

ISUZU

Bellett

**DISMANTLING AND
REASSEMBLING**

ENGINE SERIES

PART 4

INTRODUCTION

ISUZU MOTORS LIMITED

TOKYO, JAPAN

PART 4 DISMANTLING AND REASSEMBLING

CONTENTS

4-1	Removing and Mounting the Engine	4-1
4-2	Dismantling	4-3
4-3	Reassembling	4-17
4-4	Dismantling (Diesel Engine)	4-27
4-5	Reassembling	4-29

PART 4 DISMANTLING AND REASSEMBLING

4-1 REMOVING AND MOUNTING THE ENGINE

It is easier and more efficient for the dismantling of the engine block together with the transmission unit than dismounting the engine unit separately from the transmission.

With all the wiring and piping disconnected, the engine should be lifted using a chain hoist.

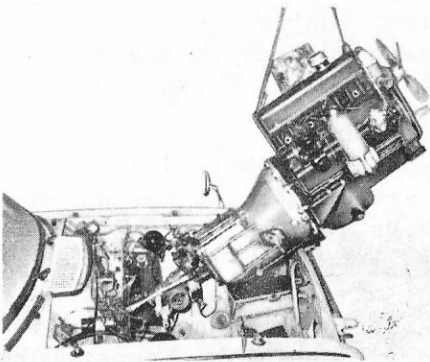


Fig. 4-1

4-1-1 Sequence of dismantling the engine

- 1) Drain the radiator and the water jacket completely.
- 2) Remove engine hood.
- 3) Remove the upper and lower rubber joints from the radiator.
- 4) First remove the four (4) clamping bolts and then dismantle the radiator.
- 5) Remove the air cleaner assembly and all its associated parts.
- 6) First remove the battery strap connected to ground and then disconnect the following circuit.
 - (1) Thermo-unit
 - (2) Oil pressure unit
 - (3) Distributor cord and its high tension cord.
 - (4) Generator connections
 - (5) Starter circuit
- 7) Disconnect the fuel piping. (fuel filter to fuel pump).
- 8) Disconnect the carburetor control at the link rod assembly (at the operating control).
- 9) Disconnect the exhaust pipe from the exhaust manifolds.
- 10) Disconnect the drive shaft and mount the plug (8529-1408) on the rear cover of the transmission.
- 11) Remove all the clamp bolts on the retainer and remove clutch control relay lever and its associated parts from the transmission case.
- 12) Put cable of the hoist through the hooks on the engine block.
- 13) Disconnect all the gear control system.

In case of remote gear control system:

- a. Remove the relay lever bracket with the link rod held in position.
- b. Remove the engine rear mounting side member from the body and dismantle the shift lever and select lever's link rod with the engine rear part slightly lowered the level.

In case of direct gear control system:

- a. First remove the floor carpet on the gearbox cover.
 - b. Then, remove the set bolts on the gear shift lever cover and dismantle the gear shift lever assembly.
 - c. Dismantle the engine rear mounting side member from the body side.
- 14) Remove the engine front mounting.
 - 15) Lift the engine block slowly and carefully from the chassis. The cable should be often checked to see if it is properly tensioned. The hook on the chain block should be carefully moved forward for slanting the engine to provide free space in the surrounding area.

Note: The work should be carefully carried out lest the engine should scratch the painted surface of the body or the accessories near it.

4-1-2 Mounting the engine

The engine should be mounted on the chassis in the sequence converse to dismounting, but attention should be invited to the

following:

Note: (1) The mounting bolts on the body side of the engine mounting bracket should be carefully checked to see if it is firmly tightened.

(2) Pipes and gasket should be carefully checked for wear or damage and replaced if necessary.

(3) Cords and terminal should be also checked and corrected or replaced as necessary.

(4) The radiator should be carefully mounted to provide uniform spacing between cooling fan and fan guide.

(5) Before the radiator rubber joints are mounted in position, the sealing compound should be applied to the joints to prevent water leakage.

(6) When the engine control link and all other associated parts are connected, the engine should be started and adjusted to ensure optimum idling by adjusting the carburetor setting after the engine has reached the normal operating temperature.

(7) The air cleaner should be put back in place.

(8) For mounting the engine hood, the hinges should be temporarily fastened to provide suitable adjusting margins. The hinges on the engine hood should be firmly tightened after the engine hood and fenders are properly aligned.

