VALVE ADJUSTMENT

Put the engine in TDC position on compression stroke (see Section 5). Unscrew the two screws of each valve adjustment cover (Fig. 9A-1) and remove the covers including the gaskets.

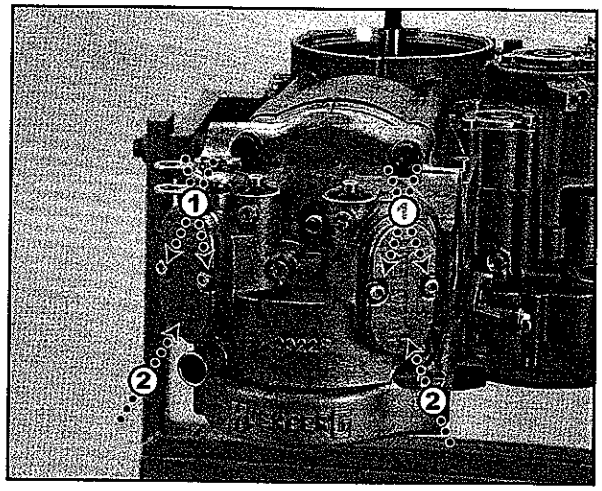

Fig. 9A

With the use of a feeler gauge check the play of each four valves in between the feet of the adjustment screws and the top of the valve stems. Valve clearance should be 0,10 mm.
With some experience this clearance can be obtained by setting the adjustment screw slightly against the valve stem and then back it out by turning the screw 1/8 of a revolution counterclockwise.
(One full revolution of the screw equals 0,75mm)
If an adjustment is needed release the lock nut (Fig. 9B-1) and adjust by turning the adjustment screw (Fig. 9B-2).
With the adequate play obtained hold the adjusment screw while tightening the lock nut, torque 12 Nm.

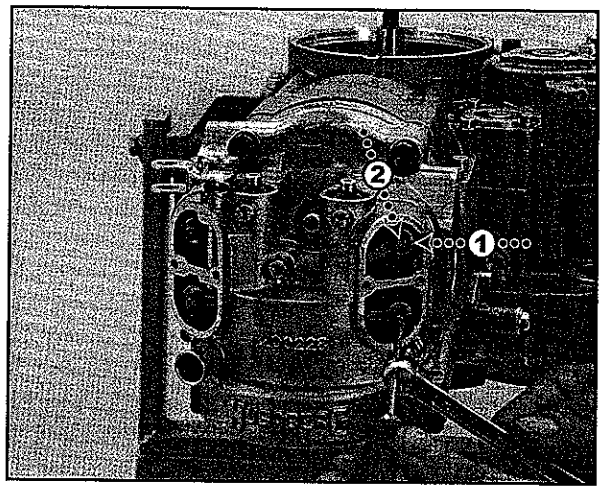

Fig. 9B

Check the axial play (Fig. 9C-1) of the rocker arms. Adequate play should be between 0,05 and 0,1 mm.
If an adjustment is needed release the screw of the rocker arm in question (Fig. 9C-2), push onto the end cap/screw of the rocker arm (Fig. 9C-3) as shown (Fig. 9C-4) and tighten the rockerarm screw, torque 10 Nm.
Check the gaskets and the valve adjustment covers for any damages or deterioration.
Refit the covers and gaskets and screw on the four screws, torque 5 Nm.

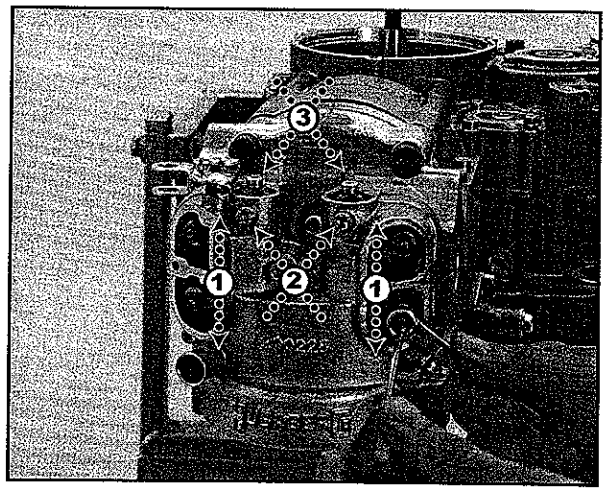

Fig. 9C

DECOMPRESSION ADJUSTMENT

Put the engine in the TDC position on compression stroke (see Section 5).
Check that the decompression cable is well lubricated and runs smoothly.
Check the play of the valve decompression lever (Fig. 9D-1) which should be 2 ±1 mm (Fig. 9D-2).
If an adjustment is needed release the lock nut (Fig. 9D-3) and turn the adjustment screw (Fig. 9D-4).
Tighten the lock nut when the adequate play is obtained.

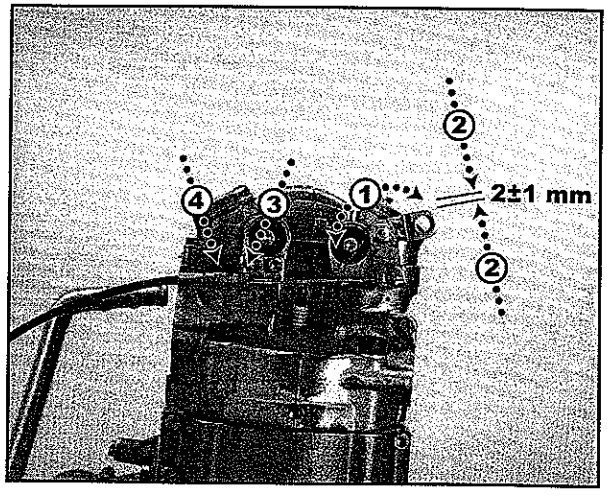

Fig. 9D

DISASSEMBLY OF CYLINDER HEAD

Drain the engine oil and the coolant liquid from the engine.If the engine is within the frame dismantle the carburettor, the spark plug cap and the exhaust pipes (see Section 10A).
Unscrew the two screws (Fig. 9E-1) holding the attachment bracket of the decompression cable.
Lift the cable out of the valve decompression lever (Fig. 9E-2) and remove the cable and the bracket from the cylinder head.

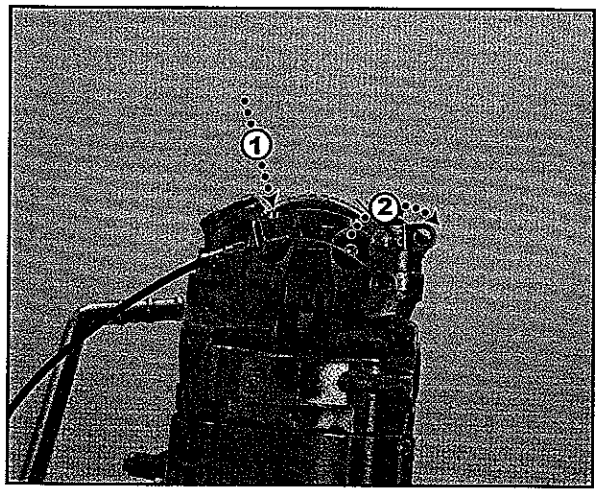

Fig. 9E

Unscrew, cross-wise, the seven screws (Fig. 9F-1, 2, 3) holding the valve cover. It is easiest to remove the center screw last.
Please observe the different lengths of the screws:
Two screws 50 mm (Fig. 8F-1)
Two screws 20 mm (Fig. 8F-2)
Three screws 45 mm (Fig. 8F-3)
Remove the cover.

