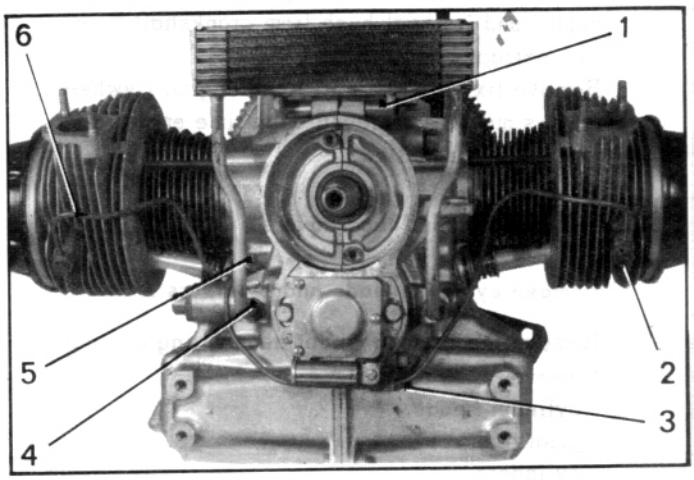
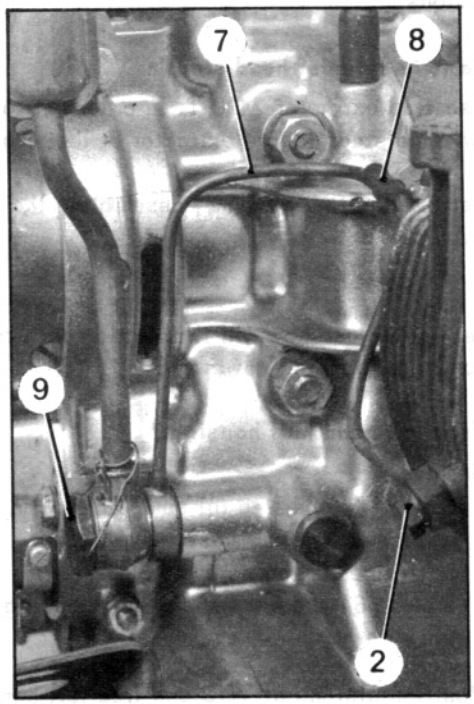
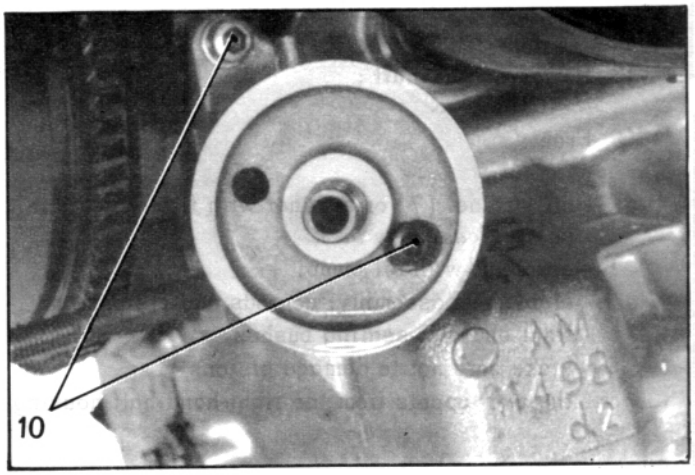
OVERHAULING AN ENGINE







DISMANTLING

1. Strip engine :
(See relevant operation).
Place the engine on support MR. 630-43/4.
Remove :
- alternator *(as applicable)*,
- fan,
- carburettor and its distance piece,
- inlet and exhaust manifold,
- the assembly fan cowl and cylinder cooling panels,
- crankcase breather,
- petrol pump,
- dynamo and its armature *(as applicable)*,
- clutch mechanism and clutch disc, or coupling ring with lined segments (centrifugal clutch).

2. Remove oil cooler :

Remove :
- fixing screw on crankcase,
- the two union screws (4) or the two union screws (9),
- the oil cooler and its two distance pieces (1).

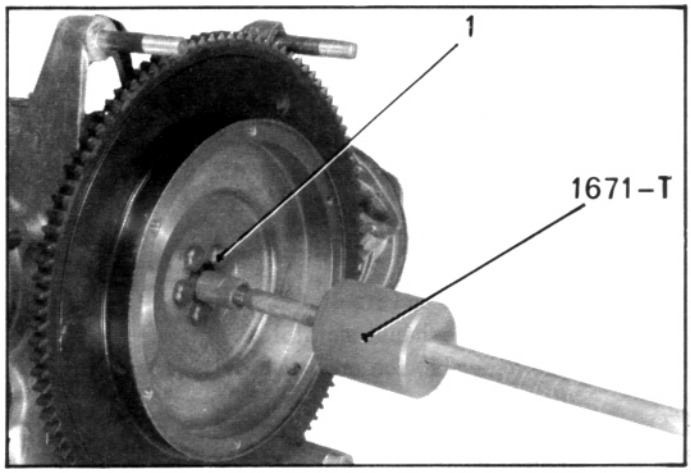
3. Remove, if necessary, the filter cartridge (spanner 1683-T).
Remove :
- the two cartridge bracket fixing screws (10),
- the cartridge bracket equipped with its O-ring seal.

4. Remove tube (6) or lubricating tubes (7) *(as the case may be) :*

Remove :
- union screw (5) on crankcase *(as applicable)*.
- union screws (2) on cylinder heads,
- clip (3) or clips (8) *(as the case may be)*.

5. Remove distributor :

Remove the two fixing screws.
Free the distributor housing with its cover and protection panel.



6. Remove engine flywheel :

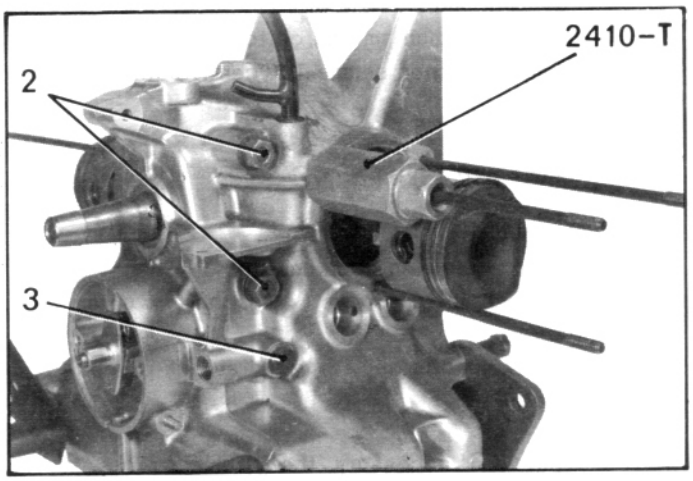
Remove needle bearing cage (or self-lubricating bush) and its seal bush from crankshaft bore.
Use extractor 1671-T.
Remove fixing screws (1) and engine flywheel.
Screws must be replaced each time engine flywheel is dismantled.

7. Remove cylinder head covers.

8. Remove cylinder heads and cylinders :

Remove the three cylinder head fixing cap nuts.
Remove :
- cylinder heads,
- push-rods,
- cylinders.

IMPORTANT : If cylinders are to be used again they must be marked as such with their respective pistons.

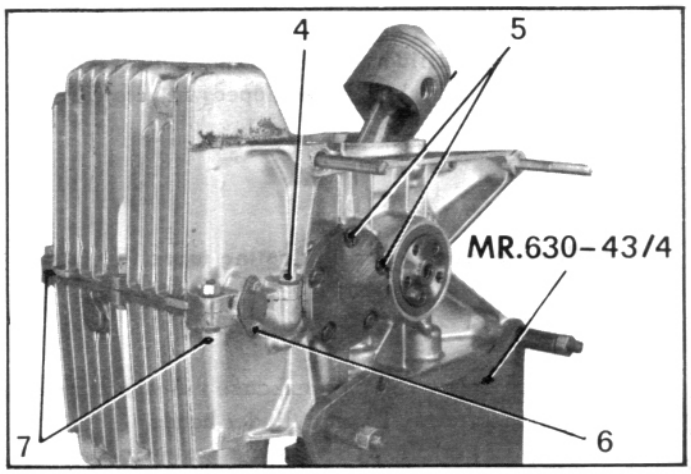


9. Remove cylinder head studs :

Use stud extractor 2410-T. In order not to risk twisting studs locate extractor at their base.

10. Remove the four nuts (2) assembling the crankcase halves.

11. Set engine as shown in illustration with right-hand half housing downwards.



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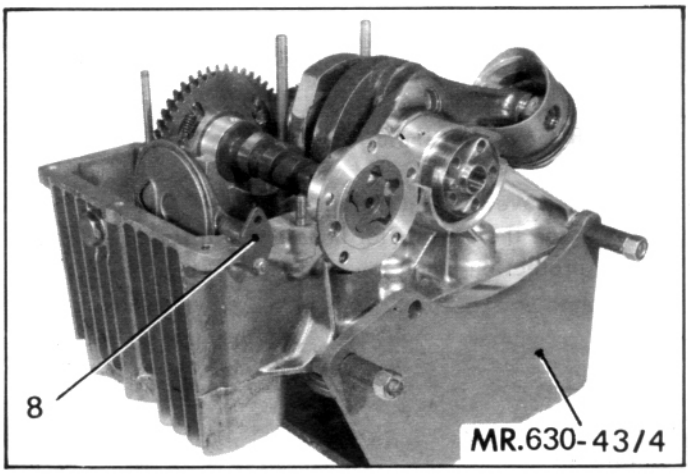
12. Free left-hand half-housing :

Remove :
- screws (4) and free oil pump cover and its O-ring seal *(as the case may be)*.
- oil strainer fixing screws (5),
- screws (6) and nut (3) for half-housing centring screw.

Position pistons at TDC and free left-hand half-housing.

Remove the two tappets.



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13. Remove crankshaft :

Free :

- oil strainer (7) or strainer with filter cartridge *(as the case may be)*.
- camshaft with oil pump,
- crankshaft assembly, conrods and pistons and front and rear sealing bushes, (take care not to damage pistons),
- the two tappets from the right-hand half-housing.

14. Remove right-hand half-housing from bracket MR. 630-43/4.

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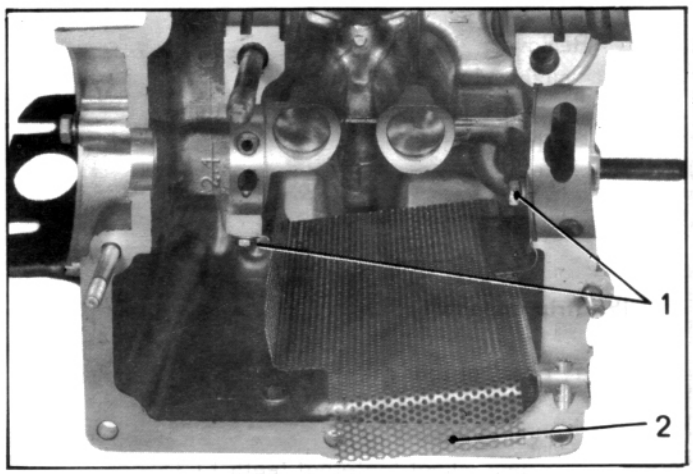

15. Strip the half-housings :

a) Remove :
- oil pressure switch or plug from left-hand half-housing,
- drain plug and plug for the pressure release valve (copper joint) from right-hand half-housing,
- spring adjusting washers (spring calibration) and valve ball or valve spring and piston *(as the case may be).*

b) Remove, if necessary, the two fixing screws (1) from anti emulsion shield (2) and free shield.

16. Remove pistons from connecting rods :

Remove :
- circlips from gudgeon pins,
- gudgeon pins (pairing each pin with its corresponding piston), by using extractor MR.630-23/8 (for engines of 425 and 435 cc), MR. 630-23/16 (for 602 cc engine).

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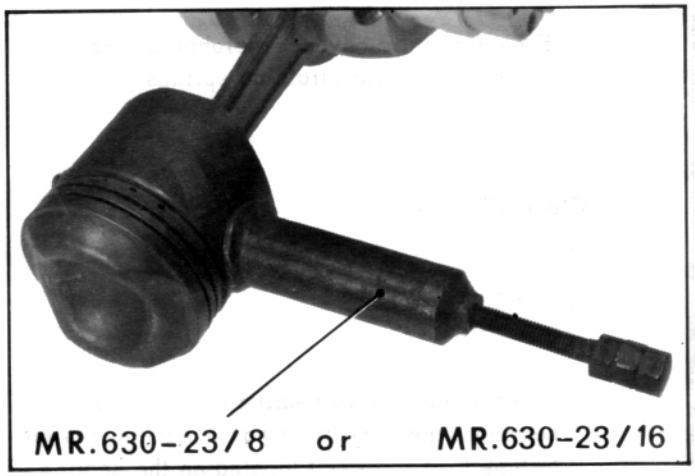

NOTES :

a) *Engines produced before October 1966 :*
If pistons are to be used again, heat them to a temperature of 60° centigrade before removing or refitting the gudgeon pins by immersion in an oil bath or heating them in an oven.

b) *Engines produced from October 1966 :*
The gudgeon pin is fitted loose in piston and connecting rod and it is not necessary to heat the piston before removing or re-fitting the pin.

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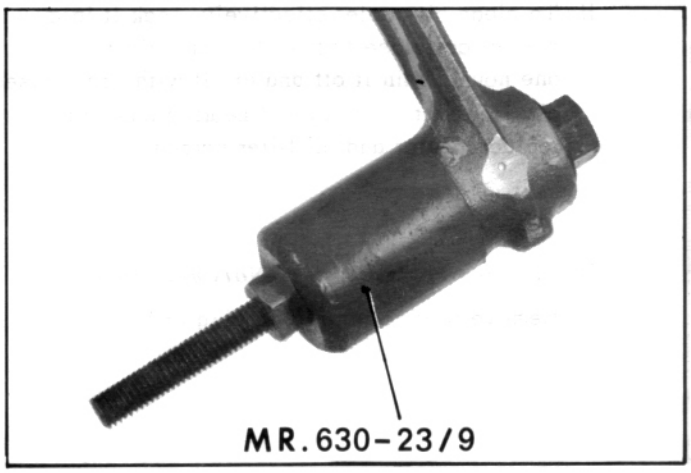

17. Remove connecting rod small end bushes (if necessary) :

NOTE : This delicate operation is not advised and can only be carried out in a specially equipped workshop.

Use extractor MR. 630-23/9.

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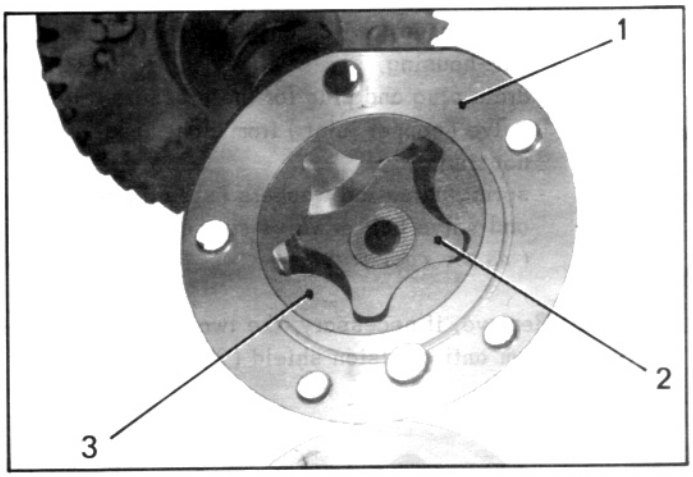

18. Strip the cylinder heads :
(See relevant operation)

Remove :
- push-rod sleeve joints,
- rocker arms and rocker arm spindles,
- valve springs,
- valves.

19. Strip camshaft :

a) Free, at rear :
- oil pump body (1),
- pump pinion (2),
- gear wheel (internal teeth) (3).

b) Remove, at front :
- circlip (5),
- thrust washer (4),

Free automatic advance weights and cam assembly without straining springs.

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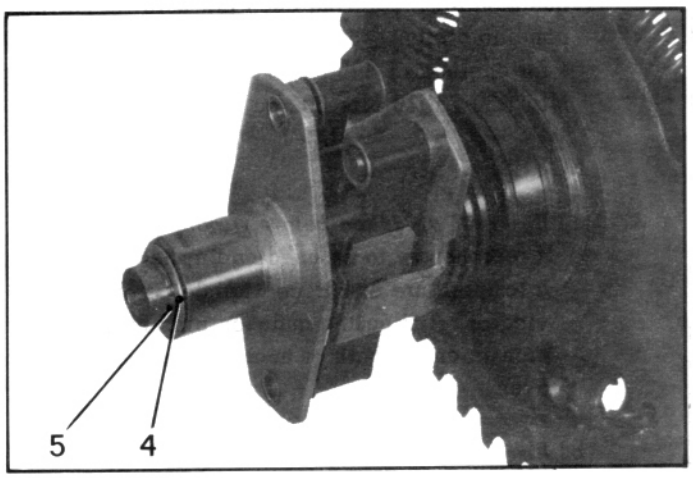

20. Clean all parts :

IMPORTANT NOTES :

I To ensure effective sealing of front and rear bearings, the crankshaft has a machined micro-turbine (oil thrower) located on the sealing faces for the oil seal. Any abrasive action on this micro-turbine will destroy its effectiveness and result in an oil leak.

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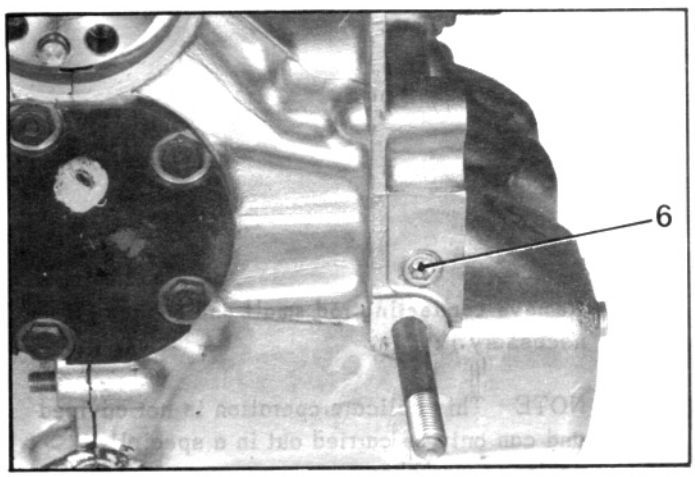
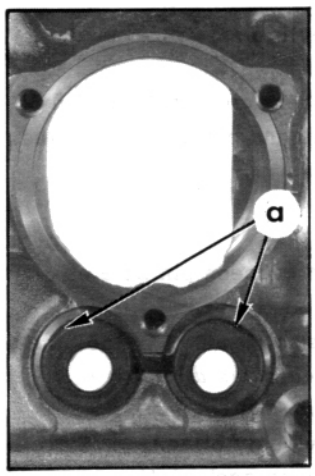
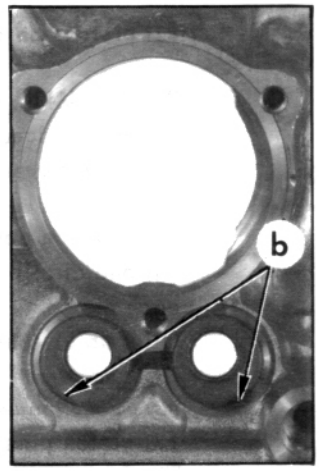


II To clean oil cooler effectively, soak it in a bath of cellulose thinner for approximately one hour. Drain it off and dry it with compressed air. However, if a big end bearing has « run », replace cooler and oil filter screen.

III *Vehicles produced since November 1970.*

Remove lubrication piping plug (6).





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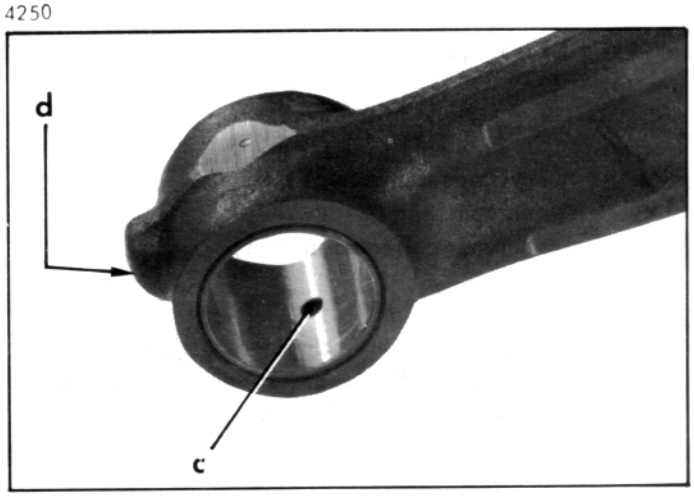

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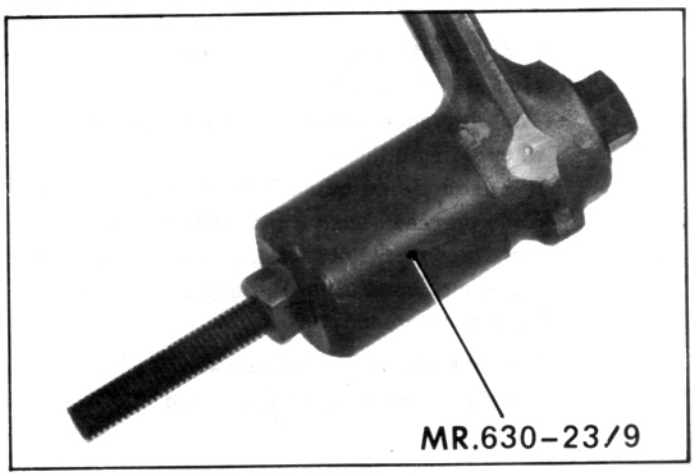


PREPARATION

21. Prepare cylinder heads :
(See relevant operation).

a) Grind valves and their seats, if necessary.
b) Lap the valves.
c) Fit valves and their springs.
d) Fit rocker arms and rocker arm spindles.
e) Fit joints on push-rod sleeves.

IMPORTANT :
Since December 1972, push-rod sleeve joints have no centring tab in crankcase and are positioned differently according to engine type (see illustrations). *This type of joint cannot be fitted to engines produced before this date.*

On engines M 28 and M 28/1 (602 cc), position flats « a » upwards.

On engines A 79/1 (435 cc), position flats « a » downwards.

22. Prepare connecting rod small ends :

If they have been removed, fit small end bushes.

NOTE : *This delicate operation can only be carried out in a specialized workshop.*

Bushes sold by the Replacement Parts Department have been bored to within approximately 0.05 mm under size of diameter of bore required.

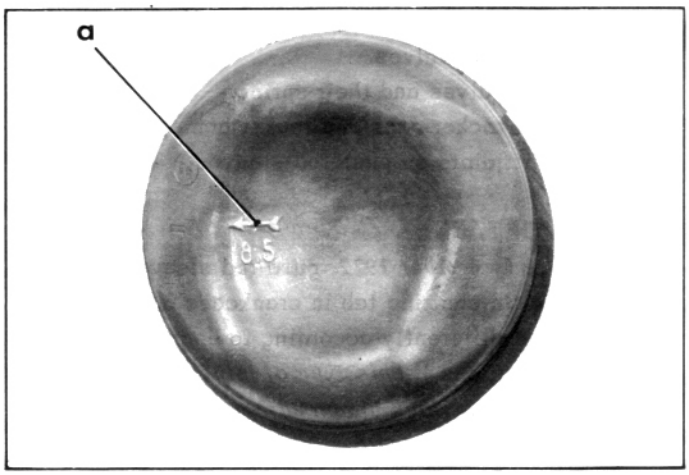
Plug holes « c » in bush with grease, or tallow.
Fit bush thus prepared so that centreline of lubrication holes « c » of the bush is perpendicular to centreline of connecting rod (Use extractor MR. 630-23/9.).
Ream the bush.
If a go-no-go gauge is not available, use the new gudgeon pin to check bore.
This delicate operation must be carried out with the greatest care as the bore measurement must be :

$$20.005 \begin{matrix} + 0.011 \\ + 0.006 \end{matrix} \text{ mm}$$

Blow compressed air through hole « d » to remove any grease and swarf.
Clean bore of bush.

23. **Engines fitted with conventional scraper-collector rings :**

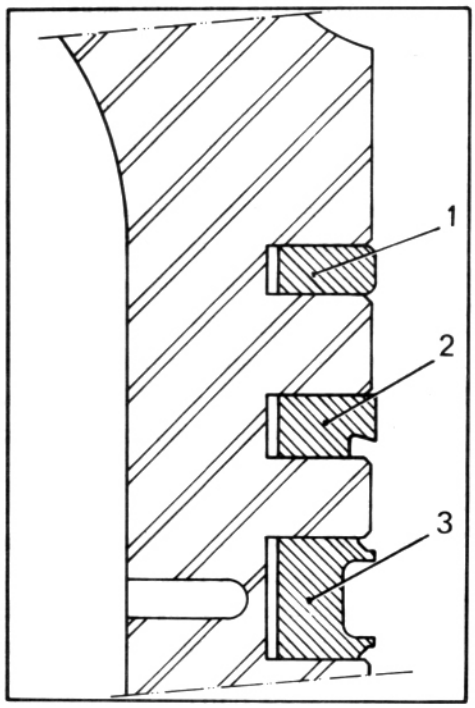
a) **Fit pistons on connecting rods :**



IMPORTANT : Cylinders are supplied with pistons, gudgeon pins and piston rings paired. *They must never be mixed.*

Oil gudgeon pins.
Fit one circlip in the gudgeon pin bore of each piston.
Offer up pistons on small ends of connecting rod : *an arrow « a » indicates direction of assembly (towards front of engine).*
Fit piston pins (previously oiled).
Fit the second circlip on each piston.

b) **Fit rings :**



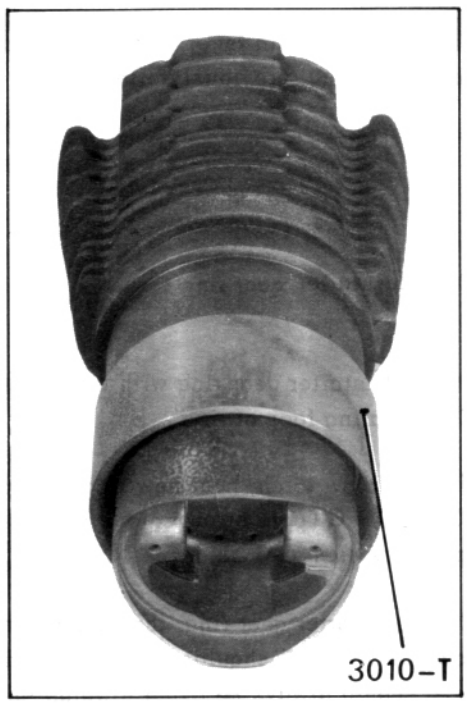
Fit in order :
- compression ring (1),
- scraper ring (2),
- scraper-collector ring (3).

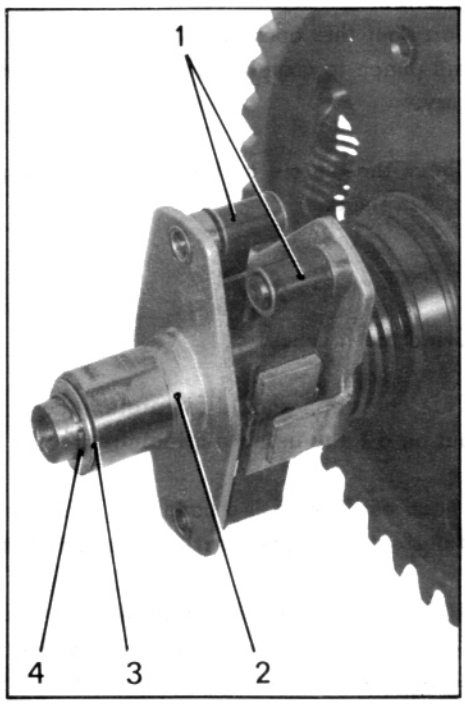
CARE : The three rings are marked near gap « H », « TOP », or « HAUT » or supplier's name (e.g. « NOVA »). *Rings must be positioned with this mark facing upwards.*

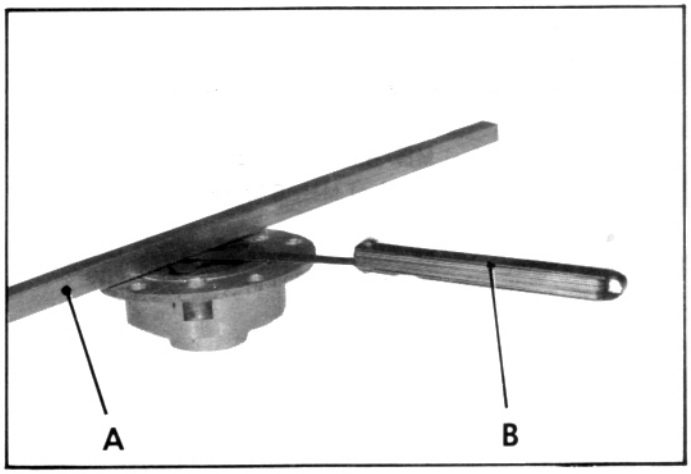
Arrange piston ring gaps at 120°.

NOTE :

Badly positioned rings will result in an excessive oil comsumption.
The clearance at the piston ring gap is checked when pairing them.
If a used piston being fitted and new piston rings are used ensure that they turn freely in their groove : if not, re-touch the latter with a piece of used ring, the gap of which will have been ground.
If on the contrary there is excessive clearance, the old piston must be discarded.







24. Engines fitted with U-FLEX scraper-collector rings :

NOTE :
Since June 1972, a number of 602 cc (3 CV) engines have been fitted with U-FLEX scraper-collector rings. When decompressed, the diameter of the U-FLEX ring is greater than the piston diameter.

Fit pistons in cylinders :
Fit a circlip in the gudgeon pin bore of the piston (arrow side).
Fit rings to piston *(take same precautions as at paragraph 23 b)*.
Oil piston-cylinder assembly.
Fit piston into lower part of cylinder.
Use piston ring fitting fixture 3010-T.

25. Prepare camshaft :

a) Check camshaft between centres. Ensure that the end of camshaft (distributor side) runs perfectly true. If not, camshaft must be changed because points gap will not be equal on both cams.

b) Position :

- automatic advance weights (1),
- cam (2),
- thrust washer (3),
- circlip (4).

26. Prepare oil pump :

a) Check end float of oil pump pinions, using straight edge A and a set of feelers B.
End float should not exceed *0.10 mm*

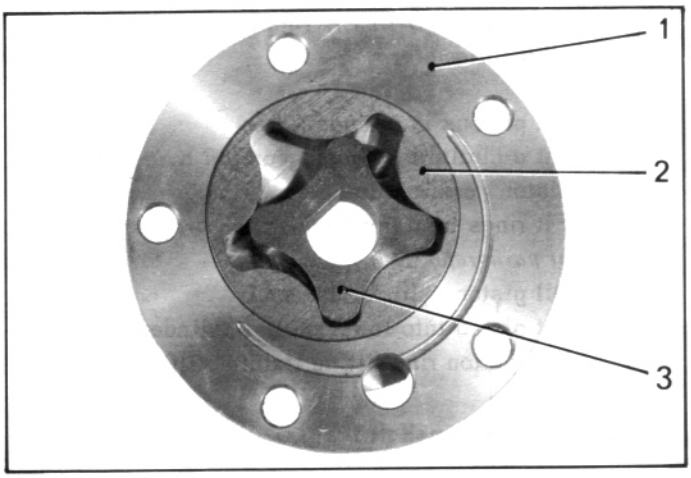
b) Check that pump body thrust faces have neither dents, not scratches (crankcase side and cover side).

c) Position *(according to engine type)* paper gasket on thrust face (engine crankcase side).
Stick in position with a few spots of grease.

IMPORTANT : The paper gasket should be fitted « dry ».

27. Offer up oil pump body (1) on camshaft.

Fit pinion (2) with inner teeth and pinion with outer teeth (3), previously oiled.



28. Replace starter gear ring :

Drive off starter gear ring with a hammer punch. Clean mating face of ring.

Using a blow-torch, heat new ring to approximately 200 - 250° C (pale straw color) turning constantly to ensure even expansion.

Offer up starter gear ring, the face not machined towards flywheel shoulder (machined and treated face should always be fitted towards the starter).

Carry out this operation quickly : use a hammer and punch to complete location of ring if necessary.

Check the run-out on the starter gear ring (0.3 mm max.).

29. Grind the flywheel :

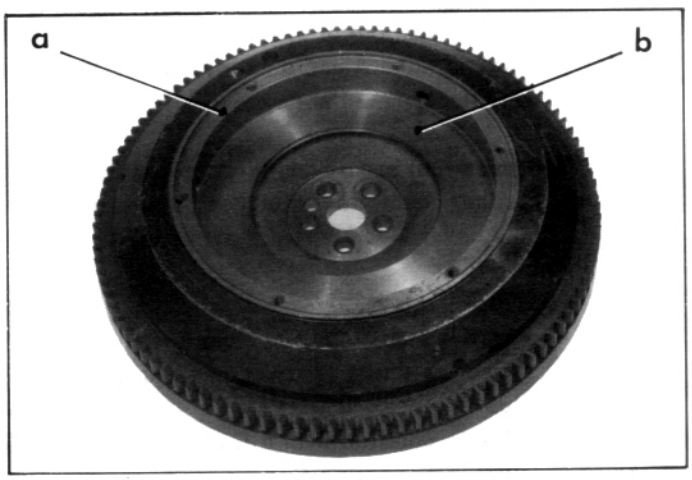
This operation should for preference be carried out on a lathe using a grinding wheel.

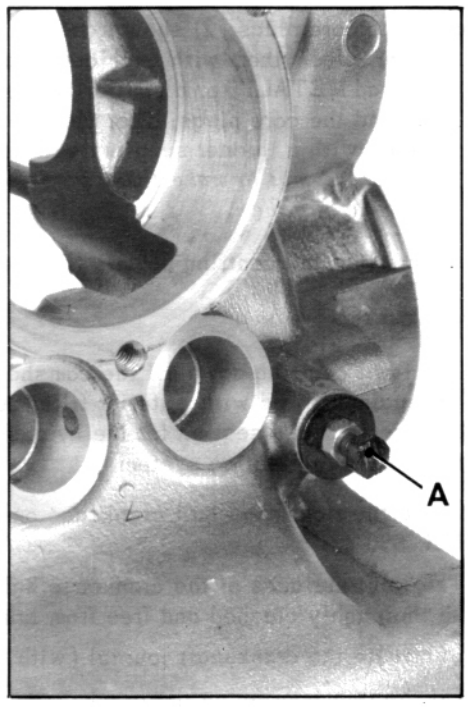
It can be done with a hand tool, provided that a perfectly polished surface can be obtained.

NOTE : After each grinding of disc thrust face « b », on flywheel, an equivalent amount should be removed on clutch mechanism thrust face « a ».

Both operations should be carried out without removing flywheel from lathe, so that the two machined surfaces are truly parallel.