4-2 DISMANTLING

4-2-1 Engine details and parts name

Exploded view of the engine

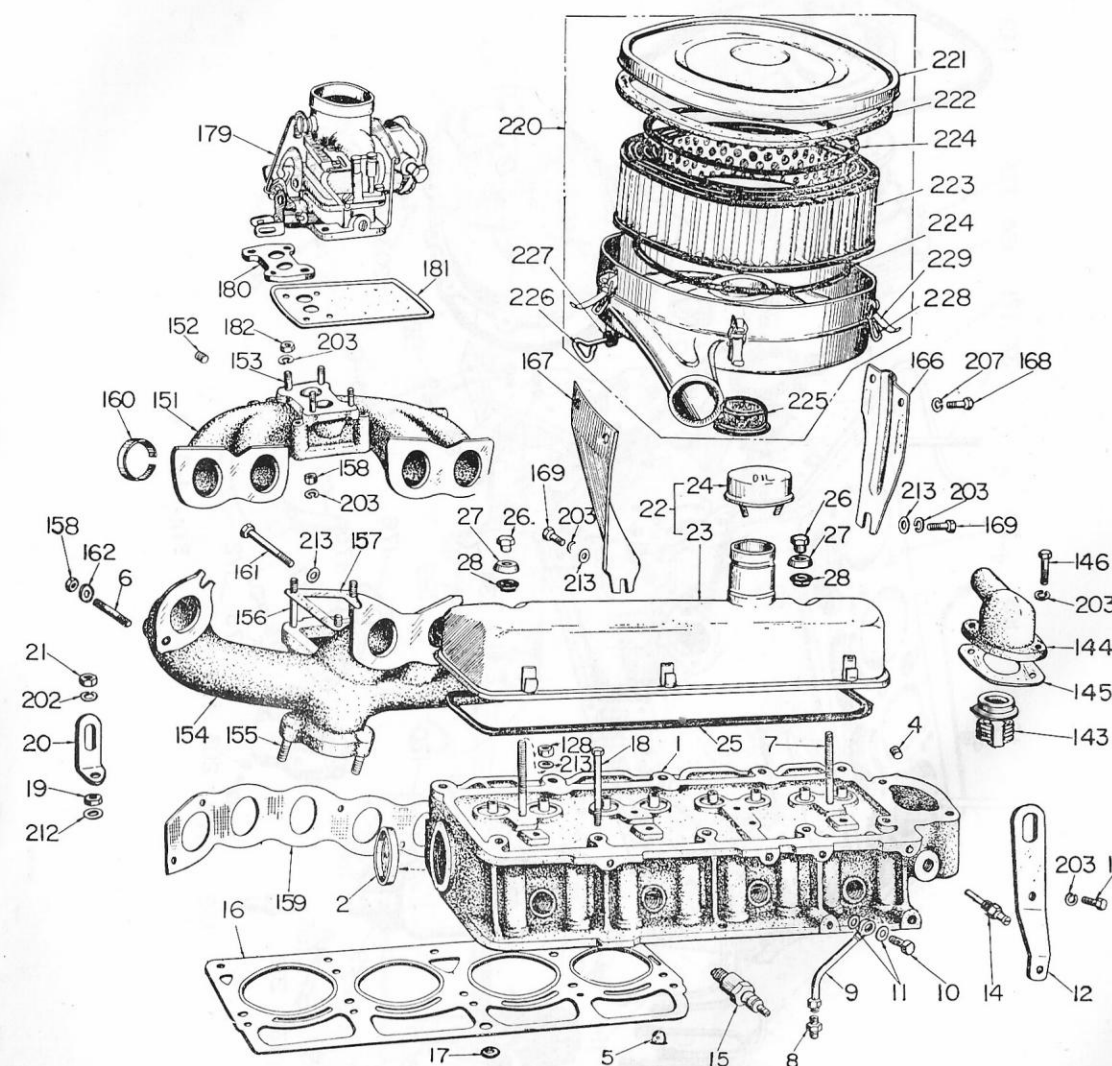


Fig. 4-2 A

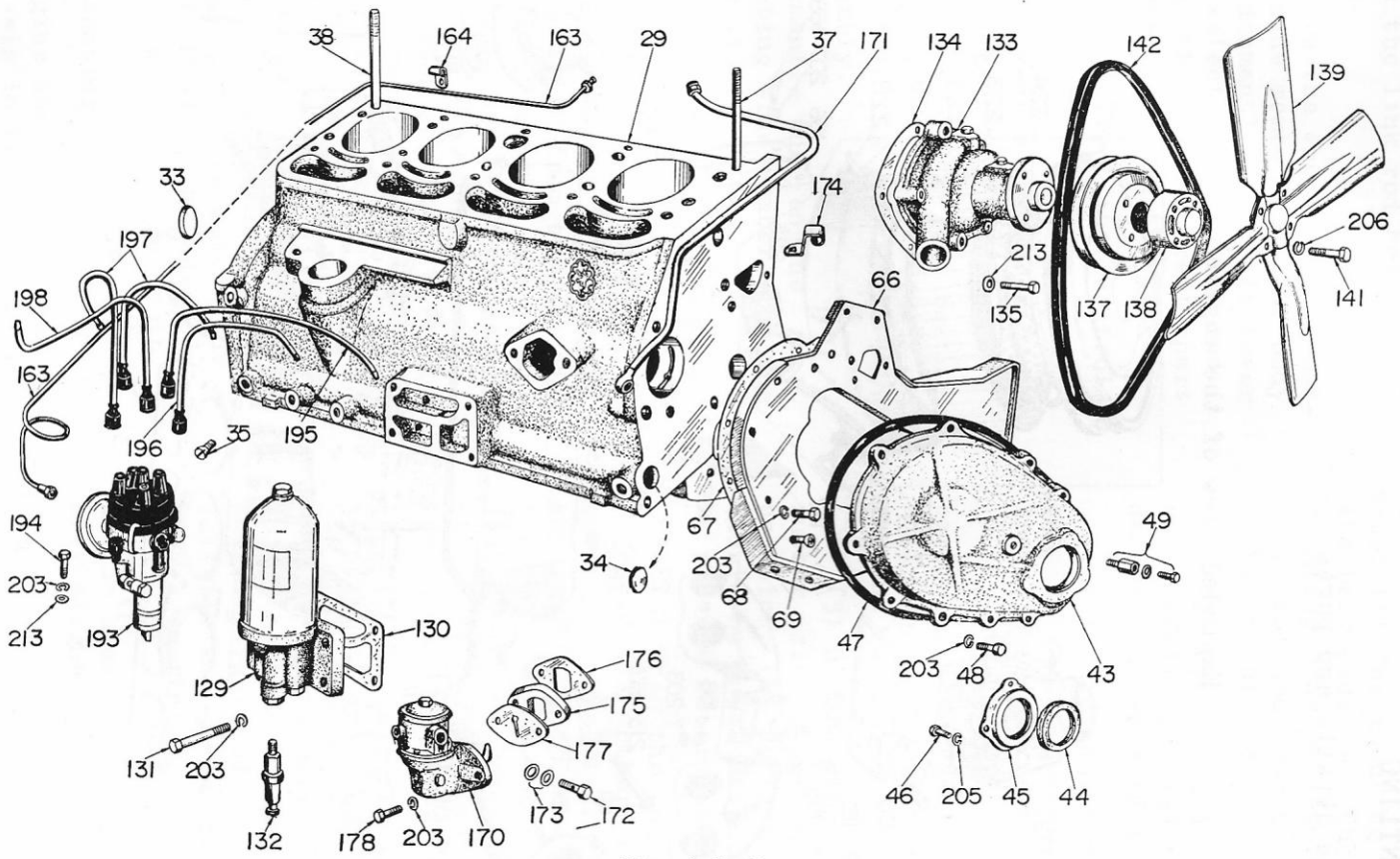


Fig. 4-3 B

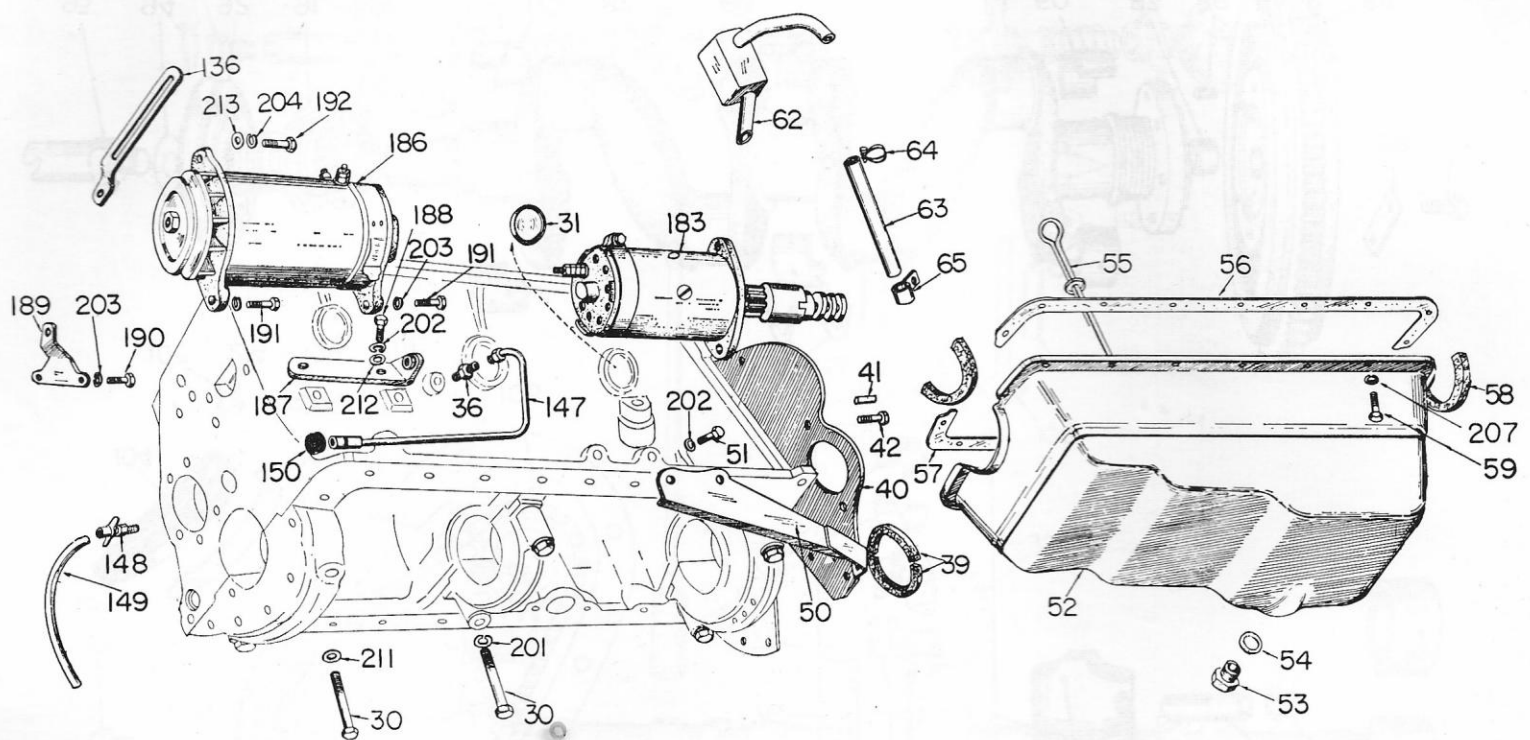


Fig. 4-4 c

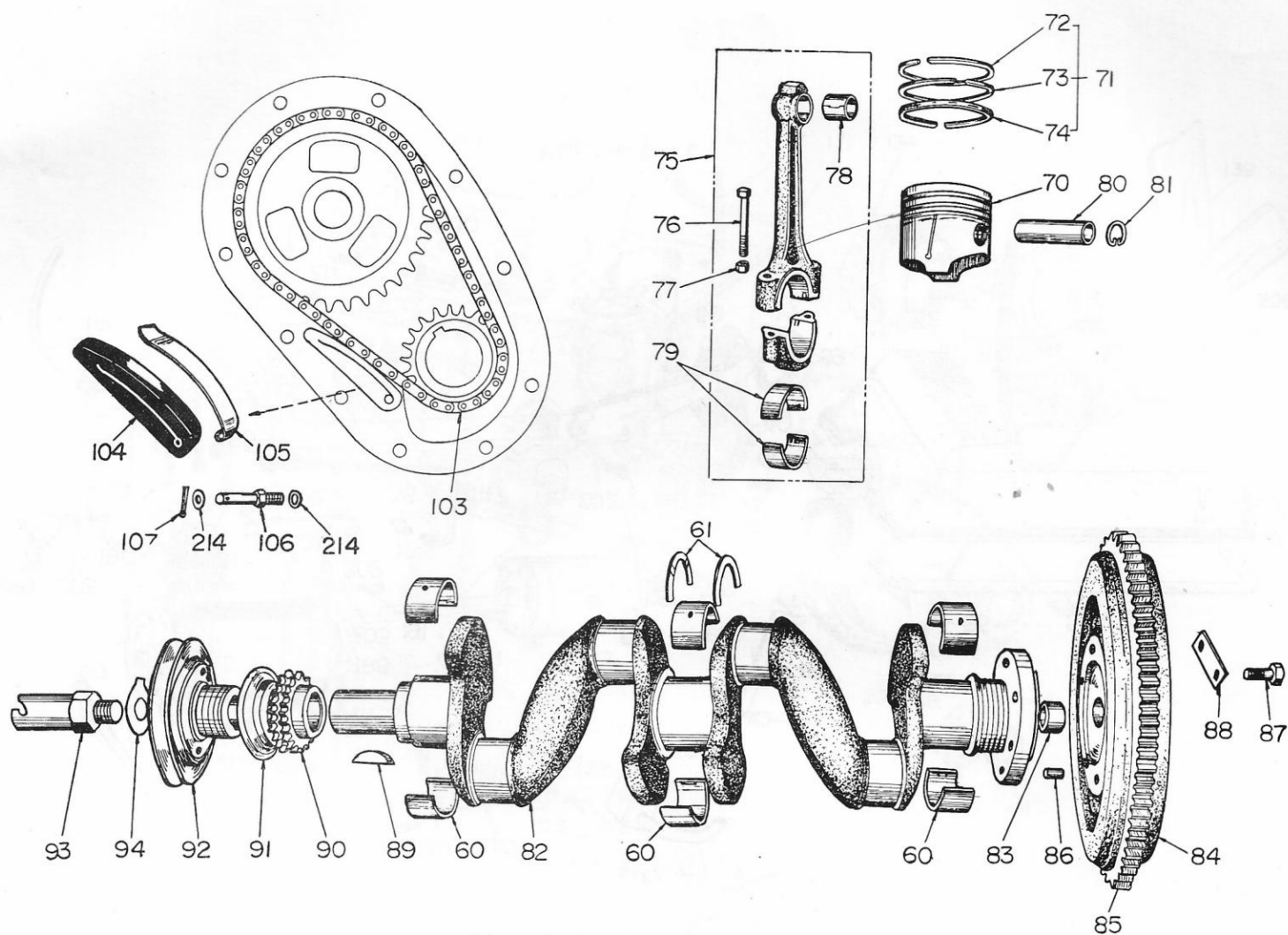


Fig. 4-5 D

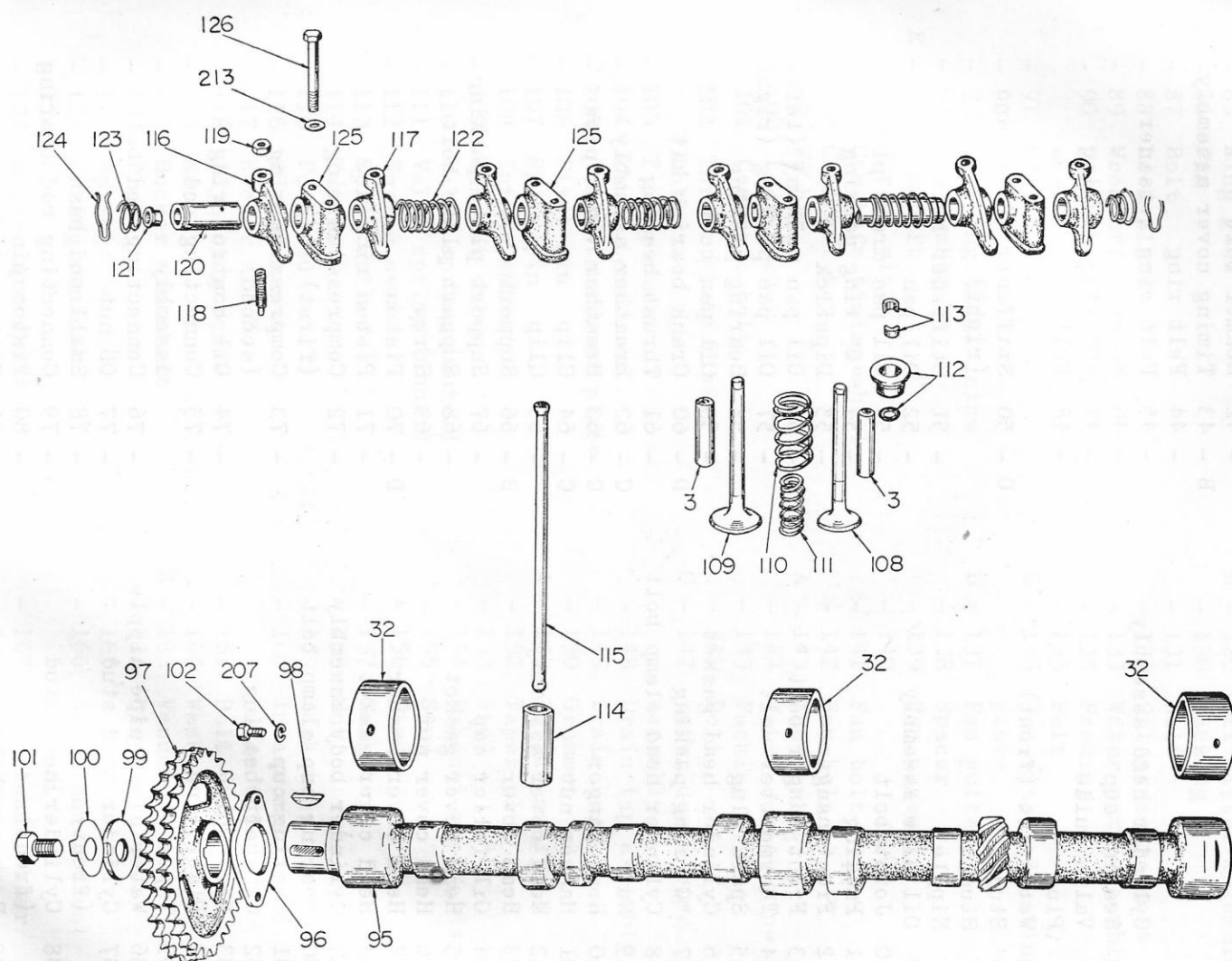


Fig. 4-6 E

PARTS NAME

A - 1 Cylinder head assembly
 - 2 Sealing cup
 E - 3 Valve guide
 A - 4 Plug
 - 5 Water jet (front)
 - 6 Stud
 - 7 Stud
 - 8 Nipple
 - 9 Oil pipe assembly
 - 10 Joint bolt
 - 11 Packing
 - 12 Front hanger
 - 13 Front hanger bolt
 - 14 Thermometer unit
 - 15 Spark plug
 - 16 Cylinder head gasket
 - 17 "O" ring packing
 - 18 Cylinder head clamp bolt
 - 19 Nut
 - 20 Rear hanger
 - 21 Hanger nut
 - 22 Head cover assembly
 - 23 Head cover
 - 24 Oil filler cap
 - 25 Head cover gasket
 - 26 Head cover nut
 - 27 Head cover washer
 - 28 Head cover gasket
 B - 29 Cylinder body assembly
 C - 30 Bearing cap clamp bolt
 - 31 Sealing cup
 E - 32 Camshaft bearing
 B - 33 Plate plug
 - 34 Plate plug
 - 35 Taper plug
 C - 36 Water drain pipe nipple
 B - 37 Cylinder head stud (front)
 - 38 Cylinder head stud (front)
 C - 39 Rear crankshaft rear seal

