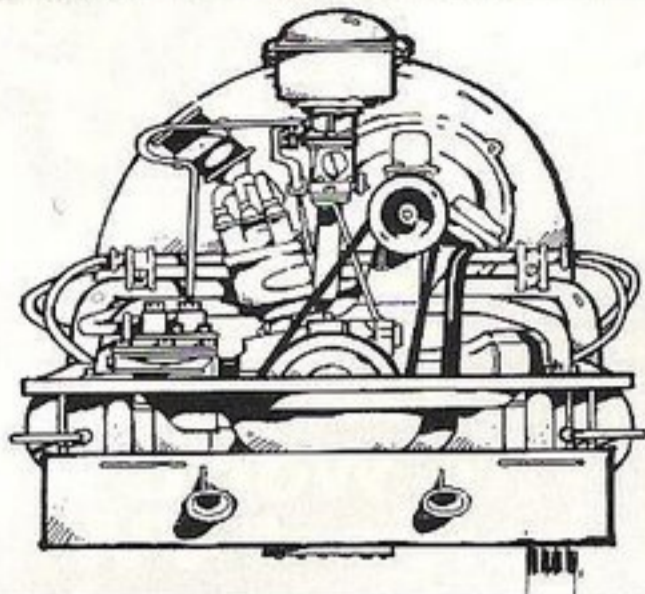


Engine



Text, Photos and Rebuild
By Hank Roed

From 1954 through 1960 Volkswagen installed a 64mm stroke by 77mm bore 1192cc engine in the Bug. This engine measured 36 horsepower by S.A.E. testing; its European rating was 36 hp D.I.N.

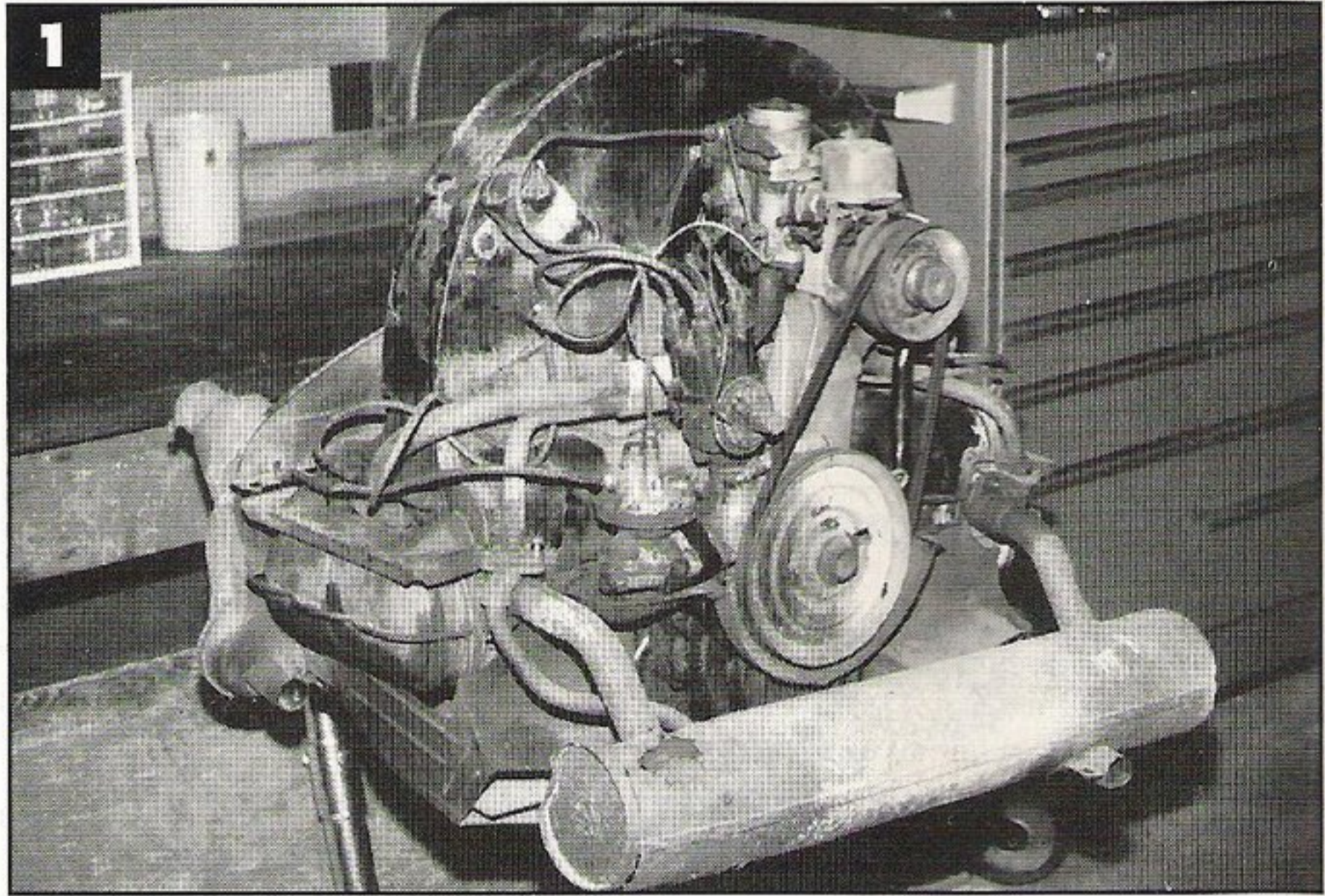
Compared to most cars on the road during that era it was, well, a real wimp; that's what Volkswagen intended. VW knew the simplest, most inexpensive way to provide long engine life to go with the sturdy chassis and body was to deliberately restrict the engine's performance. In design this was achieved with restricted breathing: It has a very small diameter carb venturi and intake manifold, matched to small valves with low lift and cam timing more suited for a tractor. When this strangled breathing system is combined with a 6.6:1 compression ratio and a top gear ratio of 3.52:1, you end up with piston speed of only 1400 feet per minute when the car is run flat out.

Full throttle, pedal-to-the-metal flat out is how you drove these cars on the highways; no, it doesn't hurt them a bit. The predominant misunderstanding was to drive them too slow; lugging the engine was a killer. Many drivers of that era had just traded in their long-stroke six- or eight-cylinder cars for Bugs, then tried driving them downhill at the speed limit and then all the way uphill in fourth gear. More informed drivers drove down hill as fast as possible to gain momentum for the oncoming uphill climb, rowing down through the gears when the rpm dropped in an attempt to keep the engine near its peak power band of about 3700 rpm.

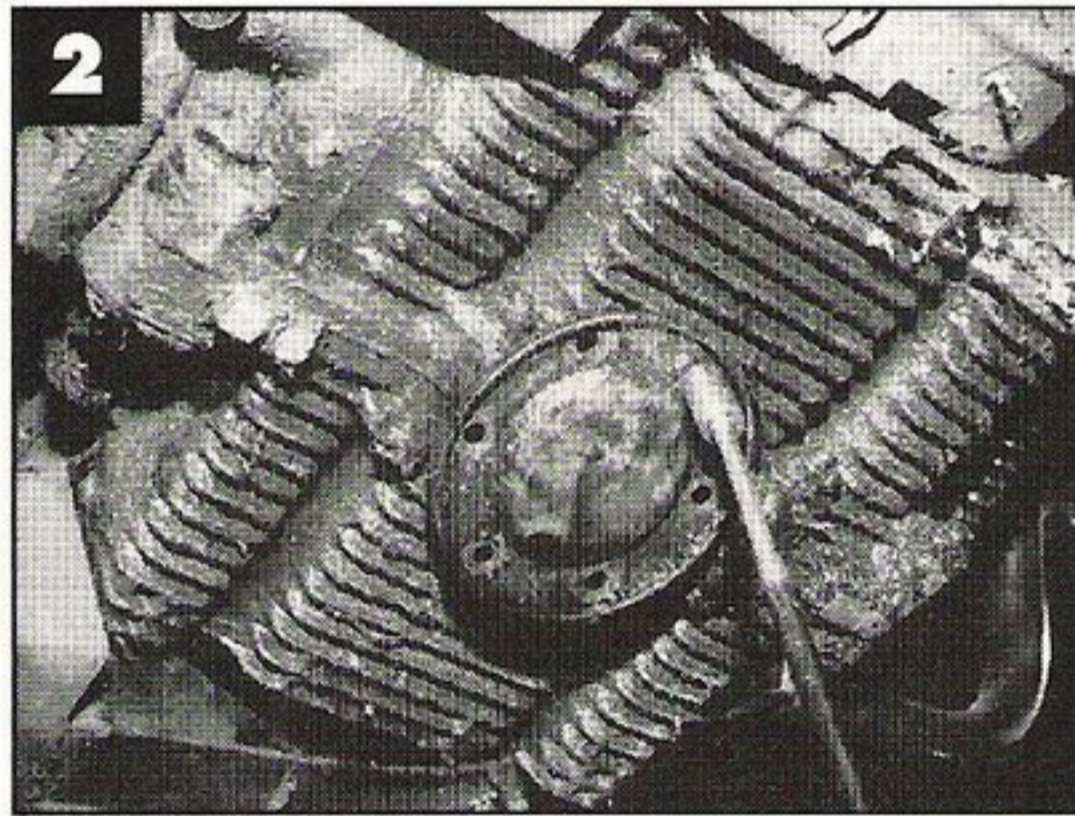
I have heard of some daring drivers jury-rigging a suicide cruise control on cross-country trips: a stick wedged between the seat and gas pedal. Yes they arrived safely with no harm to the engine or any speeding tickets, and averaged about 30 mpg.

Restoring a 1954-1960 Volkswagen to original condition requires rebuilding a 36-hp engine, preferably with the original engine cases or at least a serial number in series with your chassis number. Hopefully this article will

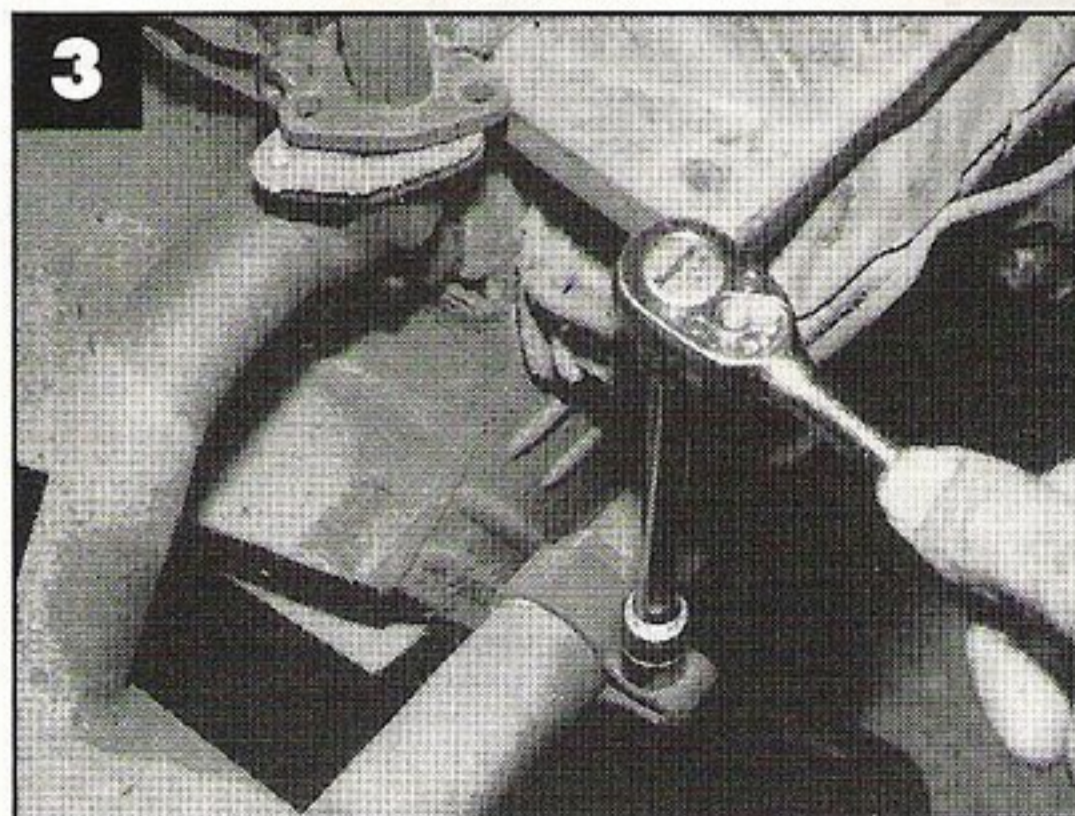
Vintage Engine Rebuild Part I



1 - A 1954 36-hp engine, complete with rusted-out single-tip muffler and unknown mileage, awaits surgery on the engine stand.



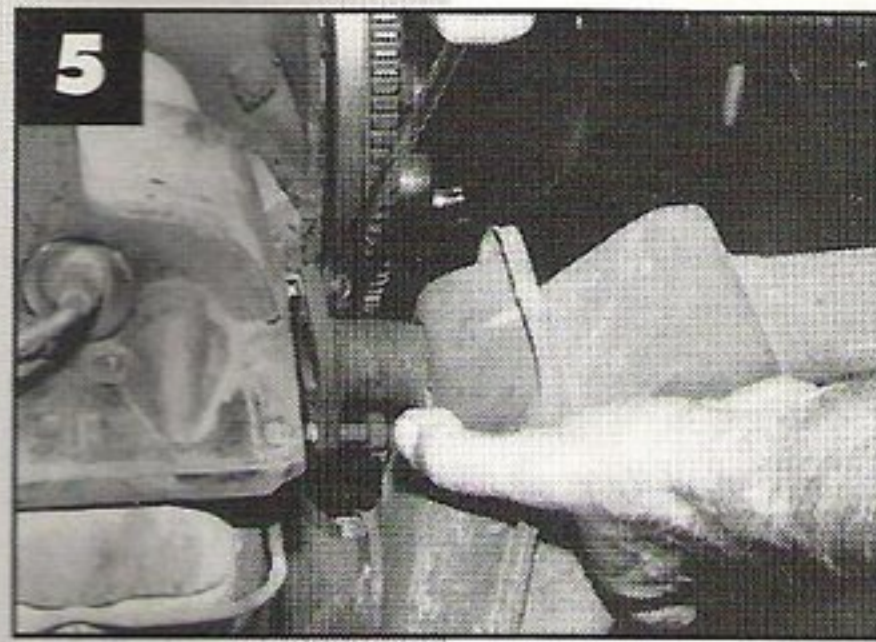
2 - Drain the oil using a 10mm socket and remove the plate and screen. Some of the studs may stick to the nuts and come out of the case; don't worry, we will tend to that later. A touch of your finger can indicate internal damage: Look for anything metallic or use a magnet. Worn bearings may show up as gray oil. Spray all nuts and bolts with penetrating oil then remove the heat-riser bolts with a 10mm socket. They often will snap off in the muffler due to rust and heat. If reusing the muffler, you will need to drill and retap the threads. Here it isn't a problem, as a new single-tip muffler will be used. Remove the sheet metal screws on the heater channels, and using a 13mm or 14mm socket, remove the nuts mating the muffler to the cylinder heads; 14mm is original on 36-hp engines.



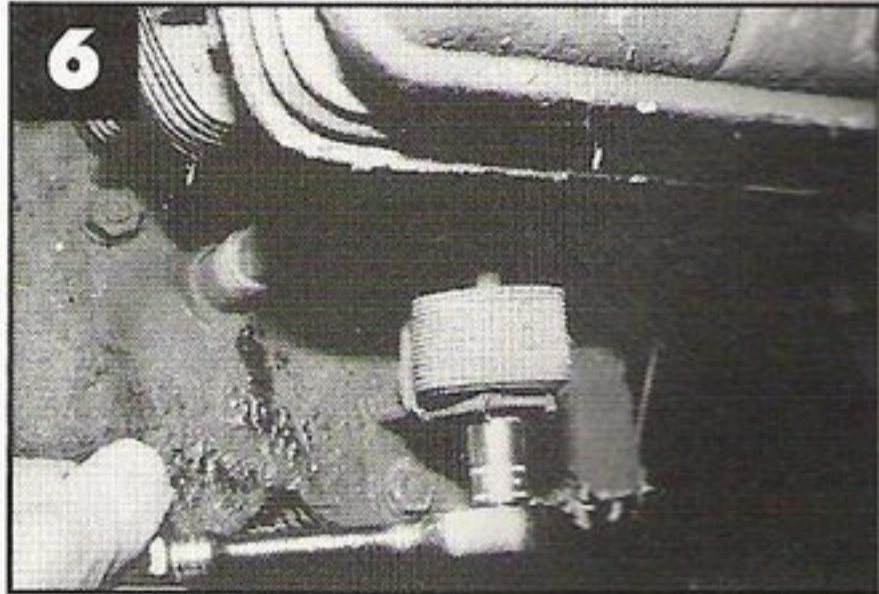
3 - Loosen the clamps that secure the header pipes to the muffler. On 36-hp engines this is a straight slip-fit without the gaskets or asbestos donuts found on later engines. Remove all remaining sheet metal screws. To save time, try to use whatever tool you have in your hand on everything it fits.



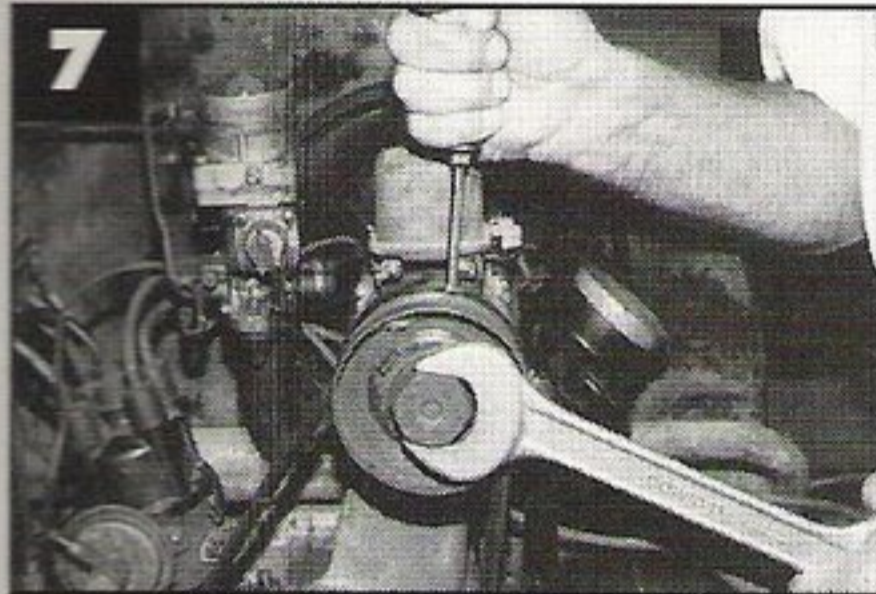
4 - Remove the front sheet metal that seals at the firewall. Note the grommet on the fuel line; when this is worn or missing, the sheet metal will cut into the fuel line. You may need to replace both.



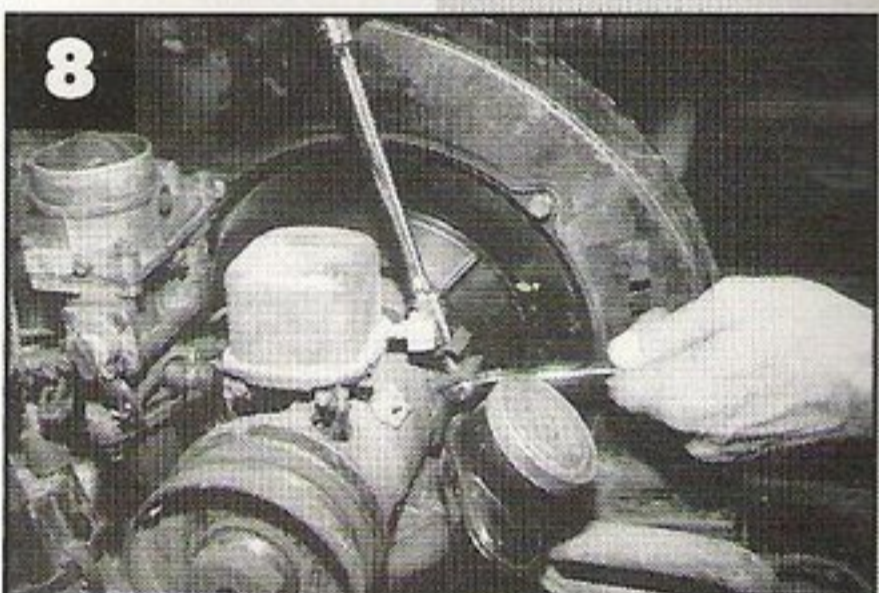
5 - Remove the heater channel assemblies as a complete unit. Shown here is the right side for number 1 and 2 cylinders as stamped on the cylinder head covers.



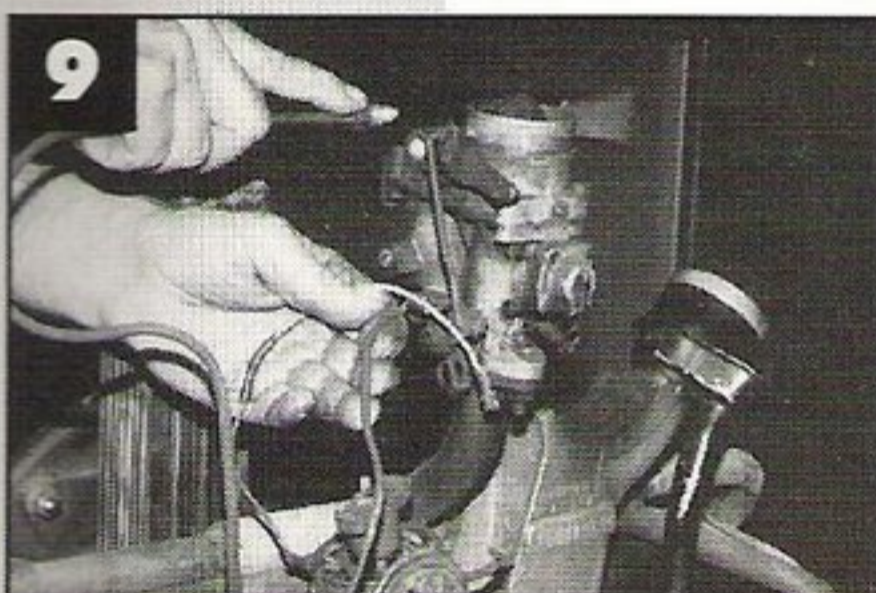
6 - First loosen the thermostat under number 1 and 2 cylinders, then unbolt the bracket from the case. Unscrew the copper thermostat bellows from the rod between the cylinders.



7 - With a screwdriver wedged in a slot on the generator pulley and against a bolt head in the generator, you can remove the generator pulley nut. Note the shims used between the two pulley halves; these are used to adjust the fan belt tension by increasing or decreasing the pinch on the wedge-shape of the fan belt. The remaining shims are stored under the pulley nut. You must have enough shims so the nut will tighten on the shims and not bottom out the generator shaft threads.



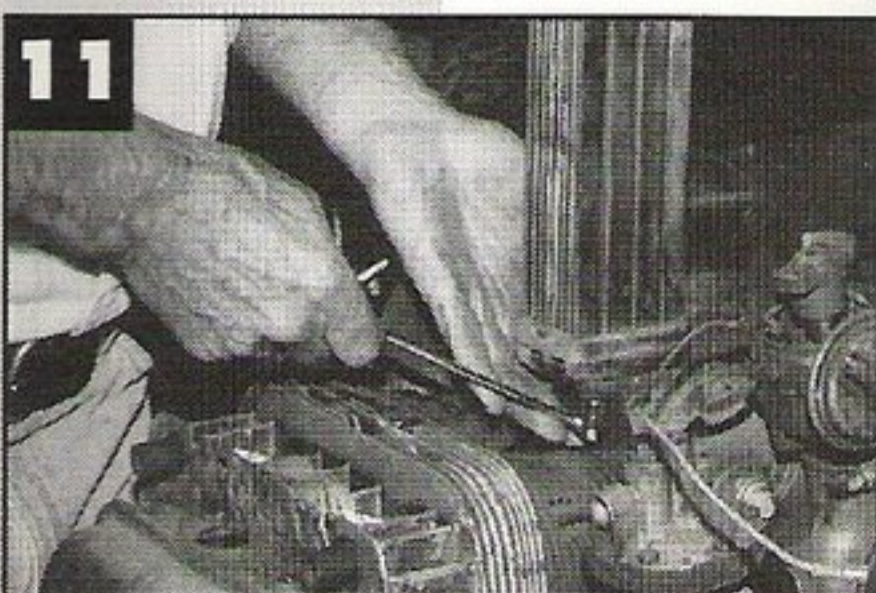
8 - Loosen the generator strap and slide it toward the fan shroud. With the fan belt, coil wire, all sheet metal screws and throttle cable guide removed, lift off the fan shroud with the fan and generator as a unit. Using a 10mm socket remove the four screws holding the generator backing plate to the fan shroud.



9 - Remove the two fuel lines and metal vacuum advance line, which run from the distributor to the right rear of the carburetor.



10 - If you took my advice to use a single tool wherever possible, you will have already removed the four nuts that clamp the intake manifold to the cylinder head; now you can just lift off the intake manifold.



11 - Remove the cylinder covers from both sides. Remove the two nuts beneath the oil cooler and the one on top with a 10mm wrench. Try not to lose the hardware; you'll need it later.

enable the novice to build his first engine, and if you have experience with the later engines you may find it helpful to note some of the differences in design. You won't need a toolbox the size of a refrigerator either; basic metric wrenches, sockets, and so forth will do for the most part with the exception of a few special tools you can borrow, or have a Volkswagen shop do the work for you. Machining, of course, will require a machine shop.

If your car is missing the engine, they are relatively inexpensive as a core from salvage yards, swap meets, or V.W. club members. Other than the serial numbers, the main visual identification is the one-piece generator stand, which is an integral part if the right engine case and horizontal fuel pump on the left side. Try to get one that hasn't been stored outdoors and turns over by hand.

Check the endplay by pushing and pulling on either the lower pulley or the flywheel. Clunk is not good; .005 inch is good. Being able to hear it run is even better. Factory wear limit on a compression test is 60 lbs./sq.-in.; 100-114 lbs./sq.-in. is new. When new, oil pressure is (with SAE 20 oil) 7 lbs./sq.-in. at idle speed when warmed up. At 2500 rpm it is 28 lbs./sq.-in.

Try to get an engine as complete as possible. However, most heater boxes and mufflers will be rusted out. Mufflers are available but heater boxes are more difficult to find in good condition.

If possible, steam clean the engine before disassembly and your shop, barn, kitchen table or hotel room will stay a lot cleaner. A VW engine stand is the preferred way to go and is available as a simple bench-mount or a roll-around model. A repair manual also is helpful; they have been published by Bentley, Haynes, and others, but be sure it is for a 36-hp engine. In this article I used the VW factory manual for most specifications, plus a few tips learned from experience.

Most parts needed are available from various companies specializing in vintage VWs; check our advertisers or look on the Internet.

When prepping the sheet metal it is recommended to bead-blast or chemically strip the old paint. You can have it powdercoated, painted by an automotive painter, or you can paint it yourself with spray cans of Krylon, which seems to work best. The black sheet metal was originally a semi-gloss or semi-flat; the heat-resistant gray on the heater junction boxes and intake manifold was again semi-flat or semi-gloss.

The generator strap and coil bracket were not painted; they were plated, so you could just sand or polish them then spray with Krylon clear spray. The clear spray could also be used on polished fuel lines, vacuum lines, the generator nut and so forth.


To save you some grief, one area of difficulty I encountered was locating the

correct size main bearings. They come in various sizes such as oversize o.d. for a line-bored case and undersize i.d. — .010-inch or .025mm. Some also have an oversize thrust surface on the rear main for a case remachined at the thrust. They are no longer in production, and many of the most commonly used sizes are difficult to locate. Consequently, after disassembly and before line-boring your case or regrinding the crank it is advisable to locate the needed bearings; you may even need a different crank or case to come up with the correct combination.

The shims for adjusting the flywheel end-play also are hard-to-find items. This is part of the treasure-hunting aspect of vintage restoration, which some people hate and others enjoy immensely when they finally find what they have been hunting. On the plus side, all vintage cars restored to original condition continue to appreciate in value along with the pride of ownership. As an investment would you rather invite friends over to see your car or your stock portfolio?

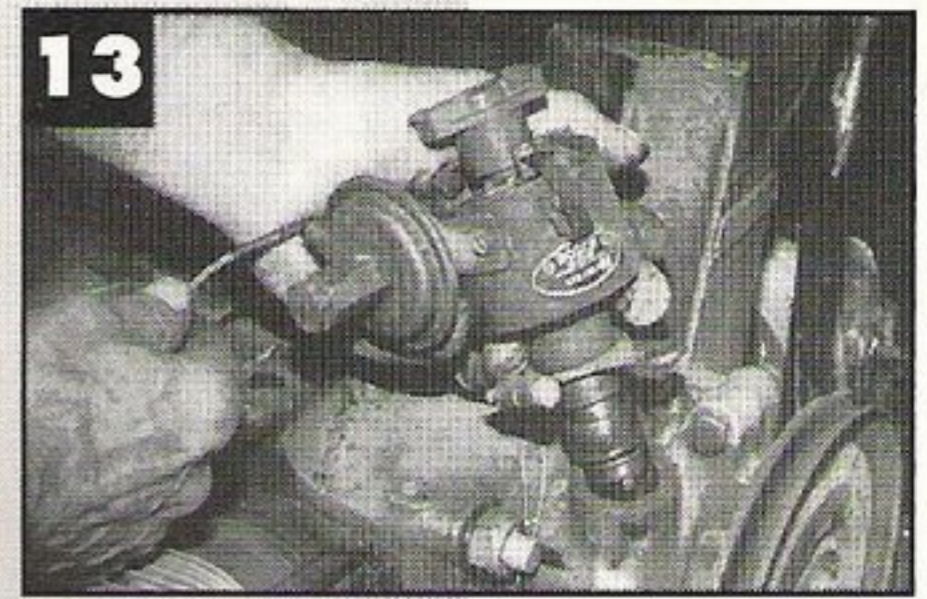
Volkswagens became a cult right from the beginning, with drivers waving to each other in recognition and bumper stickers proclaiming "You have just been passed by 36-hp." Some were happy to see the later models arrive with more horsepower, and they either traded in their cars or discovered it was an easy engine swap.

Worldwide, the original 36-hp engines carried many people and also served as cheap, lightweight, reliable motive power for many fixed or mobile industrial applications. On a historic note, VWs were even raced, such as the 1956 Australian Rally held on 10,632 miles of some of the most primitive roads in the world. How did they do? Well, Volkswagens swept an international field of entries over cars such as Ford, Chevrolet and yes, Jaguar.

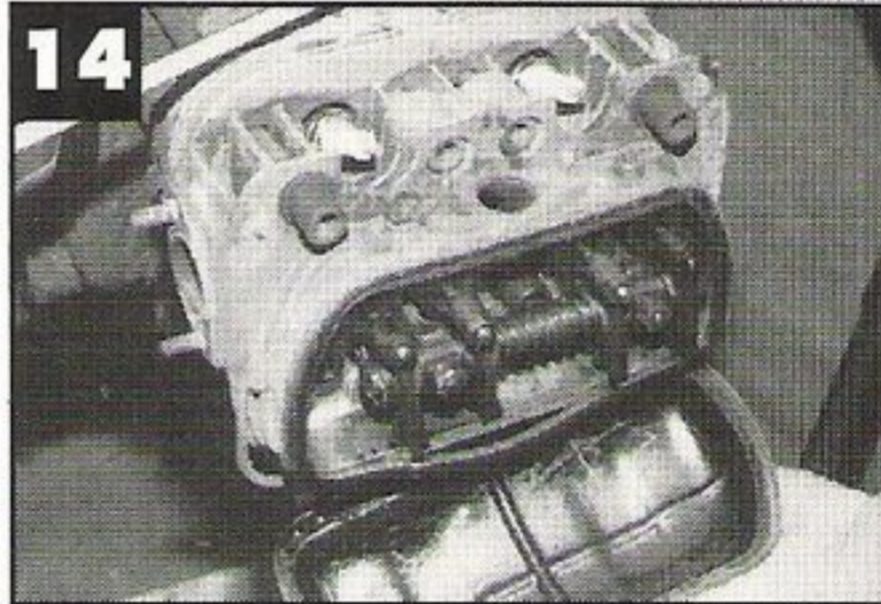
So, let's get that tired old 36-hp engine on the engine stand, turn on some '50s music and prepare to relive the past. 



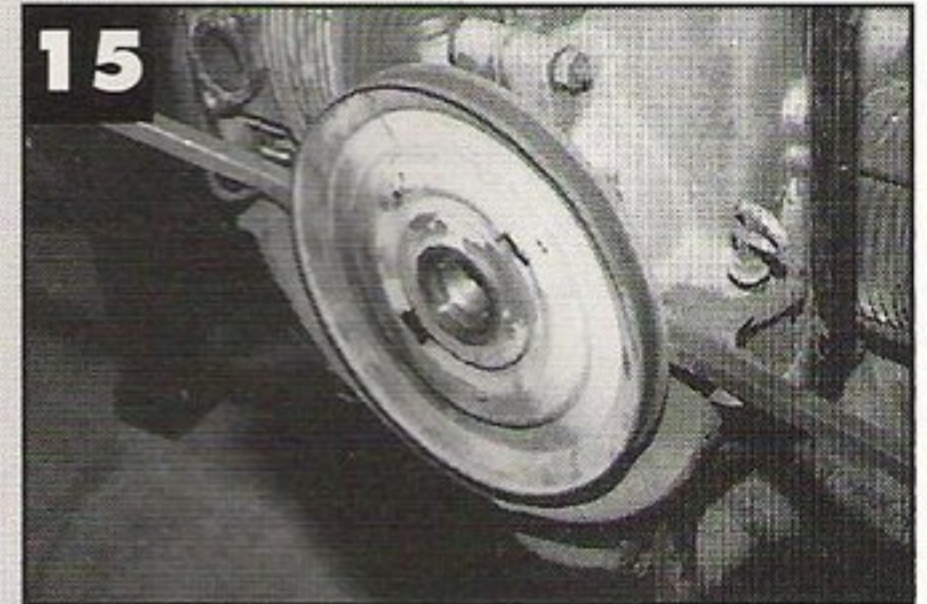
12 - Remove the fuel pump with a 14mm socket and extension. Remove the fuel pump rod and note the end toward the engine is different; it has beveled edges. Remove the fuel pump spacer block and check for cracks, usually caused by over-tightening in an attempt to fix leaks.