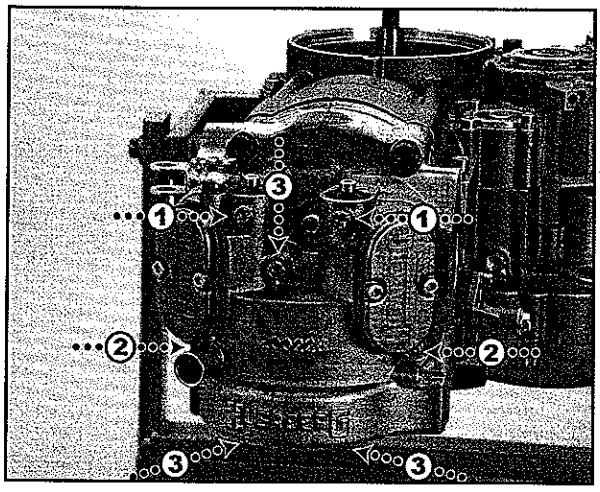

Fig. 9F

Unscrew the center bolt of the timing chain tensioner (Fig. 8G-1) and remove the bolt including the washer and the spring.
Unscrew the two screws of the tensioner (Fig. 8G-2) and remove the tensioner incl. the gasket.
Check the position of the tensioner push rod and if it is within the outer positions make a check of the timing chain and the timing sprockets regarding wear.

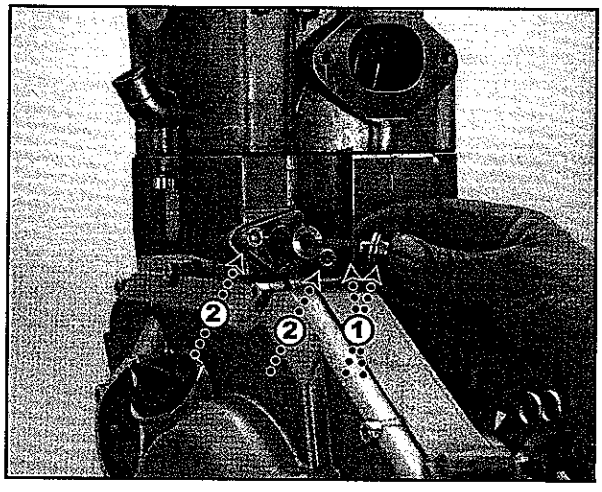

Fig. 9G

The camchain is riveted and can be opened at any link. Use a suitable rivet press (Fig 9H-1, Article No. 270) to remove one link. Be careful not to lose the parts of the link into the engine.
Remove the timing chain from the sprocket. Secure the two ends of the timing chain in order to prevent either ends to fall into the cylinder head or the crankcase.
Lift off the camshaft from the cylinder head.

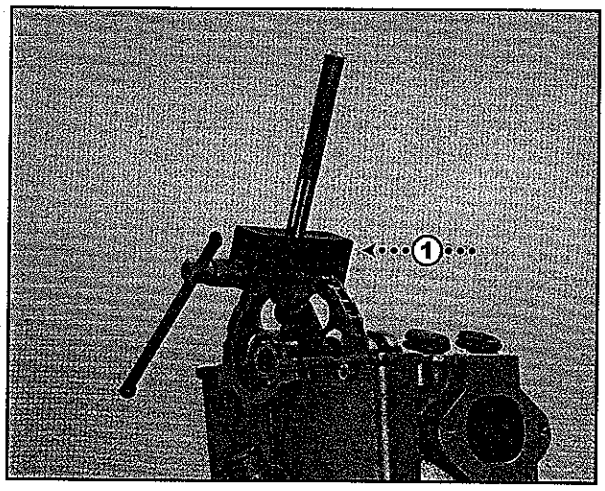

Fig. 9H

Unscrew, cross-wise, and remove the four cylinder stud screws (Fig. 9I-1) and the screw under the coolant pipe (Fig. 9I-2 Hidden).
Lift off the complete cylinderhead. Be careful not to drop the ends of the timing chain (Fig. 9I-3) down into the cylinder or crankcase.

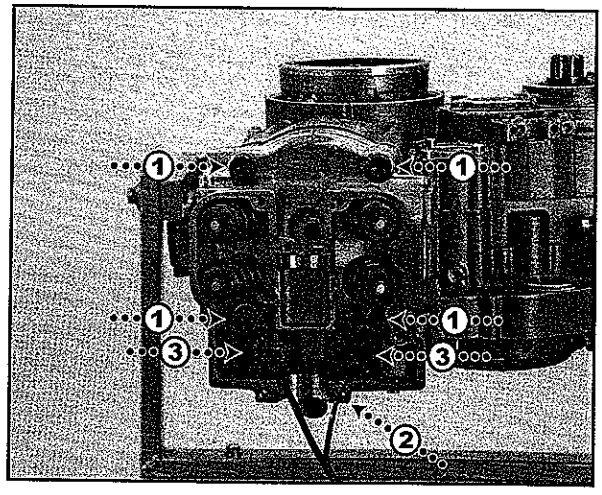

Fig. 9I

Chech the two bearings (Fig. 9J-1) for signs of wear or excessive play.
Check the intake cam lobe (Fig. 9J-2) and the outlet cam lobe (Fig. 9J-3). Both should have smooth and flat surfaces without any signs of deterioration or rough areas.

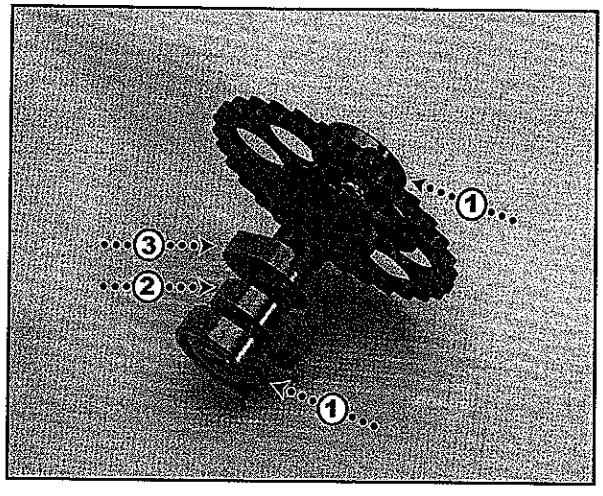

Fig. 9J

By using a suitable valve spring compressor, remove the two valve spring cotters of each valve (Fig. 9K-1), from the valve stems (Fig. 9K-2) and the valve spring retainers (Fig. 9K-3). Mark each valve and the corresponding valve seat.
Lift off the valve springs Fig. 9K-4) and the valve spring washers (Fig. 9K-5) from the cylinder head.
Remove the valve guide seals (Fig. 9K-6).

