIFICATIONS (Continued)**

**CAMSHAFT**

Type of bearings .....	Plain (running in block)
Number of bearings .....	3
Bearing clearance .....	.0024"
End thrust .....	Taken on single blade thrust spring
Type of drive .....	Endless chain
Journal diameter .....	39.5 mm — .06 mm — .09 mm
Bearing inside diameter .....	39.5 mm + .02 mm — .01 mm

**LUBRICATION SYSTEM**

Type .....	Forced feed
Type of pump .....	Gear
Type of pump drive .....	Skew gear from the camshaft
Oil pressure .....	30 to 60 psi at 30 mph
Clearance between gears and cover .....	.003" max
Peripheral clearance between gears and body .....	.006" max

**FLYWHEEL**

Type of ring gear .....	Shrunk on
Maximum run-out .....	.005"
Type of pilot bearing .....	Bush
Method of locating flywheel .....	Dowels and bolts

## SERVICE INFORMATION — PROCEDURES

## 1. THE SUMP

The sump is located by 10  $\frac{3}{16}$ " hexagon-headed bolts and spring washers inserted from the underside of the flange and two screwed in from the top at either side of the oil pump housing.

*NOTE: Avoid displacing the hood of the oil pump when removing and replacing the sump. Any such displacement may distort or break the gasket between the hood and the pump body, and cause an air leak on the suction side, resulting in a loss of oil pressure. Should there be any doubt about the condition of the gaskets, fit new ones.*

## To Remove the Sump

(1) Raise the front of the car so the full weight of the front axle is suspended on the front springs; this will provide sufficient clearance between the axle beam and the engine base for the sump to be withdrawn; with the engine in position, it is essential to disconnect the exhaust pipe flange and position the exhaust pipe to give clearance for the sump upon removal.

(2) Remove the three  $\frac{1}{4}$ " hexagon-headed bolts inserted through the clutch housing into the sump and the 12 bolts mentioned above; the sump can then be withdrawn downward if moved sufficiently to the near-side to clear the oil pump.

## To Clean

(1) Remove the three sump tray securing bolts, the sump tray and the drain plug.

(2) Wash out all oil from the sump with kerosene and clean all deposits from the drain plug; thoroughly dry the sump and refit the tray and drain plug.

## To Refit

*NOTE: When refitting the sump to the engine particular attention should be given to the three sealing gaskets—the gasket on the crankcase face; the cork strip fitted into the recess in the rear main bearing cap; and the packing fitted into the recess in the front of the engine sump. If the gaskets are in good condition and have not been damaged in removing the sump, they may be used again, but damage generally occurs. It is therefore advisable to fit new ones.*

(1) Before fitting new gaskets, remove all traces of the old ones from the crankcase face, the sump face, and the recess in the rear main bearing cap; smear the faces of the crankcase joint with a light coating of grease.

(2) Next fit the two halves of the large gasket to the crankcase face so the holes in the gasket and crankcase register, and the ends of the gasket fit against the sides of the rear main bearing cap.

(3) The cork strip should then be fitted tightly into the recess of the main bearing cap, taking care the stepped ends fit the small recess at each end of the bearing without damaging the cork; when correctly fitted, the step of the cork strip will overlap and seal the ends of the sump gaskets; check that all holes register correctly.

(4) Fit the packing seal into the recess at the front end of the sump, and lift the sump into position on the crankcase, taking care not to displace the cork strip while doing this.

(5) First tighten evenly the 10 screws into the crankcase flange, and the two inserted from the top into the sump flange; then insert and tighten the three bolts which pass through the flywheel housing

