

CAMSHAFTS

Mount the sprockets on camshafts.

- 1. Exhaust camshaft takes its own sprocket, and intake camshaft does similarly. Do not confuse the two sprockets.
- 2. Mount and secure the sprocket to its camshaft by referring to the illustration.
- 3. Apply **THREAD LOCK** to the threads of Allen-head bolts, and tighten them to this torque value:

Sprocket bolt tightening torque	1.0 kg-m (7.2 lb-ft)
---------------------------------	-------------------------

Install the camshafts as follows:

Tell exhaust camshaft from intake one by the cast-out letters "EX" (for exhaust) as against letters "IN" (for intake). Also tell the right end "R" from the left end "L" of each camshaft.

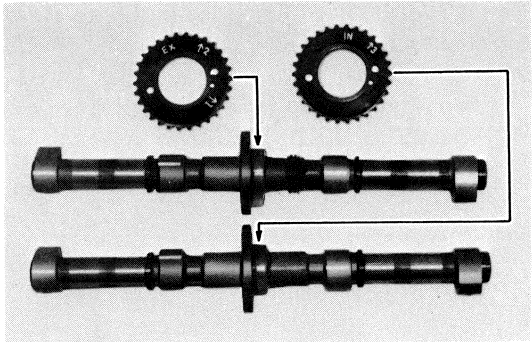


Fig. 1-163

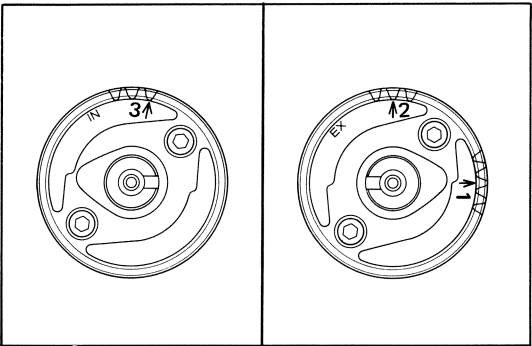


Fig. 1-164

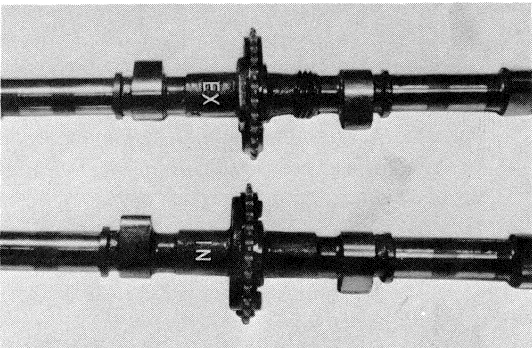


Fig. 1-165

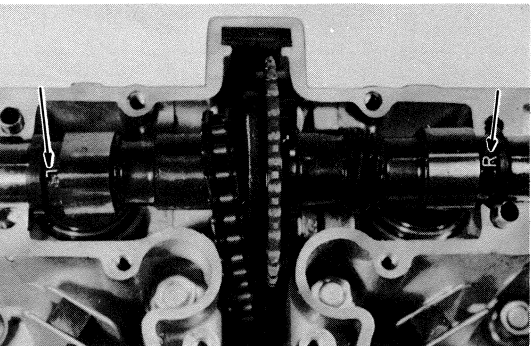


Fig. 1-166

IMPORTANT: Just before placing the camshaft on the cylinder head, apply a high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) to its journals, coating each journal with the paste fully without leaving any dry spot. Apply engine oil to the journal bearings.

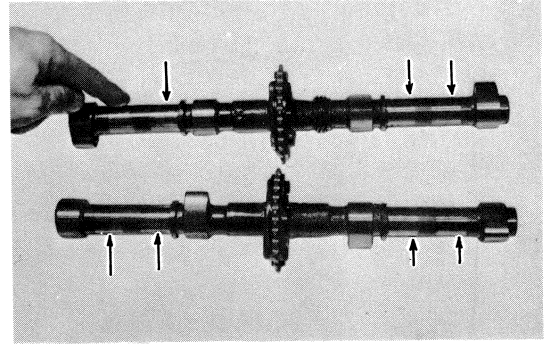


Fig. 1-167

1. With the two camshafts properly resting in place and the timing chain reeved around the sprockets, adjust the positions of components associated with valve timing, thereby timing the valve mechanism. Under this condition, put on the bearing caps, orienting each cap correctly. The method of valve timing adjustment will be explained subsequently.

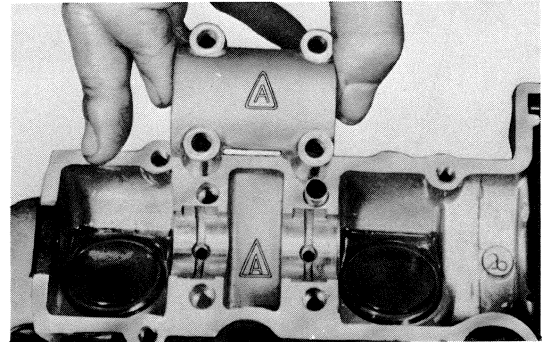


Fig. 1-168

2. Secure the four bearing caps uniformly by tightening cap bolts sequentially in the manner illustrated. Try to equalize the securing pressure by moving the wrench diagonally from one bolt to another and from one bearing cap to another. (It is assumed here that the vice pliers are used for each camshaft to hold down the tappet interfering with a cam.)