- 40 Rear plate
 - 41 Pin
 - 42 Reamer bolt
 B - 43 Timing cover assembly
 - 44 Felt ring
 - 45 Felt ring retainer
 - 46 Screw
 - 47 "O" ring packing
 - 48 Bolt
 C - 50 Stiffener (left) and (right)
 - 51 Stiffener bolt
 - 52 Oil pan
 - 53 Oil pan drain plug
 - 54 "O" ring packing
 - 55 Dipstick
 - 56 Oil pan packing (left)
 - 57 Oil pan packing (right)
 - 58 Bearing packing
 - 59 Oil pan bolt
 D - 60 Crank bearing kit
 - 61 Thrust bearing
 C - 62 Breather assembly
 C - 63 Breather vinyl pipe
 C - 64 Clip
 - 65 Clip
 B - 66 Support
 - 67 Support plate packing
 - 68 Support plate bolt
 - 69 Screw
 D - 70 Piston
 - 71 Piston ring kit
 - 72 Compression ring (first)
 - 73 Compression ring (second)
 - 74 Oil control ring
 - 75 Connecting rod assembly
 - 76 Connecting rod bolt
 - 77 OD nut
 - 78 Small end bush
 - 79 Connecting rod bearing
 - 80 Piston pin
 - 81 Piston pin snap ring
 - 82 Crankshaft

- 83 Crankshaft bushing
 - 84 Flywheel
 - 85 Ring gear
 - 86 Pin
 - 87 Bolt
 - 88 Lock plate
 - 89 Woodruff key
 - 90 Crankshaft timing wheel
 - 91 Oil thrower
 - 92 Pulley
 - 93 Starting handle claw
 - 94 Tub washer
 E - 95 Camshaft
 - 96 Thrust plate
 - 97 Camshaft timing wheel
 - 98 Camshaft key
 - 99 Washer
 - 100 Lock washer
 - 101 Camshaft bolt
 - 102 Thrust plate fixing bolt
 - 103 Timing chain
 - 104 Chain tensioner
 - 105 Chain tensioner plate
 - 106 Pivot pin
 - 107 Split pin
 - 108 Intake valve
 - 109 Exhaust valve
 - 110 Valve spring (outer)
 - 111 Valve spring (inner)
 - 112 Spring seat
 - 113 Split collar
 - 114 Tappet
 - 115 Push rod
 - 116 Rocker arm A
 - 117 Rocker arm B
 - 118 Adjusting screw
 - 119 Nut
 - 120 Rocker arm shaft
 - 121 Plug
 - 122 Spring
 - 123 Spring conical
 - 124 Clip
 - 125 Rocker arm shaft bracket
 - 126 Bolt

A - 128 Rocker bracket fixing nut
 B - 129 Oil filter assembly
 - 130 Packing
 - 131 Bolt
 - 132 Oil pressure unit
 - 133 Water pump assembly
 - 134 Packing
 - 135 Bolt
 C - 136 Generator adjusting plate
 B - 137 Fan pulley
 - 138 Spacer
 - 139 Fan assembly
 - 140
 - 141 Fan bolt
 - 142 Fan belt
 A - 143 Thermostat
 - 144 Water outlet pipe
 - 145 Packing
 - 146 Bolt
 C - 147 Water drain pipe assembly
 - 148 Drain tap assembly
 - 149 Drain hose
 - 150 Grommet
 A - 151 Intake manifold
 - 152 Taper plug
 - 153 Stud
 - 154 Exhaust manifolds
 - 155 Stud
 - 156 Stud
 - 157 Gasket
 - 158 Nut
 - 159 Gasket
 - 160 Intake manifolds guide tube
 - 161 Bolt
 - 162 Washer
 B - 163 Vacuum pipe
 - 164 Clip
 - 165
 - 166 Air cleaner front bracket
 - 167 Air cleaner rear bracket
 - 168 Bolt

- 169 Bolt	128 -	A - 207 Spring washer
B - 170 Fuel pump assembly	129 -	C - 208
- 171 Fuel pipe assembly	130 -	- 209
- 172 Fuel pump joint bolt	131 -	- 210
- 173 Joint bolt packing	132 -	C - 211 Plain washer
- 174 Clip	133 -	A - 212 Plain washer
- 175 Heat insulator	134 -	C - 213 Plain washer
- 176 Joint	135 -	D - 214 Plain washer
- 177 Joint	136 -	- 215
- 178 Bolt	137 -	- 216
A - 179 Carburetor assembly	138 -	- 217
180 Heat insulator	139 -	- 218
181 Heat protector	140 -	- 219
182 Nut	141 -	A - 220 Air cleaner assembly
C - 183 Starter assembly	142 -	- 221 Cover
184	143 -	- 222 Packing
185	144 -	- 223 Element
186 Generator assembly	145 -	- 224 "O" ring packing
187 Generator rear bracket	146 -	- 225 Tube packing
188 Bracket fixing bolt	147 -	- 226 Fixing bolt
189 Generator front bracket	148 -	- 227 Grommet
190 Bracket bolt	149 -	- 228 Lever
191 Bolt	150 -	- 229 Clip
192 Adjust plate bolt	151 -	
B - 193 Distributor assembly	152 -	
194 Bolt	153 -	
195 Ignition cable assembly (no. 1)	154 -	
196 Ignition cable assembly (no. 2)	155 -	
197 Ignition cable assembly (no. 3 and 4)	156 -	
198 Ignition main cable assembly	157 -	
199	158 -	
200	159 -	
C - 201 Spring washer	160 -	
A - 202 Spring washer	161 -	
C - 203 Spring washer	162 -	
- 204 Spring washer	163 -	
- 205 Spring washer	164 -	
- 206 Spring washer	165 -	
- 207	166 -	

4-2-2 Cleaning and inspecting the engine assembly

(1) Cleaning

The external portion of the engine should be carefully cleaned before assembling. The engine may be cleaned in the manner best suited for a given factory equipment, but steam cleaning is the most effective method. The steam cleaning is one of the cleaning methods to blow steam directly onto the engine thereby removing grease, and dirt deposit from around the grooves, bolts and the like.

The engine may be wiped with a rag and dried. Another method is to use a detergent oil and a rag or a brush to remove the dirt, grease and other deposit from the engine, in this instance, the engine should be dried with compressed air.

(2) Inspecting

1) Exterior of the engine

The water jacket should be carefully checked for cracks or restricted water passage which would often invite freezing in the winter season. It should also be checked for oil leakage.

2) Clutch housing

The clutch housing should be checked for cracks or rupture.

3) Oil pan

The oil pan should be checked for serious damage on the surface and for oil leakage. The disassembling work should be started after the above check-up are all complete.

4-2-3 Dismantling the engine

The engine should be dismantled in the following sequence.

(1) Remove the dipstick (a)

(2) Disconnect the fuel pipe (2) and the vacuum pipe (3).

To hold the joint in position, hold the joint firmly with the aid of a pair of wrenches and turn loose the socket nut.

(3) Remove the distributor cap (4) together with the high tension cables.

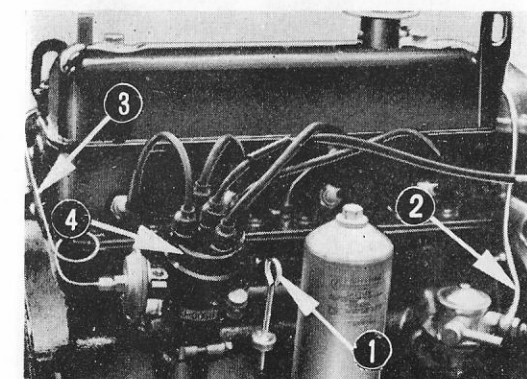


Fig. 4-7 Dismantling (1)~(3)

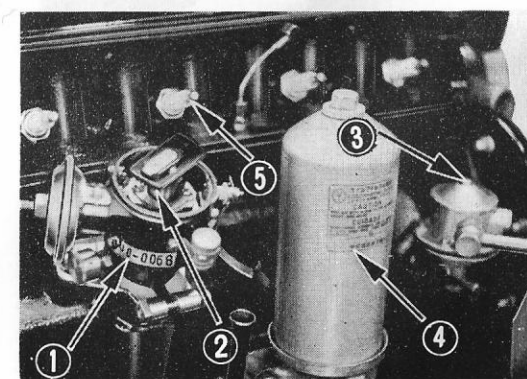


Fig. 4-8 Dismantling (4)~(8)

- (4) Slacken the distributor set plate (1) and remove the distributor (2).
- (5) Remove the fuel pump (3).
- (6) Remove the oil filter (4) from the engine block.
- (7) Remove spark plugs (5) with the aid of plug wrench.
- (8) Disconnect the oil rocker feed pipe.

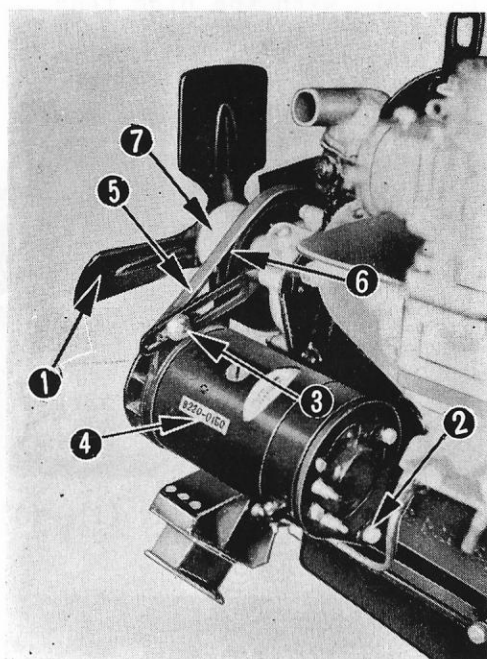


Fig. 4-9 Dismantling (9)~(10)

- (9) Remove the fan (1).
- (10) Remove the generator bracket bolt (2) and adjust plate bolts (3) and then, remove the generator (4), fan belt (5), fan pulley and the spacer (7).