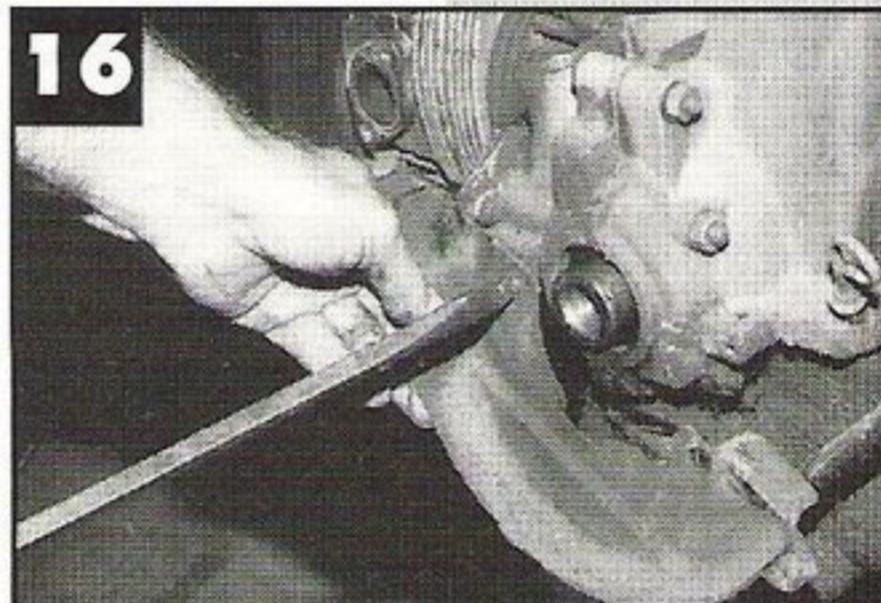
13 - Unbolt the distributor clamp from the block and lift it out. Remove the oil pressure warning switch.



14 - If you rotate the valve cover off as shown here, you can prevent oil spillage. Note the gaskeet stuck to the head. Never use adhesive next to the head, only on the valve cover side.



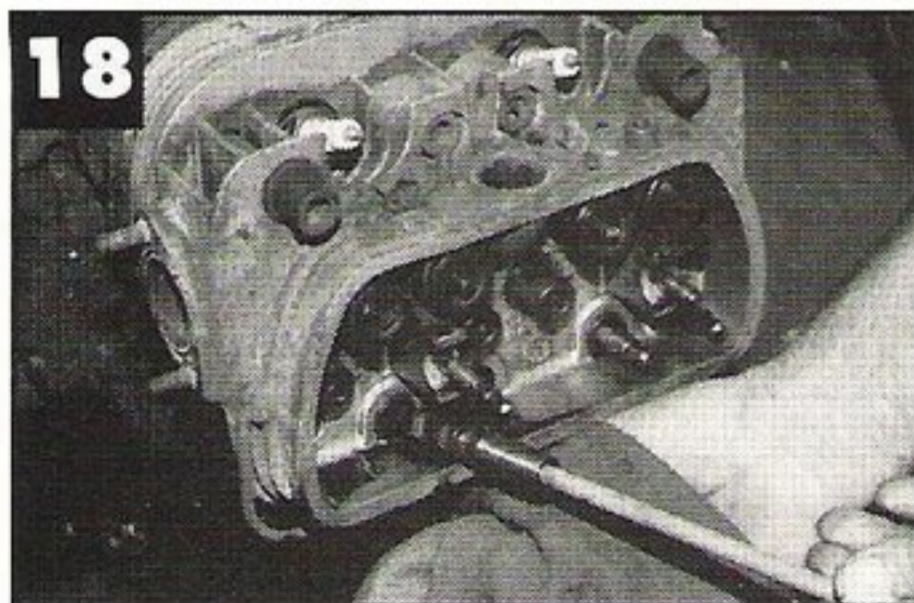
15 - Try to pry off the lower pulley without a puller tool; use the pry bars to wiggle it off. Pry against the two screws behind the pulley and not against the soft engine case.



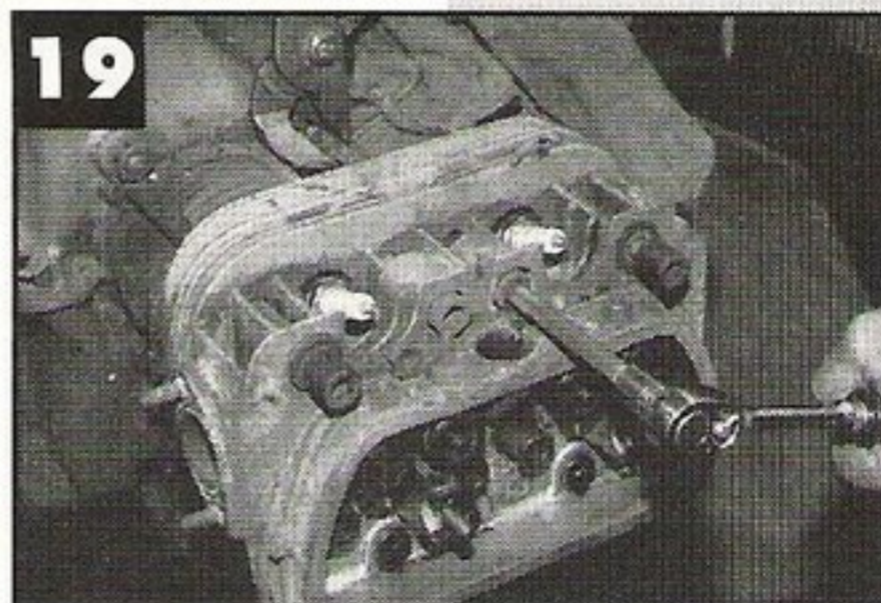
16 - Remove the two screws behind the pulley and the piece of sheet metal.



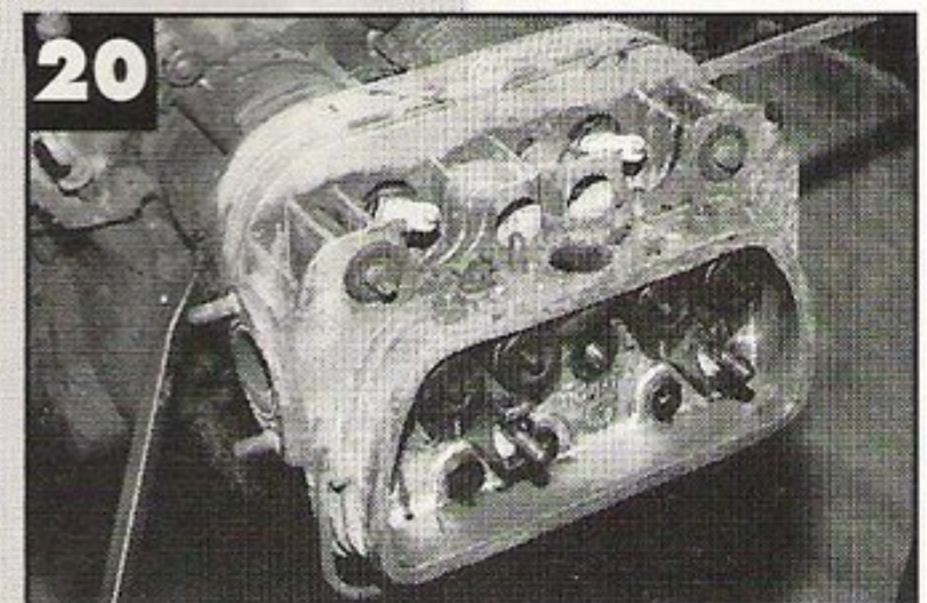
17 - Unbolt the rocker arm shaft. Note the rocker shafts mount differently than later engines; the casting in the head is a half circle and has a curved metal cap on top.



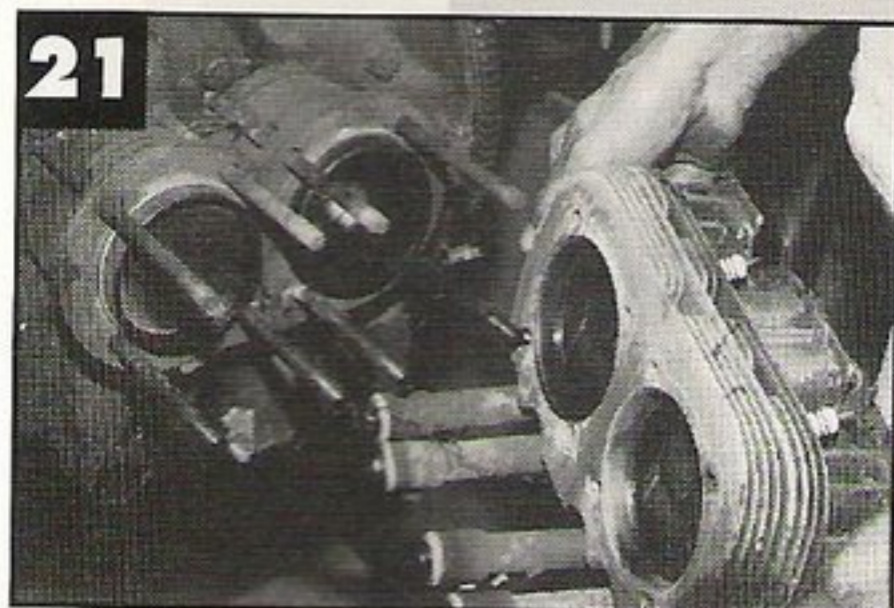
18 - When you remove the pushrods you will notice the cam followers are an integral part of the pushrod, unlike those on later model engines. The radius on the followers should be checked for wear, and make sure the oil passages are clear. If the pushrods were ever soaked in carburetor cleaner they may be plugged. This is because they were designed with a wood insert inside to absorb noise — I think. Whatever the reason, if this swells up the oil flow can be restricted or stopped.



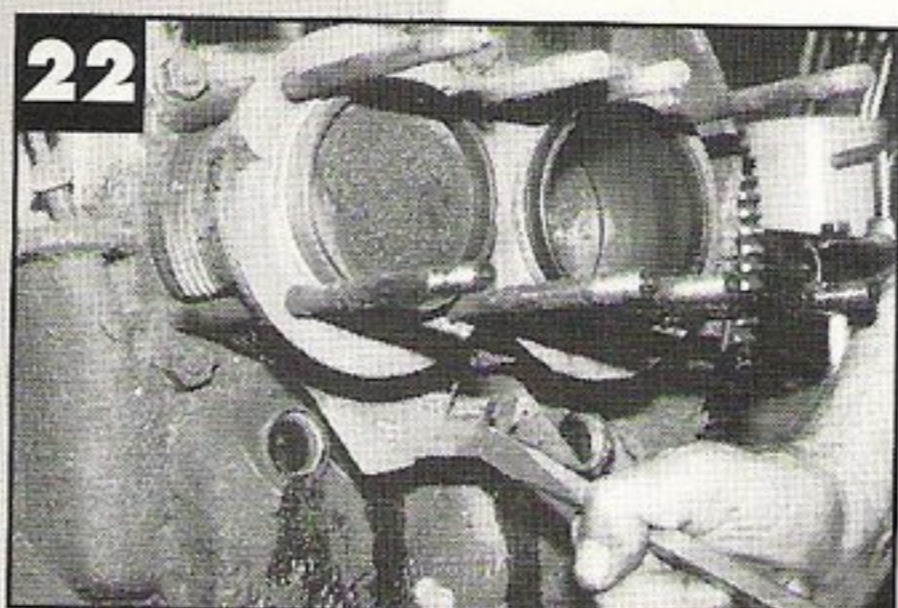
19 - Prior to 1956 the cylinder head nuts were the same as used on the Porsche, and require a 10mm hex wrench or Allen wrench. From 1956 on, hex-head nuts are used on the flat part of the head. Loosen all cylinder head nuts alternately, taking care not to lock the cylinder head. If a nut is frozen to the stud, use channel-lock pliers to prevent the stud from coming out of the case. It can be removed but every time it is it will cause a looser fit.



20 - Gently pry the cylinder head loose but not completely off. Here I'm using a magnet to retrieve all cylinder head washers. Six of them have a larger o.d. than later engines. The two in the recessed holes are smaller I.D.



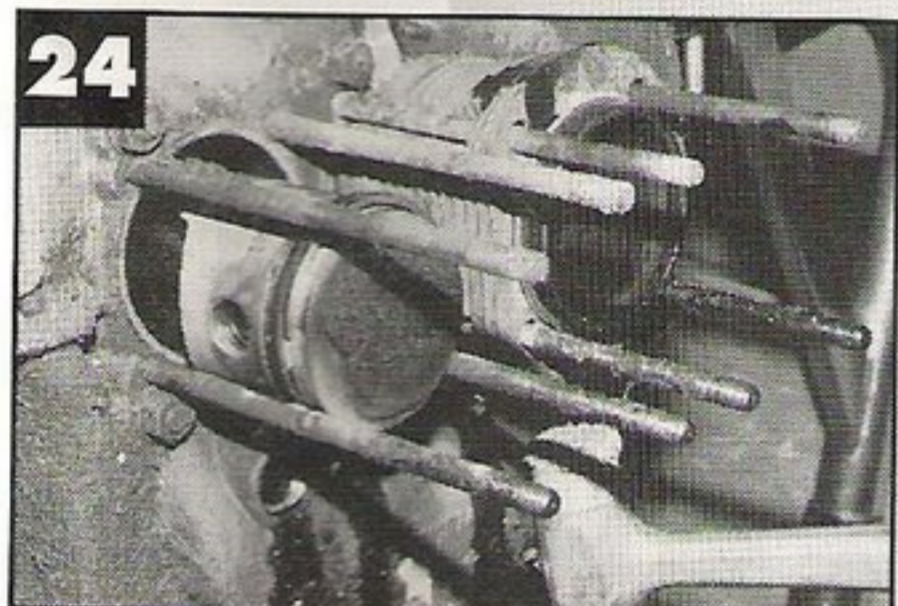
21 - Remove the cylinder heads. This one came off with the pushrod tubes and seal stuck in place.



22 - Remove the air deflector plates. They are very important as they direct airflow from the fan around the cylinders for more even cooling.



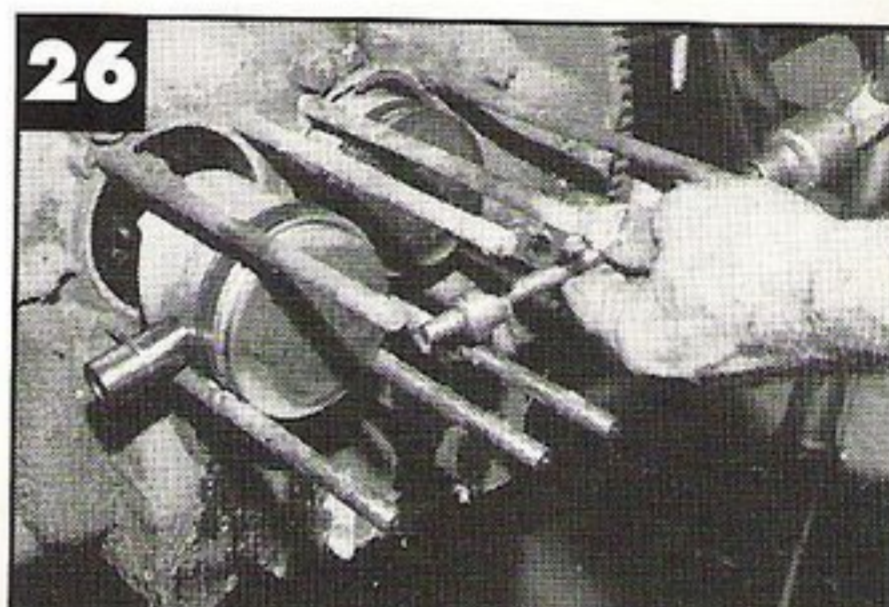
23 - If the air deflector plates fit poorly, you may want to drill two holes and wire them to the top cylinder studs.



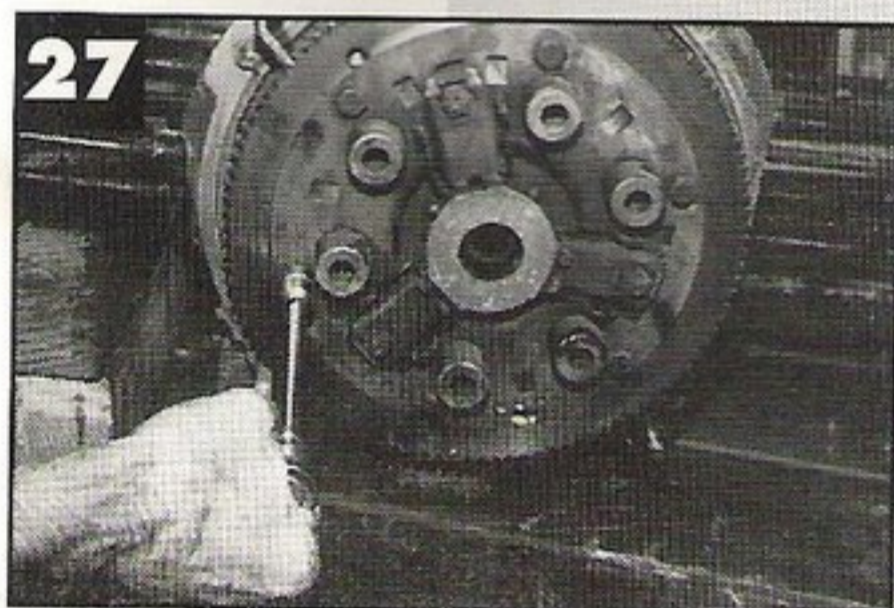
24 - Removing the cylinder may require prying. Pry away from the case, taking care not to gouge the surface where the cylinders seat on the case. Prying must be done evenly to prevent locking the cylinder in the case bore. While prying from the top, use a soft mallet to tap on the bottom. This usually will wiggle the cylinder off.



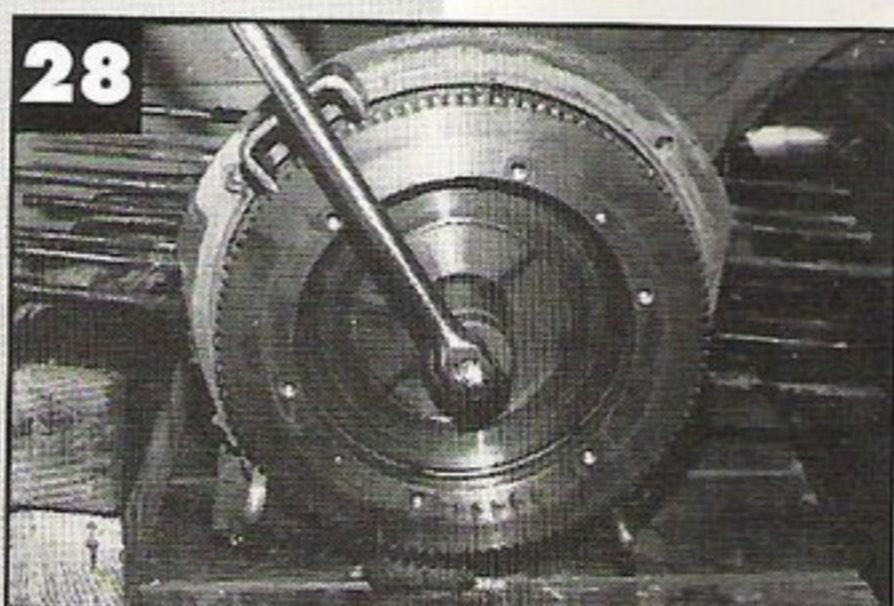
25 - Remove the wrist pin circlips. I have modified my right-angle needle-nose pliers with grooves filed in the jaws.



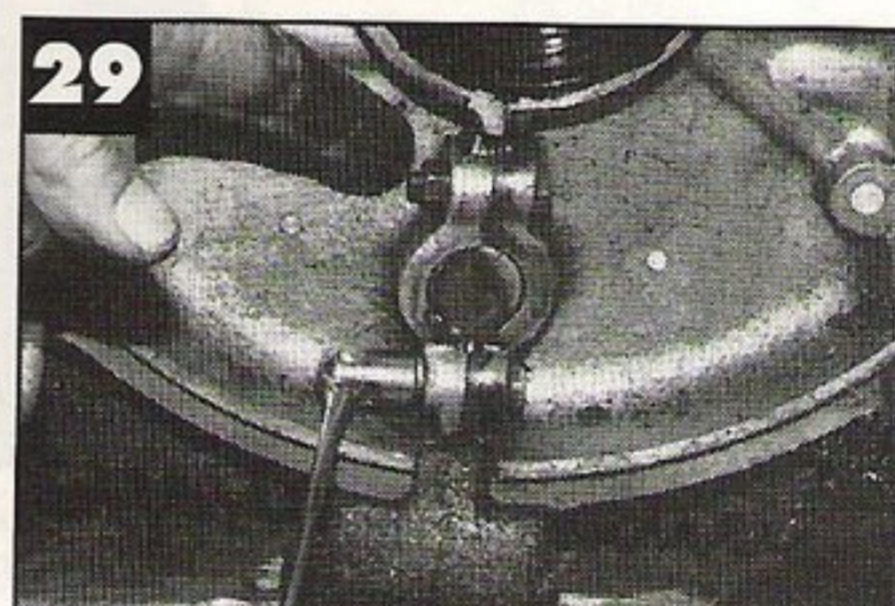
26 - You will need some type of wrist pin driver to tap the wrist pins out of the pistons. This one is an old cylinder head stud with two old barrel nuts. One nut is run all the way up on the threads leaving a portion to fit inside the wrist pin. Hold the piston while tapping with a hammer to prevent bending the connecting rod.



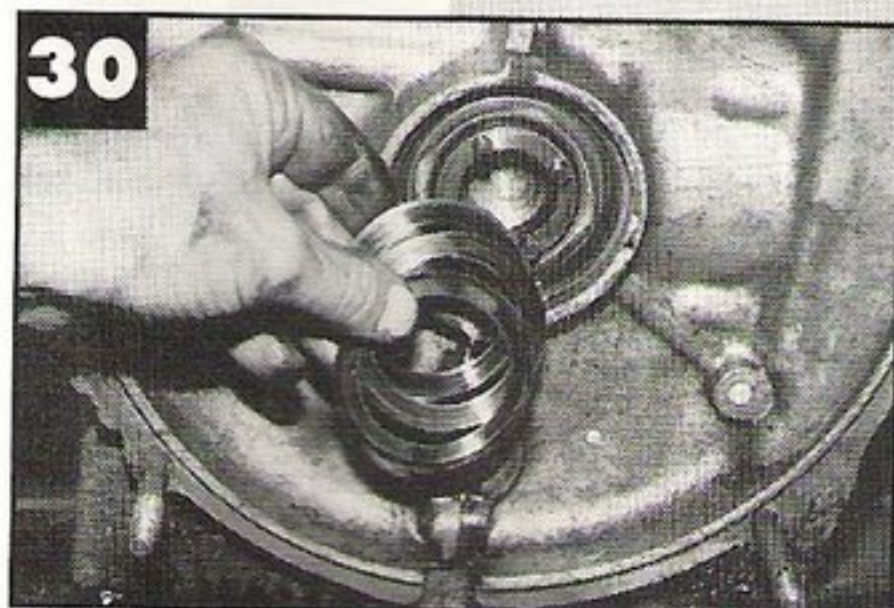
27 - Place the engine short block on the bench. Install a flywheel lock and remove the pressure plate bolts, alternating the removal sequence.



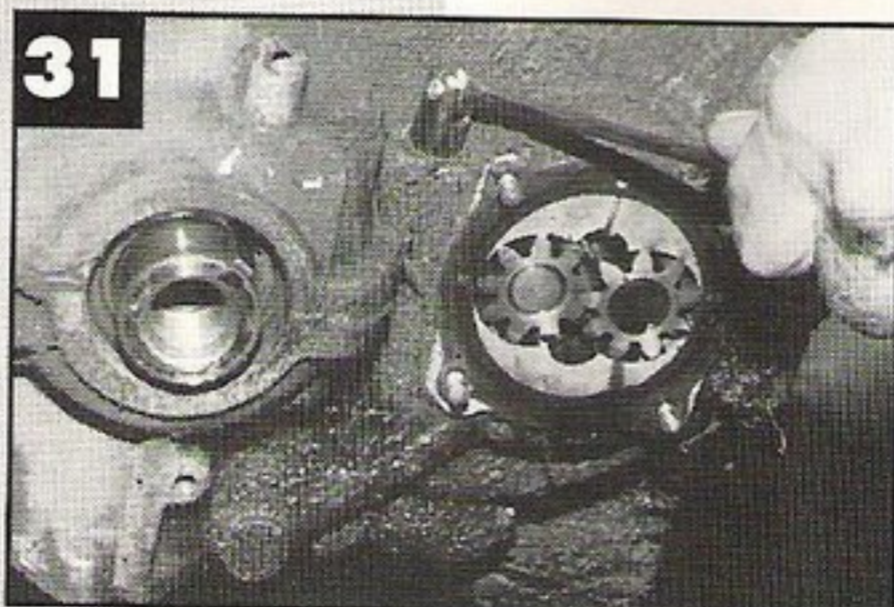
28 - Where there's a will there's a way. During assembly I will show you a better method for bracing the engine. Using a long breaker bar or air impact gun, remove the gland nut with a 36mm socket.



29 - Unlike later engines, the 36-hp has two bolts pinching the cam plug that must be removed with a 10mm wrench before making any attempt to separate the case halves.



30 - Pry out the flywheel, or rear, main seal. Do not gouge the case. Note the depth in the case; it is flush as opposed to the later models, which are recessed. Behind the seal are three shims used to adjust the crankshaft endplay. They are smaller in diameter than those on later model engines; they are made in various thicknesses and are hard to find.



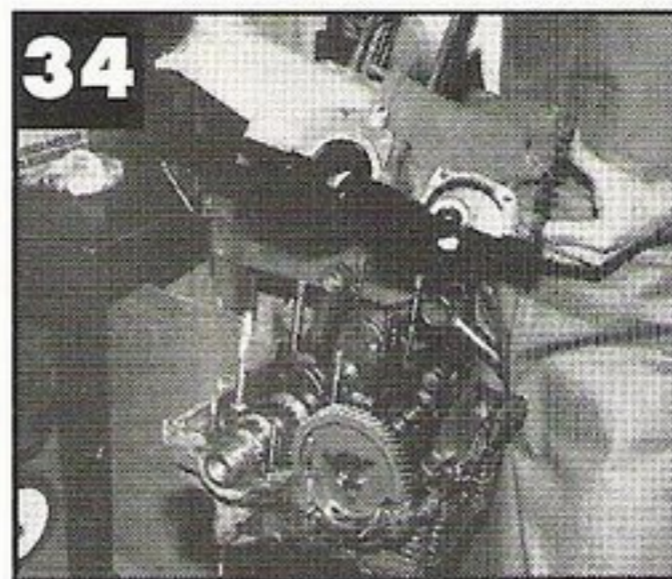
31 - With the engine back on the stand, remove the four oil pump cover nuts with a 10mm socket. Around the perimeter of the case are two different size nuts. Use a 10mm and 14mm socket to remove them. Remove the six main nuts and washers near the cylinder bores with a 17mm socket.



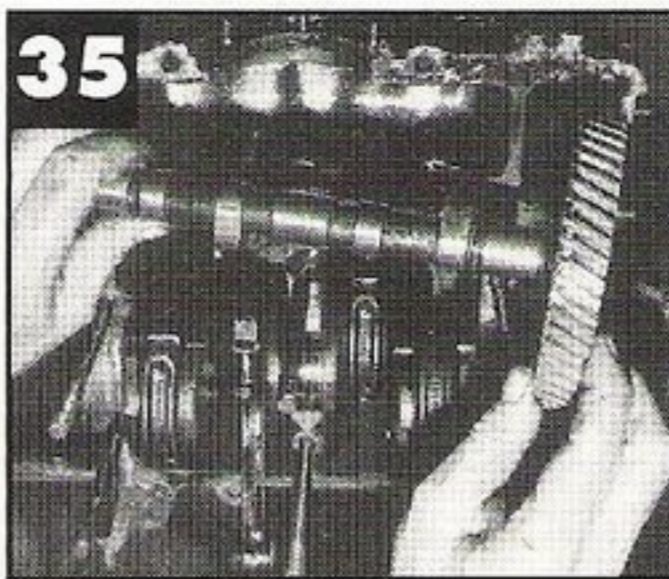
32 - While lifting up on the generator stand, tap the case studs with a mallet enough to loosen the case halves.



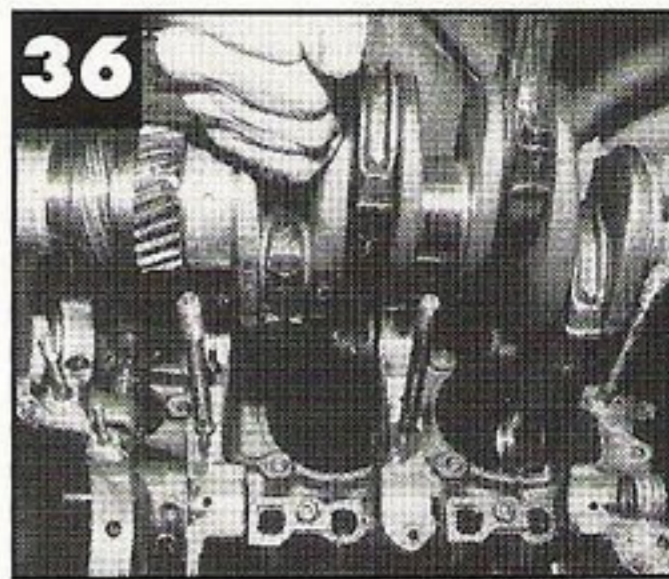
33 - After the case halves are loosened the oil pump can be removed. Slight coaxing may be needed; if so, pry away from the case. A gouge here would leak oil.



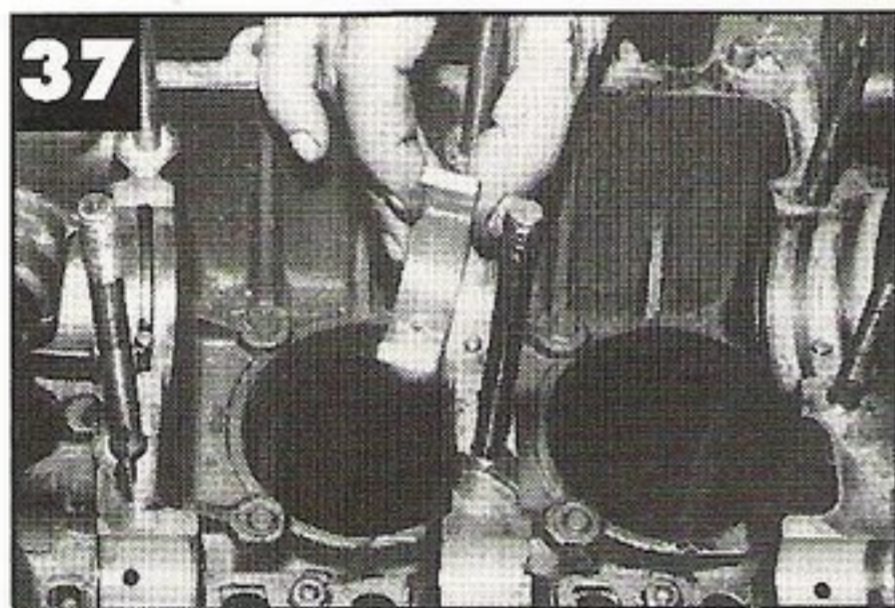
34 - While wiggling the case half and tapping on the case studs with a mallet, the case half will loosen and lift straight off; do not pry between the case halves.



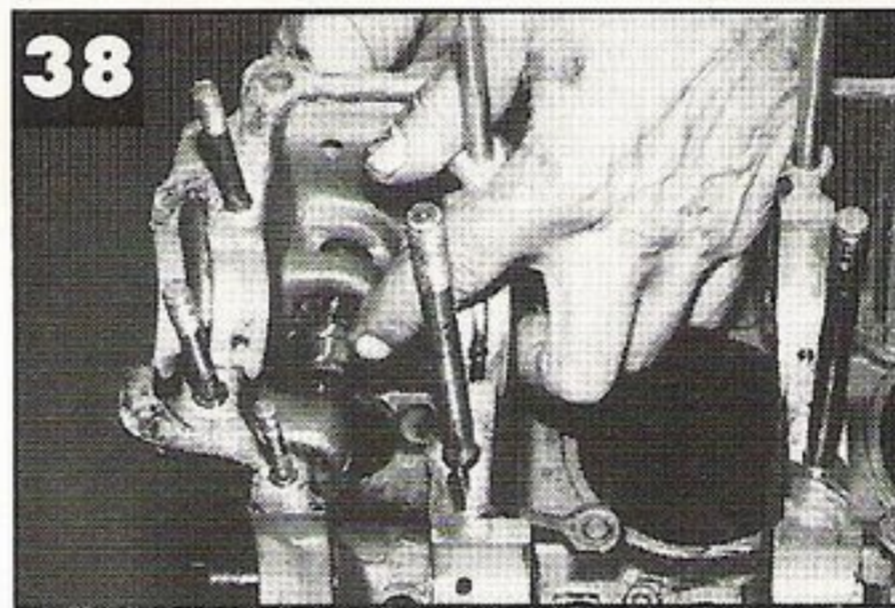
35 - Remove the camshaft. The early gear on the cam was soft fiber. Most camshafts have been upgraded with aluminum gears as the fiber ones were prone to wear.



