

0. FOREWORD

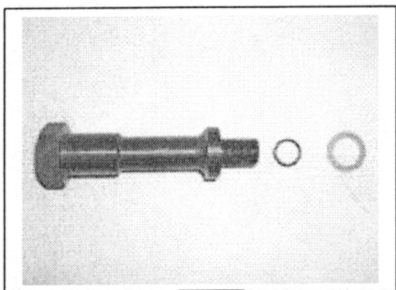
Parts composing "Fleet" Hydraulic Tappet refitting kit

PART No. 03049872 "REFITTING KIT"

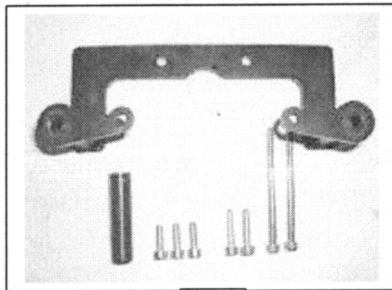
Quantity	Part No.	Description
1	G000010540010	Camshaft flange
4	G000030340300	Valve clearance adjuster screw
4	G000030370320	Valve lower cap
4	G000140380000	Valve upper cap
4	G000030458320	Bucket
4	G000030482300	Tappet
1	G000030533330	Camshaft
4	G000100341000	Nut for valve clearance adjuster screw
4	G000130372000	1.0 mm valve cap washer
10	G000140373000	0.3 mm valve cap washer
4	G000130374000	Outer valve spring
4	G000130376000	Inner valve spring
2	G000140302010	Complete right rocker
2	G000140304010	Complete left rocker
1	12001200	Timing cover gasket
1	14003600	Oil sump gasket
1	12003702	Oil drain plug
1	95100709	Oil plug seal
2	14023760	Head cover gasket
1	30153000	Oil filter

PART No. 03049871 "HYDRAULIC TAPPETS REFITTING KIT TOOLS"

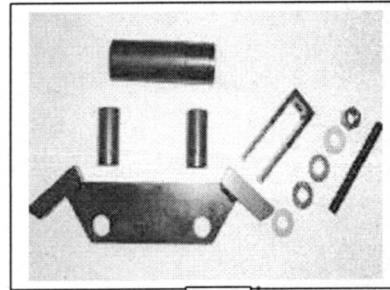
Quantity	Part No.	Description
1	03929830	Spark plug hole coupling (1)
1	03915530	Tappet adjusting and assembling tool (2)
1	03907230	Valve spring assembling-disassembling tool (3)
1	03909030	Gauged tappet (4)
1	03948930	Tappet removing-fitting and buckets locking tool assembly (5)
1	03949230	Buckets removing-fitting fork (6)



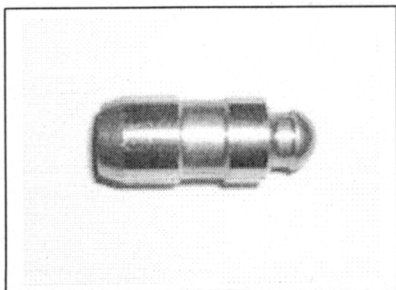
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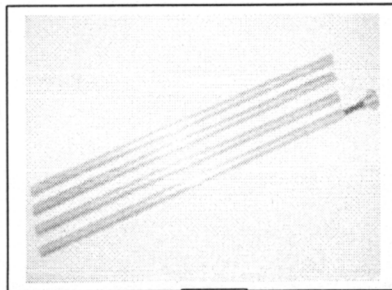
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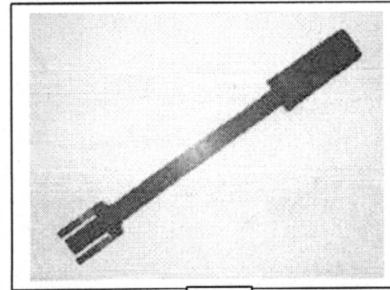
3



4



5



6

1. PREPARING THE VEHICLE

- Drain oil from sump.

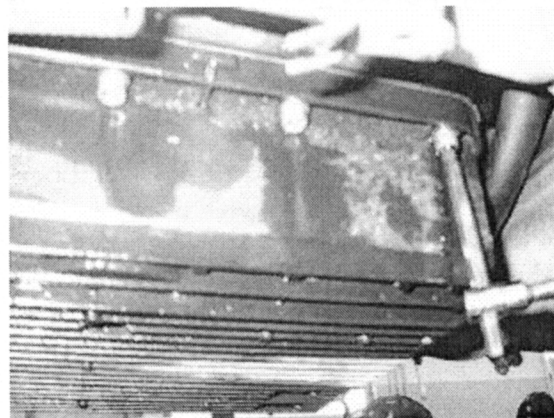


WARNING

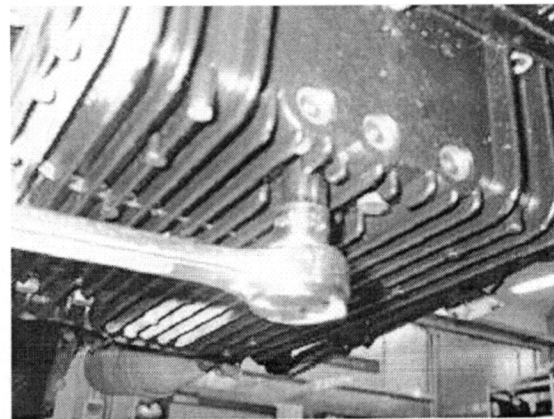
At reassembly, replace oil plug with the new magnetic oil plug supplied with the kit.



- Remove the 14 screws.



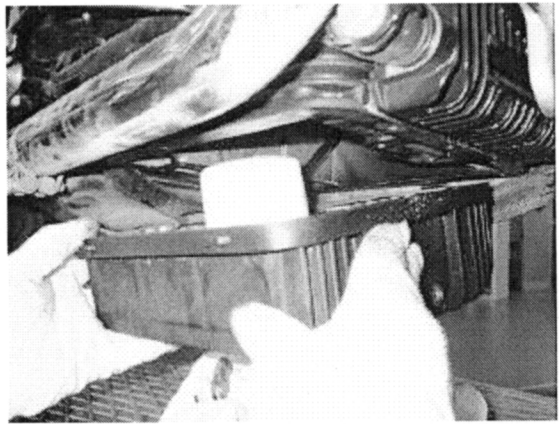
- Remove the 4 undersump screws.



- Tapping gently with a rubber hammer, loosen oil sump.



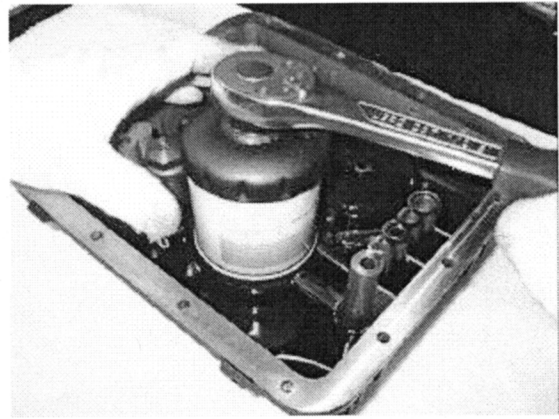
- Remove oil sump.



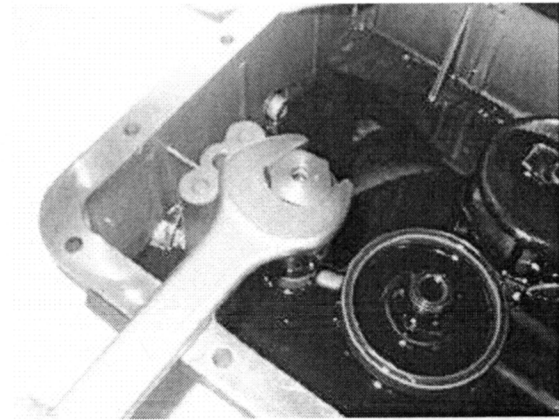
- Remove oil filter.



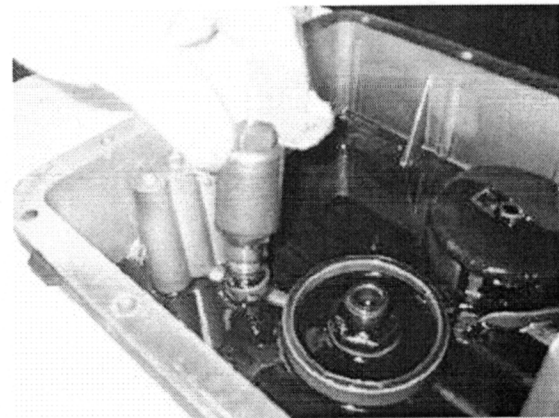
At reassembly, change oil filter with the new one supplied with the kit.



- Loosen oil overpressure valve.

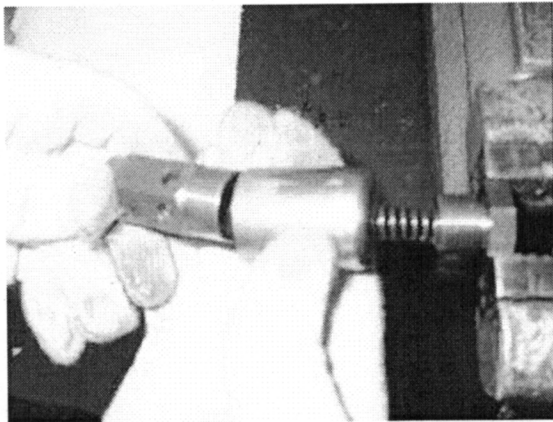


- Remove oil overpressure valve.