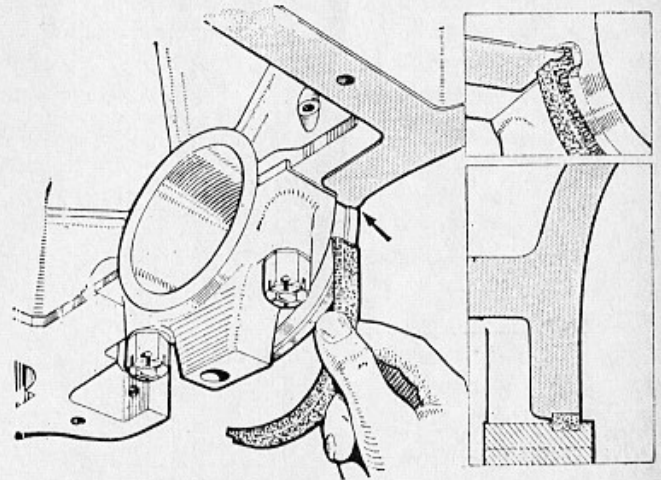


Fig 1 — The fitting of the cork sealing strip at the rear bearing is most important to prevent oil leakage. Here the correct method is shown.

## 2. OIL PUMP

## To Dismantle

(1) Detach the pump hood by extracting the cotter pin from the fixing stud at the bottom of the pump assembly, and removing the  $\frac{3}{16}$ " nut, plain steel washer, double coil spring washer, and fibre washer; this may distort or break the gasket between the hood and the pump body, and cause an air leak on the suction side and loss of oil pressure on reassembly; should there be any doubt about the condition of the gasket, fit a new one.

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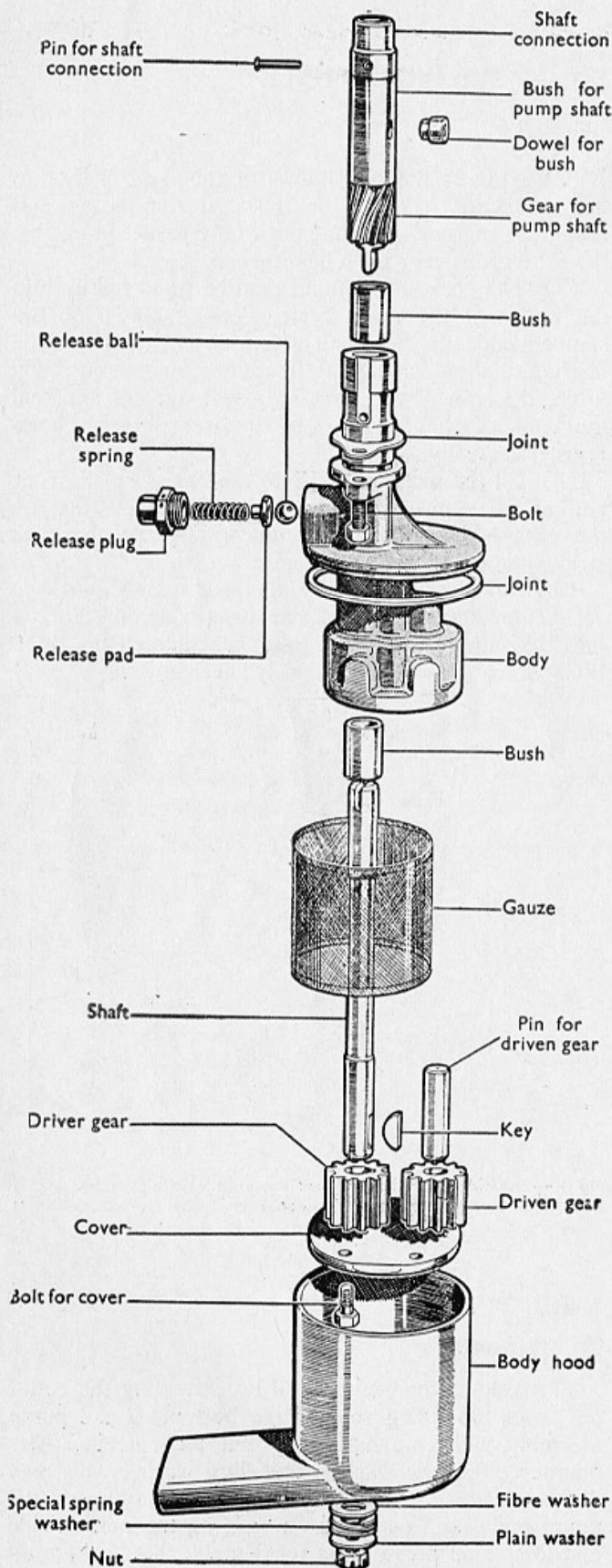


Fig 2—The component parts of the oil pump.