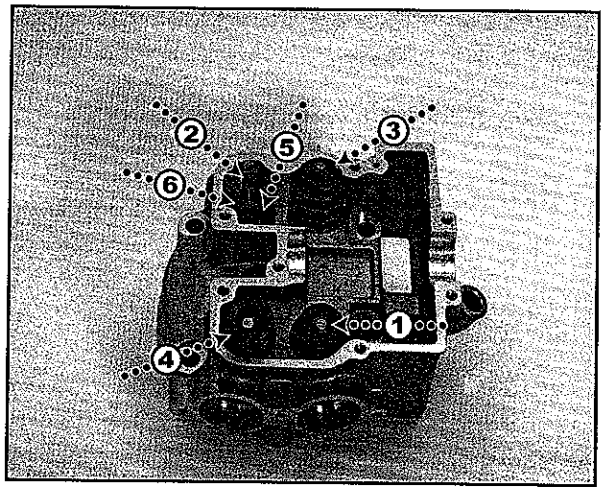

Fig. 9K

Carefully check the surfaces of the valve faces (Fig. 9L-1) and the corresponding surfaces of the valve seats for any damages or deterioration.
Check the valve stems (Fig. 9L-3) and the valve guides (Fig. 9L-4) for any damages or deterioration.

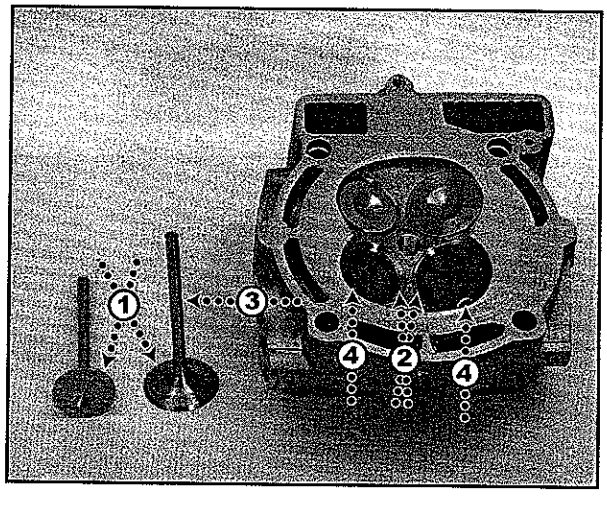

Fig. 9L

Remove the circlip (Fig. 9M-1) and pull out the decompression lever (Fig. 9M-2) including the spring (Fig.9M-3).
Check the decompression lever for any damages or wear. Especially the flat surface facing the exhaust rocker. If anu burr has apperared, the decompression device can be filed to shape while still in place.

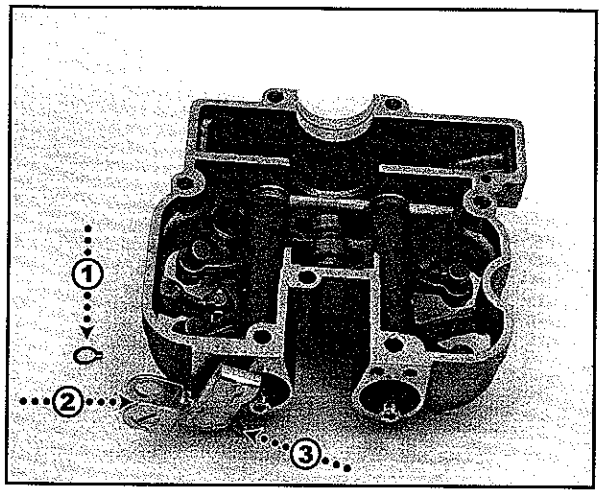

Fig. 9M

Pull out the rockerarm cap ends (Fig. 9N-1), for instance by using a washer and a M5 screw. A bent plier, pressing on the inner end of the shaft can also be used pressing out the complete unit.
Pull out the rockerarm shafts (Fig. 9N-2).
Inspect the rockerarm bearings (Fig.9N-3) and the adjustment screws (Fig. 9N-4) for any damages or deterioration.

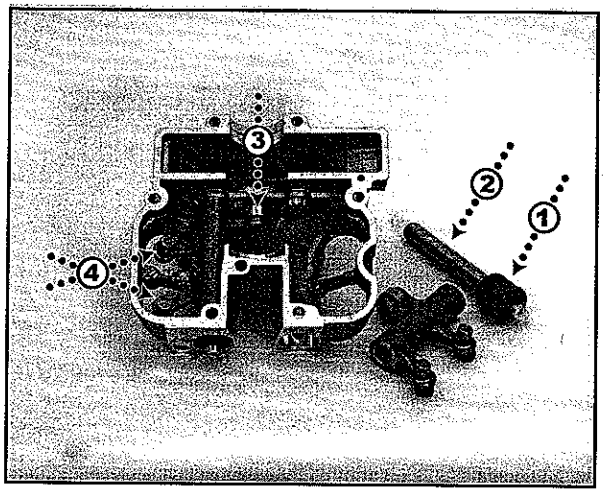

Fig. 9N

Replace the o-ring of the decompression lever (Fig. 9O-1) before installation.
Check the intake rockerarm (Fig. 9O-2) and the outlet rockerarm (Fig. 9O-3) for any signs of damage or deterioration.
Check the four bushings (Fig. 9O-4), one in each end of the rockerarms and the rockerarm shafts (Fig.9OT-5) for any damages or deterioration.
Replace the o-rings (Fig. 9O-6) of the cap ends (Fig. 9O-7) before installation.

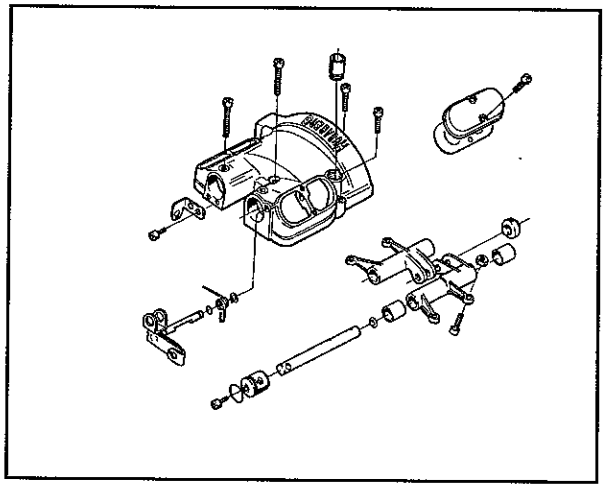

Fig. 9O

Replace the valve guide sealings (Fig. 9R-1) and also the cylinder head gasket (Fig. 9R-2) before installation.