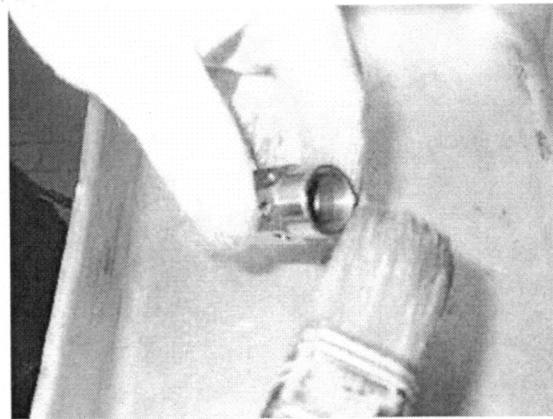


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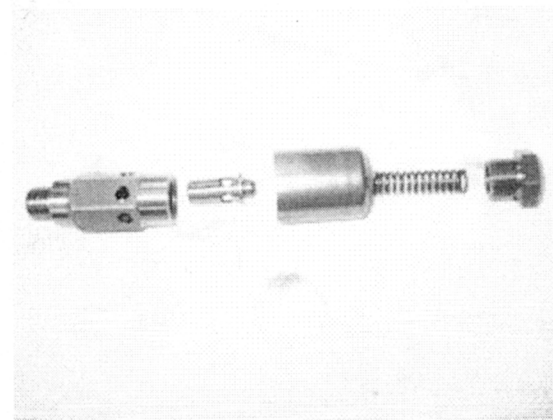
- Disassemble oil overpressure valve, taking special care to keep the spring.



- Thoroughly clean all valve parts with petrol.



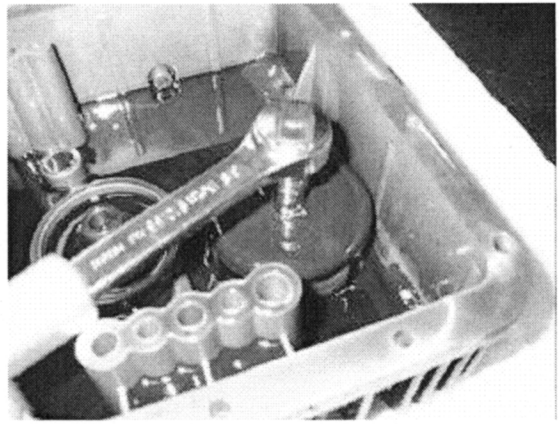
- Refit valve and check for its correct operation by following the procedure described in the corresponding reference manual.



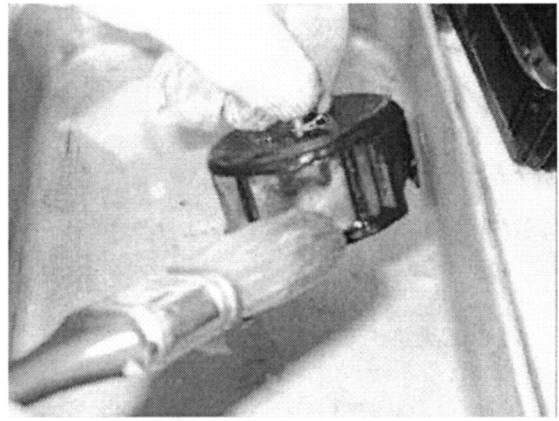
- Straighten mesh filter safety tab.



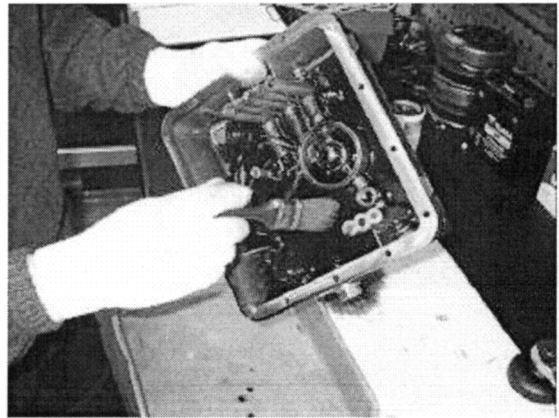
- Remove retaining screw, then remove mesh filter.



- Thoroughly clean mesh filter with petrol, using a compressed-air gun, if necessary.



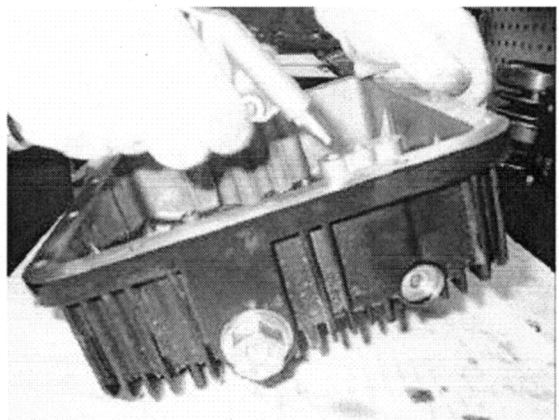
- Thoroughly clean oil sump with petrol.



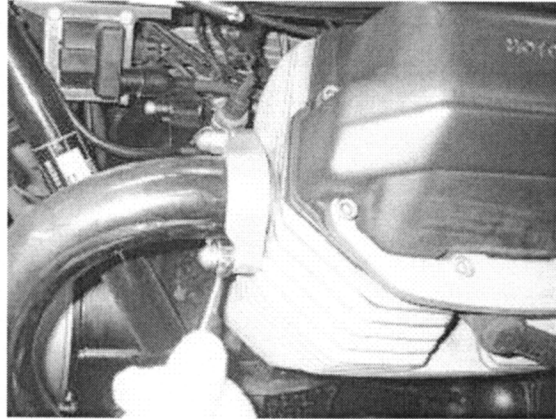
- Complete cleaning operation blowing all oil ducts with a jet of compressed air.
- Refit oil overpressure valve and mesh filter.
- Fit the new oil filter and the new oil sump gasket supplied with the kit.

 **WARNING**

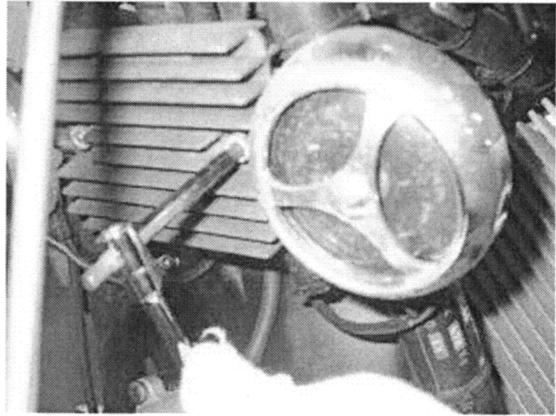
Before assembling oil sump onto motorbike, carry out the following operations.



- Remove both exhaust pipes.

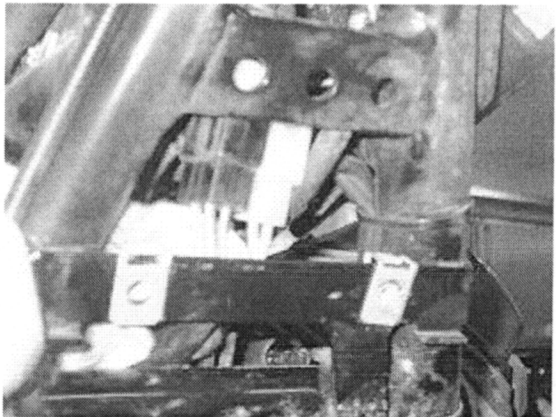


- Remove the regulator and the horns.



5

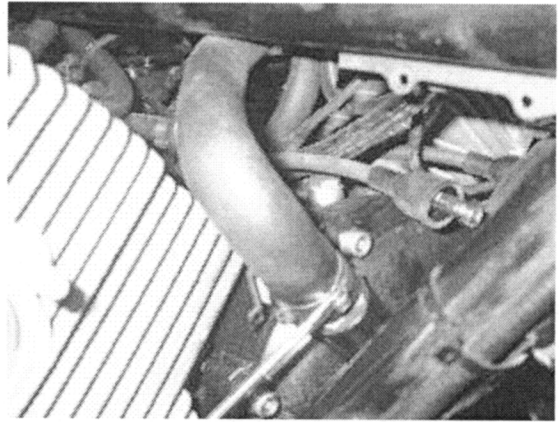
- Disconnect the two regulator connectors.



- Remove the coils.



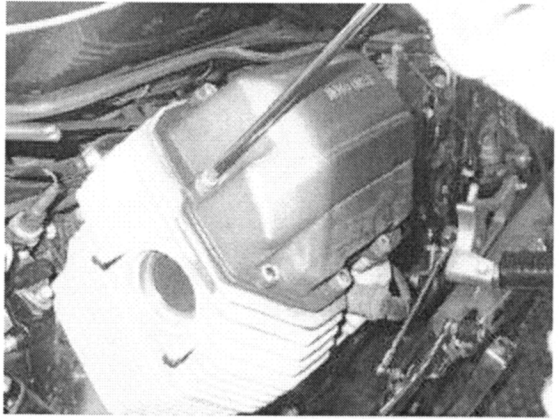
- Remove the engine breather hose.