Tighten the cap bolts to this torque value:

Cam shaft holder bolt tightening torque	0.8 - 1.2 kg-m (5.8 - 8.7 lb-ft)
--	-------------------------------------

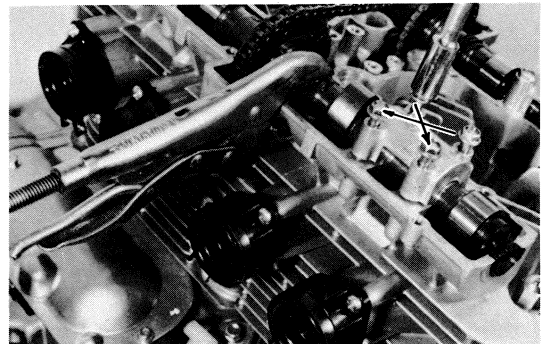
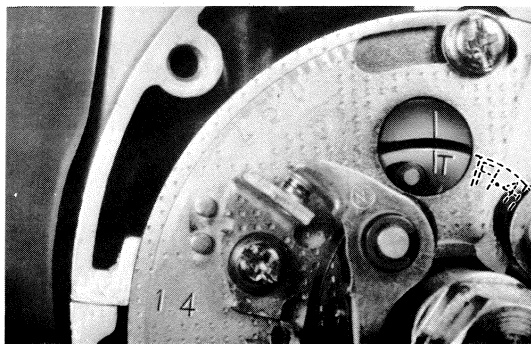
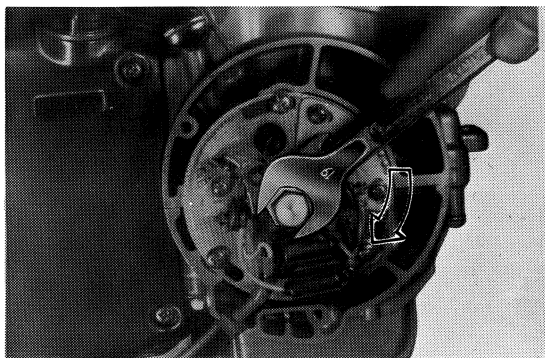


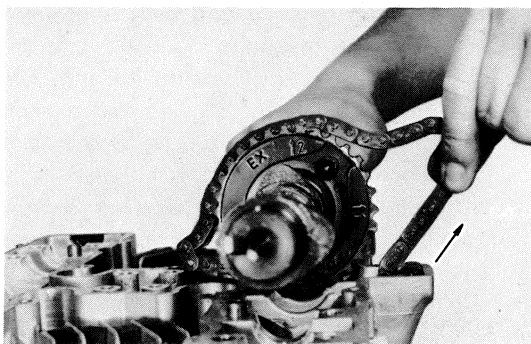
Fig. 1-169

VALVE TIMING ADJUSTMENT

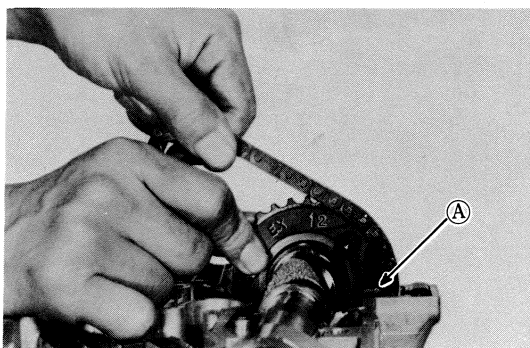
1. While holding down the timing chain, rotate the crankshaft in normal running direction to bring the "T" mark on Nos. 1 and 4 side (of the advance governor) to the timing mark. Use a 19-mm wrench to turn the crankshaft.

**Fig. 1-170****Fig. 1-171**

2. With the crankshaft held in that position (with the "T" mark aligned to the timing mark at the governor), pull up the chain on the front side to take up its sag.

**Fig. 1-172**

3. Exhaust sprocket has an arrow mark "1" indicated as (A). Turn over exhaust camshaft to point this arrow flush with the joint surface of the cylinder head. Engage the timing chain with this sprocket.

**Fig. 1-173**

4. The other arrow mark "2" is now pointing straight upward. Count the chain roller pins toward intake camshaft, starting from the roller pin right **above** this arrow mark "2" and ending with the **20th roller pin**. Engage the chain with intake sprocket, locating the 20th pin **at and above** the arrow mark "3" on intake sprocket.

