Clutch Overhaul - Posted on my website – Ken

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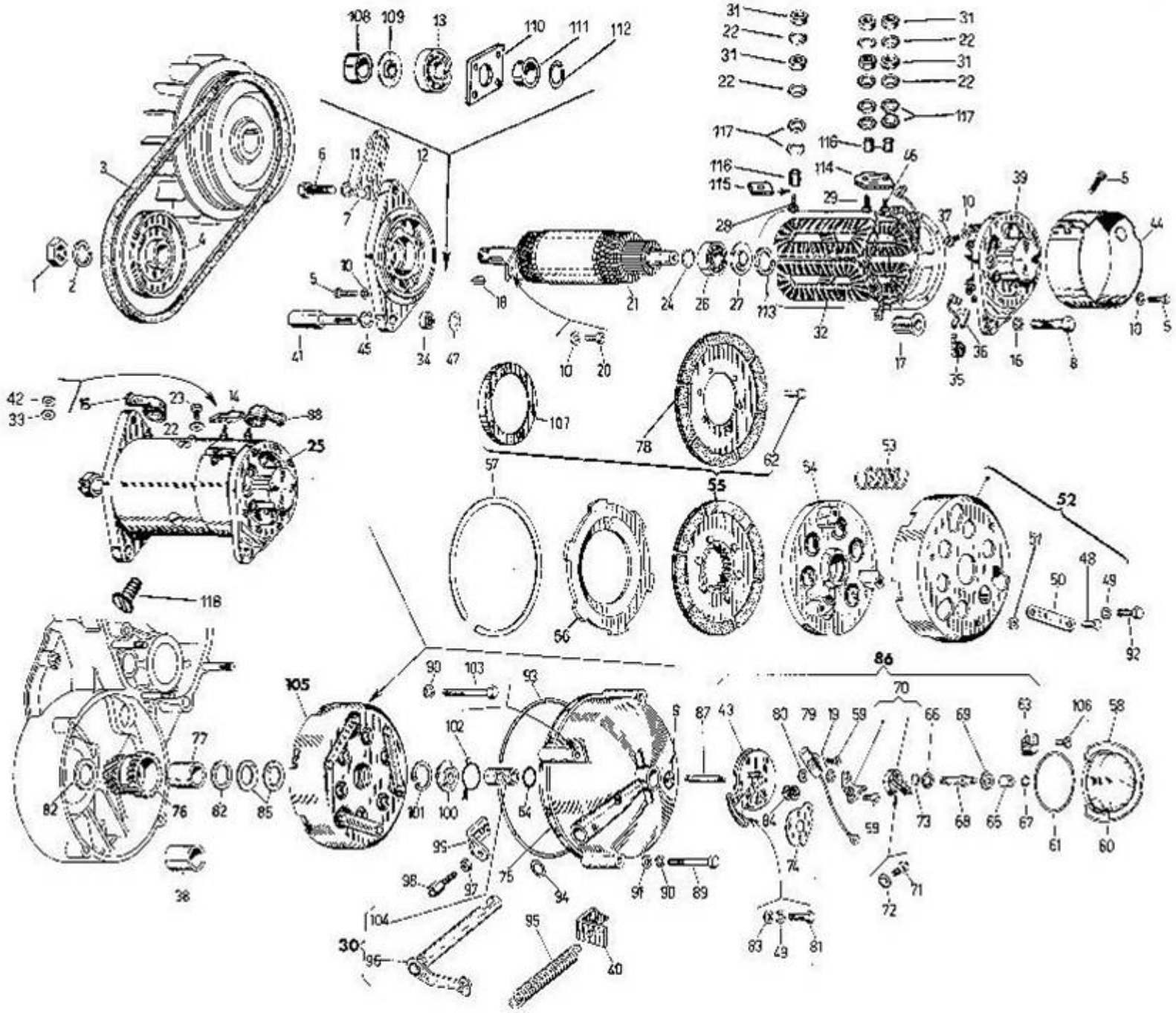
Piaggio Ape Vespacar P501
Clutch Overhaul