- (11) Remove the carburetor assembly (1) and the heat protector (2).
- (12) Remove the head cover (3)

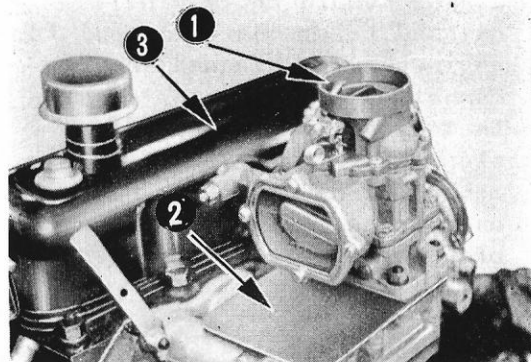


Fig. 4-10 Dismantling (11)~(12)

- (13) Remove the manifolds assembly (1).
- (14) Remove the breather assembly (2).
- (15) Remove the water drain pipe (3).

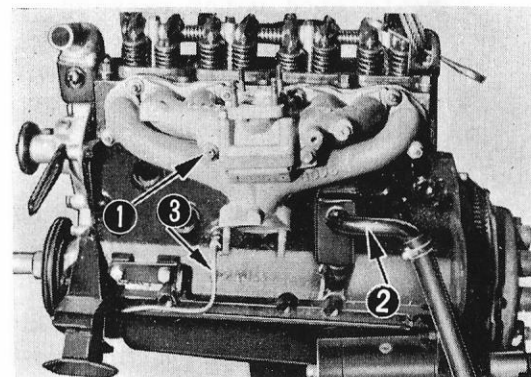


Fig. 4-11 Dismantling (13)~(15)

- (16) Remove the water pump assembly (2).

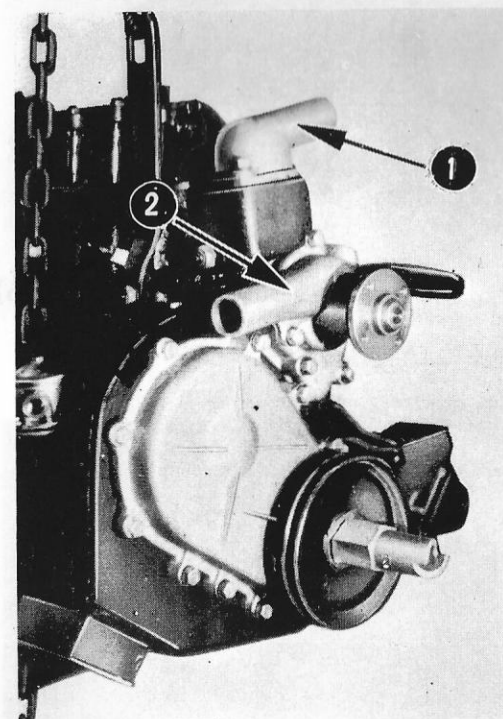


Fig. 4-12 Dismantling (16)~(17)

- (17) Remove the thermostat housing (1) and take out the thermostat unit.
- (18) Remove the valve rocker shaft assembly (1).
- (19) Pull out the Push rod (2).
- (20) Remove the cylinder head and cylinder head gasket. The cylinder head clamping bolts should be turned loose in the sequence illustrated in Fig. 4-14.
- (21) Remove the tappets.
- (22) Hold the engine vertically with the flywheel (1) side down.

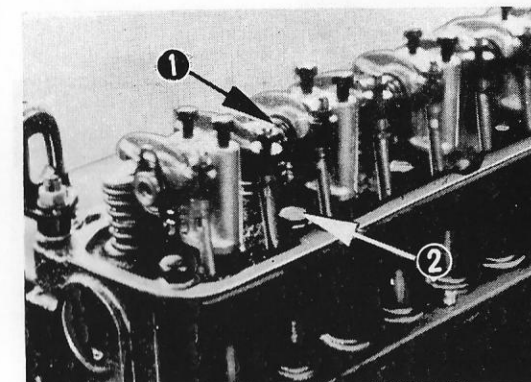


Fig. 4-13 Dismantling (18)~(19)

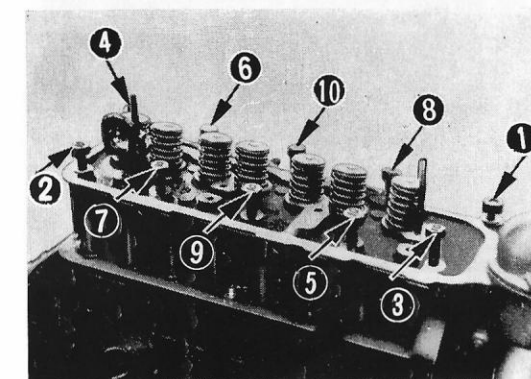


Fig. 4-14

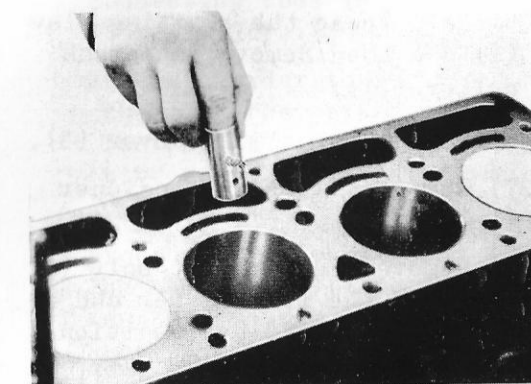


Fig. 4-15

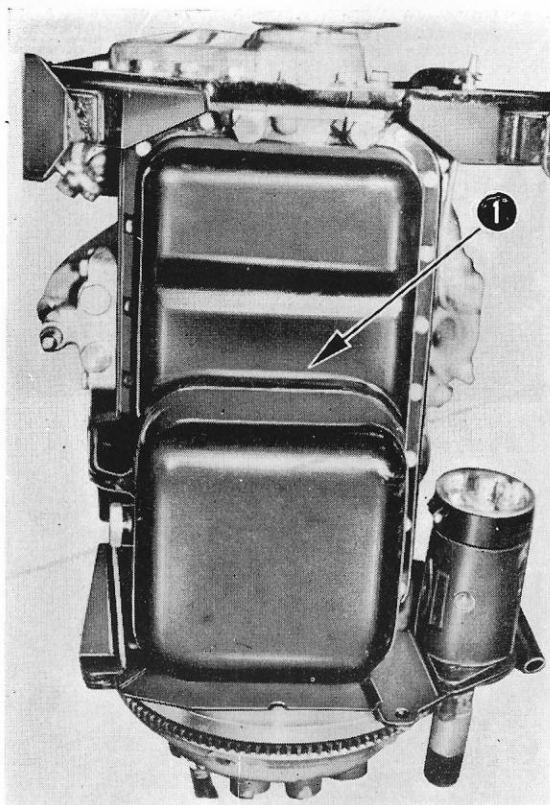


Fig. 4-16 Dismantling (22)~(23)

- (23) Remove the oil pan (1).
- (24) Remove the oil pan assembly.
- (25) Turn loose the starting claw (1) and then remove the crank pulley (2).
- (26) Remove the timing cover (3).
- (27) Remove the chain tensioner (1).
- (28) Remove the camshaft bolt (2) and take the lock washer and plain washer off the position.
- (29) Remove the crankshaft oil thrower (3).

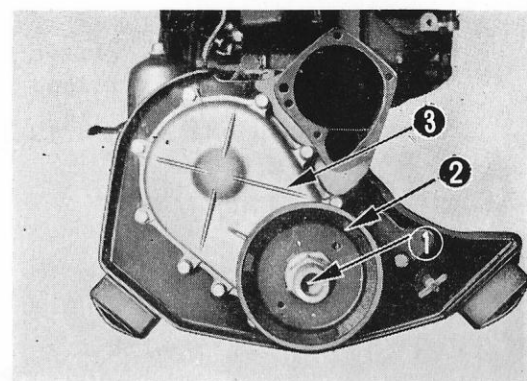


Fig. 4-17 Dismantling (25)~(26)

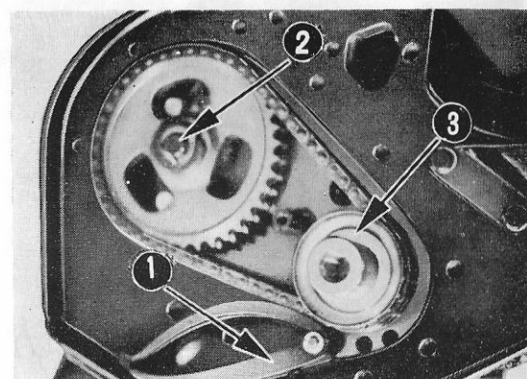


Fig. 4-18 Dismantling (27)~(29)

- (30) With the timing chain fitted on the camshaft and crankshaft timing wheels, pull out both the camshaft and crankshaft timing wheels with the aid of the puller (8521-0074) (8521-0062).
- (31) Remove the camshaft thrust plate (1) and then pull out the support plate (3).
- (32) Scrape off carbon deposit from the upper portion of the cylinder walls.

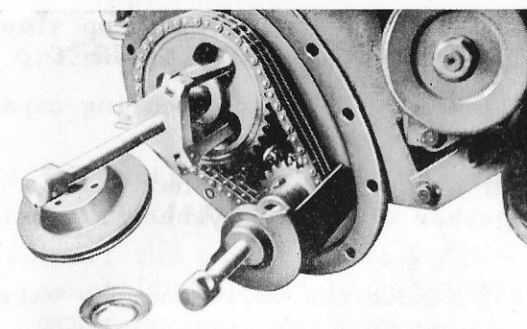


Fig. 4-19

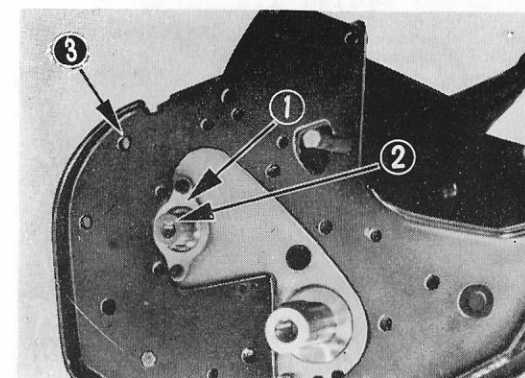


Fig. 4-20 Dismantling (31)

- (33) Carefully turn the crankshaft so as to bring the pistons in the 2nd and 3rd cylinders (or 1st and 4th) into their bottom dead centers.
- (34) Remove the bearing caps (1) and (2) from the connecting rods in the 2nd and 3rd cylinders.
- (35) With finger pressure applied onto piston heads in the 1st and 4th cylinders, carefully turn the crankshaft so as to bring the 2nd and 3rd pistons to the T.D.C.

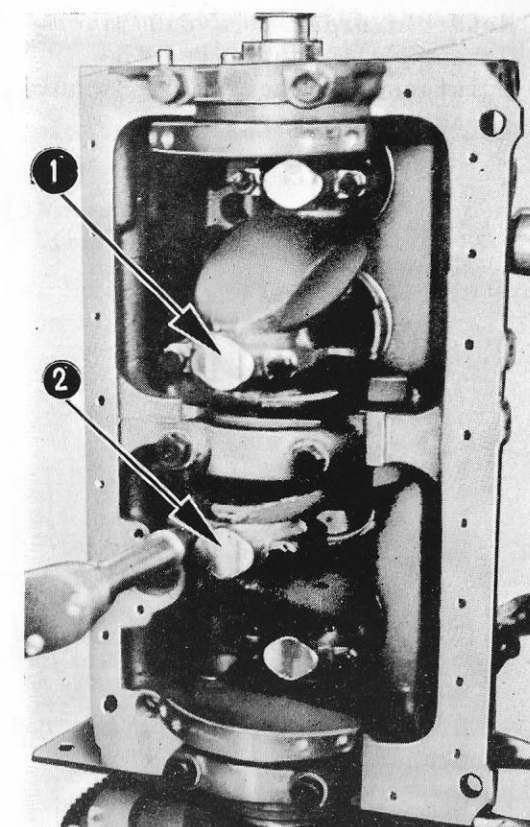


Fig. 4-21 Dismantling (31)

- (36) Pull out the pistons to the cylinder side by depressing the connecting rods in the 1st and 4th cylinders.