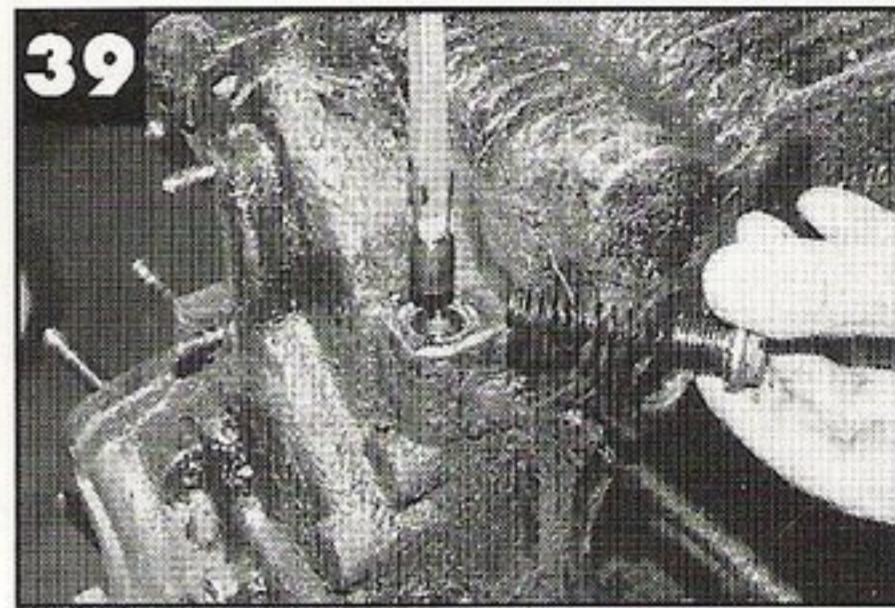
36 - Grasp the crank by the number 1 and 2 connecting rods and lift it out of the case.



37 - Remove the split center main bearing and cam plug. Also remove the other half of the bearing from the other case half. Remove the four main bearing dowel pins from the left case half and one dowel pin from the right case half.



38 - Remove the distributor drive gear and thrust washer. There may be two washers; keep them with the drive gear so they don't get confused with other similar washers in the engine.



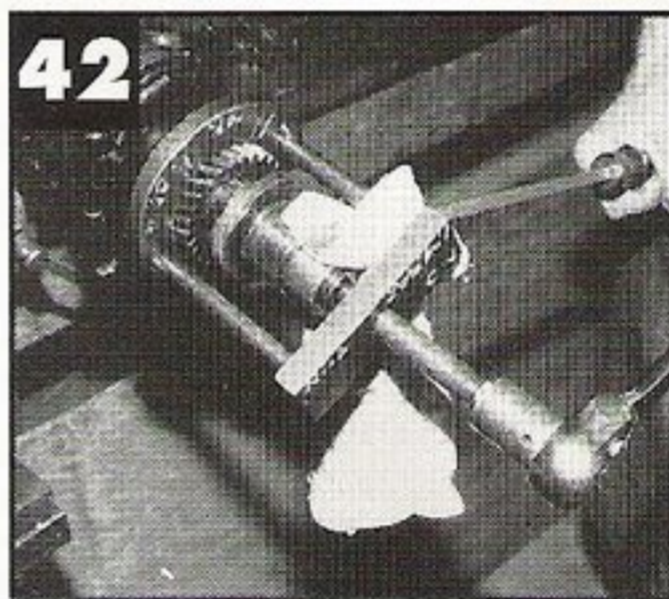
39 - With a square-shank screwdriver and crescent wrench, remove the oil pressure relief valve plug. The plug is hollow with a spring inside. Using a magnet, screwdriver or folded piece of wire, remove the oil pressure relief valve from the case.



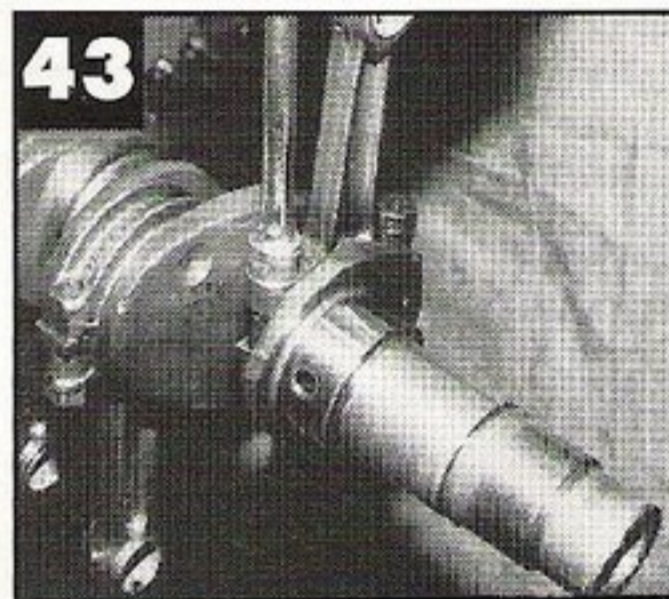
40 - An easy way to make a crank holder is with a gland nut welded to a piece of metal and clamped in a vise. Using a drift punch, drive out the woodruff key, then pry and remove the slinger ring and bearing.



41 - Remove the snap ring with snap ring pliers.



42 - Here I am using a Gene Berg gear puller and a screwdriver with a rag to keep the crank from turning as I pull off the gears. Another method is to clamp a two-piece plate under the gear and press the crank off the gear with a hydraulic press. I prefer the Berg gear puller; it has served me well for many years.



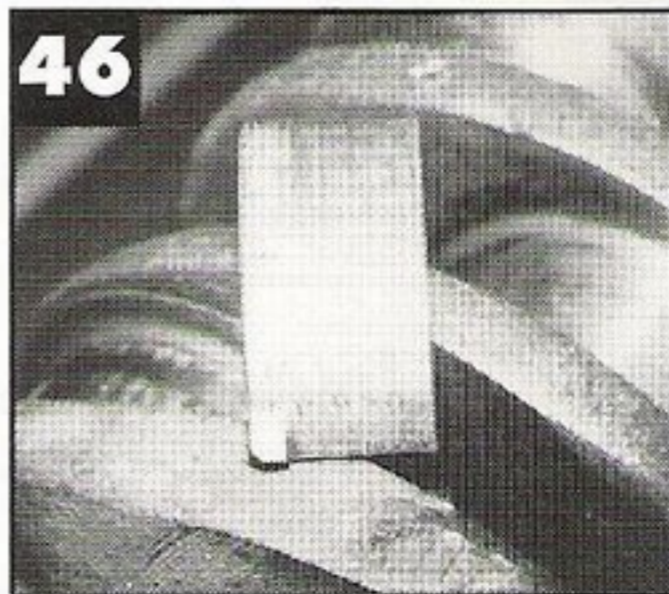
43 - As you remove the rods, keep the bolts and caps together. The rods and caps have matching numbers.



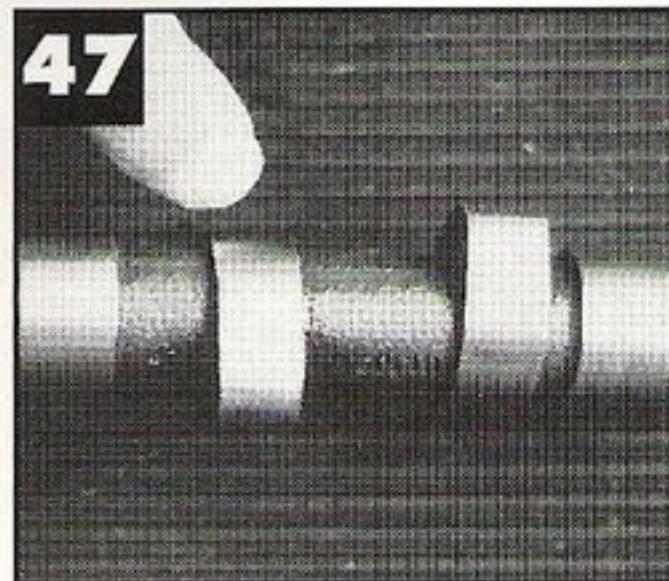
44 - Note my thumb and forefinger holding the bolts in place as they are removed. There was very little left of this burned rod bearing.



45 - The rod journal also shows excessive abuse and lack of oil. This crankshaft will have to be reground or replaced.



46 - A micrometer is not needed to check the rod journal at this point, as the metric numbers on the rod bearing, 050, tell me it is the second undersize or .020-inch. To reground the crank would require going to 075- or .030-inch. I prefer not to use a crank that is ground three steps under as it weakens it.



47 - Examine the cam lobes and the cam followers on the pushrods for excessive wear. The cam could be reground or a new one installed. If ordering a new cam look for a plus (+) or minus (-) number on the backside of the cam gear such as +1, +2, -1, -2 or even 0. Be sure your new cam is the same. These markings do not indicate oversize or undersize; they identify a different pitch of the cam gear teeth to accommodate adjusting of backlash between the crank gear and cam gear.

continued on page 38

Vanagon Engine Connection

Give us a call, We'll take the time to answer your questions!



NEW HEADS

\$1599.00

Waterboxer Longblocks
New Pistons & Cylinders & Heads!
Even the lifters are new. Performance
1.25 ratio rockers for just \$199.00 + labor.

\$1199.00 New Factory Motor
T1, 2, 3 000Mile



NEW HEADS

\$549.00 Rebuild
Type 1, 2, 3 Longblocks
New Heads, & PC's

1600cc	549.00
1641cc	599.00
1776/1835cc	749.00
1914cc	789.00
2110/2180	1259.00
New Case (Below Cost)	259.00

REBUILD KITS
Type 1, 2, 3 \$499.00
Bus, Vanagon \$429.00
WaterBoxer \$599.00

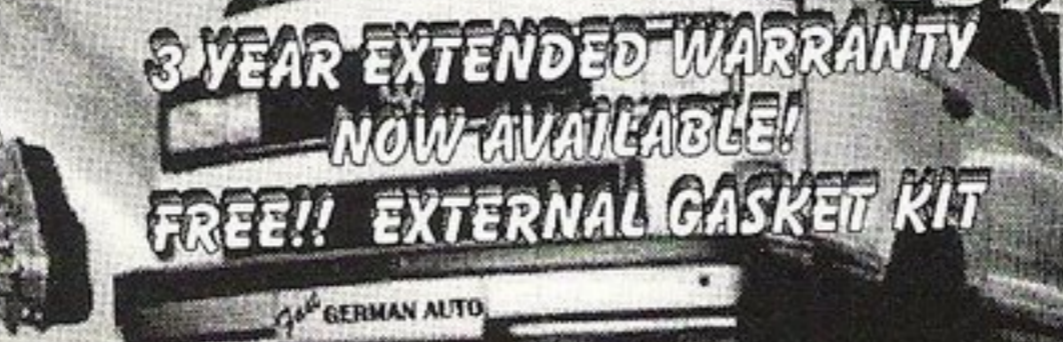


Killer Cooler Kit
For all Aircooled Buses & Vanagons
If you want the ultimate oil cooling
system designed for all weather
driving. This is the answer!

CLUTCH KITS



\$69.95
1600cc Type 1, 2, 3 69.00
Bus & Vanagons 129.00



3 YEAR EXTENDED WARRANTY
NOW AVAILABLE!
FREE!! EXTERNAL GASKET KIT



VANAGON BUS LONGBLOCKS

1700/1800cc 72-75	750.00
2.0 Liter 76-83	750.00
Hvd. Upgrade 72-75	249.00
NEW HEADS Add (Below our Cost)	369.00



RABBIT, GOLF, JETTA, GTI, ETC.

1600cc Pre 1980	649.00
1700cc 81-83	649.00
1800cc 83 on	725.00

TRANSMISSIONS
1 Year Unlimited Mileage

\$224.95

We Do Syncros too!
Type 1, 3 **224.95
Type 2 to 75 **349.95
Type 2 76-79 **495.95
Vanagons 80-83 **695.95
Waterboxer 83-91 **795.95



Longblock Install Kit

Kit includes all of the external parts typically recommended by professional engine installers.
Waterboxer 83-91 189.00
Bus, Vanagon 72-83 199.00
Bugs & Early Buses 69.00



VANAGON BRAS
Wolf makes one of the best front masks for less.



Vanagon & Bus Hub Caps 49.95



Hood Shocks & Manuals
Vanagon Manual 80-91 69.00
Euro Van 2 Vol. 92-99 149.48
Bus T2 68-79 34.95
Idiot Manual T1 23.50



Exterior & Interior Rubber Components Call for quotes.

Waterboxer Performance!!



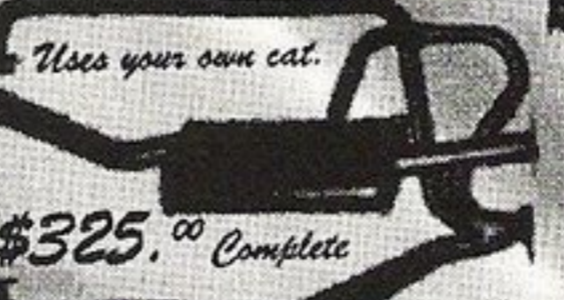
\$159.00

Vanagon KYB Shocks
Talk about a killer ride and no more nose diving on braking

Waterboxer 1.25 Ratio Rockers

These custom made rockers increase valve lift adding a est. 10% power gain. Easy bolt on performance item.

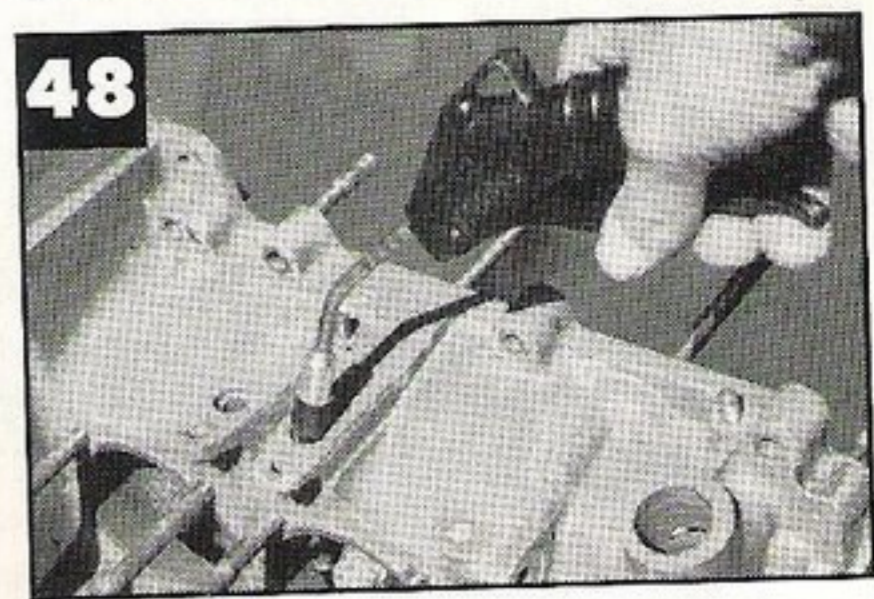
Waterboxer Hose Kits available
Call for fax diagrams & Prices.



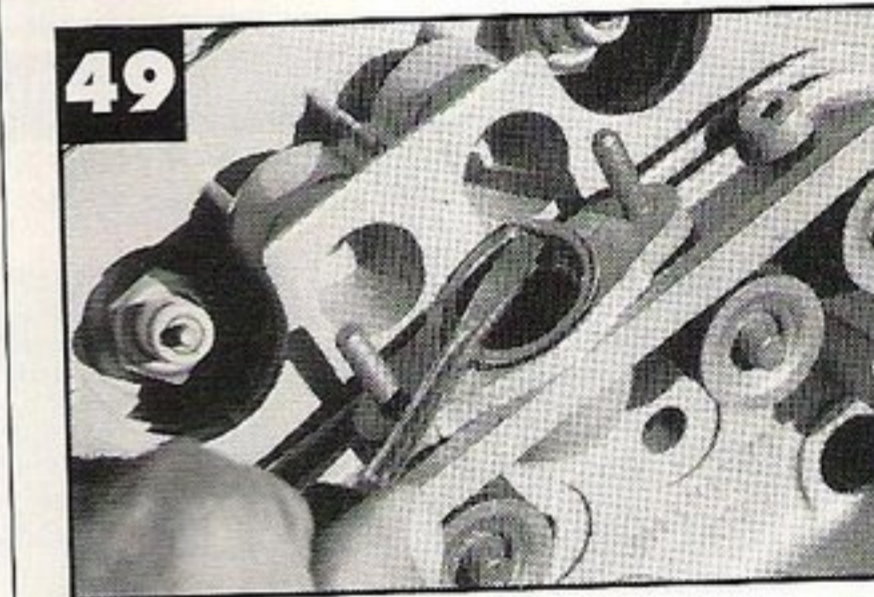
\$325.00 Complete
WaterBoxer Header System 83-91

2 Day Delivery Available.
Ordering Info: No Personal Checks. Prices subject to change without notice. 15% Restocking fee on all returned items. Shipping Extra. Motor & some Tranny prices pending core condition. Crating * = \$10.00 ** = \$15.00...
Call for additional information.
Web Site WWW.FASTGERMANAUTO.com

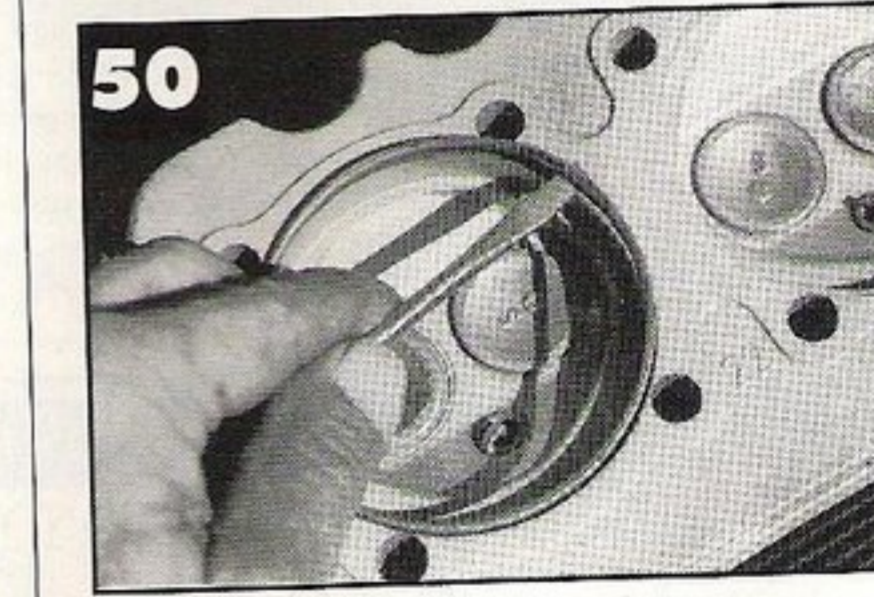
GERMAN AUTO
(888) 211-3334
Toll Free! Fast German Auto
2911-G, Oak, Santa Ana, CA 92707



48 - This section is one of the least technical but most important. Clean the case in a solvent tank and use the solvent spray hose to force solvent through all oil passages. Use small gun barrel-type brushes in all passages. Next blow them out with high-pressure air while holding your hand over the outlets. If any grit strikes your hand, use a can of carburetor cleaner to spray into the passages along with more brushing. You will be amazed at the black tar and goop this releases. Follow with a water hose and flush all passages, then follow with more compressed air. Scrub the outside of the case with bristle brushes or wire brushes as necessary. Remove all gaskets carefully without gouging the case. Dry the entire case thoroughly with an air hose as magnesium corrodes if left wet. Take time and pride in the cleaning process; only a few pieces of grit can destroy your new bearings.

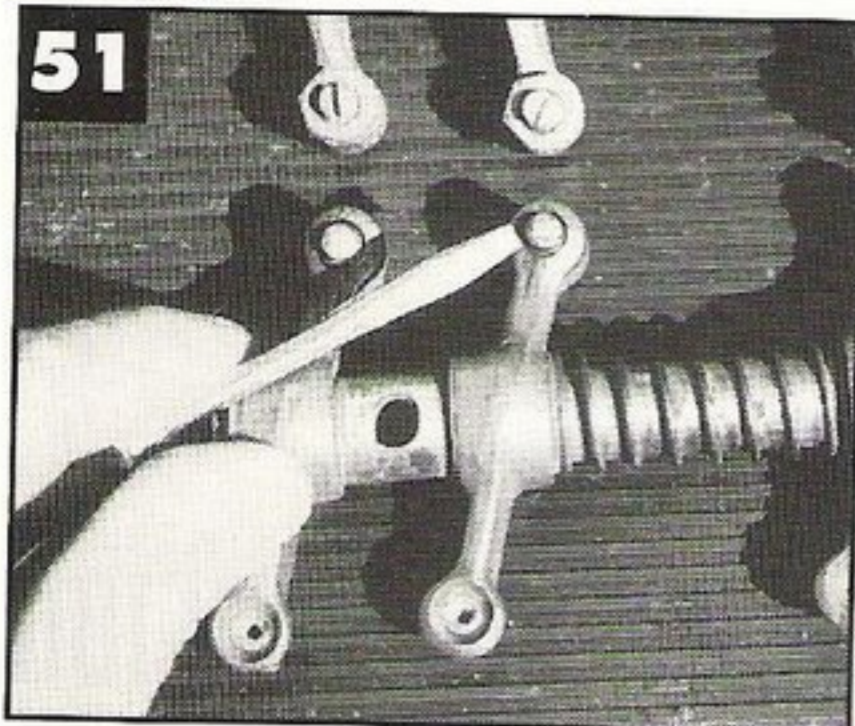


49 - Remove the copper crush gaskets from the intake ports, being careful not to gouge the sealing surface of the head; it could cause a vacuum leak after assembly.

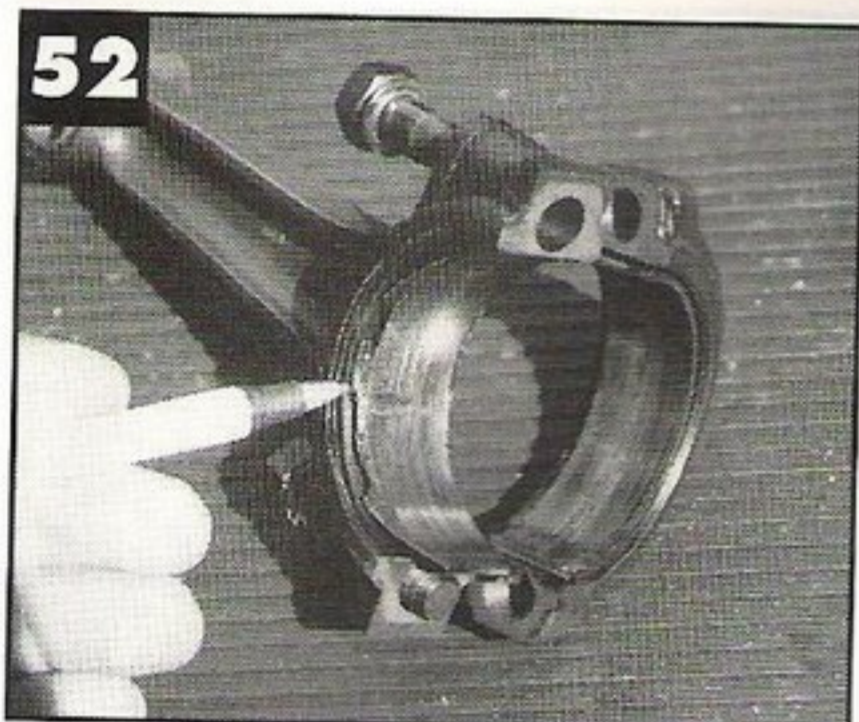


50 - Each cylinder on the 36-hp and early 40-hp engines uses a copper crush gasket on the cylinder, sealing it against the cylinder head in a machined step groove. It is commonly misunderstood that this is a compression seal. The top of the cylinder seats fully against the top of the combustion chamber for a compression seal. This copper gasket is a secondary seal to prevent carbon monoxide from getting into the heater boxes and interior of the car if the heads should loosen. This heating system is referred to as the "stale air system." The "fresh air system" began August 1962 on the 40-hp engine and did not utilize heat from the cylinders; instead, it used heat from the exhaust header surface. This eliminated the potential of carbon monoxide fumes entering the car's interior.

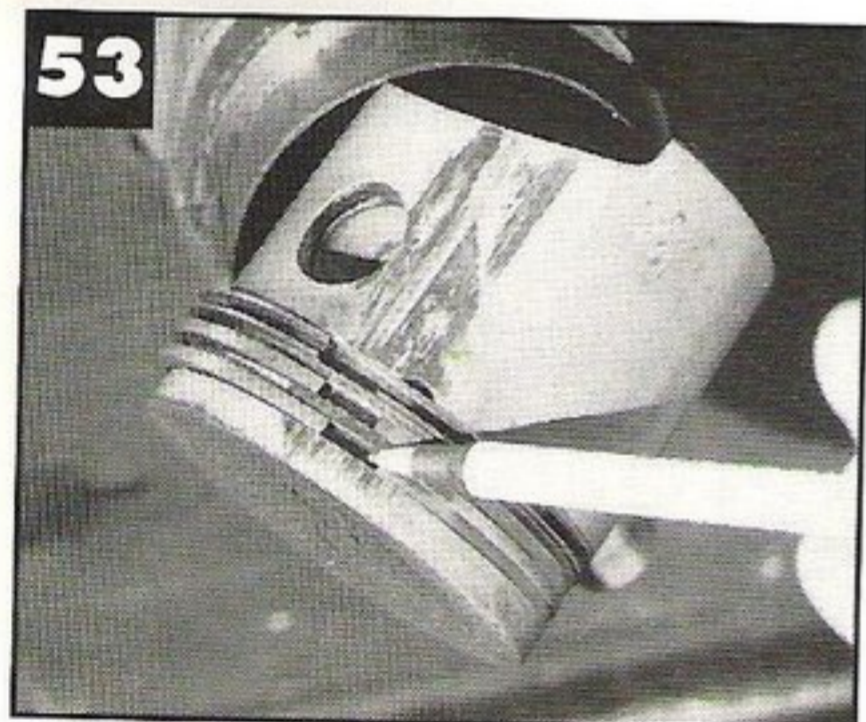
continued on page 67



51 - Check all valve adjustment screw tips and replace any that are uneven.



52 - Here is a worn rod bearing that got very thin. It was beginning to squeeze out to the edges where it could have reduced the rod side clearance, creating a lot of heat and eventual seizure or breakage.



53 - The last engine builder apparently didn't stagger the ring gaps, which caused compression flow and piston burning.



54 - The cylinder also suffered severe scoring and compression blowby.

Stay Tuned For Part II



Sewfine
INTERIOR PRODUCTS

We care about your car

We now do installations!

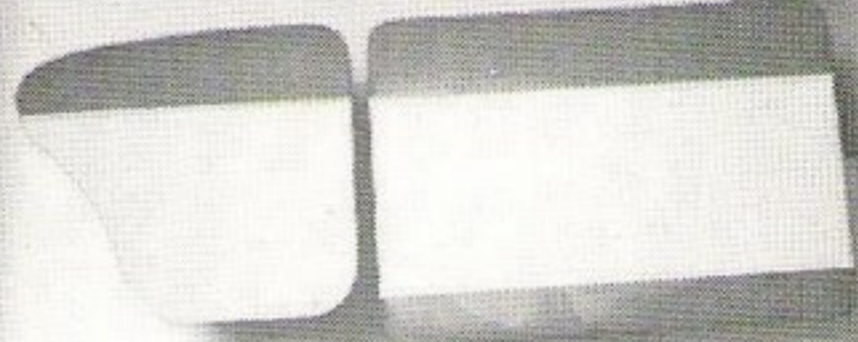
Vintage

for Bug, Ghia, Type II, & Type III

Original Style Hand Crafted Panels



60-64 Bug



58-59 Bug



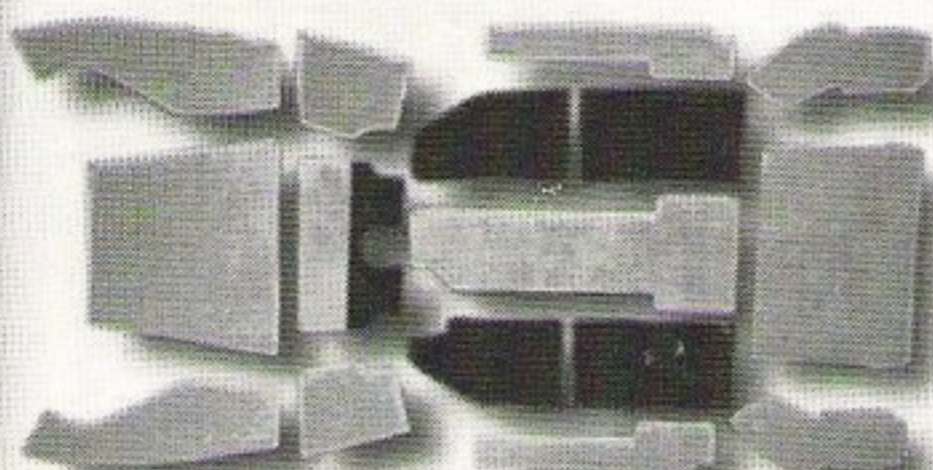
58-60 Ghia



54-55 Bug

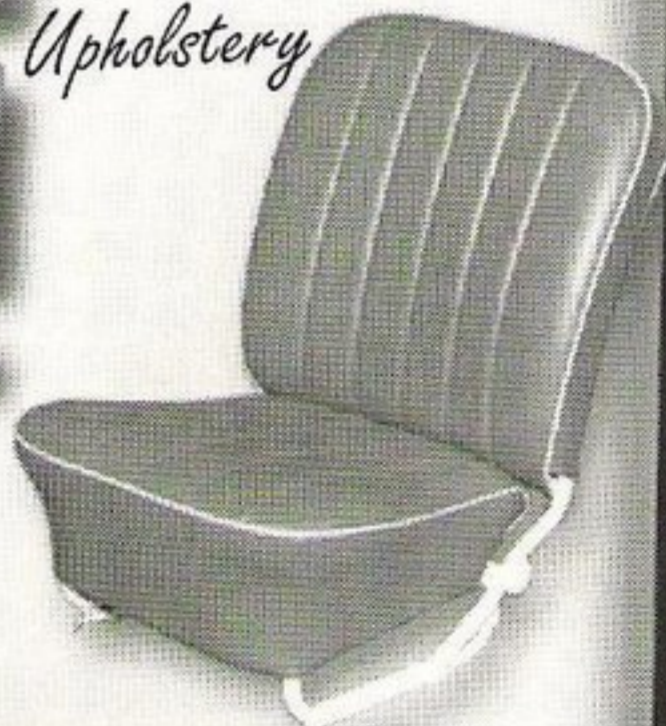


50-67 Bus



Hand Bound Carpet

Hidden Stitch Pleated Upholstery



- Imported German Squareweave
- Salt & Pepper Grey Loop
- Rubber Mats

NEW!!! OATMEAL LOOP Carpet

WHERE QUALITY COUNTS... *Always!*
CALL FOR FREE CATALOG!!! (303) 347-0212

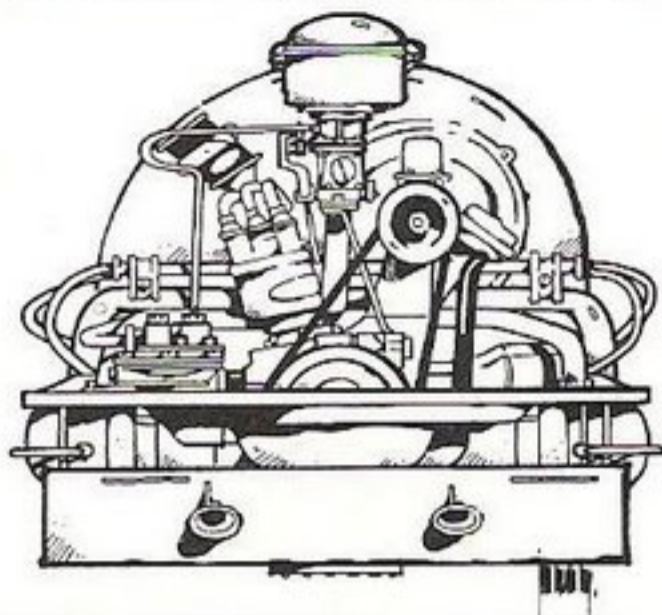
TECH INFO (303) 347-0212 FAX (303) 347-0160