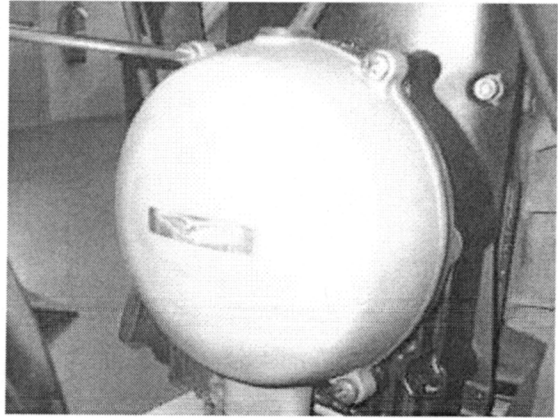
- Remove both valve covers.

NOTE: Upon reassembly, tighten the valve cover screws to 10 Nm (1.0 kgm).

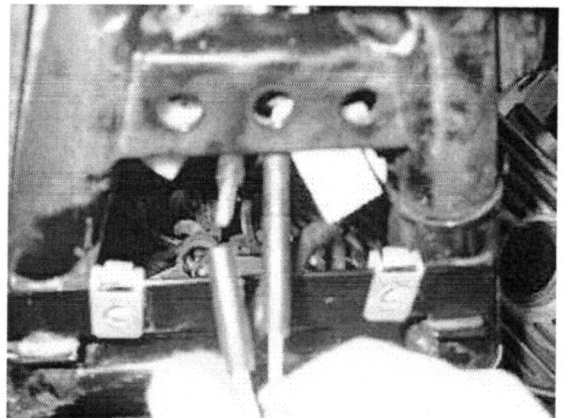
NOTE: At reassembly, change valve caps seals with those supplied with the kit.



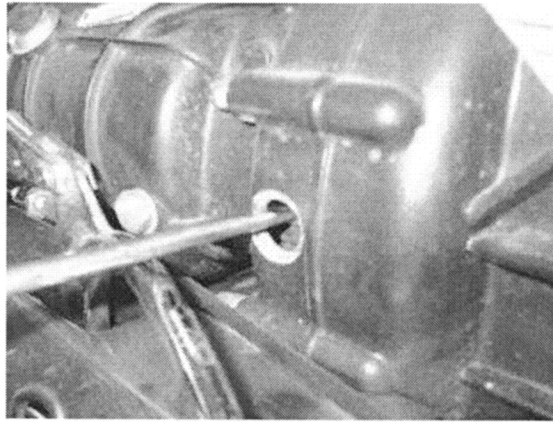
- Remove the ignition cover.



- Remove the two stator connectors.

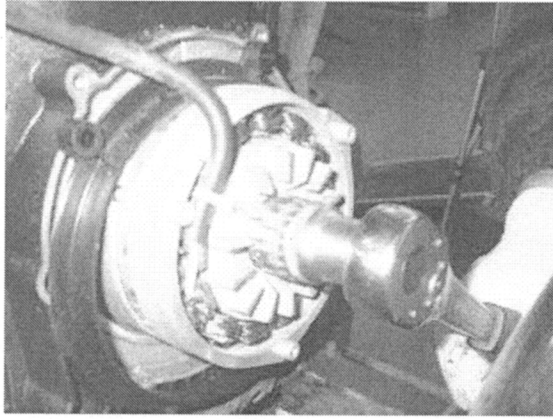


- Lock the crankshaft using the suitable hole on engine right side.

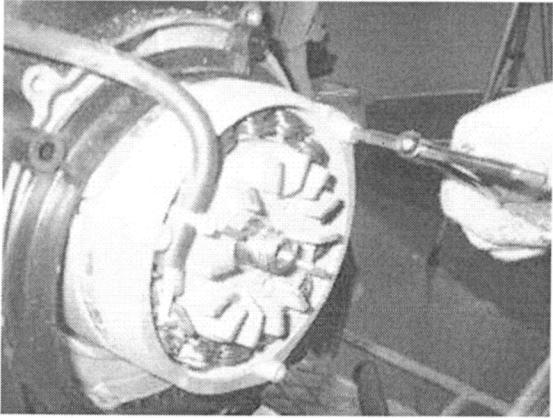


- Remove the stator locking nut, collect the spacer.

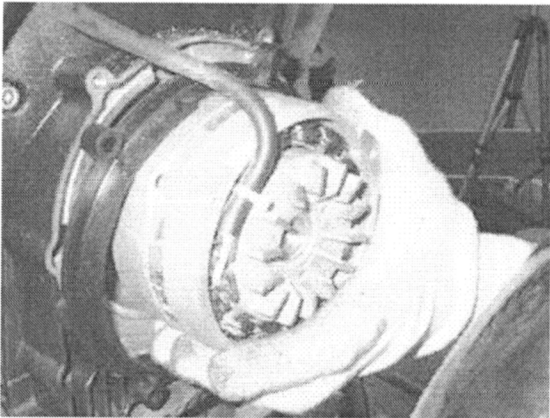
NOTE: Upon reassembly, tighten stator lock nut to 80 Nm (8.0 kgm) smearing Loctite 243.



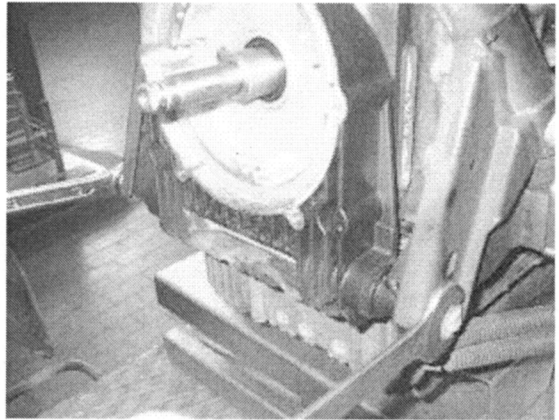
- Remove the three screws of the stator housing.



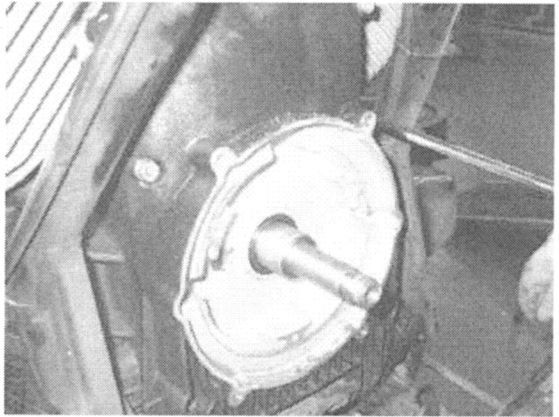
- Remove the stator and the ring nut.



- Working on the left side, remove the nut securing the through pin, collect the washer.
- Working on the right side, slide out the through pin and collect the washer.



- Take a container of suitable capacity and put it under the engine to collect oil draining out of the timing chest.
- Remove the 14 screws on timing cover.



- Remove the timing cover.

NOTE: Thoroughly clean timing cover inner part with petrol.

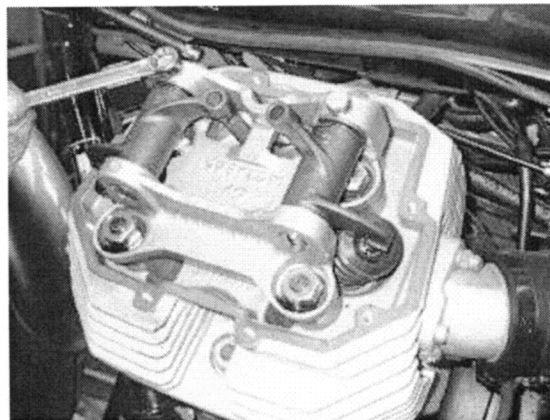
NOTE: At reassembly, change timing cover gasket with the new one supplied with the kit.



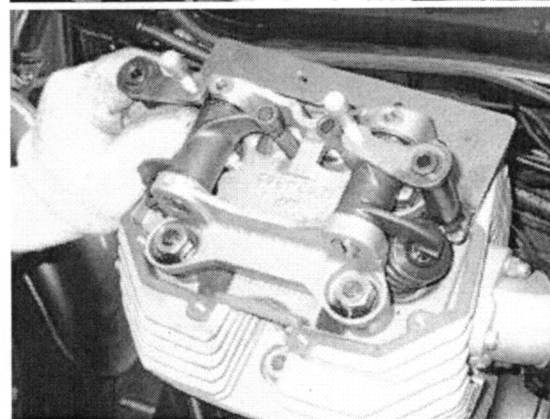
2. CHANGING THE CAMSHAFT AND BUCKETS

2.1. LOCKING THE BUCKETS (VIDEO)

- Remove the two screws securing the rocker arm shafts.



- Fit the special tool part no. 03915530 (Tool for fitting and adjusting tappets) supplied with the kit.



- Secure it to the cylinder head using the two valve cover screws.