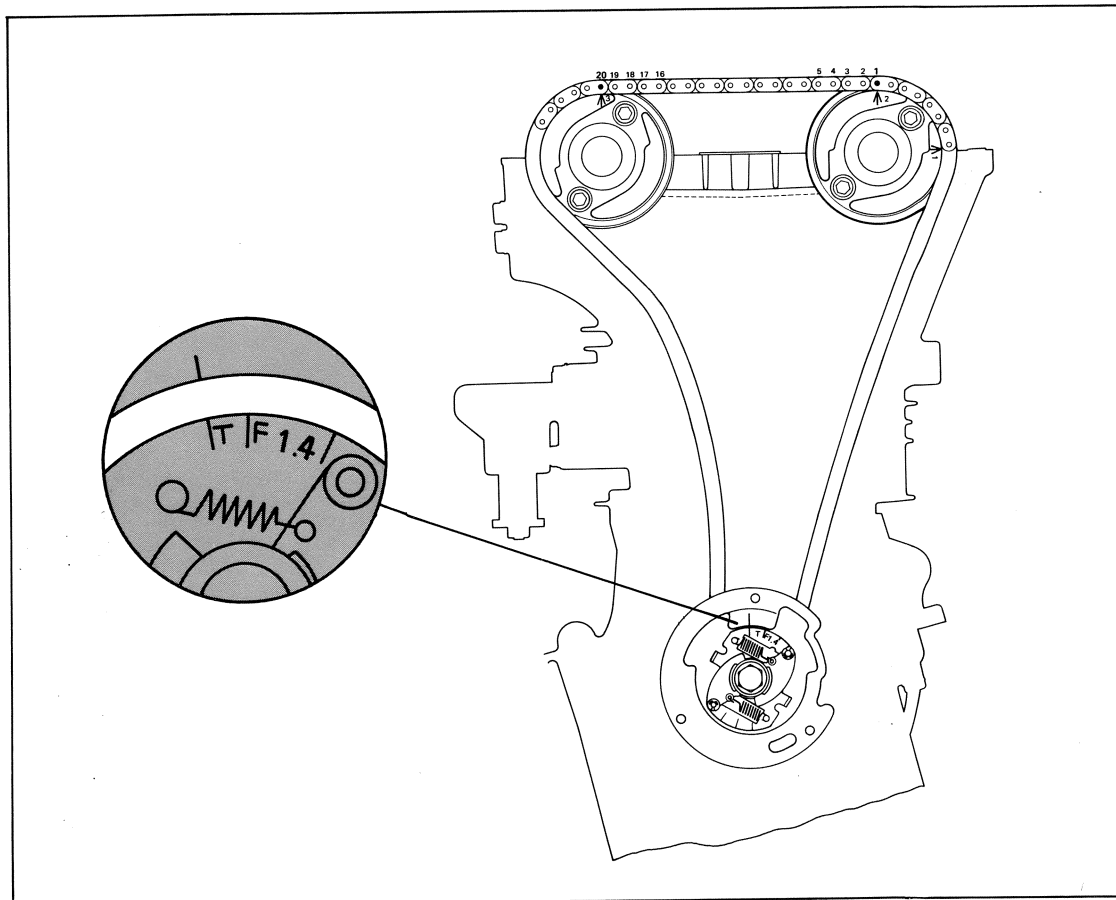


Fig. 1-174

IMPORTANT: The timing chain is now riding on all three sprockets. Be careful not to disturb the crankshaft until four bearing caps are secured.

TACHOMETER DRIVE GEAR.

Install the tachometer drive gear. This is to be effected **after** installing the exhaust camshaft. Installing this gear before installing the camshaft may cause the teeth of gear and worm to break as the camshaft is lowered and fitted to the cylinder head.

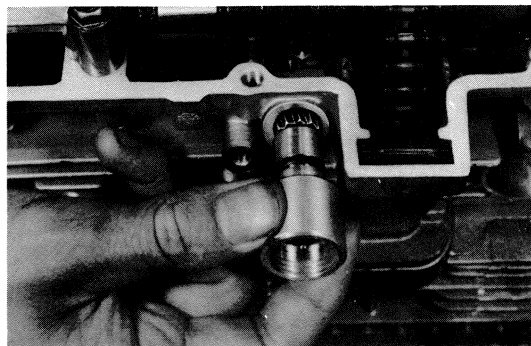


Fig. 1-175

TIMING CHAIN IDLER

Install the timing chain idler, securing it by tightening to this torque value:

Chain idler tightening torque	0.6 - 0.8 kg-m (4.3 - 5.8 lb-ft)
-------------------------------	-------------------------------------

The performance of the rubber damper in this idler presupposes that the idler is tightened correctly.

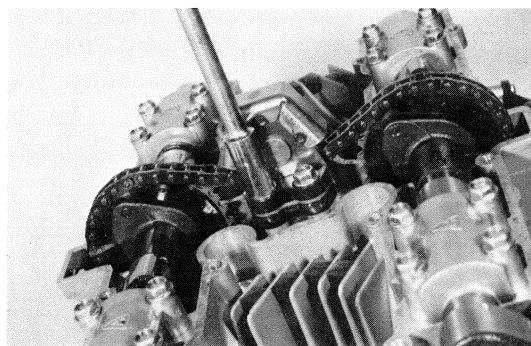


Fig. 1-176

TIMING CHAIN TENSION ADJUSTOR

The tension adjustor used in the Model GS750 is of automatic type in that it adjusts itself to apply a constant tensioning force to the chain by compensating for the stretch of the chain.

In operation, its spring-loaded pushrod keeps on pushing the timing chain. As the chain stretches, it yields to this push and remains in tensioned state. Once the adjustor is set after installation, there is no need of making any adjustment.

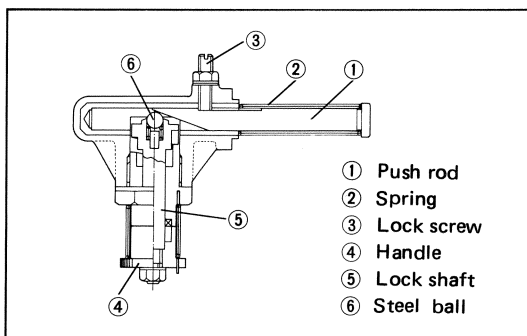


Fig. 1-177

The pushrod is prevented from backing away. By this feature, the pushrod effectively contends with the tendency of the timing chain to shake or vibrate during rough driving condition."

Reassembling

1. Apply a high quality molybdenum disulfide lubricant (SUZUKI MOLY PASTE) to the pushrod and engine oil to the pushrod guide hole. Match the lock screw to the long groove in the pushrod, as shown, and insert the pushrod by pushing it to the indicated position.