SEWFINE INTERIOR PRODUCTS-VW
5119 South Windermere St., Littleton, CO 80120



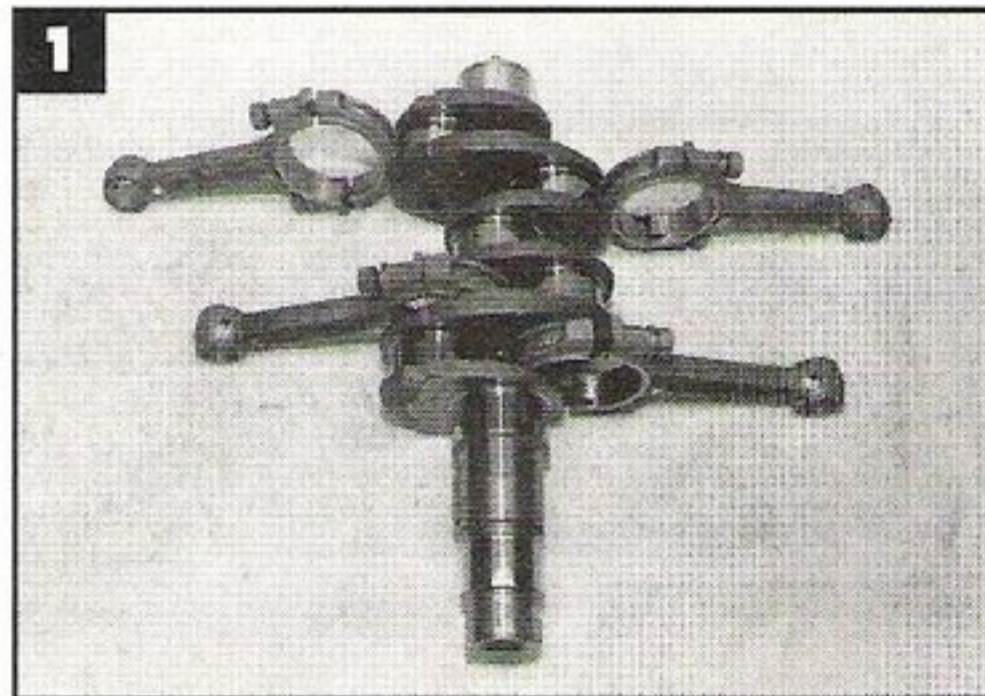
Prices subject to change © 1997 Sewfine

Engine



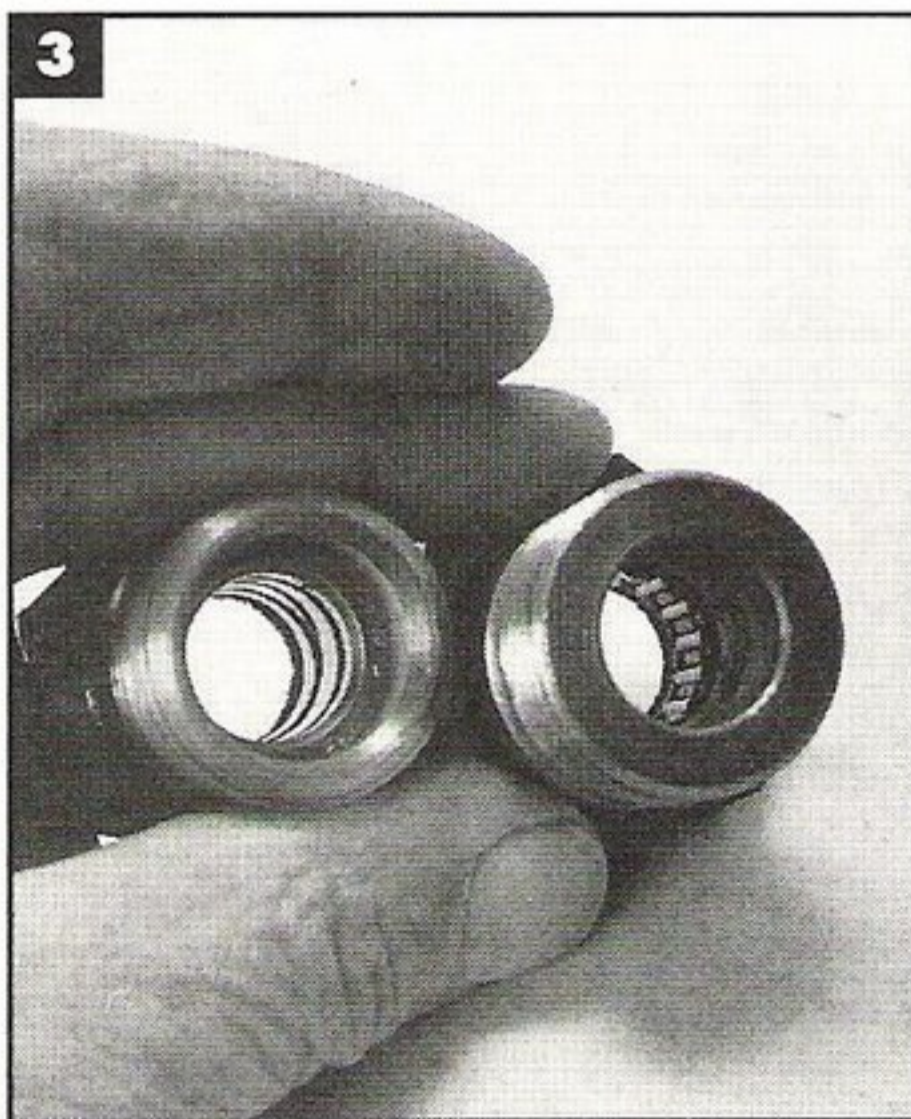
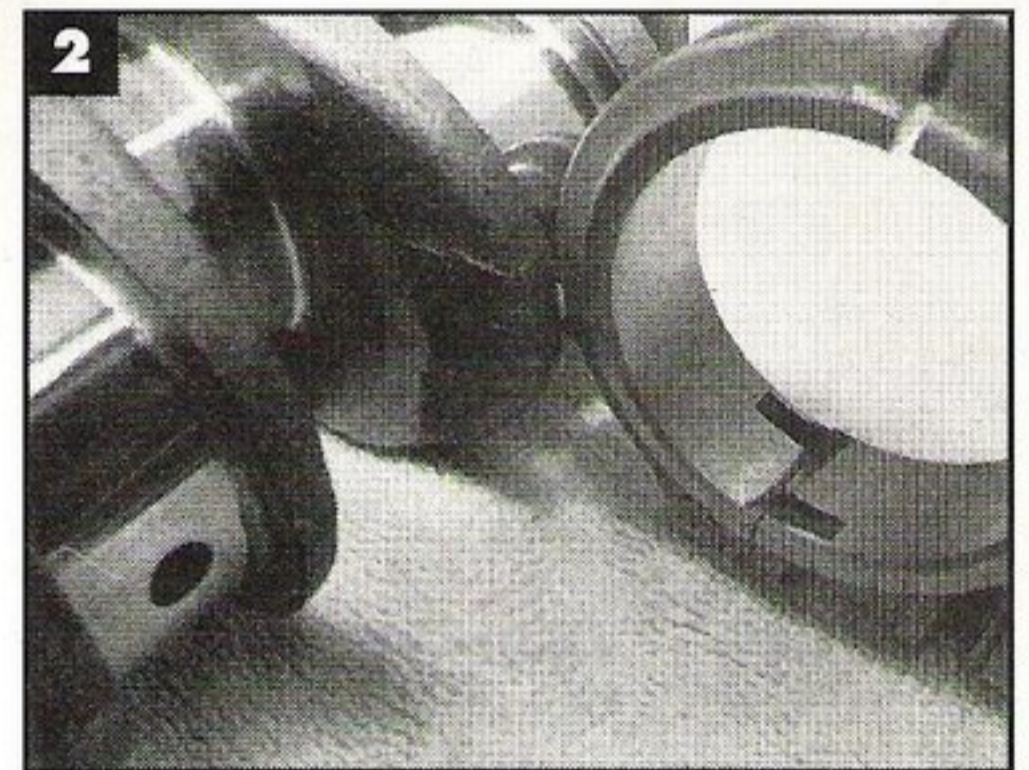
By Hank Roed

In the last installment of our Vintage Engine Rebuild, we showed you how to identify and tear down a Volkswagen 36-hp engine. With the engine now completely apart and all parts inspected for wear, we'll continue with Part 2, which will show you how to assemble the short block. Our vintage engine rebuild continues next month with Part 3, which will be installation of the pistons, cylinders, and heads. With everything nice and clean and all the parts you will need on hand, let's pick up where we left off and get the short block together.

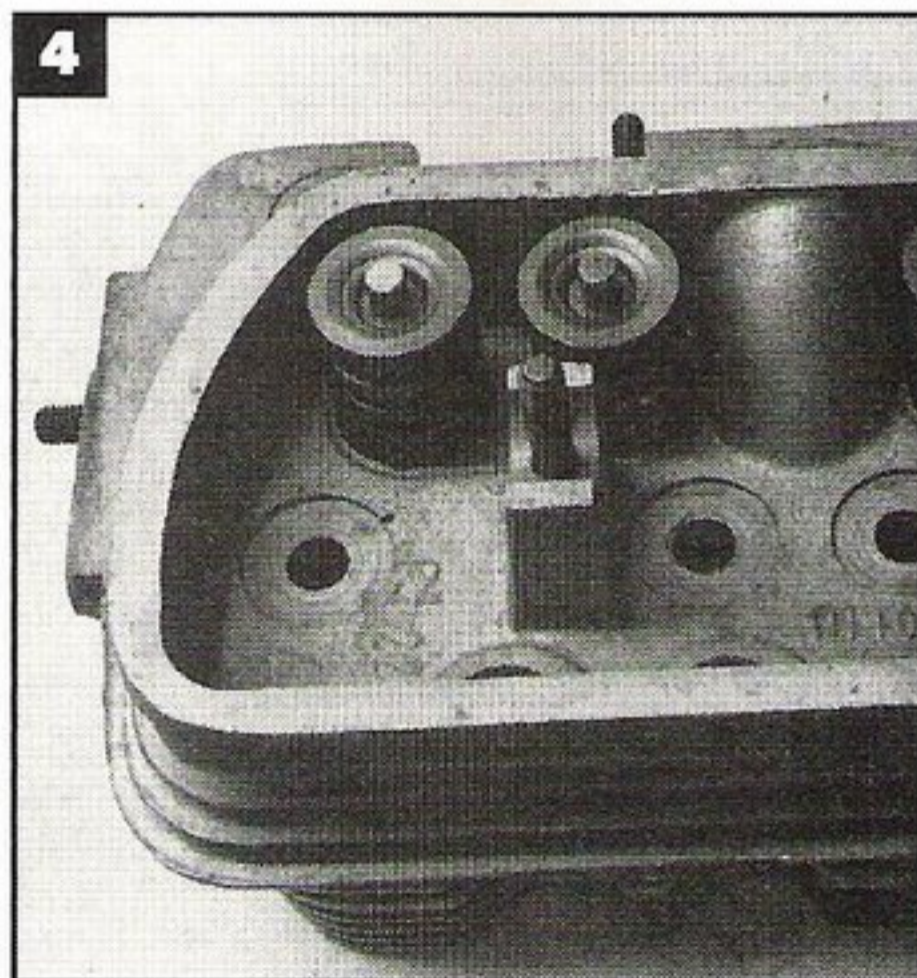


1 - The old crank was scrapped. Here is a freshly reground crank from BFY in Orange, California, along with rebuilt connecting rods from Rimco in Santa Ana. They are laid out showing the position they will be installed, with the bearing tang notches and numbers at the bottom. This applies to all air-cooled VWs and Porsches regardless of the rods used.

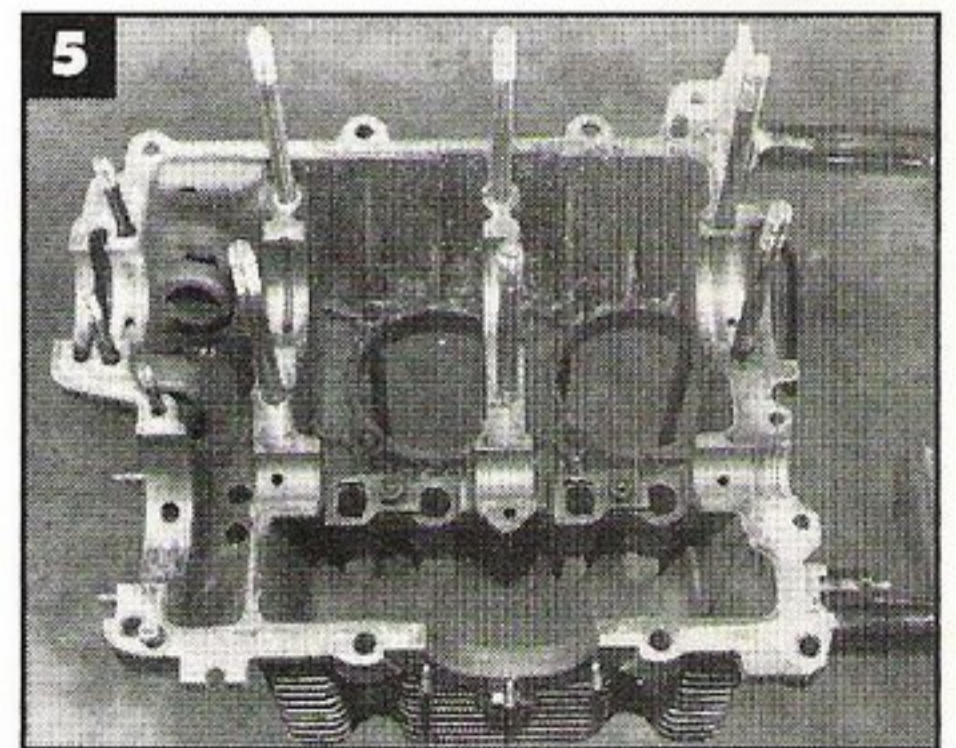
2 - A close-up of the bearing tang notches. Note where the rod and cap mate there is a slightly beveled edge. If the big end of the rod needed so much remachining that the bevel is gone, use a file or smooth stone grinder to recreate a slight bevel. The bevel prevents the back side of the bearing from being scraped on installation, which could cause the scrapings to get under the bearing and then seize on the crank when torqued.



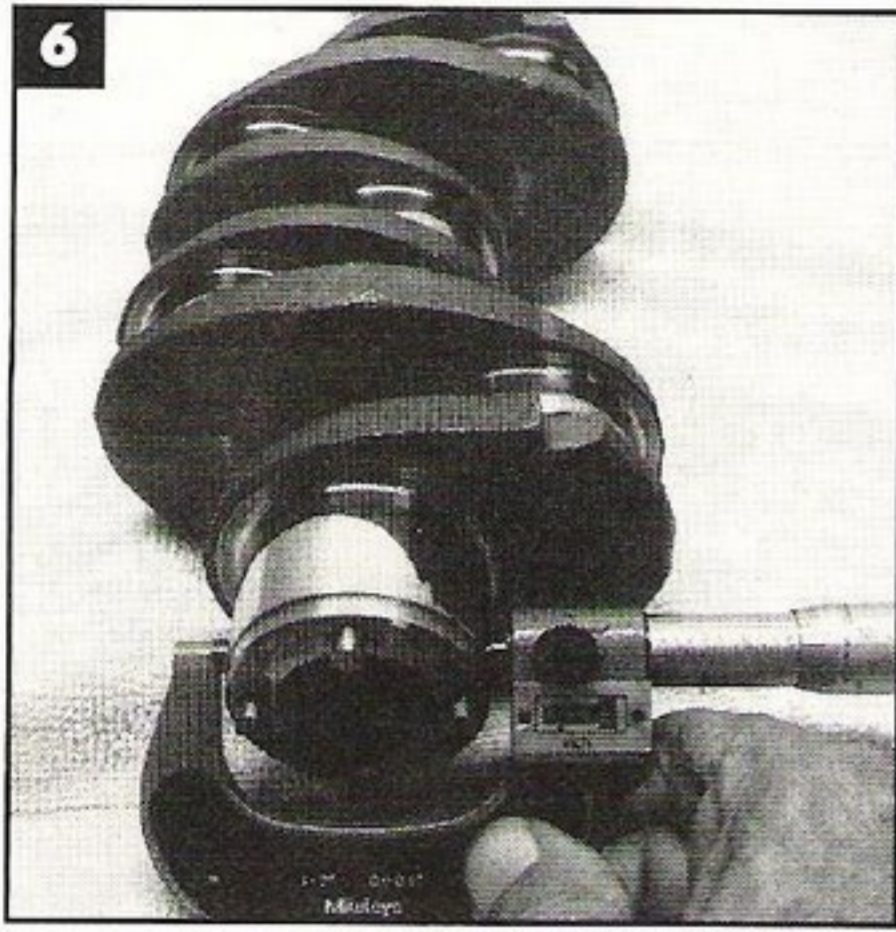
3 - The 35 hp gland nut on the left is shorter than the later one on the right. The longer gland nut will bottom out in the 36 hp crank and will not hold onto the flywheel. Note the early gland nut has a bronze bushing with rifled bore. A later short nut has roller bearings as on the long one.



4 - The cylinder heads were sent to Heads Up in Anaheim for a precision three-angle valve job, new valve guides and to make all valve stems of equal length. Only a few thousandths cut was required for the cylinder-seating surface. Please note if a deep cut is made, an equal amount must be removed from the step for the copper gasket, otherwise it will prevent the head from sealing at the top of the cylinder.



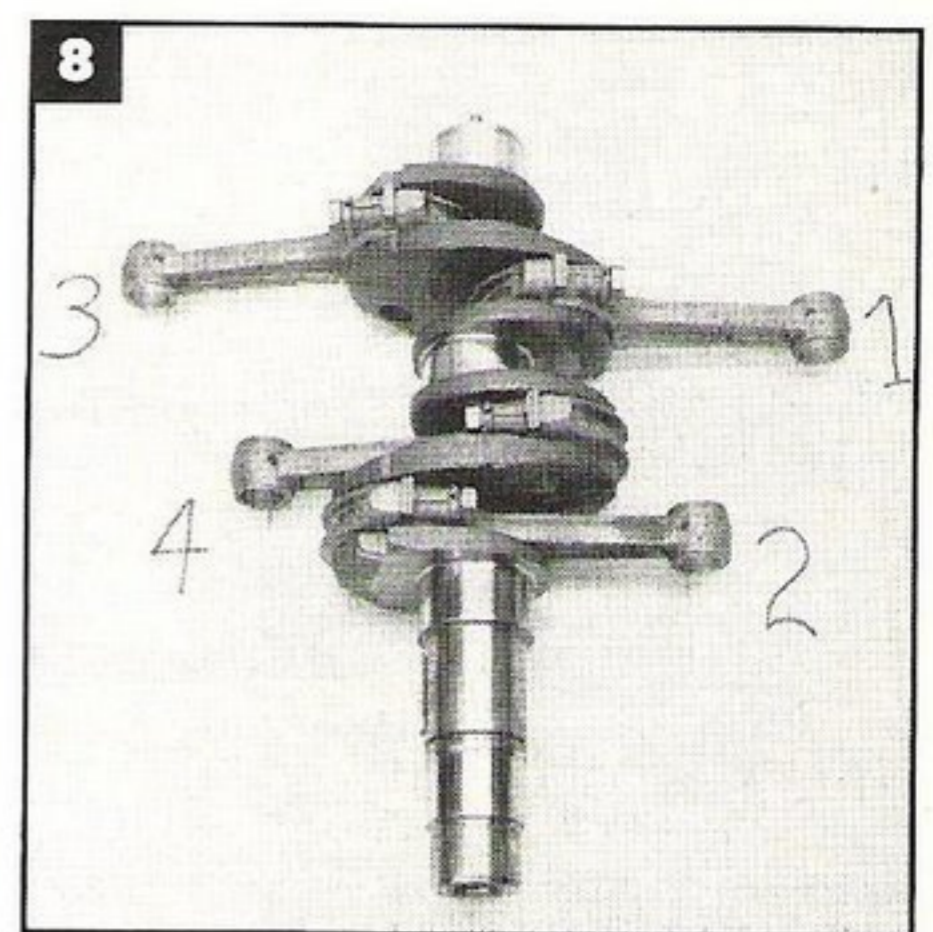
5 - After the case is thoroughly cleaned, the left half is installed in the engine stand. This engine case had never been line-bored and still looked good. There were no ridges in the main bearing saddles, and even the old bearings fit nice and snug. With the .010 inch-under reground crank, I needed standard O.D. and .010-inch under I.D. bearings. I called around and discovered they were not readily available. Although known for big off-road engines, I finally located a bearing set gathering dust at Johnsons Bug Machine in Santee, California. They were trial-inserted into the case without the crank, and all had that satisfying snap as they went into place.



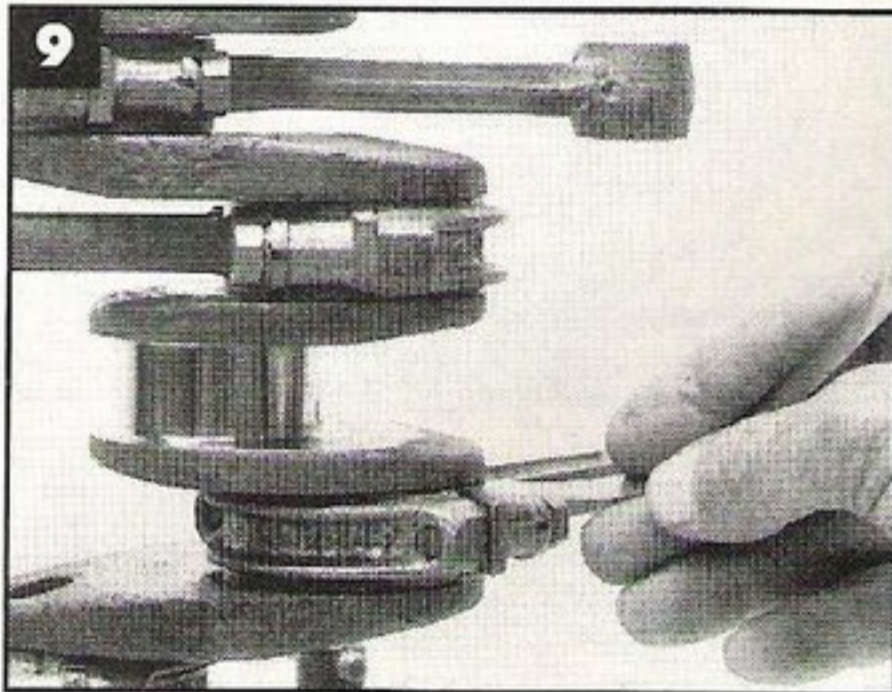
6 - The rod main journals on the reground and polished crank were checked then cleaned in solvent with wire brushes, which were run through all oil passages. After blowing dry with the air hose, a clean lint-free rag was used to clean all journals.



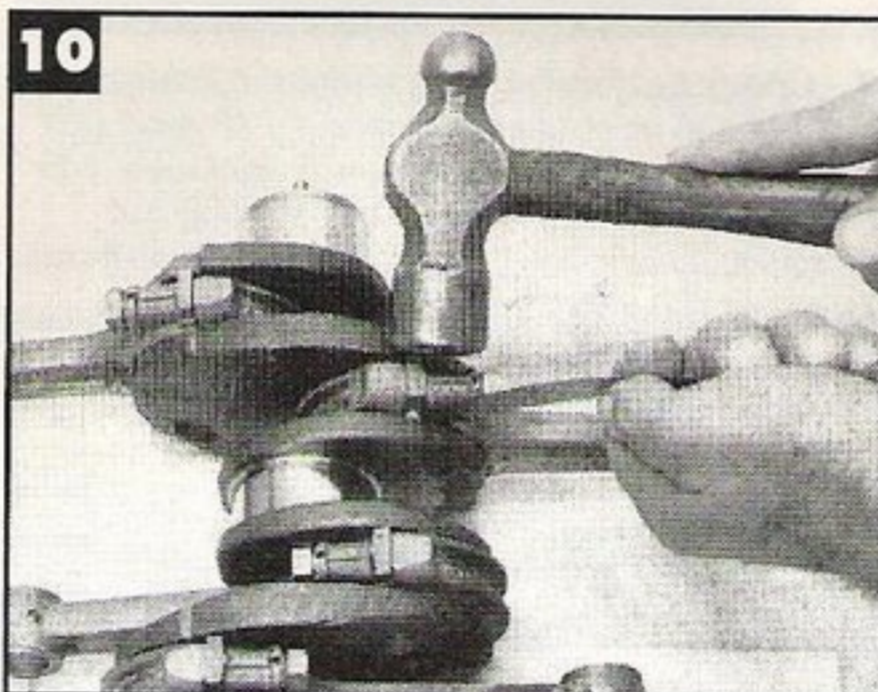
7 - The new .010-inch undersize rod bearings are fitted to the rod and cap, then oiled.



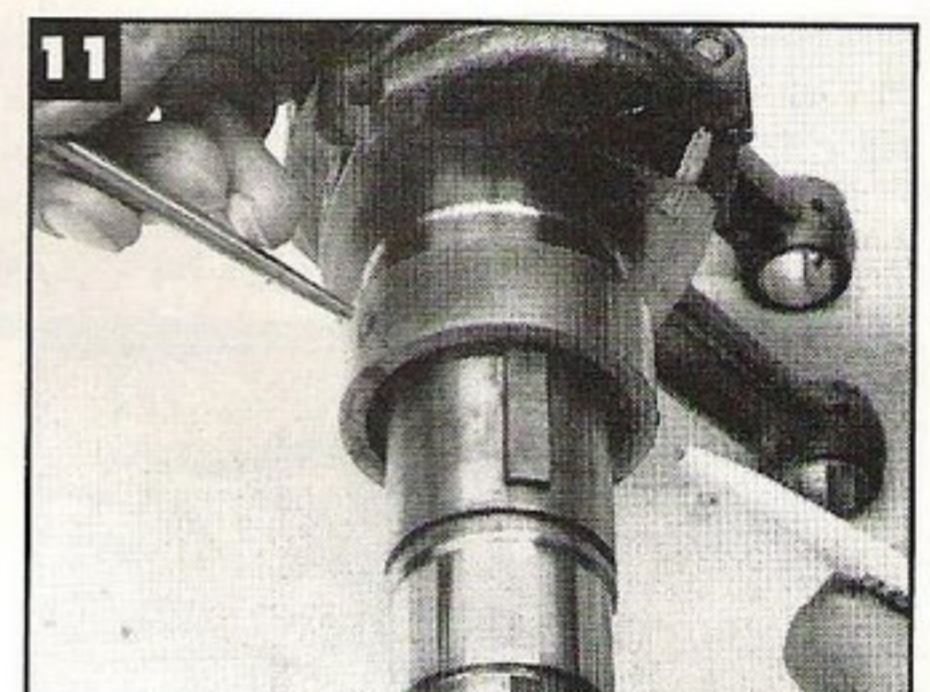
8 - The rods and caps are installed on the crank finger-tight. All bearing tangs and numbers are matched as on the bottom, with number one rod at TDC as it will be in the engine. Tighten all rod bolts.



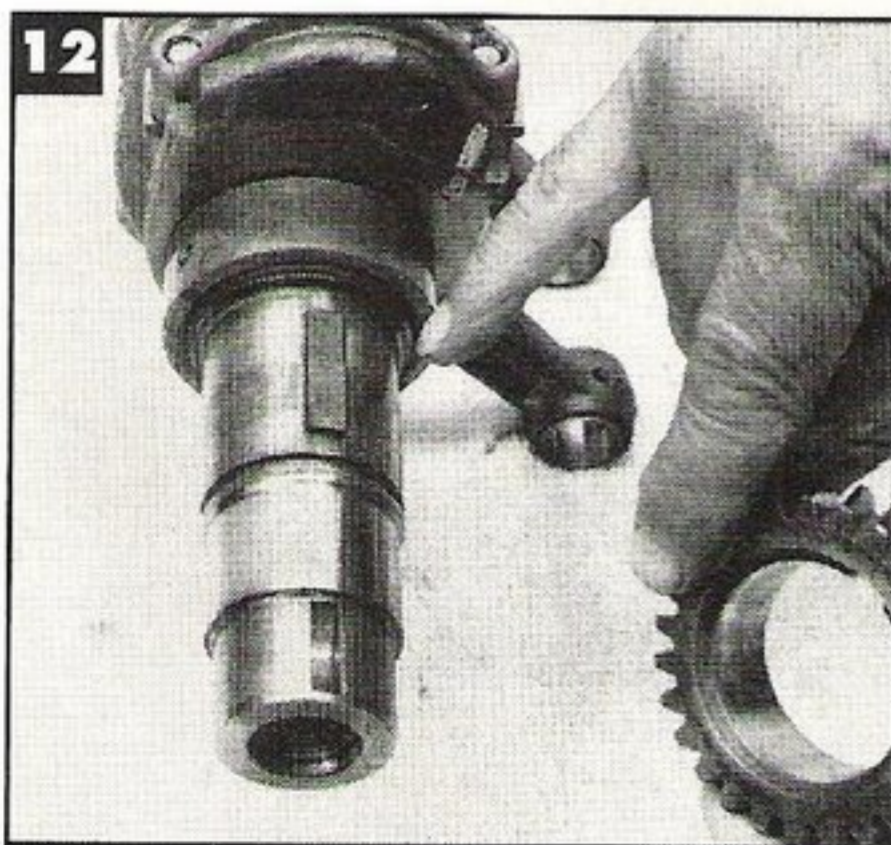
9 - Check the rod side clearance with a feeler gauge. It should be .007 inches to .016 inches. Also check that the rod gap is aligned with the rod by cocking the feeler gauge and moving it against the mating surfaces. If it catches on the edge, the cap is offset and will reduce your overall side clearance.



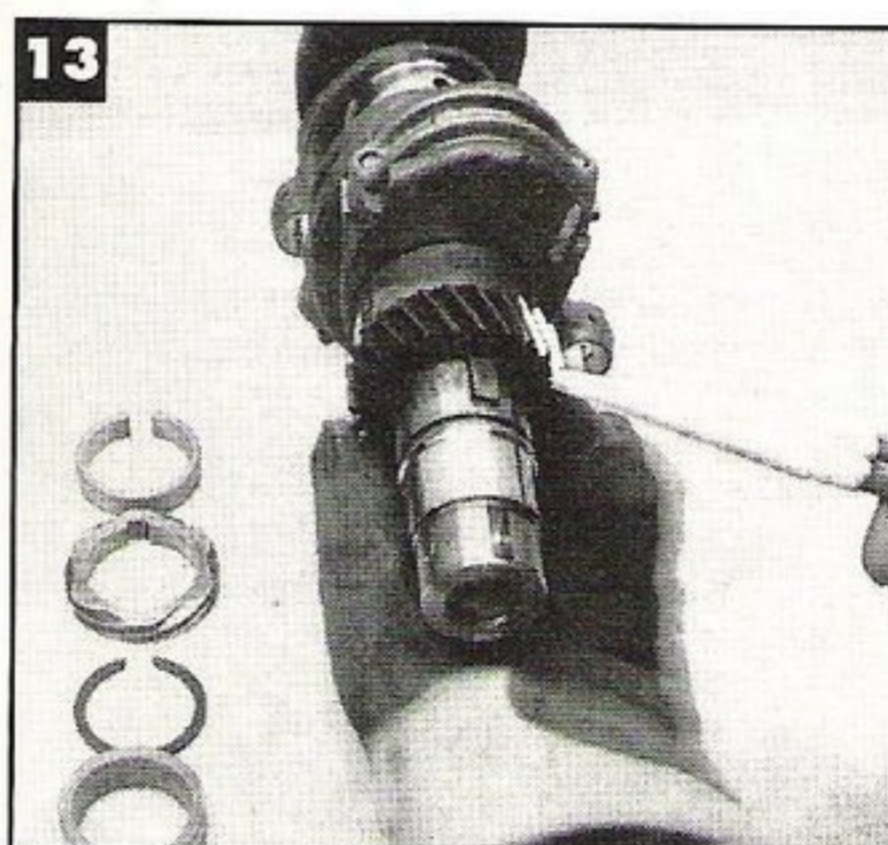
10 - To correct a misaligned cap, tap the cap in the direction it needs to go then recheck with the feeler gauge. Torque the rods to 36 lb/ft with a 14mm socket. All rods should be able to fall free of their own weight without any sticky spots. If any rods stick, disassemble, clean thoroughly and try again. If not successful, the big end of the rod may not be machined correctly or, if you are using your old crank, a journal might be out of round.



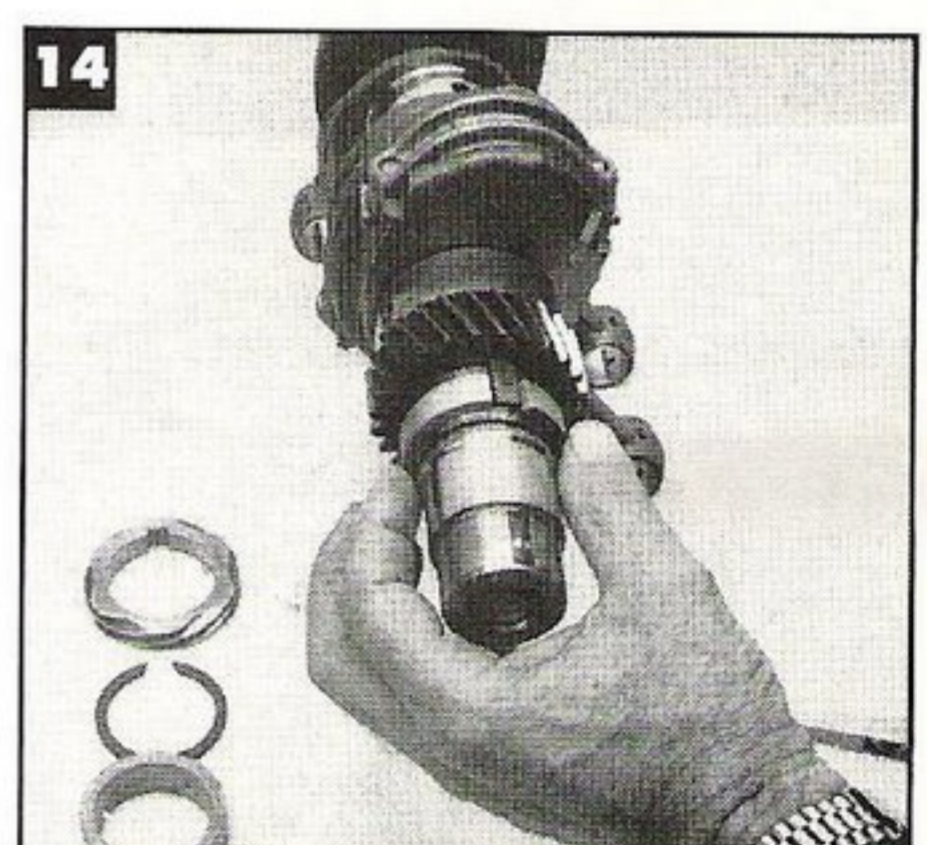
11 - With the 40 hp and later engines, the way this bearing goes in is determined by an offset recessed hole that fits the dowel pin in the case. With the 36 hp and Porsche engines the recess is centered. To determine which way to install the bearing, look at the oil galley holes in both case halves, and align them with the bearing oil holes as shown here with a pencil and scribe. Always use clean, fresh oil for assembly.