Use mandrel MR. 630-35/9 (425 cc and 435 cc engines) or mandrel MR. 630-35/19 (602 cc engines).





30. Prepare distributor :
(See relevant operation).

Check condition of the contact breaker points. Replace them if necessary.

31. Prepare half-housings :

a) *Engines fitted with « ball type » pressure release valve :*

Replace if necessary, pressure release valve seating :

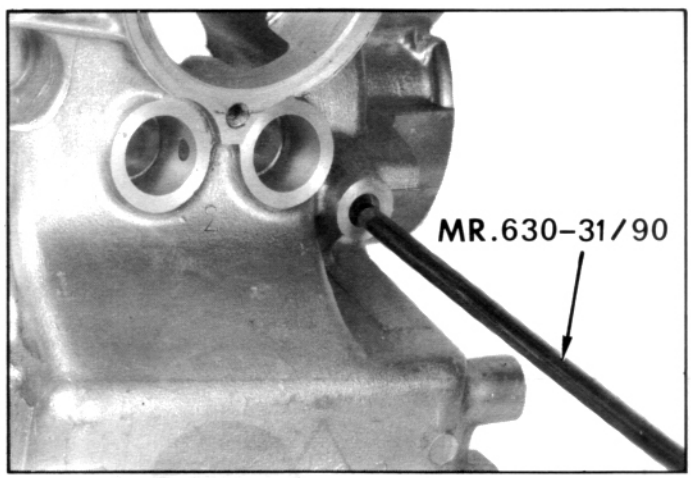
1°) Extract seating :
Tap thread dia. 6 mm, pitch 1.00 into bore of seat.
(turn a few threads with tap N° 2)

Extract seat, using screw A dia. 6 mm, length 50 mm, fitted with 6 × 20 washer and a nut.

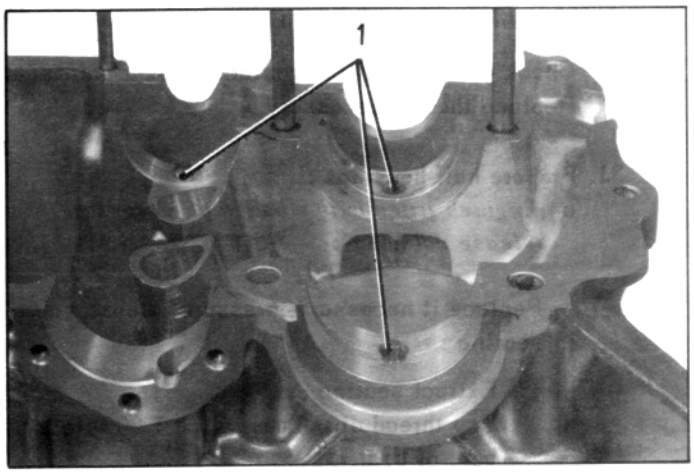
2°) Position new seat, using mandrel MR. 630-31/90.
Crimp seat, using crimping tool MR. 630-31/91.

b) Check condition of all the tapped holes in the half-housings. If a thread is damaged the half-housings can be used again by fitting a « HELICOIL » thread insert into some of these tapped holes. *(See relevant operation).* This process enables original fixing screws and studs to be used again. Fitting « thread inserts » is permitted in the following cases :

Fixing the petrol pump, breather, distributor, side plugs for draining and oil pressure gauge; front engine mountings, oil pump and oil pump strainer assembling studs for the half-housings and the connecting studs for the engine-gearbox assembly.



NOTE : If connecting studs for engine-gearbox assembly must be dismantled, note their positions as they are of varying length.



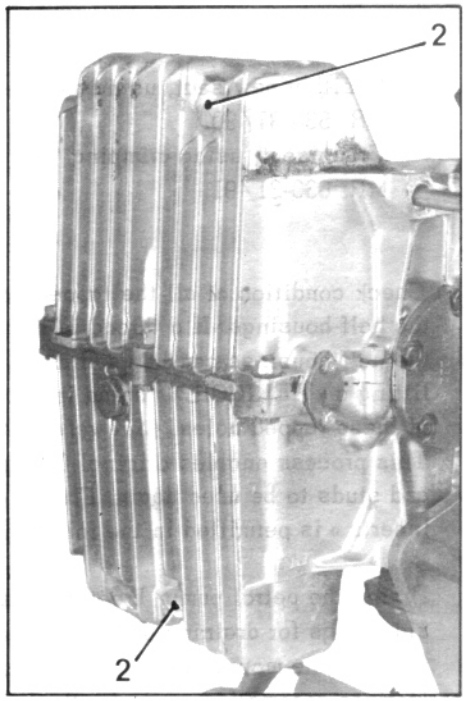
c) Fit the engine-gearbox connecting studs, if necessary One end of each stud has a thread 15 mm in length which is screwed into crankcase.

d) If the core plugs (2) show traces of oil seepage, clean them with trichlorethylene. Spread METALIT or a similar type of product around the core plugs, after cleaning them again with a thinner supplied with the product. *Never attempt to make these plugs oil-tight by dismantling them.*

32. Ensure that the centring dowels (1) are correctly in place.

NOTE :

The front centring dowel of the camshaft bearing for engines fitted with exterior filter cartridges also serves as a seating for the by-pass valve ball in the lubricating system.



Place the right-hand half crankcase on stand MR. 630-43/4.

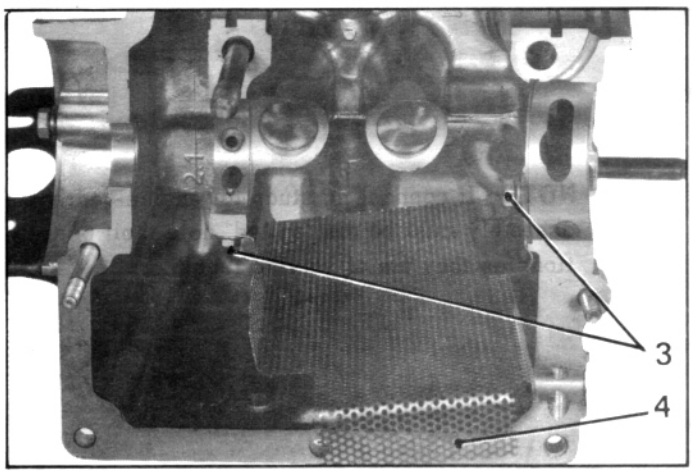
The joint surfaces of the crankcase halves should be thoroughly cleaned and free from bruise marks.

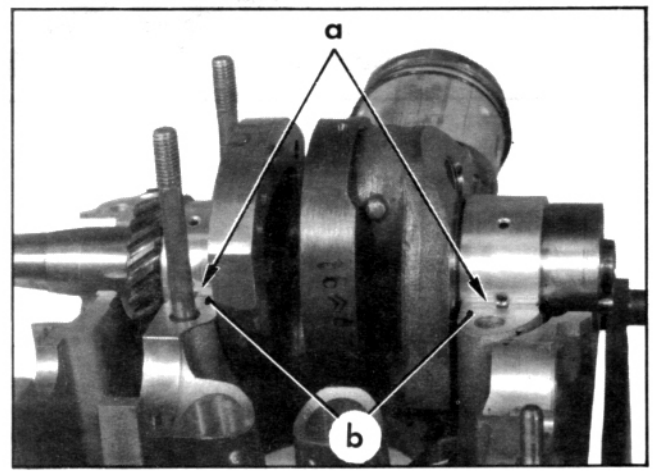
Lubricate the crankshaft journal (with an oiler)

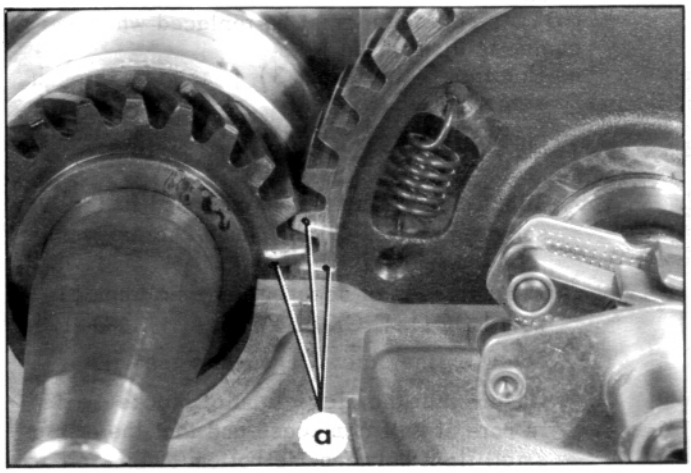
Fit the rear bearing on the crankshaft journal.

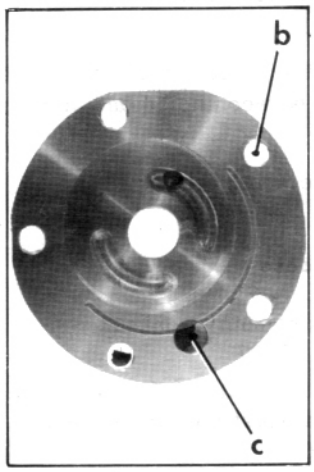
Fit the crankshaft in place, noting position of the groove « a » on the rings, which should be level with joint « b ».

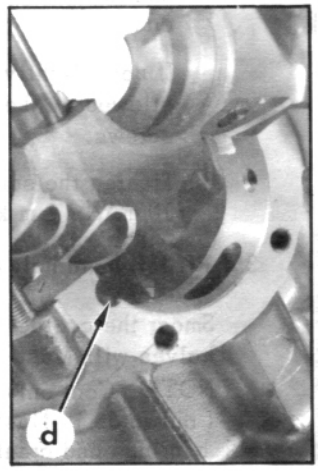
Ensure that the centring are properly fitted on the holes of front and rear bearings.

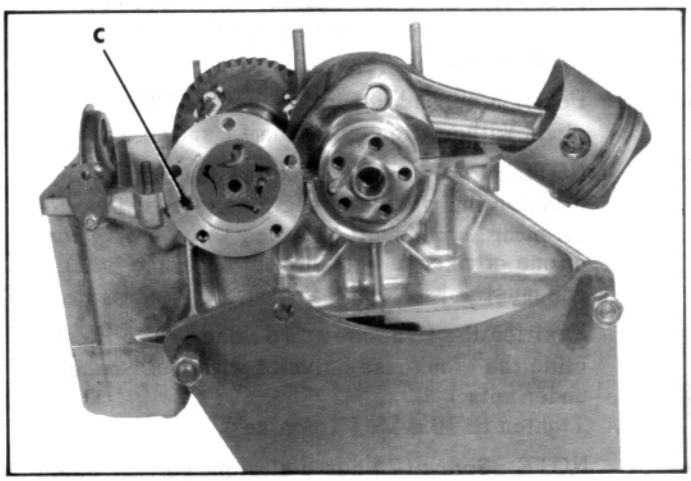


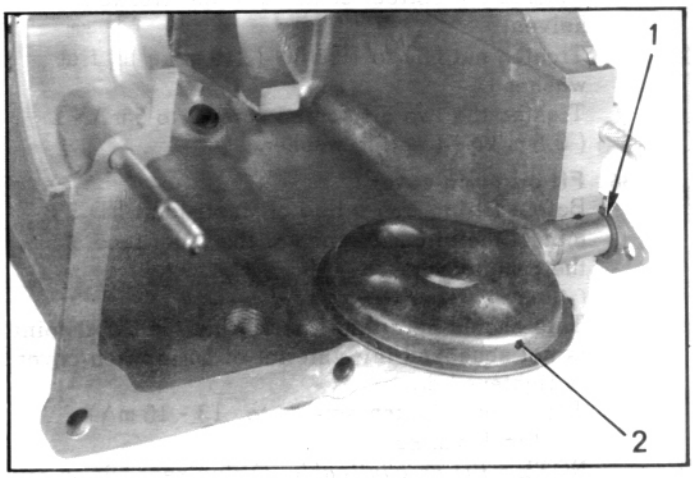












33. Fitting the camshaft :

Oil camshaft bearings (use an oiler)

a) Fit the assembly of camshaft and oil pump in right-hand half-crankcase so that markings « a » on pinions should be in accordance with each other.

Ensure that the front bearing is properly set on centring dowel.

b) Locate the oil pump body.

NOTES :

I. *If the oil pump body is equipped with a paper gasket,* check that the gasket is properly fitted between pump body and engine crankcase. This gasket should be fitted dry.

II. *If there is no paper gasket fitted to pump body,* coat thrust face of oil pump body on crankcase with Masti-joint HD 37.

Make holes « b » in pump body, face holes threaded in half crankcase, and align oil intake hole « c » in pump body, with corresponding hole « d » on engine crankcase.

34. Fit the oil filter screen (model without cartridge type filter) :

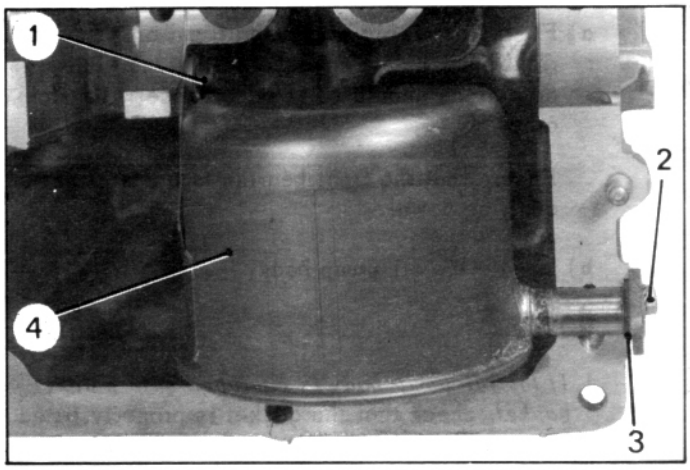
a) *If the oil filter screen is not fitted with O-ring seal,* apply Masti-joint HD 37 to securing clamp.

b) *If the oil filter screen is equipped with O-ring seal,* (1), the oil tightness of the clamp is achieved by the seal which must be renewed each time it is dismantled.

NOTE : It is not possible to fit an O-ring seal on crankcases not reamed for the seating of the seal.

c) Position oil filter screen (2) with oil entry hole positioned towards the base of crankcase ((do not use Masti-joint).

d) Screw on the securing screw (spring washer).



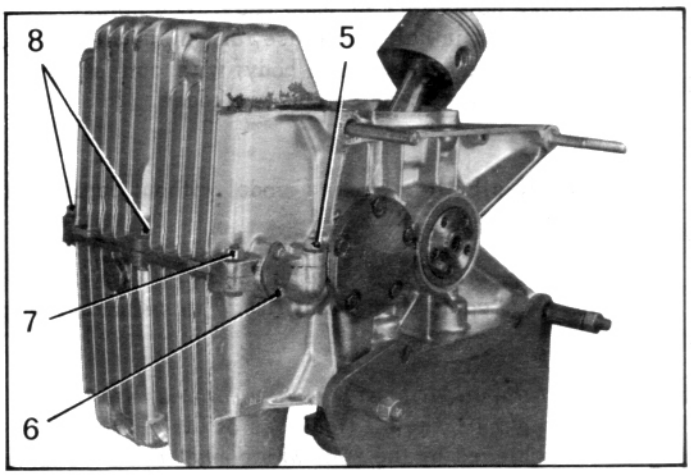
34. **Fit oil filter screen** (with filter cartridge incorporated) :
NOTE : This filter must be replaced whenever the engine is dismantled).
a) Position O-ring seal (3), passing it through screen clamp.
(replace gasket whenever it is dismantled)

b) Offer screen in half crankcase and fit the securing screw (2) for clamp (spring washer).

c) Smear threads of securing lug of screen (1) with LOCTITE GX 01 45901 A.
Screw on the screw (1) (flat washer).
Ensure that the clamp tubular bracket is set in bore of half crankcase and that there is a small float between the bottom of the screen and the central rib at the bottom of the crank case.

If not, slightly turn the screen within the limits allowed by the play between holes and securing screws.

d) Tighten the screw securing the lug (1) to 10 mΛN (1 m.kg).



35. **Fit left-hand half crankcase :**

Smear the contact faces of both crankcase halves with Masti-joint HD 37.
NOTE : Coat only half the width of the joint face (outwards) : Masti-joint must not run between bearings and crankcase.

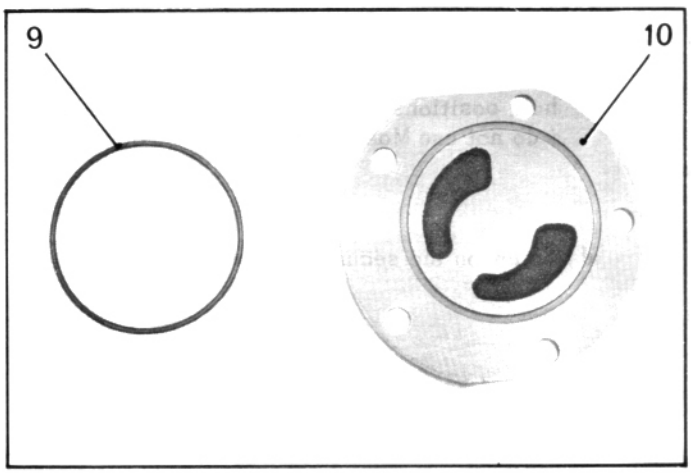
Place left-hand half against right-hand segment. Screw on the securing nuts for the bearing studs (flat washers).

Position second securing screw (6) for bearing studs without tightening them (spring washer)

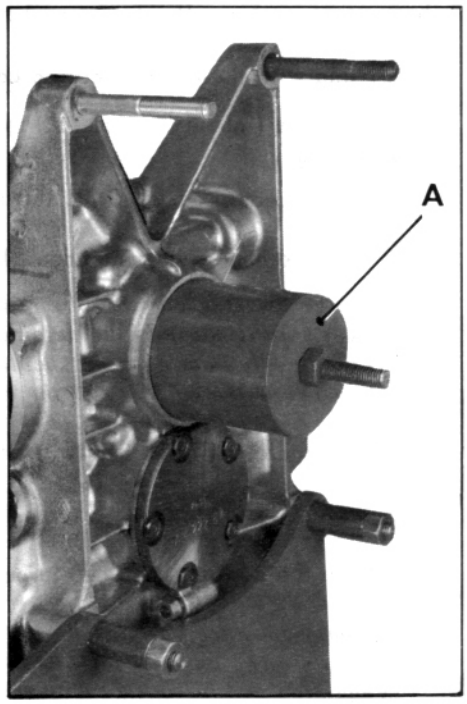
NOTE : Position the two crankcase halves by aligning the machined sections (thrust face for oil pump, crankshaft bearings), the projection of one crankcase half in relation to the other one must not exceed 0.05 mm.

Position the five screws (8) and (7) for assembling the crankcase halves (with flat washers under nuts).
Tighten to 19 mΛN (1.9 m.kg).

NOTE : Screw (7) has a straight portion which ensures the correct centring of the crankcase halves.
Tighten nut (5) to 19 mΛN (1.9 m.kg). (flat washer).
Tighten the two oil screen screws to 5 mΛN (0.5 m.kg) (spring washer).



36. **Fit oil pump cover :**
Before fitting, run a line of Masti-joint HD 35 around the circumference of the inner face of the pump cover.
(Cover without O-ring seal).
This should be a thin line so that the Masti-joint is not squeezed into interior of pump when cover is tightened down.
Fit cover. Tighten screws to 13 - 15 mΛN (1.3 to 1.5 m.kg).
NOTE : *Fit as applicable.* O-ring seal (9) on oil pump cover (10). (Renew seal whenever unit is dismantled).



37. Free engine from stand MR. 630-43/4 and set up as illustrated.

Tighten the bearing stud securing nuts (2) (flat washers) to 45 mΛN (4.5 m.kg).

38. Fit seal rings :

a) Fit rear seal ring :
Grease with high-melting point grease, interior and exterior of seal.

Position seal with face bearing name and reference of manufacturer towards exterior of engine.

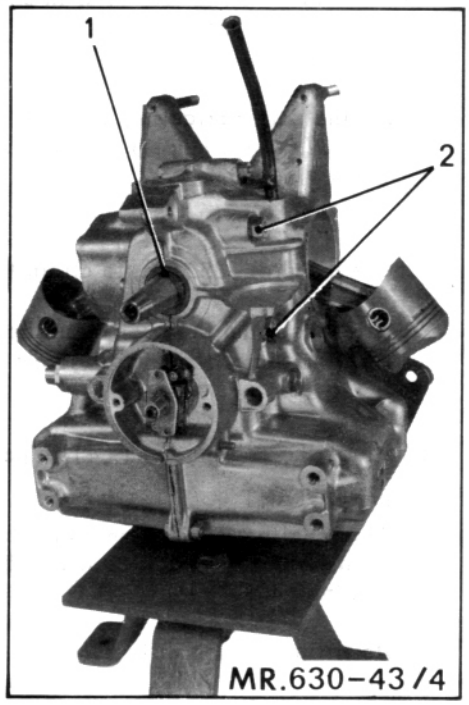
To position seal, use tool A :
- MR. 630-34/25 (for engines A 53 - A 79/0 and A 79/1),
- 3004-T (engine M 4),
- 3007-T a (engines M 28 and M 28/1).

(Oil interior cone of tool with engine oil).

The ring flange should come into contact with the crankcase.

b) Fit front seal ring :
Grease with high melting point grease, interior and exterior of seal.
Position seal with face bearing reference and manufacturer's name towards exterior of engine.

Locate ring seal (1) using a tube of exterior diameter 45 mm, interior diameter 31 mm, and length 100 mm.

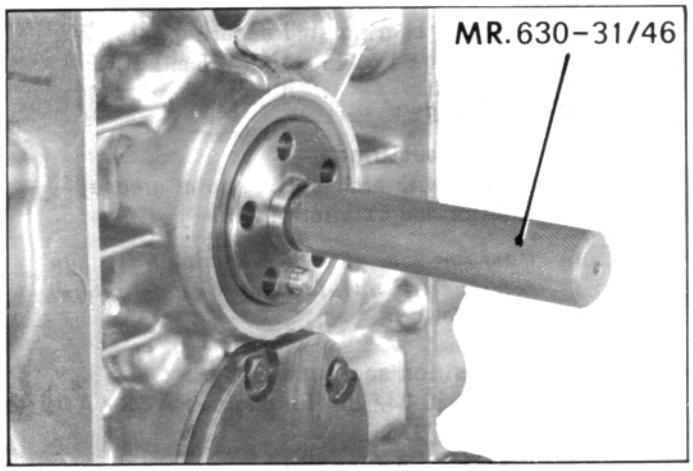


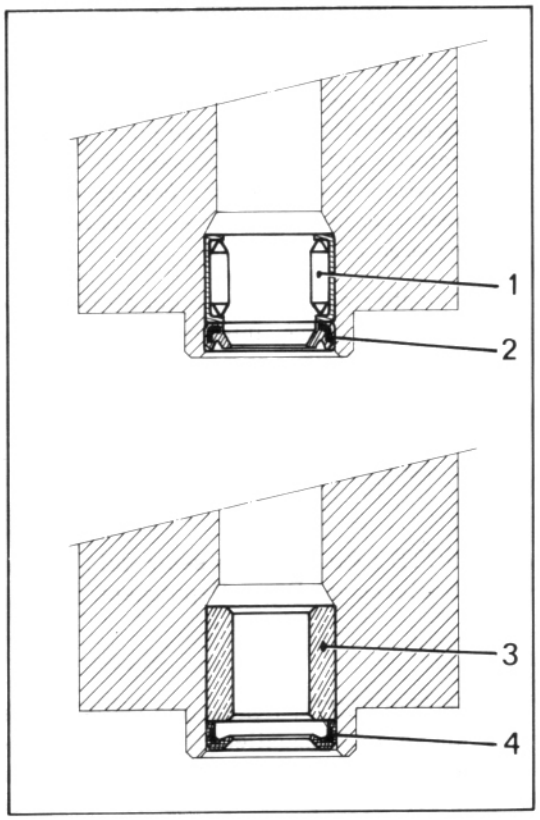
The ring recess in relation to the face of crankcase should not exceed 1 mm.

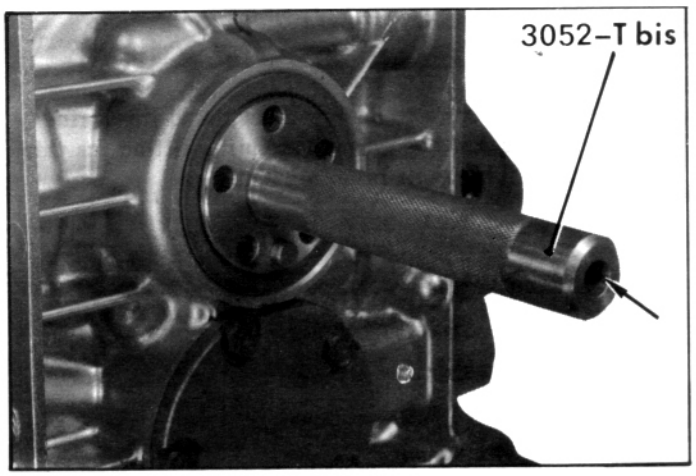
NOTE : Fit only ring seals sold by our Replacement Parts Department

IMPORTANT : Renew ring seals whenever these are dismantled. Never fit ring seals before assembling crankcase halves, this in order not to pinch them, which would cause oil leaks.

Take care to ensure that ground lip of ring has not been damaged during fitting, as this would result in an oil leak.







39. Centring the mainshaft in the crankshaft :

NOTE : Correct centring of the mainshaft in the crankshaft is assured by using either a needle bearing cage or a self-lubricating bush.

A. Fitting with the needle bearing cage :

Apply grease (about 3 grammes) to the needle bearing cage.

Use only silicon grease (G.S.I 160).

a) Place the needle bearing cage (1) in position.

Arrange the side carrying the reference and maker's name towards the outside. The end of the needle bearing cage should stand down 5 mm below the end face of the crankcase.

Use mandrel MR. 630-31/46 to attain this.

b) Place the sealing bush (2) in position.

Arrange the face carrying the reference and maker's name towards the needle bearing cage side and in contact with it.

B. Fitting with self-lubricating bush :

Immerse this bush for one hour in engine oil SAE 20, at ambient temperature.
Allow it to drip.

a) Fit the self-lubricating bush (3) in position.
It should stand down 5 mm from the end face of the crankcase.

Use mandrel 3052-T a, to attain this.

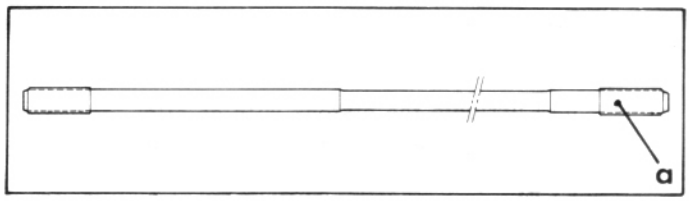
After inserting the bush, free the mandrel with the aid of its central screw at « a ».

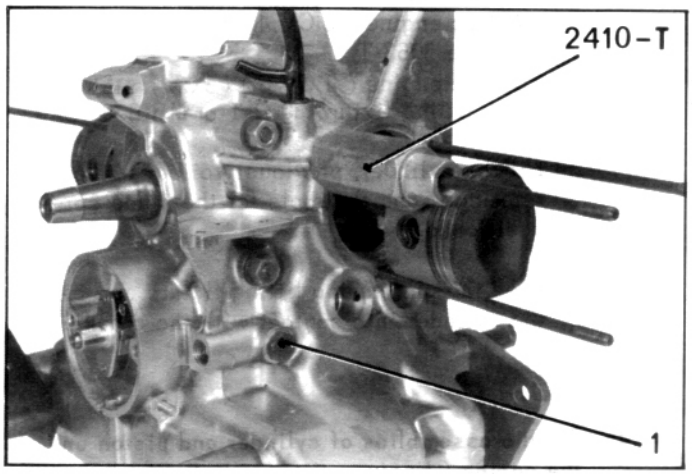
b) Place the sealing bush (4) in position.

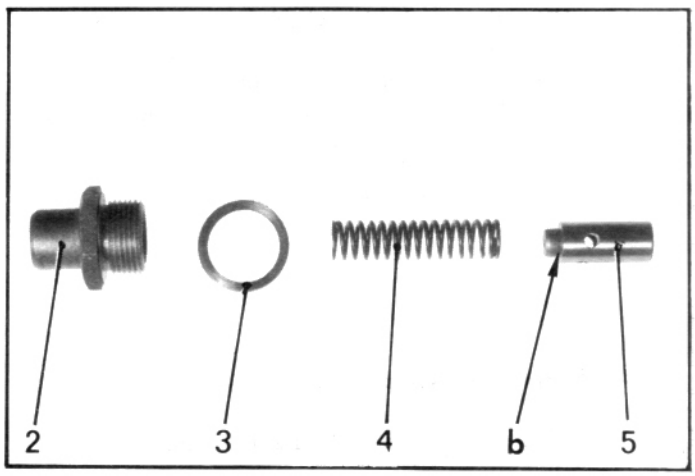
IMPORTANT :
This sealing bush (4 mm thick) differs from bush (2) (3 mm thick) used with the needle bearing cage.

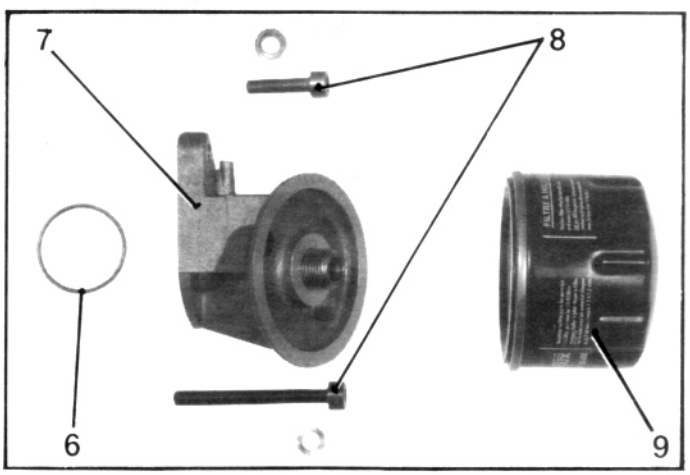
Its fitting is also different.

Arrange the sealing bush (4) with the face carrying the reference number and maker's name towards the ouside of the engine.









40. Fit the cylinder heads studs :

The threaded portion of the larger diameter « a » should be fitted on the crankcase side.

The shortest stud is placed on the lower part (stud driver 2410-T)

Place stud-driver at the base of the stud to avoid damaging it (bending it).

Fit :
- the oil drain plug (metalloplastic washer),
- the plug (1), or the oil pressure switch (copper gasket). Tighten to 30 mΛN (3m.kg).

41. Fit the relief valve :

Oil parts (engine oil).

a) *Engine fitted with ball type relief valve :*

Position :
- adjusting washers and spring in plug,
- ball

Tighten plug (copper gasket) to 40 - 45mΛN (4 to 4 5 m kg)

b) *Engine fitted with piston type relief valve :*

Position :
- piston (5) with end « b » outwards,
- spring (4),
- plug (2) and its copper joint (3)

Tighten plug to 40 - 45 mΛN (4 to 4 5m.kg)

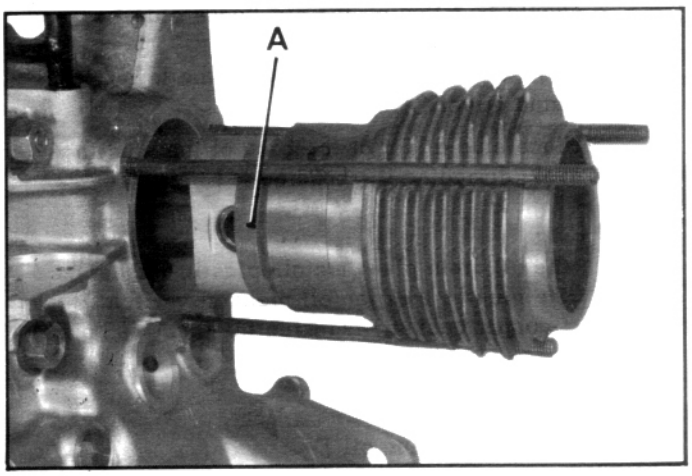
42. Fit the filter cartridge support (if necessary) :

Fit O-ring seal (6) on the support for the filter cartridge (7).
Fit the two securing screws (8) for the support (copper washer on lower screw-contact washer on upper screw).
Fit the filter cartridge (9)
Tighten as indicated by manufacturer.

43. Fit tappets :

Oil tappets before fitting

NOTE : If the engine crankcase carries the letter B stamped between guide tube bosses, the diameter of tappets is 24.2 mm



44. Fit cylinders *(Engines equipped with conventional scraper-collector rings) :*

a) Lubricate the pistons with an oiler, arranging the gaps in the three pistons rings at 120°.

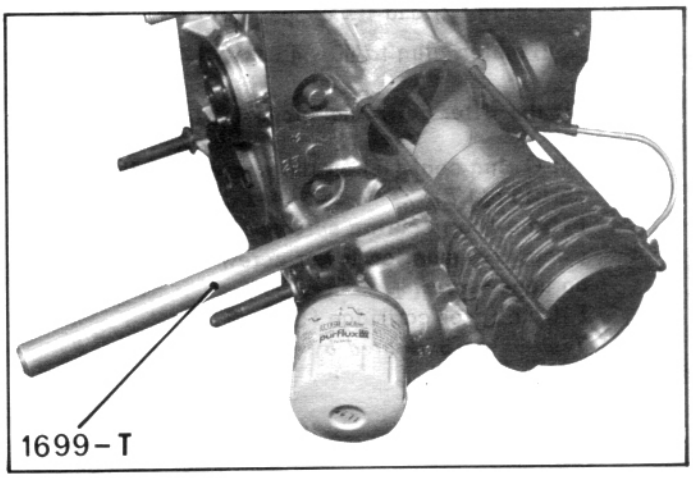
b) Place piston ring fitting fixture A on the piston :
- 425 cc engine (2 CV) piston ring fitting fixture 1654-T
- 435 cc engine (2 CV 4) piston ring fitting fixture 3063-T
- 602 cc engine (2 CV 6) (3 CV) piston ring fitting fixture 3002-T or MR.630-65/7.

c) Fit the cylinder, previously oiled, without rotating it and the slots for the studs correctly positioned.

d) Free the piston ring fitting fixture and bring the cylinder into contact with the crankcase.

45. Fit the assemblies of cylinder and piston on the engine *(Engines fitted with U-FLEX scraper collector).*

Oil connecting rod small end.
Offer the assembly cylinder piston on connecting rod, so that arrow on piston is pointing towards the front of the engine.
Complete, if need be, positioning the gudgeon pin, by using the mandrel 1699-T.
Fit the second gudgeon pin, circlip.
Complete fitting of cylinder.