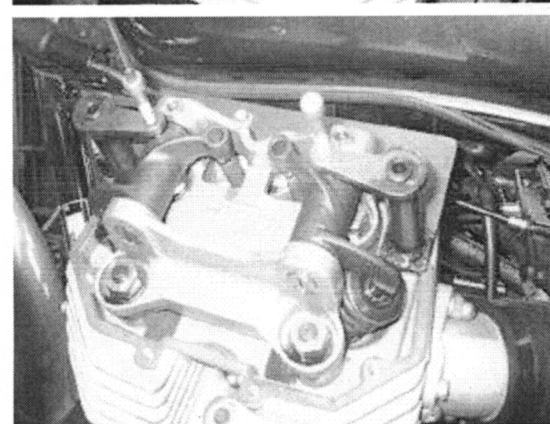


- Screw the two rocker arm screws finger-tight.



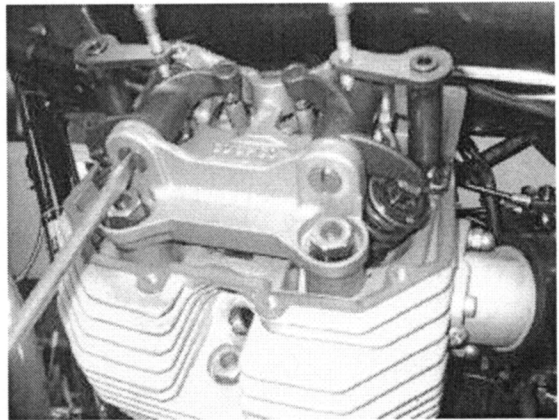
WARNING

Do not overtighten the two rocker arm screws

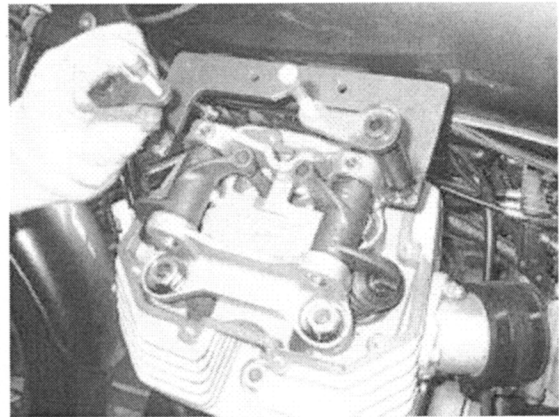


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- Remove the two rocker arm shafts.

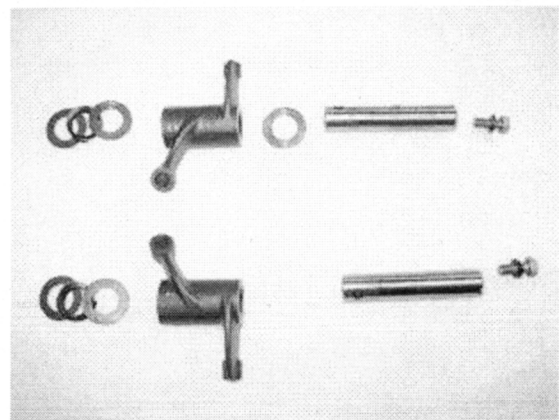


- Release the two rocker arm screws.
- Remove the two bolts securing the special tool.
- Remove the special tool.

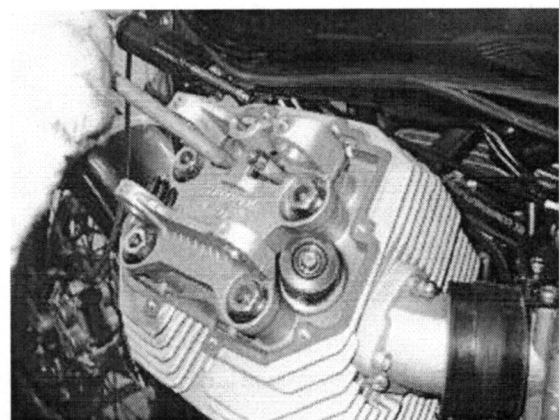


- Remove the rocker arms and collect the shims.

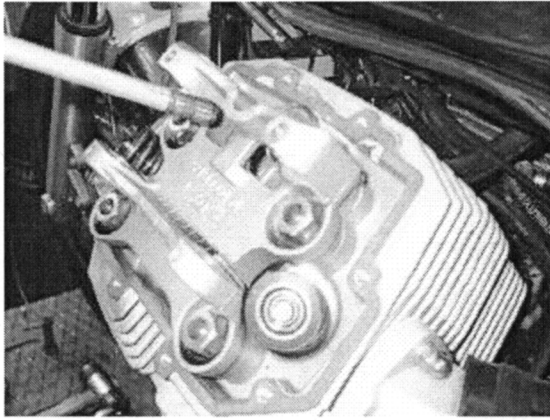
 **WARNING**
Take note of the correct position of the washers.



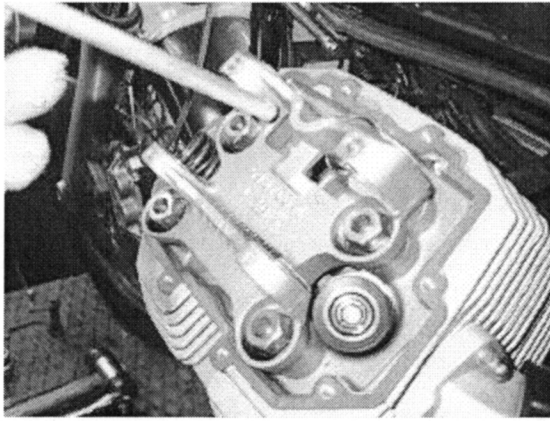
- Remove the rocker arm rods.



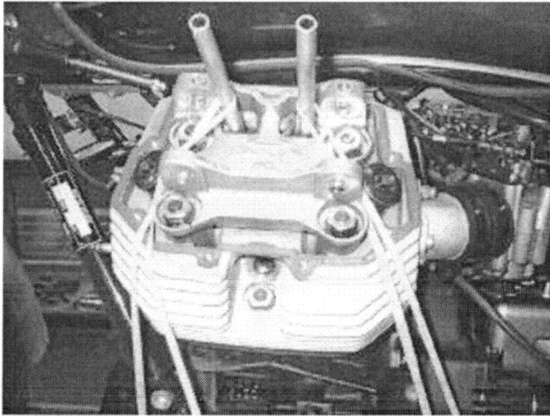
- Remove the hydraulic tappets using the special tool part no. 03949030 (Rod for removing-installing tappets) supplied with the kit.



- Fit the special tools part no. 03949130 (Bucket locking rod) supplied with the kit.



- Lock the bucket locking rods in place using two elastic bands as shown.



- Repeat the whole procedure on the second cylinder.



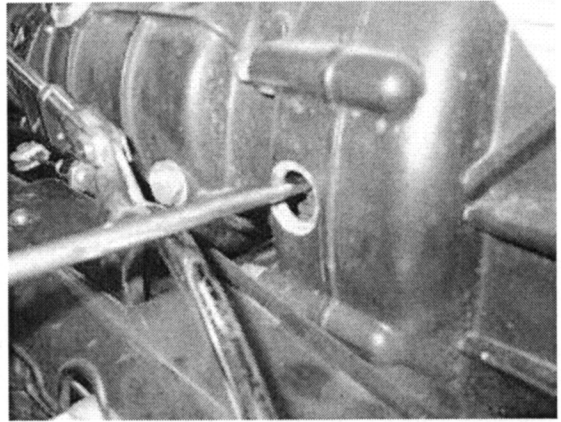
WARNING

Pay attention to the correct position of the bucket locking rod in the tappet seat. (see picture).



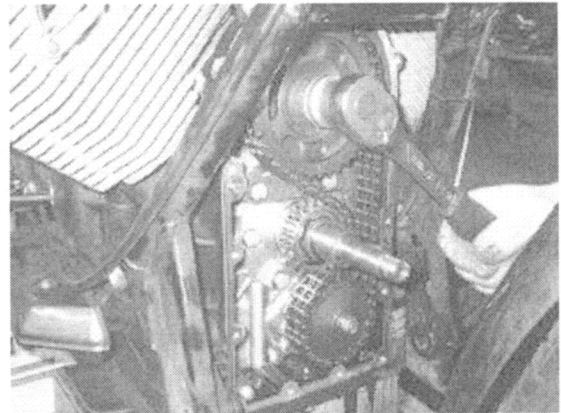
2.2. CHANGING THE CAMSHAFT AND BUCKETS

- Fit a big flat screwdriver through the inspection hole on engine right side and lock the crankshaft with the LH cylinder at TDC.



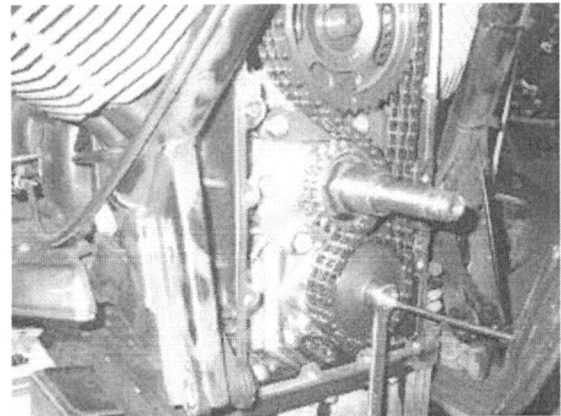
- Loosen and remove the nut on camshaft gear, collect the spring washer.