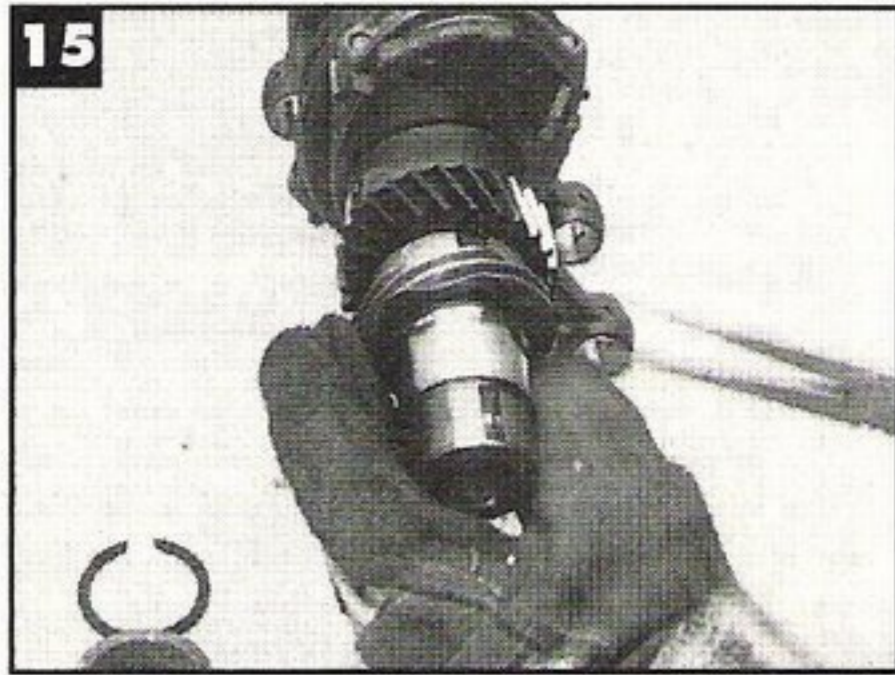
12 - The steel cam drive gear goes with the chamfered edge towards the bearing. First check for burred teeth by meshing with the cam gear and rolling it all the way around. Burrs can be cleaned off with a file.



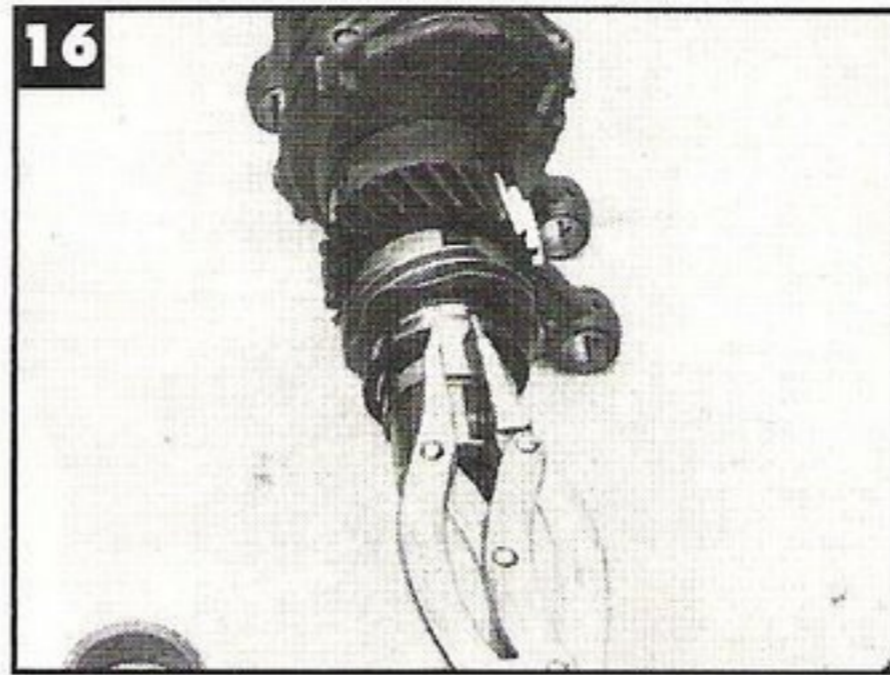
13 - Heat the cam drive gear on a hot plate or in hot oil and slide it on. If it sticks before going all the way on, tap it with a drift punch while being careful not to hit the teeth.



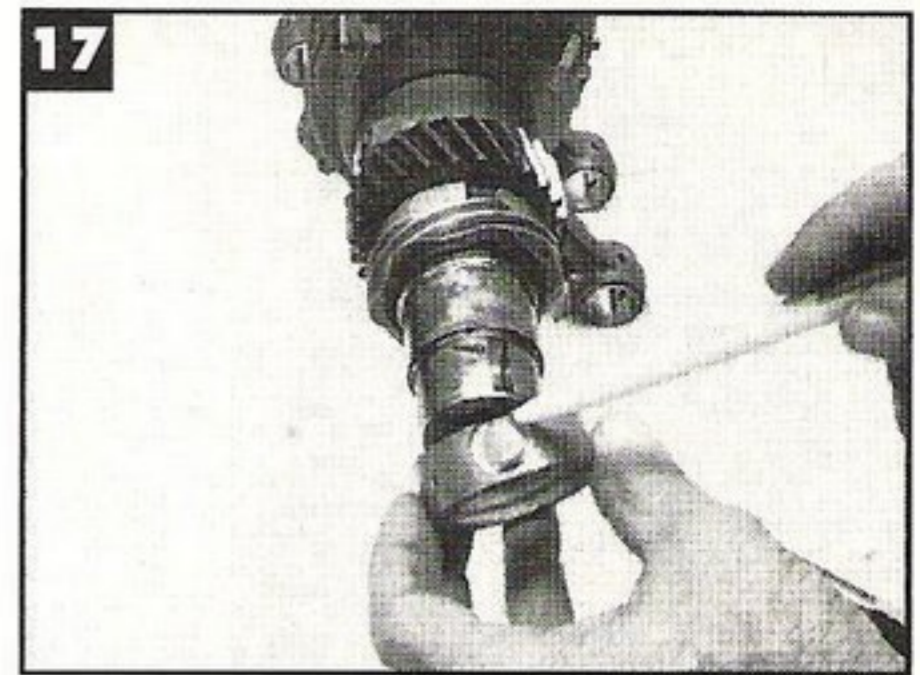
14 - Install the spacer ring while heating the brass gear.



15 - Position the brass gear ensuring it's all the way on.



16 - Install the snap ring with snap ring pliers and make sure it snaps completely into the groove.



17 - Install the last bearing in sequence with the opening of the groove on the side toward the snap ring.



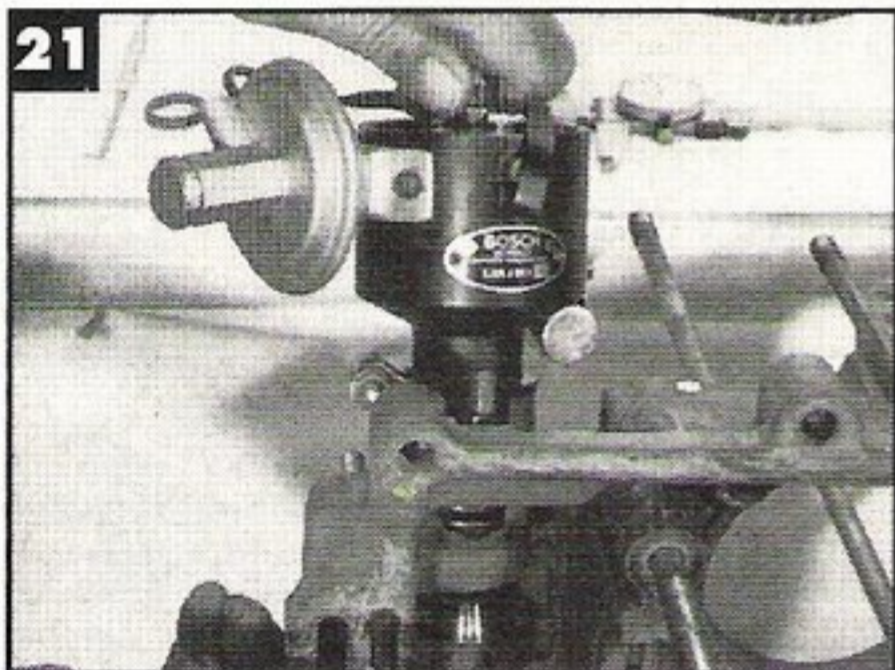
18 - Install the oil slinger ring, ensuring the concave side faces away from the crank. Then include the woodruff key, tapping it in square and firm.



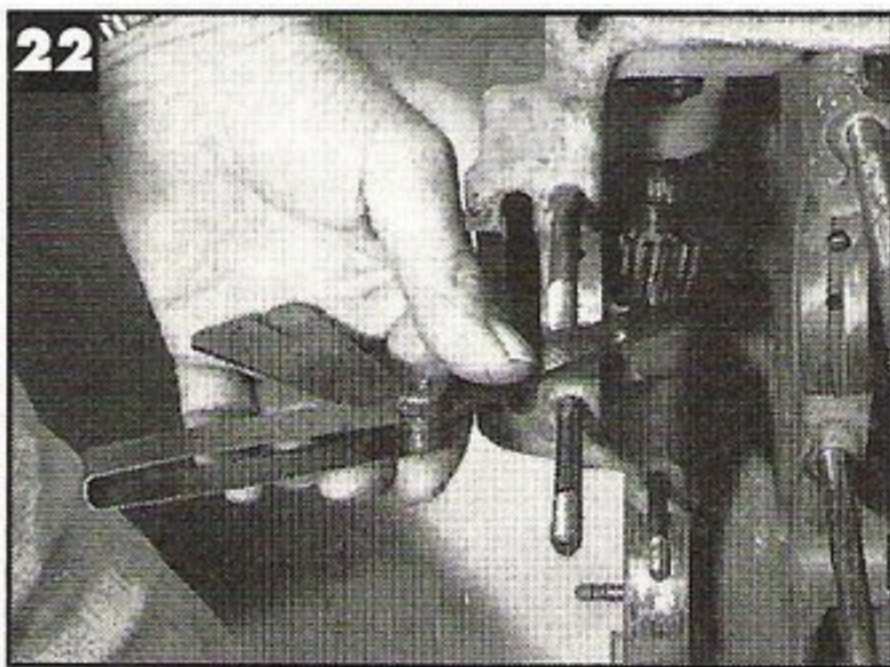
19 - Check for missing or damaged oil sump studs. Install new ones as needed with red Lock Tite. If the threads in the case are too loose, you can use a longer stud with a self-locking nut, such as a Nylock on the inside of the case. If the threads in the case are non-existent, you will need a special step stud that requires drilling and tapping or a Helicoil.



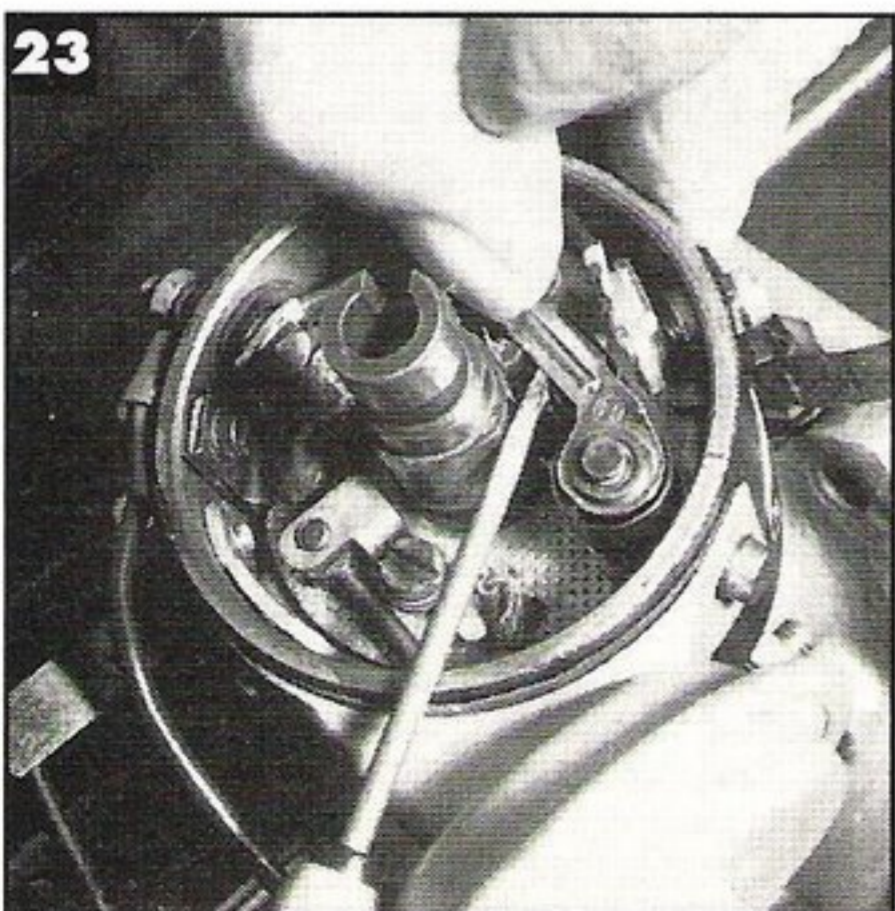
20 - Here is the vacuum advance unit from the VJUR4BR8 distributor, which if functioning correctly will give better gas mileage than a centrifugal-only distributor. Distributors in the VJU4BR8 range also incorporate centrifugal weights and work in conjunction with the vacuum advance to accommodate varying engine load. To correctly adjust the amount of vacuum advance, turn the threaded rod until it measures 1.709 inches plus or minus .008 inches to the vacuum chamber assembly housing. Shown here is a large adjusting nut and small jam nut. Loosen the jam nut and turn the large nut until it measures .138 inches plus or minus .006 inches to the vacuum chamber housing and tighten the jam nut. The long hex-shaped section and nut on the outside of the canister houses an adjustable spring for the diaphragm, which is set at the factory with special tools. No attempt should be made to adjust it.



21 - Install the small coil spring with a dab of grease into the distributor drive gear and install on the case with one thick or two thin thrust washers for a total thickness of approximately .050 inches. Next install the distributor, which has been cleaned and painted with the I.D. plate masked off.



22 - While lifting up the distributor drive gear, pre-load it against the spring and check for approximately .100-inch or 1/8-inch clearance.

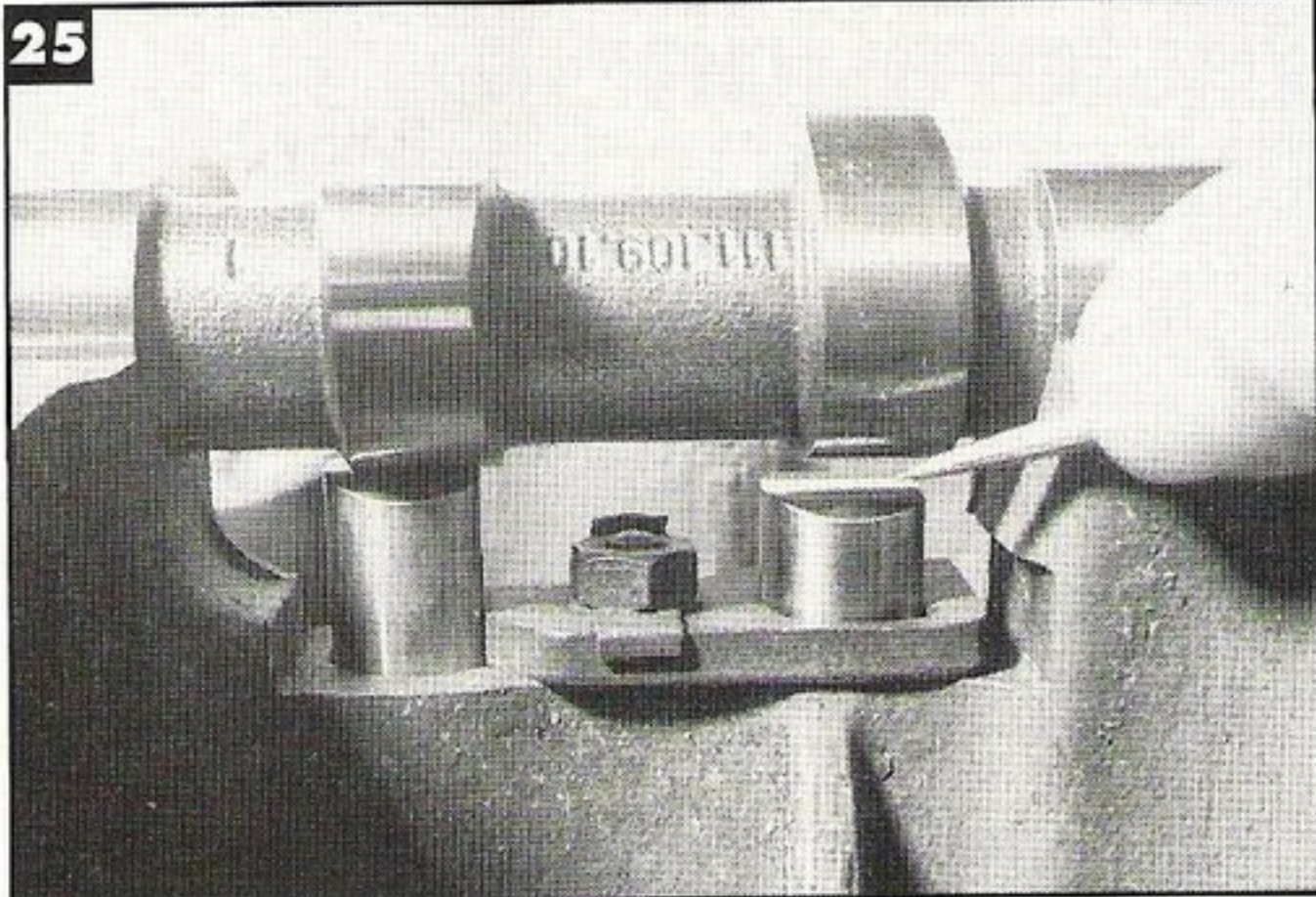


23 - Install new points and set the gap at .016 inches while the rubbing block is on the peak of the distributor cam lobe. Apply Bosch grease to the cam lobes to the side of the rubbing block on the points. This way, as the rubbing block wears down, fresh grease is applied and the point gap will remain correct much longer.

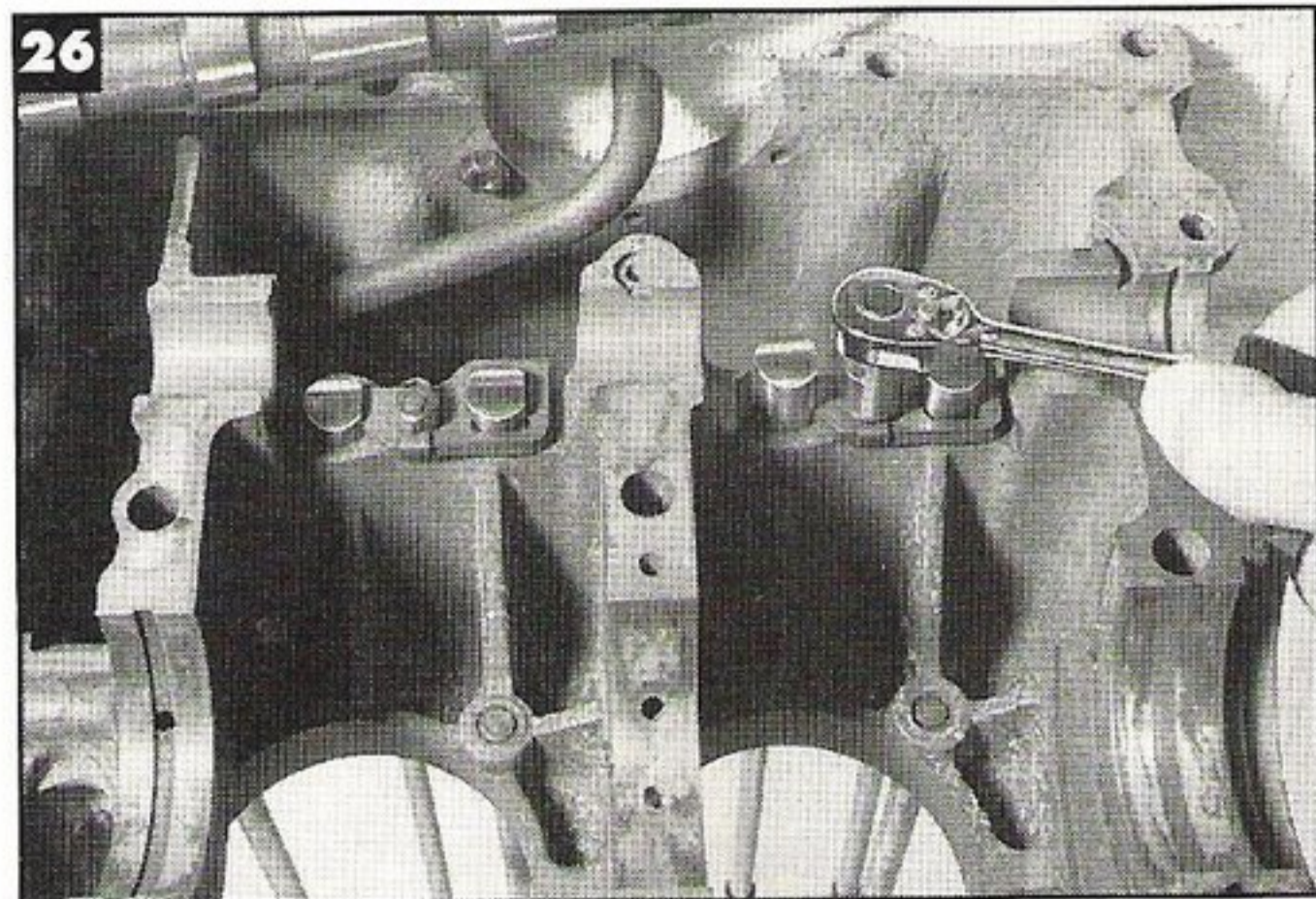
24 - Loosely attach the vacuum chamber to the distributor using a handmade thin cardboard gasket. Tighten the pull rod bracket screw and ground wire lead. Install the rotor and bring it in line with the mark on the edge of the distributor. In this position the points should have just started to open. It is best checked with a test light. If it is impossible to obtain this condition by shifting the vacuum chamber in the mounting screw holes, the length of the pull rod should be altered and the nut readjusted to .138 inches plus or minus .006 inches. Then tighten the screws.



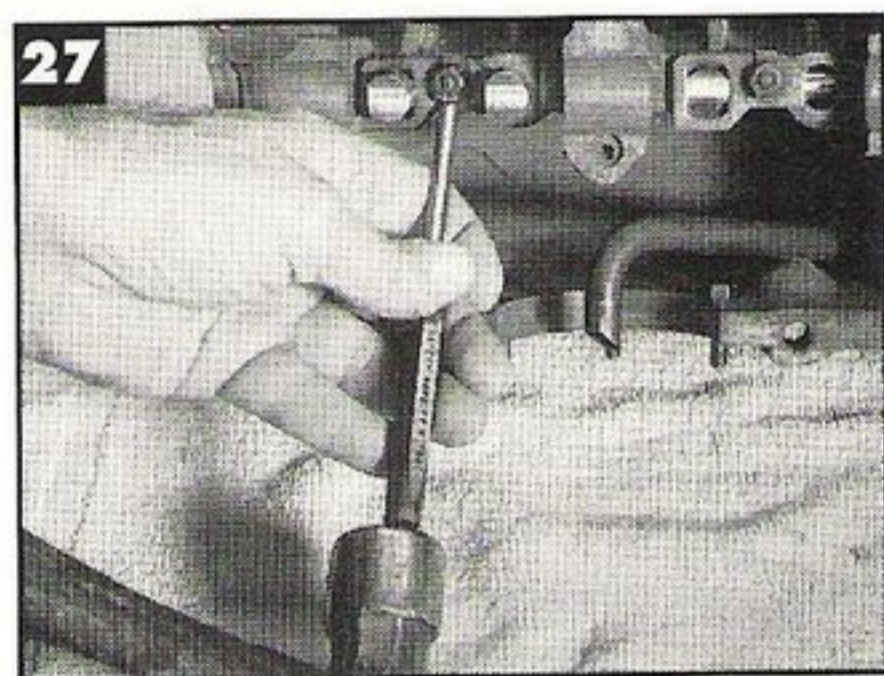
continued on page 36



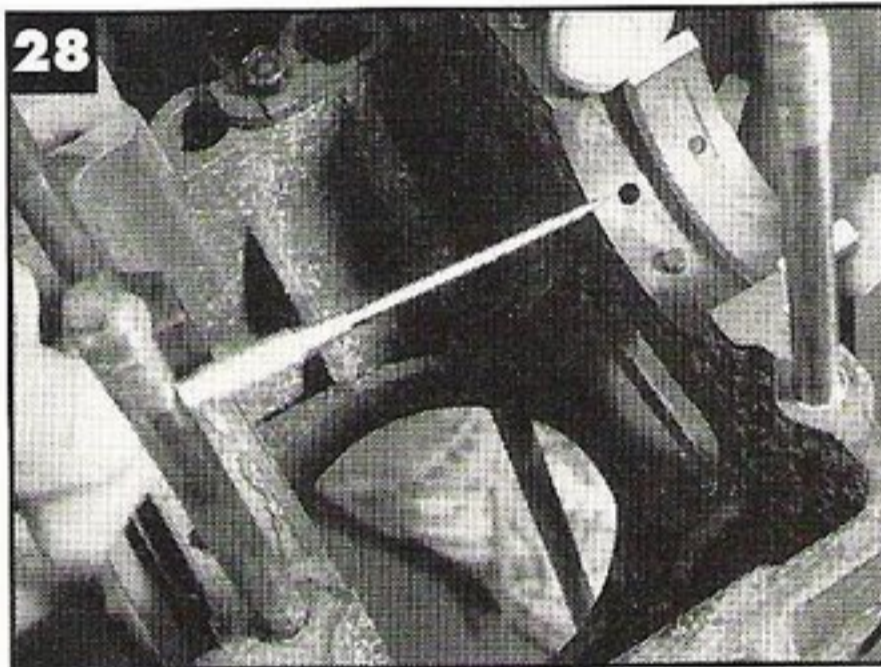
25 - Oil the push rods and check that none will bind on the cam follower guide plates; they should fall free of their own weight. Shown here is one that was sticking. Also try rotating the push rod. There should be no discernable clearance due to the flat side. Factory tolerance is quite close at .0004 inches to .0008 inches.



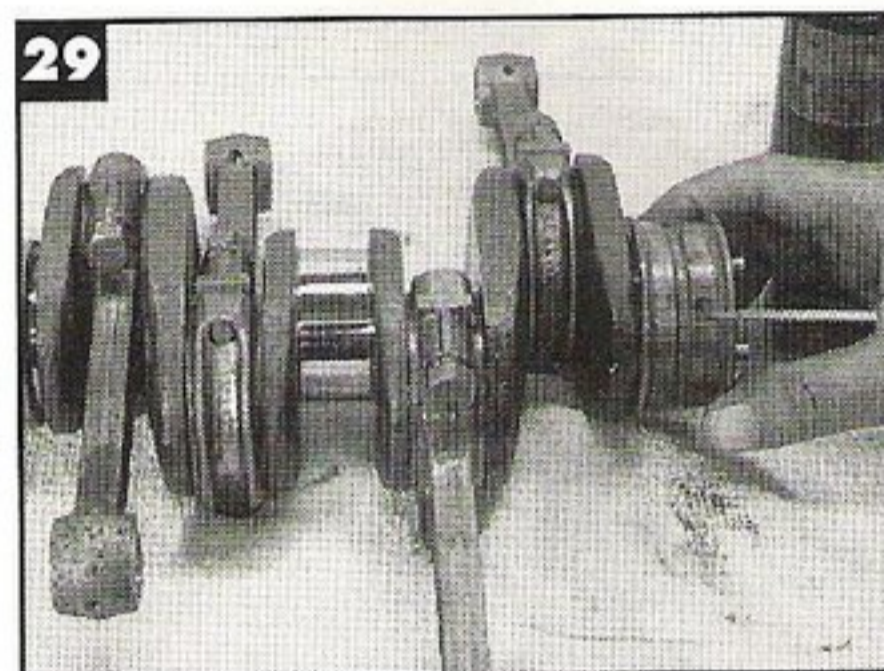
26 - The sticking cam follower was adjusted until it would fall free. After unfolding the lock tab the guide plate was adjusted.



27 - The adjustment is done laterally and care must be taken when re-tightening the nut not to let the guide plate twist. If twisted, the flat seal will guide the cam follower face crooked on the cam shaft lobes, resulting in high wear. Lastly, fold back and lock tab.



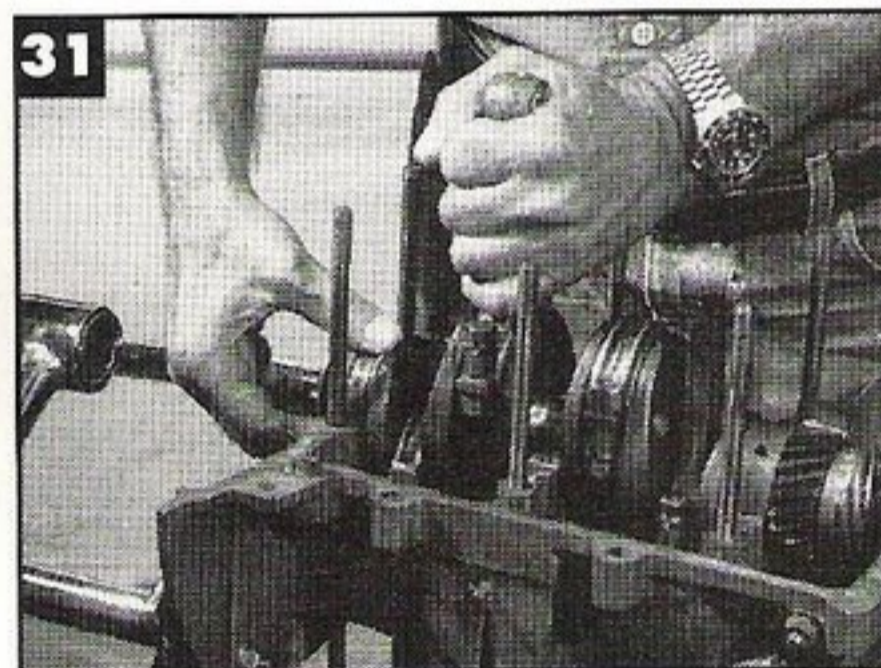
28 - Replace all four dowel pins in the left-hand case and one in the right. Insert the center main split bearings in both case halves with the oil holes corresponding to each other.



29 - Oil the rear main bearing and slide it onto the crank with the dowel-pin locating hole closest to the flywheel.



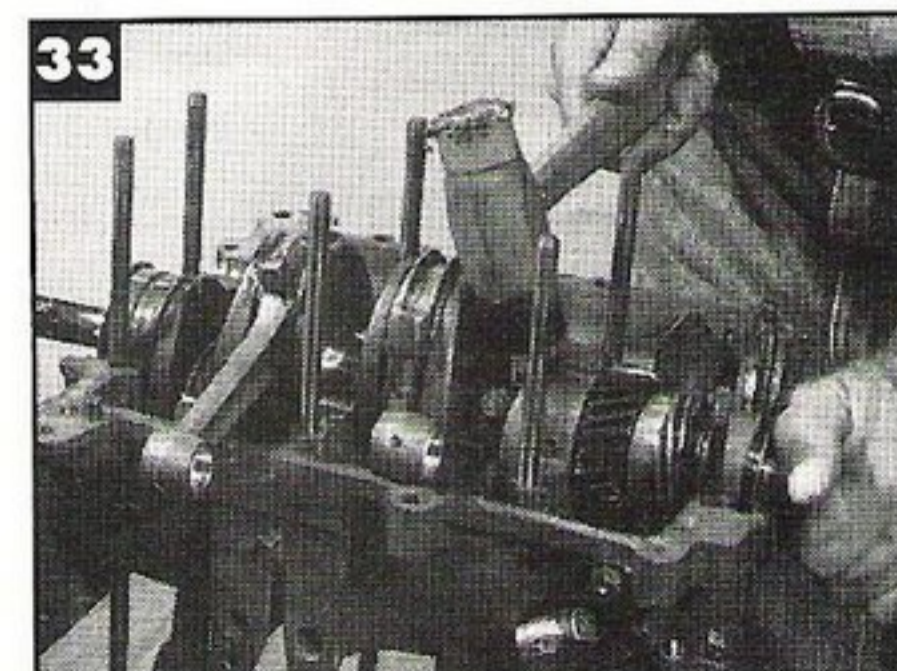
30 - With the distributor in place and rotor pointing to the number one position notch on the rim, pick up the crank as shown by number one and two connecting rods.