FRIZIONE - DINAMOTORE — EMBRAYAGE - DYNASTART — CLUTCH - DYNASTARTER — EMBRAGUE - DYNASTART

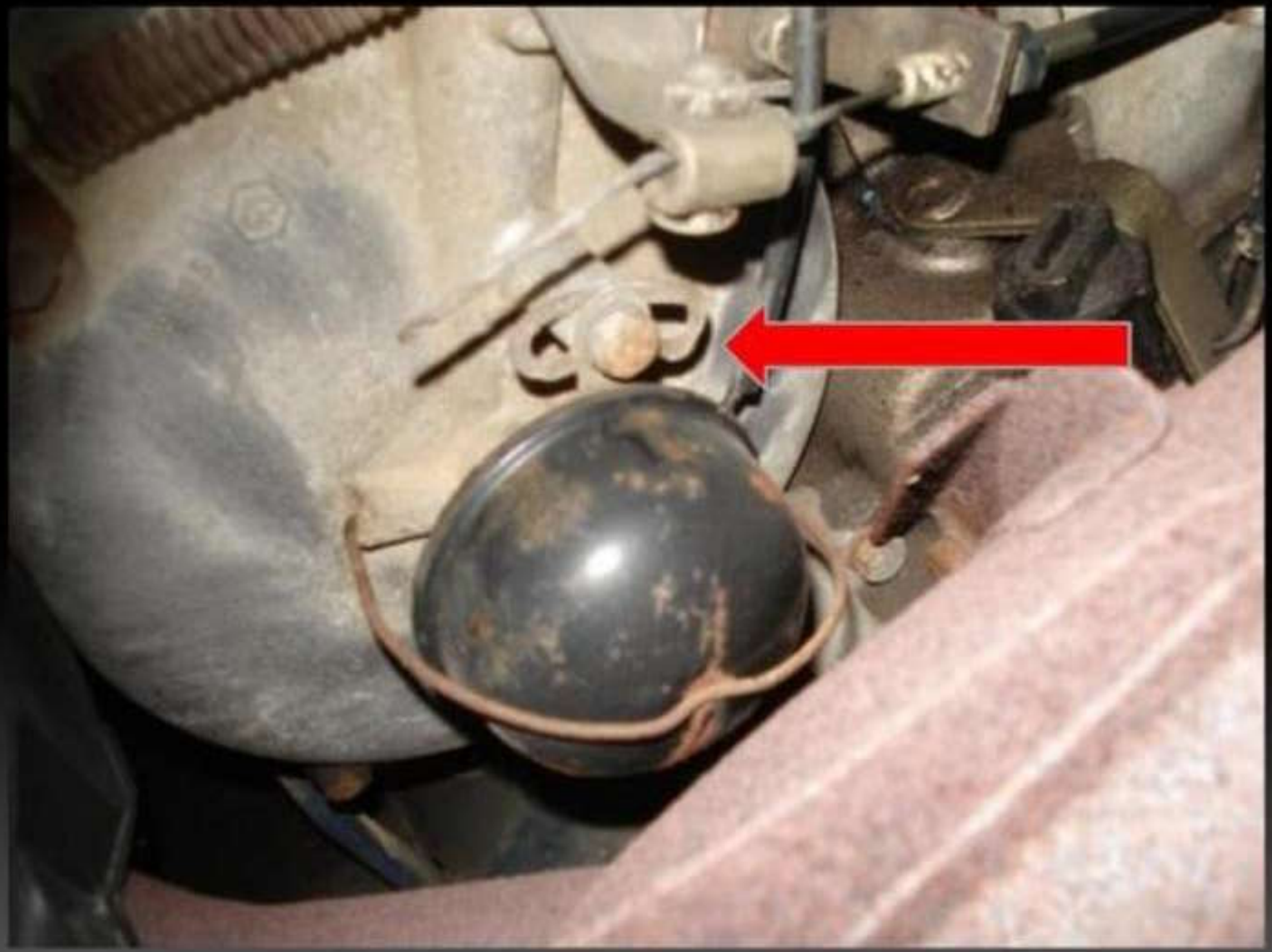


Motor - clutch housing with distributor

Motor number location – on the clutch housing - Ken

Distributor cap – wire clip holds it in place

Timing adjustment slide



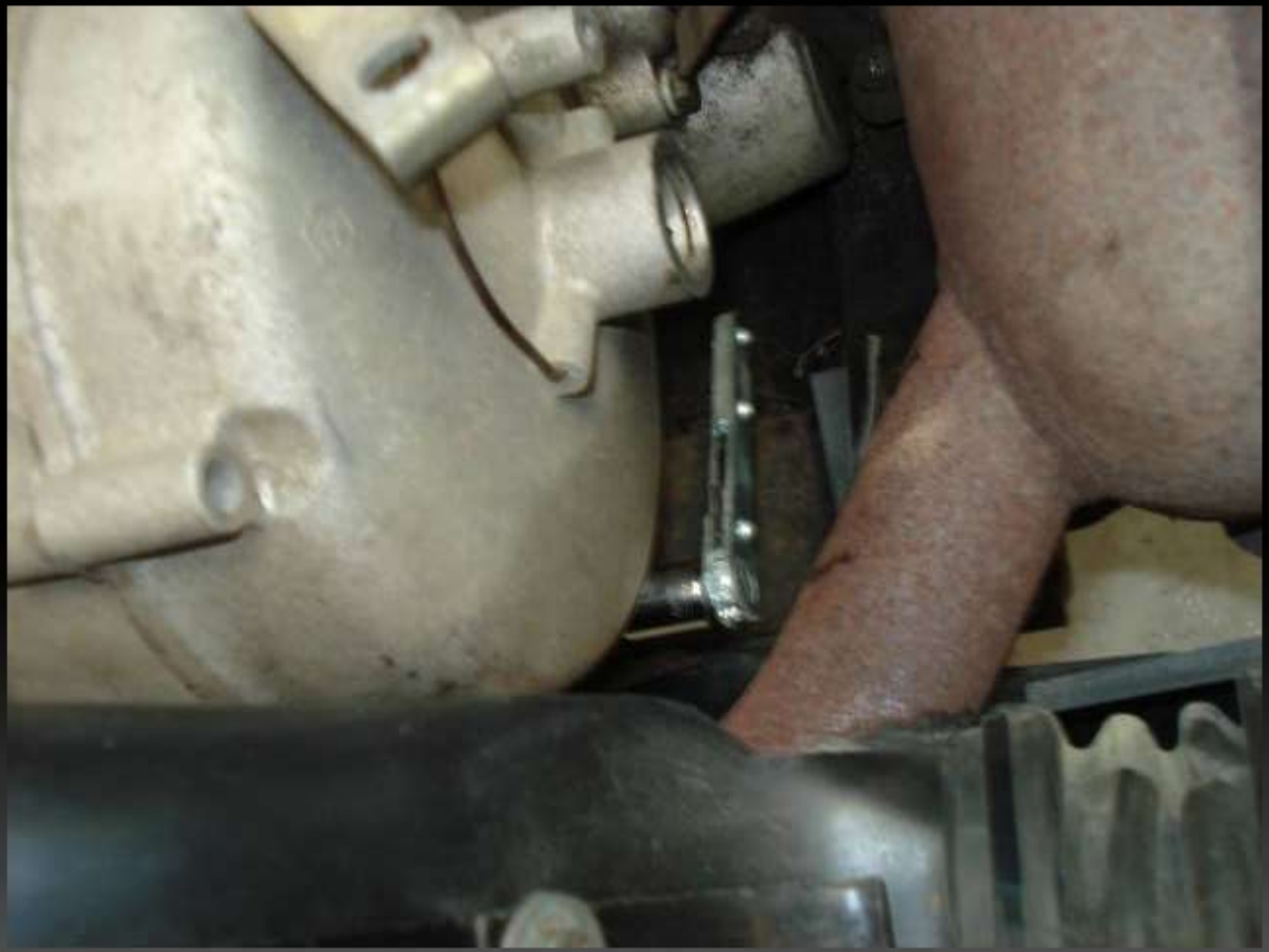
Use 10mm wrench to undo slide bolt to adjust timing

Remove distributor – push down the retaining clip, pull off the cap, remove 10mm bolt in slide and pull distributor away from clutch housing – set aside for now

Distributor cap drain hole – install with hole at the bottom

Use an 11mm wrench to remove 3 short bolts and 1 long bolt to remove the clutch housing

If the muffler is attached you'll need a small socket set to be able to undo the lower front bolt – mine is early Japanese, bought at a yard sale