(2) To gain access to the pump gears, undo the four  $\frac{3}{16}$ " bolts with spring washers.

(3) Remove the pump cover and filter gauze; the gears may now be extracted.

(4) The oil feed from the pump is taken through the pump drive shaft into the pump body, on which is mounted the oil pressure release valve assembly; this assembly is held in position by the release plug, and it should be examined to ensure the release ball is perfectly round and it is seating properly.

(5) Check if the release spring has lost its tension; this can be done by measuring the length of the spring, which should not be less than 1"; fit a new ball and spring, if necessary.

*NOTE: The body gauze oil filter, which is incorporated in the oil pump, should be cleaned in petrol with a stiff brush. If damaged in any way, a new gauze should be fitted. Never use rag to clean it.*

### To Check the Gear Clearances

(1) The pump body, gears, and shaft should be cleaned carefully and reassembled before carrying out the following procedure:

(2) Measure the radial clearance between the teeth of the gears and the pump body; this should not be more than .006".

(3) Check the end float on the gears, placing a straight-edge across the face of the pump body, and measuring the clearance with feelers; this should not be more than .003".

### To Reassemble the Pump

(1) Reverse the order of dismantling.

(2) Observe that the pump body cover is fitted with the hood locating slot facing to the left side of the engine.

(3) The hood gasket should be placed carefully in its recess on the body flange, and the hood assembled so its intake faces the right side of the engine (i.e., at right angles to the crankshaft) when the assembly is refitted to the engine.

(4) When replacing the pump assembly in the engine, take care to see the slot in the pump drive shaft is set to engage with the tongue on the distributor drive gear.

## 3. PISTONS AND CONNECTING RODS

### To Remove

(1) Drain the engine oil and remove the sump.

(2) Remove the oil pump.

(3) Remove the cotter pins and the nuts from the big end bolts.

(4) Withdraw the big end bolts and the bearing caps.

(5) Detach the connecting rod from the crankshaft.

(6) Refit the bearing cap with the numbered side registering with the corresponding number on the connecting rod.

(7) Rotate the crankshaft slowly, and draw the piston and connecting rod assembly down the off-side of the engine.

#### **To Replace**

(1) Reverse the procedure just described, but the piston ring gaps should be set at 120 deg to each other.

(2) An ample chamfer is provided at the base of each cylinder bore to facilitate refitting the pistons and rings; no difficulty should be experienced in replacement.

(3) It is essential to replace each connecting rod and piston assembly in its own bore and fitted the same way round—i.e., with the gudgeon pin clamp screw on the opposite side to the camshaft.

#### **To Dismantle**

(1) Before the piston and gudgeon pin can be dismantled from the connecting rod, it is necessary to remove the clamp screw; to enable the assembly to be held in a vice for this operation, special holding plugs should be inserted in each end of the gudgeon pin.

(2) Unscrew the gudgeon pin clamp screw and remove it completely.

(3) Push out the gudgeon pin.

#### **To Reassemble**

(1) Reverse the procedure described.

*NOTE: Attention must be given to the following points when assembling the piston to the connecting rod:*

(1) The piston is fitted the same way round on the connecting rod.

(2) The gudgeon pin is positioned in the connecting rod so its groove is in line with the clamp screw hole.

(3) The clamp screw spring washer has sufficient tension.

(4) The clamp screw will pass readily into its hole and screw freely into the threaded portion of the little-end, also it is firmly tightened down on the spring washer.

### **4. PISTON RINGS**

#### **To Remove**

(1) If no special piston ring expander is available, use a piece of thin steel such as a suitably ground hack-saw blade or a disused .020" feeler gauge.

(2) Raise one end of the ring, and insert the steel strip between the ring and the piston.

(3) Rotate the strip around the piston, applying slight upward pressure to the raised portion of the ring, until it rests on the land above the ring groove; it can then be eased off the piston.

(4) Do not remove the piston rings downward over the skirt of the piston.