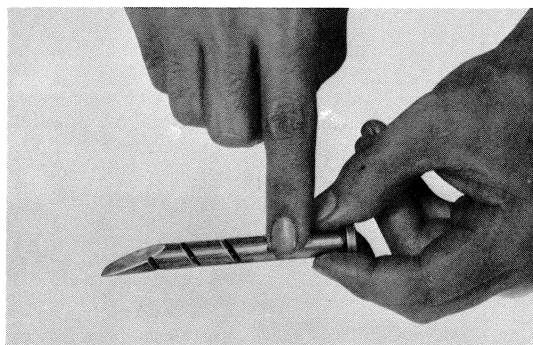


Fig. 1-178

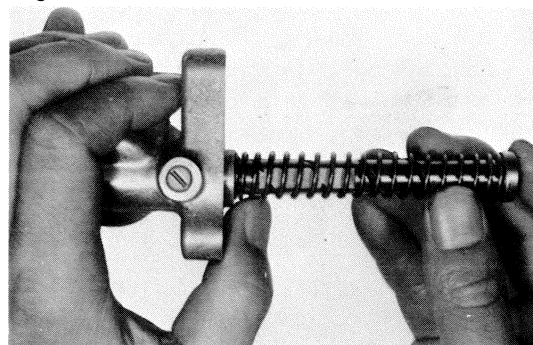


Fig. 1-179

2. Move the pushrod back and forth with fingers to see if it moves smoothly as it should.

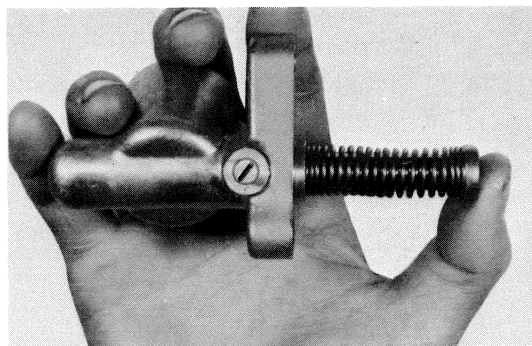


Fig. 1-180

3. With the pushrod inserted, run in the lock screw until its tip bears against the pushrod. From that position of the screw, back it away by one-quarter rotation.

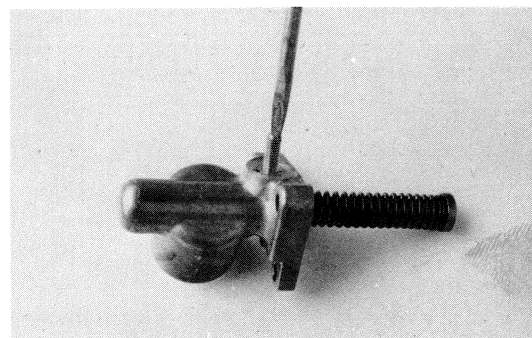


Fig. 1-181

4. Apply engine oil to the lock shaft. Insert the shaft into the holder and bring the two into the relative position indicated.

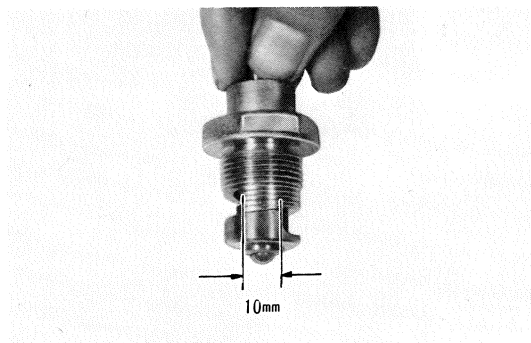


Fig. 1-182

5. Hook the spring onto the holder and handle, twist the spring by one complete rotation counterclockwise, and fit the handle onto the shaft.

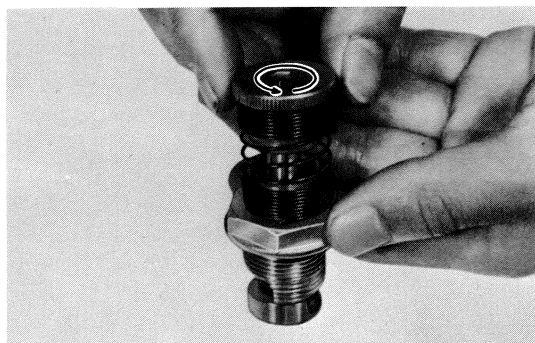


Fig. 1-183

6. After tightening the lock shaft nut, install the lock shaft assembly on the adjustor body. Be sure to adhere to the following torque specifications:

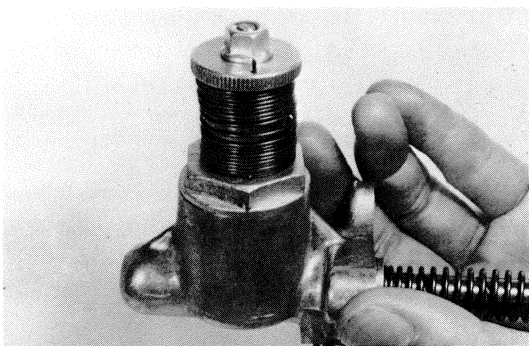


Fig. 1-184

Lock shaft nut tightening torque	0.8 - 1.0 kg-m (5.8 - 7.2 lb-ft)
Shaft assembly tightening torque	3.1 - 3.5 kg-m (22.3 - 25.3 lb-ft)

Installing the adjustor

Removal of the tension adjustor is necessitated by engine disassembly and also by removal of camshafts. In either case, re-install the adjustor on the cylinder block after the camshafts have been installed. The procedure follows:

1. While turning lock shaft handle **counter-clockwise**, push in the pushrod all the way. Keep on turning the handle until it refuses to turn further.