The old actuating pad is worn down compared to the new

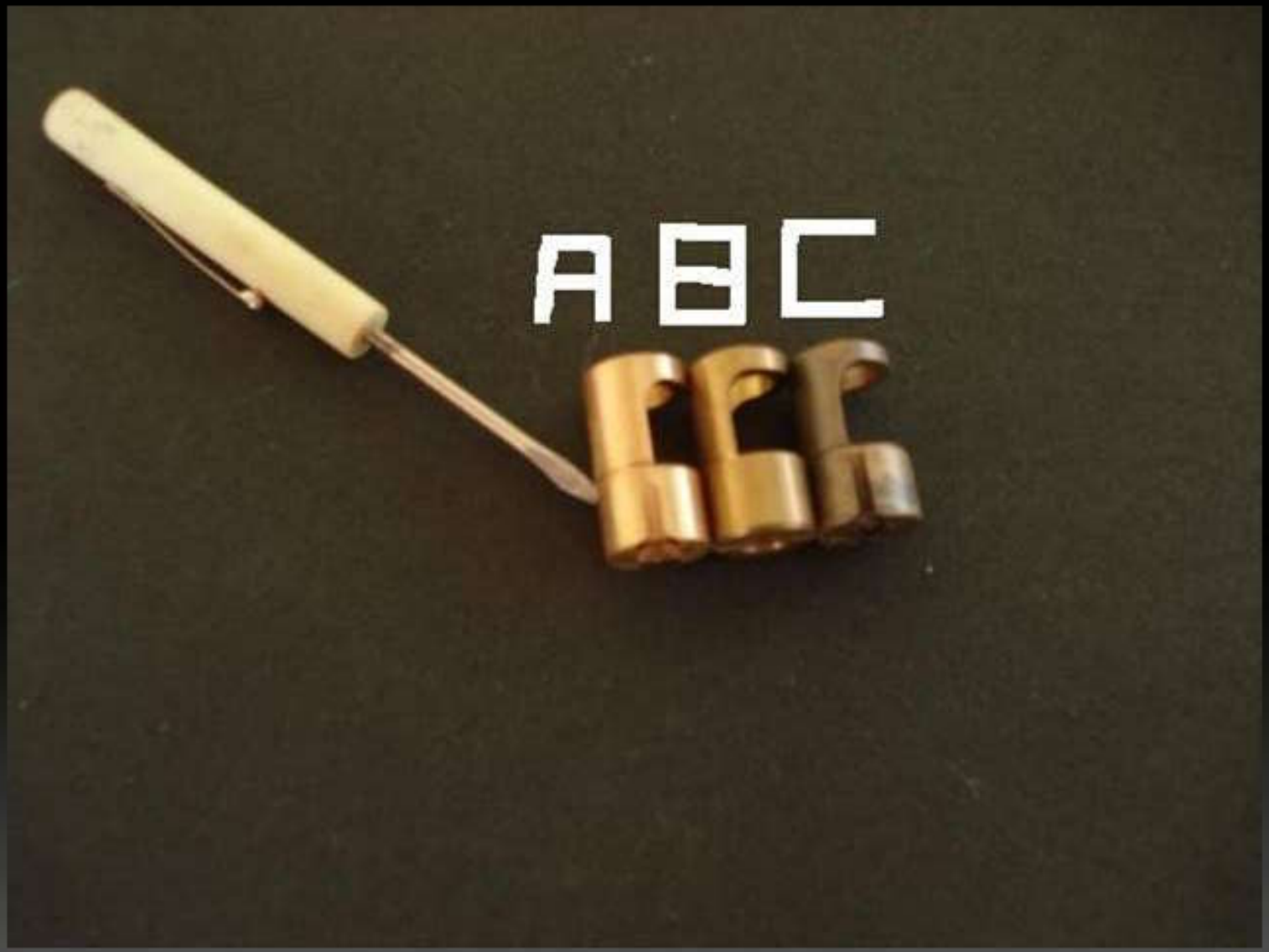
Worn pad – no clutch adjustment

I've removed the actuating pad from the arm and shows wear on the old compared to a new one. Turn the clutch arm while pulling and it'll release, installation is the reverse

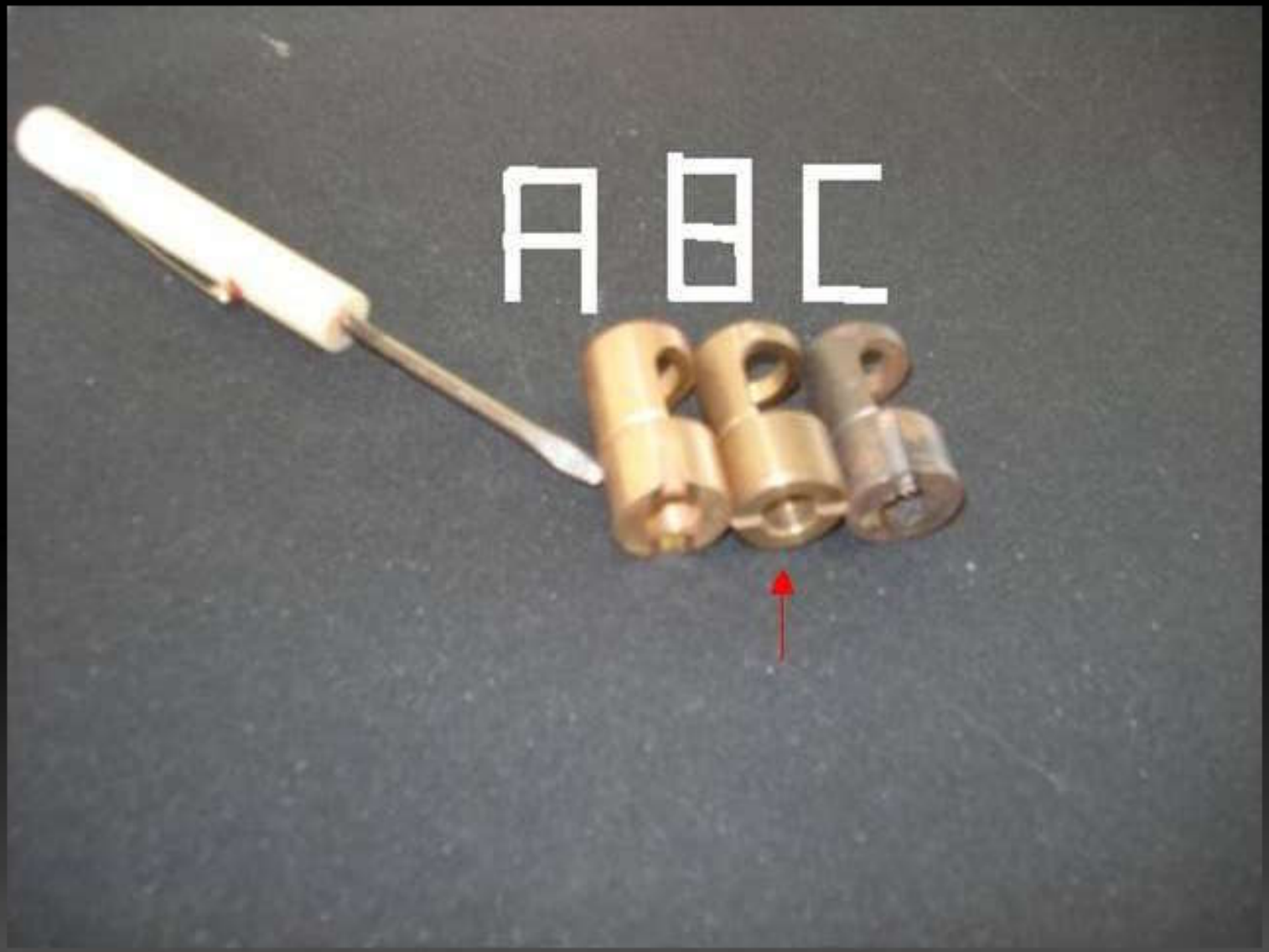
Shorter than new actuating pad

New rallino (pad) installed – note groove lineup

A (new) B (new but incorrect) C (correct old pad) - note groove machined in sides of correct ones



B (with arrow) is incorrectly manufactured. No side groove and bottom groove is in the wrong direction. The groove is to collect oil for lubricating the part. B wears out quickly.



See how B is incorrectly manufactured

Wrong actuating pad – bottom groove incorrect and no side groove

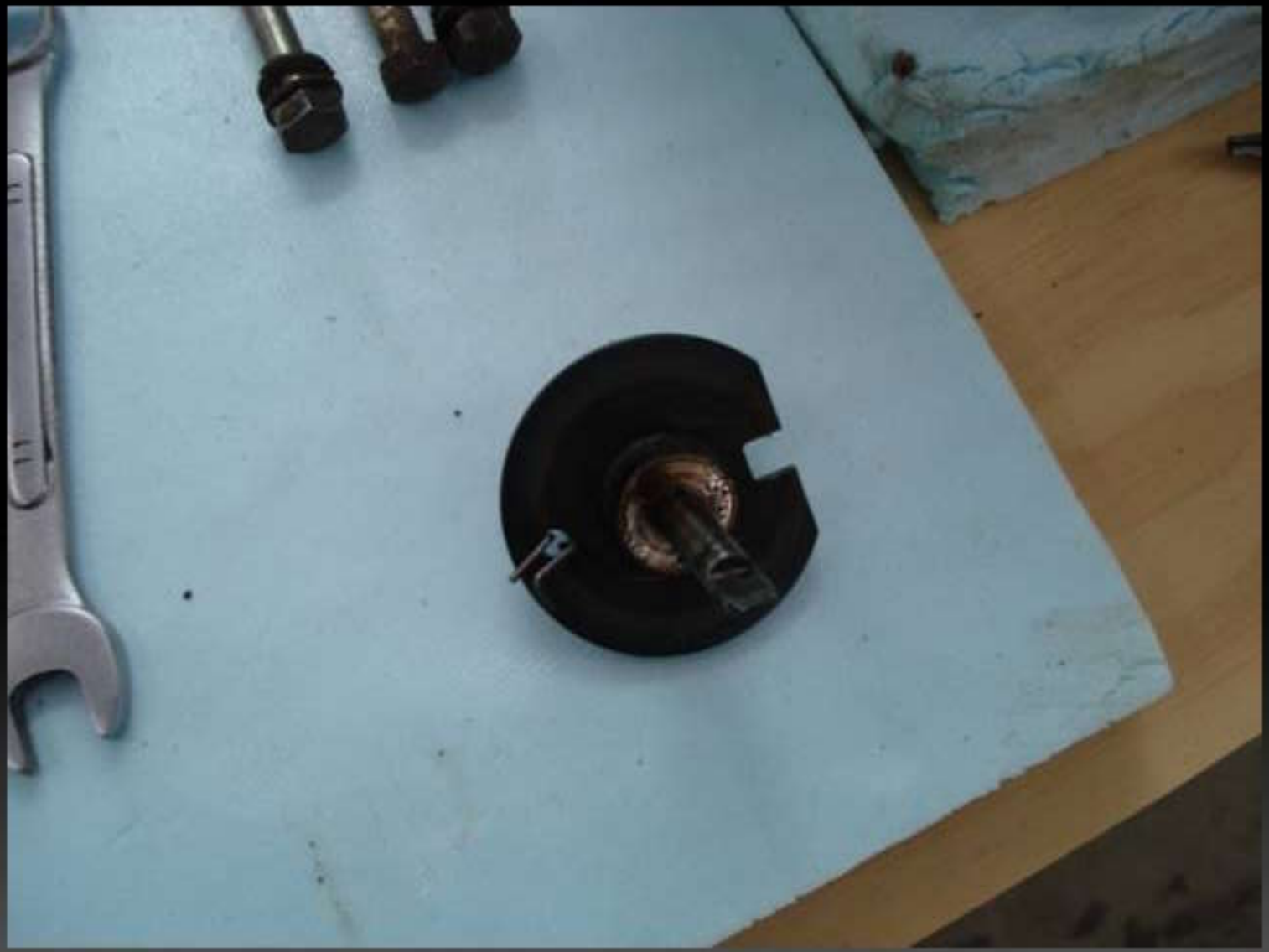
Correct actuating pad – correct bottom and side grooves line up with a groove in the clutch cover, collecting oil for lubricating the actuating pad.