#### **To Fit New Piston Rings**

(1) The grooves in the piston must first be scraped clean of any carbon deposit, taking care not to remove any of the metal; this is because play between the ring and the groove reduces gas tightness and produces a pumping action leading to excessive oil consumption.

(2) New rings should be tested in the cylinder bore to ensure the ends do not butt together; to do this effectively, the piston should be inserted about 1" down the cylinder bore, and each ring then pushed down on to the top of the piston and held there to keep the ring square with the bore; the correct ring gap is from .0025" to .0065".

(3) When in position in the piston groove, the ring must move around quite freely, but there must be no movement in a vertical position.

#### **To Fit Gudgeon Pins**

(1) When gudgeon pins are fitted to pistons, a certain amount of selective assembly may be necessary, and the following points should be observed:

(2) With the standard aluminium alloy pistons, the gudgeon pins must be a thumb-push fit for three-quarters of their travel, being finished by lightly tapping with a rawhide mallet—this with the piston cold.

(3) Never attempt to ream out a gudgeon bore because over-sized pins are not available or permissible.

*NOTE: When fitting new pistons, selective assembly is necessary. To facilitate this the pistons are stamped with identification figures on their crowns. These figures should correspond with the similar figures stamped on the bottom face of the crankcase on the oil pump side to indicate each cylinder bore size. The pistons also are graded for weight and they are stamped accordingly on their crowns. It is advisable to fit pistons of the same weight grading to an engine to ensure the correct balance.*

Symbols are used to indicate the actual measurements, the bores being marked:

A OK, indicating a standard size diameter possessing the actual nominal measurement of 57 mm.

A2, indicating an oversize of .02 mm on the standard size, and thus having an actual measurement of 57.02 mm and so on through the range of sizes permitted.

The pistons are marked with the actual cylinder bore size, the requisite running clearance being allowed for in the machining. While the cylinder head and the pistons are withdrawn, the cylinder bores should be measured for wear.

Indication that a rebore of the cylinders is necessary is given by general loss of performance, oiling up and poor compression. The pistons are supplied graded in the same way as the cylinder bores, and those marked A OK should be fitted to bores marked A OK, and so on throughout the range.

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Oversize pistons are supplied in the following sizes:

A1 = .01 mm oversize, or 57.01 mm diameter.

A2 = .02 mm oversize, or 57.02 mm diameter.

A3 = .03 mm oversize, or 57.03 mm diameter.

A4 = .04 mm oversize, or 57.04 mm diameter.

A5 = .05 mm oversize, or 57.05 mm diameter.

BOK = .25 mm oversize, or 57.25 mm diameter.

COK = .50 mm oversize, or 57.50 mm diameter.

DOK = .75 mm oversize, or 57.75 mm diameter.

EOK = 1.00 mm oversize, or 58.00 mm diameter.

FOK = 1.25 mm oversize, or 58.25 mm diameter.

GOK = 1.50 mm oversize, or 58.50 mm diameter.

### 5. MAIN AND BIG END BEARINGS

The replacement of both main and big end bearings can be carried out without withdrawing the engine from the frame. Detachable bearing caps and steel-backed liners are used both for the main and the big end bearings, which are of the shimless type and therefore non-adjustable.

#### To Dismantle

- (1) Drain the engine oil, and remove the sump.
- (2) Remove the oil pump.
- (3) Because the bearings are of the shimless type it is essential that no attempt should be made to adjust worn bearings; they should be replaced with new parts.
- (4) Similarly, if the crankshaft journals are worn, it is advisable to fit a service reground crankshaft, complete with main and big end bearings, as supplied by the manufacturers.