Note: In order to avoid interchanging the parts, temporarily fasten the cap with the respective connecting rod.

- (37) Apply the same dismantling procedure to the 1st and 4th (or 2nd and 3rd) cylinders for removing the pistons and their pertinent parts.
- (38) Remove the piston rings with the aid of piston ring expander.

Note: In order to avoid interchanging these parts, the pistons and their rings should be stored separately.

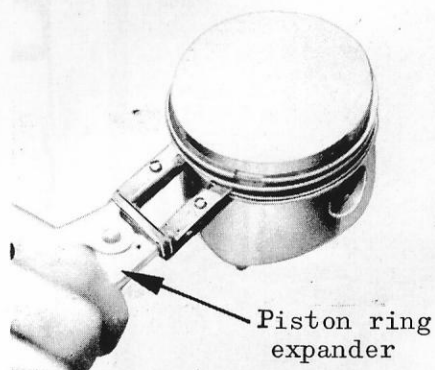


Fig. 4-22 Dismantling 38

(39) Disconnect the connecting rod from the piston.

- 1) Remove the piston pin snap ring.
- 2) Pull out the piston pin after the piston is heated to 50-60°C with use of piston heater.

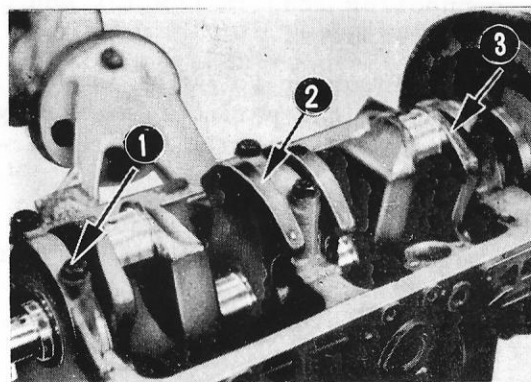


Fig. 4-23

- (40) Turn the engine block up side down to bring its head down.
- (41) Remove the crank bearing caps (1), (2) and (3).
- (42) Remove the crankshaft together with the flywheel in position.
- (43) Remove the valve and the valve spring from the cylinder head with the aid of the valve replacer (8523-1415).

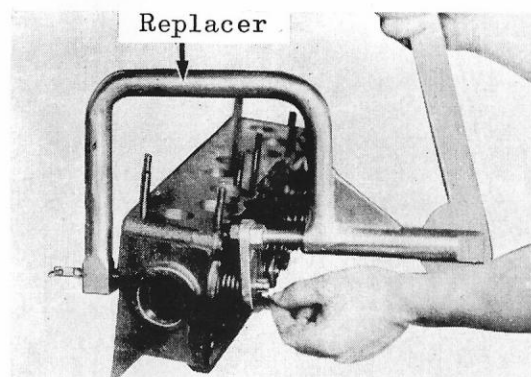


Fig. 4-24

Note: All the valves and their springs should be identified with suitable marking.

(44) Further dismantle the valve rocker arm shaft assembly.

First remove the clips on both ends of the valve rocker arm shaft assembly and then, take out the spring, rocker arm and rocker arm bracket from the shaft.

4-3 REASSEMBLING

4-3-1 Cautions for reassembling the engine

- (1) All the parts needed for reassembling should be clean and dry. Particular attention should be invited to the oil port, bearing, piston and cylinder walls.
- (2) The cylinder, piston, bearing and all other parts subjected to friction should be lubricated with engine oil before being reassembled.
- (3) All the gaskets and packings should be replaced with new ones and to prevent oil leakage, suitable bonding compound should be applied to the gaskets and packings as necessary.
- (4) All the lock washers should be replaced with new ones.
- (5) Even though all the parts are preadjusted to provide with adequate clearances, careful attention should be invited for fitting these parts in positions with optimum clearances given.

4-3-2 Reassembling

- (1) Connect the connection rod with the piston.
 - 1) Heat the piston and its connecting rod to 50° - 60°C with use of the piston heater.
 - 2) Properly fasten the connecting rod with the piston.

Note: The piston and the connecting rod should be prop-

erly aligned with their front sides faced frontward.

- (2) Mount the piston rings on the piston with the aid of the piston ring expander.
- (3) Mount the rocker arms in positions.
- (4) Mount the valve system properly on the cylinder head.

Reassembling the rokerarm

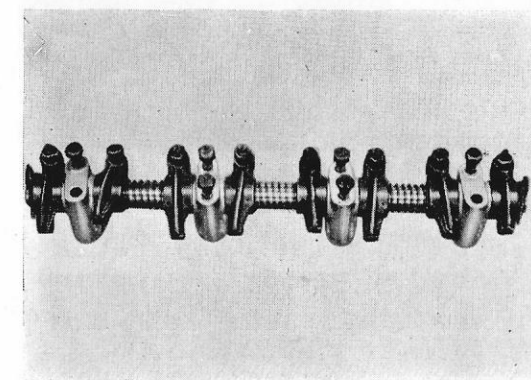


Fig. 4-25

Insert the valve into the valve guide, refit the valve spring and spring seat in position and depress the valve spring with the aid of valve spring replacer. With the valve spring held depressed, mount the sealing ring and secure it in position with the split cotter.

- (5) Refit the crankshaft rear oil seals into the grooves in the cylinder block and in the rear bearing cap.

Note: The oil seal should be fitted in position with its both edges protruded about 0.5mm from

the contacting faces of the bearing caps.

Mounting the rear oil seal

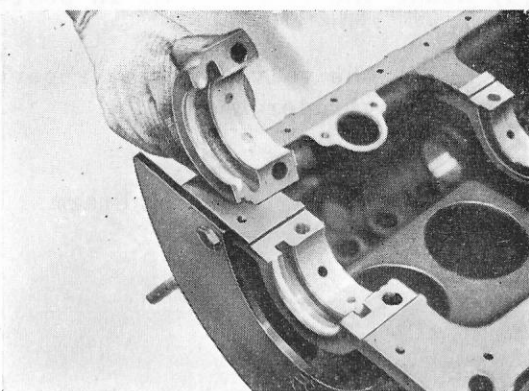


Fig. 4-26

(6) Mount the main bearings (upper front), (center) and (rear) in the cylinder block.

(7) Mount the crankshaft thrust bearing on the both sides of the center bearing upper in the cylinder block.

Note: The thrust bearing should be mounted in place with its oil groove faced against the mounting face.

(8) Mount the crankshaft in the cylinder body.

(9) Refit the crankshaft bearing lower half into the bearing cap and then mount the cap in the cylinder block.

The bearing cap clamp bolts should be tightened with specified torque given below in the sequence of center bearing.

rear bearing and front bearing.

The clamping torques are standard at:

9-10 m-kg for model G150
9-10 m-kg for model G130 and
9-10 m-kg for model C180

(1) The front bearing cap should be tightened in such a manner that the face of the cap is properly aligned with the front face of the body.

(2) After the bearing caps are tightened, the crankshaft should be carefully turned with hand to make sure that it rotates freely.

(10) Refit the flywheel in place if it has been removed.

The clamping torques are standard at:

4.5 - 6.5 m-kg for model G150
4.5 - 6.5 m-kg for model G130
and
4.5 - 6.5 m-kg for model C180

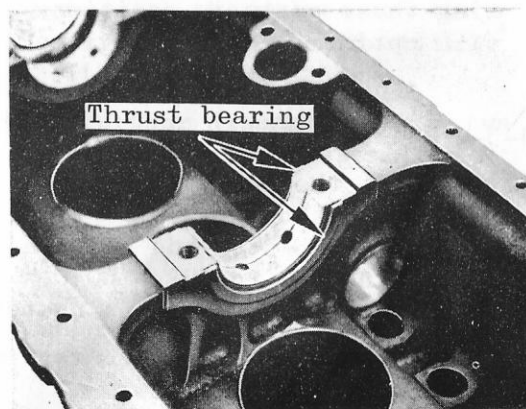


Fig. 4-27

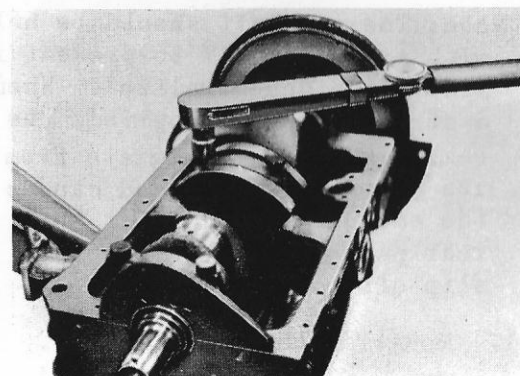


Fig. 4-28

(11) Mount the bearings on the connecting rod and the cap.

Note: The bearing and the face of the engine block in which the bearing is mounted should be cleaned.

(12) Insert the piston with the connecting rod mounted in position into the cylinder from the upper part thereof with the aid of the piston ring setting tool. (8522-1169)

Inserting the piston into cylinder with an aid of setting tool



Fig. 4-29

(1) The piston should be mounted in position together with the connecting rod with the face of the connecting rod with the cylinder number marking faced toward the camshaft side.

(2) The piston rings should be so arranged on the piston that their gaps are properly aligned. (The gaps of the compression rings should be at 180° or 120° on the circumference of the piston). The piston ring gap should not be held in line with the piston pin.

(13) The bearing should be mounted on the connecting rod. The torque required for clamping the bearing is 2.4 - 2.9 m-kg.

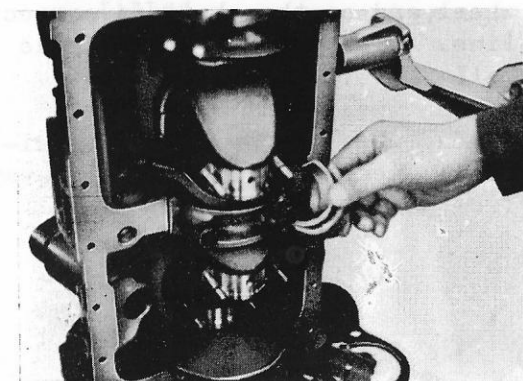


Fig. 4-30

(1) The connecting rod should be checked to see if it is provided with optimum thrust clearances. The thrust clearance is standard at 0.2 - 0.33mm.

(2) The crankshaft should be turned with hand to make sure that it rotates freely without any restriction.

- (14) Mount the support plate in position.
- (15) Mount the camshaft in place and refit the thrust plate in the cylinder body.
- (16) Refitting the timing chain.

Rotate the crankshaft carefully so as to bring the pistons in the 1st and 4th cylinders to their T.D.C. Put the crankshaft timing wheel through the crankshaft and hold it in position about 30mm apart from the outer end of the crankshaft. Place the timing chain over the crankshaft timing wheel and camshaft timing wheel after their notched markings are properly aligned. Carefully turn the camshaft to bring the key grooves on the timing wheel and on the shaft in correct line. With the aid of the hide mallet, refit the crankshaft timing wheel and the camshaft timing wheel properly into position. Keep the timing chain away from undue strains.