Guarnizione - “ O “ ring to seal clutch housing

Found a bad thing – brass washer over cam control, sitting on thrusting plate to take up space of worn actuating pad (replacement obviously not available) – I guess it worked.

Spring clip mounted on the bottom of the thrusting plate, it should be on top as original.

Spring retaining wire on the bottom, should be on top around the cam control shaft, holding the thrusting plate in place



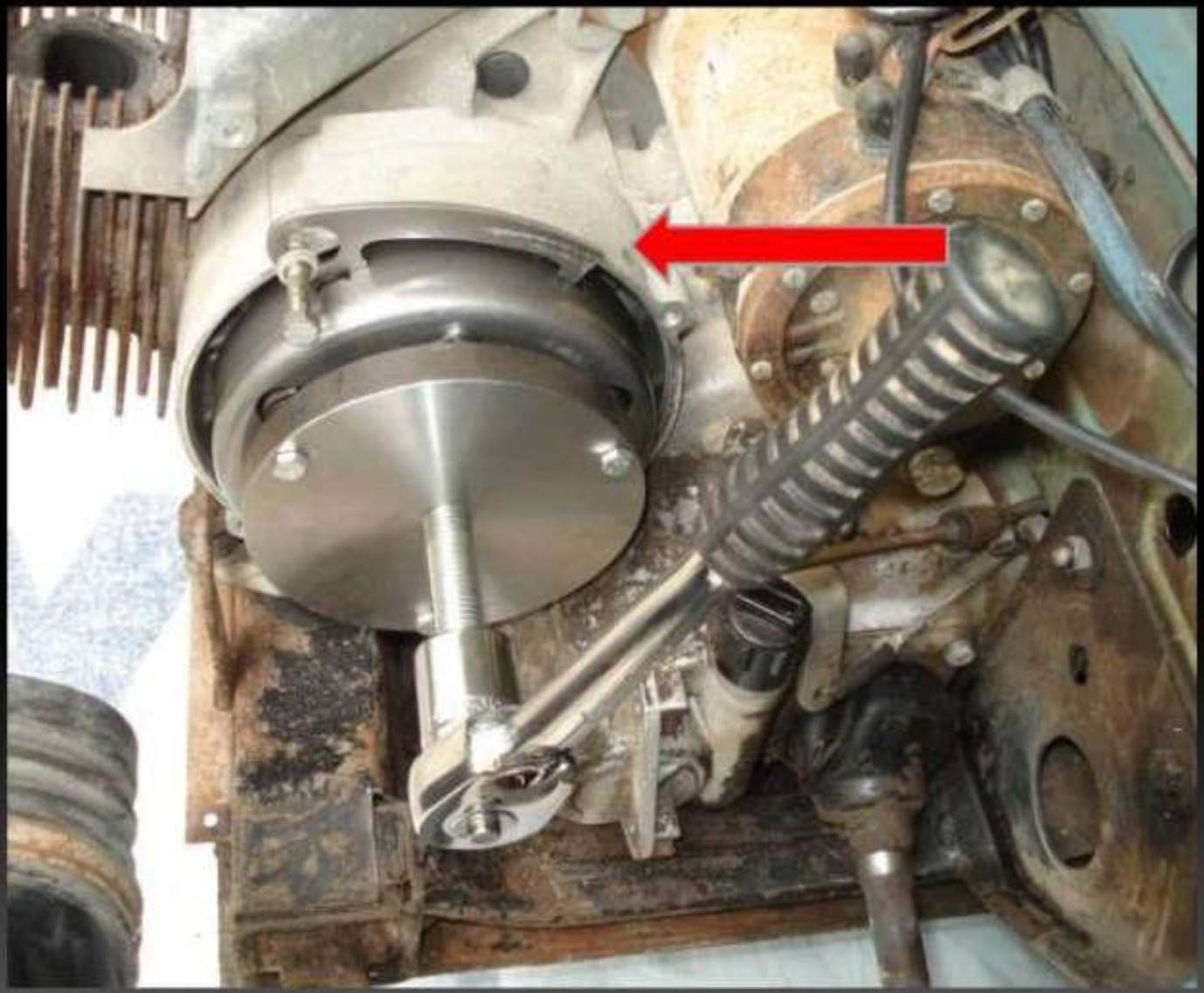
Brass washer to take up wear on actuating pad

Brass washer tightly fitted

Cam control shaft

Clutch holding wrench used to undo or tighten nut that holds the clutch in place – it's reversible.

Clutch holding wrench (shown for tightening – reverse to loosen clutch nut) and clutch puller may be required to free a frozen clutch housing – we made the puller.