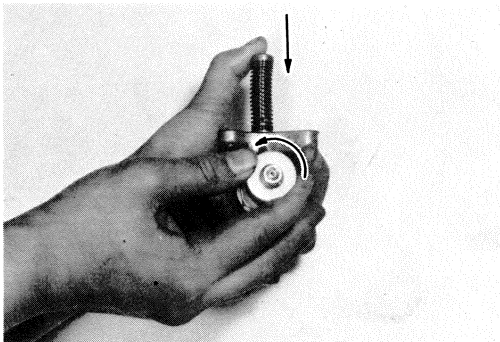


Fig. 1-185

2. Tighten the lock screw to lock the pushrod, so that the pushrod will not plunge out.

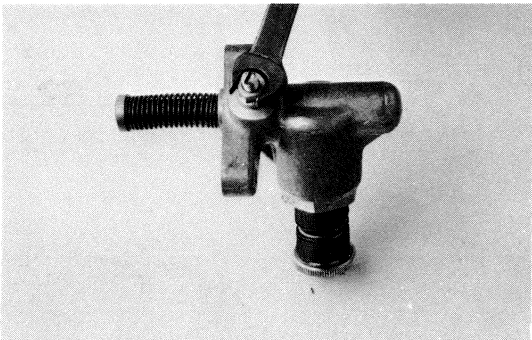


Fig. 1-186

3. Secure the adjustor to the cylinder block.

4. Back away the lock screw by one-quarter to half rotation: this separates the tip of this screw from the pushrod, thereby allowing the pushrod to advance under spring force and press the tensioner against the timing chain.

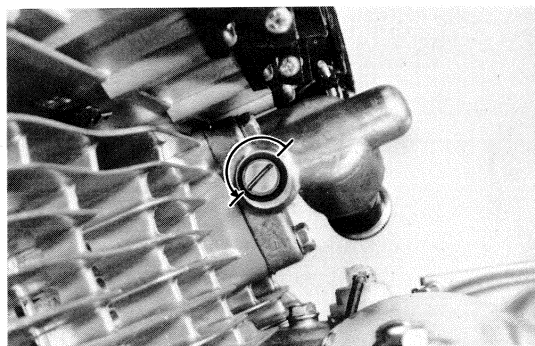


Fig. 1-187

5. Fit the packing, and tighten the lock nut.

NOTE: When tightening the lock nut, be careful not to allow the lock screw to turn.

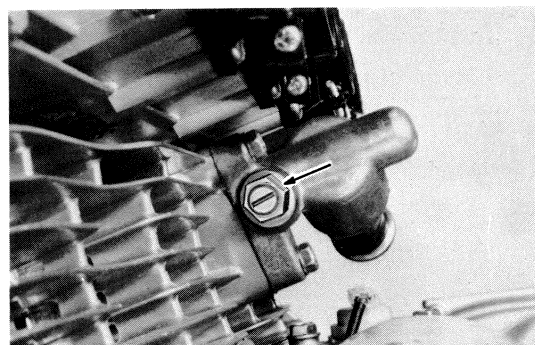


Fig. 1-188

The method of checking to see whether the adjuster is functioning correctly or not after initially setting the adjuster in place is as follows:

1. While turning the handle counterclockwise, slowly rotate the crankshaft in **reverse** direction (thus causing the chain to push back the tensioner).
2. Release the handle and slowly turn back the crankshaft in **normal running direction** (to slacken that portion of the chain extending along the tensioner). See if the handle rotates by itself as the chain becomes increasingly slackened; if it does, then the pushrod inside is obviously moving forward under spring force as it should, thus signifying that the adjuster is in good operable condition. If the handle rotates but sluggishly, it means that the pushrod or lock shaft is sticking and, in such a case, remove the adjuster and service the pushrod and lock shaft to make them move smoothly.

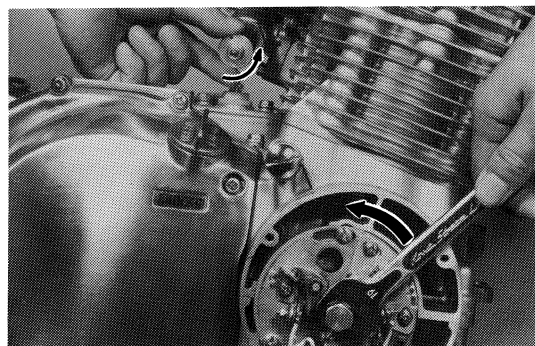


Fig. 1-189

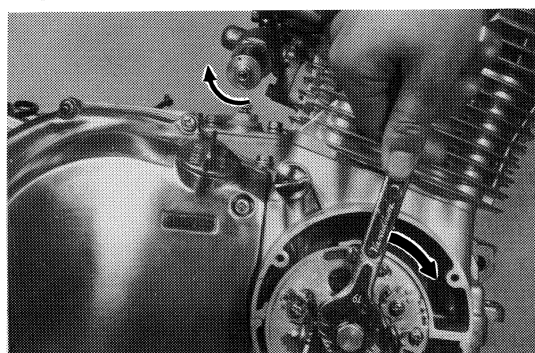


Fig. 1-190

CAUTION: After installing the adjuster and checking it in initially set condition for operation, do not attempt to turn the handle in either direction until the next overhaul.