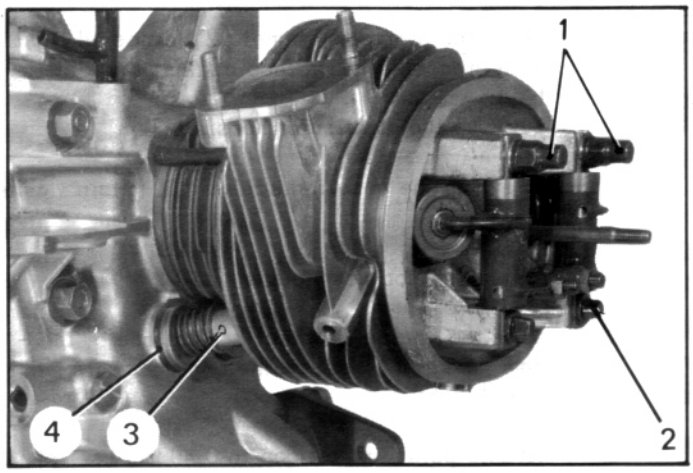


46. Fitting the cylinder heads :

a) Unscrew the adjusting screws for the rockers.

b) Check and lubricate the balls ends of the rocker push rods which must be free from burrs, scratches, and signs of wear.

c) *Insert the push-rods in the guide tubes.*
(coppered ball end on the rocker arm side).



d) Fit the cylinder heads :

Place in position the three securing nuts (1) (copper washer under the upper nuts, steel washer under the lower nut).

Screw up lower nut until the cylinder head is in contact with the cylinder and the cylinder on the crankcase.

Guide the tubes (3) so that the shoulders of the rubber seals (4) enter correctly in the crankcase bore.

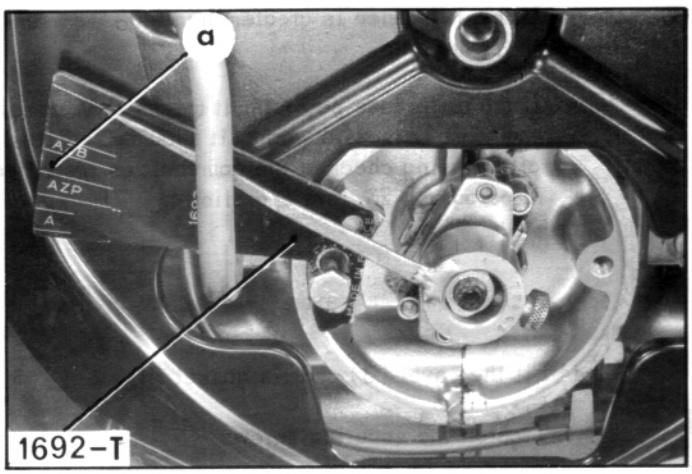
Screw up the upper nuts (1).

Provisionally tighten the three nuts securing the cylinder head to 10 mΛN (1 m.kg).

47. Fit the engine flywheel :

Fit new securing screws after each dismantling and tighten them to 40 - 45 mΛN (4 to 4.5 m.kg) while holding the flywheel with the aid of a screwdriver.

Ensure that the assembly turns freely.



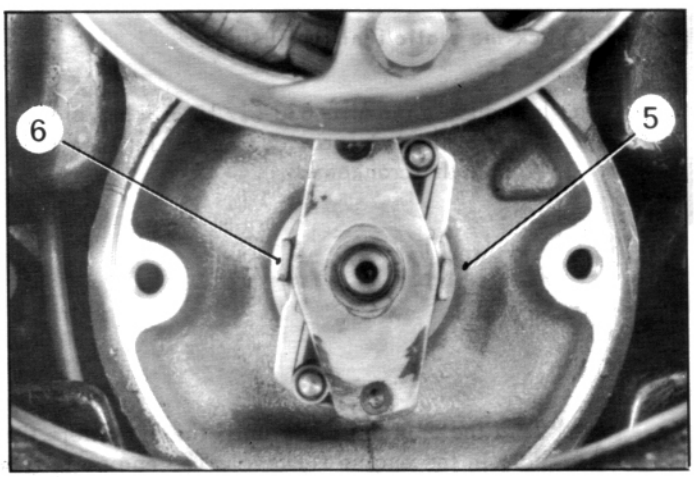
48. Fit distributor :

a) Check and adjust centrifugal advance :

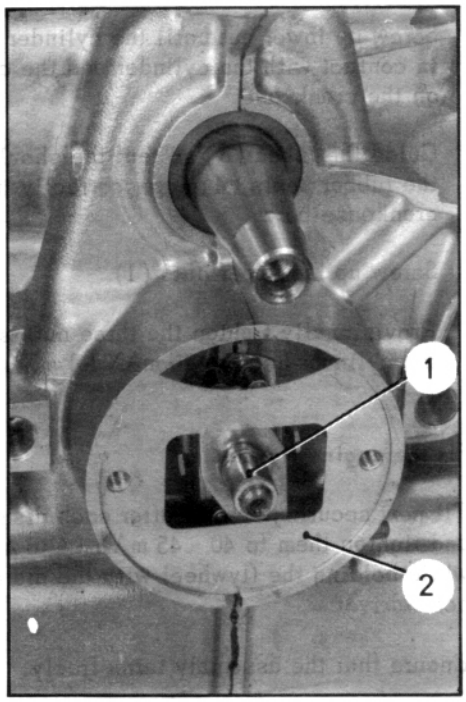
- Check the angle of rotation of the cam, in relation to the camshaft, using graduated scale 1692-T.
- Fit indicator needle on cam, pressing it down to fullest extent, and slightly tighten the retaining screw.
- Turn flywheel to bring indicator needle of checking tool opposite mark O.
- Gently rotate from right to left, on needle shaft without forcing.

At the end of its travel the needle should be ;

- in zone « AZB » for distributors fitted on engines A 53 and M 4.
- At point « a » between zones « AZB » and « AZP » for distributors fitted on engines A 79/0.
- In zone « AZP » for distributors fitted on engines A 79/1 - M 28/1 and M 28.



If the indicator needle comes to rest outside the zone corresponding to the type of distributor as indicated above, the travel of the weights must be adjusted by bending the clips (5) and (6) of the stops.



b) Fit the distributor :

Place the protection panel (2) (smeared lightly with grease, with its face against the distributor).
Offer up the distributor housing (6).

Screw up the securing screws (5) (plain washer).

c) Adjust the contact breaker gap :

Turn the engine flywheel so that one of the cam bosses (1) raises the contact to its maximum height.

At this point, adjust gap to 0.40 mm (set of feeler).

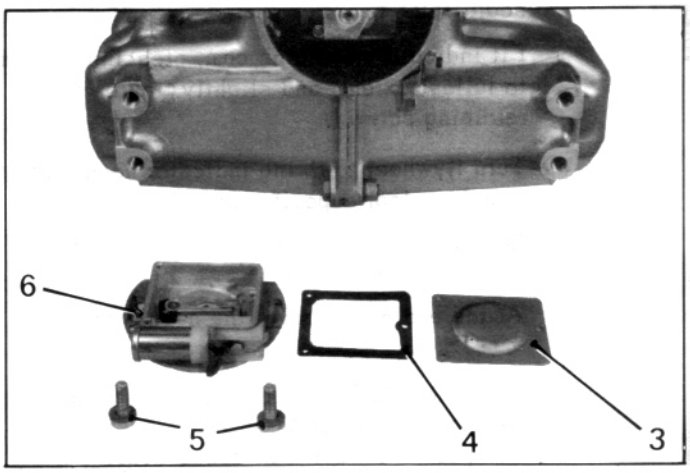
Turn the flywheel again, so that the second boss of the cam raises the contact to its maximum height. Again check the gap.

If the difference is greater than 0.05 mm, turn the cam again.

If the difference persists, it means that one of the cam bosses is worn. (it must be replaced after having checked the camshaft as indicated in paragraph 25, this operation).

d) Fit the cover (3) and its gasket (4).

Tighten the securing screws.



49. Check the static ignition timing :

a) Introduce a pin MR. 630-51/15 of 6 mm diameter in the hole provided on the left-hand side of the crankcase.

b) Turn the engine slowly until the pin enters the hole in the engine flywheel. The engine is then at the ignition point.

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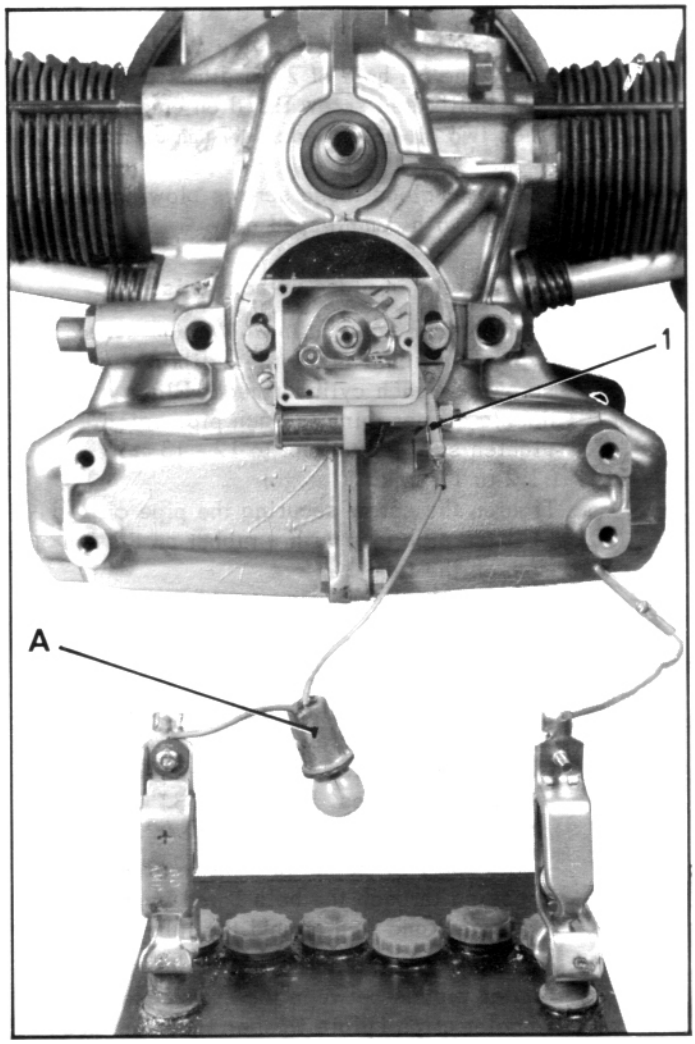


c) Connect the positive terminal of a battery (6 or 12 volts) to the terminal (1) of the distributor outlet inserting a test lamp of 6 or 12 volts in series.

Connect the negative terminal of the battery to the engine earth.

d) Check that the centrifugal advance weights are at their position rest.

e) Loosen the two securing screws of the distributor.
Find the exact point of opening of the contact breaker by turning the housing.
The lamp will go out at this precise moment.

f) Tighten the distributor securing screws.

g) *Remove the pin from the engine flywheel.*

h) Turn the engine (by the flywheel) in the direction of running, when the lamp will light.

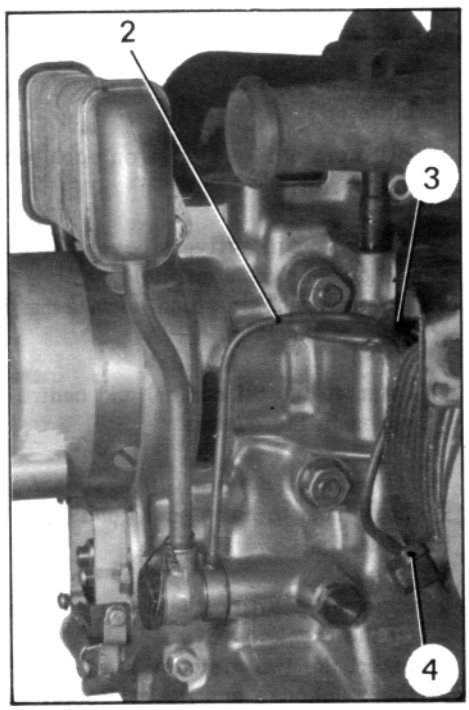
Stop at the precise moment when the lamp goes out for the second time (at this point the engine will have made one revolution). It should be possible to insert the pin in the engine flywheel.

If the hole in the flywheel has passed the pin the ignition is retarded : It will be necessary to re-adjust the ignition timing on this cylinder.

In no circumstances must the initial advance be less than :
- 12° (A 53 - A 79/0 - A 79/1 - M 4 engines)
- 8° (M 28/1 - M 28 engines).

The variation should not be more than 3° (1 1/2 teeth on the starter ring) between the static setting on one cylinder and that on the other.
If it is, them cam must be replaced.

Remove the pin and the test lamp from the battery.

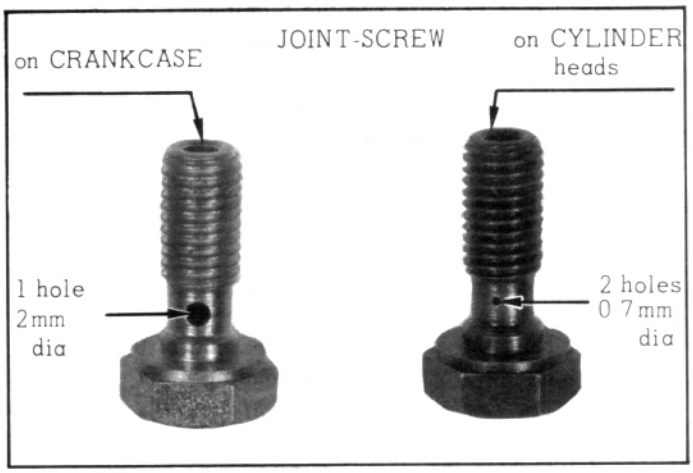


50. Fit the cylinder head lubrication tubes :

a) *Engines fitted with earliest model oil cooler :*

- Fit the cylinder head lubrication tubes (2). (Place double gasket (4) on cylinder head joint).

- Tighten the screws for the lugs securing the tubes (3) on the front cylinder head studs. Fit the protective sleeve on the tube.



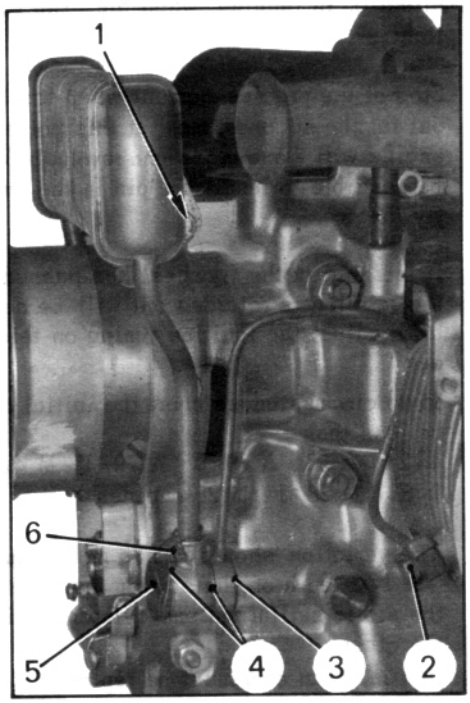
b) *Engines fitted with second type oil cooler :*

CARE : Do not reverse the calibrated union screws :
- the calibrated screw on the crankcase has only one oil hole of 2 mm diameter.
- the calibrated screw fitted on each cylinder has two oil holes, each 0.7 mm diameter.

Thoroughly clean these screws blowing them through with compressed air.

Fit the tube in place without twisting.

Fit (by hand) the calibrated union screw on the crankcase, then the calibrated union screws on each cylinder head. Place a double copper joint on each pipe union.
Tighten screwed unions to 12 - 13 mAN (1.2 to 1.3 m.kg)
Tighten the screw securing the pipe clip (11) (Fit the pipe clip with a rubber protection bush on the tube).



51. Fit the oil cooler :

a) *First type oil cooler :*
- Place in position the cooler fitted with joints (4) and screws (5).
- Insert the screws (5) into the cylinder head lubrication tubes. Fit joints (3) and tighten screws (5) to 27 - 30 mAN (2.7 to 3 m.kg).
- Lock them by means of a piece of wire (6) passing through the hole bored in the head of screw and tied around the tube.
- Fit the securing screw (1). Insert the distance pieces between the crankcase and the cooler clips (plain washer under the head of the screw under the nut). Tighten the screw (1). Tighten the calibrated union screw (2) to between 12 and 13 mAN (1.2 to 1.3 m.kg).

b) *Second type oil cooler :*

1° Place in position *(as applicable)* protection plate (9).

2° Fit a protective sleeve on each tube of the oil cooler.

NOTE : The protective sleeves must be renewed at each dismantling.
This sleeve should stand down 2 mm below the end of the tube.

3° Offer up the oil cooler, and centre the tubes in their bores.

Start the union screws (10) by hand.
Tighten them to between 10 and 14 mAN (1 to 1.4 m.kg).

4° Place in position the securing screw (7) on the crankcase,
Insert the two distance pieces (8) between the crankcase and the oil cooler clips (plain washers under the screw head - plain and shakeproof washers under the nut).

Tighten the screw (7).

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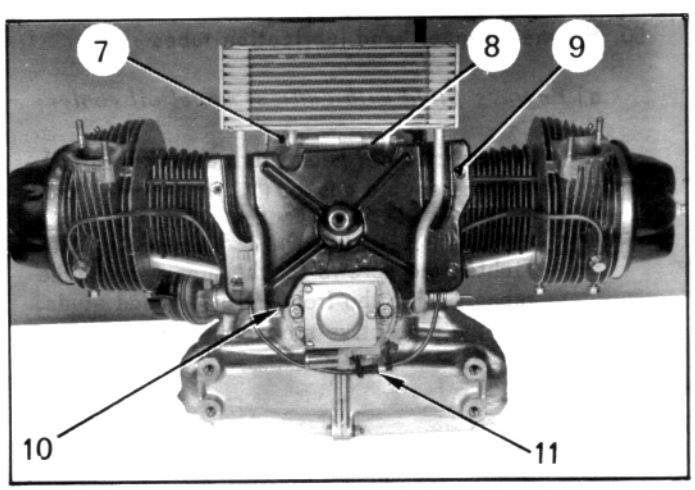
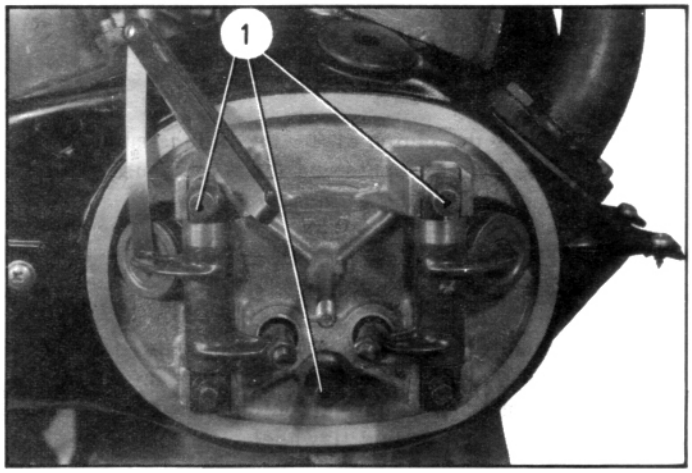




52. Assemble the engine :
(See relevant operation)

Fit :
- dynamo and its armature *(as applicable)*.
- petrol pump,
- fan cowl and cylinder cooling plates,
- inlet and exhaust manifolds,
- carburettor,
- breather,
- fan and drive belt for alternator,
- alternator *(as applicable)*.

Tension the belt.

53. Tighten finally the cylinder heads :

IMPORTANT : The final tightening of the cylinder heads must only be carried out after fitting and tightening the manifolds.

Tighten the three securing screws (1) to between 20 and 23 mΛN (2 to 2.3 m.kg)

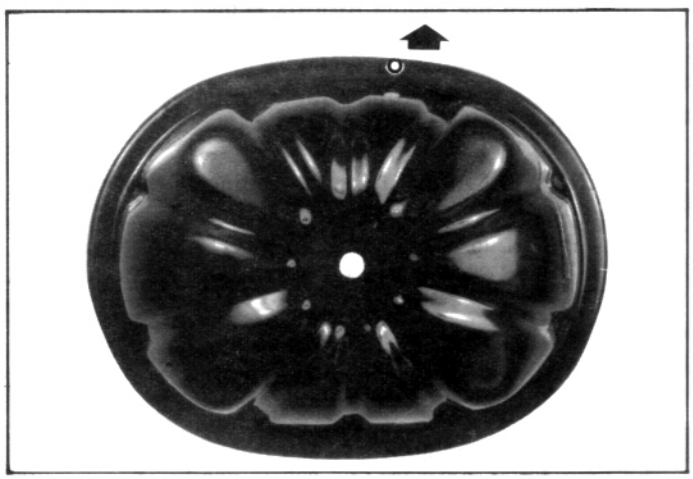
Respect order of tightening as below :

- upper front nut,
- upper rear nut,
- lower nut.

54. Adjust the rocker clearance :

This adjustment must be made with the engine cold.

Adjust one valve of cylinder, when the corresponding valve of the opposite cylinder is at maximum opening.



Inlet and exhaust = 0.20 mm

55. Fit the cylinder head covers :

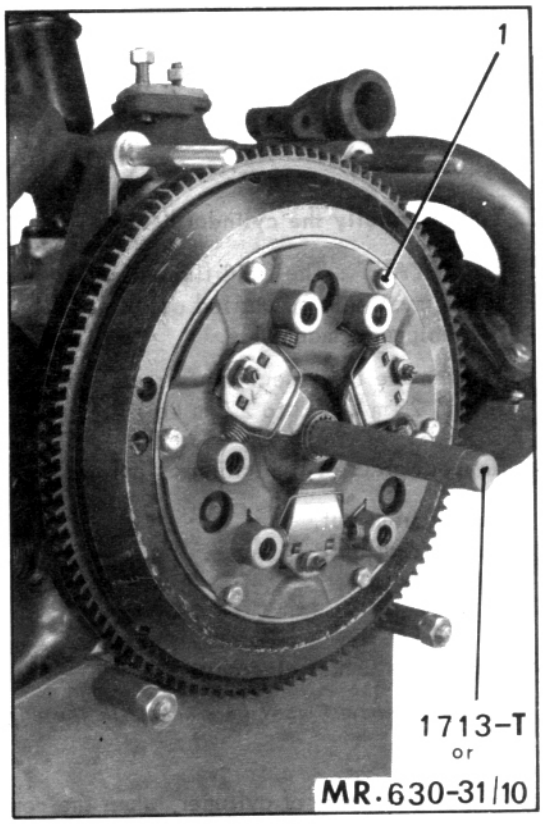
Check that there is no roughness on the joint faces.

Stick the rubber gasket on the cylinder head cover only. (using BOSTIK 1400 or MINNESOTA F 10).

NOTE : On a certain number of engines, cylinder head covers are marked with the letter « O » cold stamped on the cover. This mark should be placed towards the top.

Moderately tighten nuts to between 5 and 7 mΛN (0.5 to 0.7 m kg).

NOTE : A badly fitting rubber joint, or incorrect tightening of the nut, may entail a total loss of the engine oil.



56. Fitting the clutch :

a) *Centrifugal clutch :*

- Fit the centrifugal clutch coupling ring with lined segments
- Tighten the screws to between 9 and 14 mN (0.9 to 1.4 m kg)

b) *Conventional clutch :*

Check the clutch disc : the linings must be dry, free from oil spots and the rivets must stand down below the linings.

Ensure that the disc slides freely on the gearbox mainshaft splines.

Ensure that the contact faces of the disc on the flywheel and the clutch plate are perfectly clean as well as the contact faces on the housings and engine flywheel.

Fit the clutch mechanism to the engine flywheel : Centralize the disc using mandrel 1713-T (for discs with splined tube) or MR 630-31/10 (for discs with toothed hub rings)

While tightening the screws (1) ensure that the mandrel slides freely

Tighten the screws to between 10 and 13 mN (1 to 1.3 m kg) (spring washer)

Free mandrel

57. Remove the engine from its support MA 630-43/4.

58. Fit the two centring dowels on the gearbox coupling studs.

NOTES : After fitting the engine in the vehicle :

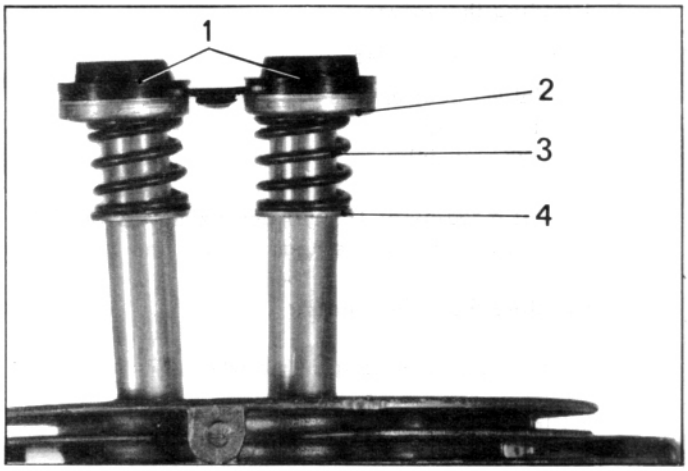
1° Fill up with engine oil (TOTAL altigrade GTS 20 W 50 or GT 20 W 40).

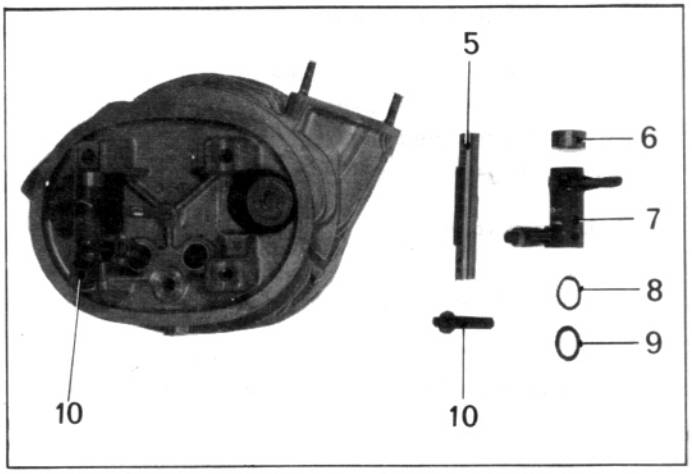
2° Check the oil pressure.

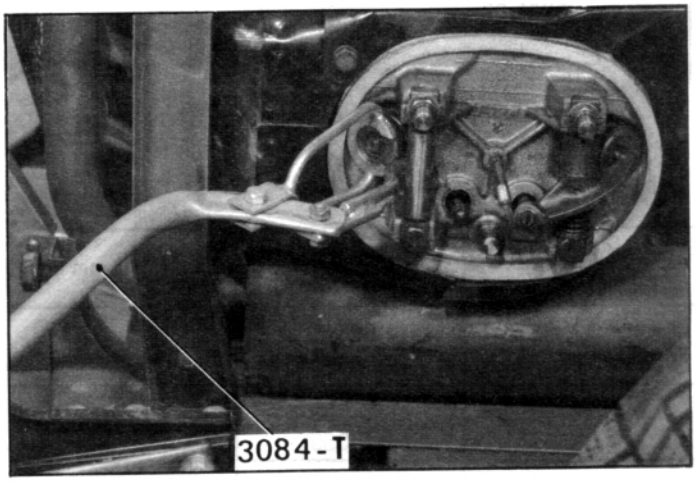
3° Adjust the slow running.

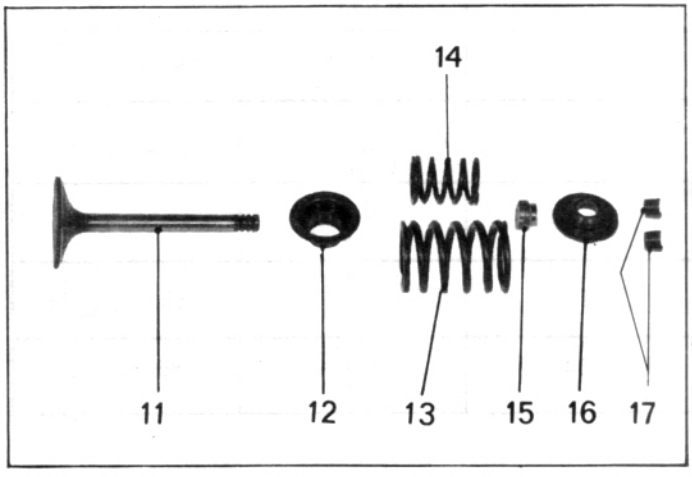
A 53 engine	: 600 to 650 rpm
A 79/0 engine	: 800 to 850 rpm
A 79/1 engine	: 800 to 850 rpm
M 4 engine	: 750 ± 50 rpm
M 28/1 engine	: 750 to 800 rpm
M 28 engine	: 750 to 800 rpm

OVERHAULING A CYLINDER HEAD









DISMANTLING

1. Strip the cylinder head :

Free :
- rubber gaskets (1),
- cups (2),
- springs (3),
- thrust washers (4)

2. Remove the rocker spindles :

a) Remove the securing screws (10) (using spanner 1677-T) (if necessary).

b) Free :

thrust washers (9),
- flexible washers (8) or springs *(early type cylinder head)*
- rockers (7),
- distance pieces (6).

3. Hold the cylinder head in vice (support 3001-T bis)

Bring cylinder head supports stop screw in contact with valves, screwing by hand.

4. Remove the valves :

a) Place the spindles in position and secure them with the support screws.

Compress the valve springs, using tool 3084-T applying pressure under the rocker spindles.

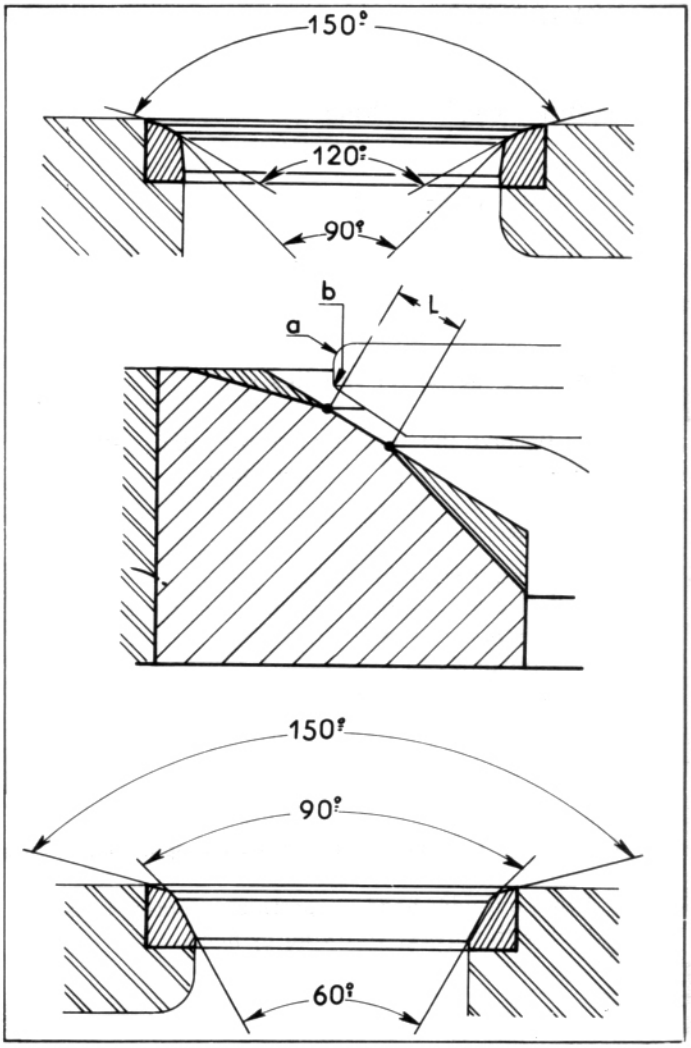
b) Free :

- cotters (17),
- cups (16),
- springs (13) and (14),
- centring collars (12),
- valve stem seals (15).

c) Remove the cylinder head from support

Free :
- valves (11),
- rocker spindles (5).

INLET



EXHAUST

ASSEMBLY

5. Grinding the valves :

Use a valve grinder

a) Valves seat angles
Inlet 120°
Exhaust 90°

b) Put a radius of 0 5 mm approximately on the edges of the valve head at « a » and « b ».

6. Grinding the valve seats :

Using the following grinding wheels

a) Inlet valve seats
- for the valve seat face : 120°
- for top clearance : 150°
- for bottom clearance : 90°

b) Seats for exhaust valves
- for the valve seat face : 90°
- for top clearance : 150°
- for bottom clearance : 60°

7. Lap the valves :

Use lapping tool 1615-T

- Valve : The large diameter of the valve seat face must be equal to the large diameter of the valve

- Valve seat : The width of the valve seat face must be :

Inlet L = 1.45 mm max.
Exhaust L = 1.80 mm max.

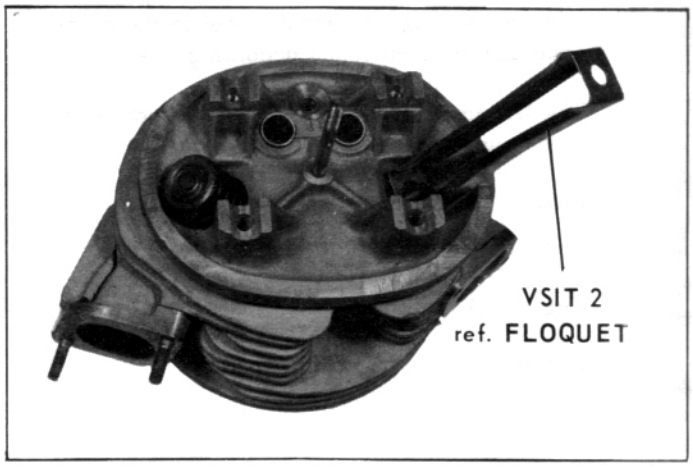
ENGINES	Valves	Angle	ϕ of head (mm)	ϕ of stem (mm) (under head)	Length (mm)
A 53 - A 79/0	Inlet	120°	39	$8\ ^{-0.025}_{-0.040}$	90.8 ± 0.25
(435 cc)	Exhaust	90°	32	$8.5\ ^{-0.035}_{-0.050}$	88.65 ± 0.25
A 79/1	Inlet	120°	39	$8\ ^{-0.005}_{-0.035}$	$89.57\ ^{+0.45}_{-0.25}$
(435 cc)	Exhaust	90°	34	$8.5\ ^{-0.020}_{-0.050}$	$88.18\ ^{+0.45}_{-0.25}$
M 4	Inlet	120°	39	$8\ ^{-0.025}_{-0.040}$	88.8 ± 0.25
(602 cc 1968)	Exhaust	90°	34	$8.5\ ^{-0.035}_{-0.050}$	86.5 ± 0.25
M 28/1 - M 28	Inlet	120°	40	$8\ ^{-0.020}_{-0.035}$	$88.5\ ^{+0.45}_{-0.25}$
(602 cc 1968 ⟶)	Exhaust	90°	34	$8.5\ ^{-0.035}_{-0.050}$	$86.95\ ^{+0.45}_{-0.25}$

8. Clean very carefully the cylinder heads in order to remove all traces of emery in the gas ducts. Blow these passages and lubrication ducts through with compressed air.
If the latter are obstructed, soak the cylinder head in a bath of cellulose solvent for about one hour. Then blow the ducts through again with compressed air.