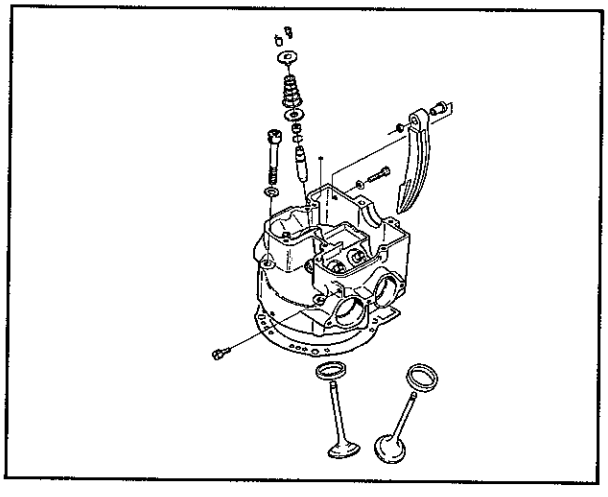

Fig. 9P

ASSEMBLY OF CYLINDER HEAD

Insert the decompressrion device (Fig. 9Q-1) into the slot of the camshaft and upper timing sprocket, slide the spring over the shaft of the device. With the straight end of the spring resting towards the camshaft (Fig. 9Q-2) just twist the spring, counter clockwise, and slide the end of the spring (Fig. 9Q-3) onto the shaft of the device. Secure the device with the spring positioned on the flat surface of the device shaft.

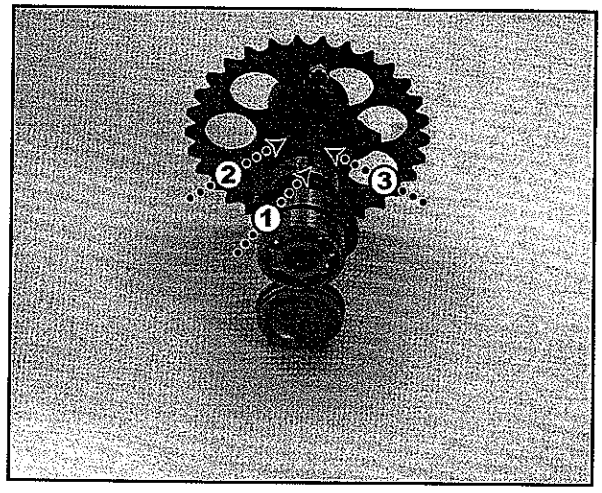

Fig. 9Q

Install the bearing (Fig. 9R-1) onto the camshaft with the help of a press. The bearing should be mounted as far as possible onto the camshaft but the decompression device has to move freely (Fig. 9R-2).

There are two different types of gears. The picture shows the steel gear for late 2002 and 2003. For 2001 a solid alu-gear was used.
On steel gears the stop screw must be fitted with a thick washer (Fig. 9R-3) to avoid breakage of the decompression device.

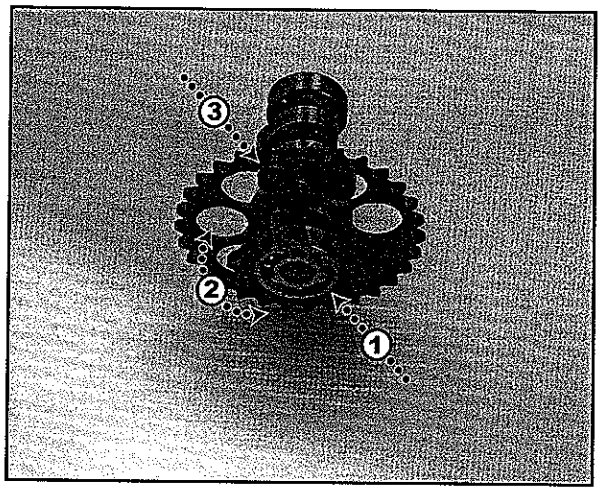

Fig. 9R

Lubricate and insert the two rockerarm shafts into the valve cover and through the two, lubricated, rockerarms (Fig. 9S-1).
Push in the two cap ends (Fig. 9S-2) and screw on the two screws (Fig. 9S-3). Make sure that the screw holes of the cap ends are in alignement with the holes of the cover (Fig. 9S-4).
Lubricate and insert the decompression lever (Fig. 9S-5), including the spring (Fig. 9S-6) into the cover and secure it with a new circlip (Fig. 9S-7).

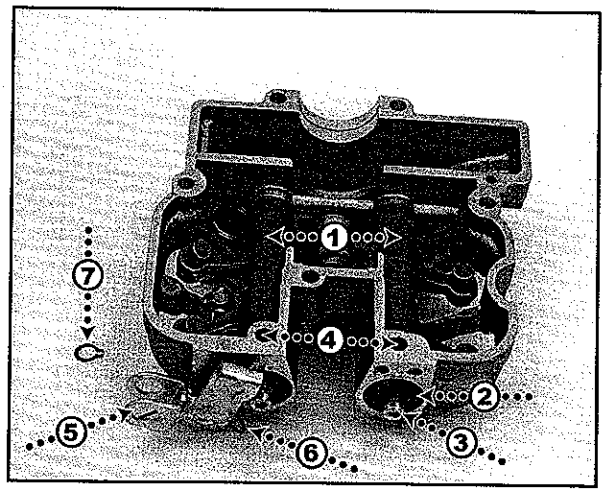

Fig. 9S

Install the four valve guide seals (Fig. 9T-1).
Lubricate the inner of the valve guide seals and slide the valves through the valve guide seals and the valve guides.
Install the valves (Fig. 9T-2) by putting on the valve spring washers (Fig. 9T-3) and the valve springs (Fig. 9T-4) onto the cylinder head and the valves, and by using a suitable valve spring compressor, secure the valves with the spring retainers (Fig. 9T-5) and the two valve spring cotters of each valve (Fig. 9T-6).

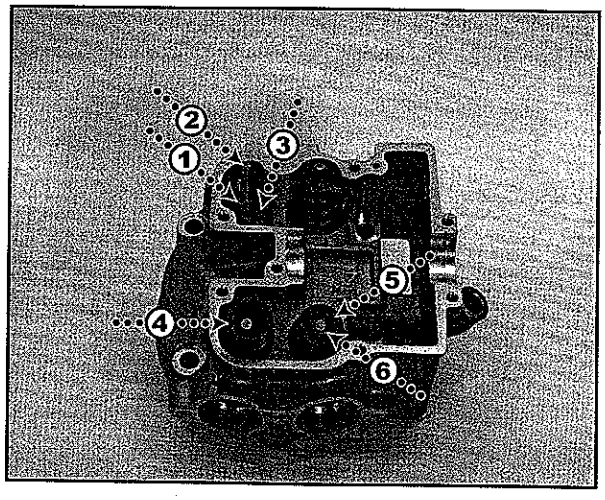

Fig. 9T

Put a new cylinder head gasket onto the cylinder. Make sure that both of the guide dowels on the top of the cylinder are in the accurate positions.
Put the cylinder head onto the cylinder and pull the two ends of the timing chain through the cylinder head. Check that the timing chain is in an accurate position onto the lower timing sprocket.
Put washers onto the four cylinder head bolts (Fig. 9U-1), lubricate the threads and tighten the bolts crosswise to torque 44 Nm.Do not forget the screw under the coolant pipe (Fig. 9U-2), torque 10 Nm.