31 - Gently insert the crank into place while holding it up slightly by the number one rod; you will be able to rotate the rear main bearing and feel when it lines up with the dowel pin. Then gently lay the rod down without dinging the case sealing surface.

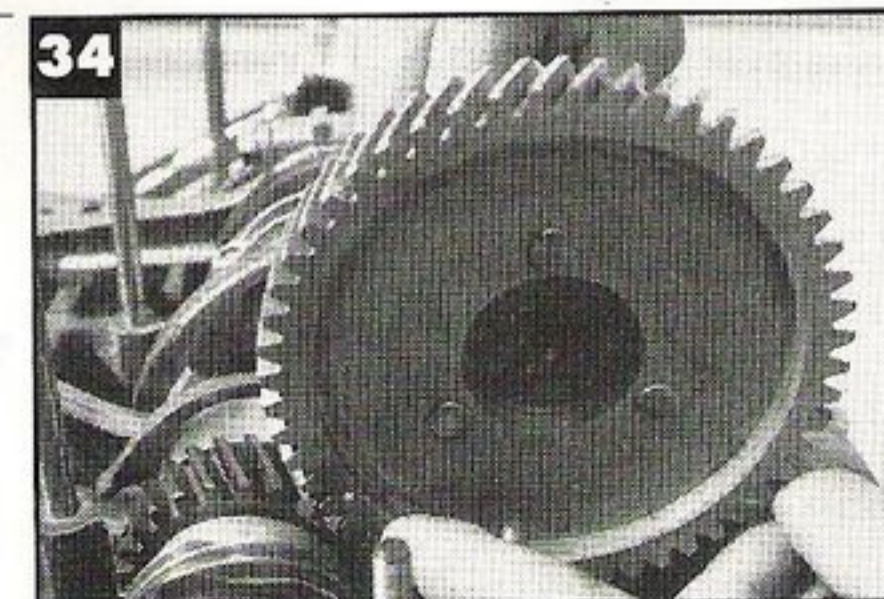


32 - Repeat the process holding the number two rod and engage the other bearings on the dowel pins.

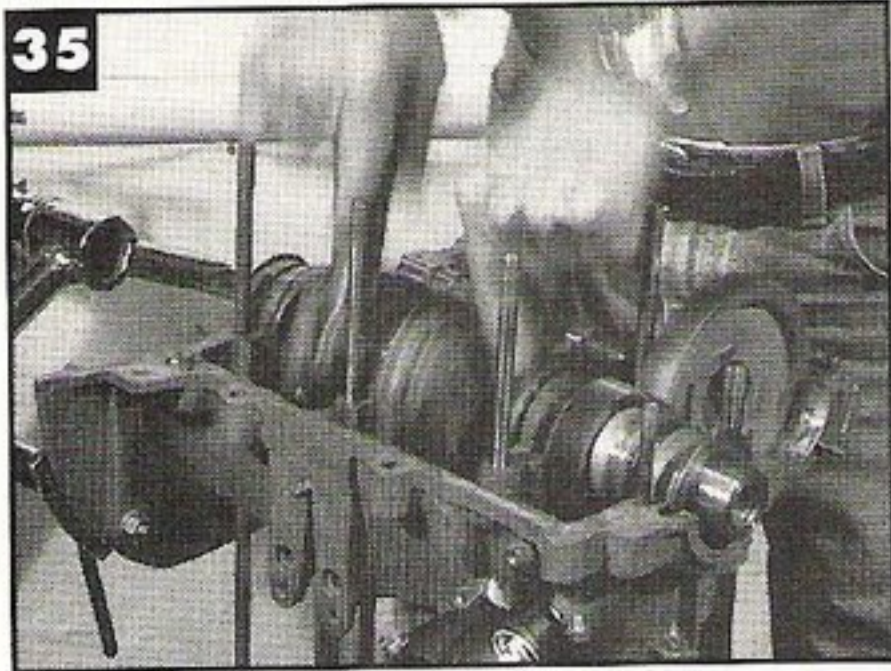


33 - With a soft mallet, tap gently along the crank but do not hit any bearings. All bearings should now be firmly in place, and because you were holding up the number one rod with the distributor rotor at the number one mark, you will have closely engaged the timing.

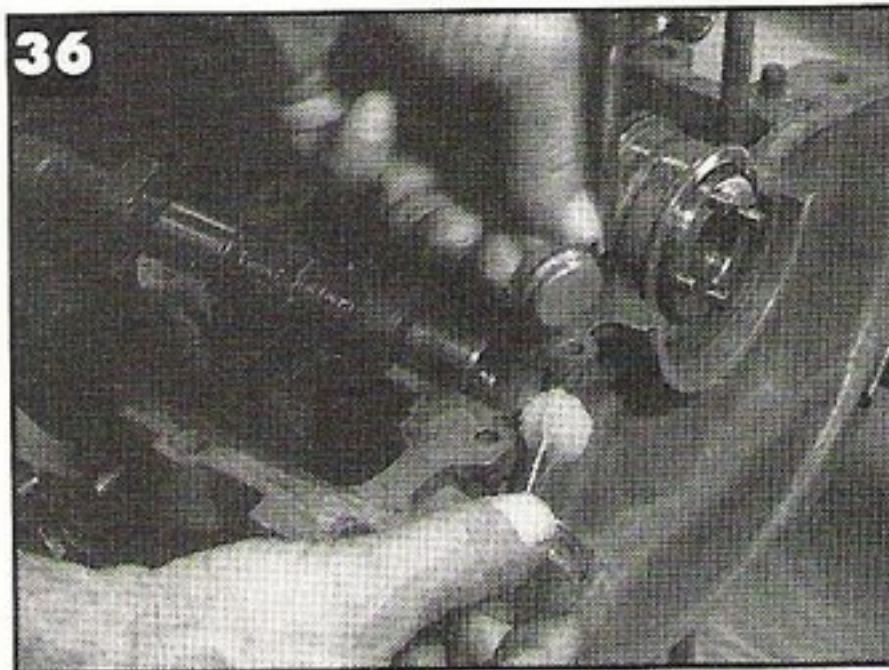
34 - Coat all journals and lobes on the cam with cam lube. Rotate the crank a few degrees clockwise and you will see the two dots on the cam drive gear. The 36 hp does not use cam bearings; so, while holding the cam, engage the timing on the face of the cam gear between the two dots on the crank gear. While keeping the teeth engaged, roll the cam down into the case. If you ever need to change a cam gear note it goes with the dot in line with the slot in the cam.



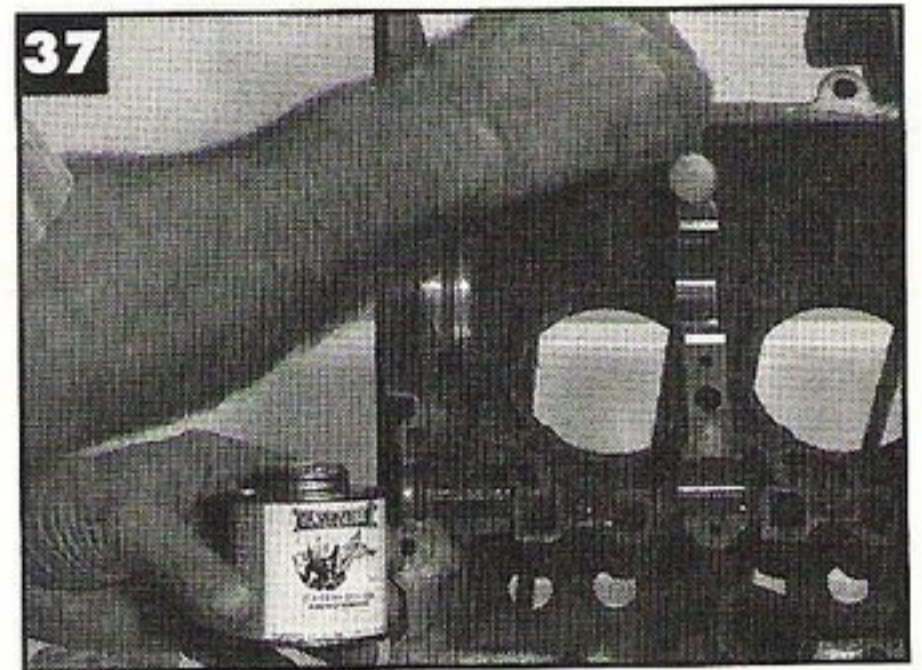
continued on page 38



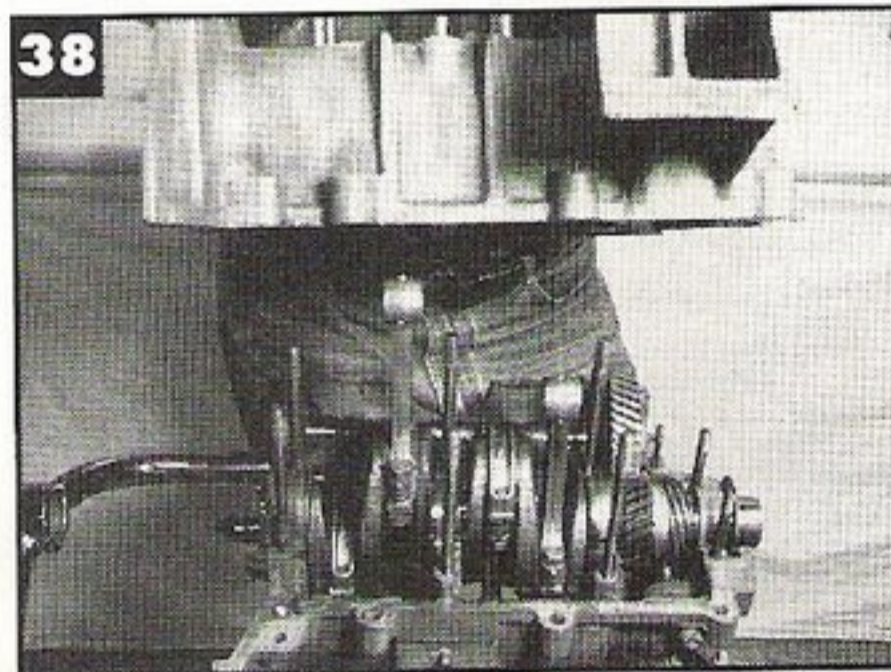
35 - First rotate the crank clockwise by the rods and feel for binding between the gears. Next slowly rotate the crank counter clockwise. All should turn freely. If the cam tries to climb up out of the case you will need a -1 or -2 etc. These numbers are on the backside of the cam gear. None means it's a zero. If there is no binding, check the backlash by holding the cam down and rocking the cam gear. It should barely be perceptible, as the factory spec is .004 inches to .0014 inches. The only other alternatives to correct backlash might be to use a different gear on the crank. Just remember to use 36-hp gears, as the degree of pitch is less than on later engines.



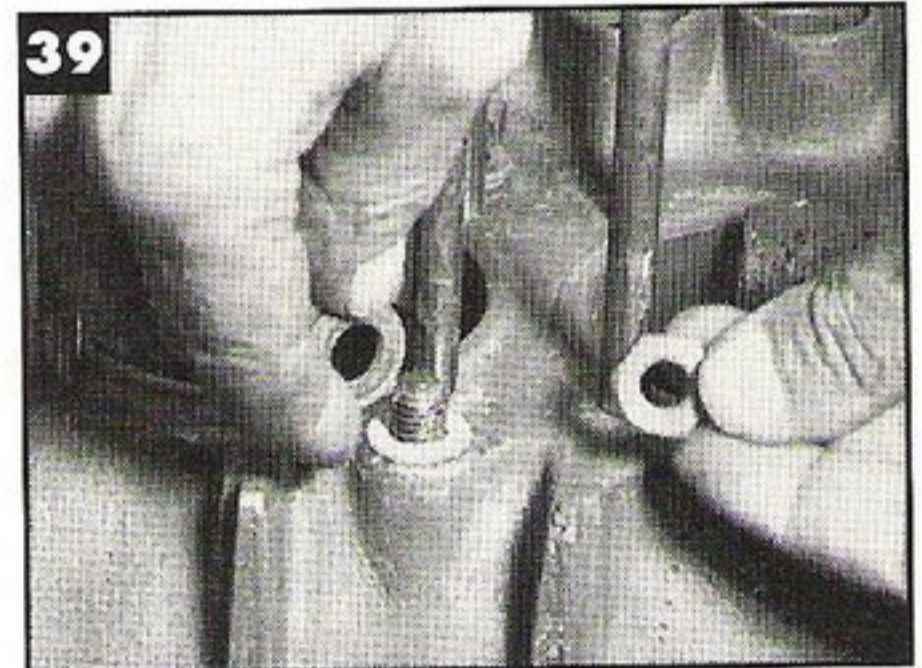
36 - Coat the cam plug with sealant. Put some sealant in the groove of the case but not on the journal. Insert the cam plug.



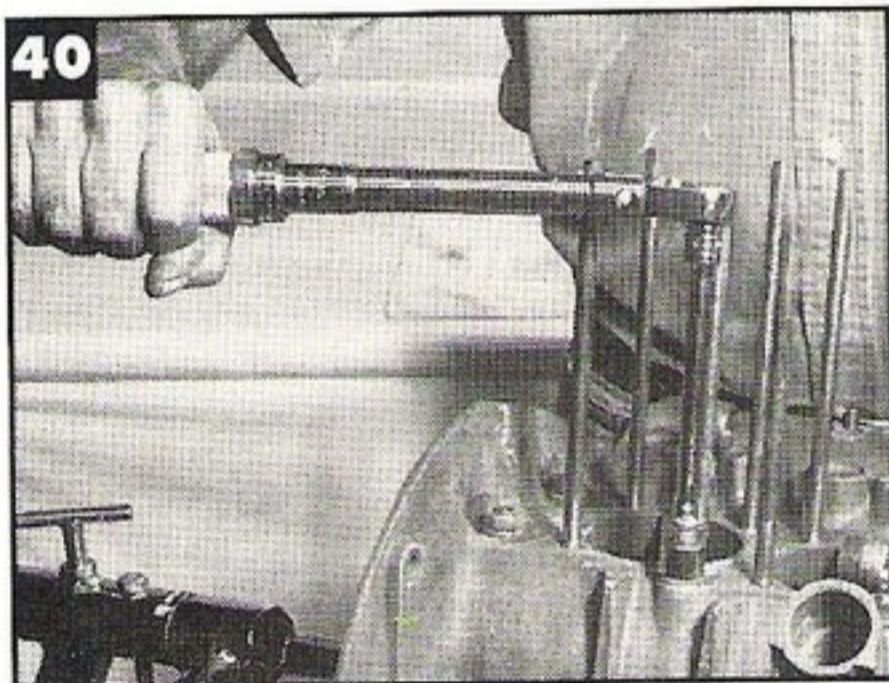
37 - Coat the entire perimeter of the right case half, the cam plug groove and the six holes for the studs with sealant. Be careful not to get any near the smaller oil passage holes. I use Gasacinch or Aviation Permatex. Others are your choice, but do not use a silicone type. It could squeeze out into the engine and plug oil passages.



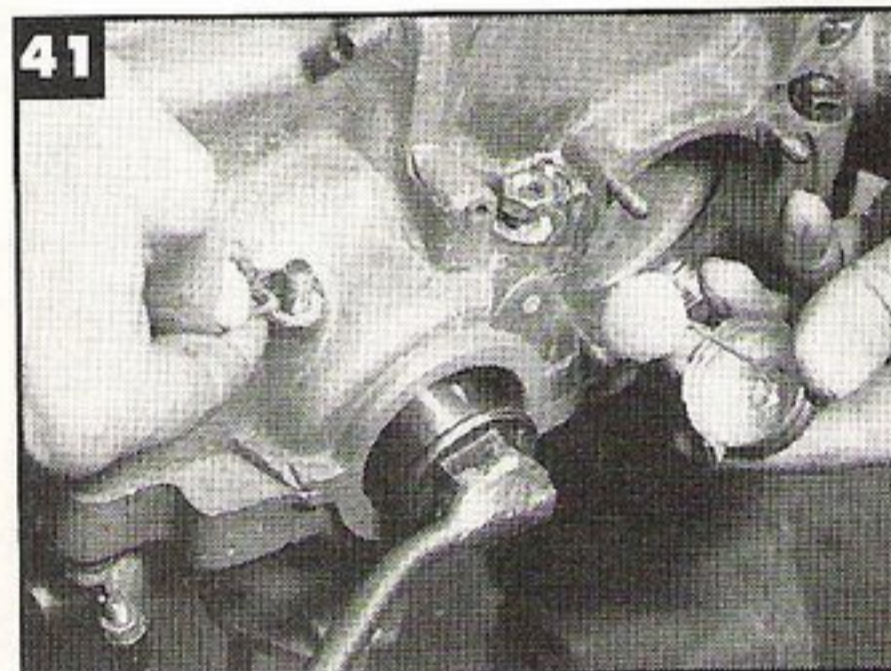
38 - Before the case sealant dries too much, press the rods sideways or have someone hold them and set the right case half down on the studs. Tap around the case with a mallet. Be sure the cam plug is still in place.



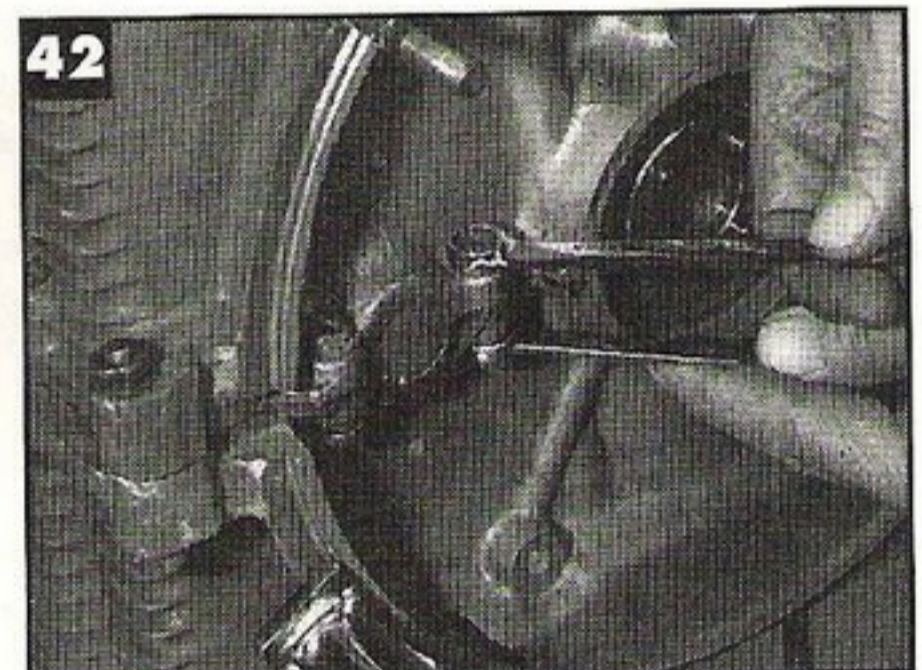
39 - At the six main case studs apply sealant, the paper washer, metal washer and nuts.



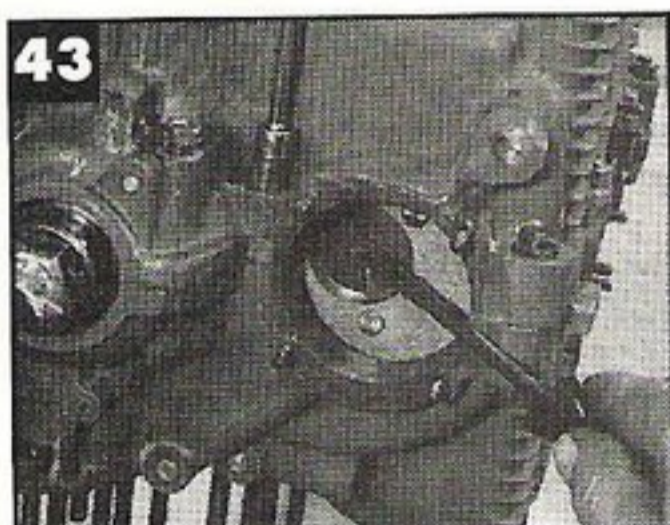
40 - Torque the six main case nuts to about seven lb/ft working from the center studs outward. At the same time, rotate the crank and stop if anything begins to bind. Here I use a pulley nut welded to a cylinder head stud, or you could temporarily slip on the pulley. If any main bearings are not centered in the dowel pins, you will crush the bearing and ruin it; definitely not desired with hard-to-find bearings. Finally, torque the six main nuts evenly to 22 lb/ft while turning the crank.



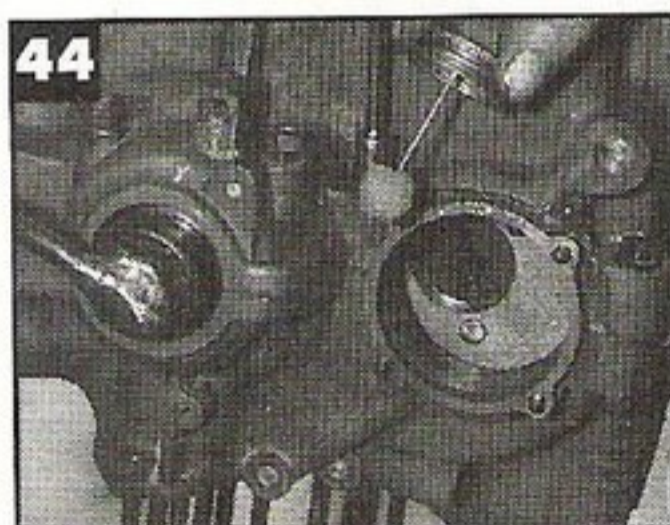
41 - Install all nuts and washers around the perimeter of the case, using paper washers and sealant on the ones shown here. Do not fully torque them yet, especially the ones near the oil pump.



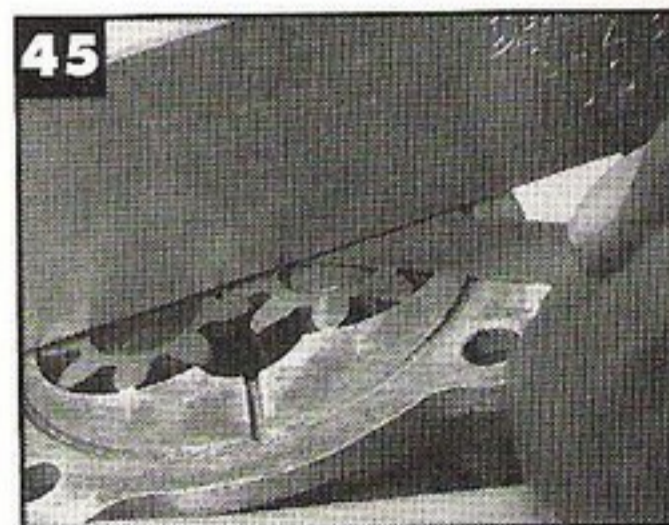
42 - Tighten the two bolts at the cam plug.



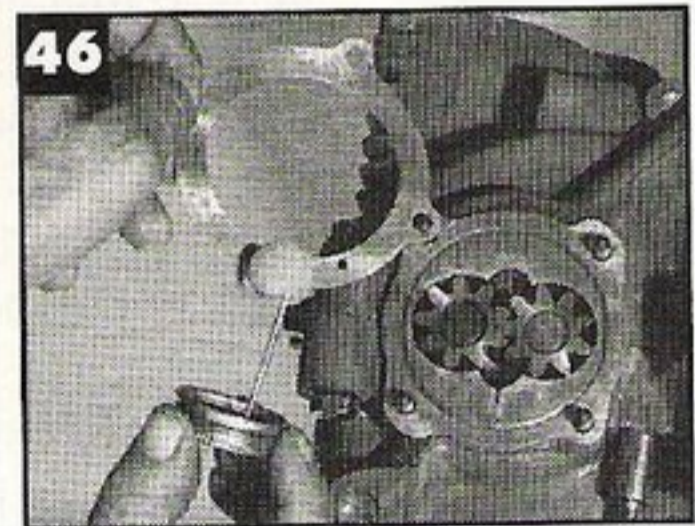
43 - Put a dab of grease in the cam slot.



44 - There are two oil pump gaskets, one thick and one thin. The thick one goes on first. Use a sealant, but please not silicone or it may plug the oil passage.



45 - Check the clearance between the gears and oil pump without a gasket. The factory spec is no more than .004 inches. Closer to zero is better and would improve oil pressure. After the gasket is in place the clearance will be sufficient.



46 - Install the oil pump housing, put some assembly lube on the gears and shaft and coat both sides of the thin gasket with a thin sealant. Again, No Silicone! The factory recommends leaving these gaskets dry or wetting them with oil.

continued on page 58

**The Only ...
Volkswagen
Upholstery
good enough
to have a
LIFETIME
WARRANTY!**



- **Exact Fit** (Yes...TMI is the brand that installs right and fits great!)
- **Looks Better** (TMI is the brand that looks perfect years from now...won't wrinkle or stretch like some cheaper vinyls & carpets.)
- **Selection...Selection** (The largest color & texture selection of upholstery & carpet.)
- **Thicker Vinyl** (Others use vinyl film...TMI vinyl wears better and looks new longer.)
- **Masonite Backed Door Panels** (Others use cardboard...easy to bend...better not get them wet or damp! No worries with TMI.)

Bug, Bus, Ghia, Thing, Sq./Fast/Notchback Rabbit, and Cabriolet: Seat Upholstery, Door Panels, Carpet Kits, Center Consoles, Sunvisors, Conv. Tops, & Headliners. Custom and Authentic Stock Colors...and more!

Available at better Volkswagen accessory stores nationwide...

www.tmiproducts.com

For nearest Dealer or FREE catalog:

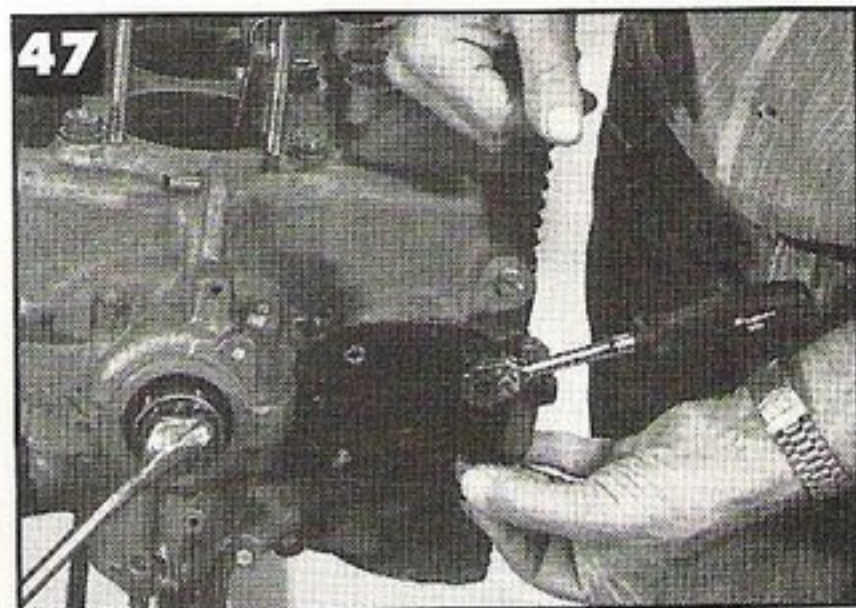
1-800-624-7960

191 Granite St. • Corona, CA 91719

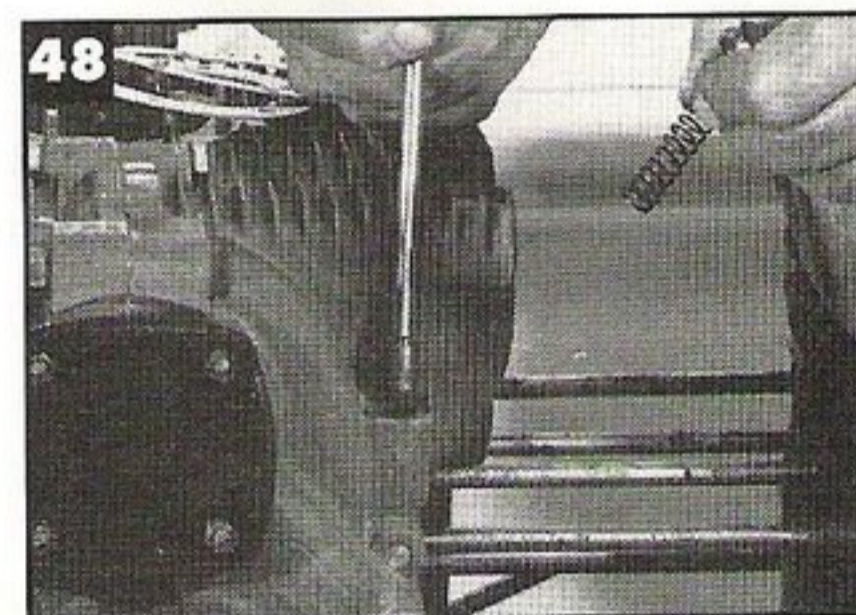
Email: tmiprods@aol.com • FAX (909) 272-1584



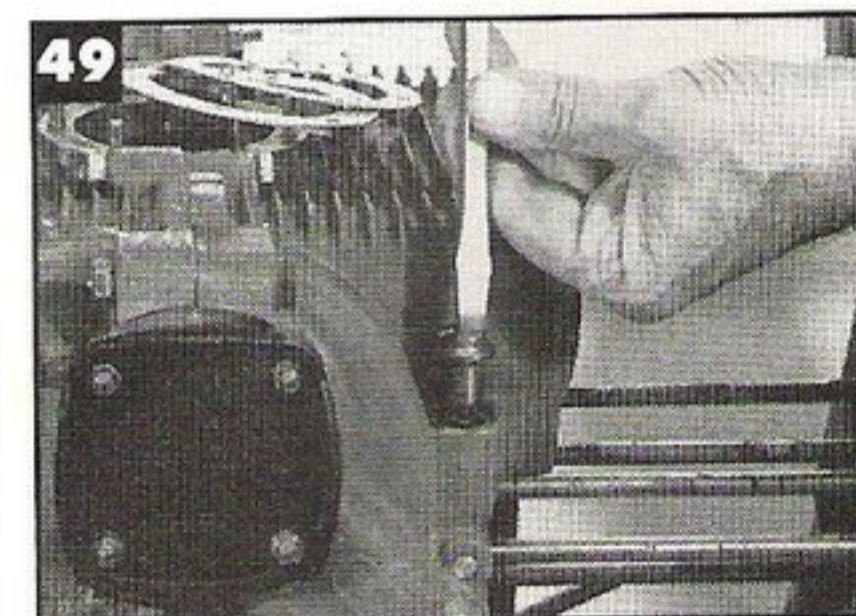
REBUILD continued from page 38



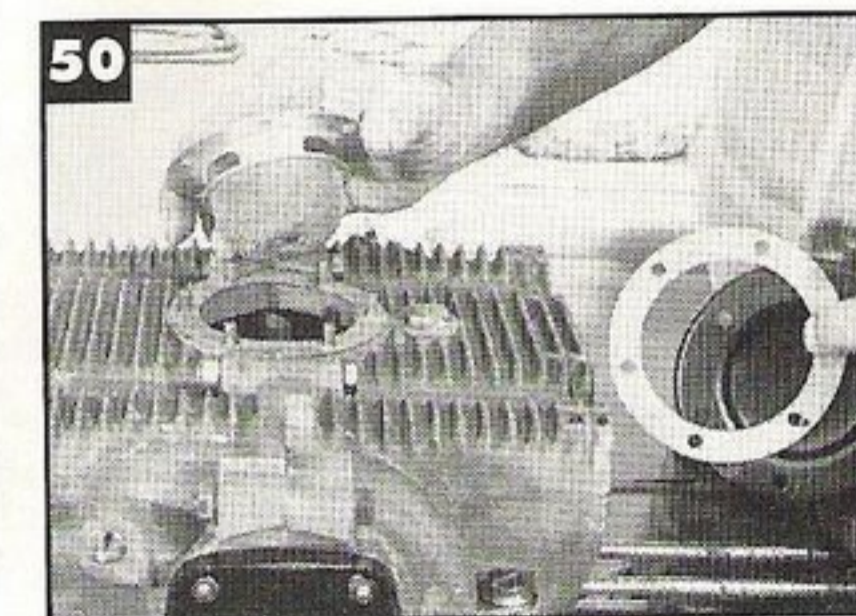
47 - The cover plate must be absolutely flat. A piece of wet or dry sandpaper on a glass surface works well for resurfacing. Just be sure it's cleaned afterward and, with a little assembly lube in the center of the cover plate, install it. The same copper washers as are on an oil strainer plate will work here to prevent leaks. Torque the nut to no more than 5 lb/ft.



48 - Turn the engine upside down and squirt some oil in the oil pressure relief valve hole. Install the plunger with the hollow side toward you, and check that it moves freely with a magnet, bent wire, or screwdriver.