9. **Calibrate the valve :**

Engines	Springs		Length decom - pressed	Length com- pressed	Load in kilos	Length under load	Load in kilos
A 53 A 79/0 M 4	Up to September 1963	outer	38 mm	24 mm	38 to 42	31 mm	18 to 21
		inner	28 mm	14.5 mm	7.5 to 8.3	21.5 mm	3.6 to 4.4
	From September 1963	outer	38.6 mm	24.4 mm	47.3 to 48.3	31.7 mm	21.2 to 24.6
		inner	28.8 mm	15 mm	9 to 10	22.3 mm	3.7 to 4.7

Engines	Springs	Length under load	Load in kilos	Length under load	Load in kilos	Direction of spiral
A 79/1 M 28/1 M 28	Outer	31.4 mm	28 ± 1.5	24.15 mm	42.5 ± 2	right-hand
	Inner	24.4 mm	12 ± 1	17.15 mm	25 ± 1.5	left-hand



10. **Fit the valves :**

a) Oil the valve stems and seat faces. Place the valves in position.

b) Secure the cylinder head in the vice using stand 3001-T bis and fit the spindles.

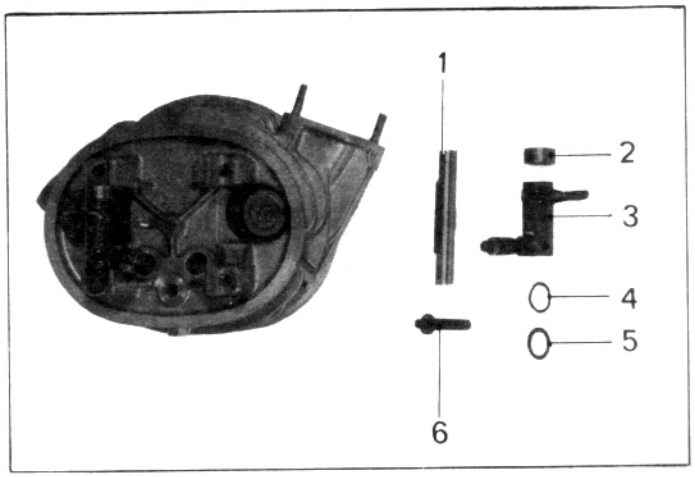
Bring the end of the stop screw into contact with the valve, screwing by hand.

c) Place in position the valve stem seals : Fit the plastic centring cap on the end of each valve stem.

Slide the seal on the cap.

Lower the seal onto the guide.

Use compressed tool VSIT 2, reference FLOQUET, to finish the assembly.



d) Fit :
- centring collars,
- springs,
- cups

Compress the springs using spring compressor 3084-T

Fit the locking cotters

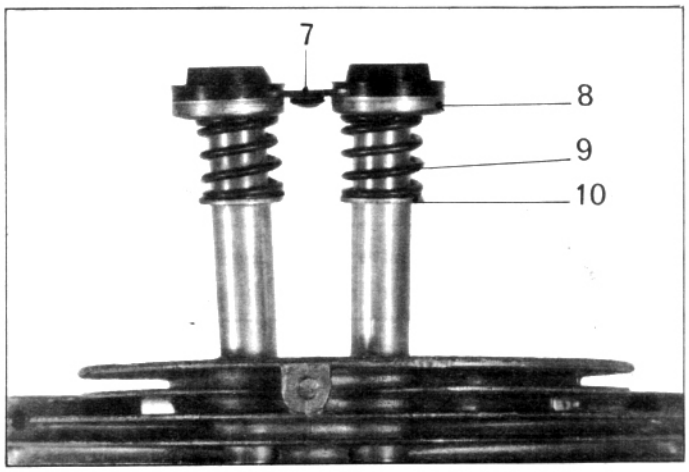
Remove the cylinder head from the stand

11. Fit the rockers :

Remove the rocker spindles

Place on each spindle (1) :
- a thrust washer (5),
- a flexible washer (4) *(new type cylinder head)*,
- or a spring *(old type cylinder head)*,
- the rocker (3),
- the distance piece (2)

Fit the rocker spindle thus equipped on the cylinder head, tighten the screw (6) (using spanner 1677-T, if necessary)



12. Place in position on the push-rod tubes :

thrust washers (10),
springs (9),
cups (8),
double joint (7)

NOTE : As from December 1972, the push rod tube joints have no centring heel in the crank case and are positioned according to engine type.

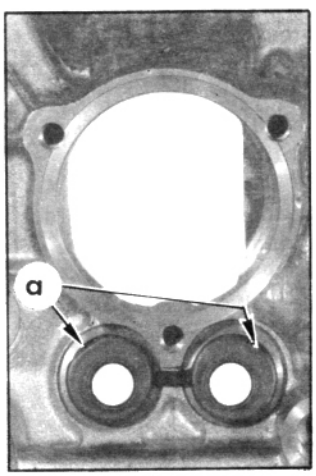
The fitting of this type of gasket is not possible on engines produced before this date

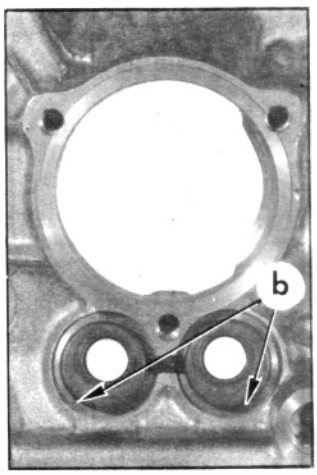
Engines M 28 and M 28/1 (602 cc) :

Position flats « a » upwards

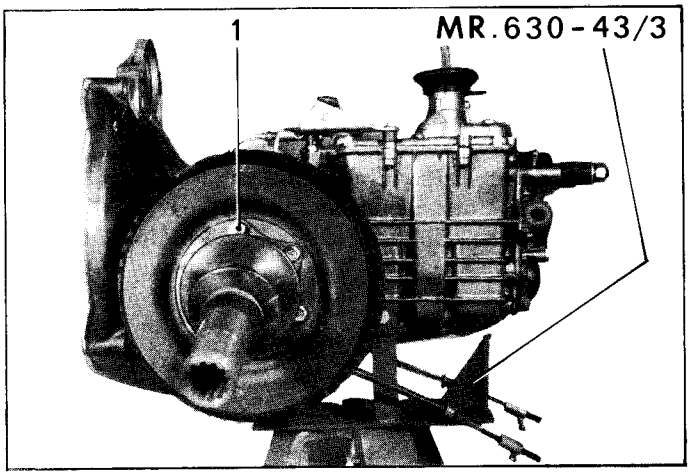
Engines A 79/1 (435 cc) :

Position flats « b » downwards.





OVERHAULING A GEARBOX



DISMANTLING

1. Drain the oil.

2. Place the gearbox on support bracket (MR. 630-43/3).

3. **Remove the brake drums :**

Remove the securing screws (1) or nuts *(as applicable)*.

Free the drums.

4. **Remove the wheel cylinders :**

Remove the brake piping

Open the brake shoes to maximum extent by operating adjusting cams

Remove the cylinder securing screws and remove the brake cylinders.

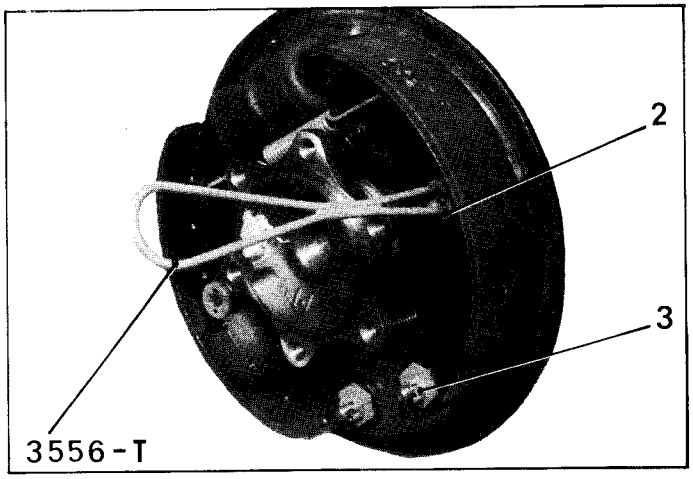
5. **Remove brake shoes :**

On each side :

a) Move the adjusting cams to the closed position

Remove the caps (2) holding the thrust, springs by turning them one quarter of a turn (tool 3556-T)

Remove the guide stems and springs.

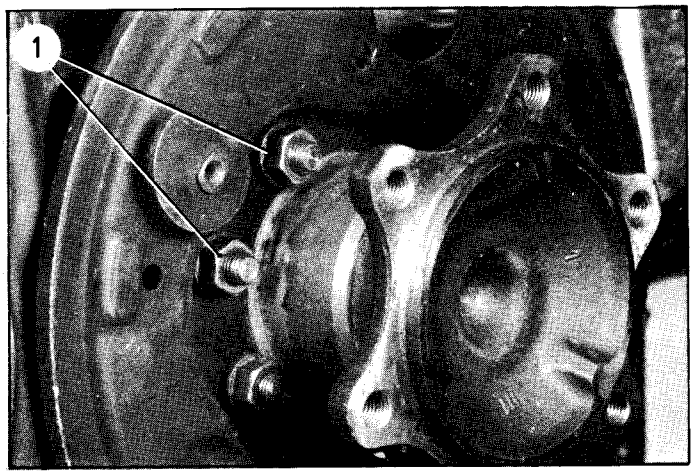


b) Unpin the nuts (3) from the cams, remove and free washers and adjusting cams.

c) Remove the brake shoes :

Remove the shoes from the spindles, tipping the rear point pins shoe upwards.

Unhook the return spring from the shoes as well as the brake cable from the lever.



6. Removal of brake plates :

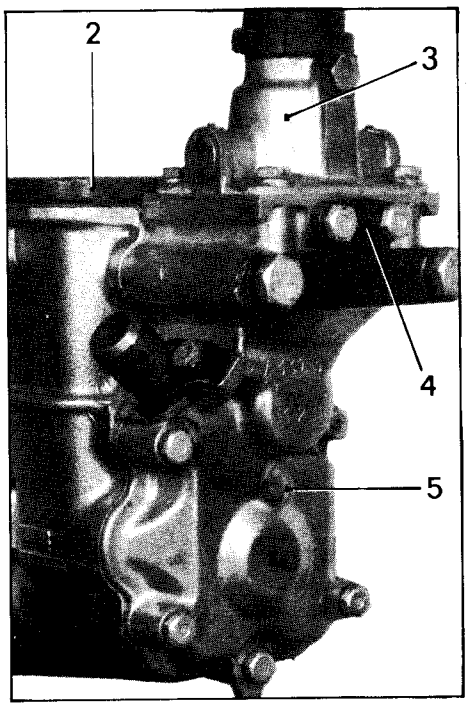
On each side :

a) Remove the securing nuts (1).

b) Free the assembly brake plate and shaft outlet bearing.

NOTE : If the gearbox is dismantled for overhaul without changing :
- either the gearbox housing,
- or the crown wheel and pinion,
- or the differential bearings,
- or the drive shaft bearings.

Mark the adjusting shims between the differential and the hubs. thus obviating readjustment of the tooth clearances.



7. Remove the covers :

Remove :

a) The upper cover (2) *(first fitting)*, or the upper cover (6) equipped with gear control forks lever *(second fitting)*.

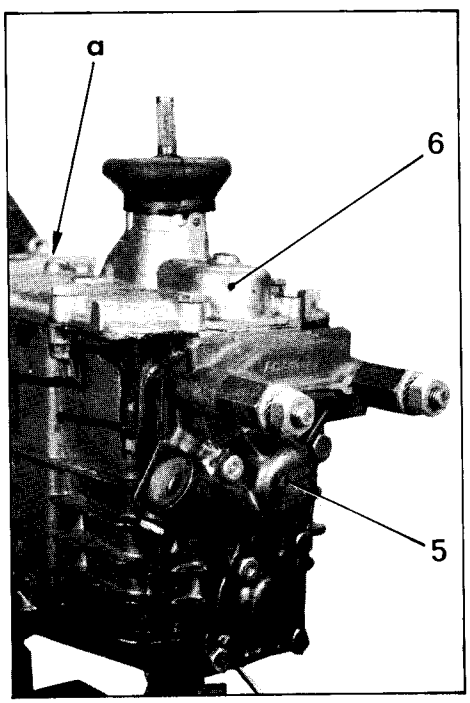
NOTE : The spring for locking ball on the fork spindle of 2nd - 3rd gears is housed at « a » in the upper cover (6).

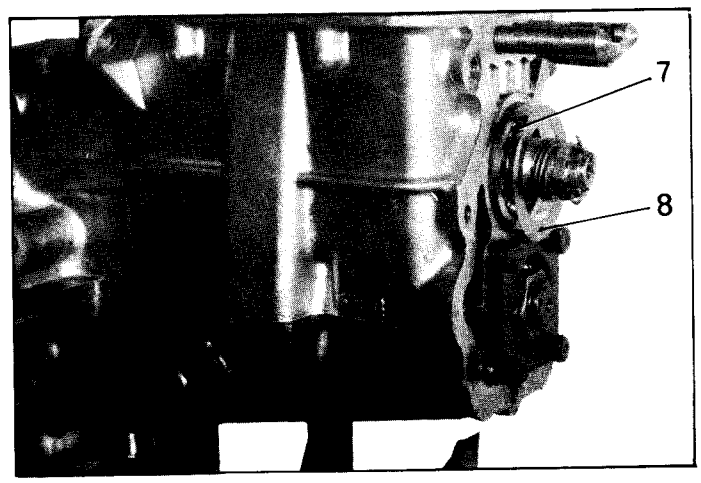
b) The fork control (3), holding lever inclined towards the left *(gearbox equipped with selector fork tip (4))*.

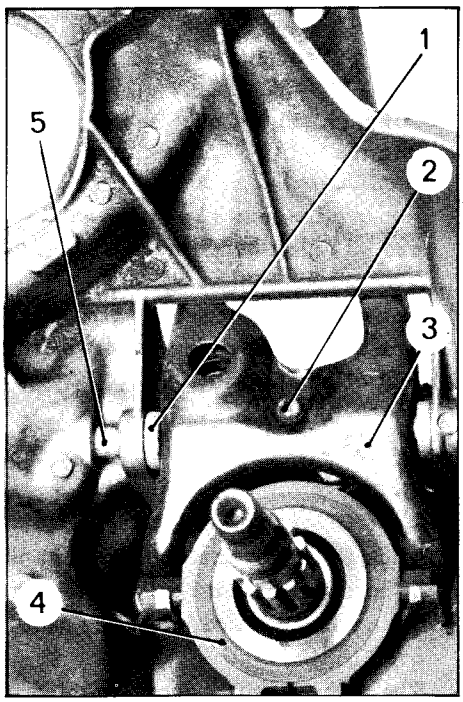
c) The rear cover (5).

d) Adjusting shims (8) *(as applicable)*

NOTE : If the rear cover (5) and the rear bearing (7) of mainshaft are to be used again, **mark position of adjusment shims (8).**







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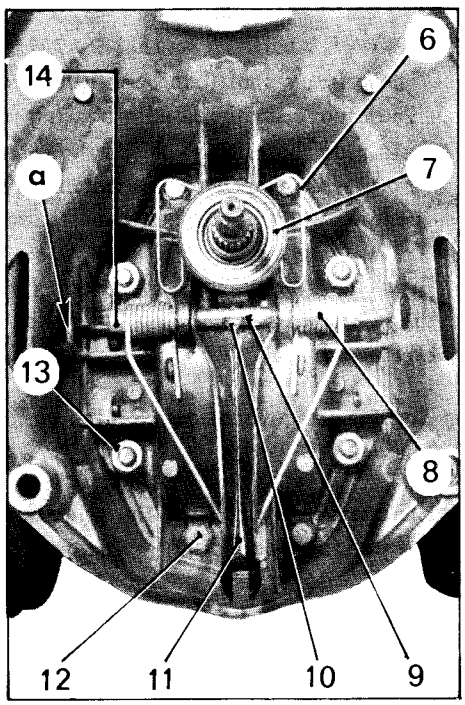
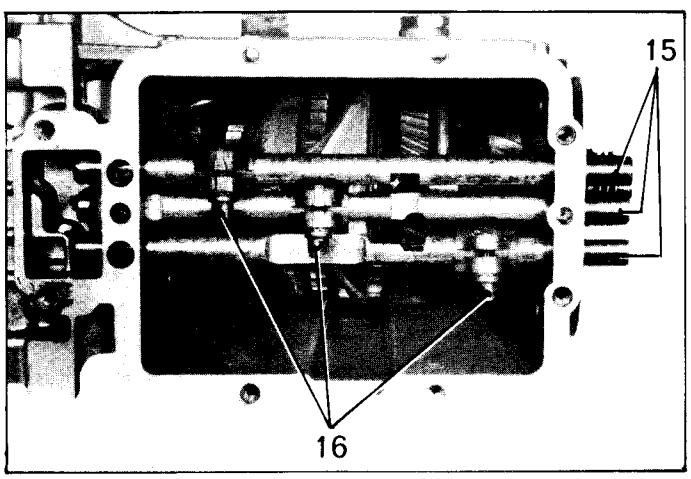




8. Remove the clutch stop and its control fork :

a) Gearbox with *graphite ring for clutch withdrawal :*
- Remove the selector fork spindle (2),
- Tap out the spindle (5),
- Free :
- the two washers (1)
- the fork (3) with its graphite ring
- the return spring.

b) Gearbox with *ball thrust bearing for clutch withdrawal :*
Remove :
- the retaining clip (6),
- the thrust bearing (7),
- the screw (10) for locking the spindle,
- the spindle (9) by passing it through one of the slits « a » in clutch housing,
- the spring (8) the nylon bushes for sound-deadening fork (11).

9. Remove the clutch housing and the differential :

- Remove the screws (12) and the securing nuts (13),

- Free the clutch housing supporting the differential to prevent it falling.

NOTE :

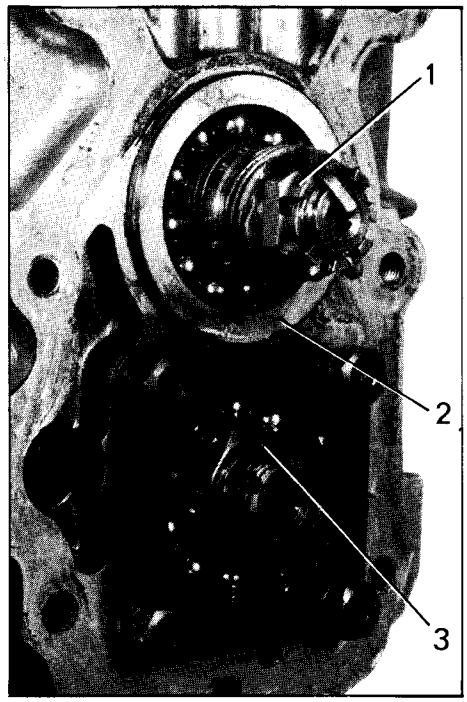
Mark the position of the conical bearing cages of the differential (left and right-hand).

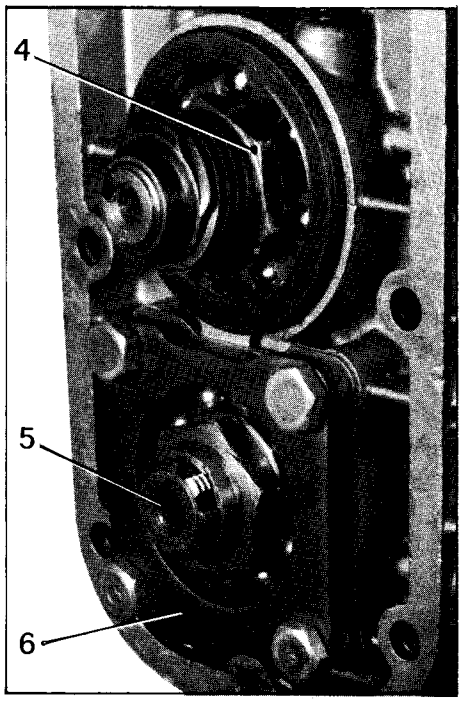
10. Remove the forks and the spindles :

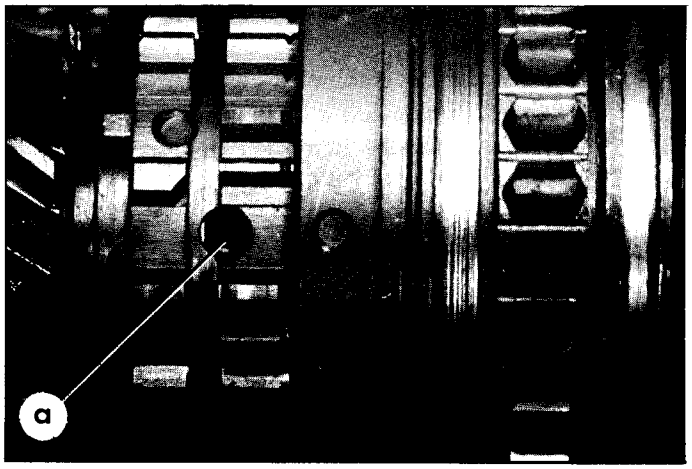
a) Unscrew the screws (16) holding the forks on the spindles (use spanner 1677-T, if necessary).
Free the three spindles (15) rearwards, rotating them half a turn to unlock them.
Block the holes to prevent the fork locking balls from escaping.

b) Remove :
- 1st gear-reverse gear selector fork,
- 2nd-3rd gear selector fork.

c) Recover the locking balls and the springs.







11. Remove the primary shaft :

a) - Engage two gears.

b) - Using chisel, remove the metal turned over into the nut (3) and unpin nut (1) *(as applicable)*.
- Remove the nuts (1) (right-hand thread) and (3) (left-hand thread).

c) Remove the speedometer screw, the distance piece and the flexible washer, if fitted (see illustration opposite).

NOTES :

1°) *Since October 1966*, the tapered distance piece the speedometer screw and nut have been replaced by a speedometer screw (4), acting as a nut and locked by metal turned over.
The reverse gear reduction pinion is fitted on teeth instead of splines.

2°) *(Vehicles built since January 1971) :*
The primary shaft has been modified :
The groove for the needle bearing race for retaining the circlip and the hole for removing the circlip have been discontinued:monobloc needle bearing cage has been fitted.

d) Drive out the bearing (2) towards the rear of the gearbox by tapping on the pinion with a copper drift.

e) Remove the reverse gear pinion and the distance piece.

f) Engage overdrive. Free the primary shaft and the pinions from inside the gearbox.
NOTE : Hold the monobloc needle bearing cage in the main shaft, with a slightly curved wire introduced into hole « a » of 2nd-3rd sliding gear.

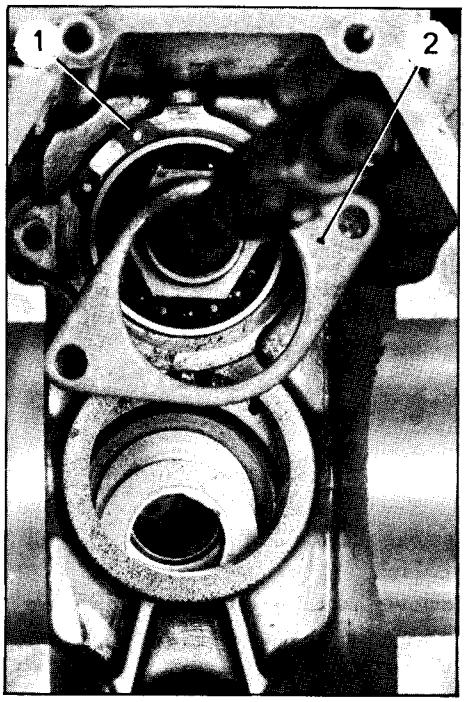
g) Disengage the overdrive fork.

12. Remove the bevel pinion :

a) Remove the bearing retaining plate (6) with its four distance pieces.

b) Drive out the bevel pinion towards the front of the housing, tapping on the end with a copper drift.

c) Free the pinion, and leave the intermediate gear train in the bottom of the housing.



13. Remove the driving shaft and the intermediate gear train :

Remove the bearing retaining flange (2) from the driving shaft.

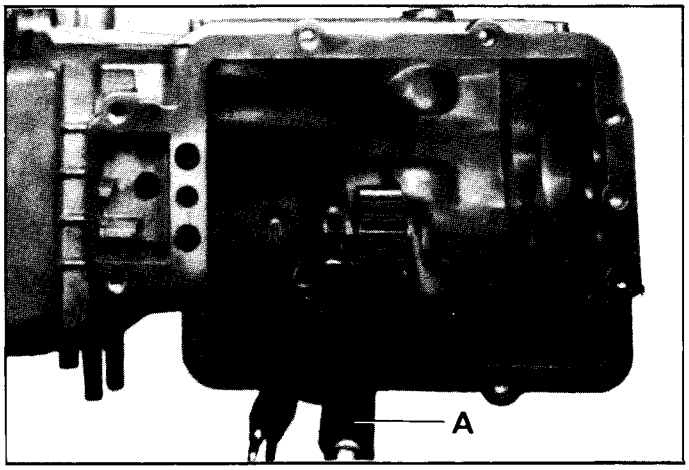
a) If the toothing of the driving shaft has a smaller diameter than the one of the bearing, disengage the latter from the differential side.

b) If the toothing has a diameter larger than the one of the bearing :
- Remove the circlip (1),
- Disengage the driving shaft from the inside of the gearbox. If necessary, drive out the bearing from the casing by tapping on the outer cage with a tube.

c) Remove the intermediate gear train.

d) Disengage the rear bearing of the intermediate gear train using a tube passing inside the gearbox (tube ϕ outside 51 mm, inside diameter 43 mm, length 290 mm).

NOTE : If the bevel pinion, the bearings and the gearbox housing are to be used again, **mark the adjusting shims for bevel pinion distance** *(gearbox with gear change lever on rear gearbox housing).*



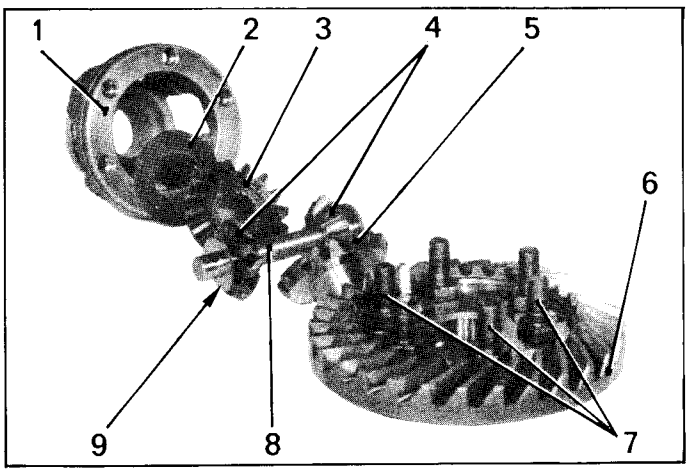
14. Remove the reverse speed pinion :

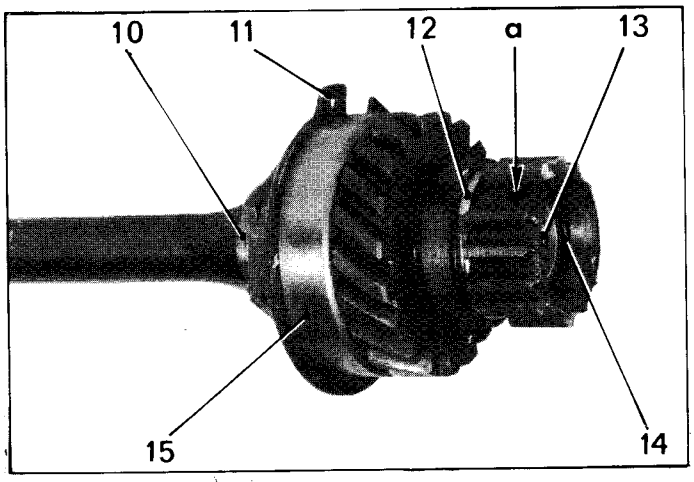
Remove the Mecanindus retaining pin from the spindle.

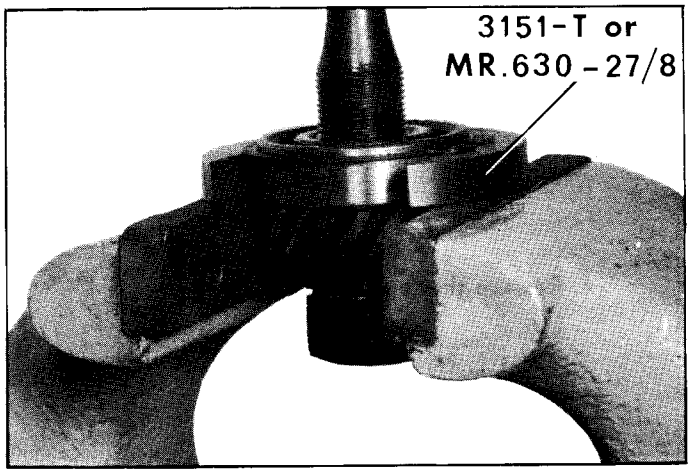
Use gripping pliers A, having previously inserted a 4 mm split pin inside the Mecanindus pin.

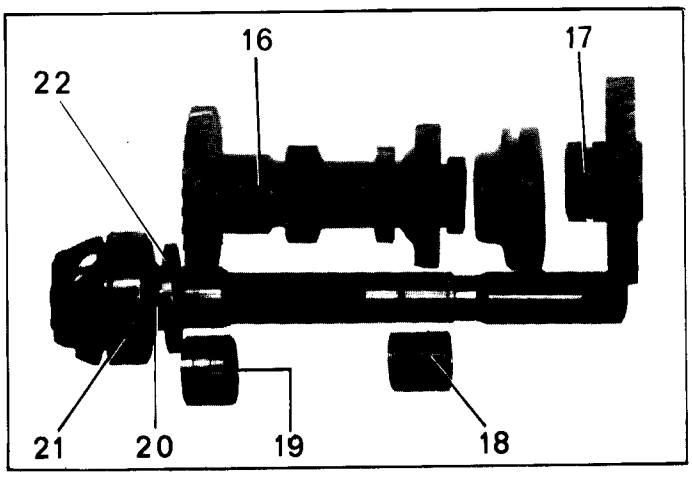
Withdraw the spindle. Free the reverse speed pinion.

15. Remove the oil drain and filler plugs.









16. Dismantle the differential :

a) Remove the conical inner bearing cages (use extractor 1750-T with half shells 1736-T and pressure pad 1743-T or extractor 2405-T).

b) Remove the screws (7) :
- Free the crown wheel (6) from housing (1).
- Remove the planet wheel (5) (crown wheel side)
- Tap out the spindle (8).

c) Remove :
- the two satellite pinions (4) and their adjusting washers (9),
- the second planet wheel (3),
- the fibre washer (2).

17. Stripping the main shaft :

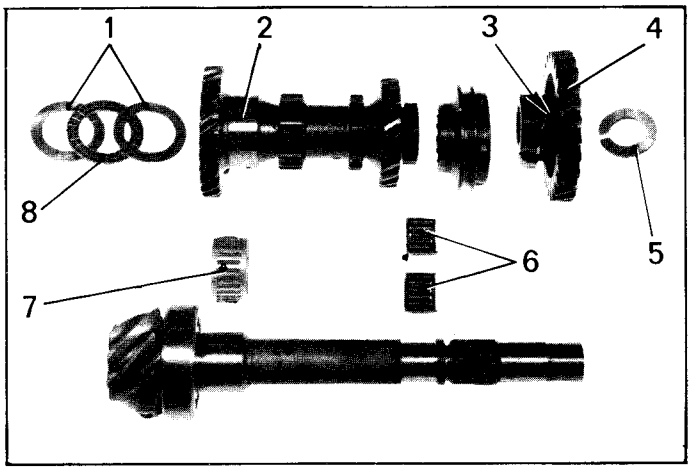
Remove the locking metal from the nut (10), using a chisel.
Remove the nut (10) (left-hand thread).
Remove the bearing (15) ; to do this :
- Fit the stop ring (11).
- Place the pinion (see illustration opposite), with the thrust ring bearing on block 3151-T or MR. 630-27/8 and drive the shaft from the bearing using a press.

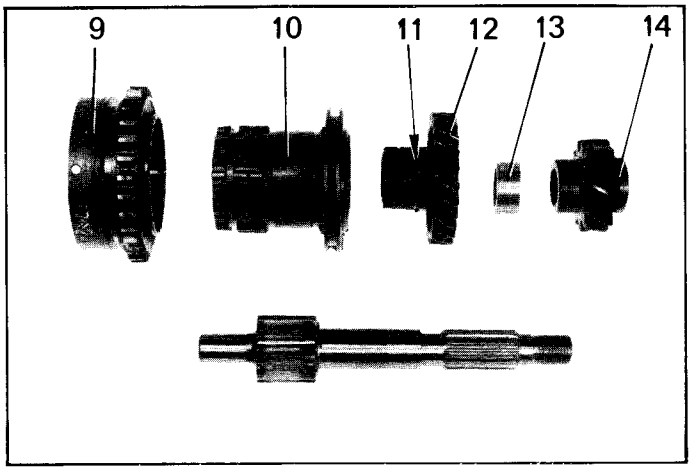
Remove the stop ring (11).
Remove the synchronizing circlip (12).
Renew the synchronizing circlip after each overhaul.
Remove the bearing locking circlip (14) from the needle cage (13), using a 2 mm pin passing through the hole « a ».
Remove the needle bearing cage and distance piece (as the case may be).

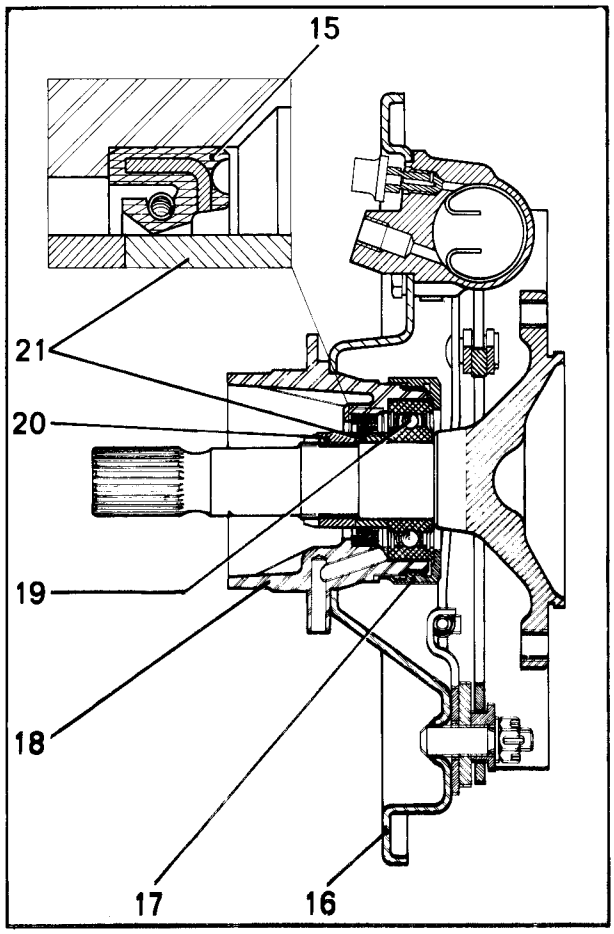
18. Strip the bevel pinion and intermediate gear train :

a) *Gearbox with intermediate gear train and its thrust washer :*
Remove :
- the fixed thrust washer (22),
- the circlip (20),
- the bearing (21), using a tube and a press if necessary),
- the synchronizing circlip (17) from the step-down gear pinion,

Renew the synchronizing circlip after each overhaul.
Remove the bushes (18) and (19) from the bore of the intermediate gear train (16).







b) *Gearbox with intermediate gear train and its needle bearing thrust race :*
Remove :
- the needle bearing thrust race (8) and its two thrust washers (1),
- the needle bearing cage or the two needle bearing cage halves (as applicable),
- the synchronizing circlip (3) from the step-down gear (4).