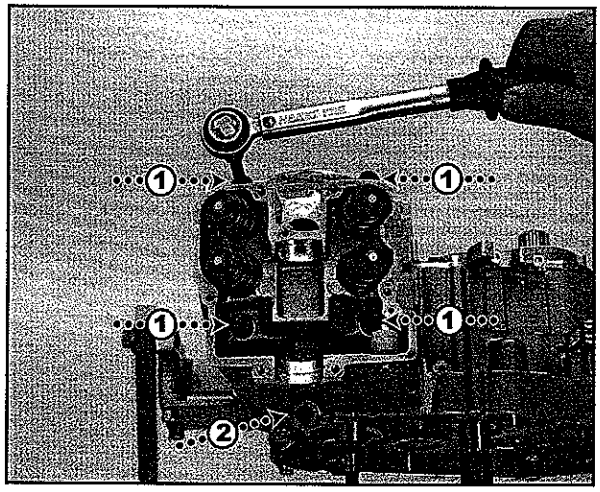

Fig. 9U

Turn the engine/crankshaft into TDC position (Fig. 9V-1). Position the camshaft with the cam lobes facing downwards and one attachment screw of the upper timing sprocket in line with the cylinder (Fig. 9V-2). Put on the timing chain onto the timing sprocket and install the timing chain lock.

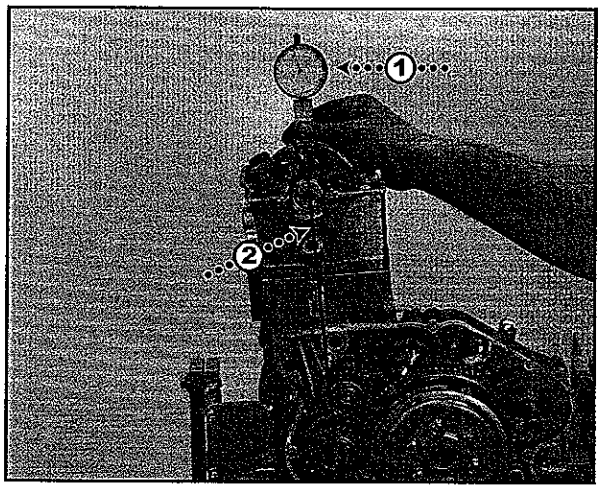

Fig. 9V

Thoroughly clean the sealing surfaces of the cylinder head and add a thin layer of silicone (Fig. 9X-1). Thoroughly clean the valve cover and put it onto the cylinder head.

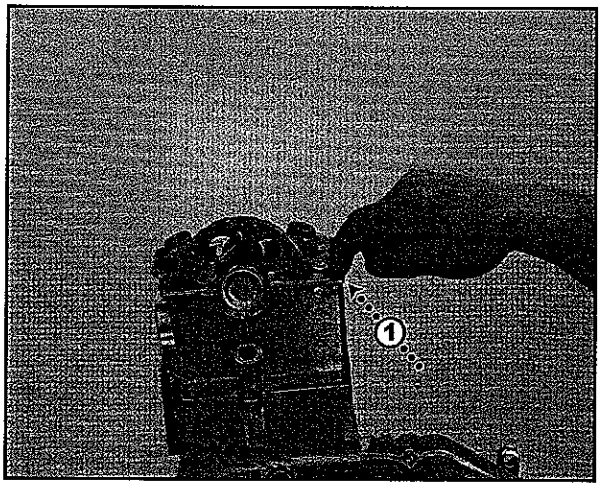

Fig. 9X

Attach the valve cover with the seven screws.
Please observe the different lengths of the screws:
Two screws 20 mm (Fig. 9Y-1)
Three screws 45 mm (Fig. 9Y-3)
Two screws 50 mm (Fig. 9Y-2).
Torque 10 Nm.
Also mind that the decompression lever has to be turned vith the fork lever pointing forward and the flat lever downwards (Fig. 9Y-4).

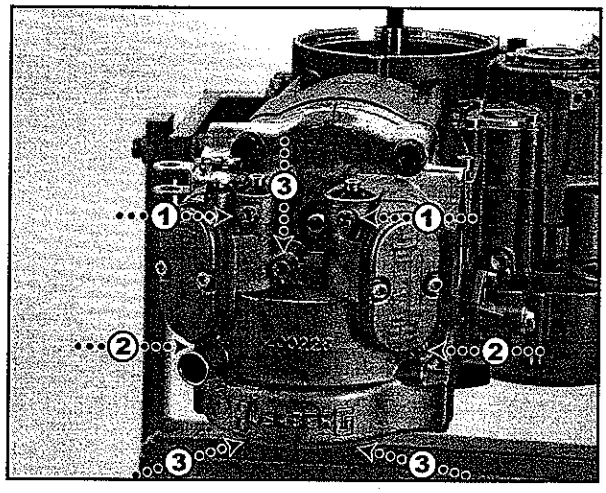

Fig. 9Y

Install the timing chain tensioner and a new gasket. Before installation; press in the spring loaded hook (Fig. 9Z-1) to release the tensioner push rod (Fig. 9Z-2) and push the rod into the bottom position towards the rear part of the tensioner (Fig. 9Z-3).
Push the spring into the tensioner and towards the push rod, put on the washer and the screw and tighten the screw.

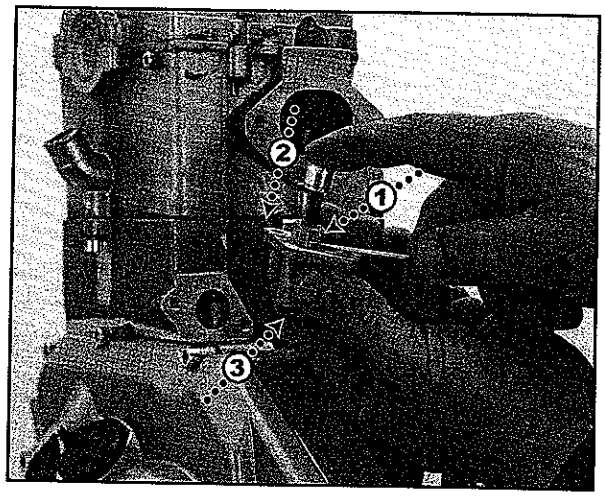

Fig. 9Z

Finally, adjust the valves (see Section 9A). Attach and adjust the decompression cable (see Section 9B).
Install transmission cover, the gearshift lever and the kickstart lever (see Section 7D).
Fill the engine with the adequate quantity of oil and the cooling system with the adequate quantity of coolant liquid.

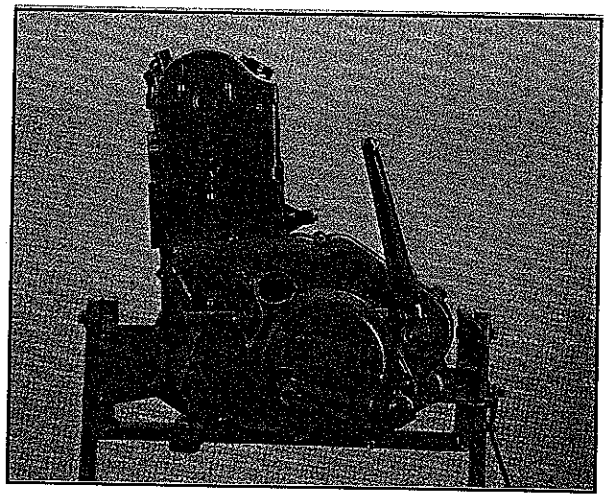

Fig. 9AA

REPLACEMENT OF ROCKERARM ROLLERS

Knock out the pin (Fig. 9AB-1) of the roller using a rod and mallet. Make sure that the rocker arm, and especially the lower ear (Fig. 9AB-2), is well supported to avoid damage.