Remove nut and washer – wrench holds it tight

Clutch nut and washer removed

New and old thrusting plates

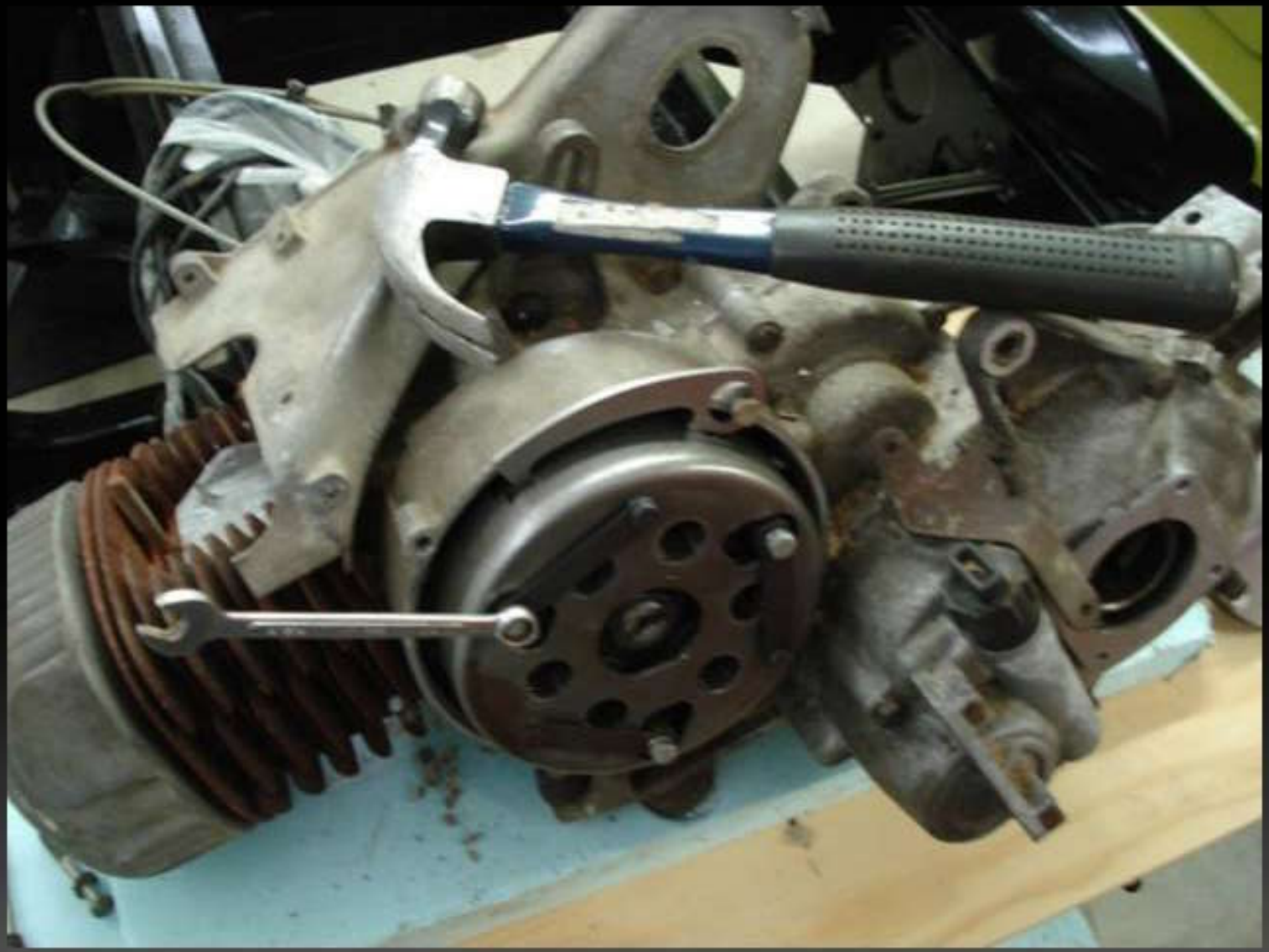
New cam control on the left, old wrongly repaired one on the right – when welded the tip should have turned 90 degrees – prior owner used plumbers strap to set timing.

With the motor in place it's a tight squeeze

Clutch puller

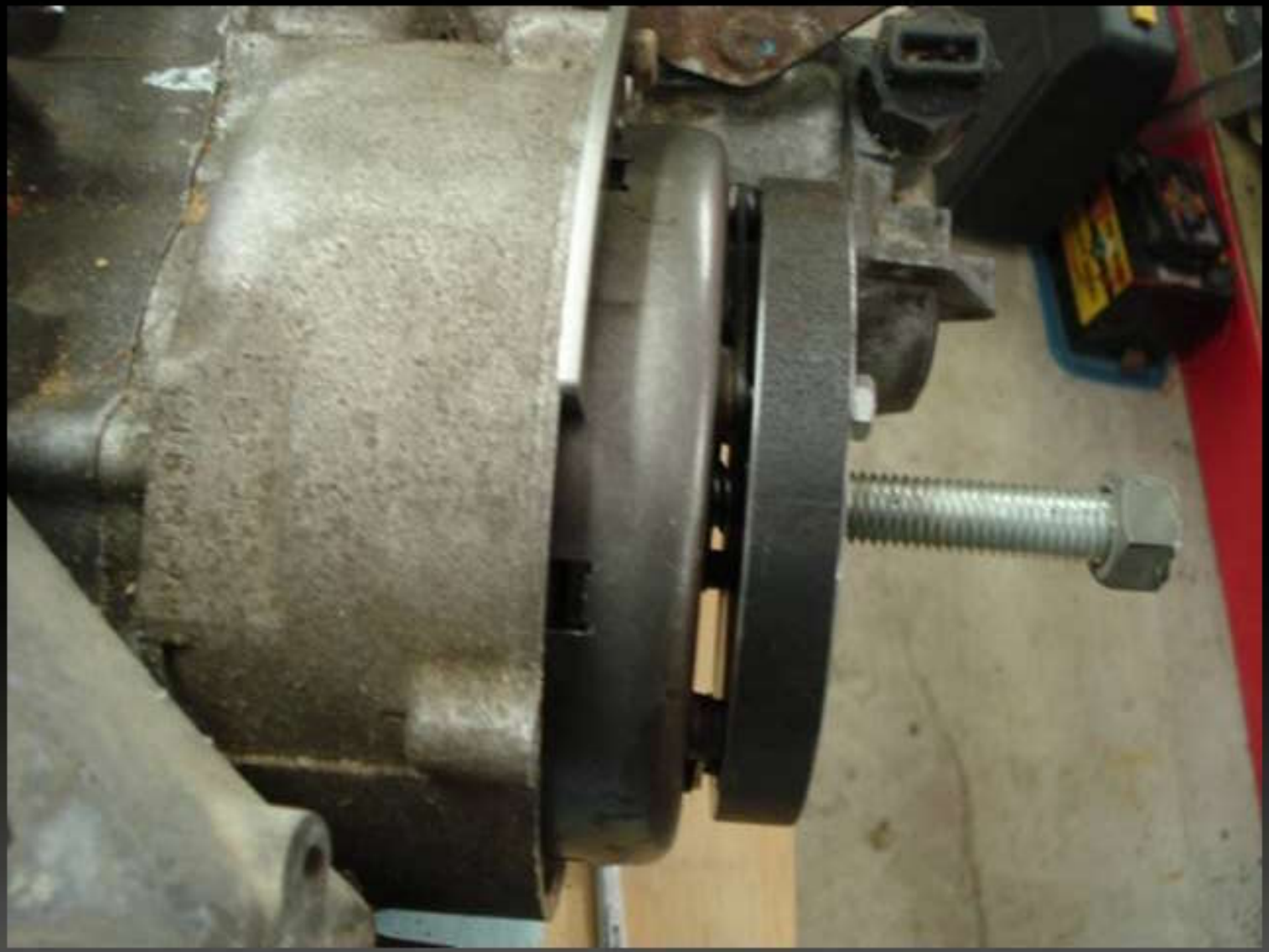
Tapered bolt to fit into end of shaft where cam control fits. This is critical so as to not damage the shaft.

Use a 10mm wrench to remove the three bolts on the face of the clutch to be able to mount clutch puller



Clutch puller mounted – use long enough metric bolts to fasten securely

Clutch puller must be fastened tightly to face of the clutch – quite a bit of force involved to free it, can't be loose. Center threaded bolt has a tapered point to fit into the shaft end.



Screw in the center bolt against the shaft. The clutch wrench will hold it in position. Do this slowly and you'll see it start to pull the clutch outwards

Thread the center bolt inwards to pull out the clutch

Remove the clutch puller by undoing the three small bolts

Tapered split cone is what holds the clutch so tightly in place and it's what requires the clutch puller to remove it

Clutch-clutch compressor. Holes allow a tight fit against the outside of the clutch housing.

The man who made this tool for me did the markings – KJ on the collar and VESPA on the back plate – neat.

Mounted, collar centered. The collar is very important and must fit tightly inside the teeth on the clutch plate. If the fit is sloppy the clutch plate won't align properly.