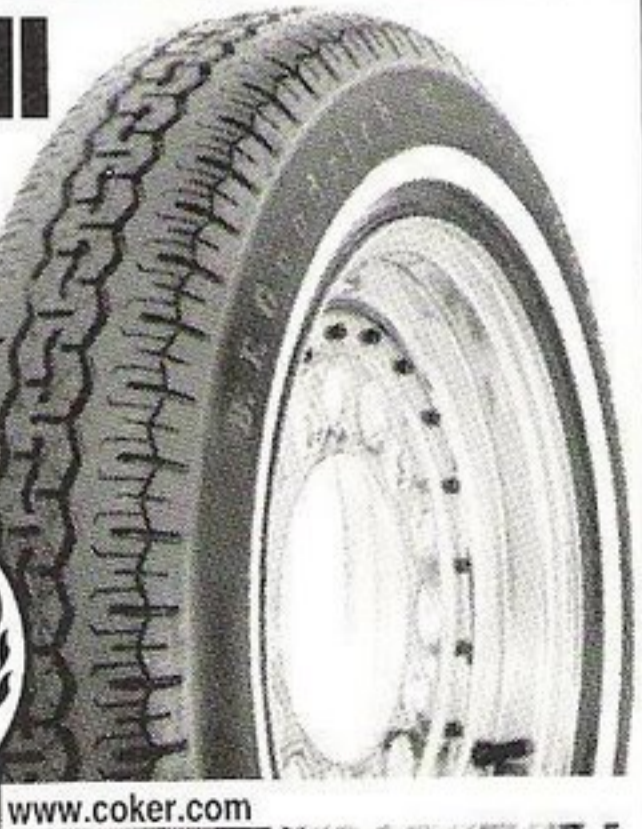
49 - Check that the spring is 52-53mm or 2.05-2.09 inches and install it into the hollow of the plunger. Finally, tighten the plug with a copper gasket using a square-shank screwdriver and crescent wrench; tighten it to crush the gasket.



50 - Install a clean oil strainer with a dry paper gasket on each side and cover the plate. Be sure the cover plate is flat inside as the six holes are sometimes deformed from over tightening. Install the copper washers and torque the nuts to five lb/ft.

165R15 Whitewall

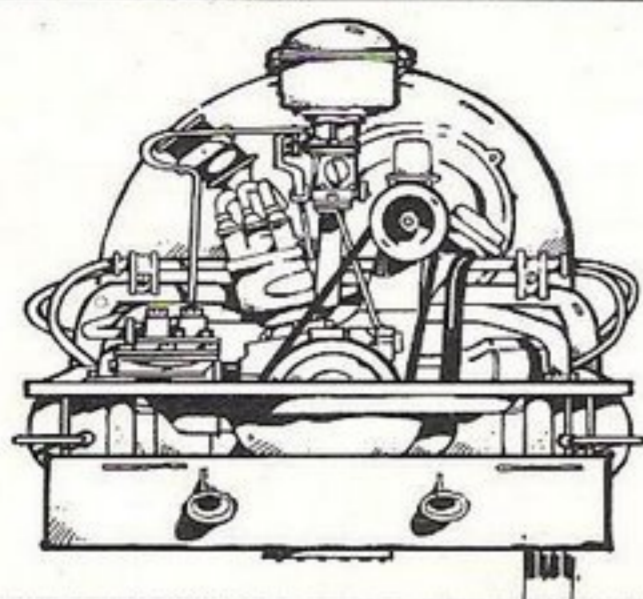
The new B.F. Goodrich GT-100 radial features a 3/4" raised whitewall and is perfect for classic VWs.



1317 Chestnut Street, Chattanooga, TN 37402
Local & Int'l (423)265-6368 • Fax (423)756-5607
1-800-251-6336

www.coker.com

Engine

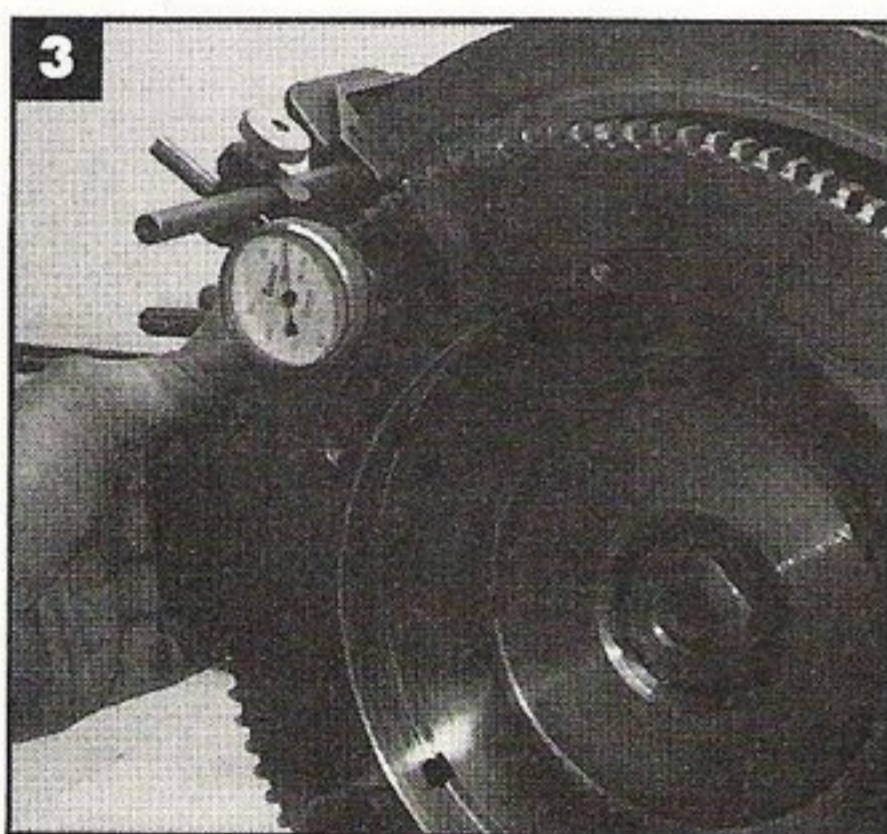


By Hank Roed

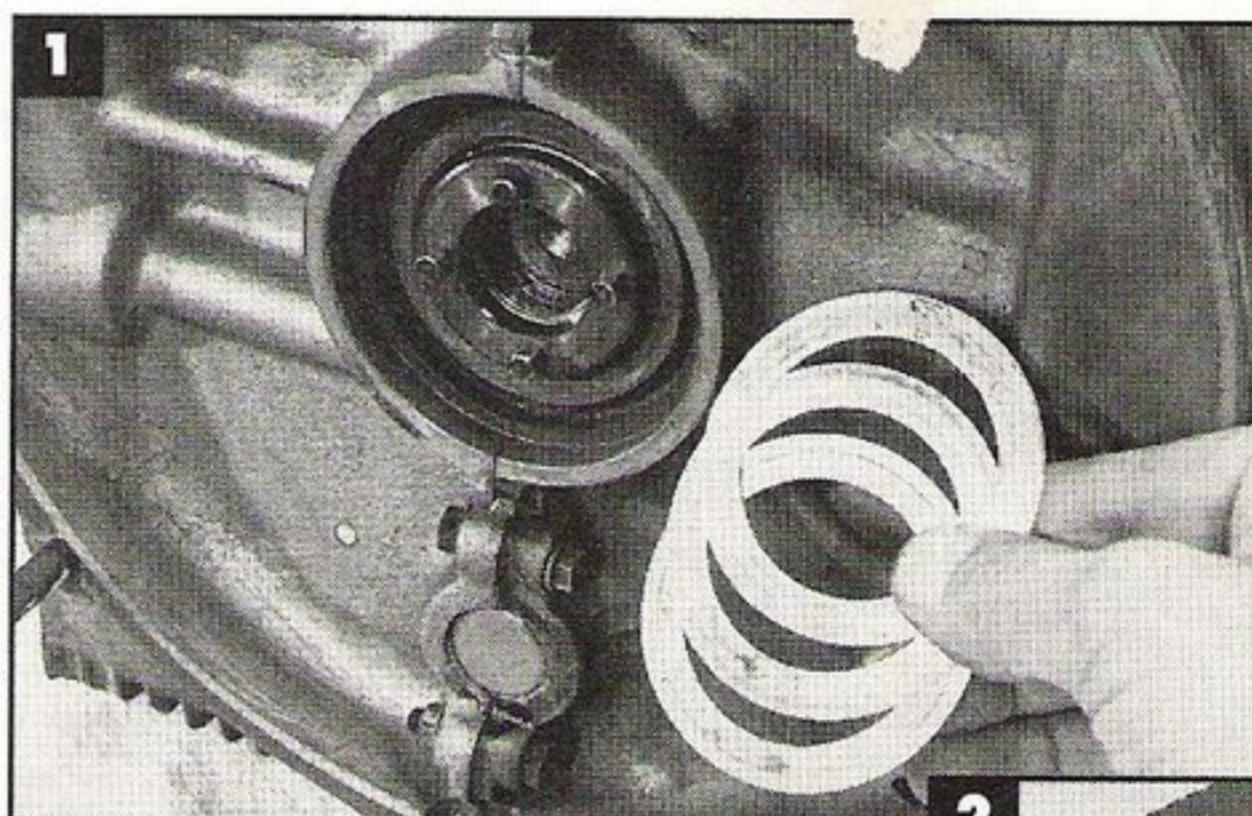
From 1954 through 1960 the Volkswagen Bug came from the factory with a 64mm stroke by 77mm bore, 1192cc 36hp engine by S.A.E. testing. In European rating, it was 36hp D.I.N.

Compared to most cars on the road of that era it was, well, a real wimp, but that's the way Volkswagen intended it. They knew the simplest, most inexpensive way to get long engine life to match the sturdy chassis and body was deliberately restrict the performance of the engine.

Part Three of the Vintage Engine Rebuild continues our resurrection of this significant piece of aircooled history.

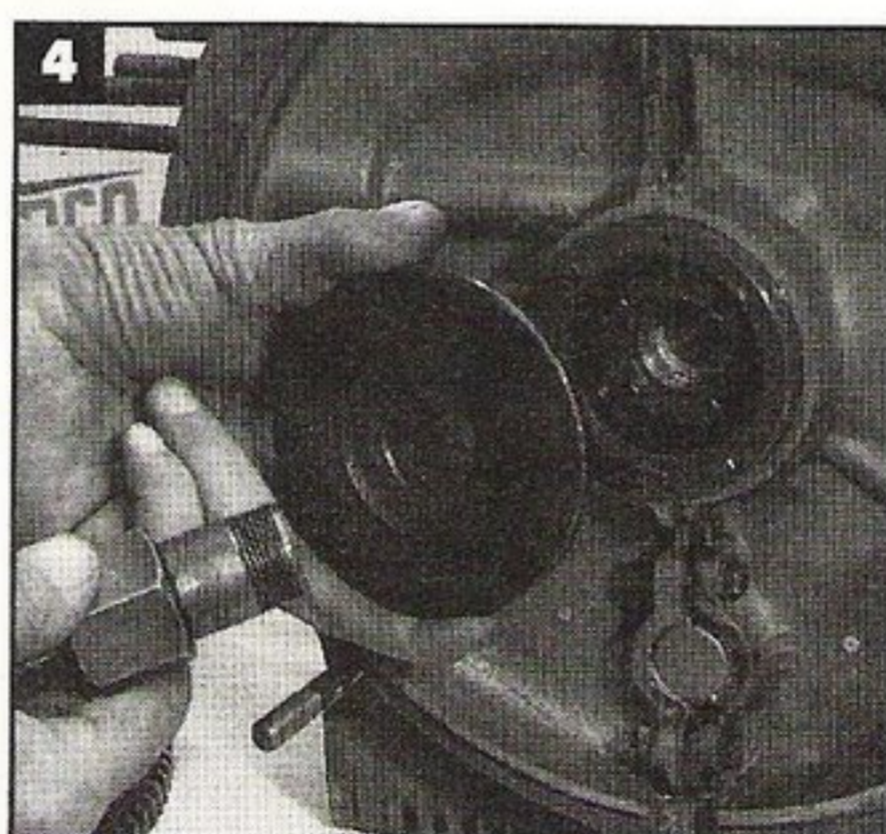
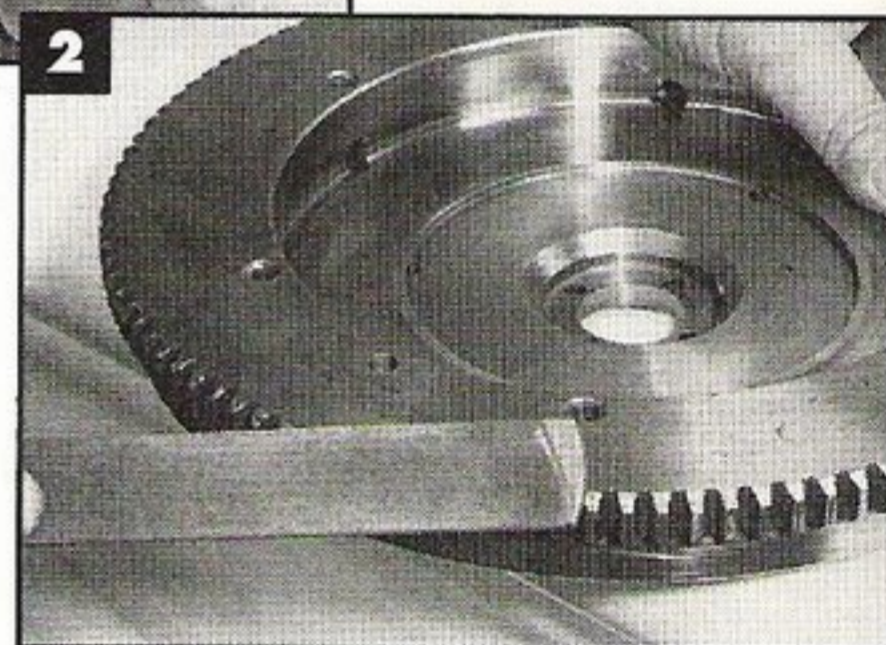


3 - There are several methods of setting end play. Here the paper gasket and original three shims are installed, minus the flywheel seal and the gland nut torqued down to a temporary 75 lbs/ft. A dial indicator is clamped to the case and the flywheel pushed towards the case. Set the indicator on zero then pull the flywheel outward. The desired end play is .003 to .005 inches with .006 inches being the wear limit. It can be adjusted with different thickness shims exchanged. Use a micrometer to measure the shims and substitute thicker or thinner shims as necessary but use a total of three shims.

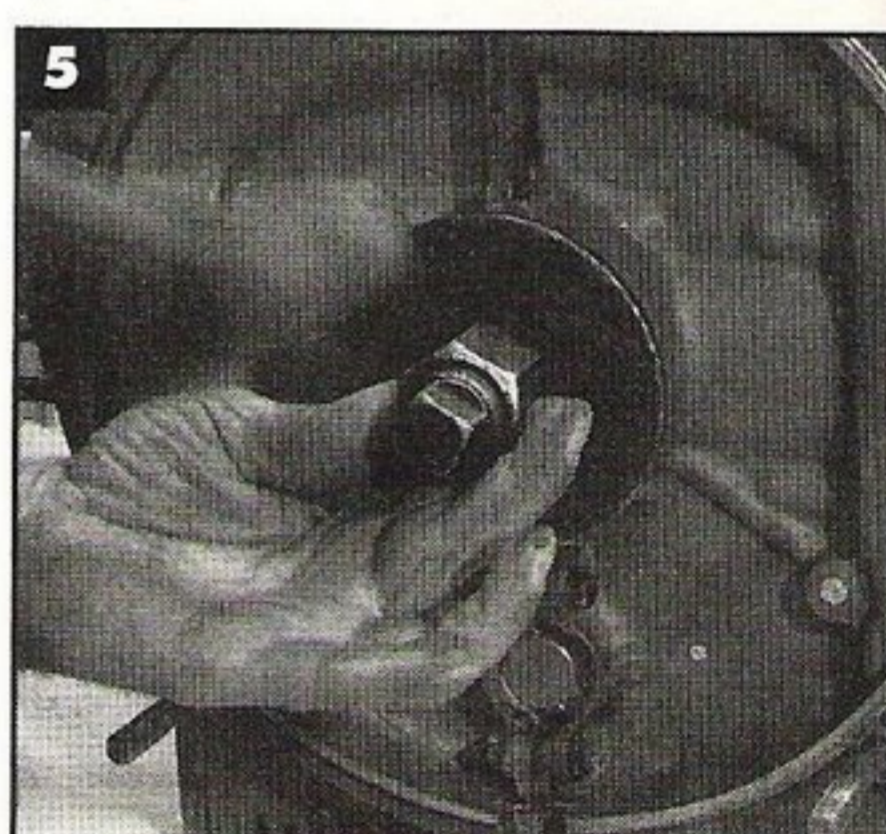


1 - Setting the crankshaft end play requires three shims available in varying thickness. They are a smaller diameter than later engines. Install the paper gaskets dry on the four dowels.

2 - If the teeth on the flywheel are ragged, now is a good time to file them clean at an angle evenly all around. If available, turn them on a lathe; the material is soft. An alternative would be to have a hardened steel gear pressed on. This service is offered on an exchange basis by Gene Berg Ent. (Orange, CA) with your choice of a 6- or 12-volt ring gear.



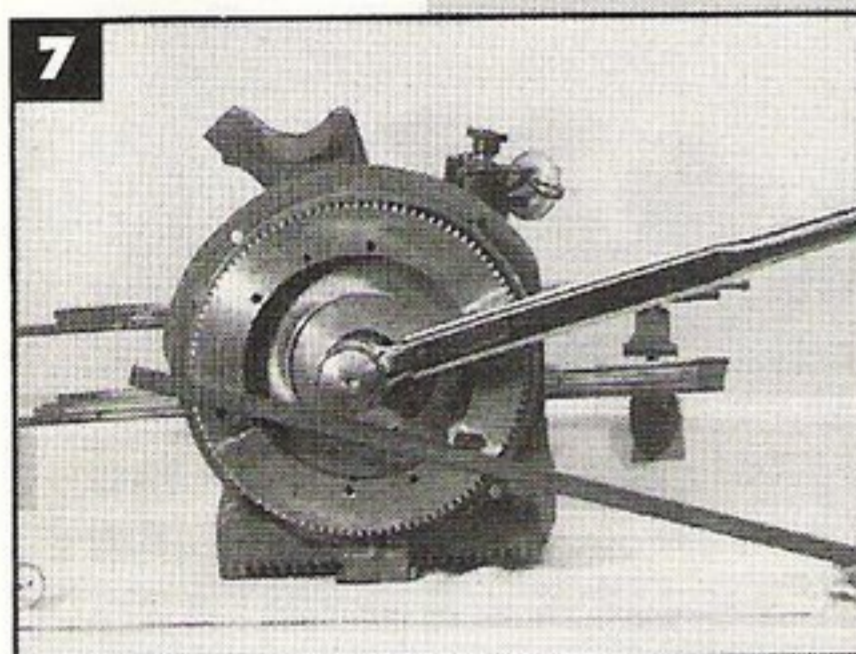
4 - Remove the flywheel and with the now-correct shim stack in place and the paper gasket. Coat the outer edge of the oil seal with a thin sealant and when tacky, insert the seal. It can be tapped in with a mallet but may go crooked and get out of round. Your VW Parts House may be able to get you a seal installer such as this.



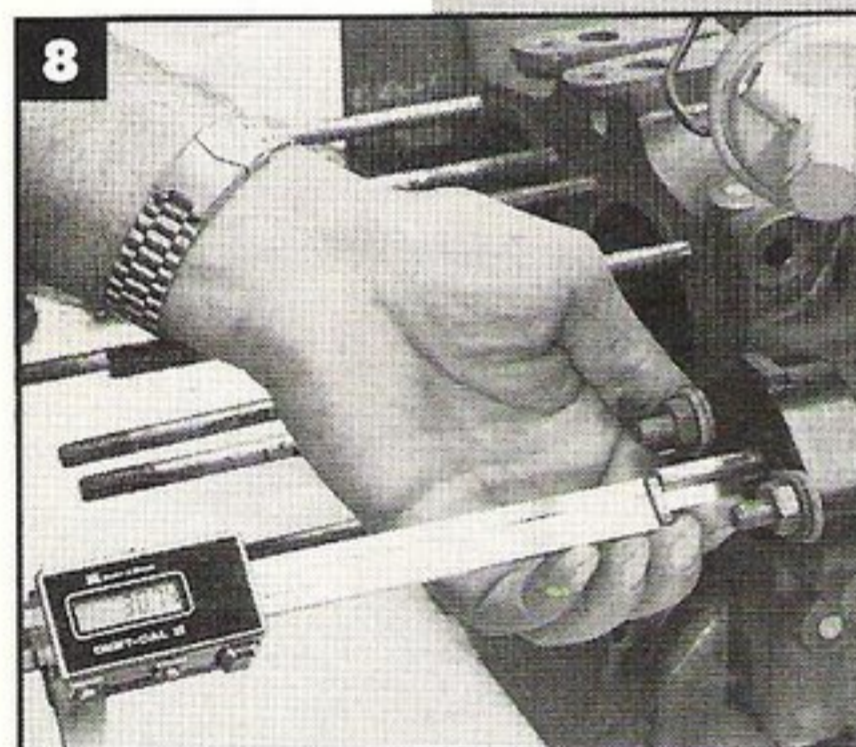
5 - Using a seal installer, screw the shank into the flywheel and tighten the nut with a wrench or continuously tighten by hand as you tap around the edges. The seal will bottom out in the case when approximately flush. On later engines, it will be recessed below the case surface. Coat the lip of the seal with oil.



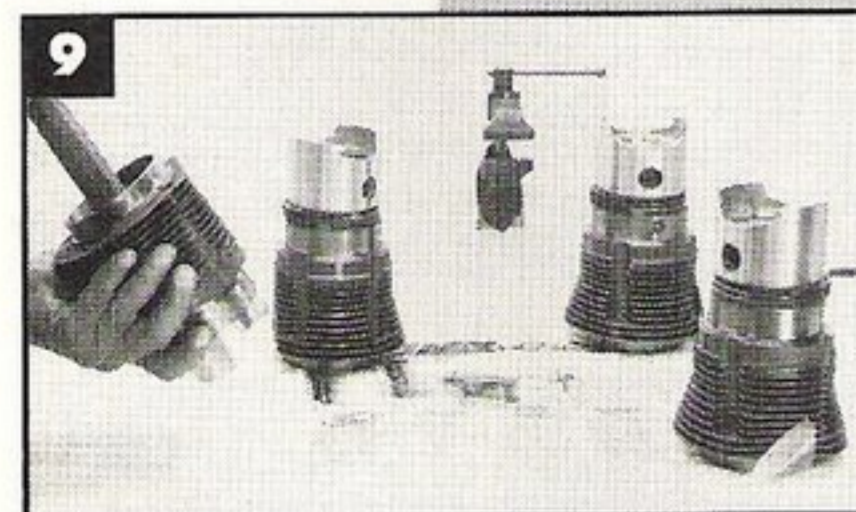
6 - Be sure you have the short gland nut and wavy washer. Install the flywheel on the crank dowel pins and snug up the gland nut.



7 - With two bolts in the flywheel arrange a steel bar or angle iron as shown and you can easily torque down the gland nut to the 217 lbs/ft final torque.



8 - The stroke of the fuel pump rod can be measured by lightly bolting on the spacer block with one gasket and turning the crank. The stroke should be about 4mm or .160 inches. There is a more precise method but it requires VW Gauge 328. The stroke is only half the equation. The other half is how close the fuel pump is to the engine. Factory-required pump pressure is only 1.3 to 1.85 psi with the carburetor needle valve closed and the engine at 1 to 3000 rpm. Pressure can be reduced by adding gaskets and increased by shaving the spacer block.



9 - Always remove and install pistons from the bottom of the cylinder. Wash the pistons and cylinders in clean solvent and blow-dry with compressed air. Keep each piston with the cylinder it came from.



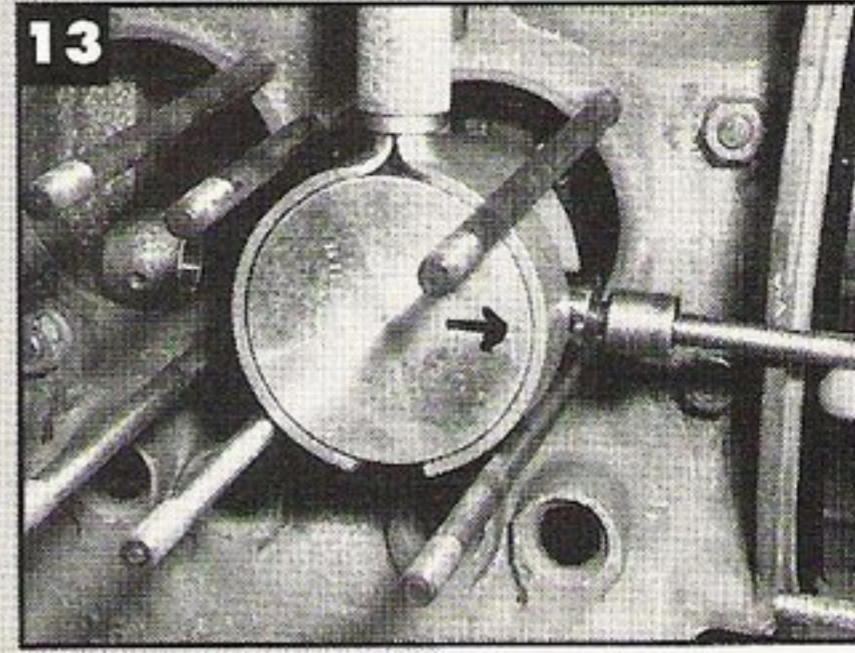
10 - Lay the pistons and cylinders out in order on your bench. Note there is an arrow on top and a bump inside the piston at the wrist pin boss. Both of these indicate that they go towards the flywheel. Ring gaps and side clearance rarely need to be checked when using a new matching set. If you plan on re-ringing the old pistons and honing the cylinders, the ring gaps are .012 to .017 inches on all rings. On the compression ring the side clearance is .0014 to .0022 inches with a wear limit of .008 inches.



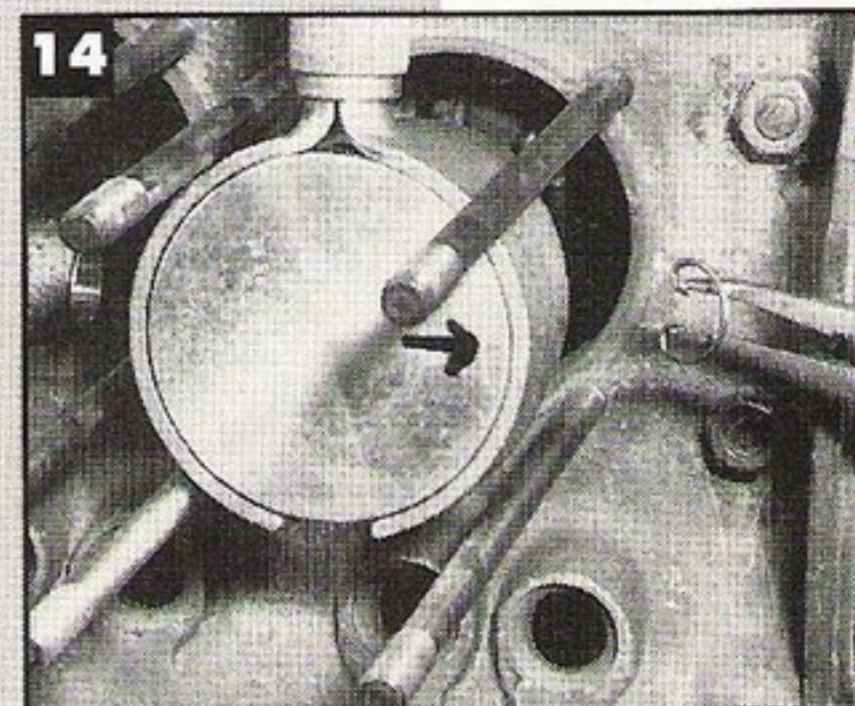
11 - Upon assembly you will be inserting the wrist pins from the outboard ends, so now install a circlip on the inboard side of each piston.



12 - Remember the photo of all the ring gaps lined up and the scorched piston during disassembly? We don't want that to happen so set the lower oil control ring up to the top at the 12 o'clock position, the middle oil scraper ring at 4 o'clock and the top compression ring at 8 o'clock. Here I use a HAZET split-type 77mm ring compressor but adjustable ones will also work. Note the number one and two wrist pins partially inserted and piston arrow towards the flywheel.



13 - Oil all the wrist pin bushings in the rods and push in the wrist pin. If they are snug use a wrist pin driver to tap in slowly, but don't dislodge the previously installed circlip at the other end.



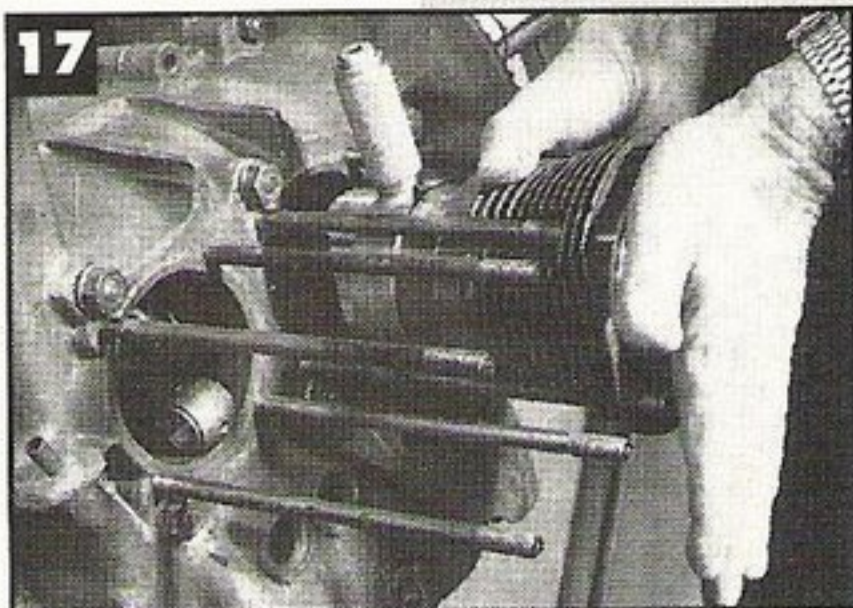
14 - Install the outboard wrist pin circlip.



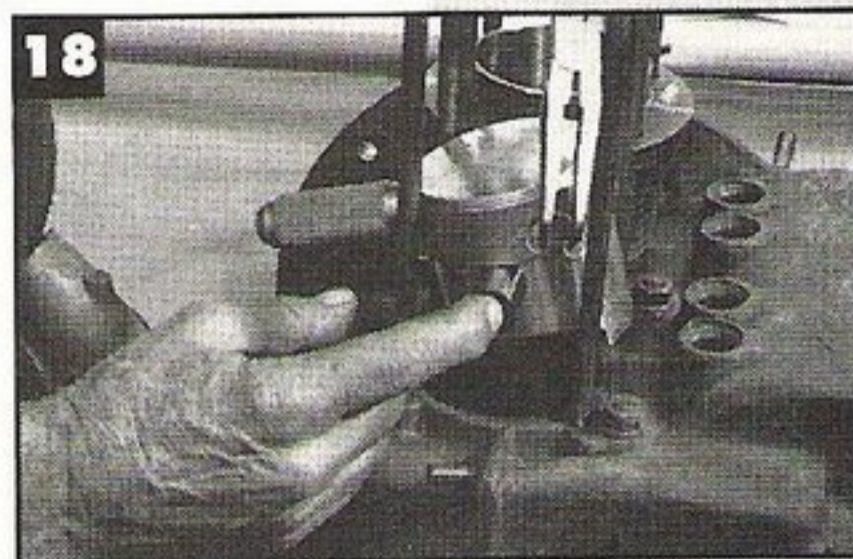
15 - Install the paper gaskets on each cylinder with a thin coat of sealant. This is one of the places on a VW engine that heat-proof real silicone sealant can be used but is normally reserved for stroked engines with metal spacers and no gaskets. It is also difficult to use as it dries fast and thick, requiring a fast assembly of four cylinders pushrod tubes and cylinder heads torqued down before it gets too thick.



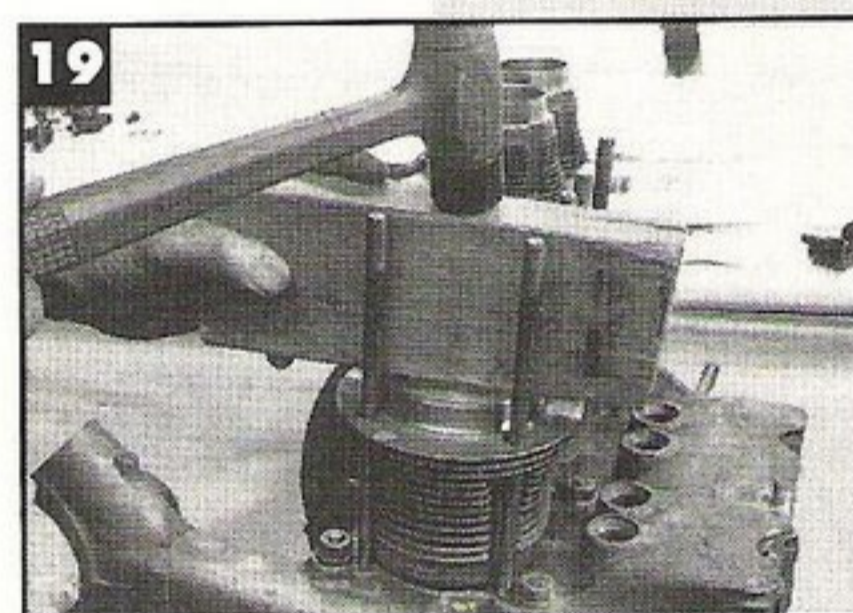
16 - With some clean oil on a clean lint-free cloth, wipe the inside of the barrels thoroughly and you will see some dirt picked up by the cloth even though you cleaned them. This will also leave enough oil on the cylinder bore to prevent scratching the new rings. Leave the rings dry and they will break in properly.