NOTE: Upon reassembly, tighten camshaft gear lock nut to 150 Nm (15.0 kgm) smearing Loctite 243.



- Loosen and remove the nut on oil pump sprocket, collect the washer.

NOTE: Upon reassembly, tighten oil pump sprocket lock nut to 20 Nm (2.0 kgm) smearing Loctite 243.

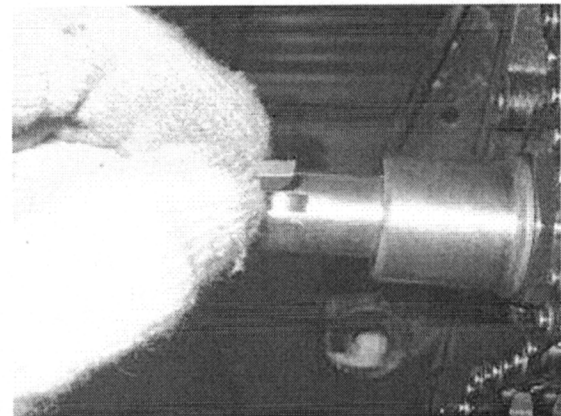


- Remove the key from the timing drive shaft.



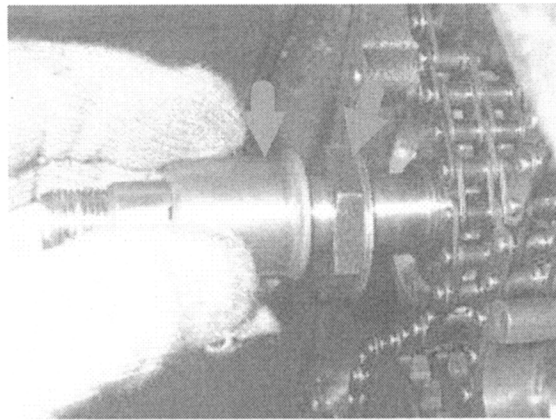
WARNING

When reassembling, ensure that the key is in the correct position because it transmits motion to the flywheel.



- Slide out the spacer.
- Loosen and remove the nut on the timing drive gear.

NOTE: Upon reassembly, tighten timing drive gear lock nut to 120 Nm (12.0 kgm) smearing Loctite 243.



- Remove the gears together with the chain, collect the key from the oil pump gear.



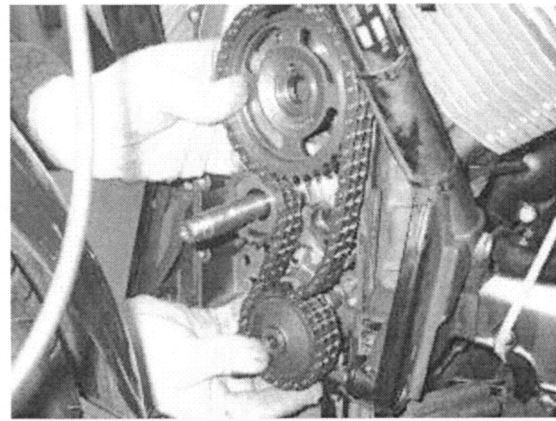
WARNING

When reassembling, ensure that the key is in the correct position because it transmits motion to the oil pump.



CAUTION

Before reassembly, thoroughly clean all parts with petrol.

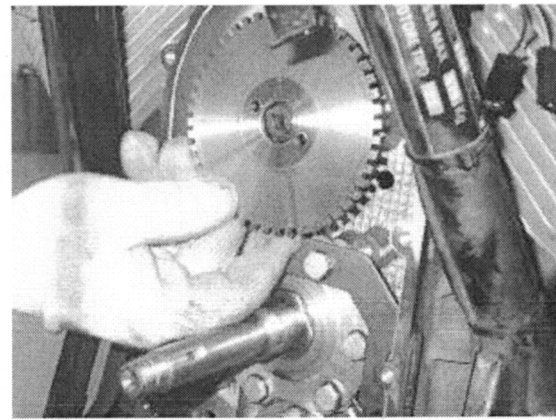


- Remove the phonic wheel.

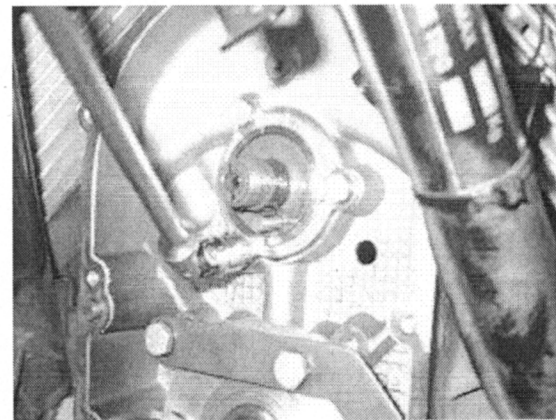


CAUTION

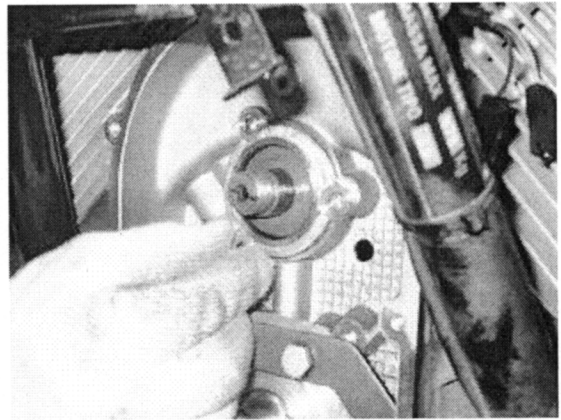
Manually turn the camshaft to move up all buckets. It will be easier to remove the shaft.



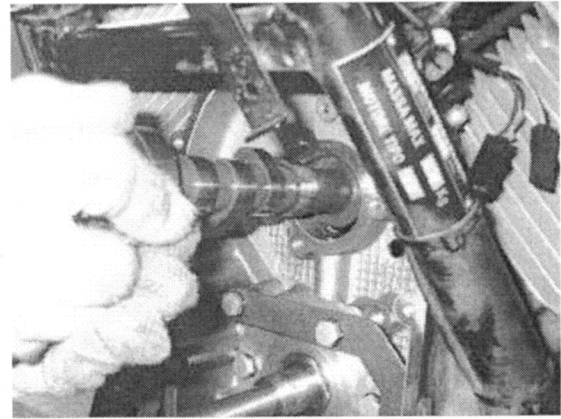
- Loosen and remove the three screws on camshaft flange.



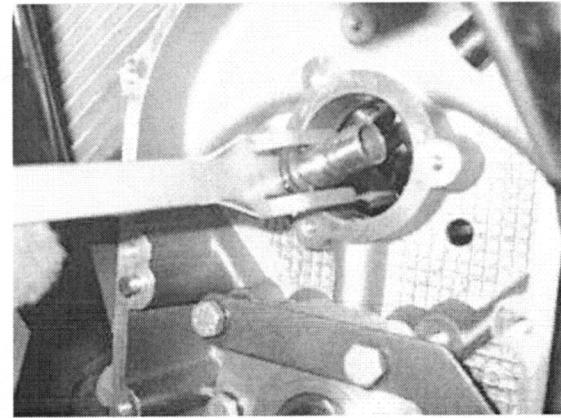
- Remove the camshaft flange.



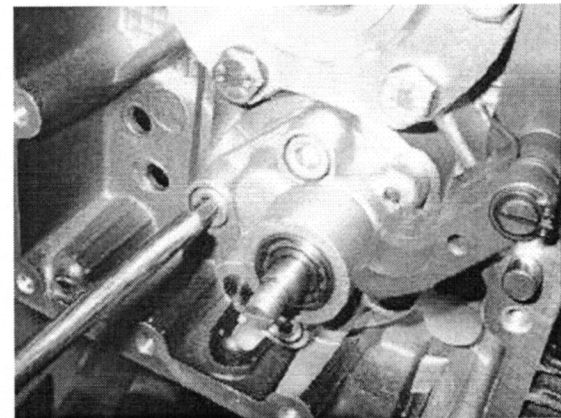
- Remove the camshaft.



- Remove the four buckets using the suitable special tool part no. 03949230 (Fork for removing-installing buckets).
For easier removal, firmly couple the bucket and remove the relevant locking rod.



- Remove oil pump.

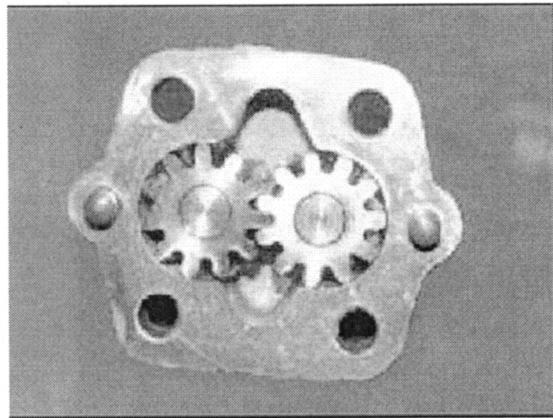


- Check for oil pump correct operation: gears shall slide smoothly and there shall be no sign of excessive wear. Thoroughly clean it with petrol.
- Check size tolerances, as described in the corresponding reference manual.