Screw down the big nut to compress the clutch springs.
Once compressed slip out the retaining clip gently.

With retaining clip removed undo the nut and remove the collar. Set the clutch on a rubber mat to stop it from spinning while undoing the nut. Carefully lift off.

Undo the nut to release

The original clutch plate wasn't very worn

Old and new clutch plates – I've decided to put in a new one

Here are the springs inside the clutch – they're why you take it apart carefully and slowly.

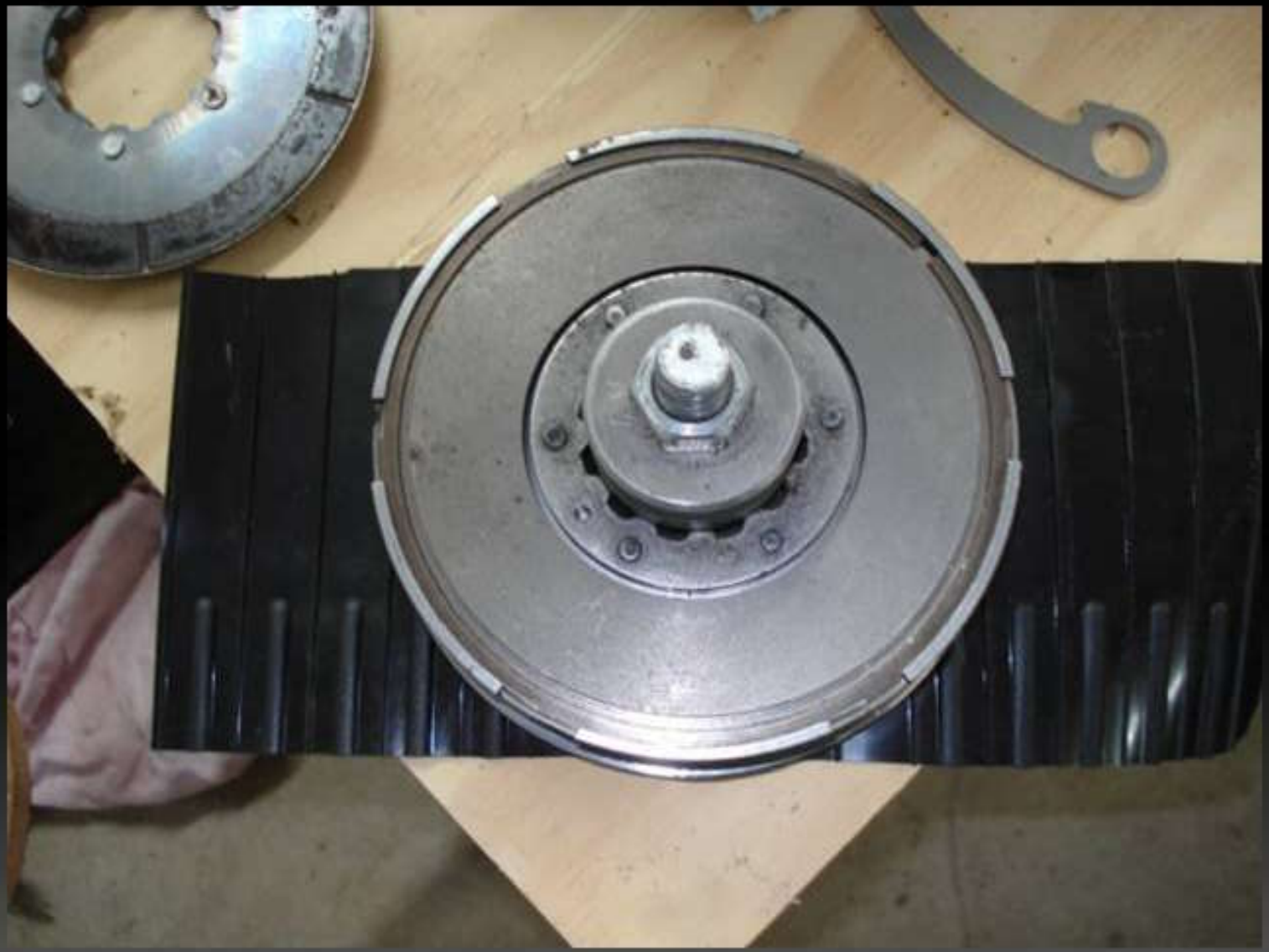
A clutch returned to me – The clutch plate is off to one side, not centered. Not assembled correctly.

Incorrectly assembled clutch – a client didn't use a collar to center the clutch plate – it won't self adjust! – spacing not concentric.

Springs fit inside the holes – before final assembly make sure they're all in these holes

Just look in the space and with a pencil or screwdriver make sure all the springs fit into their respective holes

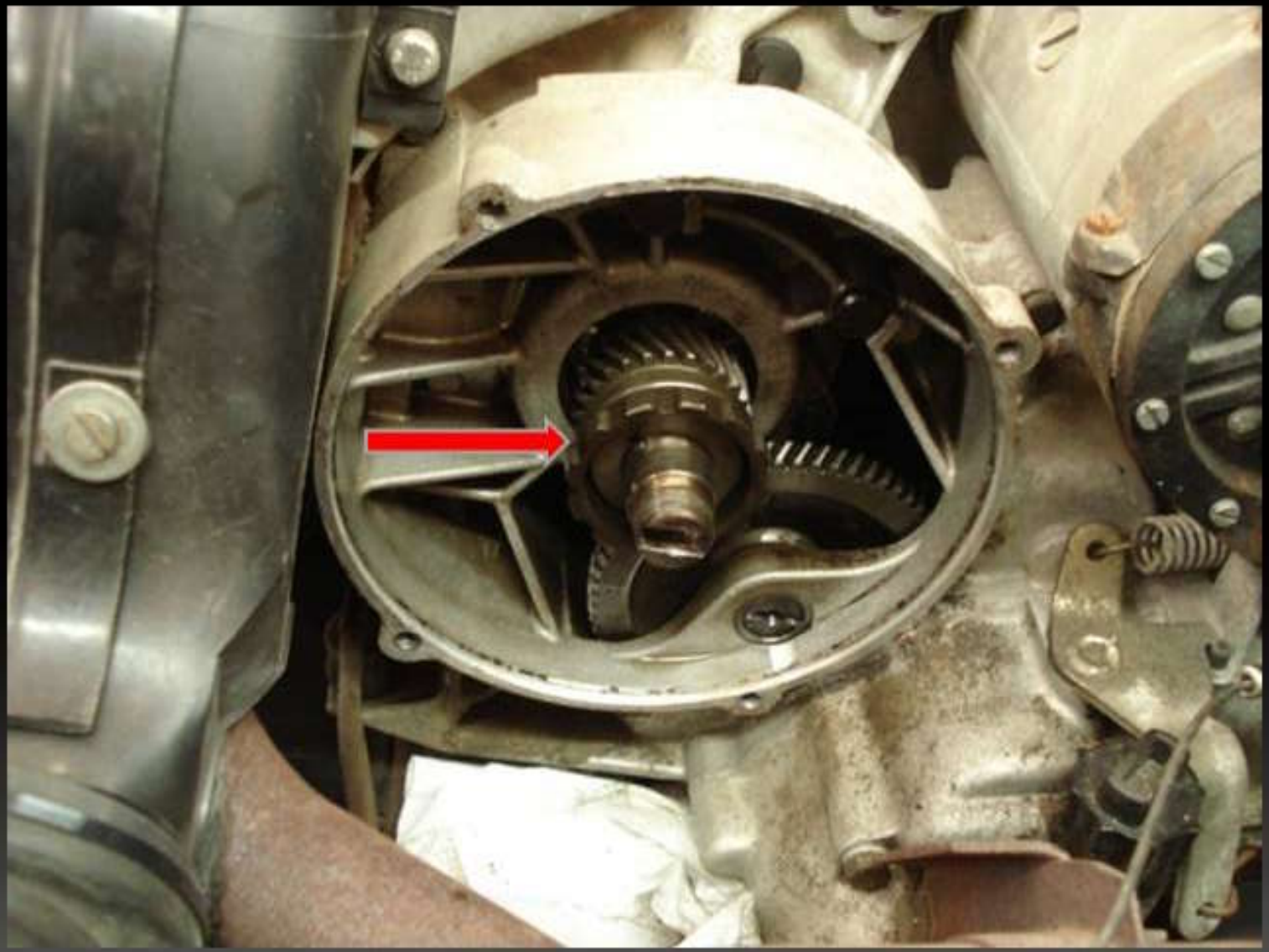
Insert the spring clip around the outer edge after the clutch is completely compressed – there's a groove on the edge



Very low km's on this motor, like new inside

Pull the gear (green dot on it) and slide the brass bushing ahead to check for wear as well as the steel bushing inside it. Replace if showing signs of wear. These are fine.