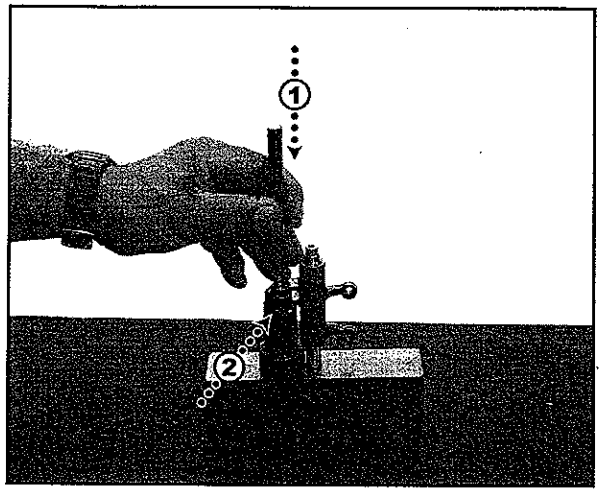

Fig. 9AB

When fitting the new roller, grease the needles to make them stick in the roller, place the roller between the arms and center it with a pin or rod, slightly smaller than the rollers own pin (Fig. 9AC-1).
The easiest way to fit the new pin is to turn the rocker arm and knock the pin from the side that allready is damaged. That way you only have to deform one ear to lock the pin.

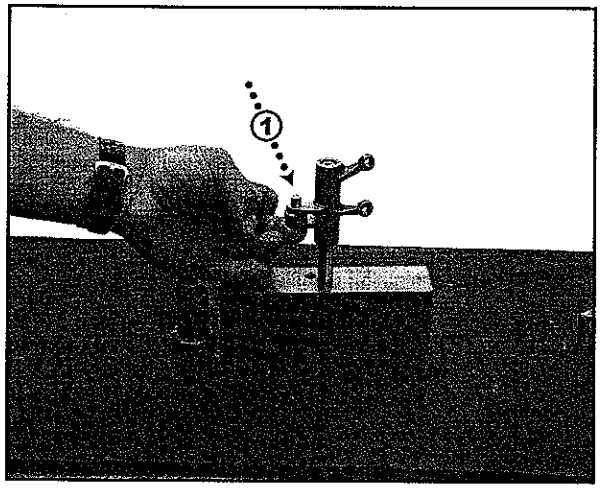

Fig. 9AC

Using a pointed tool, knock dents in the rocker arm ear to press material over the end of the pin. Two dents are sufficient.

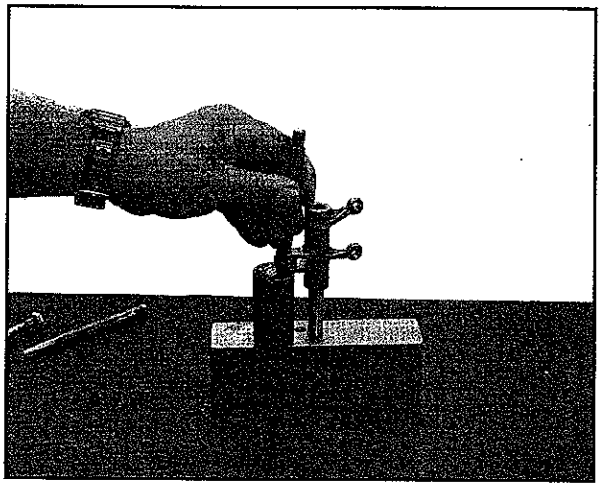

Fig. 9AD

Measure the rollers axial play. It should be between 0,3 and 0,5 mm to let oil in to the needles.

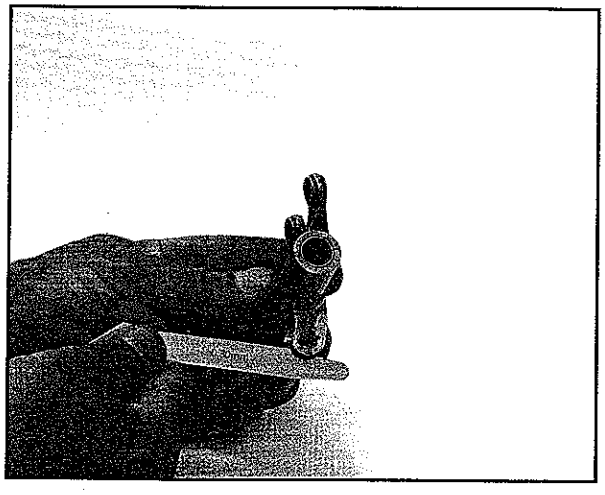

Fig. 9AE

10-B CRANKSHAFT & GEARBOX

DISASSEMBLY OF CRANKCASE

Dismount the engine from the frame.
Dismantle the cylinder head (See section 9D).
Dismantle the kickstart lever, the gearshift lever and the transmission cover (see Section 7A).
Use another primary gear wheel (Fig. 10A-1), or part thereof, in order to block the crank shaft while unscrewing the nut of the primary gear wheel (Fig. 10A-2). Use the same method for the nut of the balancer drive wheel (Fig. 10AI-3).

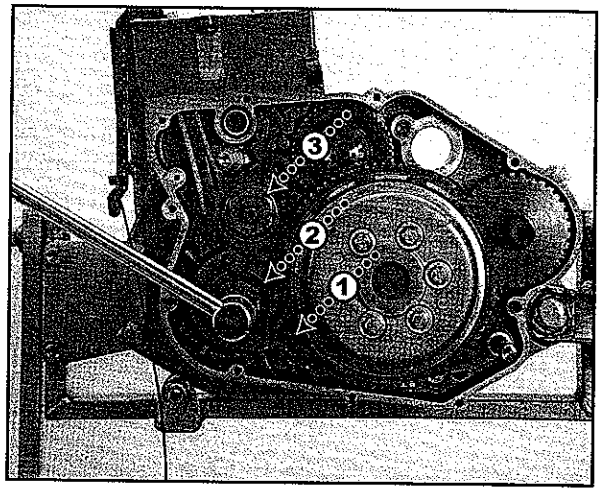

Fig. 10A

Dismatle the clutch (see Section 7A) and remove the oil connection nozzle (Fig 10B-1) before attaching a spanner to the crankshaft end.