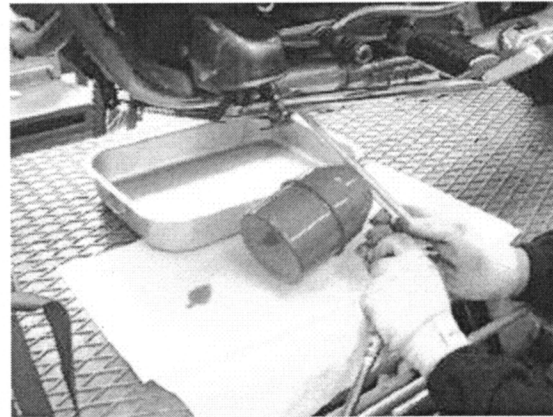


WARNING

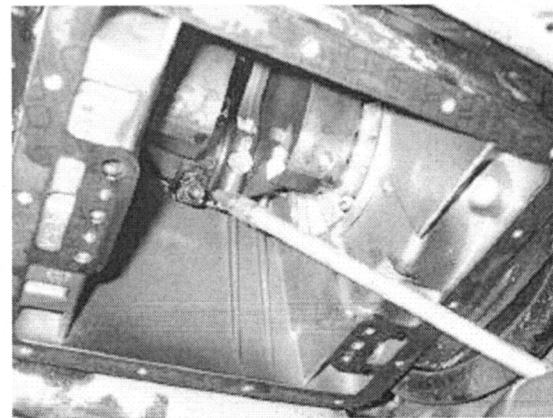
If the pump is damaged, change it without delay.



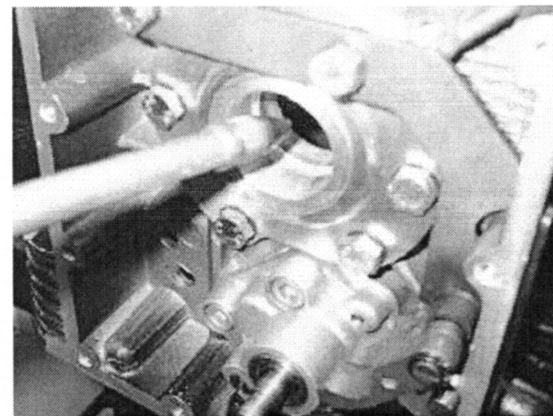
- Using a gun for engine washing filled with petrol, thoroughly clean all engine crankcase parts in contact with oil.



- Take special care in cleaning all interstices and connecting rod big ends.

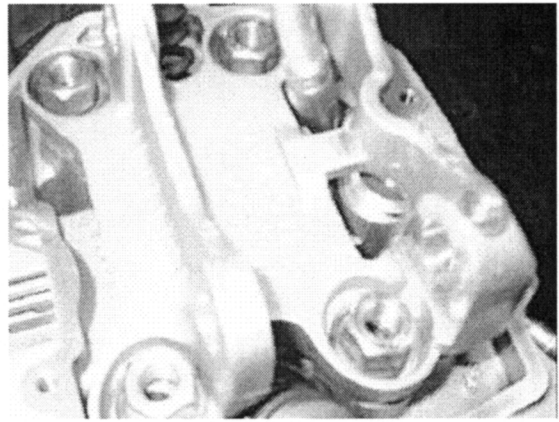


- Complete washing procedure inserting gun end inside camshaft mount;

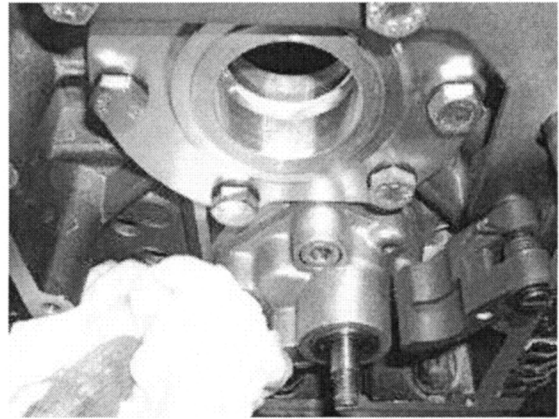


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- and rocker rod seats.

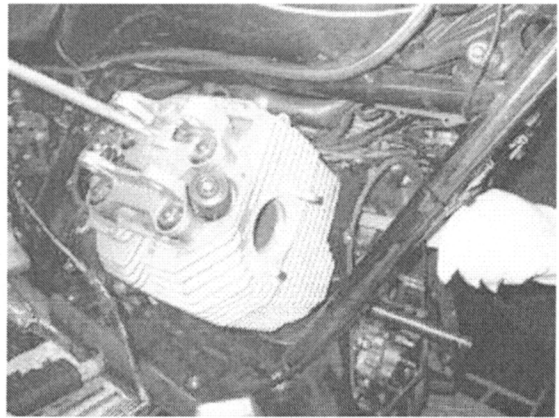


- Once finished, dry valve spring seats and timing belt casing with absorbent paper



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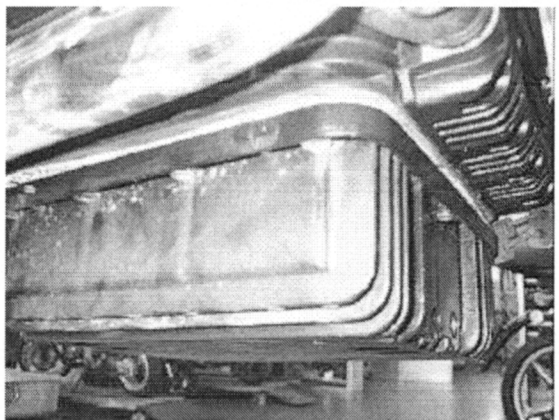
- Smear the new buckets with abundant oil and fit them using the suitable fork, lock them in place with the locking rods previously removed.
- Fit the new camshaft.
- Refit the timing gears.



WARNING

Please follow the procedure described in the reference manuals as far as engine timing is concerned

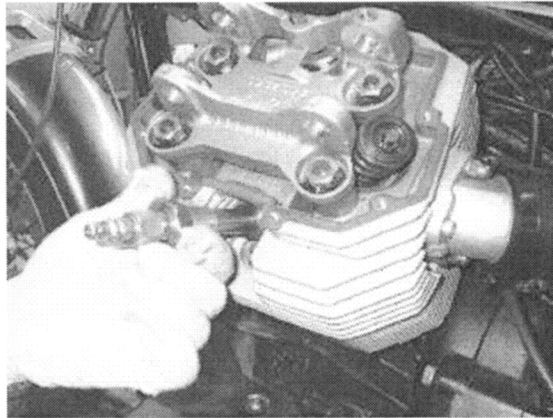
- Replace oil sump gasket with the new one supplied with the kit, and then refit oil sump.



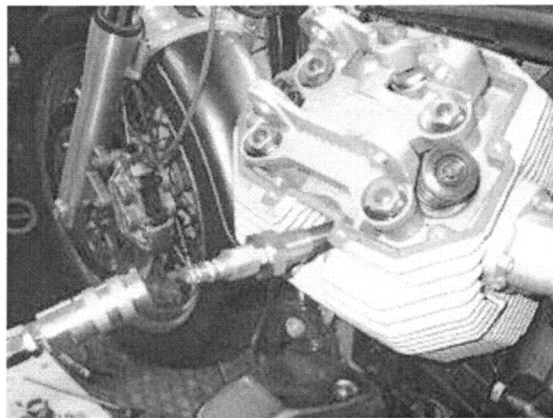
3. CHANGING SPRINGS, CAPS, ROCKER ARMS

3.1. CHANGING SPRINGS AND CAPS (VIDEO)

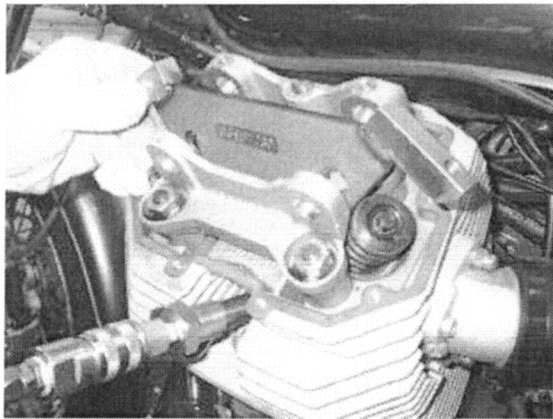
- Take the cylinder to be set to the BDC and lock the crankshaft.
- Prepare the special tool part no. 03929830 (Compressed air union) supplied with the kit, fit a quick-release fitting and a snap ring.
- Fit the compressed air union in the place of the spark plug.



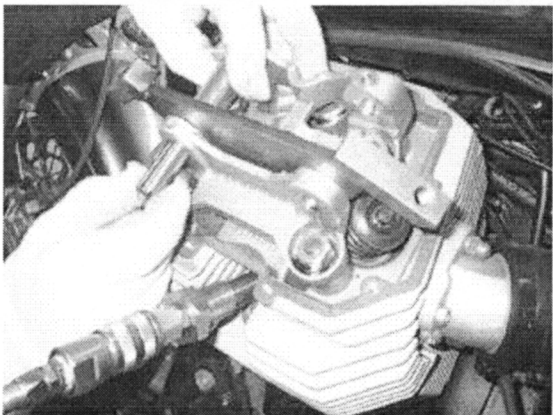
- Pump compressed air into the cylinder (min. 6 bar).