Grooves in the clutch plate must fit over the teeth on this gear for clutch installation

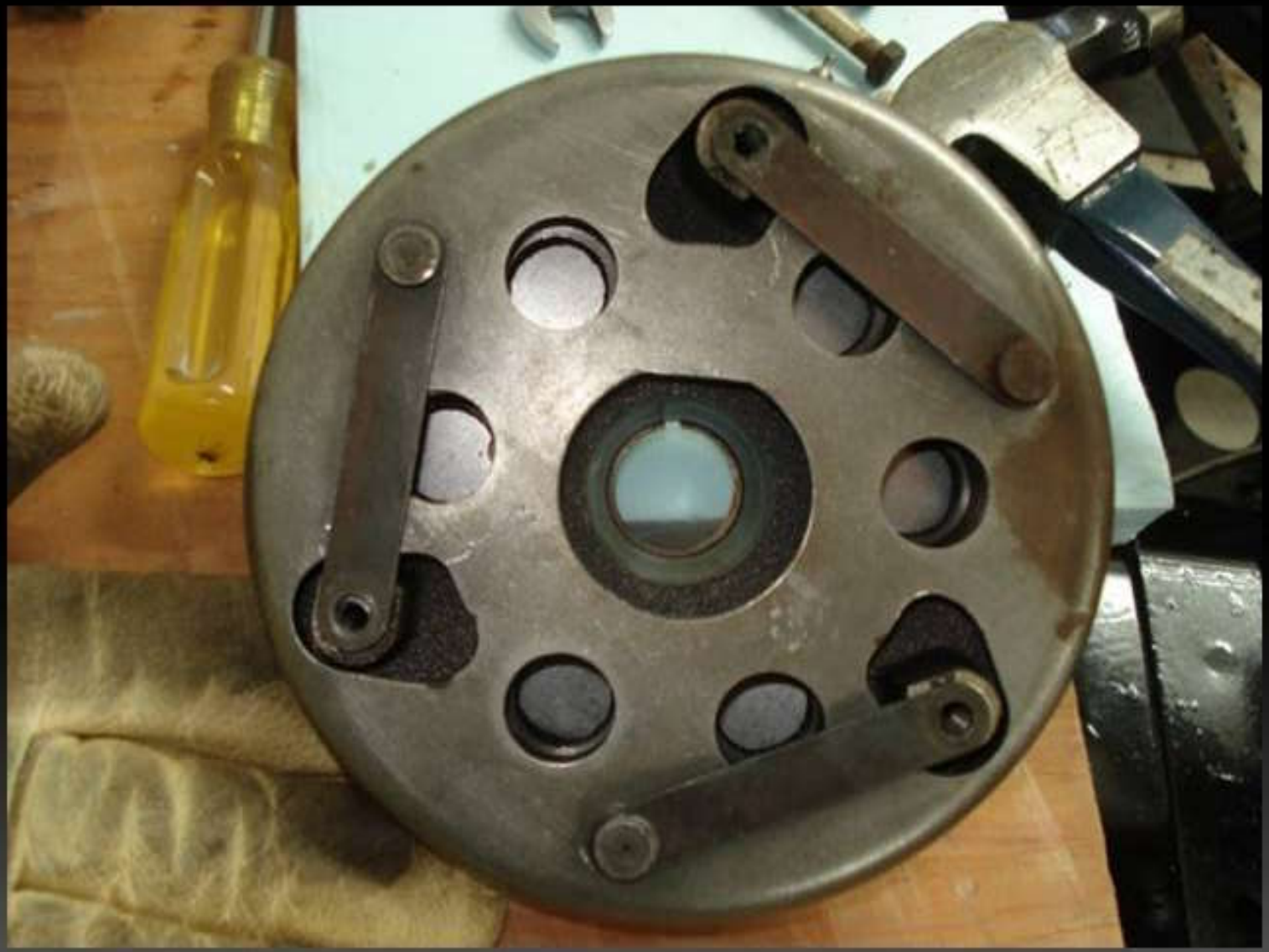


There's a half moon key in the shaft and it must be in good condition to keep everything lined up and in its place. Critical.

The groove in the large washer fits over the half moon key in the shaft.

Washer mounted over the key in the shaft

The groove or slot in the center hole fits over the half moon key in the shaft for the clutch to seat properly



Mount the clutch in place making sure the teeth of the clutch fit into the grooves in the gear. Slide the tapered collar over the shaft (taper in) and put on nut & washer

Properly mounted thrusting plate, cam control shaft and retaining spring on the clutch

Tighten the shaft bolt to Manual torque specs. Set cam control into end of shaft, thrusting plate over and insert the spring clip as shown to hold in place (twin ends first)

With a new actuating pad re-install the clutch cover, spring for clutch lever and you're ready to install distributor and reset the timing. - Ken

Install the clutch cable again and make sure the clutch arm has a bit of free play to allow the clutch to spin without dragging on the actuating pad or you'll quickly wear it out.

Very dirty original distributor. The rim seal on the distributor under the cap was broken allowing dirt to enter