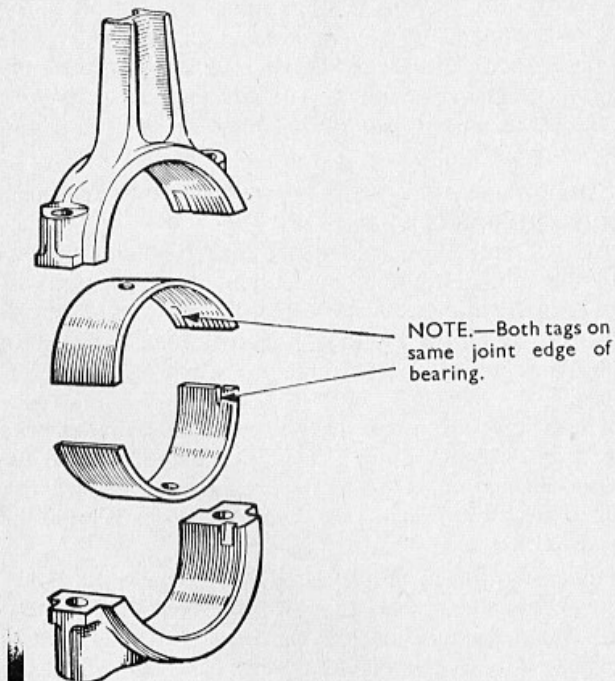


Fig 3—The location of the tags on the joint edge of the big end bearing.

(5) Both the main and big end bearing liners are located in position in the bearing housings by a small tag on one side of each half liner.

(6) Note the bearings are fitted so the tags come on the same joint edge of the bearing housing, although on opposite corners.

(7) To detach the big end bearings, extract the split pins from the big end bolts; undo the castellated nuts; remove the connecting rod caps and extract the bearings; take care to see all parts are cleaned before installing new bearings; no scraping is required because the bearings are machined to give the correct diametrical clearance of .001" to .0015".

(8) The main bearings should be dealt with one at a time; detach the main bearing caps, with the bottom half bearing liner; the top halves of the bearing liners are extracted by rotating them around the crankshaft in the direction of their locating tags, using a small grub screw inserted in the crankshaft oil-feed holes to facilitate this, if necessary.

#### To Replace

(1) The replacements are fitted in a similar manner by first inserting the plain side of each bearing liner into its housing; here again, no scraping is required, because the bearings are machined to give the correct diametrical clearance of .001" to .0015".

(2) In the event of a "run" bearing, it is always advisable to clean out all the oilways in the crankshaft and block; wash out the engine base with kerosene; remove the pump cover to ensure no particles of white metal are left anywhere in the lubricating system.

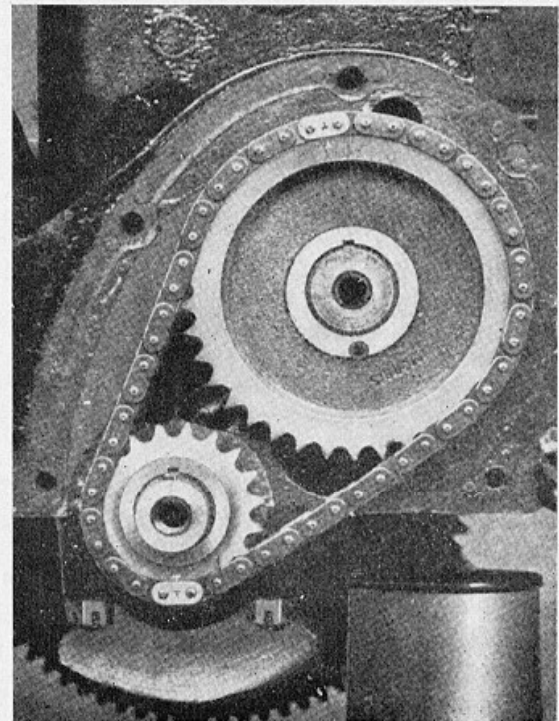


Fig 4—Showing the position of the marked teeth on the sprockets and of the bright links on the timing chain when set correctly for the replacement of the timing chain.

**6. ENGINE REPLACEMENT**

There is no difficulty in removing the engine, leaving the gearbox in the frame, if the work is carried out in accordance with the sequence described below. It is not necessary to remove the bonnet, but, as a safety measure, it should be secured carefully in the open position.

**To Remove**

(1) Drain the water from the radiator by means of the drain tap located in the near-side of the radiator bottom tank; if Bluecol or other anti-freeze mixture is used, it should be drained into a suitable clean container and carefully preserved for future use.

(2) Disconnect the battery by removing the positive cable lug from the battery terminal post.