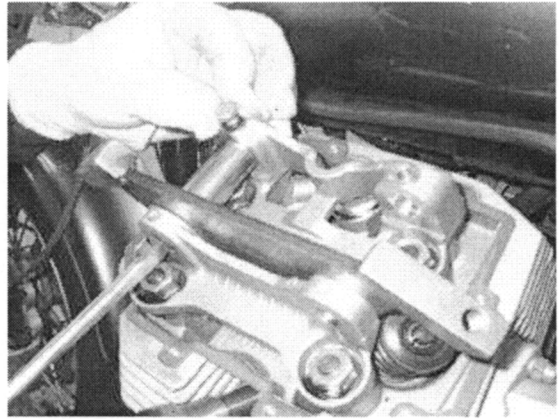
- Fit the special tool part no. 03907230 (Tool for removing and installing the springs) supplied with the kit, pay attention to set the printed side facing the spark plug.



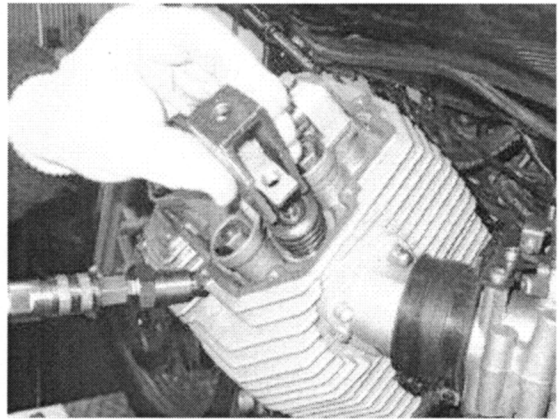
- Lock the tool for removing and installing the springs using the original rocker arm shafts.



- Secure the shafts with the rocker arm shaft screws.



- Fit the spring compression fork.



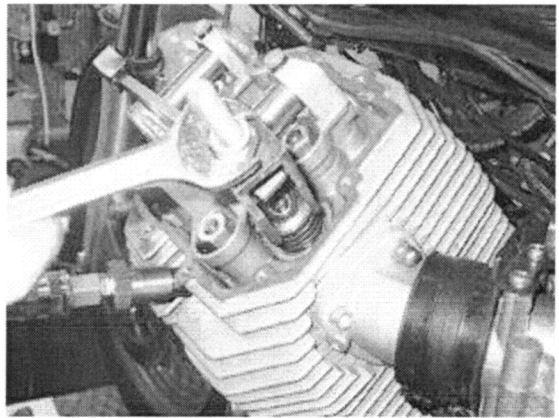
- Bring the spring compression fork against the upper spring cap and slightly preload it by working the threaded pin.



WARNING

Should the valve collets be stuck against the cap and the cap is too much preloaded, the valve might open and let the compressed air in the cylinder out. When carrying out this operation it is therefore necessary to wear safety goggles.

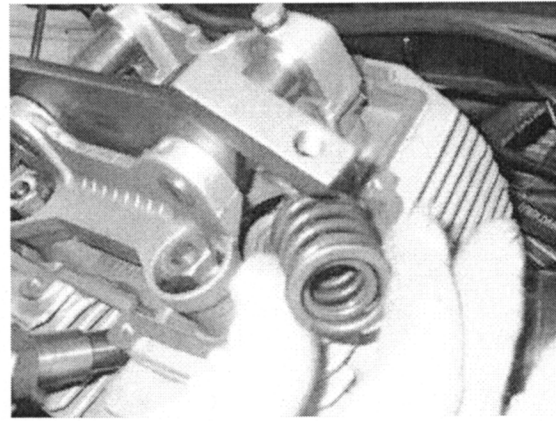
- Using a mallet and the drift supplied with the tool for removing and installing the springs, gently tap to release the valve collets from the spring cap.



- Compress the spring working the suitable threaded pin.
- Remove the valve collets.



- Release the spring working the suitable threaded pin.
- Remove the spring compression fork.
- Remove the upper spring cap.
- Remove the spring.
- Remove the lower spring cap.



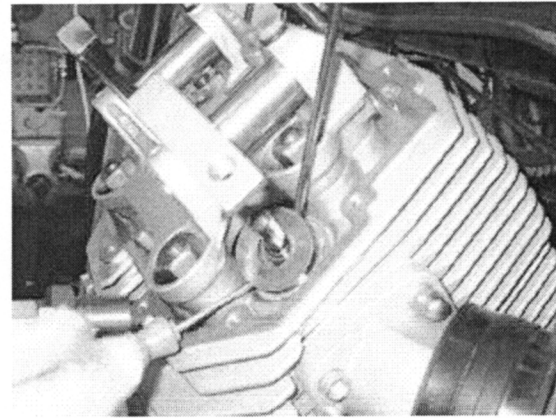
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- Remove the shims under the cap, possibly blow compressed air to "unstick" them from the cylinder head.

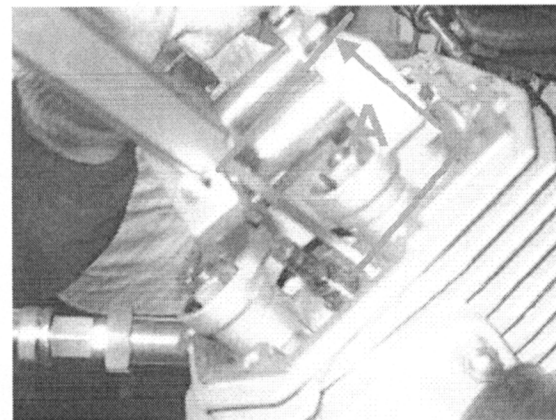


WARNING

The shims are very thin and in a variable quantity depending on the vehicle. Please ensure you removed them all before proceeding



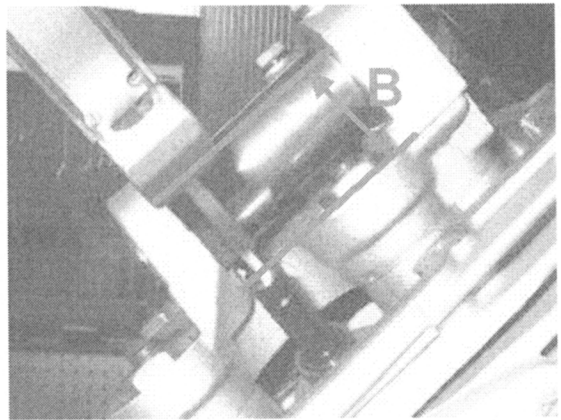
- Using a gauge, measure the distance between the cylinder head and the calibrated plate of the tool for removing and installing the springs.
- Take note of the reading "**A**"



NOTE: For example **A** = 89.2 mm

- Measure the distance between the valve stem end and the calibrated plate of the tool for removing and installing the springs.
- Take note of the reading "B"

NOTE: For example **B = 45.5 mm**



- It is now necessary to calculate:

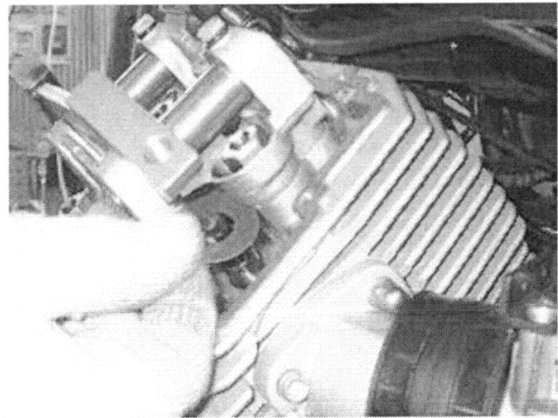
$$A - B - 43.2 = \text{New shim to be fitted under the spring}$$

To obtain the new shim to be fitted under the spring you should use some calibrated shims until exceeding the value obtained.

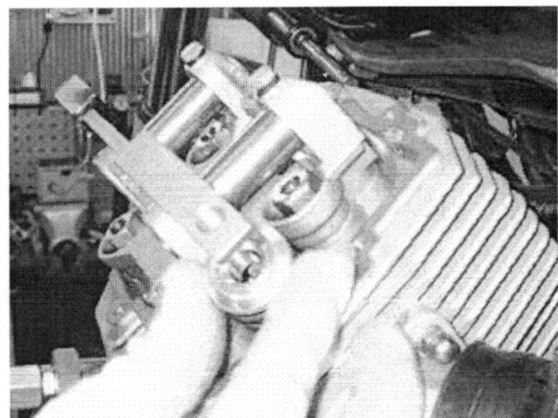
NOTE: The shims available are 1mm or 0.3 mm, therefore maybe it will not be possible to precisely obtain the required shim thickness. In this case, use the smallest shim thickness that exceeds the required value.

For example: $89.2 - 45.5 - 43.2 = 0.5$: in this case use 2 shims of 0.30 mm.

- Fit the calculated shims.