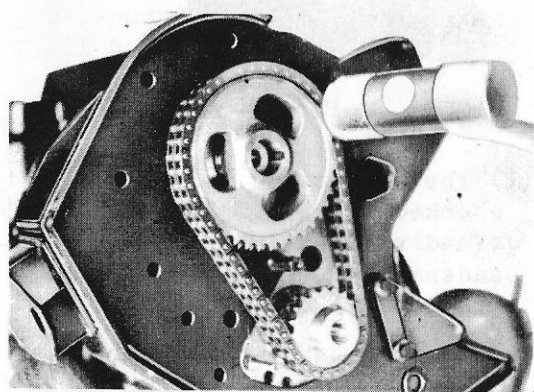


Fig. 4-31

Note: The camshaft should be held with a screwdriver to prevent it from being decentralized. When a strong force is applied, the camshaft tends to deviate from its normal position and causes the end plug provided at the rear part of the camshaft to slip off the position.

(17) Mounting the oil pump

- (1) Hold the piston in the first cylinder at T.D.C. in the compression stroke. (When the timing marks on the crankshaft and camshaft timing wheels are properly aligned, the piston in the 4th cylinder is held at T.D.C. in the compression stroke.)
- (2) Insert the oil pump shaft into position with a smaller half of the oil pump drive pinion end divided into two portions by a groove faced frontward. The oil pump shaft is driven by the helical gear on the camshaft. The pump shaft should be so arranged that when viewed from the position of the distributor the smaller half of the pinion end appears to be held within the angle of 47°-49° against the engine.

- (3) Connect the feed pipe to the cylinder body.

- (18) Mount the blade on the chain tensioner and further fit the tensioner into the cylinder block and secure it in position with the pivot pin.

Note: The crankshaft should be turned with hand to make sure that it rotates freely.

Fitting the felt ring into position

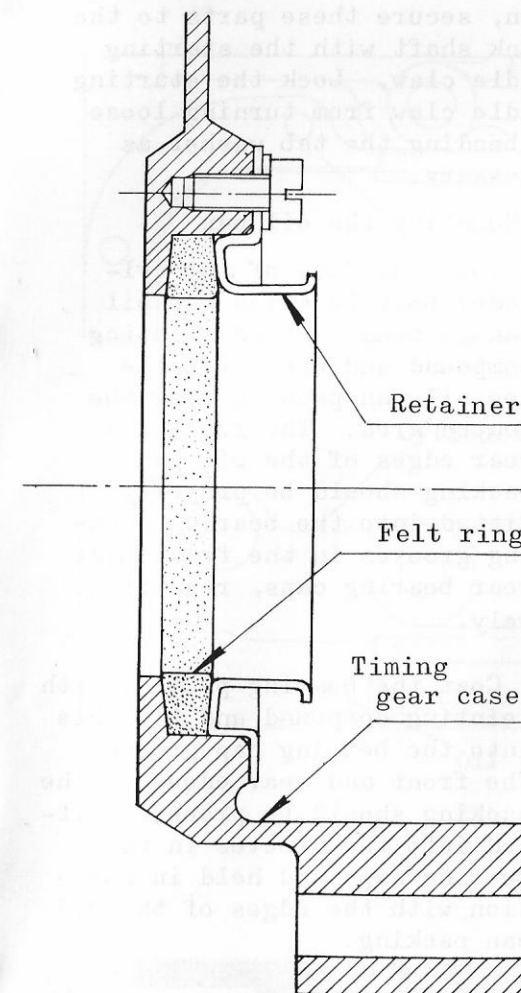


Fig. 4-32

- (19) Fit the felt ring into the crank pulley hole on the timing cover.

- (20) Fit the "O" ring packing into the groove on the inside face of the timing wheel cover.

Before the "O" ring is fitted

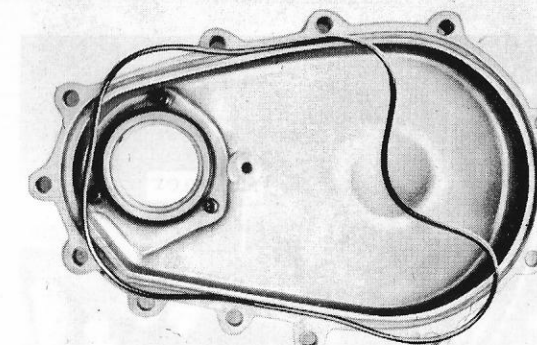


Fig. 4-33

After the "O" ring is fitted

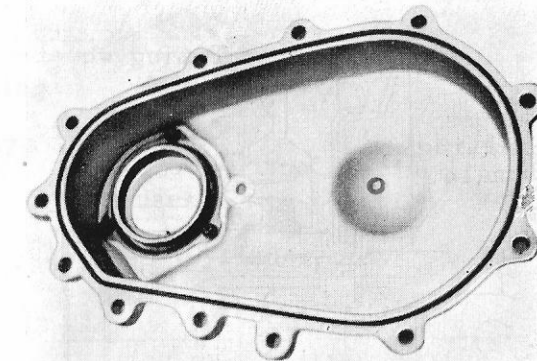


Fig. 4-34

- (21) Fit the oil thrower over the crankshaft timing wheel.
- (22) Mount the timing wheel cover on the cylinder body with the aid of the timing wheel cover aligner. (8524-1701)

Mounting the timing wheel cover

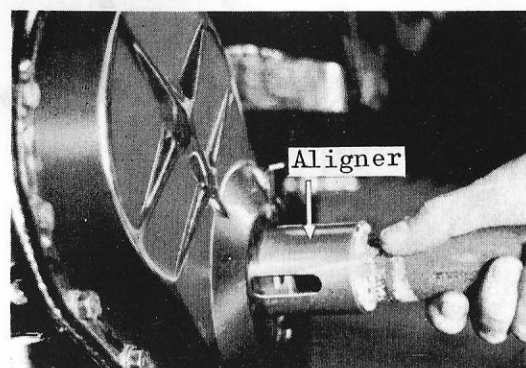


Fig. 4-35

Reassembling the oil thrower, crank pulley and timing gear case

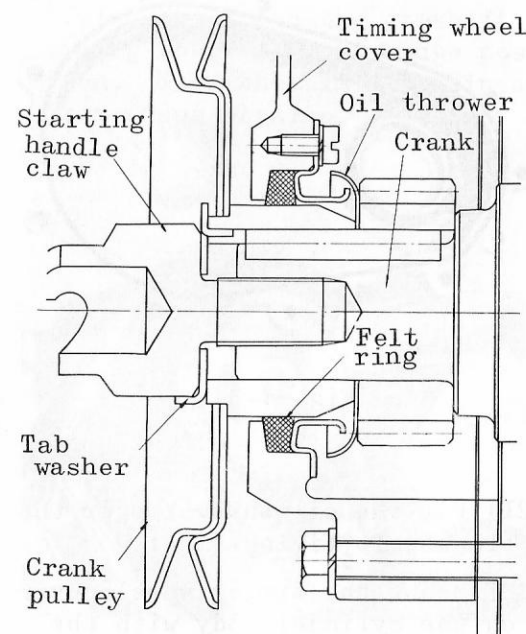


Fig. 4-36

(23) After the crank pulley is mounted on the crank shaft and the tab washer fitted into position, secure these parts to the crank shaft with the starting handle claw. Lock the starting handle claw from turning loose by bending the tab washer as necessary.

(24) Mounting the oil pan

(1) Coat the face of the cylinder body to which the oil pan is mounted with jointing compound and then, fit the new oil pan packing over the coated area. The front and rear edges of the oil pan packing should be properly fitted into the bearing packing grooves in the front and rear bearing caps, respectively.

(2) Coat the bearing packing with jointing compound and fit this into the bearing cap groove. The front and rear edges of the packing should be properly fitted into the grooves in the bearing caps and held in position with the edges of the oil pan packing.

(3) Coat the oil pan packing with jointing compound and fit this into place together with the oil pan. Secure the oil pan tightly to the cylinder body by applying even clamping torque to the oil pan fixing bolts.

Note: The oil pan should be mounted in place with its flat side faced frontward.

Fitting the oil pan packing in position

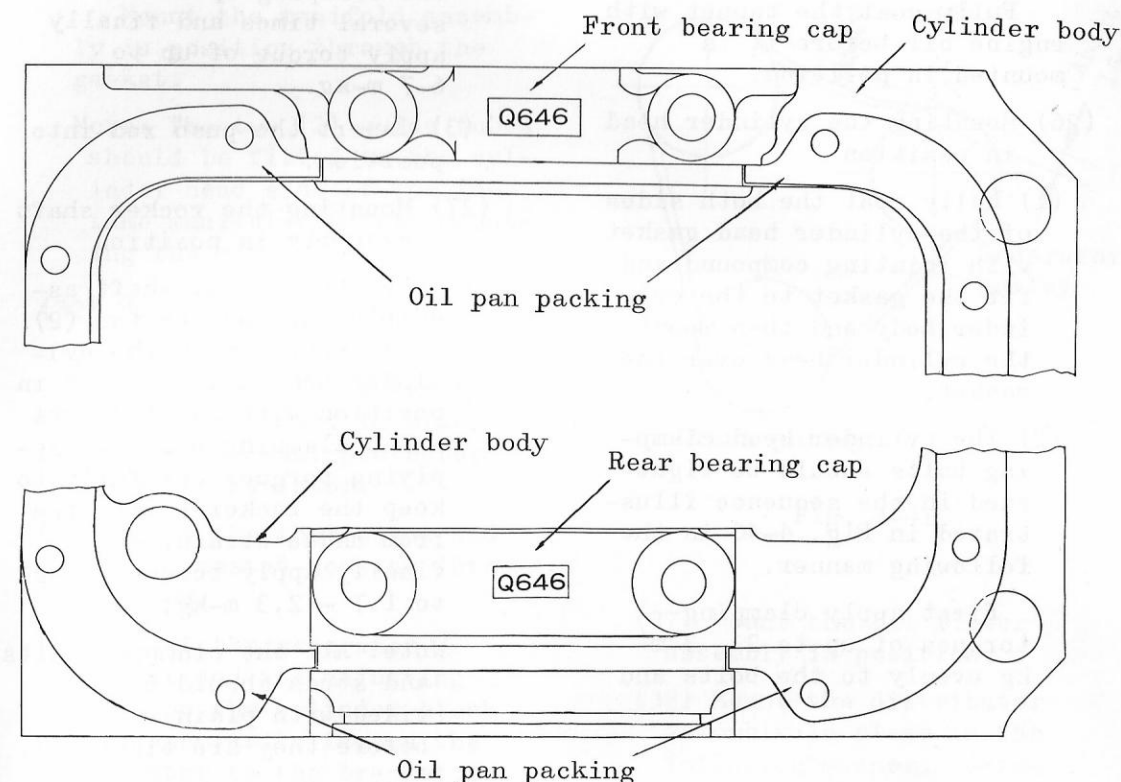


Fig. 4-37

Fitting the bearing packing in position

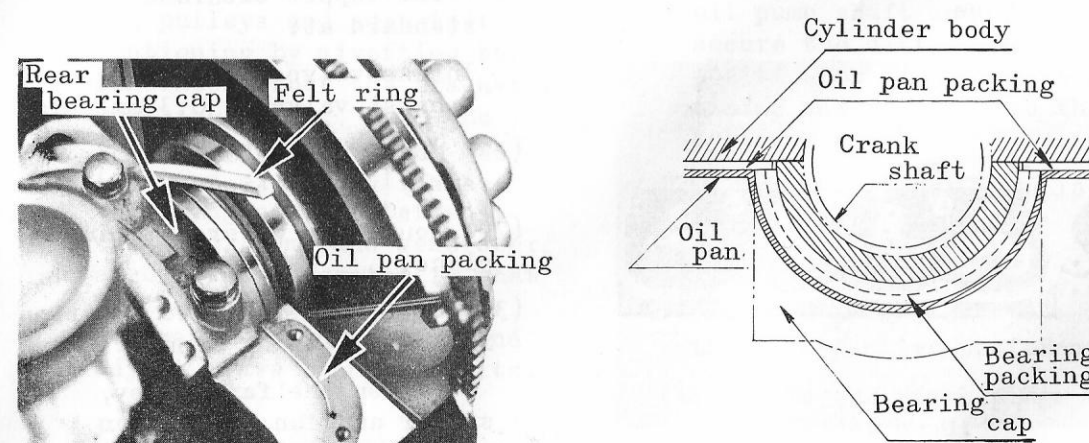


Fig. 4-38

Fig. 4-39

- (25) Inserting the tappet into position

Fully coat the tappet with engine oil before it is mounted in position.