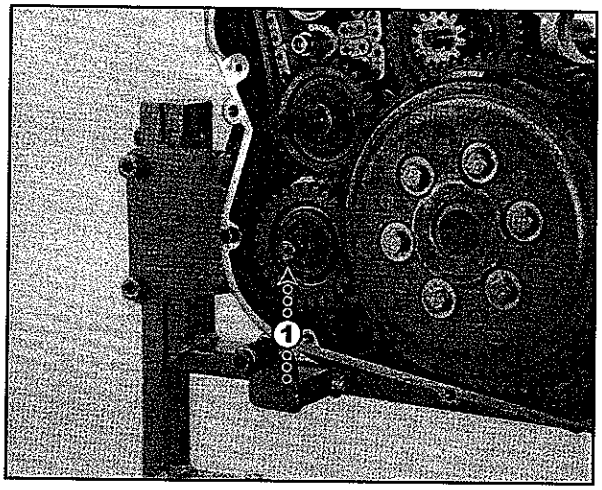

Fig. 10B

Remove the primary drive gear (Fig. 10C-1), the lower timing sprocket (Behind primary gear) and the balancer drive gear (Fig. 10C-2) by using a suitable spanner (Fig. 10C-3).
Dismantle the gear shift mechanism (see Section 7B), the kickstart mechanism (see Section 7C), the electric start free wheel (see section 7 D).

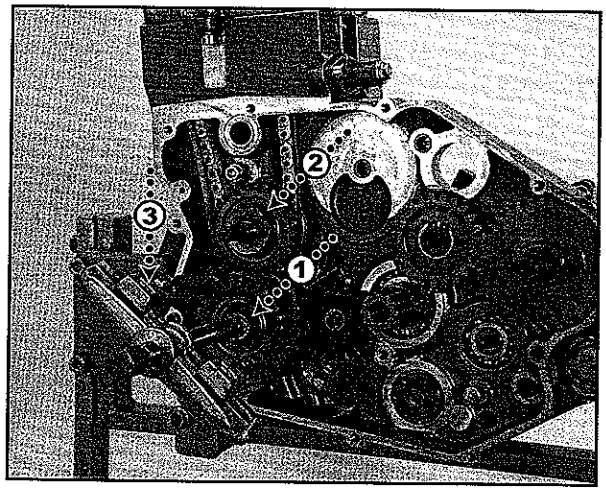

Fig. 10C

Remove the alternator/ignition (see Section 5) and the oil filter (see section 6).
Unscrew the twelve screws of the right crankcase half (Fig. 10D-1) and any screw or bolt holding the crankcase halfs within any engine stand (Fig. 10D-2).

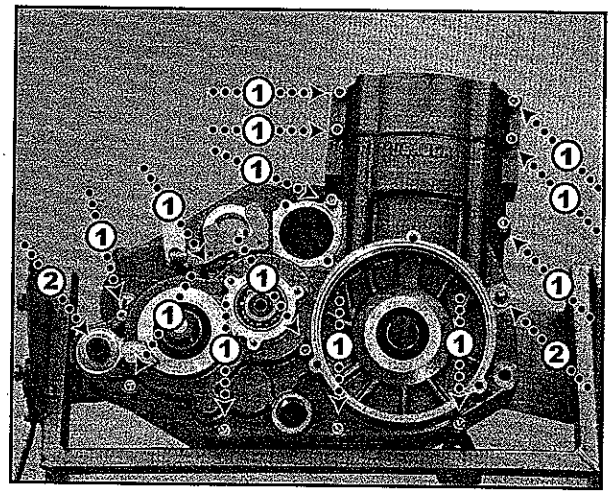

Fig. 10D

10

Attach a crankcase puller (Fig. 10E-1, Article No. 270011-01) to the crankcase by using three M6x20 screws (Fig. 10E-2).
While screwing in the center bolt of the crankshaft puller; gently tap on the secondary shaft and, if any engine stand is used, also tap on the attachment tube of the stand (Fig. 10E-3). Be careful to have the two crankcase halfs aligned all time during the operation.
Lift off the right crankcase.

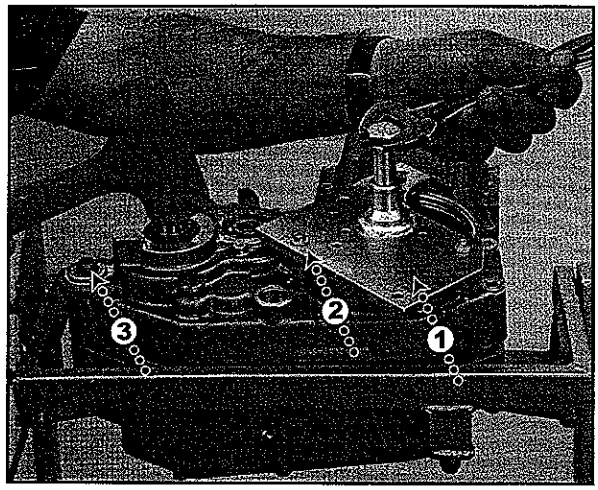

Fig. 10E

6-speed gearbox: Pull the two shift fork shafts (Fig. 10F-1) out of the left crankcase half and move them aside along with the shift forks, thus freing the shift drum (Fig. 10F-2).

4-speed gearbox: Pull out the single shift fork shaft (Fig. 10F-1) out of the left crankcase half and the two shift forks.

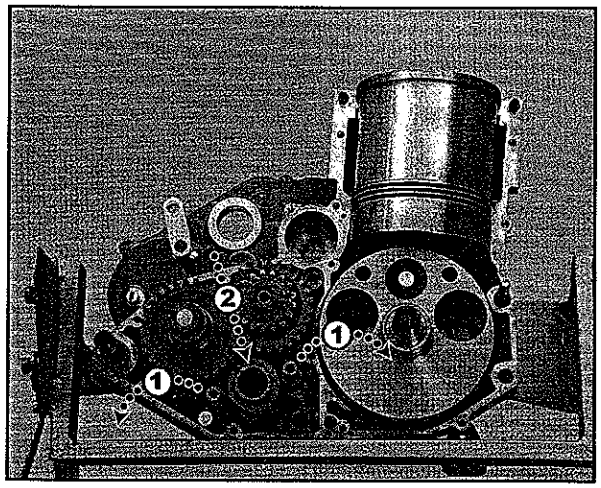

Fig. 10F

Lift out the shift drum (Fig. 10G-1). The shift drum might need to be gently knocked out from the transmission side of the crankcase half in order to release it from the crankcase.
Lift out the three (4-speed: two pcs) shift forks (Fig. 10G-2).
The shift forks may also be lifted out together with the complete gear shafts, the main shaft (Fig. 10G-3) and the secondary shaft (Fig. 10G-4).

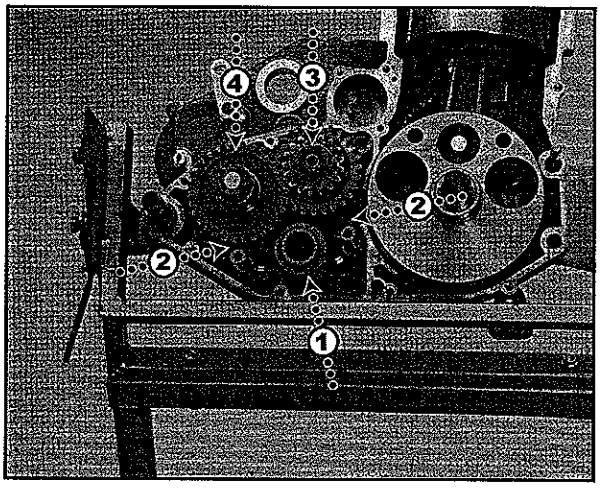

Fig. 10G

Both gearshafts, including all gear wheels, are to be lifted out at the same time. The main shaft might need to be knocked out from the transmission side of the crankcase half.