CHECKING AND ADJUSTING THE TAPPET CLEARANCE

The tappet clearance specification is the same for both intake and exhaust valves. Too small a tappet clearance could reduce the ability of the engine to develop power; too large a tappet clearance increases valve noise and promotes the wear of valve and seat. An engine running with not much noise coming from the valve mechanism and delivering full power has its tappets set to the specified clearance. In the present engine, the tappet clearance is increased or decreased by replacing the shim disc, made of a special wear-resistant material, fitted to the top of the tappet. The shim discs are easy to remove and refit. Tappet clearance adjustment must be checked and adjusted 1) at the time of periodical inspection, 2) when the valve mechanism is serviced, and 3) when the camshafts are disturbed by removing them for servicing.

Checking the tappet clearance

Tappet clearance specification (for both intake and exhaust valves)	0.03 - 0.08 mm (0.0012 - 0.0031 in)
--	--

IMPORTANT: 1. The cam must be at the position (A) or (B) in order to check the tappet clearance or to remove the shim disc. A clearance reading taken with the cam in any other position off these two positions is false.
2. The clearance specification is for COLD state.

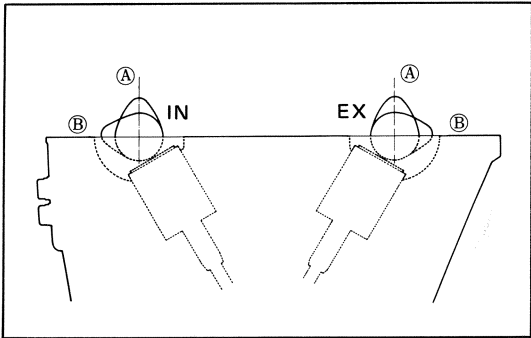


Fig. 1-191

3. To turn the crankshaft for clearance checking, be sure to use a 19-mm wrench and to rotate in normal running direction.

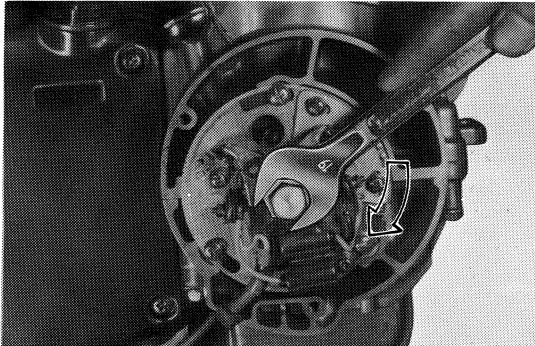


Fig. 1-192

1. Turn crankshaft to bring the exhaust cam of No. 1 cylinder to this position. Under this condition, read the clearance at the exhaust tappets of Nos. 1 and 2 cylinders. Use the thickness gauge (special tool) on all tappets.

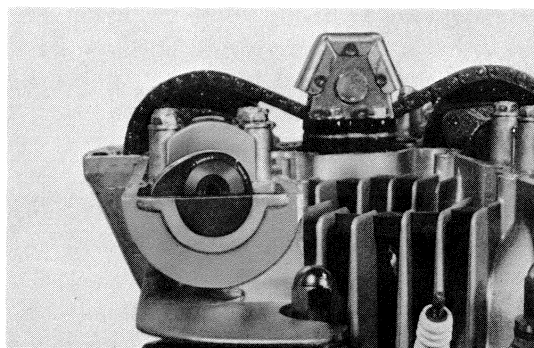


Fig. 1-193

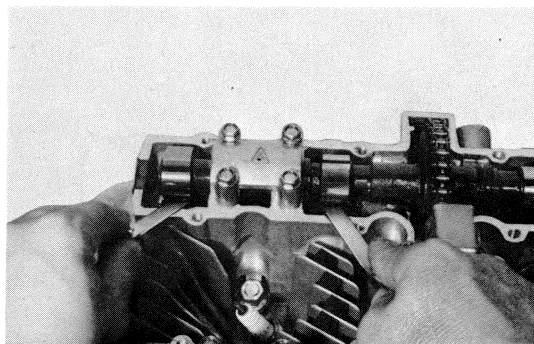
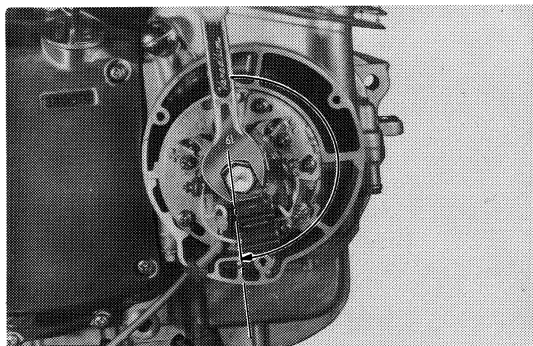
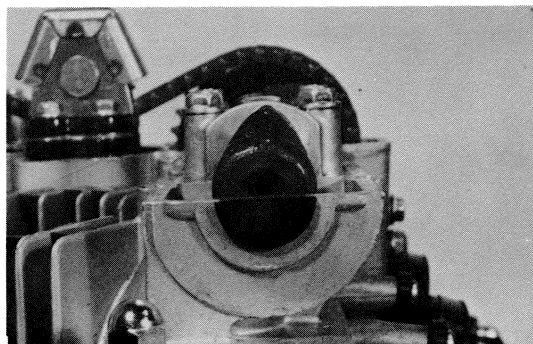
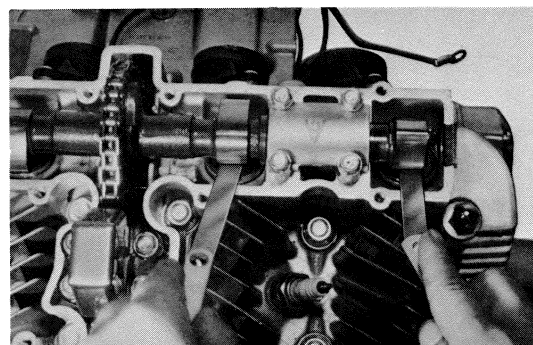