- (26) Mounting the cylinder head in position

(1) Fully coat the both sides of the cylinder head gasket with jointing compound and fit the gasket to the cylinder body and then mount the cylinder head over the gasket.

(2) The cylinder head clamping bolts should be tightened in the sequence illustrated in Fig. 4-40 in the following manner.

First apply clamping torques of up to 2 - 3 m-kp evenly to the bolts and

Cylinder head clamping bolts tightening sequence and clamping torques

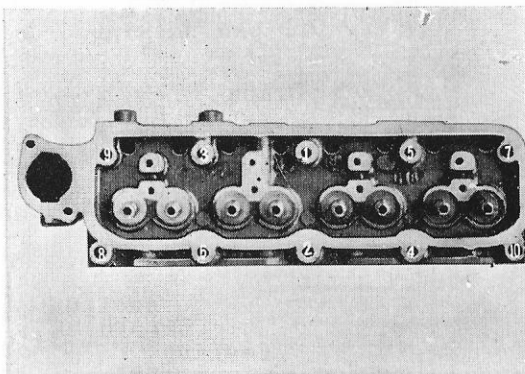


Fig. 4-40

gradually increase the clamping torque. Repeat the clamping operation several times and finally apply torque of up to 6-7 m-kp.

- (3) Insert the push rod into position.

- (27) Mounting the rocker shaft assembly in position

(1) Put the rocker shaft assembly through the two (2) stud protruded on the cylinder head and clamp it in position with two (2) nuts and 6 clamping bolts by applying torques carefully to keep the rocker shaft free from undue strain, and finally apply torque of up to 1.7 - 2.3 m-kp.

Note: All the clamping bolts and studs should be provided with plain washers before they are tightened.

(2) After the rocker shaft is mounted in position, adjust the tappet clearance.

The tappet clearances are standard at:

Intake valve ... 0.3mm (cold)
Exhaust valve .. 0.35mm(cold)

- (28) Mount the head cover assembly in position.

- (29) Mount the water pump in place.

- (30) Refit the fan into position in the following manner.

Fasten the fan pulley, spacer and fan to the fan center with four (f) clamping bolts.

- (31) Mounting the manifolds assembly in place.

Mount the manifold assembly in position through the gasket.

Note: The two (2) guide tubes should be fitted to the cylinder head side of the intake manifolds before mounting the manifolds in place.

- (32) Mounting the carburetor assembly in place

The carburetor assembly should be mounted in place through the heat protector and heat insulator.

- (33) Refit the thermostat and the thermostat housing into position.

- (34) Mount the generator bracket and its adjusting plate on the cylinder block and temporarily fasten the generator to the bracket.

- (35) Refitting the fan belt into position.

Refit the fan belt over the pulleys and adjust its tensioning by pivoting the generator about the bracket mounting bolts. When the fan belt gives lateral deflection of about 15mm at centering portion between the water pump and generator, secure the generator in that position by clamping the generator bracket bolts and adjust plate clamping bolts.

- (36) Mount the breather assembly in place.

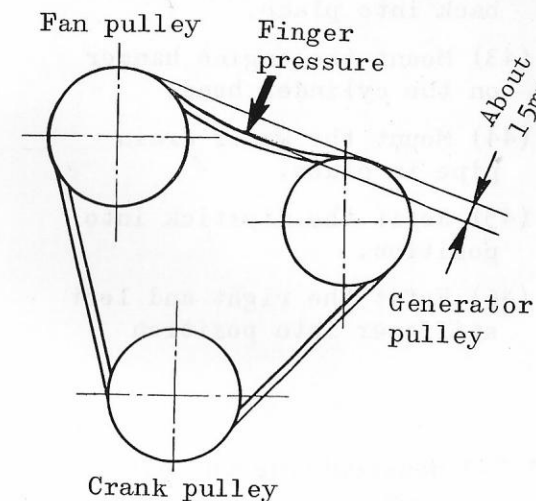


Fig. 4-41

- (37) Mount the oil filter assembly in position.

(38) Mount the distributor assembly in place in the following manner. Carefully insert the distributor shaft into position with its boss properly fitted into the slot on the oil pump shaft and then, secure the distributor in position by clamping the timing adjust plate to the cylinder block.

- (39) Mount the fuel pump in position.

(40) Connect the fuel pipe, vacuum pipe and oil pipe to their respective positions.

- (41) Refit the spark plugs to the cylinder head.

- (42) Put the ignition cable back into place.
- (43) Mount the engine hanger on the cylinder head.
- (44) Mount the water drain pipe in place.
- (45) Refit the dipstick into position.
- (46) Refit the right and left stiffener into position

4-3-3 Reassembling the oil pump

Note: The method for reassembling the oil pump introduced in subparagraph (17) on page 4-18 is corrected as follows:

- (1) Bring the piston in the 4th cylinder into T.D.C. in the compression stroke. (The corresponding marks on the timing sprockets come in line with the shaft center line against each other)

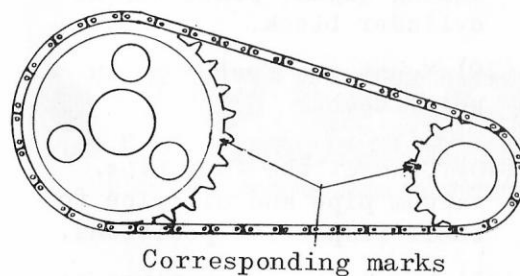
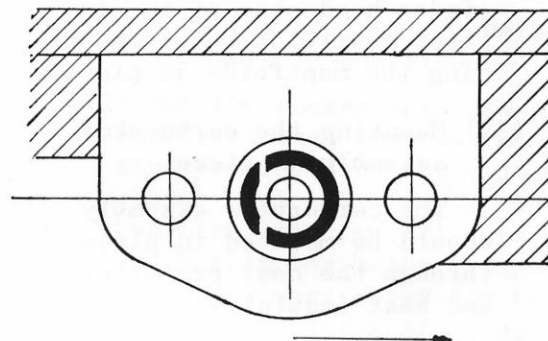


Fig. 4-42

- (2) Mount the oil pump in place with a smaller half of the oil pump drive pinion end divided into two portions by a groove faced frontward. (See Fig. 4-43)



Toward the front part of of engine

Fig. 4-43

- (3) The pinion gear comes into engagement with the helical gear on the camshaft and should be so arranged that when viewed from the distributor mounting hole, the smaller half of the pinion end appears slightly turned toward the right handside with the groove in the pinion end facing the cylinder wall at an angle of 30°. (See Fig. 4-44)

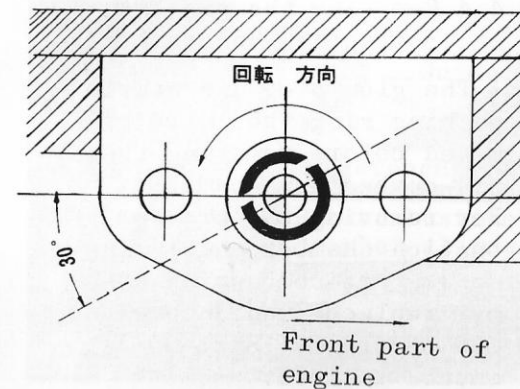


Fig. 4-44

4-4 DISMANTLING

(DIESEL ENGINE)

Many of the parts used in the diesel engine of Isuzu are in common with those in the gasoline engine and therefore, are omitted from further description.

4-4-1 Removing the injection pump

- (1) Remove the fuel injection pipe (1) together with the clip.
- (2) Remove the governor vinyl pipes (2) and (3).
- (3) Remove the injection pump joint bolts (4) and (5).
- (4) Remove the six setting bolts (6) and then, withdraw the injection pump assembly rearward. (See Fig. 4-45)

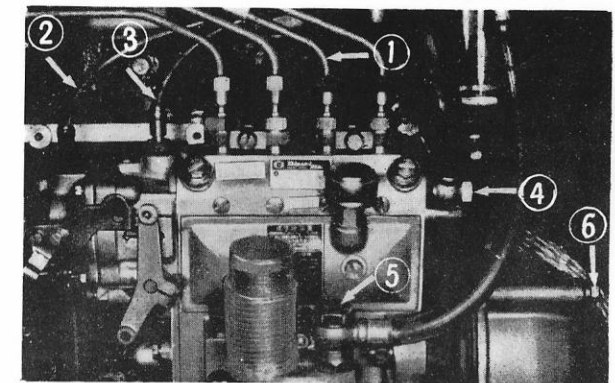


Fig. 4-45

4-4-2 Removing the camshaft

- (1) Remove the timing gear case assembly.

- (2) Remove the idle gear thrust collar (1) and then, remove the idle gear (2).
- (3) Remove the camshaft and thrust collar set bolt (3).
- (4) Carefully remove the camshaft (4) together with the gear. (Fig. 4-46) (Push rod and tappet should be removed before the camshaft is removed.)

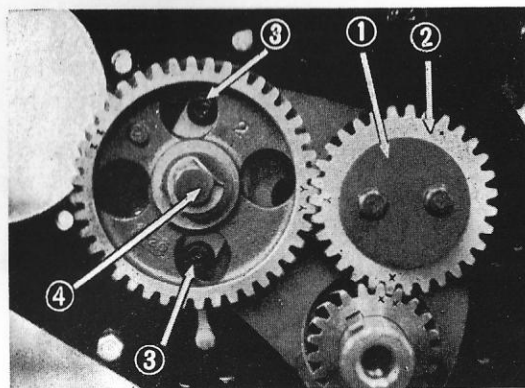


Fig. 4-46

4-4-3 Removing the fuel injection nozzle assembly

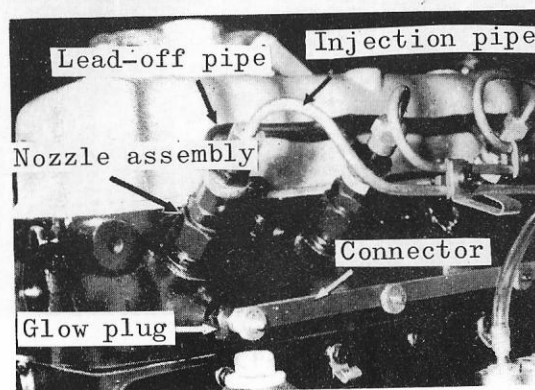


Fig. 4-47

- (1) Remove the injection pipe and leak-off pipe and then, remove the nozzle assembly by turning loose the nozzle holder nut with a wrench. (See Fig. 4-47)

4-4-4 Removing the pre-combustion chamber

- (1) The glow plug and nozzle packing ring should be removed before removing the pre-combustion chamber. For removing the pre-combustion chamber and fixing screw, pre-combustion chamber replacer and a complete set of wrench (8521-0077) should be used.