Replace the needle bearing cage after each overhaul.
Remove :
- the needle bearing cage (7) from the bore of the intermediate gear train (2),
- the adjusting washer for the conic distance of the bevel pinion (as applicable).

NOTE : If the gearbox overhaul does not entail changing the gearbox housing, the crown wheel and pinion or the step-down pinion, retain the adjusting washer to avoid having to re-set the conic distance.

19. Strip the primary shaft :

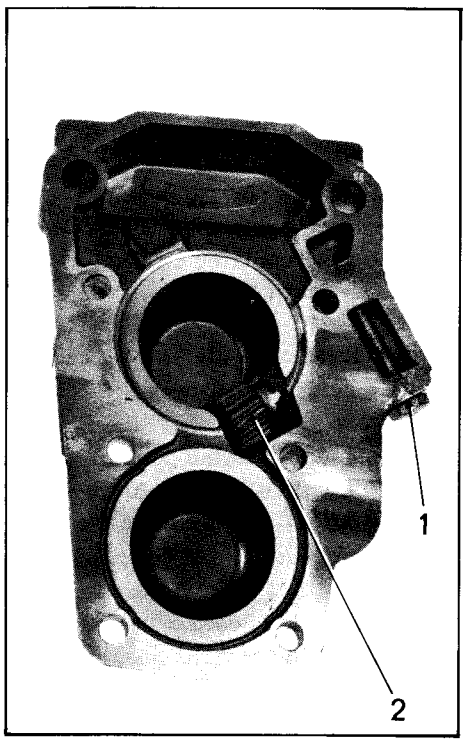
Remove :
- 1st-reverse gear sliding pinion (9),
- 2nd-3rd gear sliding pinion (10),
- 2nd gear idler pinion (12),
- 2nd gear idler pinion synchronizing circlip (11).

Renew the synchronizing circlip after each overhaul.

20. Strip the brake backplate :

- Clamp the differential shaft in a vice fitted with soft jaws (to prevent damage) holding it by the driving plate (18).
- With a chisel knock out the metal of the nut and remove the nut (20) locking the differential shaft.
- Press out the differential shaft from the bearing, resting the back plate (16) on two vee blocks.
- Disengage the back plate from the bearing (18)

a) *Vehicles fitted with gearbox having the gear change lever on the upper cover :*
Hold the bearing (18) in a vice.
Unscrew the bush-nut (17) (use a chain spanner or strip spanner).
Remove :
- the sealing bearing (19),
- the distance spacer (21),
- the sealing bush (15).



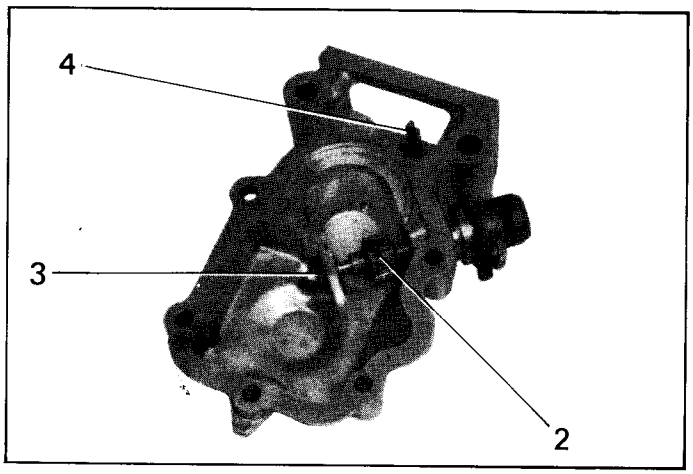
b) *Vehicles equipped with gearbox having the gear change lever on the rear cover :*
Using a chisel, remove the locking metal from the bush-nut and remove the bush-nut (use spanner 1926-T).
Free the bearing using a bronze drift.
Drive off the sealing bush from the hub.
Remove, if necessary, the oil deflector from the hub.

21. Stripping the wheel cylinders.
(See relevant operation).

22. Strip the rear cover :

Remove :
- the stop-screw (1) *(as the case may be).*
- the speedometer drive and pinion (2),
- the thrust ring (3) *(as the case may be).*
- the guide finger (4) *(on gearboxes thus equipped).*

Disconnect the pinion from its plastic support *(as applicable).*



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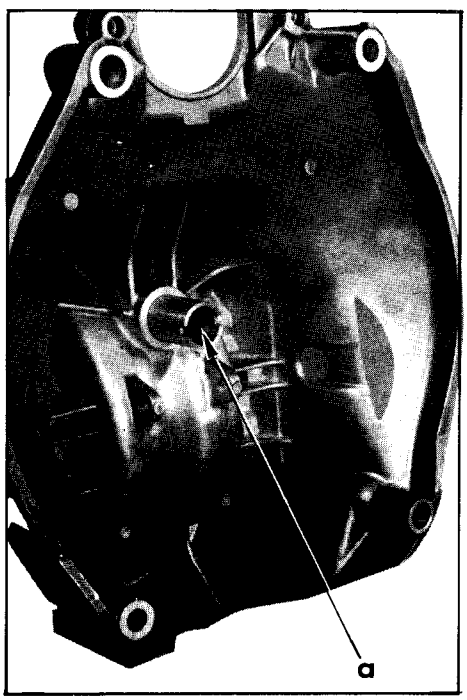
23. Strip the clutch housing *(first fitting) :*

Remove :
- the oil retaining cup *(gearboxes on vehicles equipped with centrifugal clutch mechanism).*
- or the bearing *(gearboxes fitted on vehicles equipped with a conventional clutch mechanism.*



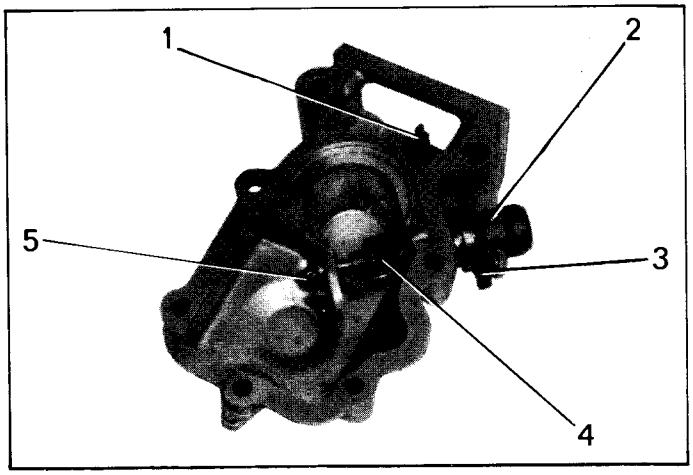
24. Thoroughly clean all the parts.

PREPARATION.

25. Prepare the clutch housing :

a) *First fitting :*
- Fit the oil retaining cup using a mandrel MR. 630-32/14 *(gearbox for centrifugal clutch).*
- Fit the bearing *(gearbox for conventional clutch).*

b) *Second fitting :*
Check that the inner bore at « a » of the hub support for the clutch stop is not worn *(traces of threads in driving shaft oil return).*



26. Prepare the selector fork control lever :

Grease the control lever ball
(TOTAL MULTIS).

NOTE : In case of an overhaul of the control lever, see relevant operation.

27. Prepare the rear cover :

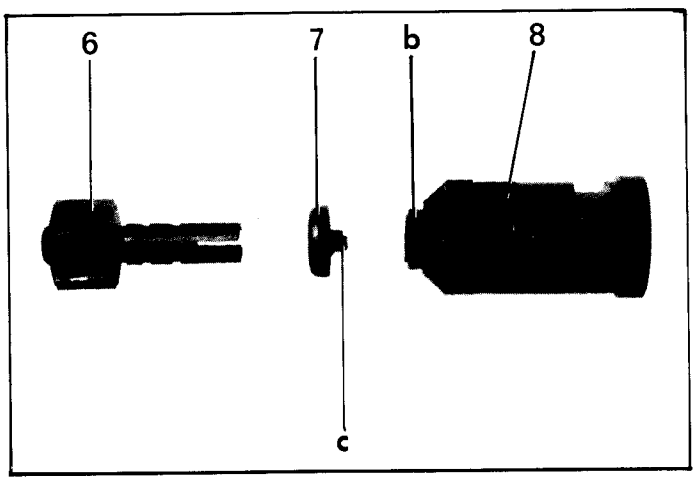
a) *Early type gearbox :*

Position :
- the thrust ring (5),
- the pinion (4) previously oiled.

Fit the speedometer drive socket (2) with its clamp (3) ; tighten the screw (spring washer).

NOTE : The slot for the flexible drive retainer should be parallel to the box centreline and positioned downwards.

For gearboxes equipped with a selector fork guide finger (1) :
- Fit with the flat opposite the speedometer drive socket.



b) *New type gearbox :*

Oil the speedometer pinion (6).
Place the cup (7) on the end of the plastic support (8), positioning the spigots « c » in the corresponding slots « b ».

Fit the pinion on its support.

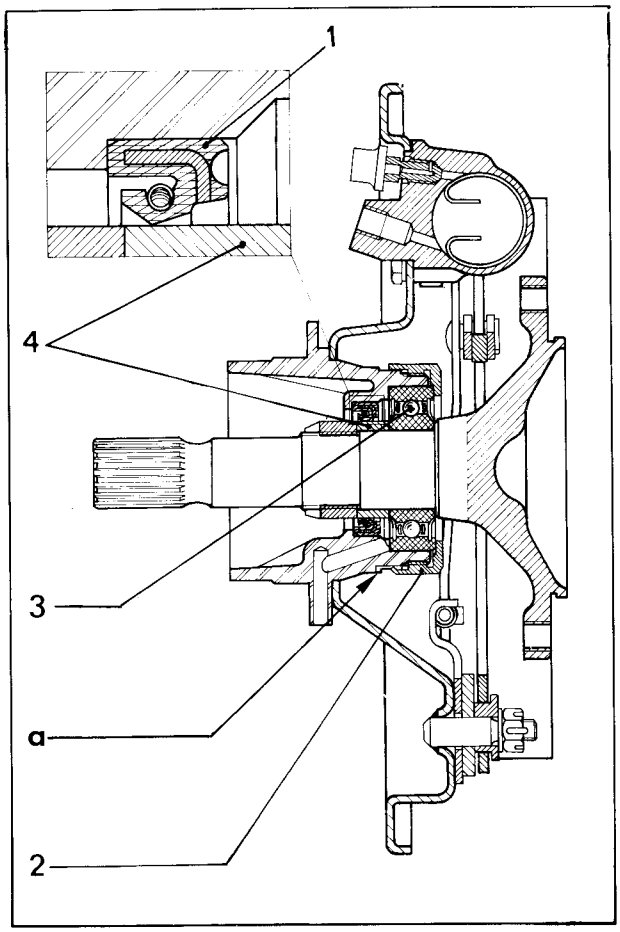
Fit the assembly in the rear cover.

Tighten the stop screw.

28. Prepare the wheel cylinders :

(See relevant operation).

29. Prepare the brake plates :

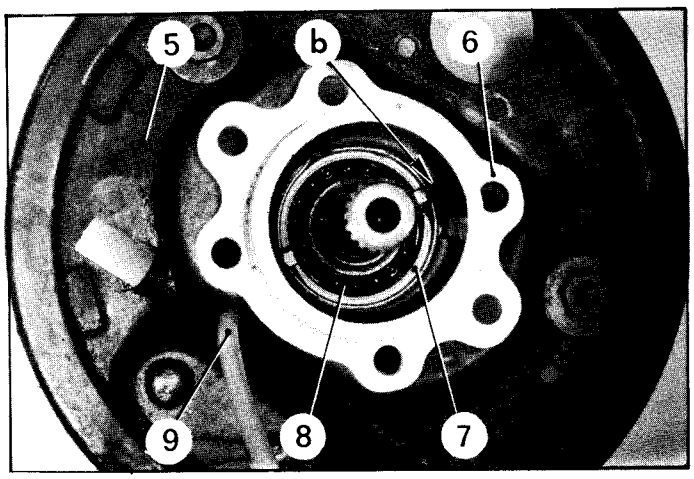


a) If necessary, fit the adjusting cams.
Tighten the pins so as to obtain a rotation torque of between 10 to 25 mΛN (1 to 2.5 m.kg).
Use mandrel for rivetting MR. 630-62/13 and snap for rivets : MR. 630-62/11.

b) *Vehicles equipped with a gearbox having the gear change lever on the upper cover.*

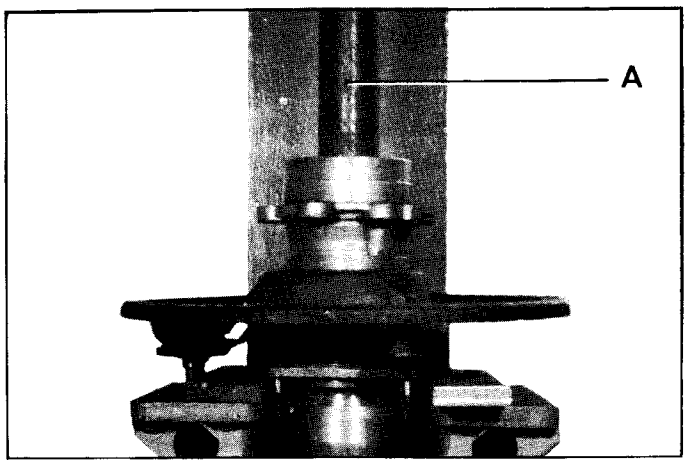
Fit in position :
- the sealing bush (1) (previously oiled) with the rubber edge inwards,
- the distance piece (4) in the bore of the bush inserting it from the outside,
- the sealing bearing (3),
- the bush-nut (2). Tighten it using a chain spanner or a strap spanner (60 to 75 mΛN, 6 to 7.5 m.kg) and knock over the shoulder flange at point « a »,
- the brake plate on the bearing.

c) *Vehicles equipped with a gearbox having the gear change control lever on the rear cover.*



Place in position :
- the brake plate (5) on the bearing (6),
- the oil deflector on the bearing support using a tube of 60 mm inside diameter, 72 mm outside diameter, length 60 mm. Align the oil drain tube with the centreline of the oil return hole boss,
- the sealing bush previously oiled, with its rubber edge inwards,
- the bearing (8) (oiled),
- the bush-nut (7) tightened to between 100 and 140 mΛN (10 to 14 m.kg) (spanner 1926-T) and knock over the metal of the nut in the counter sunk portion of the bearing support at point « b ».

d) Fit the differential shaft in the bearing support :
Offer up the assembly of brake plate and bearing on the differential shaft.

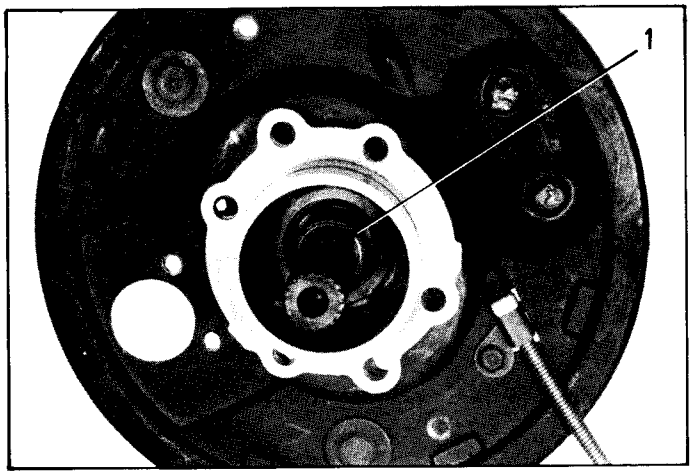


- Fit the differential shaft in the bearing (under a press) using a tube A (inside ϕ 26 mm, outside ϕ 34 mm, length 150 mm).

- Screw and tighten the nut (1) to between 100 and 120 mAN (10 to 12 m.kg).

- Knock over the metal of the nut with a matting tool into the countersunk portion of the shaft.

- Fit the handbrake cable. Tighten the securing screw for the stop sheath (spring washer).

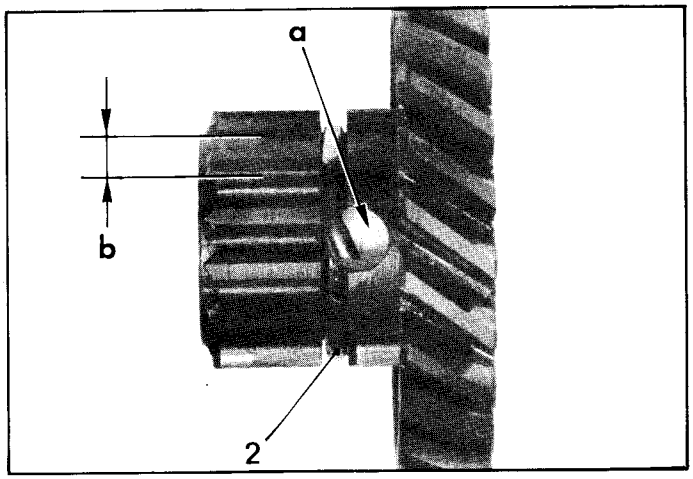


30. Prepare the primary shaft :

NOTES :

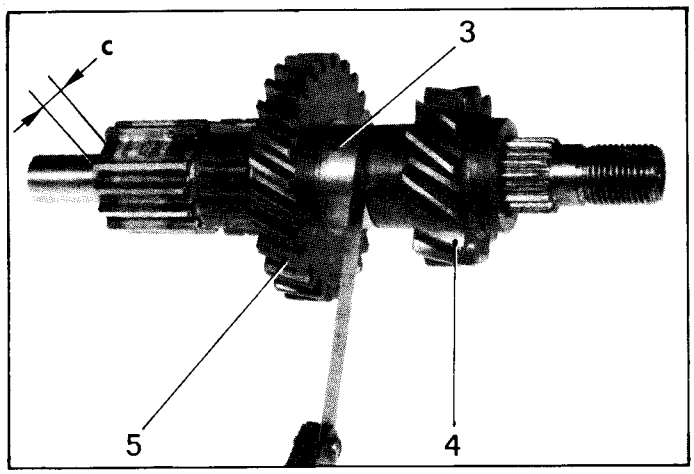
1°) *Since April 1966 and up to October 1966*, the primary shafts were fitted with a rear single row ball bearing and a 7 mm distance piece between this bearing and the step-down pinion.

2°) *From October 1966*, the distance piece has been discontinued and the step-down pinion hub has been lengthened by 7 mm.
The step-down pinion has teeth instead of splines.
The conical distance piece, the speedometer screw and the nut have been replaced by a nut forming speedometer screw and locked by knocked over metal. Gearboxes produced earlier can be modified in the same way if the following parts are replaced :
- the primary shaft,
- the step-down pinion,
- the ball bearing,
- the nut forming speedometer screw.



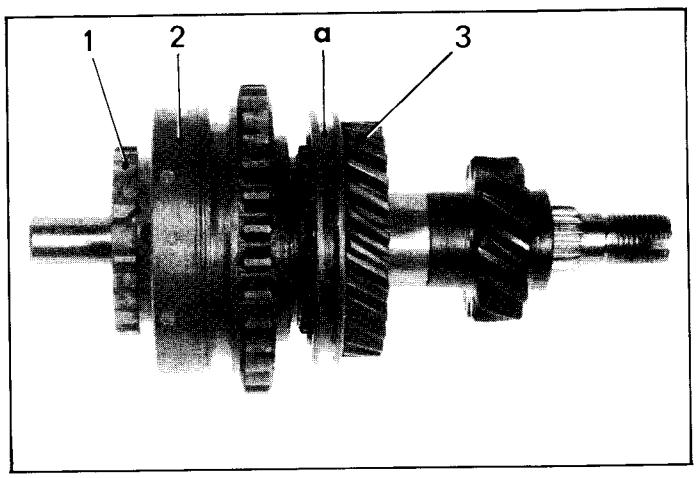
a) Place the synchronizing segment in position (2) on the second gear idler pinion.

NOTE : Position the « tag » of the segment (2) in the hole « a » in the pinion.



b) Position on the primary shaft, the 2nd gear idler pinion (5) the distance piece (3), the step-down pinion (4).
Hold the step-down pinion (4) against the shoulder of the shaft.
Make sure that the 2nd gear idler turns freely with an end float of between 0.05 and 0.35 mm.
If not, replace the distance piece (3).

c) Place the wide splines « b » on the 2nd gear idler pinion (5) in line with those « c » on the shaft.



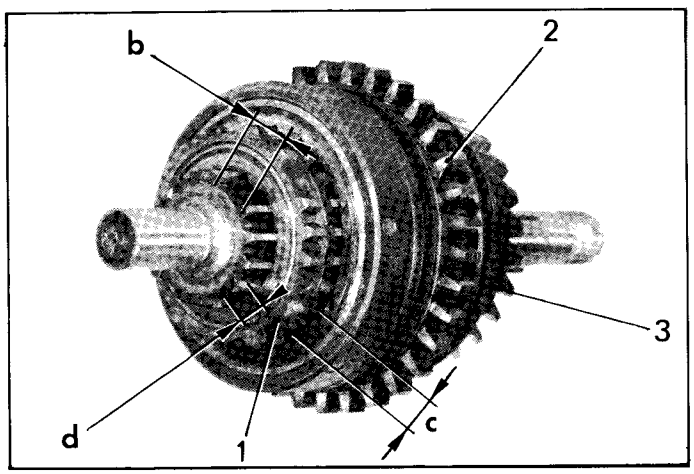
d) Place on the primary :

- the 2nd - 3rd gear sliding pinion (1), the collar « a » against the 2nd gear idler pinion (3) with wide splines « d » of the synchronizing cones in line with those on the shaft « b ». Engage the sliding gear (1) on the dogs of the 2nd gear idler pinion.

- 1st gear - reverse gear sliding pinion (2) (teeth facing towards the rear), engaging the dogs in the wide splines « c » of 2nd - 3rd gear sliding pinion (1). Push the sliding pinion (2) fully home.

CARE : The sliding pinions must be cleaned with the greatest care to ensure that the cones do not stick : ensure that the latter turn freely.

NOTE : The Replacement Parts Department sell « paired » assemblies of primary shaft and second and third sliding pinion (1).
If either of these two parts is worn, a new assembly must be fitted.



31. Prepare the bevel pinion :

a) *Gearbox with intermediate gear train fitted with fixed thrust washer :*

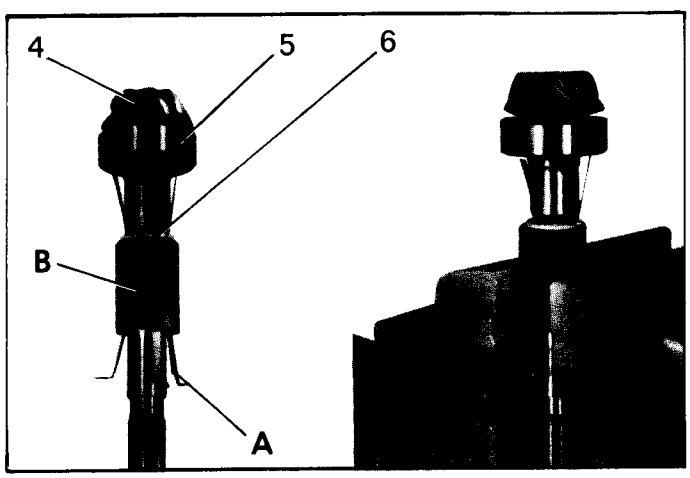
- Fit bearing (5) on shaft (4) using a press.

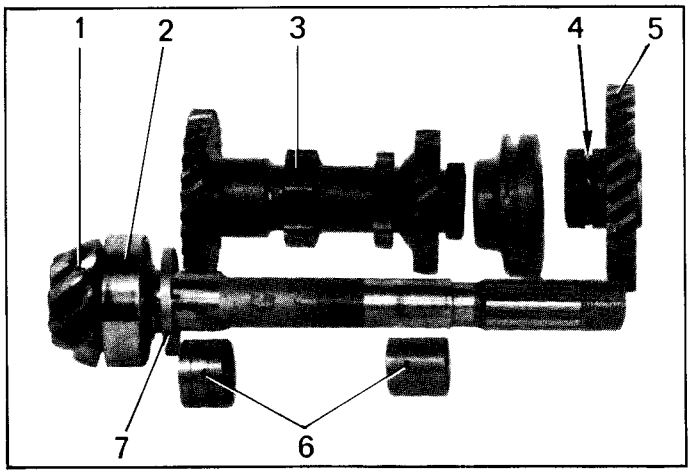
NOTE : *From October 1963*, the ball bearing has been modified : width 16 mm instead of 18 mm. The bevel pinion, the fixed thrust washer and the front bush of the intermediate gear train have also been modified.

This coupling may be fitted in early type gearboxes on condition that the fixed washer and front intermediate gear train bush are also fitted.

To avoid scoring the bearing face of the front bush, fit the circlip as follows :

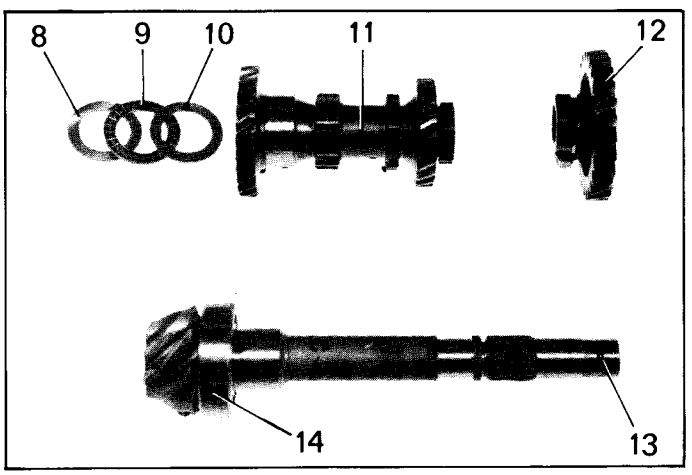
Place on the shaft the locking segment (6) and the three shims A (0.3 mm thick, 5 mm wide, 100 mm long) arranged at 120°. Fit a tube B of inside diameter 26 mm, bearing against the segment. Invert this assembly and the clamp tube in a vice. Tap on the end face of the bevel pinion with a mallet until the locking segment is correctly located in its groove. Remove the shims. To save time, the tool MR. 630-31/34 can also be used for this operation.





- Grease and place in position the fixed thrust washer (7). Place the flats on the shaft (1) in line with those on the washer. If the latter as a chamfer, fit it with the chamfer towards the bearing (2).
- Fit the synchronizing segment on the step-down gear pinion (5).
- Fit on the shaft (1) :
  - the intermediate gear train (3) with its two bushes (6),
  - the step-down gear pinion (5).
- Hold the step-down gear against the shoulder of the shaft.
- Ensure that the intermediate gear train turns freely.
- The end float should be of from 0.05 to 0.35 mm for the early type coupling (width of bearing = 18 mm) and of from 0.45 to 1 mm for the new type (width of bearing = 16 mm). If not, replace the thrust washer (7).

  After this check remove :
  - the step-down gear pinion (5),
  - the intermediate gear train (3) with its bronze bushes (6).



b) *Gearbox with intermediate gear train fitted with needle bearing thrust race :*

Fit the synchronizing segment on the step-down gear pinion (reverse speed reduction gear) (12).
Determine the thickness of the thrust washers for the needle bearing thrust race.
Place on the bevel pinion shaft (13) :
- a thrust washer of any thickness (8),
- a thrust washer of identical thickness to that of the needle bearing thrust race (9), i.e. 2 mm,
- the intermediate gear train (11),
- the reverse speed reduction gear pinion (step-down gear) (12).

Hold the reverse speed reduction gear pinion (step-down gear) (12) against the shoulder of the bevel pinion shaft (13).
Select from the thrust washers sold by our Replacement Parts Department those which pass (at « a ») between the reverse speed gear pinion (step-down pinion) and the end of the intermediate gear train with a *clearance between 0.10 and 0.20 mm.*
Remove the step-down pinion (12), the intermediate gear train (11) and the 2 mm thick thrust washer.
Fit in this order :
- the thrust washer (8) fitted previously (as selected),
- the needle thrust race (9),
- the washer (10) of the predetermined thickness.

Stick these three parts with grease on the bearing retaining the front roller bearing (14) of the bevel pinion.

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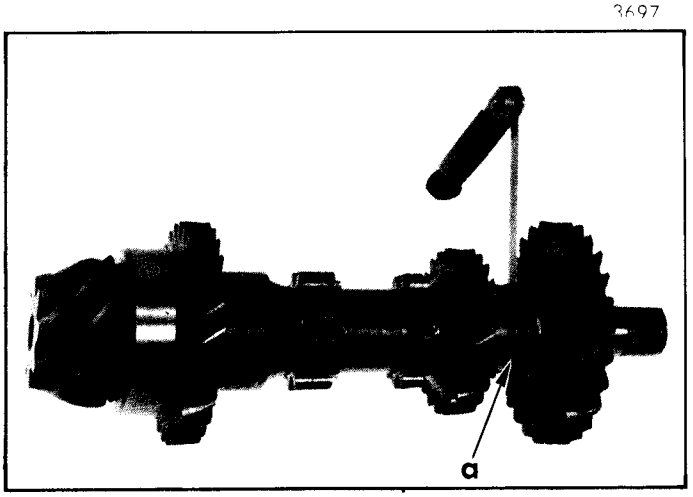
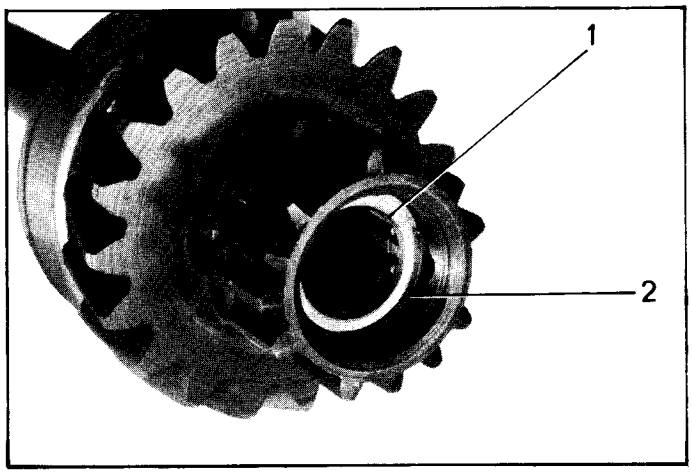
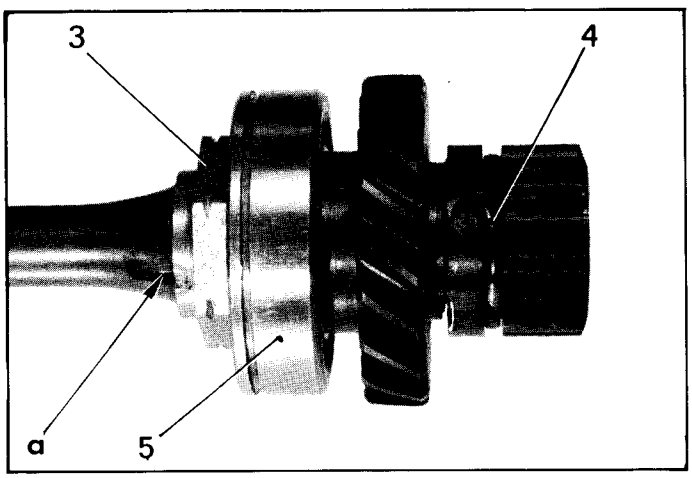
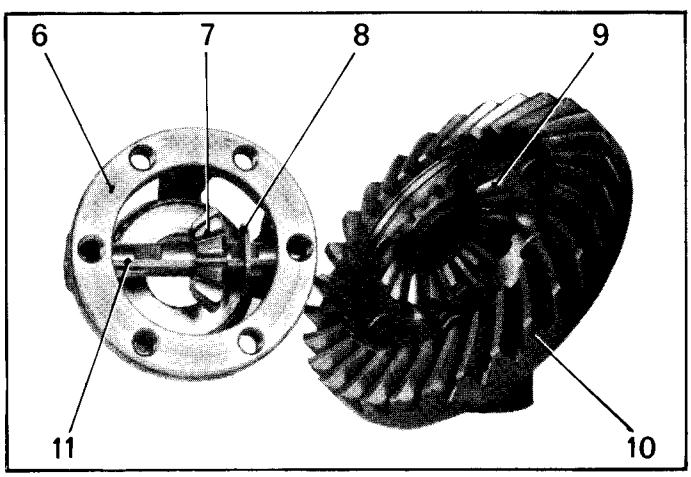
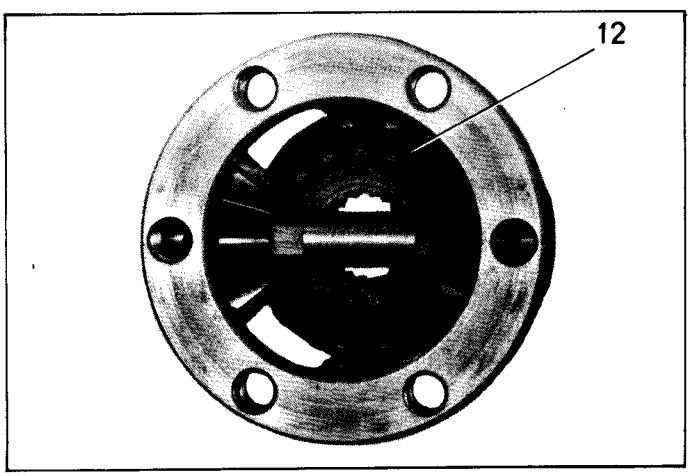










32. Prepare the main shaft :

a) Fit the needle bearing cage :
Place the needle bearing cage (1) (previously greased) in the bore of the shaft.
Fit (if need be) the retaining circlip (2) in the groove in the bore of the shaft.
(See NOTE, paragraph 11, this operation).

b) Fit the synchronizing segment (4).

c) Fit the bearing (5), using a press.
Tighten the nut (3) to between 120 and 140 mN (12 to 14 m.kg) *(left-hand thread)* and lock it in position by turning over the metal of the nut into the countersunk portion of the shaft at point « a ».