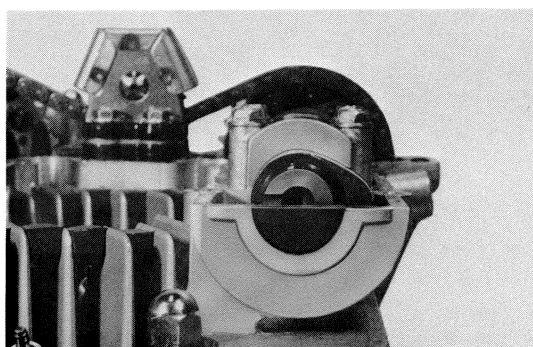
Fig. 1-194

If clearance checked is off the specification, bring it into the specified range (0.03 - 0.08 mm) by replacing the shim discs. The method of changing the discs will be explained in the next section.

2. The clearance having been set to the specification at the exhaust tappets of Nos. 1 and 2 cylinders, turn crankshaft by 180° (half rotation) to bring the intake cam of No. 1 cylinder to the position indicated. Read the clearance at the intake tappets of Nos. 1 and 2 cylinders and, as necessary, adjust the clearance to the specification at each.

**Fig. 1-195****Fig. 1-196****Fig. 1-197**

3. Turn over crankshaft another 180° , bringing the exhaust cam of No. 4 cylinder to the position indicated. Under this condition, repeat the checking and adjusting process outlined in step "1" at the exhaust tappets of Nos. 3 and 4 cylinders.

**Fig. 1-198**

4. Again turn over crankshaft another 180°, bringing the intake cam of No. 4 cylinder to the position indicated. Similarly check and adjust the clearance at the intake tappets of Nos. 3 and 4 cylinders.

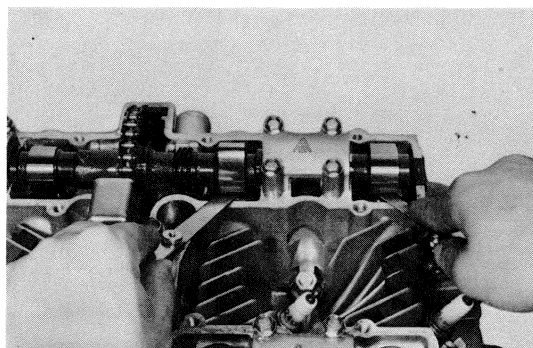


Fig. 1-199

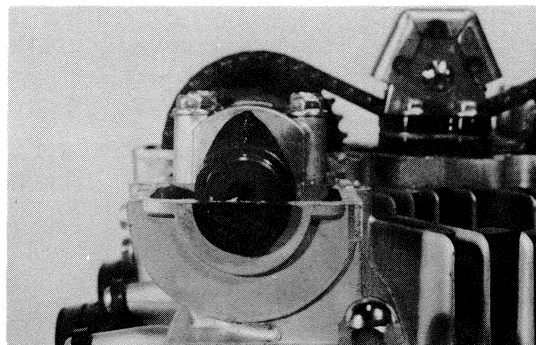


Fig. 1-200

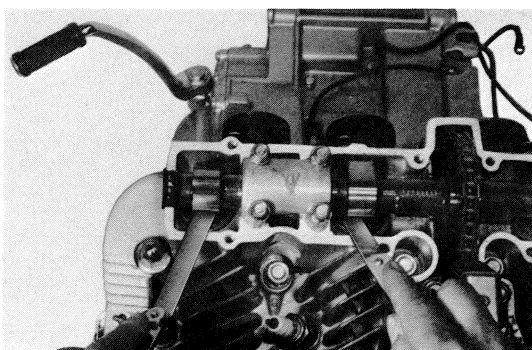


Fig. 1-201

Tappet clearance adjustment

The clearance is adjusted by replacing the existing tappet shim by a thicker or thinner disc.

1. Put your fingertips to the tappet, and turn it in place to bring its notch to the position indicated.

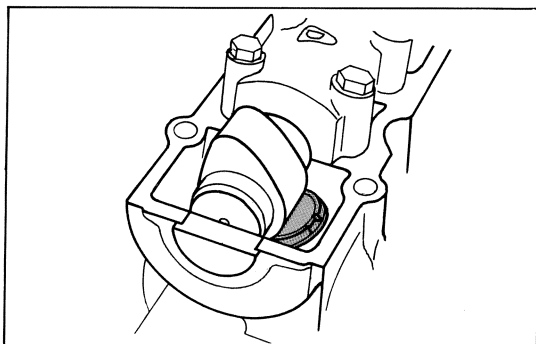


Fig. 1-202

2. Using the tappet depressor (special tool), push down the tappet.

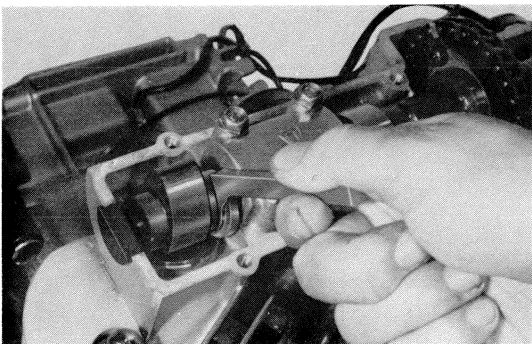


Fig. 1-203

NOTE: Be sure to make the tool bear on the tappet correctly, as shown, with its tip hitched securely.