Top of new distributor – ‘ Simon ‘ underneath ‘

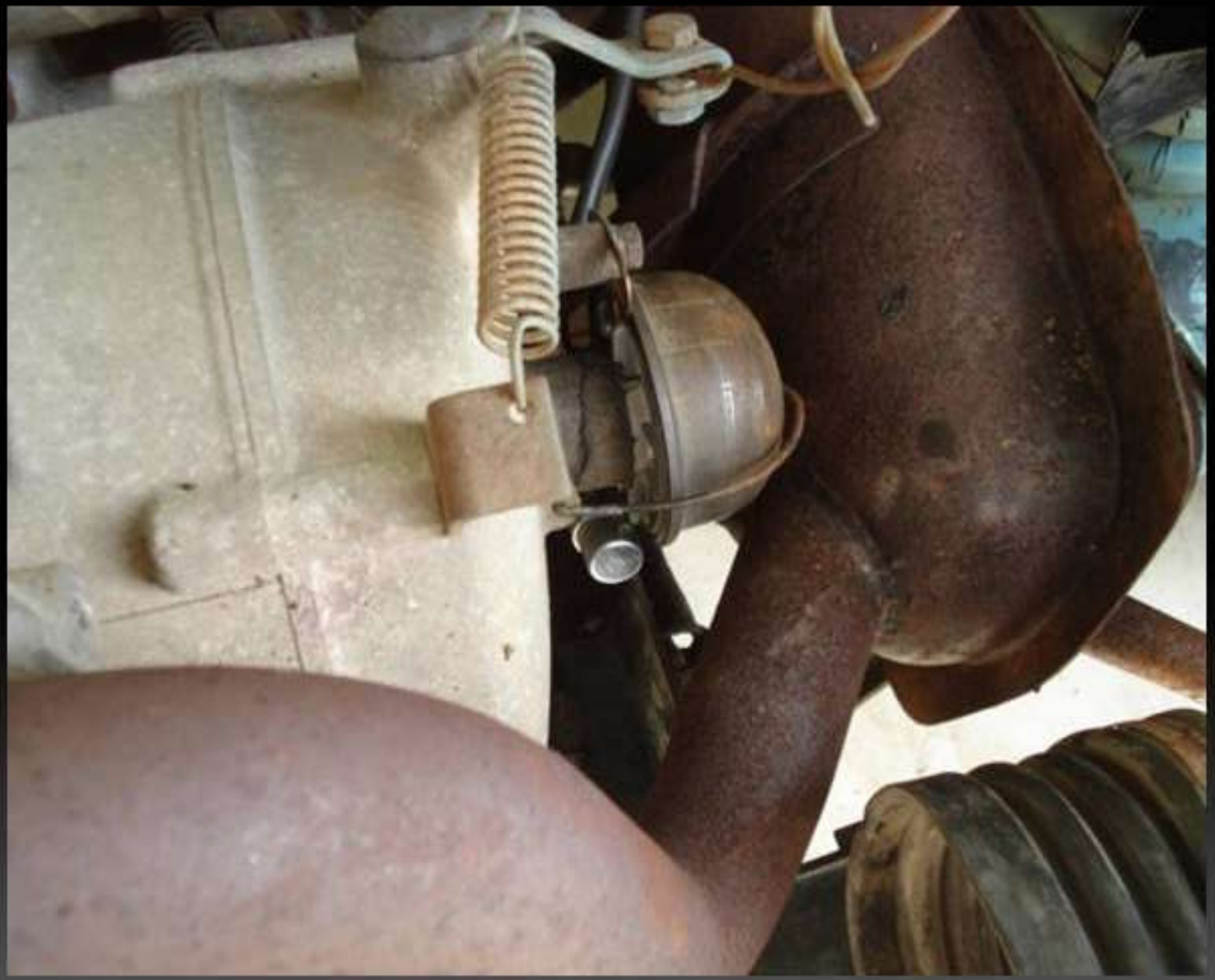
Base of a new distributor with condensor attached

Correct spark plug and iginition tools – you'll need a small mirror when working on the points when the distributor is in place.

Top Dead Center hole – a rod is inserted here when setting the timing. The rubber plug forward of it is to check the slack in the fan belt.

Finding TDC – rod must go through the top hole, through the second hole in the casing and fit into a groove on the fan. When lined up that's Top Dead Center.

Install the distributor with locking bolt and spring on the cap, correct points gap. Follow instructions for setting the timing. New points and condensor while you're at it.



Operations for checking the flywheel magneto timing :

1. - Dismantle the **lid** and release the cap « A » fig. 20.
2. - Draw out from the engine (by pulling towards the outside) the plate « B » with shaft and contact breaker (fig. 20).
3. - Rotate this shaft by hand, the max opening of the contact breaker points must be 0.4 ÷ 0.5 mm.: (0."015 to 0".019) if it is not the case, unlock the screw «C» securing the contact breaker braket (fig. 21) and adjust it.
4. - Introduce again into the engine the group shaft - plate «B» as follows.
   — Apply the group in its housing, by rotating and pushing it untill the shaft clicks.
   — Rotate again the fitted group in order to obtain that the tail piece of the stirrup (with an opening) «D» comes back to its seat «E» located on the plate.
5. - Introduce in the hole « F » (fig. 20) a rod ∅ 5; with the gear change in the 4th gear, **the engine cut out and ignition off,** push the vehicle so that the engine slow rotates until the rod end is meeting an other hole on the rotor and drives into it.
6. - Unlock the bolt « G » and rotate **anticlockwise** the plate « B » **until it attains the end of the opening « D ».**

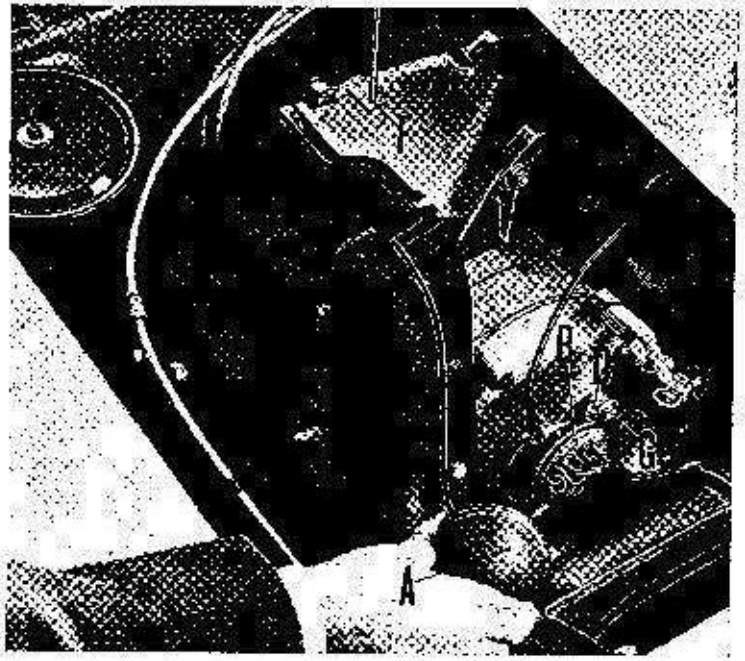


Fig. 20

Fig. 21

Fig. 22

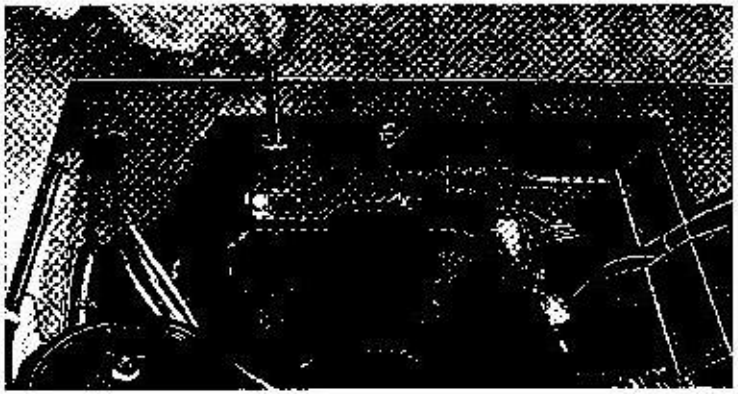


Fig. 23

7. - Rotate now **slowly clockwise** the plate « B » until the contact breaker points begin to open : **in this position lock the bolt « G ».**

b) - **MAIN OPERATIONS OF OVERHAUL OR-PARTS REPLACEMENT**

Cylinder, piston, roller cage on the con - rod.

— Release the plate with grommet (on engine cooling hood) for control warm air device.
— Disconnect H. T. cable from spark plug.
— Open straps securing bellows (part n. 66 T. I of Spare Parts Catalogue and part n. 21 T. VIII) and release the cooling hood after having unscrewed the screws securing it to the air distributing channel of cooling.
— Unscrew the stud nuts and remove the cylinder head and the cylinder (see paragraph « Engine dismantling » for particular dismantling and chapter « Overhauls » for assembly plays). For re - assembly, operate contrarywise.

Replacement dynastarter belt.

— Release the bellows of the air intake and the cover for channel distributor of cooling, by unscrewing the securing screw and the spring.
— Unloose three bolts securing the dynastarter by displacing the last in order to release the belt.
— Fit the new belt and pull taut by means of the calibrated tool 0035712 as illustrated on fig. 22

When you're finished it's time to take the Vespacar for a ride in a Parade - Ken