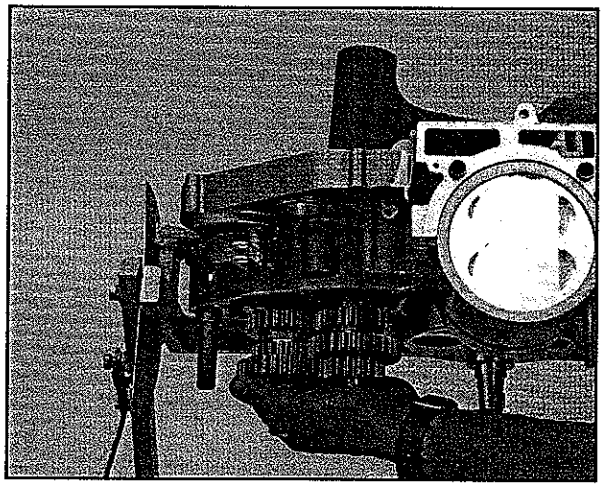

Fig. 10H

10-B CRANKSHAFT & GEARBOX

Check inner surfaces of the shift forks (Fig. 10V-1) and the shiftfork shafts (Fig. 10V-2, 3) for any damages or deterioration.
Check the grooves in the shift drum (Fig. 10V-4) for any damages or deterioration. Check that the gear positioning surfaces in the grooves are flat.
Check the condition of the o-ring (Fig. 10V-5).
Check the dogs of each gear wheel and the corresponding slots for any damages or deterioration. Especially regarding the gear wheels on the secondary shaft.
Check the bearings (Fig. 10V-6, 7, 8, 9, 10, 11) and rollers (Fig. 10V-12) for any damages or deterioration.

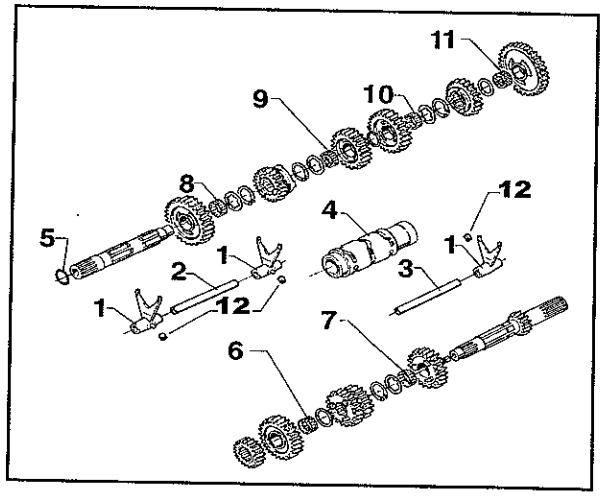

Fig. 10I

Attach the crankcase puller (Fig. 10J-1, Article No.270011-02) to the crankcase by using three M6x25 screws (Fig. 10J-2).
While screwing in the center bolt of the crankshaft puller, hold the crankshaft firmly during the operation.
Support the cylinder liner (Fig. 10J-3) as the crankshaft is pressed out.

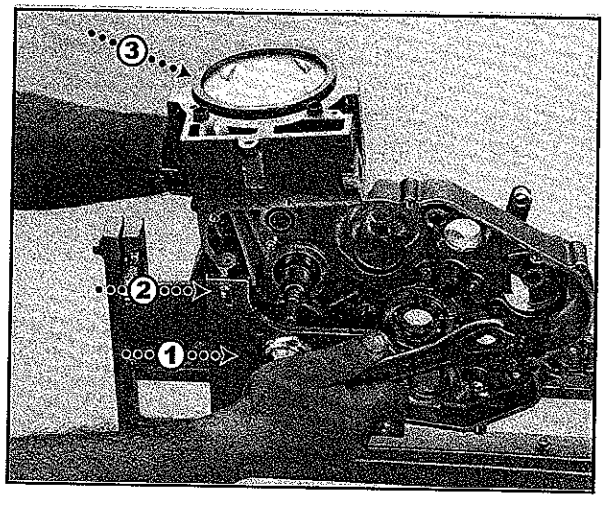

Fig. 10J

Mind that the complete assembly - crankshaft, counterbalancer, connecting rod and piston with cylinder liner - comes out as one item.
Lift out the crankshaft when it is released from the bearing within the crankcase half.

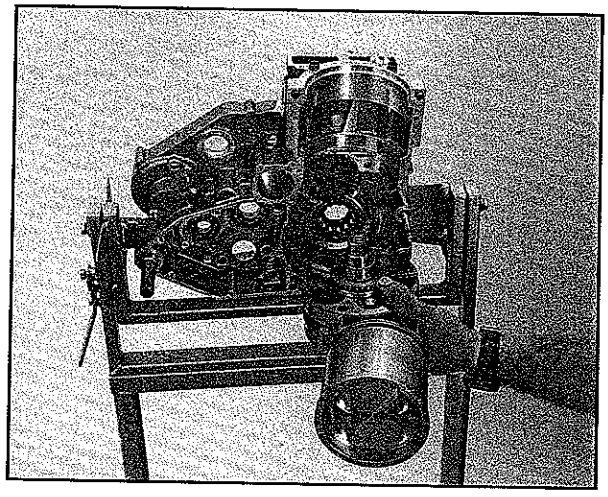

Fig. 10K

Remove the counter balancers drive shaft (Fig. 10L-1) by tapping it with a soft mallet from the left side.
The pressure relief valve (Fig. 10L-2) is normally not any subject to either cleaning or dismantling but if needed; remove the circlip out of the housing in order to remove the washer , the spring and the steel ball.
Install all pieces in the exact and adequat position within the housing and by using a new circlip.
If the housing has been removed use a threadlock liquid in order to secure it into the crankcase half.

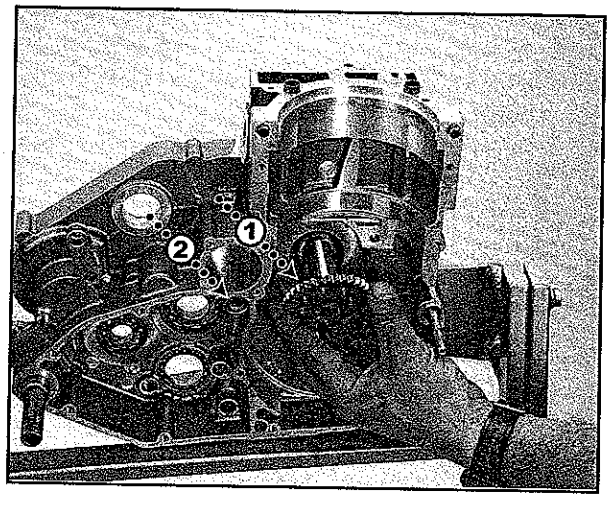

Fig. 10L

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