33. Prepare the differential :

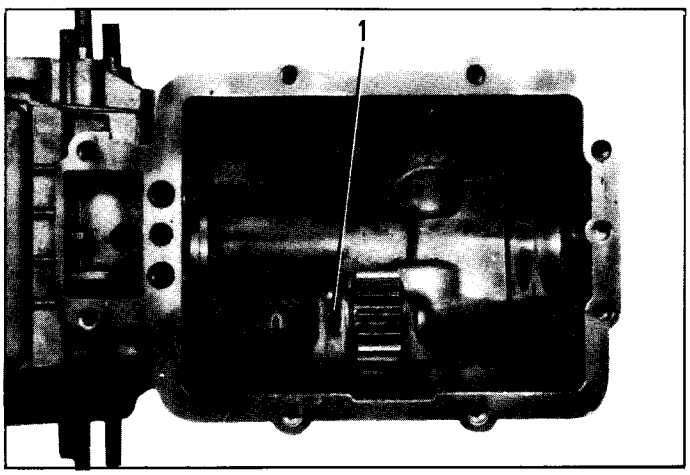
a) Place in the housing (6) a satellite pinion (7) a thrust washer for satellite pinion (8) and the spindle (11).

b) Offer up the crown wheel (10) together with a planet wheel (9). Tighten the screws progressively, at the same time checking the rotation of the planet wheel. There must be no stiffness at any point. There must be a minimum clearance at any point of 0.10 mm, and the tightening torque of the crown wheel securing screws must be between 70 and 80 mN (7 to 8 m.kg) (use torque spanner 2471-T).
Select from amongst the washers sold by our Replacement Parts Department those giving those conditions.
Remove the crown wheel and its planet wheel : disengage the satellite pinion and its thrust washer. *Do not unpair these parts.*

c) Carry out the same operation for the other satellite pinion.

d) Remove the crown wheel (10). Disengage each satellite pinion and thrust washer assembly, without mixing the parts.

e) Place the 2nd planet wheel (12) with its thrust washer in the housing. Fit the satellite spindle and each satellite and thrust washer assembly.
Select from the planet wheel thrust washers sold by our Replacement Parts Department one which permits the rotation of the planet wheel without stiffness at any point. The minimum clearance at any point should be 0.10 mm.



f) Finally fit the planet wheel and its thrust washer, the satellite pinions and their thrust washers, the spindle, the 2nd planet wheel and the crown wheel, after first oiling their bearing surfaces.
Tighten the screws to between 70 and 80 mAN (7 to 8 m.kg).
(There are no lockwashers under the heads of the screws).

g) Fit the tapered bearing using a press and a tube (inside ϕ 36 mm, outside ϕ 45 mm, length 40 mm).

34. Prepare the reverse speed pinion (step-down gear) :

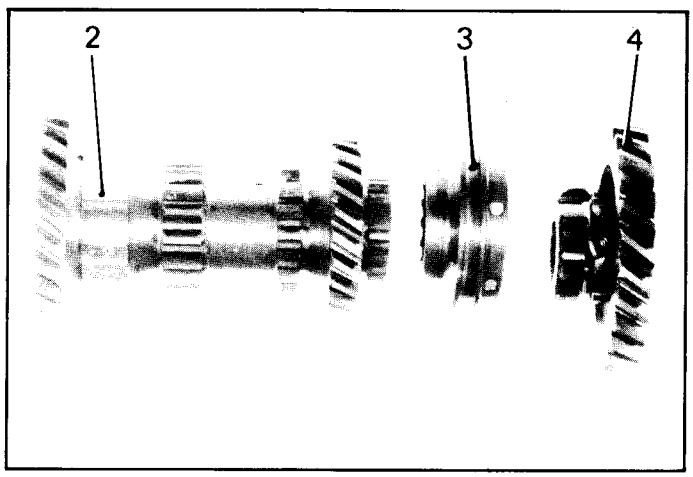
Check the condition of the bush.

NOTE : If the bush is worn, the complete pinion assembly should be renewed.

FITTING.

35. Place the gearbox housing on a stand (MR. 630-43/3).

36. Fit the reverse speed pinion :

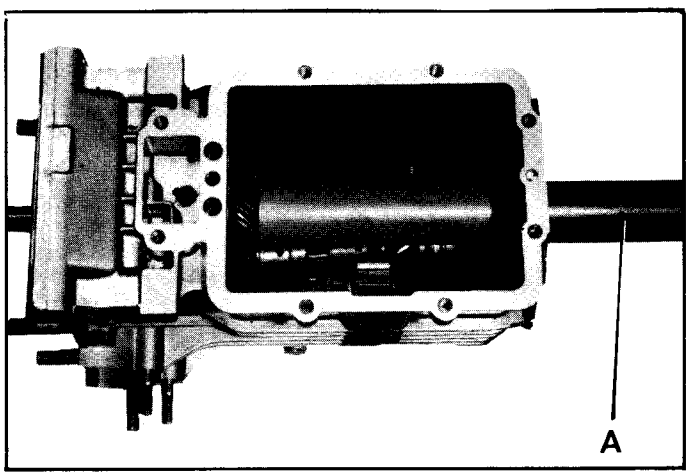


Oil the spindle.
Engage it in the boss in the casing, place the hole for the locking pin towards the front, approximately vertical.
Offer up the reverse speed pinion with the entry side of the teeth facing the front of the gearbox.
Insert the spindle and position it correctly : insert the Mecanindus pin (1) in contact with the bottom of the front support.

37. Fit the main shaft *(Only in cases where diameter of toothing is greater than that of bearing) :*

a) Prepare the intermediate gear train fitted with its two bronze bushes or its two needle bearing cages or the front needle bearing cage *(as applicable)*, (the intermediate gear train bores and bushes previously oiled).
Fit the overdrive sliding pinion (3) on the intermediate gear train (2).
Fit the step-down gear pinion (4) in the sliding pinion dogs.
Place the assembly in the bottom of the housing.

b) Offer up the main shaft from inside the housing.
Fit it in position by tapping on the end with a bronze drift or a tube A (inside ϕ 33 mm, outside ϕ 40 mm, length 250 mm).



c) Fit the bearing circlip.
Fit the securing clamp and tighten the screws to 25 mAN (2.5 m.kg).

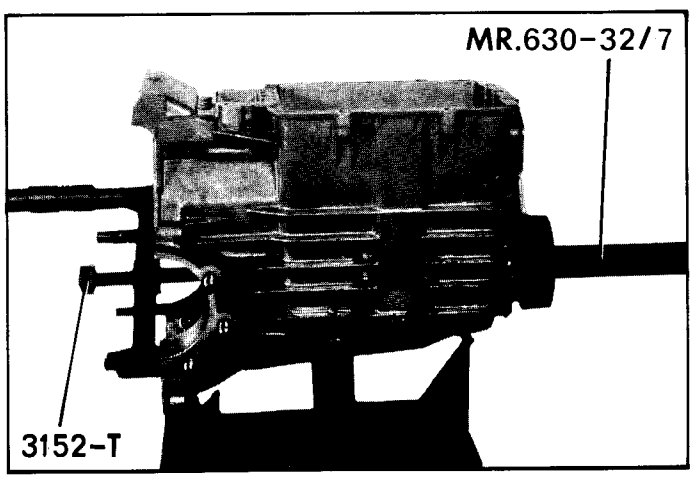
38. Fit the bevel pinion :

a) Place in position the half needle bearing sleeves *(as applicable)*, securing them with grease to the bevel pinion.

NOTE :

Check as applicable :
- that the needle thrust bearing with flat is correctly positioned on the bevel pinion,
- or that the needle thrust bearing and its two thrust washers are securely stuck on the front bearing circlip.

3707



b) Fit the bevel pinion in the intermediate gear train and in the splines of the step-down gear.

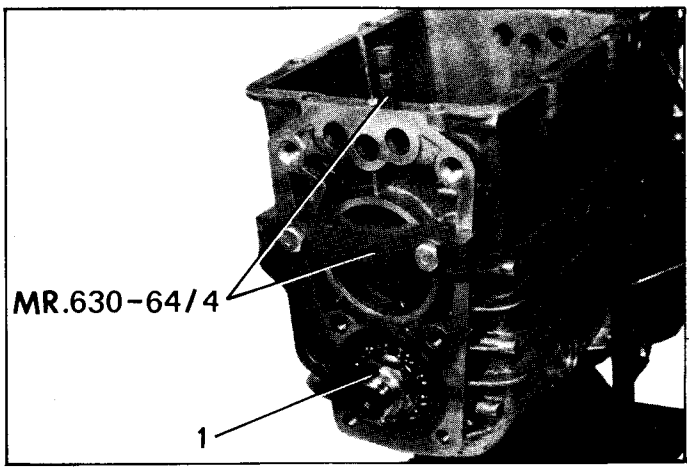
Insert the front bearing into its bore.

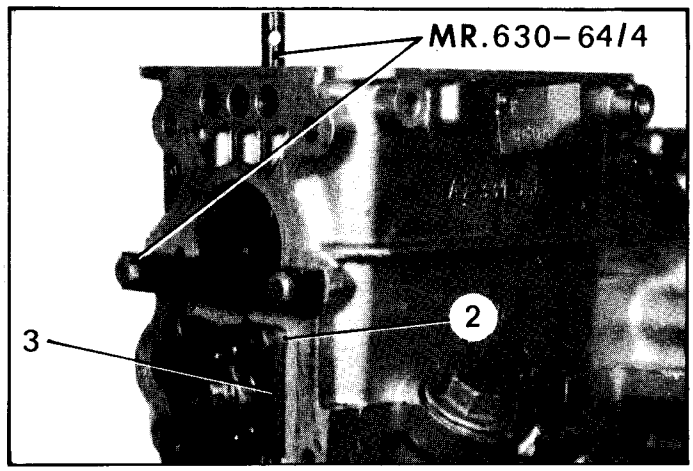
Complete the fitting of the pinion by means of the thrust screw 3152-T and leave this in position.

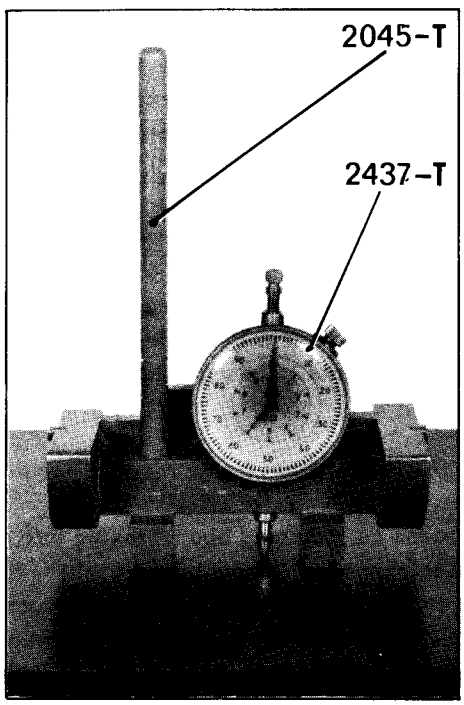
c) Fit a conic distance adjusting washer of any thickness on the rear end of the pinion.
Push it against the reverse speed pinion *(gearbox with the gear change lever on the cover)*.

d) Fit the rear bearing, positioning it with the mandrel MR. 630-32/7.

3720







e) Support the step-down gear with apparatus MR. 630-64/4.

Tighten the nut (1) to between 70 and 80 mAN (7 to 8 m.kg).

Remove the thrust screw 3152-T and the tool MR. 630-64/4.

f) Fit the flange (3) with its four distance pieces (2). *(Gearbox with gear change lever on the rear cover).*

g) Fit the rear cover, securing it with four screws only . *(Gearbox with gear change lever on the upper cover).*

39. Adjust the conic distance of the bevel pinion :

NOTE : This adjustment is of the utmost importance. Giving the teeth the correct setting will ensure silence and long service from the crown wheel and pinion. The setting dimension is given in millimetres and hundredths of a millimetre and is etched on the ground end of the bevel pinion. The dimension represents the distance which must exist, when the adjustment is completed, between the centreline of the differential shaft and the ground end of the bevel pinion.

This will vary with each crown wheel and pinion.

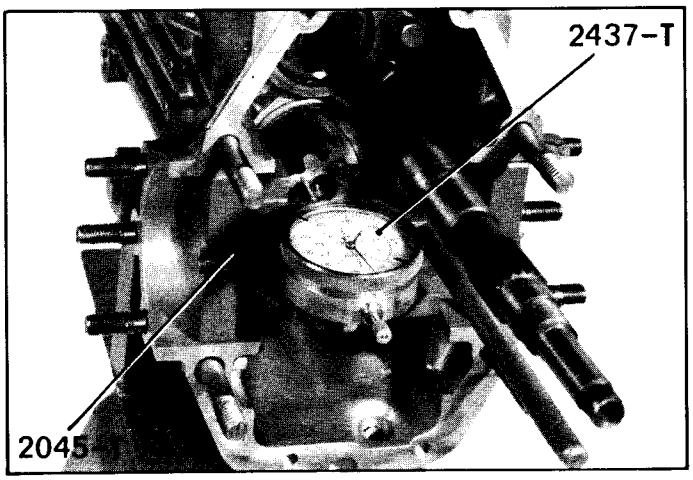
The adjustment of the conic distance should be made by using the adjusting fixture 2045-T together with a dial gauge 2437-T.

This fixture is constructed so that the distance between the centreline of the ground contact surfaces and the contact points is 48 mm.

IMPORTANT NOTE :
The measurements should not be taken from the joint facing, since the machining tolerance for this face is measured in several tenths millimetres as compared with the centre of the bores of the differential bearings.

a) Place the adjustment fixture on a surface plate bringing the figure zero on the movable dial in line with the large pointer.
Note the position of the pointers on the dial gauge.

Example : totalizing pointer on figure (6), large pointer on zero.



b) *Gearboxes with the gear change lever on the rear cover :*

Measure the actual distance of the bevel pinion :

1°) Put the adjusting fixture in place on the differential ; pivot the adjusting fixture by means of the knurled handle, until the large pointer of the dial gauge changes its direction of rotation : note the readings given by the dial gauge pointers.

Example : totalizing pointer between 5 and 6, large pointer on 49,

2°) Bring the pointers back to the position in which they were in paragraph « a » by pulling on the dial gauge stem.

3°) Slowly release the dial gauge stems counting the number of turns and fractions of a turn made by the large pointer until the point again contacts the ground face of the bevel pinion.
Check to make sure that the dial gauge pointers have returned to exactly the same position as in b) 1°).

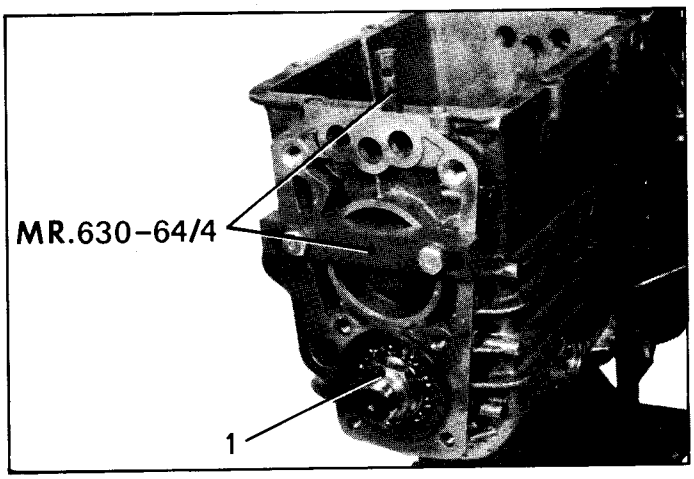
Example : the large pointer has rotated 0.51 turns, that is to say that the dial gauge point has travelled 0.51 mm from the position it occupied when the adjusting fixture 2045-T was placed on the surface plate (see paragraph a). Therefore, the actual conic distance setting :
48 mm + 0.51 mm = 48 51 mm.
The dimension etched on the ground end of the bevel pinion being for example 49.50, it is necessary to move the bevel pinion from the differential centreline 49.50 - 48.51 = 0.99 mm.

The thickness of the adjustment shims to be placed between bearing flange and casing in the above example, would be 1 mm, because the shims sold by our Replacement Parts Department only allow for adjustments to be made to within 0.05 mm.

c) *Gearbox with gear change lever on the upper cover*

Proceed as indicated above, taking into account the thickness of the adjusting washer (fitted at paragraph 38, sub-paragraph c) and choose an adjusting washer so as to make the conic distance previously measured equal to that etched on the bevel pinion.

3720



d) Remove (as applicable) the flange securing the bearing and the four distance pieces or the rear cover.

- Place in position holding fixture MR. 630-64/4.

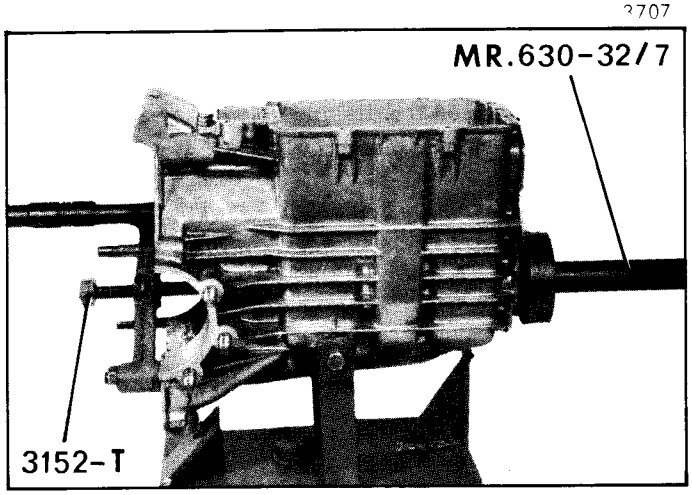
- Remove the nut from the bevel pinion.

- Remove the rear bearing, using two levers.
  CARE : Do not damage face of joint.

- Remove fixture MR. 630-64/4.

Place in position (as applicable) the adjusting shims previously determined, between the thrust flange of the bearing and the housing or between step-down gear pinion and the bearing.

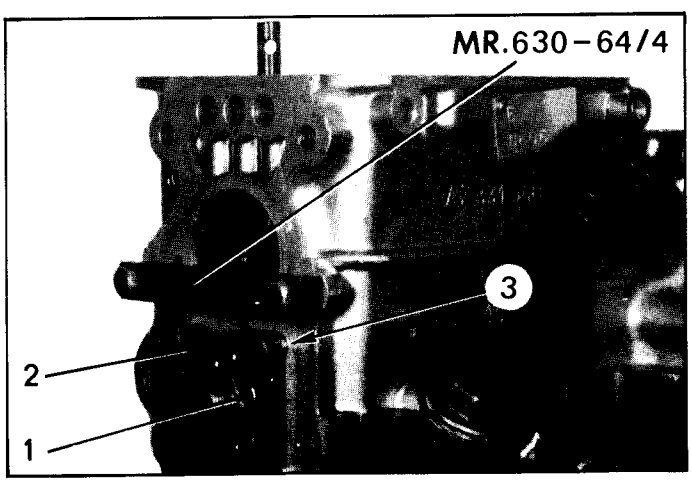
3707



e) Fit the rear bearing, using mandrel MR. 630-32/7, and supporting the bevel pinion by means of the thrust screw 3152-T.

- Place in position fixture MR. 630-64/4 and tighten the nut to between 70 and 85 mAN (7 to 8.5 m.kg).

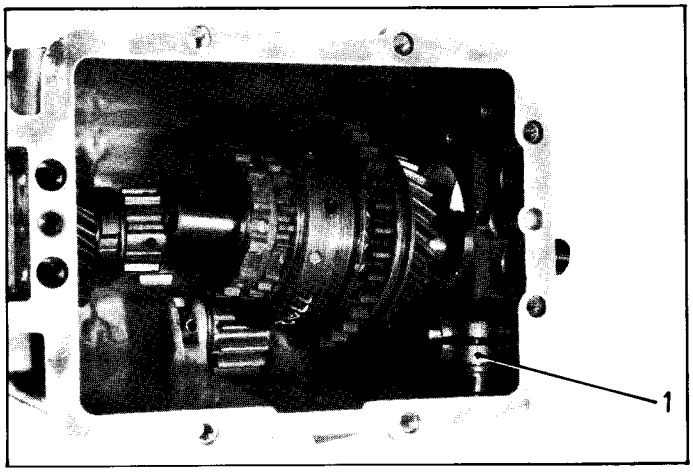
- Remove the thrust screw 3152-T and the fixture MR. 630-64/4.

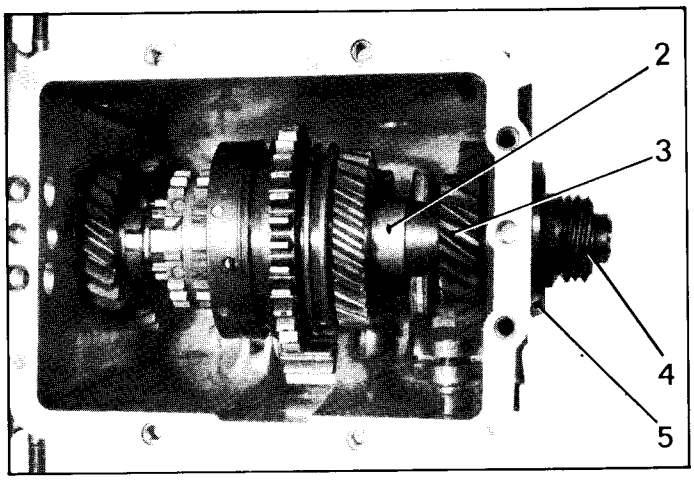


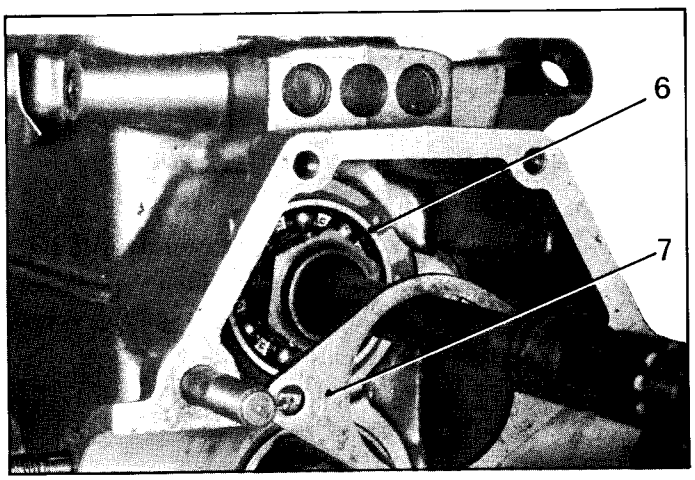
f) Fit the flange (2) securing the bearing with its four distance pieces (3) and tighten the screws to 25 mAN (2.5 m.kg) or fit the rear cover securing it with four screws only.

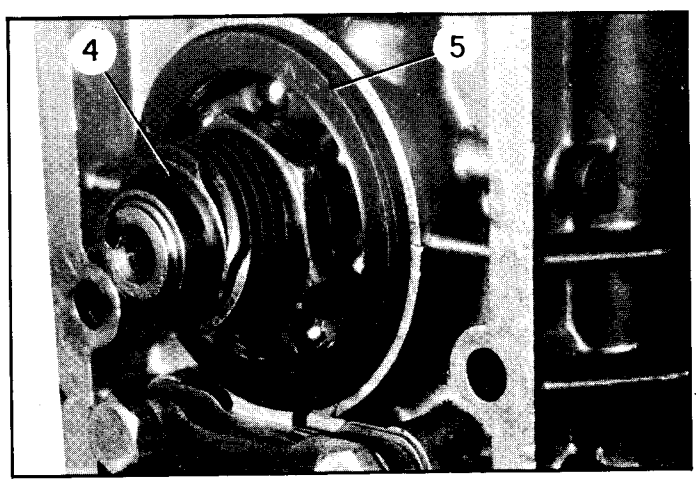
g) Check again the conic distance as indicated above.

h) Remove (as applicable) the rear cover.
Tap over the metal of the nut (1) to lock it.
(Perpendicular blows to the shaft are prohibited in order to avoid damage to the bearing).









40. Fit the main shaft and the primary shaft :

a) *The toothing of the main shaft has a larger diameter than that of the bearing :*

- The main shaft having been fitted at para. 38, position the primary shaft.

- Place the fork (1) of the overdrive in the groove of the sliding pinion, with the head of fixing screw positioned towards the left hand-side of the gearbox.

  Ensure that the sliding pinion is engaged on the step-down pinion.

- Offer up the assembly of primary shaft, sliding pinions and second gear idler pinion in the gearbox casing. Engage the end of the shaft in the needle bearing cage of the main shaft pinion and the sliding pinion on the 3rd gear dogs.

- Position the distance piece (2) and the step-down gear pinion (3).

b) *The toothing of the main shaft has a smaller diameter than that of the bearing :*

- Place the overdrive fork (1) in the groove of the sliding pinion, with the head of the securing screw positioned towards the left of the gearbox.

- Position the assembly shaft and pinion in the gearbox casing.

- Fit the main shaft making sure that the dogs on the main shaft mesh with the second third gear sliding pinion (use a tube placed against the outer race of the bearing (6) (inside ϕ of tube = 46 mm, outside ϕ = 52 mm, length = 300 mm).

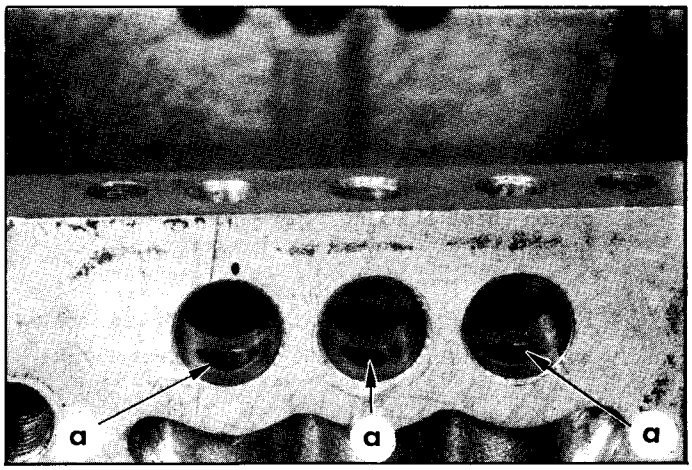
- Fit and tighten the securing flange (7) to 25 mN (2.5 m.kg).

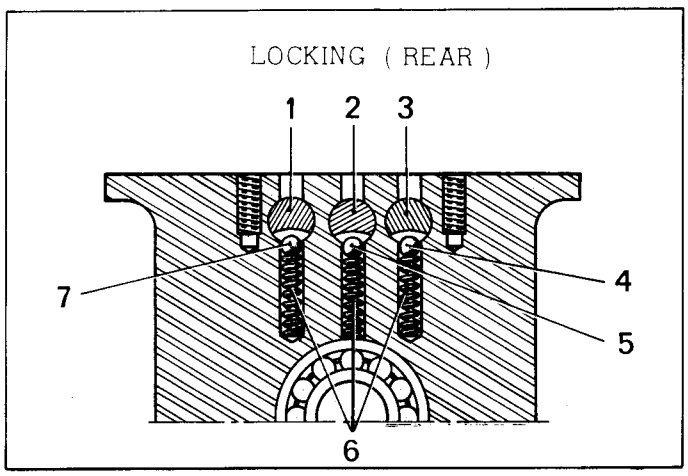
c) Fit the rear bearing (5) (mandrel MR. 630-32/7).

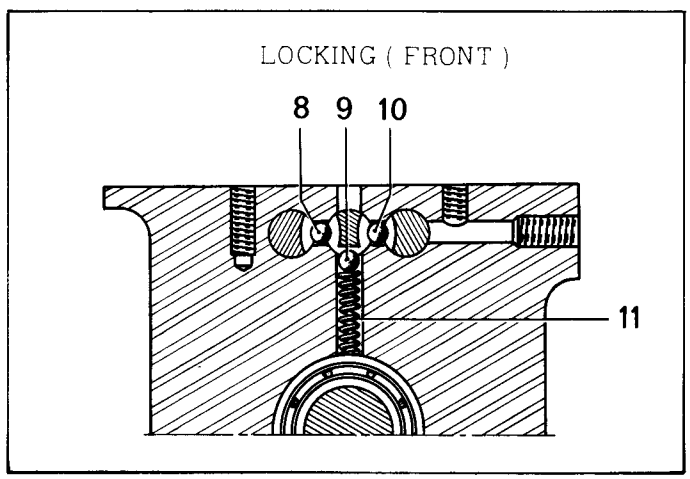
d) Place the speedometer screw (4) forming a nut or flexible washer, the distance piece and the speedometer screw (as applicable).

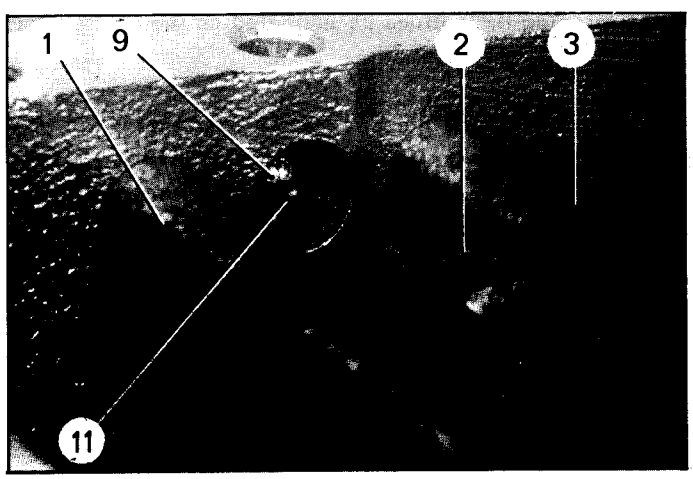
e) Engage two speeds, tighten the nut to between 70 and 90 mN (7 to 9 m.kg).

Lock the nut by turning over the metal or fitting split pin.









41. Fit the selector fork shafts :

A - *Gearbox with gear change lever on the rear cover :*

- Place the 2nd and 3rd gear selector forks and those of 1st and reverse gear in the grooves of their sliding pinion (head of the fixing screws positioned towards the left).

  Fit the springs (6) in their housings « a ».

  Position the 4th gear selector fork shaft (1) previously oiled and fitted with its locking segment ; grease and fit the locking ball (7) on the spring.

  Block the shaft passageway on the gearbox side, with one finger.

  Compress the ball and spring assembly using a rod (5 mm ϕ).

  Fit the shaft after having turned it 1/4 of a turn to prevent it from locking and complete fitting in its selector fork until it reaches neutral position. Rotate 1/4 of a turn so that it reverts to its normal position.

- Fit the shaft of 1st-reverse gear (3) :
  Grease and fit the ball (4) on its spring and proceed as above.

- Fit 2nd-3rd gear shaft (2) :

  Oil and position the shaft (rotating it 1/2 of a turn).
  Grease and fit the ball (5) on its spring.

  Block the shaft passageway on the gearbox side.

  Compress the ball and spring assembly using a rod (5 mm ϕ).

  Fit the shaft.

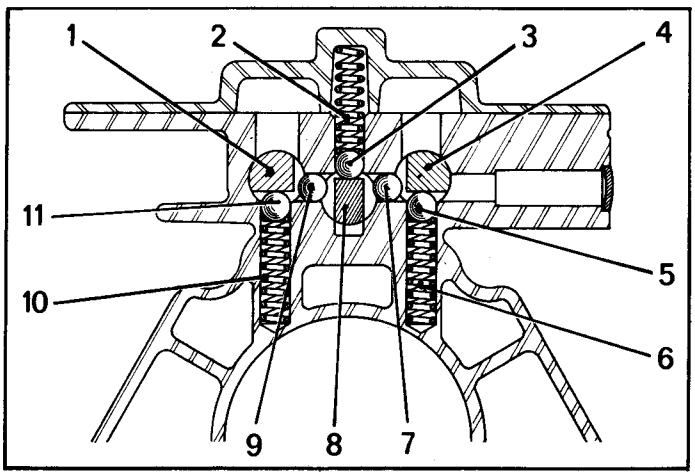
  Insert the shaft in selector fork.

  Rotate the shaft to bring it to normal position (do not engage the shaft to fullest extent).

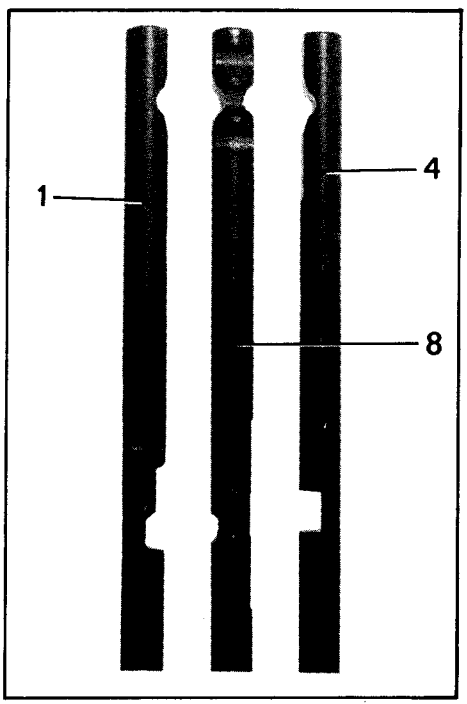
  Position the spring (11).

  Fit the safety balls (8) and (10) then ball (9) on the spring (11) (the ball having previously been greased).

  Compress the ball (9) and spring (11) assembly and complete the engagement of 2nd-3rd gear fork selector shaft up to neutral position.



LOCKING



B - *Gearbox with gear change lever on the upper cover :*

- Place the selector forks of 2nd - 3rd gear and 1st - reverse gear, into the grooves of their sliding pinion (head of fixing screws positioned towards the left).

- Position the springs (10) and (6) for the locking balls of overdrive and 1st - reverse gear shafts.

- Oil the three shafts.

- Fit the overdrive shaft (1) in gear casing (the end with the locking splines towards the front), then in the fork, but without inserting it in the front housing of the casing.

- Position the balls (7) and (9) previously greased.

Fit the 2nd - 3rd gear shaft (8) in the casing, then in the selector fork, the end with the splines towards the front.

Introduce the shaft into its front housing, arranging as indicated in the diagram and photograph herewith.

Position the ball (3) previously greased.

Move the shaft in « neutral » position.

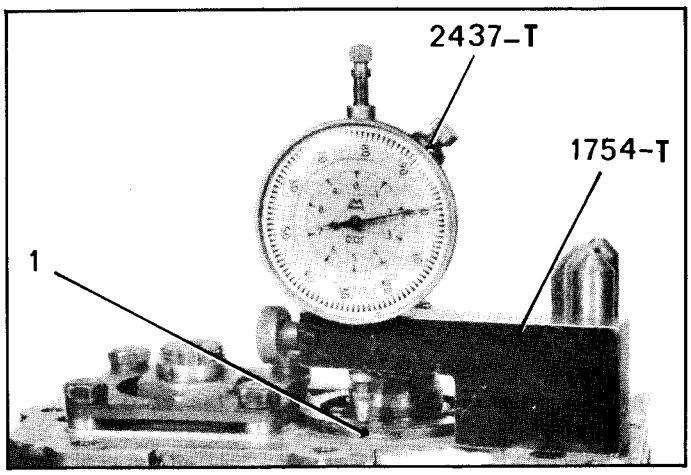
- Fit the 1st and reverse gear shaft (4) into the casing, then into its selector fork, with splined end toward the front.