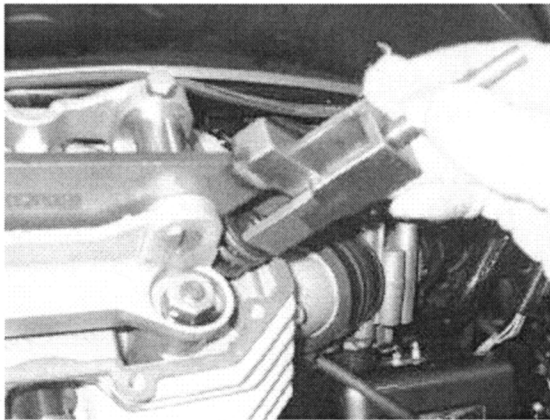


- Fit the new lower spring cap.
- Insert the new spring.
- Fit the new upper spring cap.

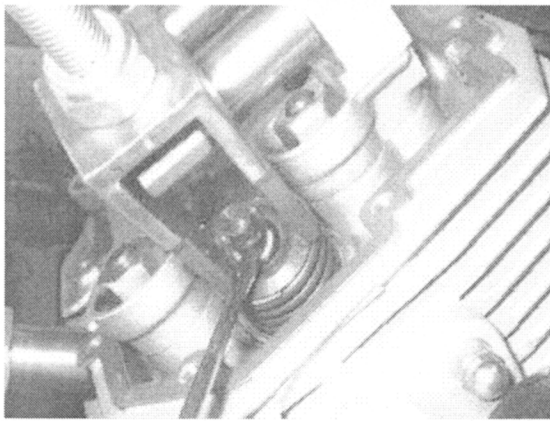


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- Fit the spring compression fork.
- Compress the spring working the suitable threaded pin.

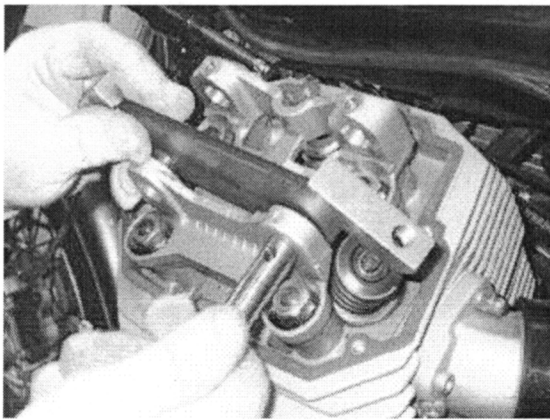


- Fit the valve collets.



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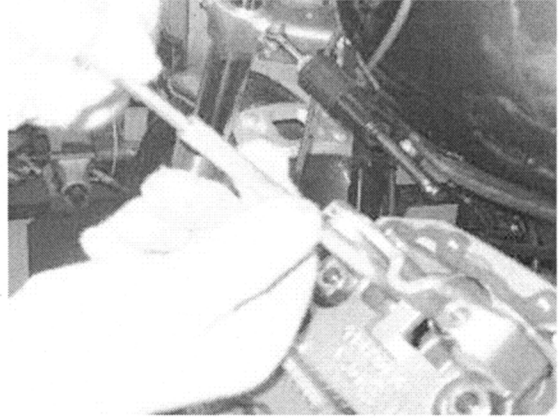
- Release the spring and remove the spring compression fork.
- Carry out the same procedure to replace spring and caps on the second valve.
- Remove the tool to remove and install the springs.
- Disconnect the compressed air feed.
- Remove the compressed air union.



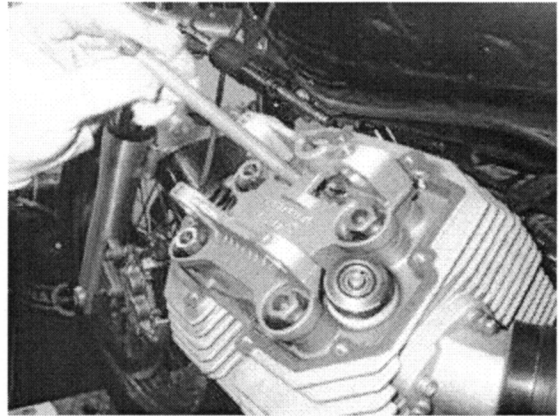
- Carry out the same operation on the second cylinder.

3.2. CHANGING THE ROCKER ARM

- Lock the crankshaft with the LH cylinder at TDC.
- Using the special tool "Rod for removing and installing tappets" fit the tappet gauge part no. 03909030 supplied with the kit.

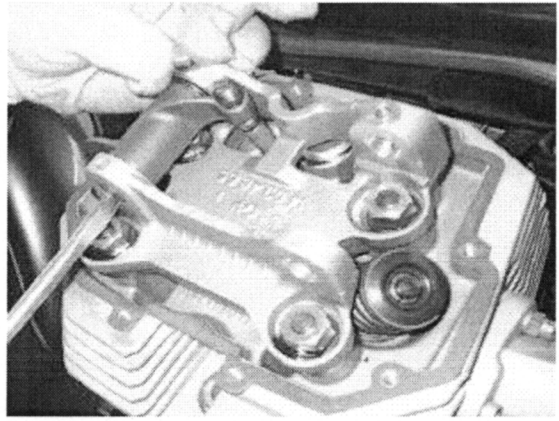


- Fit the valve rod.

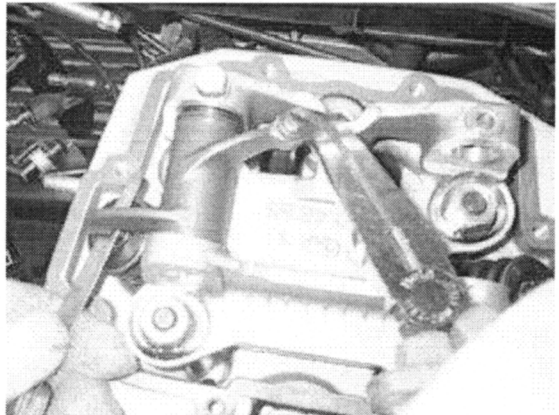


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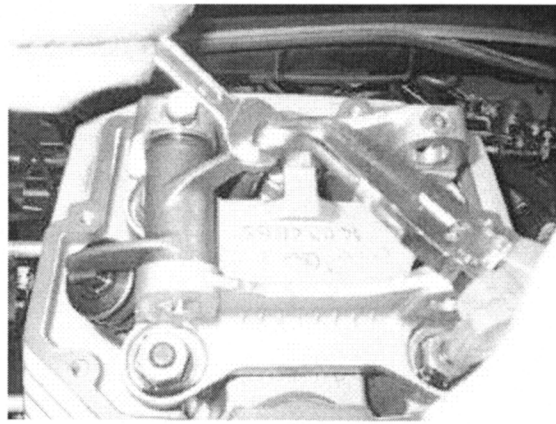
- Fit the new adjustable rocker arm and secure it with the suitable screws.



- Set the valve clearance to 0.5 mm by working the adjuster.



- Tighten the adjuster lock nut.

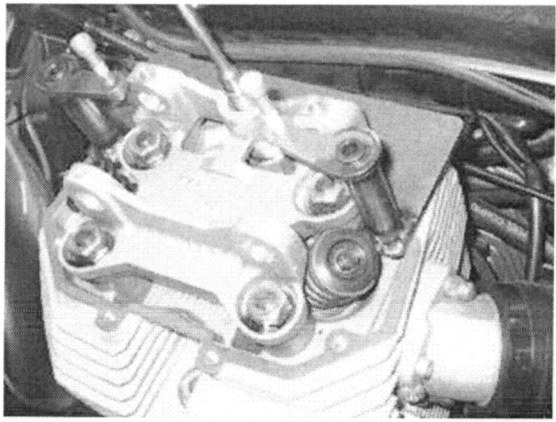


- Once tight, turn the cut part clockwise and force it until it breaks.



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- Fit the "Tool to install and adjust tappets" supplied with the kit
- Remove the adjustable rocker arm.



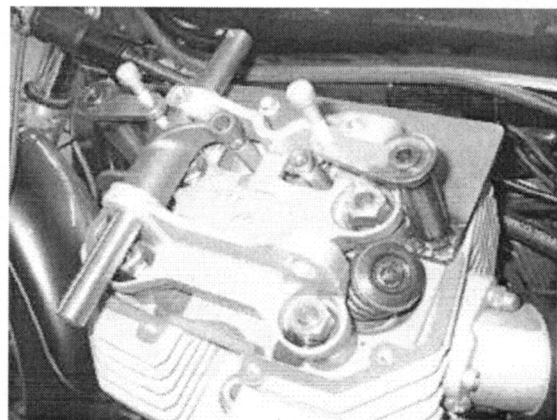
- Remove the valve rod.
- Remove the tappet gauge.
- Fit the new hydraulic tappet.
- Refit valve stem.
- Refit the adjustable rocker arm.



WARNING

Use the pin supplied with the kit to help alignment of the rocker arm washers

- Carry out the same operation on the second valve and on the second cylinder.



4. FINAL WASHING

Once vehicle has been reassembled, proceed to cleaning with oil as follows:

1. Fill engine with oil until the min. level (about 2 litres).
2. Remove both spark plugs.
3. Crank engine with starter motor until oil pressure warning light goes out (about 10 to 15 seconds).
4. Wait for 30 seconds, and repeat the procedure described in item 3.
5. Fit spark plugs and start the engine.
6. Let engine run at idle speed for 5 minutes.
7. Drain washing oil and fill up with new oil until reaching the max. level (about 3 litres).

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WARNINGS

All removed parts, even if apparently in good order, are on the contrary irremediably damaged, and shall thus be scrapped.