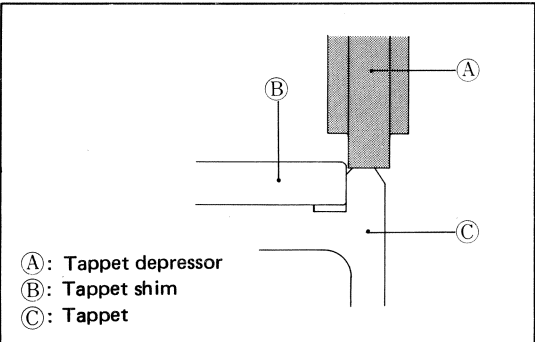


Fig. 1-204

3. Pick out the tappet shim from the tappet, using a pair of forceps.

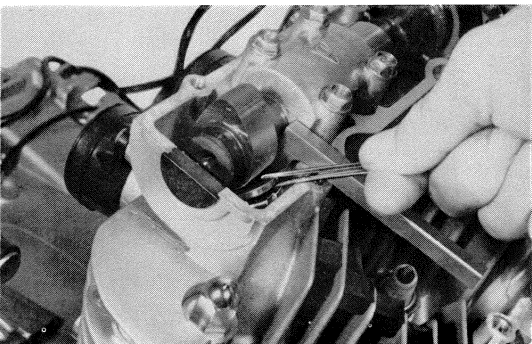


Fig. 1-205

4. Check the figures punched on the shim. These figures tell the thickness of the shim, as illustrated.

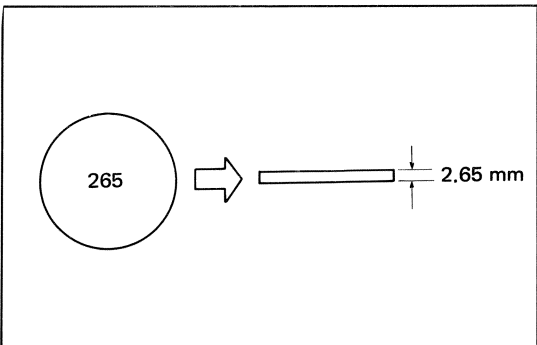


Fig. 1-206

5. Select such a replacement shim as will provide a clearance coming within the specified range (0.03 - 0.08 mm). For the purpose of this adjustment, a total of 20 sizes of tappet shim are available, ranging from 2.15 to 3.10 mm in steps of 0.05 mm each. Put the selected shim to the tappet.

Tappet shim size chart

No.	Thickness (mm)	Part No.	No.	Thickness	Part No.
1	2.15	12892-45000	11	2.65	12892-45010
2	2.20	12892-45001	12	2.70	12892-45011
3	2.25	12892-45002	13	2.75	12892-45012
4	2.30	12892-45003	14	2.80	12892-45013
5	2.35	12892-45004	15	2.85	12892-45014
6	2.40	12892-45005	16	2.90	12892-45015
7	2.45	12892-45006	17	2.95	12892-45016
8	2.50	12892-45007	18	3.00	12892-45017
9	2.55	12892-45008	19	3.05	12892-45018
10	2.60	12892-45009	20	3.10	12892-45019

NOTE: Before fitting the tappet shim to the tappet, be sure to oil its top and bottom faces with engine oil.

6. After replacing the tappet shim, check the clearance again to be sure that it is within the specified range.

CYLINDER HEAD COVER

Install four oil separators at the locations indicated.

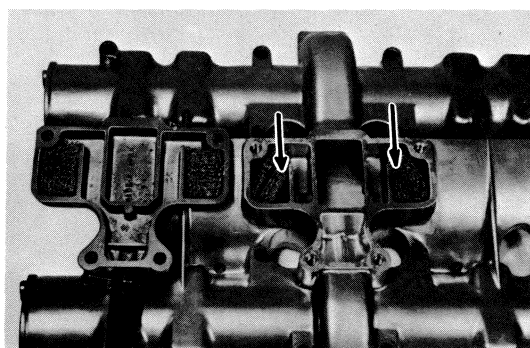


Fig. 1-207

There are 16 bolts for securing the cover to the head. Tighten these bolts in the ascending order of numbers as shown, so as to make sure that it will be fastened down with evenly distributed pressure.

Tighten the bolts to this torque value:

Head cover bolt tightening torque	0.7 - 1.1 kg-m (5.1 - 8.0 lb-ft)
-----------------------------------	-------------------------------------

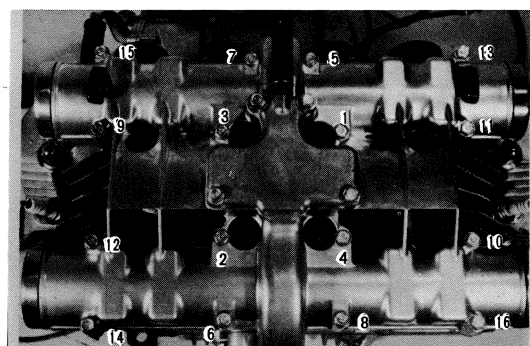


Fig. 1-208