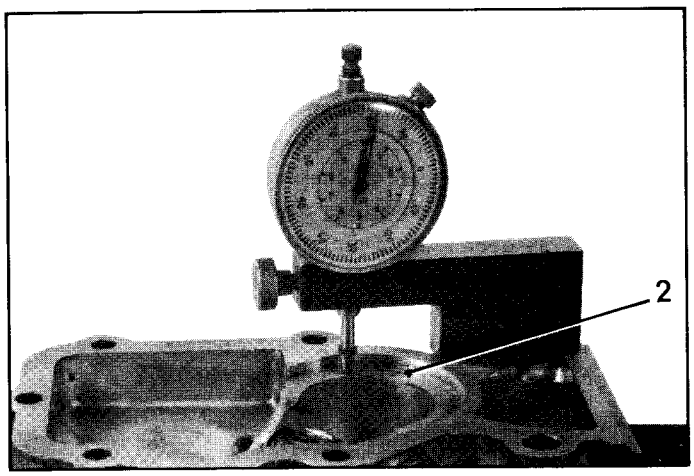
- Position the ball (5), previously greased, on the spring (6).

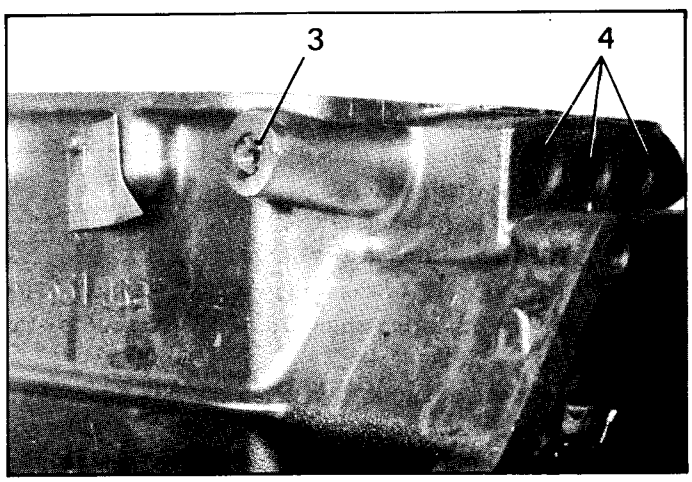
Compress the assembly of ball and spring using a rod 5 mm in ϕ, and complete the engagement of 1st and reverse gear shaft in its front housing positioning the splines as indicated on the diagram and photograph herewith.

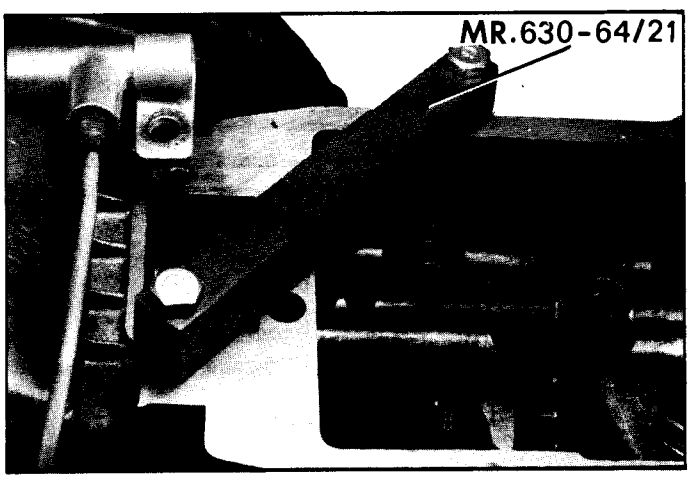
- Position the greased ball (11) on the spring (10). Compress the assembly of ball and spring using a rod 5 mm in ϕ and complete the engagement of the overdrive shaft (1).

- Set the overdrive and 1st - reverse gear overdrive shafts in « neutral » position.









42. Fit the rear cover :

a) *Gearbox with the gear change lever on the rear cover :*

a) Ensure that the flange of the bearing of the primary shaft is firmly in contact against the gearbox casing.

b) Measure the projection of the bearing (1) (using straight edge 1754-T equipped with dial gauge 2437-T).

c) Measure the depth of the bearing recess in the cover (2). The difference between these two measurements, increased by 0.05 mm indicates the thickness of the shims to be placed between the upper bearing and the cover.

Coat the joint of the cover with CURTYLON.

Hold the shims in place with grease.

Fit the cover and tighten the screws.

d) Fit the plug (3) or the screw on the front right-hand side of the gearbox.

Fit blanks (4) coated with CURTYLON if the casing has been renewed.

NOTE : These blanks do not exist on pressure cast casings.

b) *Gearbox with gear change lever on the upper cover :*

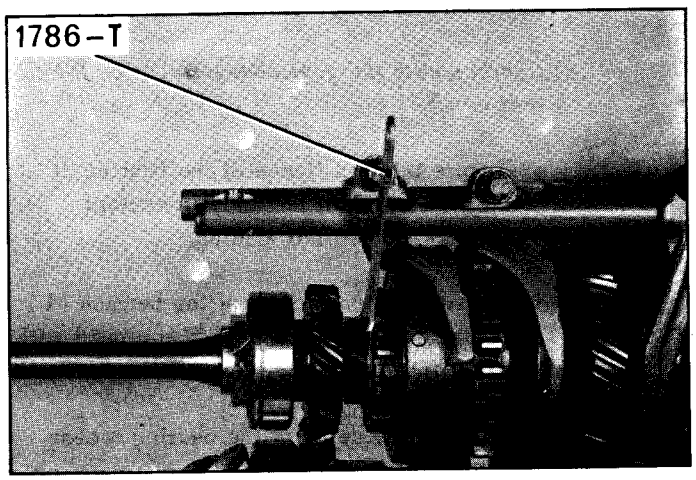
Ensure that the casings and cover joint surfaces show no traces of bruising or scratches. Coat them with CURTYLON Masti-joint. Tighten the screws to between 15 and 20 mN (1.5 to 2 m.kg).

43. Adjust the selector forks :

a) Adjust the selector fork of 2nd - 3rd gear :

- Set the selector fork spindle in « neutral » position.

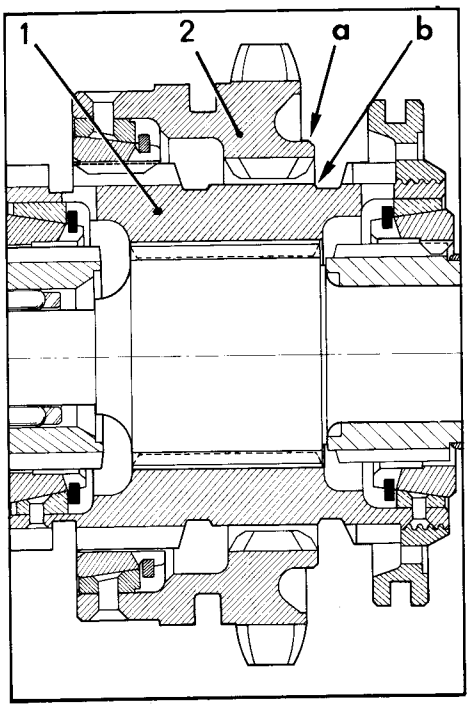
NOTE : In the case of a gearbox with the gear change lever on the upper cover the operation is more easily carried out by using clamp MR. 630-64/21 which holds 2nd - 3rd gear shaft locking ball and spring in position.



- Set the adjusting shim 1786-T, 1.8 mm thick on the synchronizing segment of the driving shaft.
- Using the selector fork, move the 2nd and 3rd gear sliding pinion into contact with the adjusting shim in order to obtain a play of 1.8 mm, between the end of the 2nd and 3rd gear sliding pinion and the main shaft dogs.
- Tighten the selector fork fixing screw.
  (For screws with flats use spanner 1677-T).
- Disengage the adjusting shim.

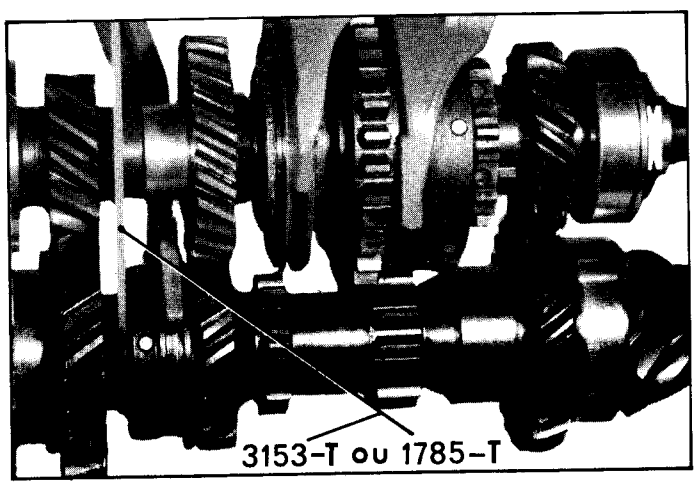
b) Adjust the selector fork 1st-reverse gears :

IMPORTANT : Before starting this adjustment, it is essential that the selector fork of 2nd and 3rd gear is correctly adjusted.
Ensure that the selector fork shafts is in « neutral ».
Position 1st gear-reverse gear sliding pinion (2) bringing it, by means of the selector fork, to the centre of its travel on the 2nd-3rd gear sliding pinion (1), which brings the rear face of the 1st-reverse gear sliding pinion « a » with the rear end « b » of the ground portion of the 2nd and 3rd gear sliding pinion.
Tighten the selector fork fixing screw.
(For screws with flats use spanner 1677-T).



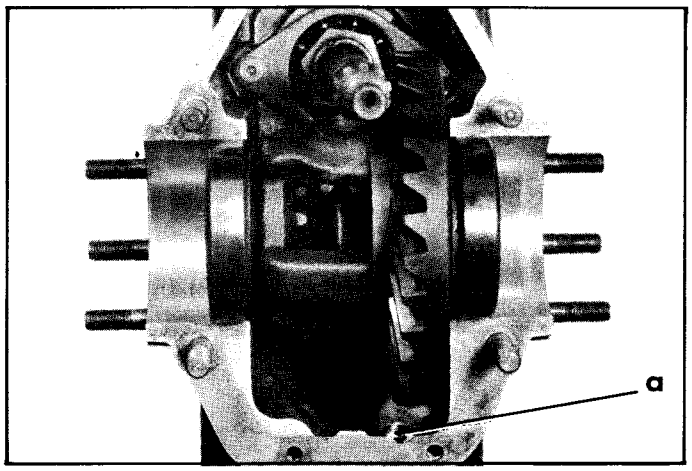
c) Adjust the 4th gear (overdrive) selector fork :

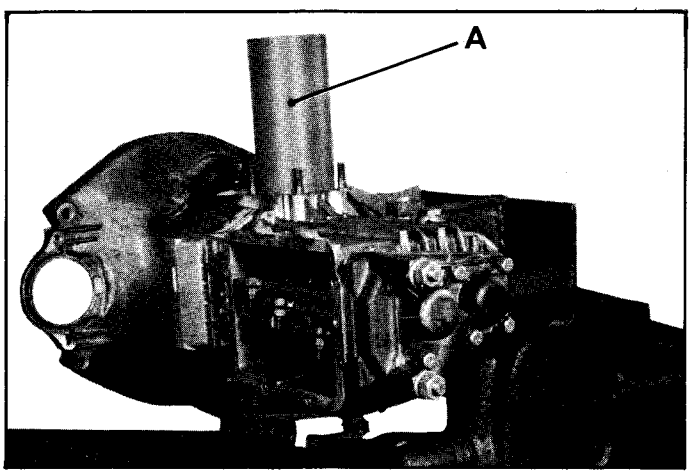
- Ensure that the selector fork spindle in the « neutral » position.
- Place the adjusting shim on slow running ring of idle reduction gear pinion :
- Use the adjusting shim 1785-T, 1.50 mm thick for the following vehicles :
  - *AZ up to February 1970.*
  - *AZU up to January 1972.*
  - *DYANE (AYA) from August 1967 to March 1968.*
- Use the adjusting shim 3153-T, 2.70 mm thick for other vehicles.
- Using the selector fork, bring the sliding pinion of 4th gear in contact with the adjusting shim so as to obtain a play (of the amount determined above) between the end of the 4th gear sliding pinion and the idle reduction gear pinion dogs.
- Tighten the selector fork fixing screw.
- Disengage the adjusting shim.

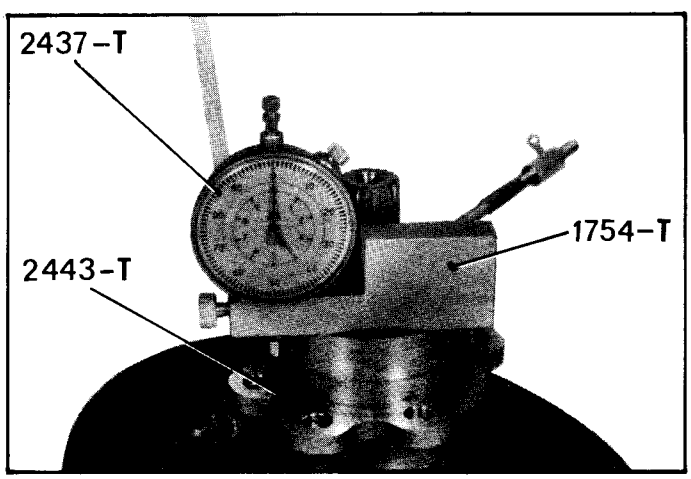


d) Check the operation of the gears successively of the gears.
Remove clamp MR. 630-64/21.

e) Fit the upper cover.
Pay attention to 2nd-3rd gear change locking spring (gearbox with gear change lever on the upper cover).







44. Fit the differential :

- Oil the bearings. Put the outer races of the bearings on the rollers.

Position the differential assembly in the half of housing.

NOTE : The crown wheel passes via the centre line of the drain plug « a ».

- Fit the clutch housing, and when tightening, make sure that the bearing faces of the differential shaft hubs on the clutch housing and gearbox casing are correctly aligned

NOTE : If neither the clutch housing, the crown wheel and pinion, the roller bearings nor the bearing housings have been replaced, there is no need to adjust the bearing clearance, provided that the same adjustment washers, found when dismantling are used in exactly the same positions.

Fit the left-hand hub assembly inserting two gaskets between the hub housing and the casing.

Tighten the nuts to between 38 and 42 mAN (3.8 to 4.2 m.kg).

45. Adjust the bearing clearance :

a) Clamp the gearbox on its bracket in a vice, as shown opposite.

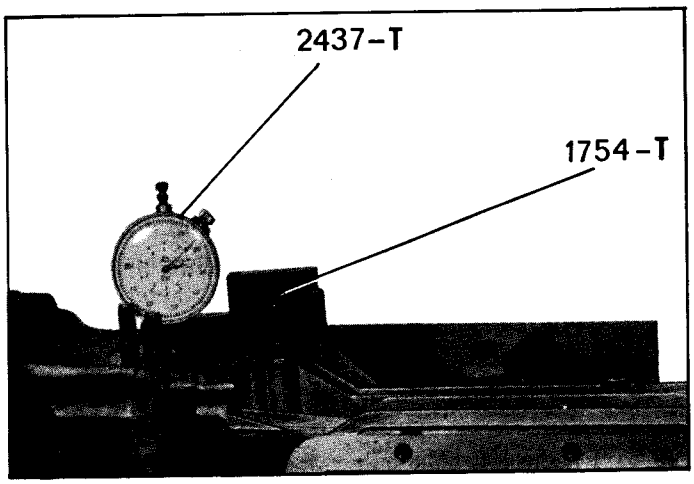
b) Make sure that the differential is properly positioned against the left-hand hub and that the outer races are properly located on the rollers by lightly tapping on the outer race of the right-hand bearing with a tube «A» (outside ϕ 71.5 mm, inside ϕ 58 mm, 150 mm long).

c) Fit the straight edge 1754-T together with dial gauge 2437-T (with extension 2443-T) on the hub shoulder of the bearing as shown opposite, with dial gauge point in contact with bearing.

Bring the zero mark on the movable dial of the gauge opposite the large hand and note the position of the totalizing needle.

Example : Totalizing needle between 7 and 8, large needle on zero.

Take this measurement at several points and take the meansurement. The difference between the measurements should not exceed 0.05 mm.



d) Without disturbing the dial gauge, place a straight edge 1754-T on the hub bearing face of the casing the point of dial gauge resting on the outer race of the bearing. (*Make sure that the point of the extension of the dial gauge does not rest on the inscription engraved on the bearing, as this would give a false reading*).

Note the position taken by the dial gauge needle and make sure that this remains constant (within about 0.02 mm) when measurements are taken at three equidistant points of about 120°.

If the reading is the same the bearings of the differential are not seated properly on the left-hand hub, and their correct positioning must be re-checked as indicated at b) above. Take the measurement again.

Example : totalizing hand between 4 and 6, large hand at 54.

e) Bring the dial gauge hands back to the position they occupied at c) by pulling on the dial gauge spindle.

Slowly release this spindle and count the number of complete turns and partial turns made by the large hand, until the point of the dial gauge is again on the outer race of the bearing.

Check that the dial gauge hands have returned to the same position they occupied in «d»).

Example : the large hand has made 1.46 turns.

Select from among the adjusting shims sold by our Replacement Parts Department those which give this thickness.

Check this thickness.

Put these shims aside for subsequent fitting.

46. Adjust the clearance between the teeth :

a) Put the gearbox on its bracket in a vertical position.

Remove :
- the left-hand bearing,
- the two paper gaskets,
- the clutch housing.

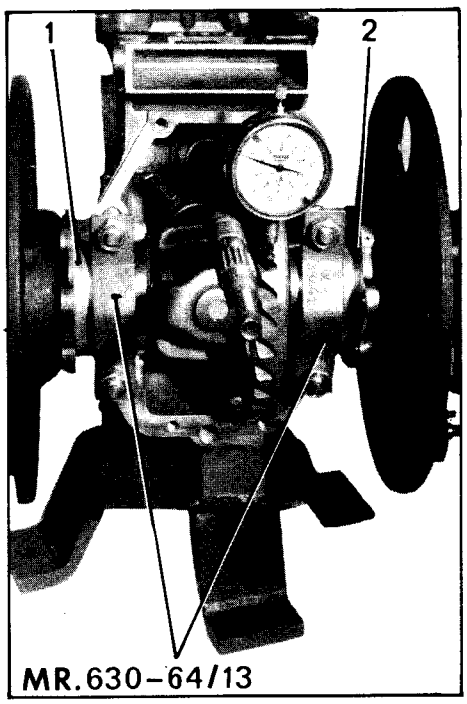
b) Secure the differential using the two clamps MR. 630-64/13.

Fit a paper gasket (without shim) on the left-hand hub.

Fit the left-hand hub (2) and secure it.

Place on the right-hand side :
- all the adjusting shims (determined in para. 45) against the outer race of the right-hand bearing,
- a paper gasket,
- the right-hand hub (1), and secure by two nuts.

Ensure that the differential turns without any hard spots.

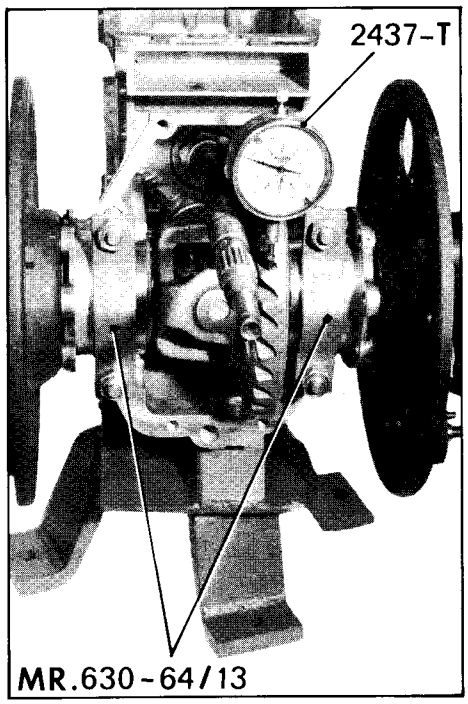


c) Fit the dial gauge 2437-T, in position on the upper left-hand securing stud of the clutch housing, using only the adjustable component of the dial gauge 2041-T.

Adjust the position of the dial gauge so that its point rests perpendicularly on the flank of one tooth on the periphery of the crown wheel.

The figure for the clearance between the teeth should be :
0.14 and 0.18 mm *(gearbox with the control lever on the upper cover)*
0.13 and 0.23 mm *(gearbox with the control lever on the rear cover).*

d) Measure the clearance between the teeth on four teeth at an angular distance of 90° approximately (keep the bevel pinion stationary, holding it by hand) and take the average of the four measurements.
The distance between two measurements must not exceed 0.1 mm.
If it does the crown wheel is running out and must be replaced or there is a foreign body between the crown and the differential housing.
Example : movement measured : 0.77 mm.



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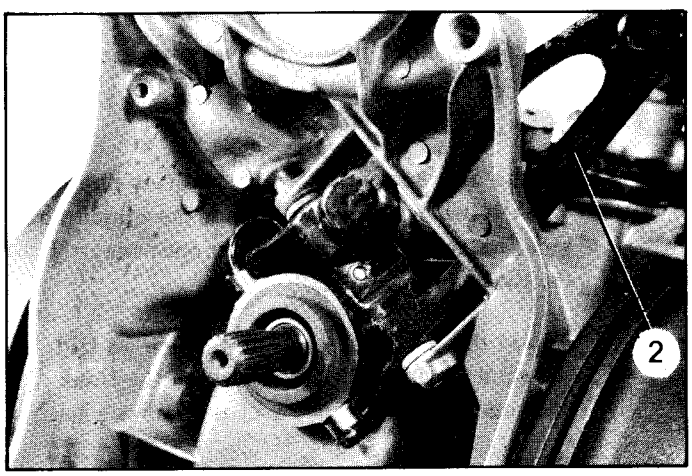
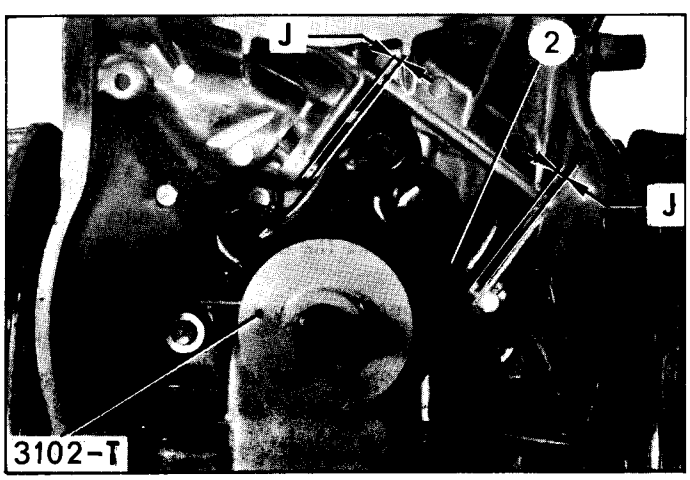




e) Determine the thickness of the adjusting shims to be removed from the right-hand side and placed on the left-hand side.

NOTE : Moving one adjusting shim having a thickness of 0.1 mm will cause a variation of 0.07 mm approximately in the meshing clearance.

Example : Clearance between the teeth measured = 0.77 mm
minimum clearance to be obtained = 0.14 mm
difference = 0.63 mm

The thickness of the shims to be moved in this case is therefore :

$$\frac{0.63 \times 0.1}{0.07} = 0.90 \text{ mm}$$

Loosen the two clamps MR. 630-64/13.
Remove the left and right-hand hubs.
Take away from the right-hand hub, shims of the thickness determined above (in the example given : 0.90 mm) and position them under the left-hand hub.

Fit the hubs.

Tighten the two clamps.

Check the clearance between the teeth and make any necessary modification by changing one or several shims from one side to the other.

Remove :
- the dial gauge 2437-T and the support 2041-T
- the two hubs (mark the shims : do not damage the gaskets),
- the two clamps MR. 630-64/13

f) Coat with CURTYLON the mating faces of the clutch housing. Fit the housing, tighten the nuts to between 35 and 45 mN (3.5 to 4.5 m kg) and fixing screws to between 15 and 20 mN (1.5 to 1 m kg). While tightening, ensure that the bearing faces of the differential shaft hubs on the differential housing and the gearbox casing are in alignment.

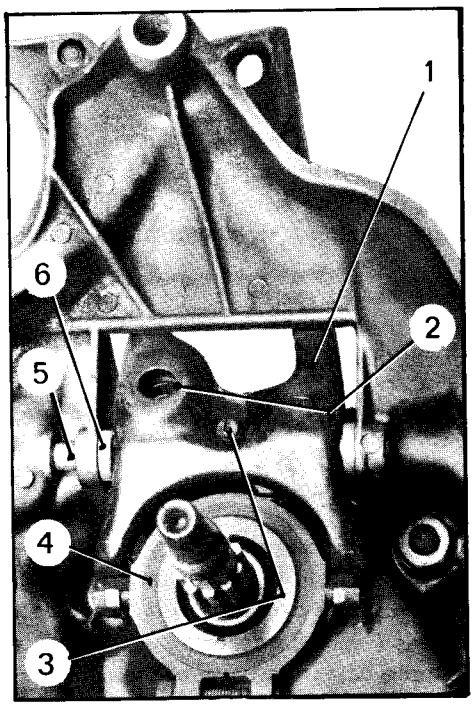
47. Fit the clutch selector fork :

a) *Gearbox with graphite clutch stop :*

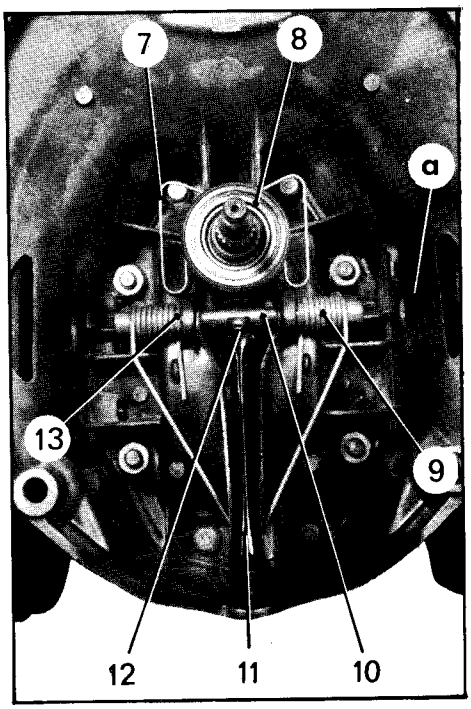
1°) Centre the fork :
Fit the clutch release fork (2).
Place the bush 3102-T on the driving shaft splines.
Swing the fork so that the two support fork for the clutch stop ring come into contact with the bevelled portion of bush 3102-T.

With feeler gauge, measure clearance on either side of fork at point « j ».

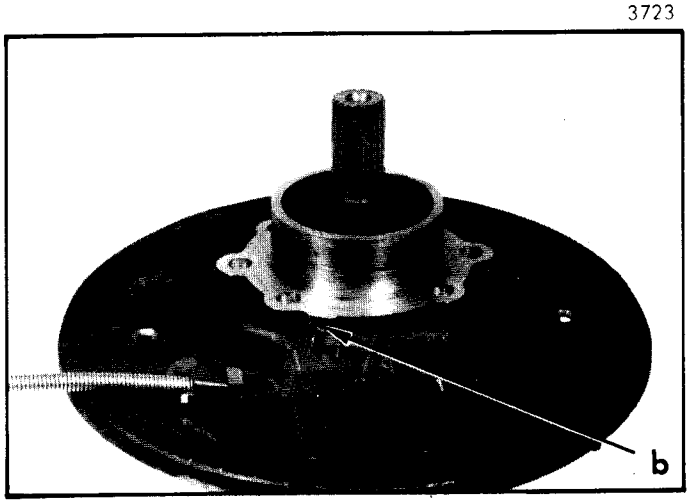
Choose washers with appropriate thickness to leave clearance of between 0.03 and 0.4 mm on either side of the fork.
Remove ring 3102-T, the fork and the shaft.



3921



3723



2°) Fit the fork.
Fit the clutch stop ring (4) in the fork (1)
Position the spring (2).
Offer up the fork equipped with its clutch stop ring.

Oil and fit the spindle (5) with thrust washers (6) determined as above (or the distance pieces, for early type housings) and by compressing the spring.

Insert the spindle and position it by turning the screwdriver.

Screw the locking screw (3).

b) *Gearbox with ball bearing stop ring :*

Place in position the-two anti-noise bushes (13) in the spirals of the spring (9), with the shoulders face to face.

Lightly oil the spindle (10).

Hold in position the selector fork (11) and its spring (9).
Insert the spindle (10) through one of the holes « a » in the casing, then through the spring, the fork and the hubs.

Position the spindle and tighten the nut (12) (shakeproof washer).

Fit the stop ring (8) on the hub.

Fit the stop clip (7) locking the bearing stop ring on the fork.

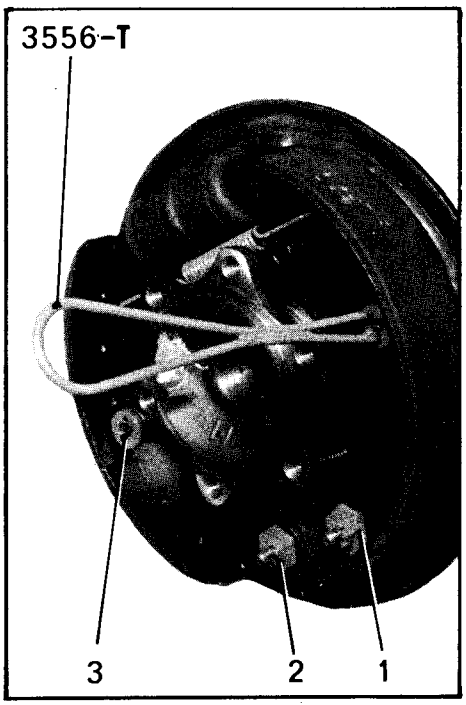
48. Fit the hubs and brake backplates :

- Stick the adjusting shims with grease against the outer bearing rings of the differential bearings.
- Fit the front guide-rods on the backplates.
- Fit the hubs, inserting a gasket.

NOTE : Position (as applicable) the hubs so that the overflow holes « b » point downwards.

Tighten the securing nuts (shakeproof washers) to between 38 and 42 mΛN (3.8 to 4.2 m.kg)

3566



49. Fit the brake shoes :

a) Hook the return springs onto the shoes with the hand-brake lever on the longer shoe.

b) Position the shoes, hooking the hand-brake cable to lever.

c) Lightly oil the adjusting eccentrics (1) and put them in position. Fit the plain washers and the nuts (2), provisionally tighten them

d) Fit the rear guide rods, the thrust springs and the retaining caps (3), locking them with tool 3556-T.

Ensure that the shoes operate freely.

50. Fit the wheel cylinders :

- Separate the brake-shoes by turning the adjusting cams to the maximum.
- Fit the wheel cylinders. Fit the adjusting screws (spring washer).

Bring the adjusting cams to their initial position.

51. Centre the brake shoes :

(Use centring apparatus 3570-T)

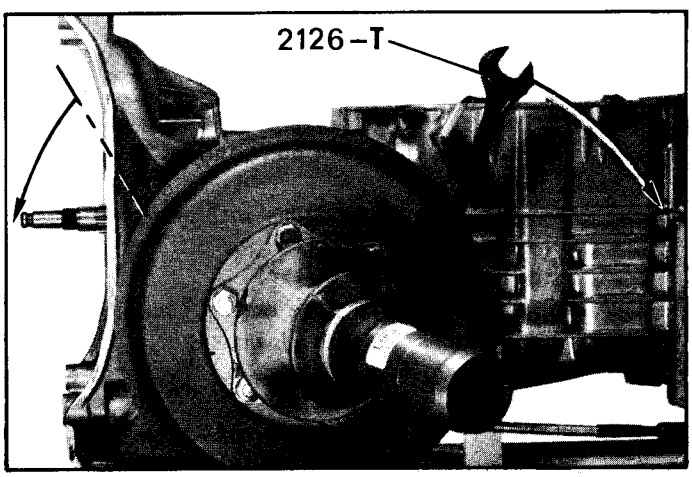
52. Fit the brake drums :

True drums if necessary, using *(as applicable)* mandrel 2118-T or MR. 630-35/7, or mandrel MR. 630-35/11.

Fit the drums and drive shafts on drum side *(as applicable)*.

Tighten the screws to 45 mAN (4.5 m.kg) or nuts to 25 mAN (2.5 m.kg).

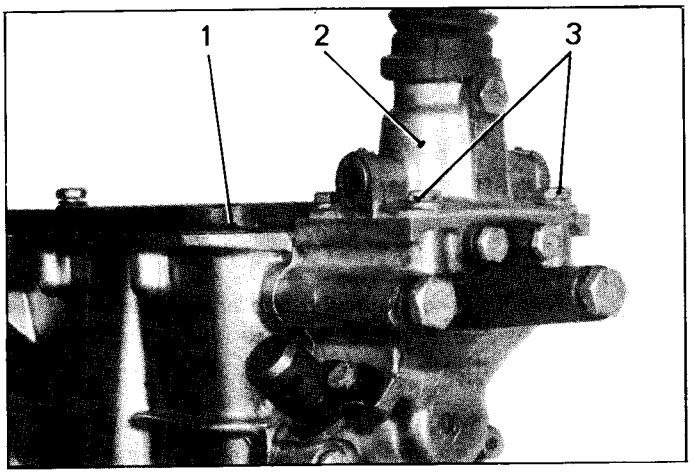
PL. 440

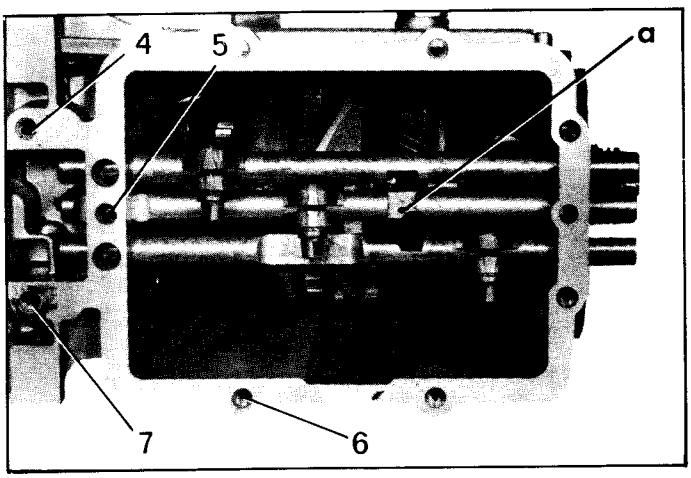


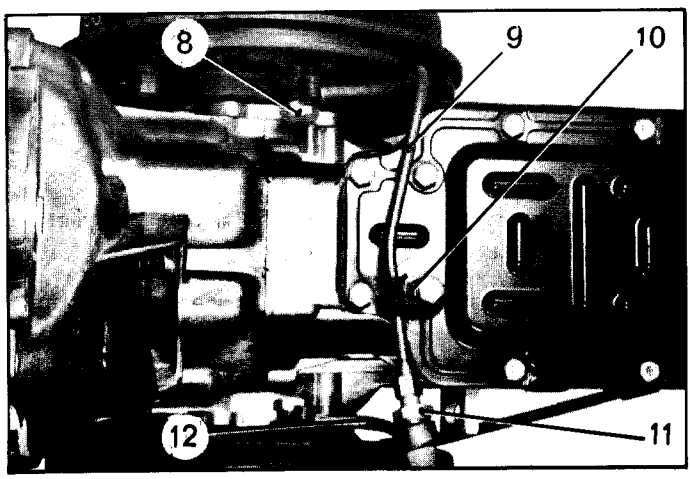
53. Adjust the brake shoes :

Turn the cam spindle using spanner 2126-T (or a 14 mm ring spanner) in the direction shown opposite, at the same time turning the brake drum by hand until the brake shoe comes in contact with it. Withdraw the shoe lightly to free it and bring it forward again until the lining exerts a light pressure. *(Never complete the adjustment by withdrawing the shoe from the drum).*

Proceed in the same manner for the other shoe.