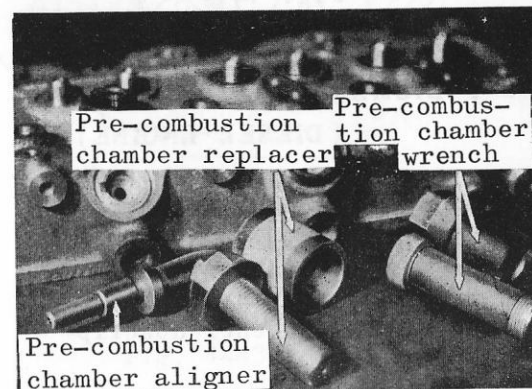


Fig. 4-48

- (2) Insert the pre-combustion chamber aligner (8524-1204) into the glow plug mounting hole.
- (3) Set the guide to the pre-combustion chamber wrench (8521-0075) and then fit the boss on the wrench into the groove in the fixing screw and screw the threaded portion of the guide into the fixing screw.

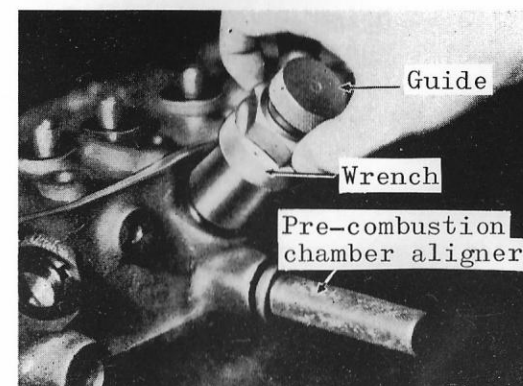


Fig. 4-49

- (4) Turn loose the nut on the wrench with the wrench and then, remove the fixing screw and lock plate.
- (5) Turn the screw on the pre-combustion chamber replacer (8521-0076) all way into the pre-combustion chamber. (See Fig. 4-50)

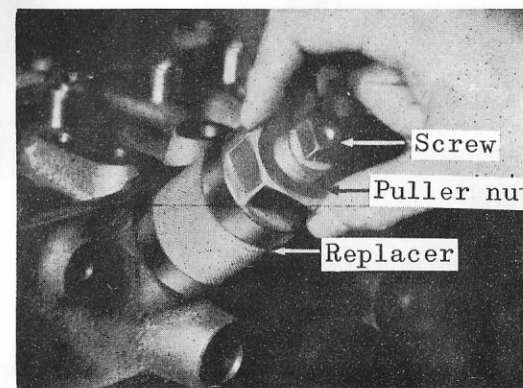


Fig. 4-50

- (6) Pull out the pre-combustion chamber aligner through the glow plug hole.

- (7) Hold the upper portion of the screw with a wrench and then, turn the puller nut in to remove the pre-combustion chamber.

4-5 REASSEMBLING

4-5-1 Reassembling the timing wheels

- (1) Put the timing wheels through the crankshaft and camshaft and then, install them in the cylinder body.
- (2) The crank gear is provided with mark X-X and the cam gear is also provided with mark Y-Y and Z. The idle gear has the marks X and Y.
- (3) The idle gear should be so arranged that the X-X mark on the crank gear and the Y mark on the idle gear correspond with the X mark on the idle gear and the Y-Y mark on the cam gear respectively. Backlash of the gears is standard at 0.1mm.
- (4) The injection pump drive gear should be so arranged that the ZZ mark on the pump drive gear corresponds with the Z mark on the cam gear. (See Fig. 4-51)

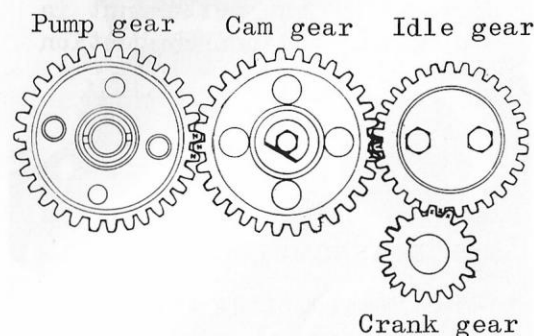


Fig. 4-51

4-5-2 Mounting the injection pump assembly (Excluding its associated parts)

- (1) Remove the cover from the timing gear case.
- (2) The crankshaft should be carefully rotated to bring the piston in the first cylinder to the T.D.C. in the compression stroke and to correspond the timing mark on the crank pulley with the mark on the cover. (See Fig. 4-52)

If the piston in the first cylinder is held at T.D.C. in the compression stroke and the timing marks are properly aligned, the Z mark on the cam gear can be seen from the adjusting port on the timing sprocket casing. (If the piston in the 4th cylinder is held at T.D.C. in the compression stroke by error, the Z mark on the cam gear can not be seen.

In such instance, the crankshaft should be further rotated to bring the piston in the first cylinder to T.D.C.)

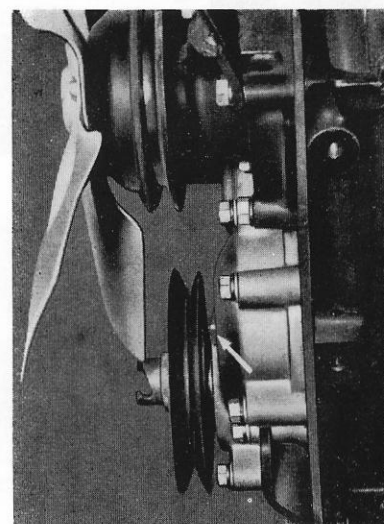


Fig. 4-52

- (3) The injection pump assembly should be mounted in position with the Z-Z mark on the pump drive gear coincided with the Z mark on the cam gear. (See Figs. 4-53 and 4-54)
- (4) Fasten the timing gear case with the front plate using the six clamping bolts. Spring washer and plain washer should be used for fastening these parts together with the bolts.
- (5) Connect vinyl pipes (for vacuum and for atmospheric pressure) to the injection pipe and fuel pipe.

Note: Vacuum vinyl pipe (identified with red color) should be connected to the nipple on the rear part of the injection pump. Atmospheric pressure vinyl pipe (transparent) should be connected to the nipple on the front part of the injection pump.

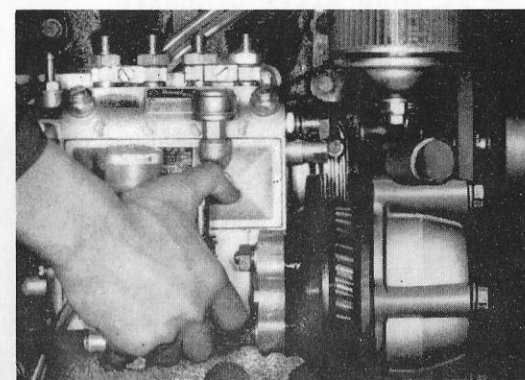


Fig. 4-53

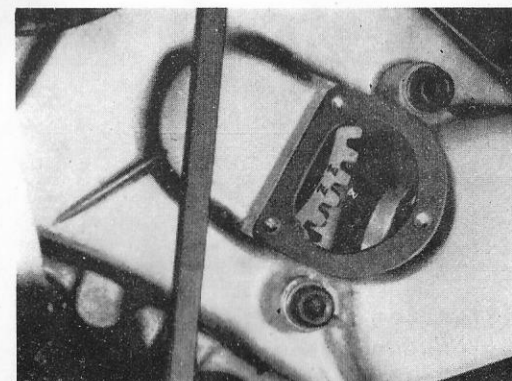


Fig. 4-54

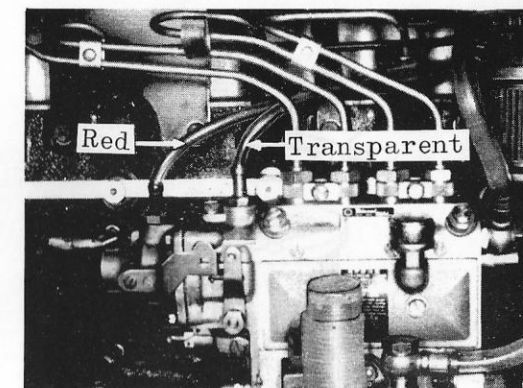


Fig. 4-55

4-5-2 Mounting the pre-combustion chamber

Pre-combustion chamber replacer kit (8521-0077) should be used for refitting the pre-combustion chamber. (Refer the subparagraph "Removing the pre-combustion chamber".)

- (1) The gasket should be put through the pre-combustion chamber after it is cleaned. With the glow plug mounting holes in the pre-combustion chamber held in register with those in the cylinder head, the pre-combustion chamber should be carefully mounted in place. (See Fig. 4-56)
- (2) The pre-combustion chamber should be properly aligned by inserting the pre-combustion chamber aligner through the glow plug mounting hole. (See Fig. 4-57)

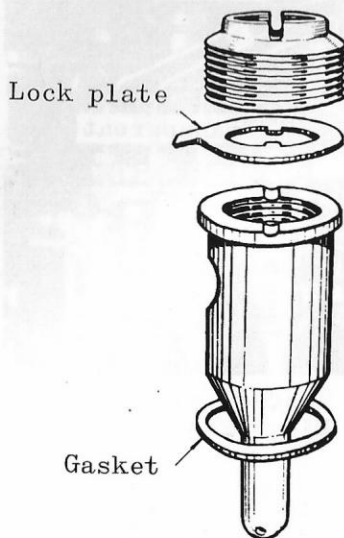


Fig. 4-56

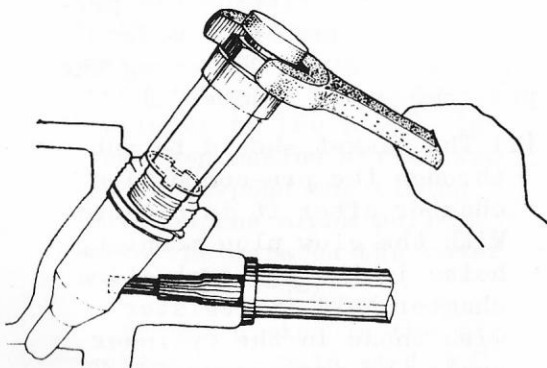


Fig. 4-57

- (3) With a lock plate put through, the pre-combustion chamber should be carefully clamped in position using a pre-combustion

chamber wrench. The clamping torque is 10 - 12 m-kp. (Refer subparagraph "Removing the pre-combustion chamber" for correct method for using the pre-combustion chamber wrench.)

4-5-4 Mounting the nozzle assembly

- (1) The nozzle assembly should be put back in place and clamped with a torque of 10 - 12 m-kp after a nozzle gasket is put through the nozzle assembly. (See Fig. 4-58)

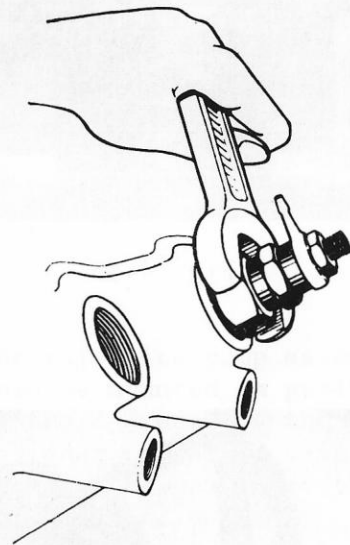


Fig. 4-58

- (2) After the lock nut is loosened, the joint nipple should be adjusted to provide a proper angle for connecting the leak-off pipe. (See Fig. ____)