(3) Detach the radiator mask by removing the two countersunk-headed and metal-threaded screws and nuts and spring washers locating the radiator core to the mask; undo the 10  $\frac{3}{16}$ " setscrews, with spring washers and plain steel washers, locating the radiator mask to the front wing valances.

(4) Release the clips on the top and bottom water hoses, and separate the hoses from their connections.

(5) Undo the  $\frac{5}{16}$ " locknut and retaining nut, with plain steel washers, from the two radiator foundation studs, which pass through the front chassis cross-member; remove the radiator.

(6) Release the throttle return spring from the air intake pipe; detach the air silencer or cleaner complete with the air intake pipe by removing the  $\frac{3}{16}$ " bolt and spring washer, attaching the air silencer support bracket to the air silencer, and the two  $\frac{1}{4}$ " bolts, with spring washers, locating the air intake pipe to the carburettor flange.

(7) Disconnect the throttle and mixture controls from the carburettor; release the Bowden throttle control steady bracket from its attachment on the cylinder head.

(8) Release the flexible pipe from the pump and detach the carburettor from the manifold.

(9) Disconnect the high-tension cable from the coil, and the low-tension cable from the distributor; remove the two leads from the generator, noting the yellow wire goes to the terminal nearest the right side; detach the starter cable from the switch on the scuttle dash by undoing the  $\frac{5}{16}$ " terminal bolt with spring washer; disconnect the earth cable from the cylinder head.

(10) Disconnect the oil gauge pipe from its connection on the cylinder block, and release it from the clip on the tappet cover; remove the two  $\frac{5}{16}$ " nuts, bolts, and spring washers from the exhaust manifold flange, and remove the gasket.

(11) Remove the three  $\frac{1}{4}$ " and  $\frac{5}{16}$ " nuts and washers from each of the front engine mountings.

(12) Support the engine with suitable lifting tackle; if a lifting ring is employed, it should form part of a plate which can be fitted under two of the stud nuts;

raise the front end of the engine with the lifting tackle, and remove the front engine mounting rubbers.

(13) Lower the engine down until the bearer brackets on the timing cover rest on the chassis frame bearer brackets.

(14) It is now possible to slacken and remove the four short  $\frac{1}{4}$ " hexagon-headed bolts locating the clutch housing to the cylinder block, and the three longer  $\frac{1}{4}$ " hexagon-headed bolts, locating the clutch housing to the sump housing.

(15) To prevent the gearbox from dropping when it is released from the engine, place a suitable support beneath the gearbox housing.

(16) The engine may now be raised and carefully manoeuvred forward clear of the car.

**To Replace**

(1) When replacing the engine in the frame, it will help if a second operator raises the front end of the gearbox by executing downward pressure on the gear lever, while in gear; if the car is then moved forward steadily, this will assist in aligning the gearbox drive shaft with the clutch and flywheel.

(2) Ensure the clutch casing is located on the two dowel pins in the flywheel housing; then lower the power unit until the front engine bearer brackets rest on the chassis frame brackets.

(3) Replace the seven bolts locating the clutch casing to the flywheel housing, making sure the correct length of bolt is used in each case.

(4) Raise the engine and insert the front engine mounting rubbers.

(5) Lower the engine on to the rubbers.

(6) The replacement operation now continues in the reverse manner to the sequence of removal.

**7. POWER UNIT**

The removal of the power unit does not present any serious difficulty if the operations are carried out in the sequence described below. It is not necessary to remove the bonnet, but as a precautionary measure it should be secured safely in the open position.

**To Remove**

(1) Drain the water from the radiator by means of the drain cap located in the left side of the radiator bottom tank; if Bluecol or other anti-freeze mixture is used, it should be drained into a suitable clean container and carefully preserved for future use.

(2) Disconnect the battery connection by slackening the pinch bolt and removing the positive cable lug from the battery terminal.

(3) Detach the radiator mask by removing the two countersunk-headed screws, with nuts and spring washers, locating the radiator core to the mask; undo the 10  $\frac{3}{16}$ " setscrews, equipped with spring washers and plain steel washers, locating the radiator mask to

**This original  
document is currently  
being digitally  
converted.**

**More pages will be  
added soon**

**The last update was on the  
7<sup>th</sup> March 2018**