54. Fit (as applicable) gear change forks control lever on the rear cover :

Pack the lever (2) on the casing with grease (TOTAL MULTIS).

Position the lever, inclining it towards the left to clear the selector fork tip (if fitted).

Tighten the four fixing screws (3). (spring washer).

Check the operation of the lever.

55. Fit the upper cover :

a) *Gearbox with control lever on the rear cover :*

Fit a cork gasket with CURTYLON on the cover (1).

Tighten the screw (spring washer).

b) *Gearbox with control lever on the upper cover :*

Ensure that the forks are all in « neutral » position.

Coat the faces of the cover joint with CURTYLON paste.

Fit in position the spring (5) for the locking ball of fork spindle for 2nd and 3rd.

Fit the cover, positioning the spindle control lever so that its ends fits into notch « a » in the fork spindle of 2nd and 3rd speed.

Position the fixing screws except those at at points (4), (6), and (7). Tighten moderately.

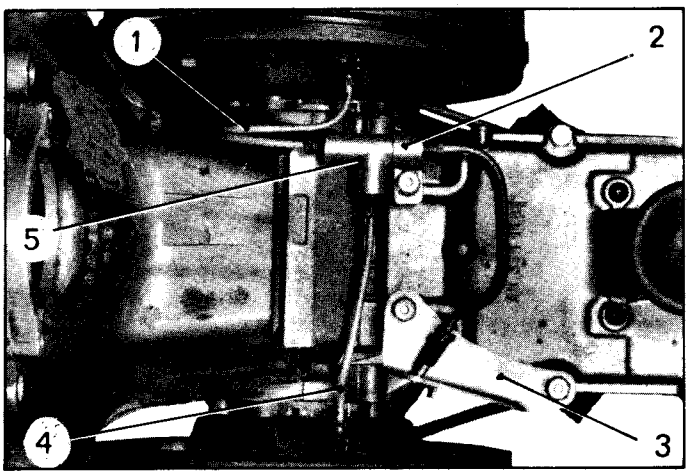
56. Fit the brake piping :

a) *Gearbox with control lever on the rear cover :*

Fit the right-hand connecting tube (9) with its fixing lug (10) and a copper joint on either side of the screwed union (8) and tighten this screw provisionally.

Fit the left-hand connecting tube (12).

Provisionally assemble left and right-hand connecting tubes with the distribution connection (11) fitted with a copper joint.



Fix the right-hand connecting tube to the upper cover fit a distance piece ; tighten the screw (flat and spring washers).

Tighten the union screws to the wheel cylinders.

NOTE : The distribution connection is tightened after fitting the gearbox on the vehicle.

b) *Gearbox with control lever on the upper cover :*

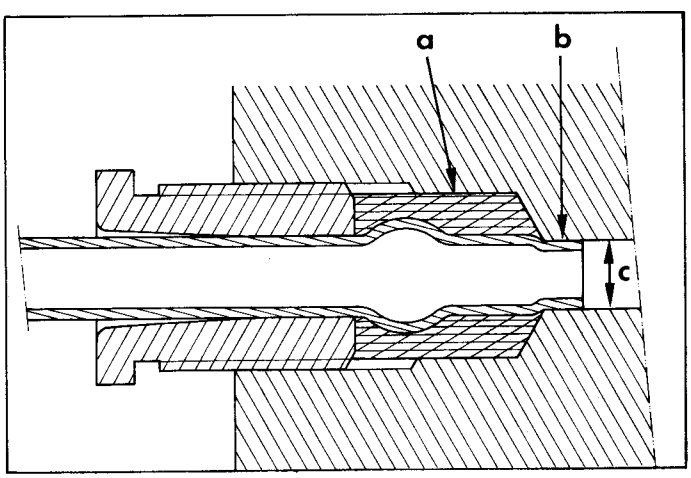
NOTE : The sealing of the brake lines is achieved by seals which must be renewed after each dismantling.

IMPORTANT : Never use jointing marked in green, which deteriorates rapidly under the action of brake fluid used in this type of vehicle.

When fitting, the seal « a » should stand down 2 mm below the end of the tube « b ».

Centralize the tube in the bore offering it up in the centre of the hole.

Ensure that the end of the tube « b » enters well the small bore at « c ».



Start fitting the union screw by hand and tighten it moderately 6 to 8 mΛN (0.6 to 0.8 m.kg).

Provisionally connect :

- the left-hand (4) and right-hand (1) brake piping to wheel cylinders,
- the three-way union (5) to the brake piping

Fix the three-way union to the casing with a clip (2)(distance piece plain washer and shake-proof washer).

Finally tighten the union screws.

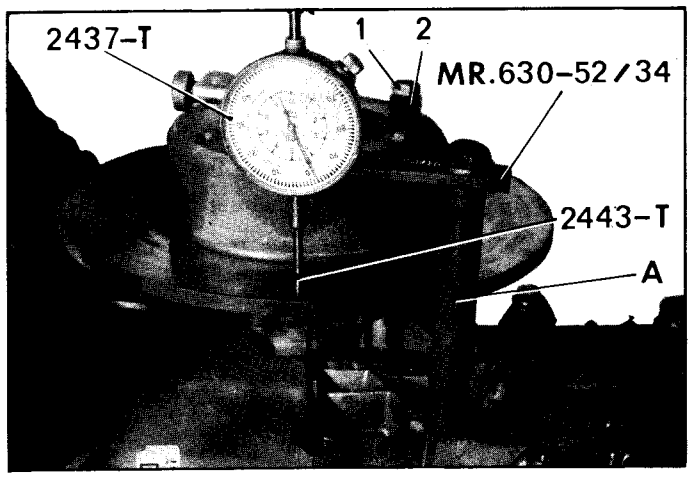
Fit the bracket (3) securing the connection Tighten the screws (distance piece shake-proof washer).

57. Provisionally fit the oil filter plug with metalloplastic gasket.

Tighten the drain-plug, fitted metalloplastic gasket.

58. Remove the gearbox from its bracket MR. 630-43/3.

FITTING THE DISCS AND THE BRAKE CALIPERS.



5605

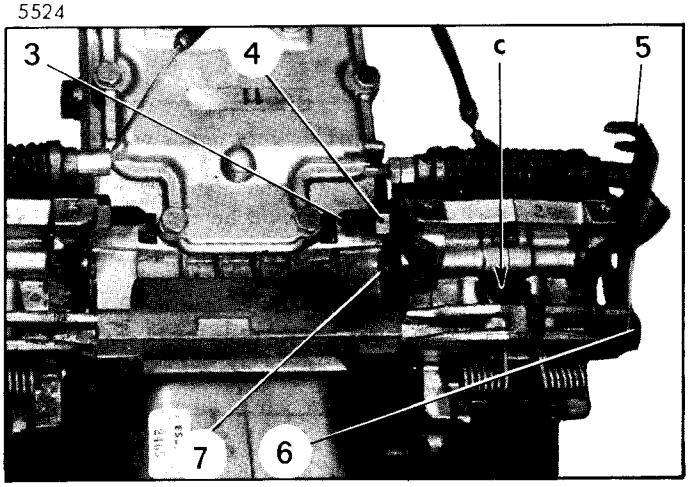
58. Fit the brake discs :

Position the discs. Fix them by means of three securing bolts (1), equipped with spacers (2) (thickness = 10 mm).
Tighten bolts **from 4.5 to 5 m.daN (33 to 36.8 ft. lbs).**

59. Check the disc run-out :

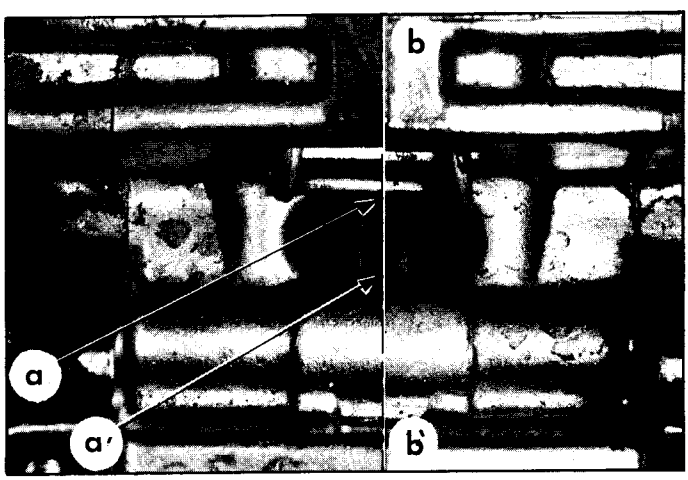
- Use support MR. 630-52/34, fitted with comparator 2437-T (with extensions 2443-T).
- Secure the support and distance tube (A) on the gearbox housing using a bolt for brake caliper fixing (see the figure).
- Rotate the disc : *the run-out must not exceed 0.20 mm.*
- If it does exceed 20 mm, choose among the six positions of the disc, the one which gives the minimum run-out. If the run-out chosen is still superior to the authorized value, change the disc.

5524



60. Fit the brake calipers :

- Position the caliper (prepared in para. 28) equipped with shim (7) (identified when removed).
- Fit securing bolt (6) without fully tightening it. (plain washer under bolt head, R.H. side, and bracket (5) on L.H. side).
  Swing the caliper in order to position it on the disc. (If necessary, release the rubber holding the securing brake pads in position).
- Remove nut (4), free bolt (3) and position the caliper.
- Fit securing bolt (3), checking that shim (7) is correctly positioned.
  Tighten bolts (3) and (6) **from 4.5 to 5 da Nm (33 to 36.8 ft. lbs).**



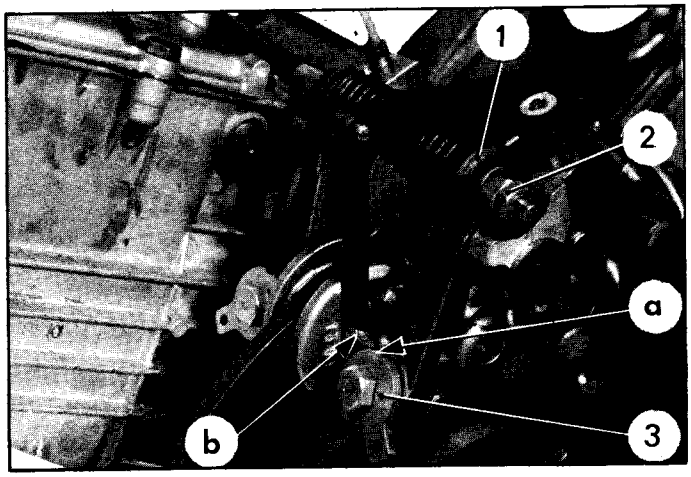
5513

61. Check the caliper position in relation to the discs :

- Make an identification mark « a a' » on the edge of the disc, at an equal distance from the two faces.
- Rotate the disc so that the mark appears through hole « c » of the caliper.
- This mark must coincide with seating surface « bb' » of the two half-calipers.

62. Fit the main brake pads.

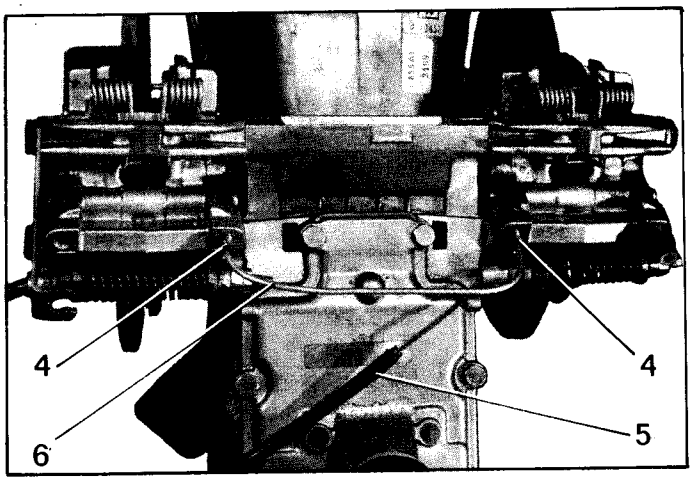
5515



63. Adjust the position of the handbrake pads :

- Check that eccentrics (3) are orientated as shown on the opposite figure (position notches « a » in relation to levers (1)).
- Bring one pad into contact with the disc, using its eccentric , and determine the point of maximum run-out. Then, adjust the eccentric so as to obtain *a 0.10 mm free-play between heel « b » of lever (1) and the pad.*
- Adjust the other pad in the same way.

5523



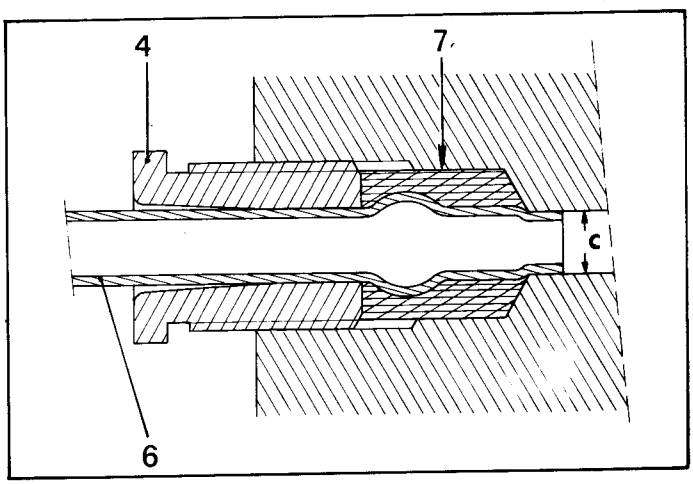
64. Fit connecting pipe (6) :

The correct sealing of unions (4) is ensured by sleeve-seal (7).

For this type of vehicle, only use sleeve-seals identified by a green paint mark.
Any other sleeve-seal would be rapidly damaged by the LHM mineral fluid used for these brakes.

Each time the tube is removed, these sleeve-seals must be replaced.

TT.00-5



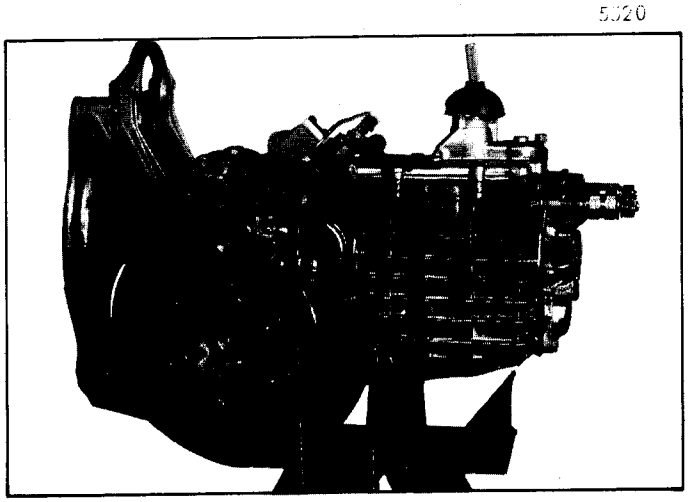
When fitting the brake, the sleeve-seal must be at 2 mm from the end of the tube.

Centre the tube in the bore, positioning it according to the centre line of the orifice.

Make sure that the end of the tube correctly enters the small bore at « c ».

Screw the union-nut by hand and slightly tighten it : **from 0.8 to 0.9 m.daN (5.8 to 6.6 ft.lbs)**. This slight tightening is enough to ensure a correct sealing. *Tightening too strong would entail a leak.*

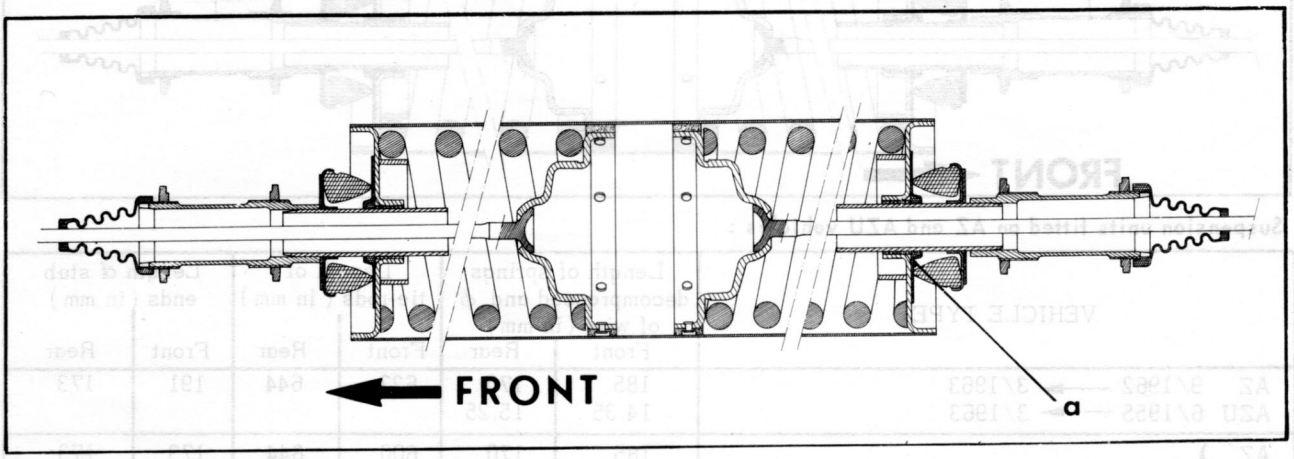
5520

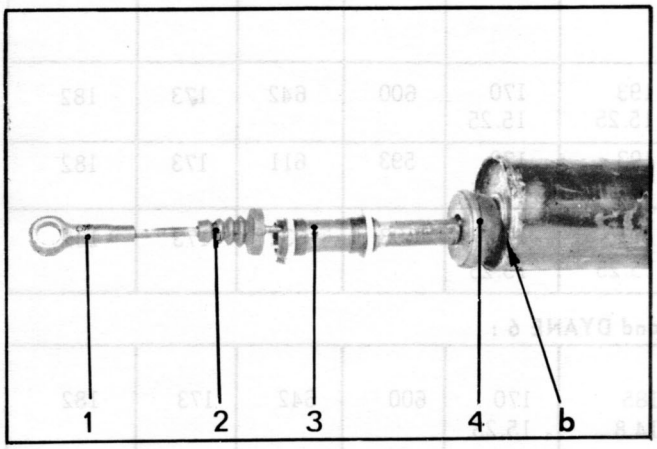


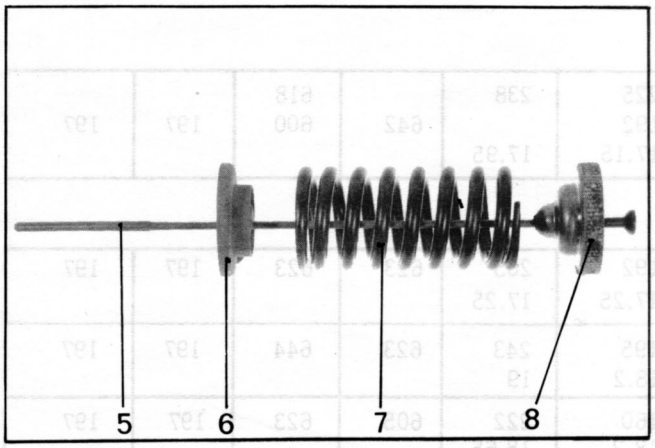
65. Temporarily fit the oil filler plug and its gasket.

Remove the gearbox from its bearer.

OVERHAULING A SUSPENSION UNIT







REMOVAL

1. Unscrew the knife-edge end-pieces (1) from the front and rear tie-rods.

   Free :
   - the duct covers (2),
   - the adjustable end-piece (3),
   - the two rubber suspension buffers (4).

2. Using a scriber, mark the angular position of the front closing cup of the housing in relation to the latter.
   Remove, *for preference by grinding*, the weld seam at point « b » securing the closing cup on the cylinder housing. (If milling is not possible hold pot in vice, tightening moderately, and saw weld seam).

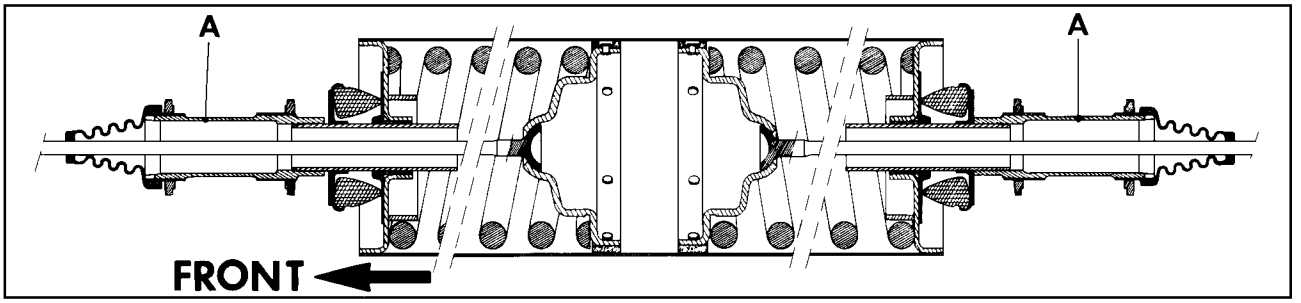
3. Free the assembly :
   - front tie-rod (5),
   - front closing cup (6),
   - front suspension spring (7),
   - compression cup (8).

4. Free the assembly :
   - rear tie rod,
   - compression cup,
   - rear suspension spring.
   Remove, if necessary, the felt joints and the bronze bushes at « a ».

5. Clean all the parts.

6. **Prepare the closing cups :**

   If bushes at « a » are to be replaced, soak the new bushes in mineral oil for approximately 24 hours.



Suspension units fitted on AZ and AZU vehicles :

VEHICLE TYPE	Length of springs decompressed and ϕ of wire (in mm)		Length of tie-rods (in mm)		Length of stub ends (in mm)	
	Front	Rear	Front	Rear	Front	Rear
AZ 9/1962 → 3/1963 AZU 6/1955 → 3/1963	185 14.35	170 15.25	623	644	191	173
AZ, AZU } 3/1963 → 9/1965	185 14.8	170 15.25	600	644	173	173
AZ 9/1965 → 2/1970 AZU 9/1965 → 9/1972 AZ (2 CV 4), AZ (2 CV 6) } 2/1970 → 10/1971	185 14.8	170 15.25	600	642	173	182
AZ (2 CV 4), AZ (2 CV 6) } 10/1971 → 9/1972	193 15.25	170 15.25	600	642	173	182
AZU 9/1972 →	193 15.25	170 15.25	593	611	173	182
AZ (2 CV 4), AZ (2 CV 6) } 9/1972 →	193 15.25	170 15.25	593	632	173	182

Suspension units fitted on DYANE vehicles - DYANE 4 and DYANE 6 :

AYA 8/1967 → 3/1968 AYA 2 3/1968 → 10/1968 AYA 3 1/1968 → 10/1968 AYB 10/1968 → 12/1968	185 14.8	170 15.25	600	642	173	182
AYA 2 10/1968 → AYB 12/1968 → 9/1972	193 15.25	170 15.25	600	642	173	182
AYA, AYB } 9/1972 →	193 15.25	170 15.25	593	632	173	182

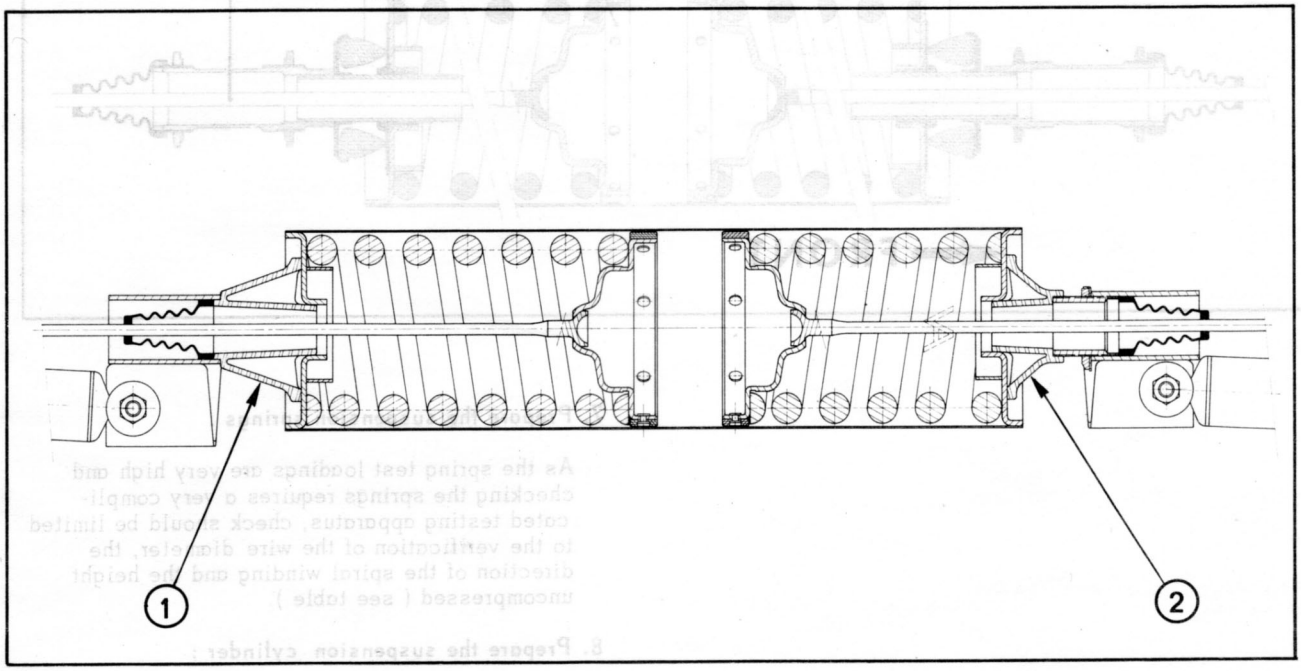
Suspension units fitted on AK vehicles :

AK All Types 9/1962 → 5/1968 5/1968 → 7/1976	225 192 17.15	238 17.95	642	618 600	197	197

Suspension units fitted on AM vehicles :

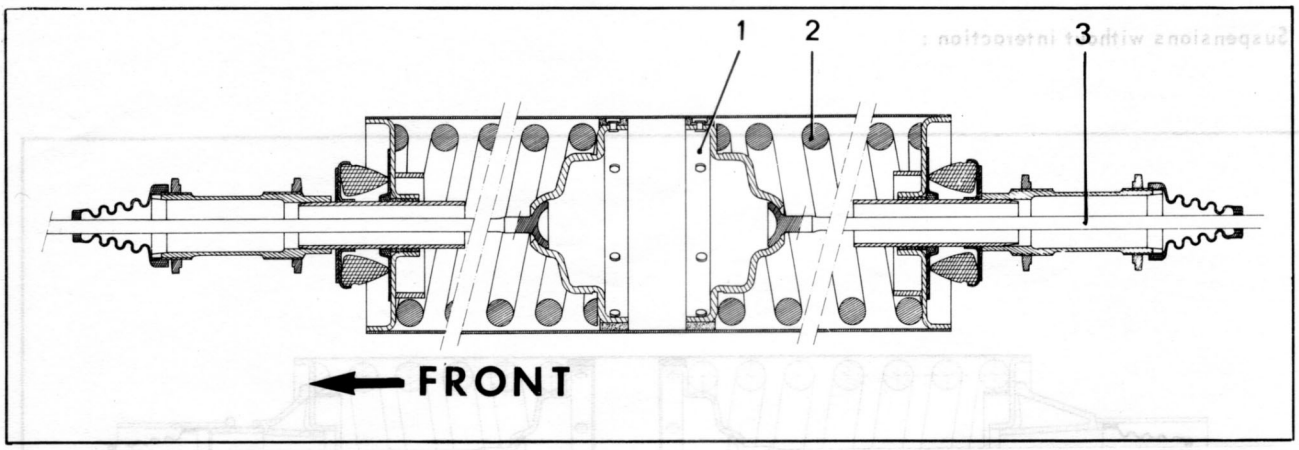
AM → 3/1969	192 17.25	205 17.25	623	623	197	197
AMB → 6/1972	195 18.2	243 19	623	644	197	197
AM 3/1969 → 6/1972	160 18.2	222 18.65	605	623	197	197
AM 6/1972 → 7/1976	160 18.2	222 18.65	575	611	197	197
AMB 6/1972 → 7/1976	160 18.2	222 18.65	611	632	197	197

* **Suspensions without interaction :**



VEHICLE TYPE	Length of springs decompressed (in mm)		Length of tie-rods (in mm)	
	Front	Rear	Front	Rear
Suspension units fitted on AM vehicles :				
AM 3 7/1976 ⟶	172 18	210.45 17.95	590	608
AMF 3 / AMC 3 } 7/1976 ⟶	172 18	239.7 18.65	575	629
Suspension units fitted on AK vehicles :				
AK 7/1976 ⟶	168 17.15	260 17.15	575	608
Suspension units fitted on AYCD (ACADIANE) vehicles :				
	168 17.15	260 17.15	590	792

* The suspension unit is secured by positioning two spacers (1) and (2) between the unit and the brackets on sidemembers.



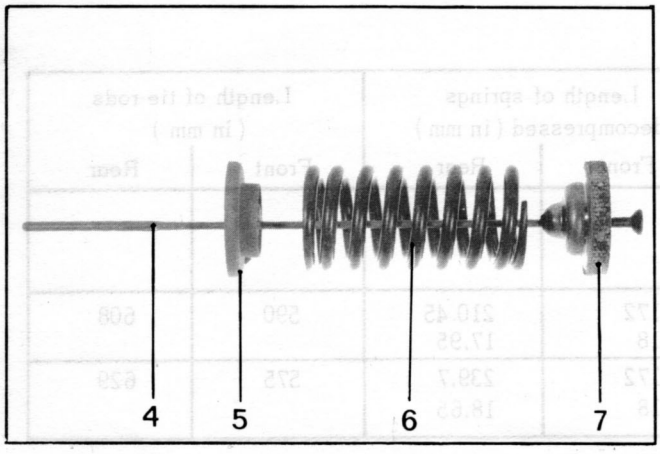
7. Prepare the suspension springs :

As the spring test loadings are very high and checking the springs requires a very complicated testing apparatus, check should be limited to the verification of the wire diameter, the direction of the spiral winding and the height uncompressed (see table).

8. Prepare the suspension cylinder :

Smear the interior using only castor oil.

PL. 576



9. Prepare the compression cups (1) :

Impregnate them with castor oil by immersion in a bath at an ambient temperature of workshop for 15 minutes, then leave them to drip.

10. Prepare the tie rods :

Identification (see table).
Grease the balls ends (TOTAL MULTIS grease).

11. Fit the suspension cylinder :

a) Place in position in the casing :
- the rear suspension spring (2), *(right-hand spiral winding).*
- the compression cup (1),
- the rear tie-rod (3).

b) Place on the front tie-rod (4) :
- the compression cup (7),
- the front suspension spring (6) *(left-hand spiral winding).*
- the front closing cup (5).

Insert the assembly in the casing.

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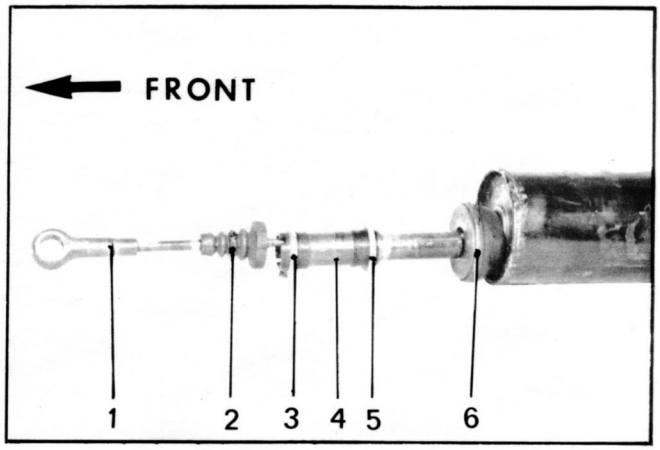
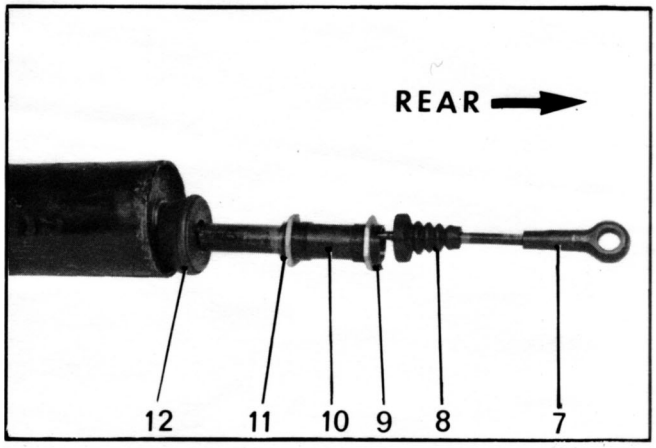


PL. 51



12. Weld the front closing cup :

a) Locate the cup in position marked when removing.
Ensure that the cap is perpendicular to the centre line of the casing.

b) Arc weld or if not possible, weld with a blow torch.

13. Assemble the suspension unit :

Position in succession :

a) On the front tie-rod :
- the rubber suspension buffer (6),
- the nut (5),
- the adjustable end-piece (4) (see table) fitted with the nut (3),
- the dust cover (2),
- the end-piece (1) for carrying the knife edged pin

b) On the rear tie-rod :
- the rubber suspension buffer (12),
- the nut (11),
- the adjustable end-piece (10) (see table) fitted with the nut (9),
- the dust cover (8),
- the end-piece (7) carrying the knife edged pin.