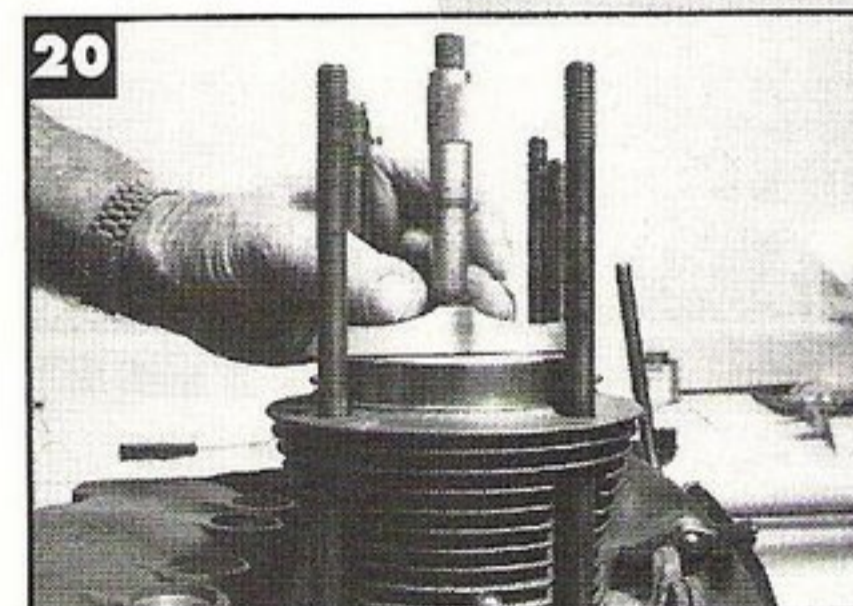
17 - Offer the cylinder to the piston and tap on the cylinder with your open palm while watching the rings to ensure they don't pop out from the ring compressor until sliding inside the cylinder. A flywheel lock may be necessary.



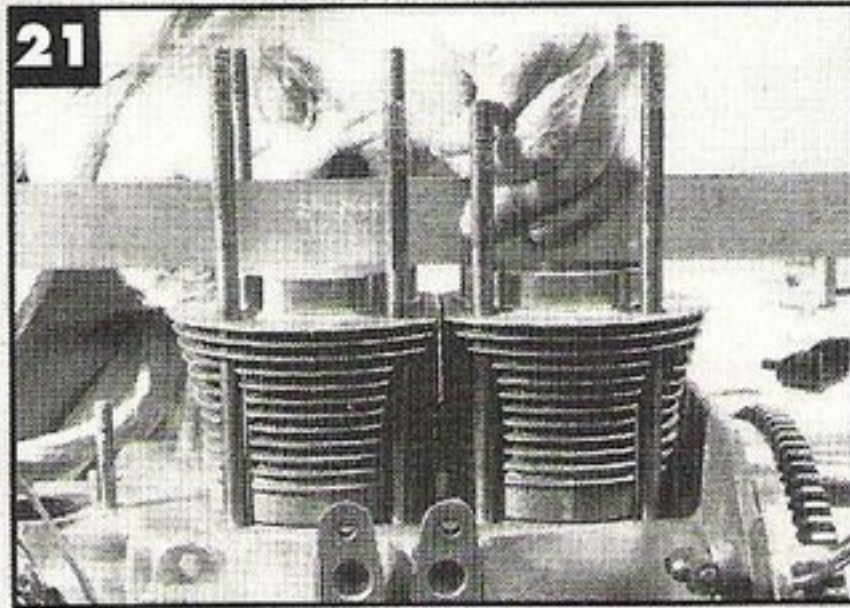
18 - Continue inserting the wrist pins from outboard of the cylinders as shown here on the number two cylinder. Remember staggered ring gaps and arrows toward flywheel.



19 - Sometimes a cylinder may be too tight in the case. Never tap on top of the cylinder to coax it in. You have a very thin rim at the top, which must be true and flat to seal against the head. If coaxing is necessary, use a soft piece of wood like a piece of a pine 2x4 and tap on it instead.



20 - After all the cylinders are on, check the deck height with a depth gauge reading at the center of the piston. No factory specs seem to be available, but .050 inches to .070 inches should do. Mainly you're checking for variations such as a cylinder not seated, a rod of different length or double gaskets, etc. If all the pistons stick out of the cylinders, it's your lucky day as you may have an Okrasa stroker crank. Under such happy circumstances have spacers machined to fit under the barrels to restore deck height clearance.



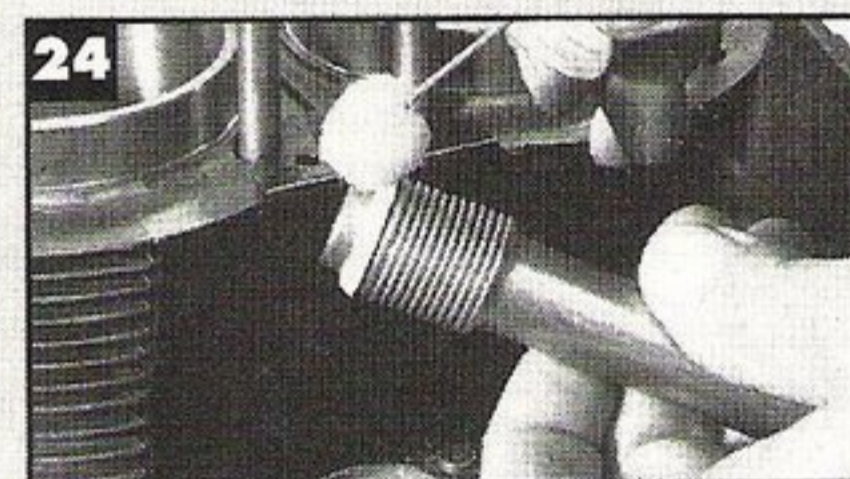
21 - With a straight edge, check that the cylinders are even. If a cylinder is cocked it may have some old gasket material under it or need to be tapped down to equal level.



22 - Press the cylinder air deflector plates into the studs under the cylinders on both sides.



23 - Carefully install all pushrod tube seals by pulling on from one side. Pushing them straight on will at times cause a cut from the sharp edge of the pushrod tube.



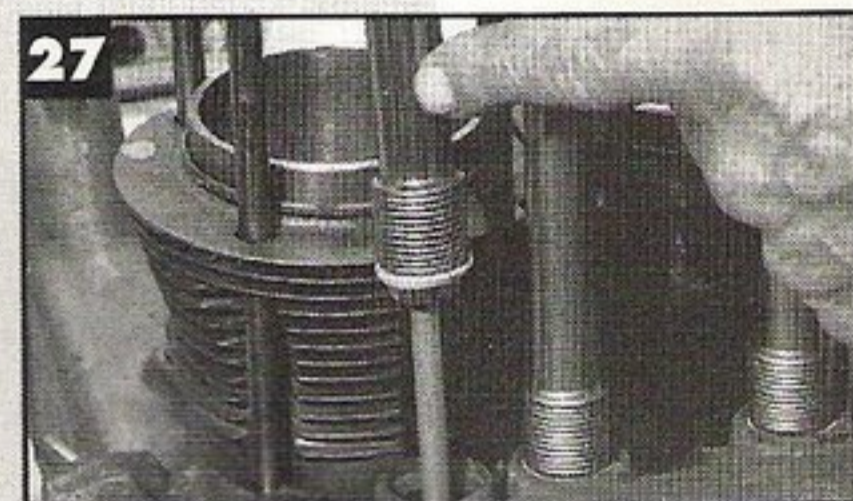
24 - Some say dry, some say oiled, but I have always had the best luck applying Gaskacinch to all the seals.



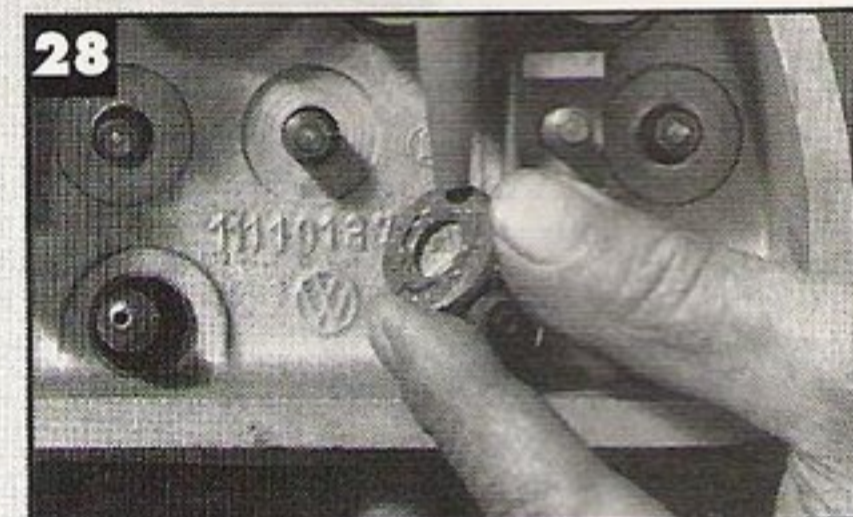
25 - Coat the lifters with cam lube and install them. Also put some cam lube on the rocker arm end of the pushrods.



26 - With the pushrods in place, install one copper gasket on each cylinder with the split side of the gasket towards the cylinder head.



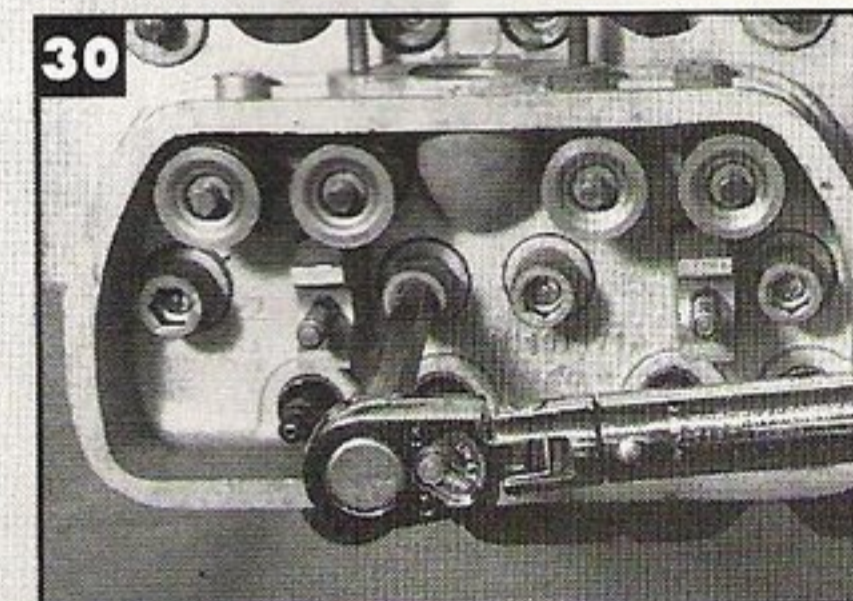
27 - Here is the welded seam on the pushrod tube, which should be turned to face the top of the engine.



28 - Apply a thin coating of high-temp silicone sealant to the four washers for the lower cylinder head studs.



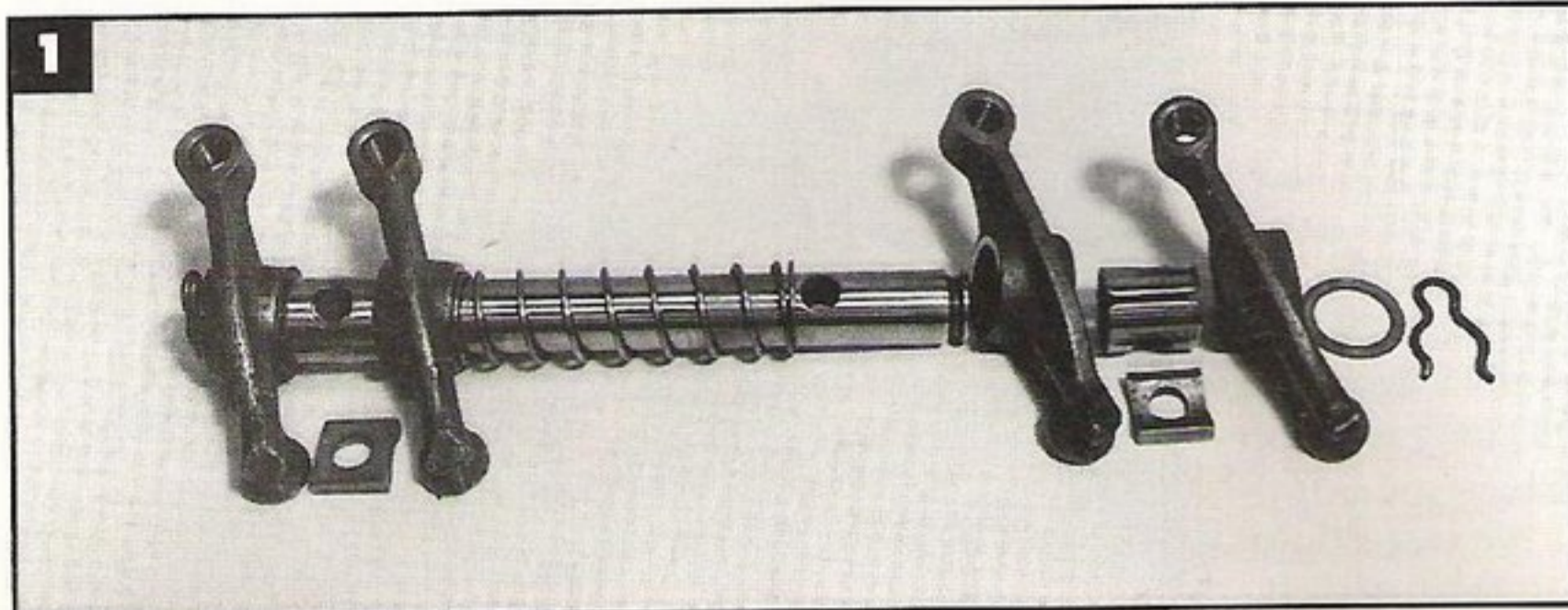
29 - Sealant is not needed on the upper washers, but be sure a washer isn't stuck in the recessed holes. The four recessed holes take a washer with a smaller O.D.



30 - With anti-seize compound applied to the threads, torque down the lower row of nuts to 7 lb/ft, starting in the center and alternating left to right for an even seating of the head. Then use the same procedure on the top nuts. Do both heads. Now torque the heads to 27 lb/ft, starting at the lower center and criss-crossing top to bottom while working your way outboard. Recheck all nuts for final torque.

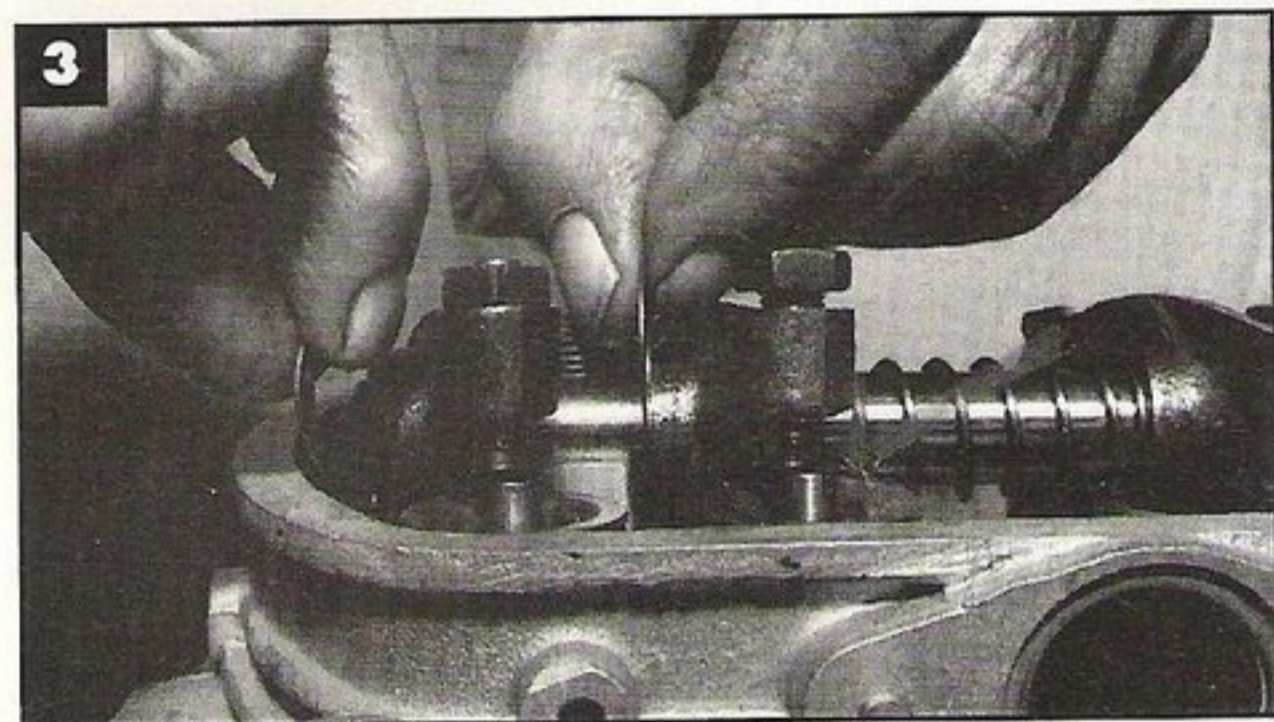
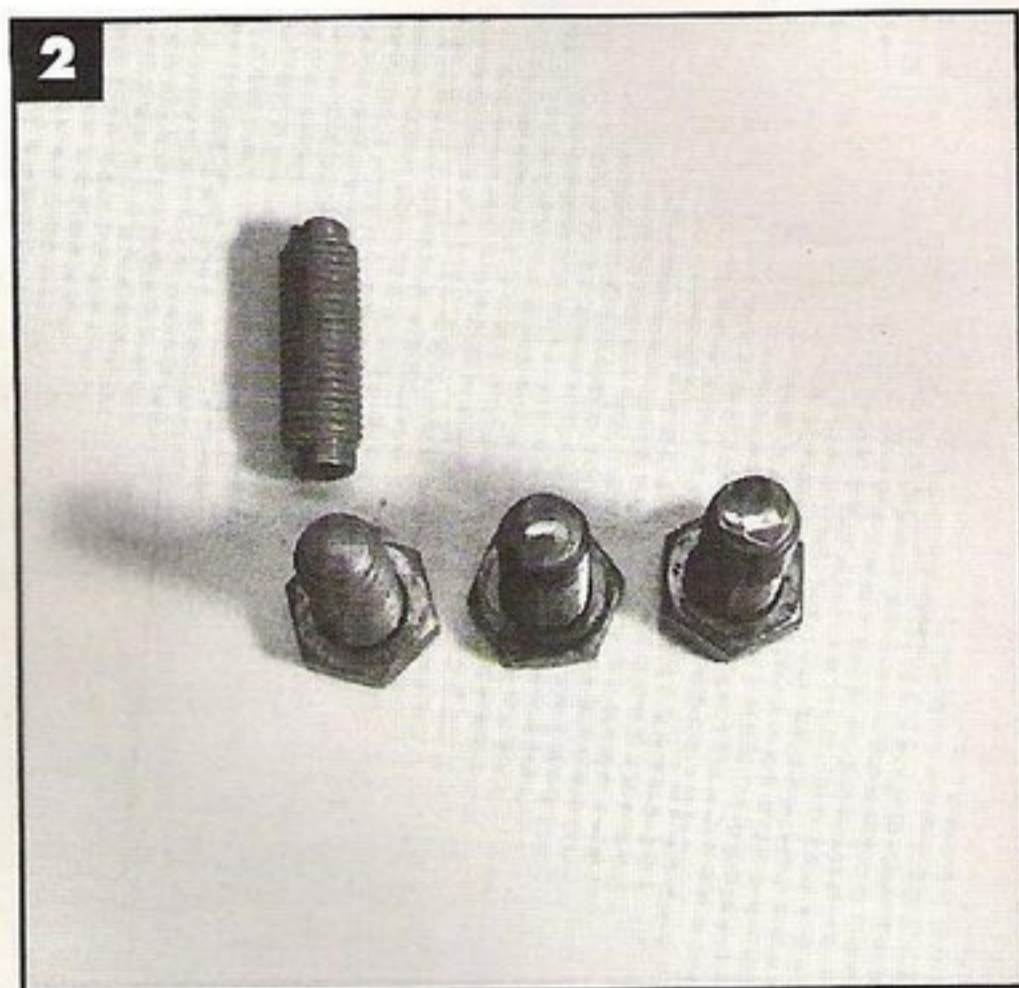
Vintage Engine Rebuild Part 4

By Hank Roed

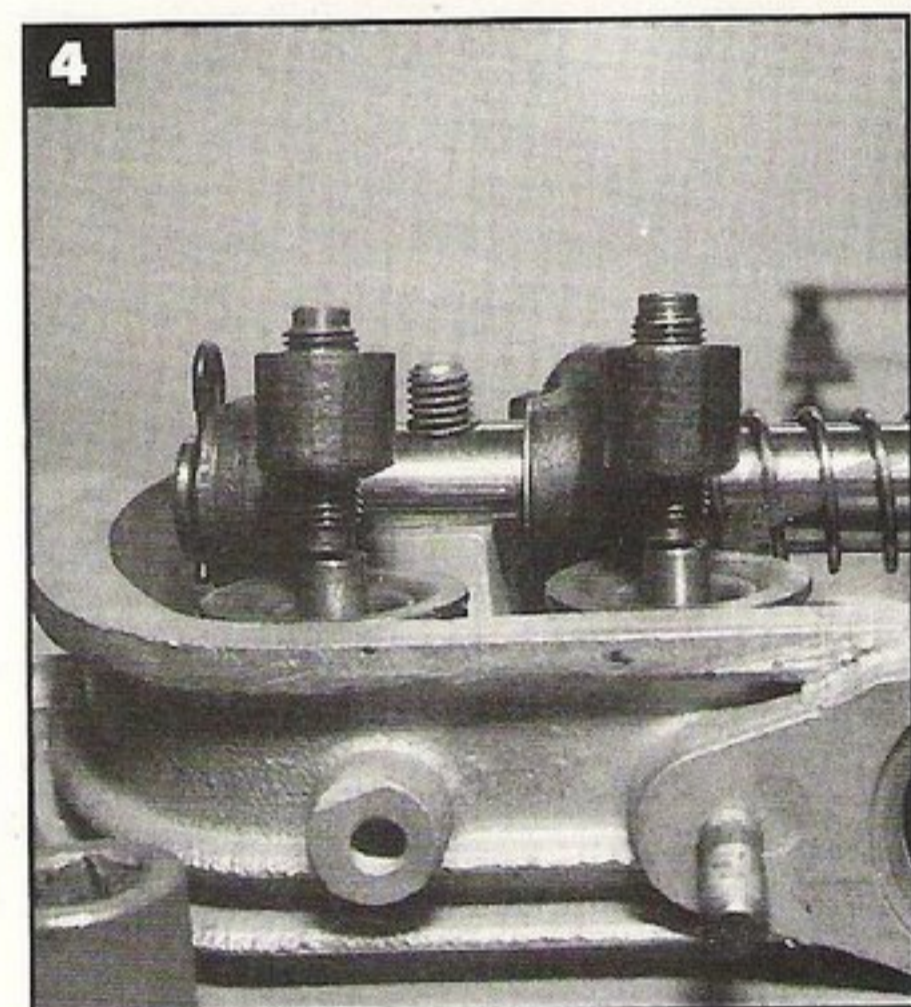


1 - The unique 36 hp rocker assembly half-apart for reference. After taking it all apart, inspect the end clips and washers for wear. Also, check the shaft and polish it. I used a discarded crankshaft polishing belt. The rocker arms can be cleaned in carb dip and the oil passages blown clear. Re-assemble with assembly lube or cam lube.

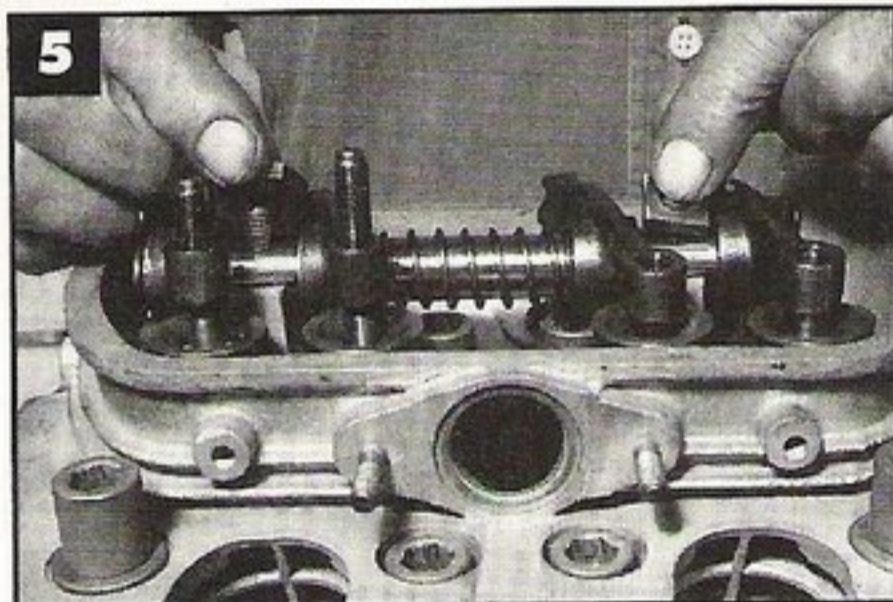
2 - Inspect the valve adjustment screws. From left to right is new, OK and marginal. Replace as necessary.



3 - Check the adjustment screw to the valve stem alignment. It should be slightly off-center, so each valve opening and closing causes the screw to rotate the valve for more even wear at the seat. Shown here are the screws too far left of the valve stem. With additional washers and patience this can be corrected.



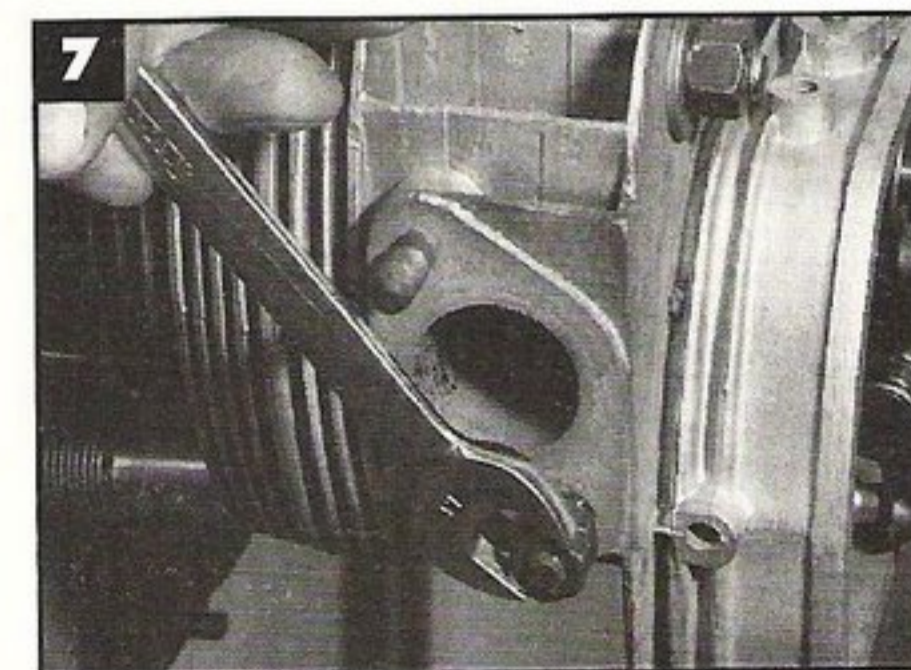
4 - This is how the adjusting screw-to-valve stem alignment should look with a slight off-center alignment.



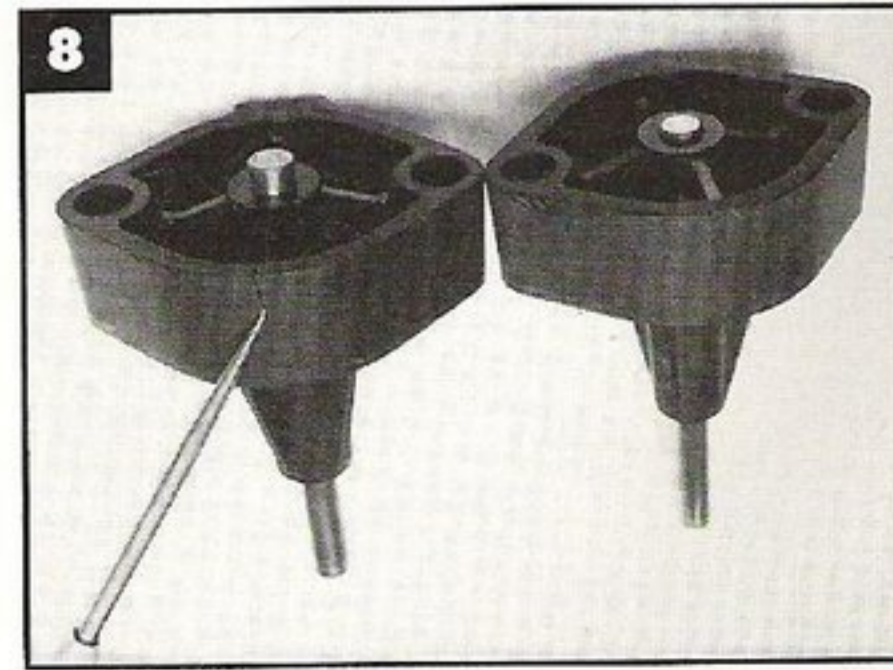
5 - Install the half round caps on the rocker shaft studs and evenly torque to 14 lb/ft. Turn the crankshaft until the distributor rotor points to the notch on the distributor, and the crank pulley notch is in line with the case halves at the top. This is number one T.D.C. Make a mark at the bottom of the pulley and adjust the valves to .004 inches on the number one cylinder. Turn the crank counter clockwise half a turn so the mark you made on the bottom is now on top, and adjust the valves for the number two cylinder. Continue the same way for numbers three and four cylinders.



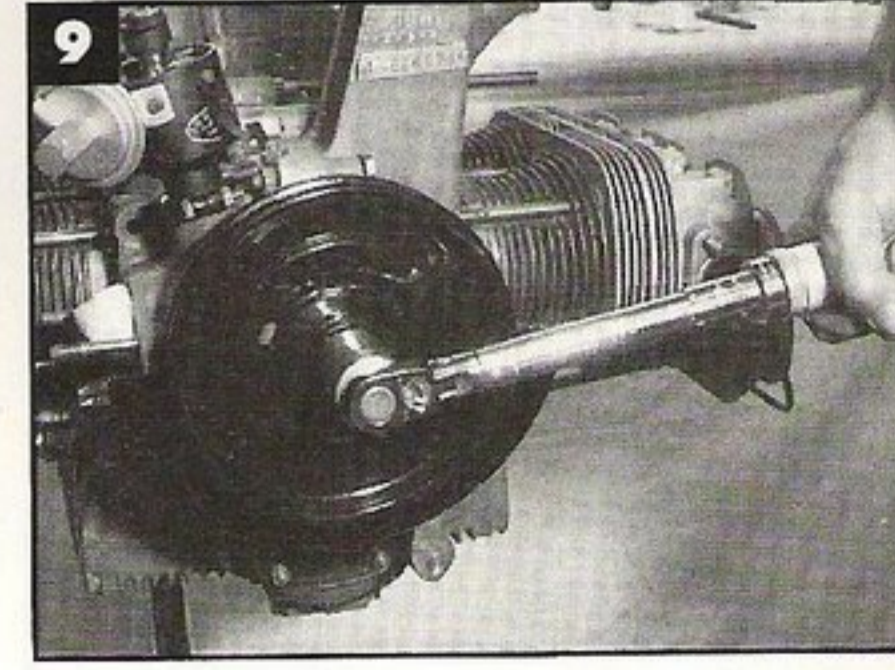
6 - A caution note on powdercoating sheet metal. Here the powdercoating company didn't tape the pulley grooves completely. The remaining powdercoat is thick enough to rub against the bore in the case and could do harm — by leaking or binding. This pulley was not usable.



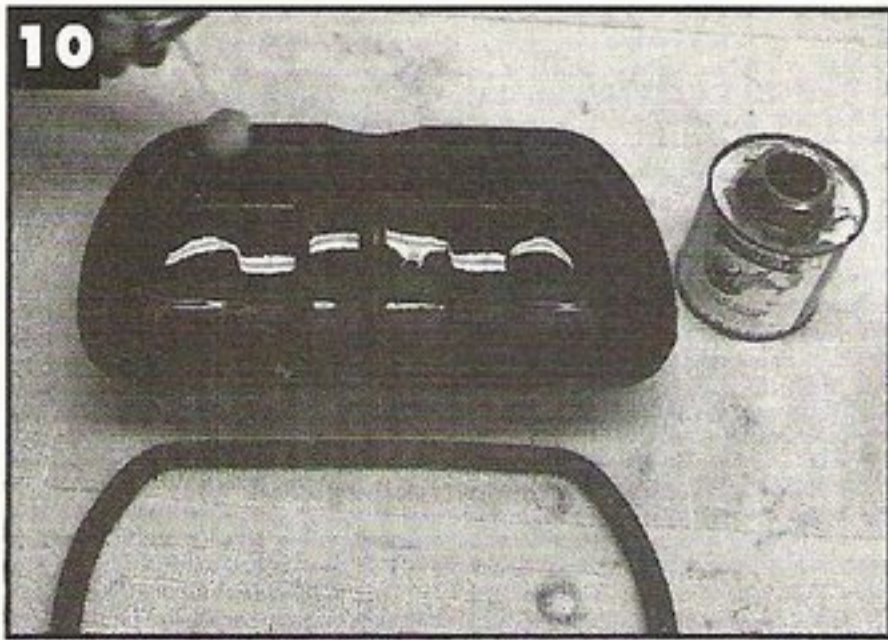
7 - Using the double-lock nut method, bad or missing exhaust studs can be changed, but first apply Red Locktite to the threads that go into the head.



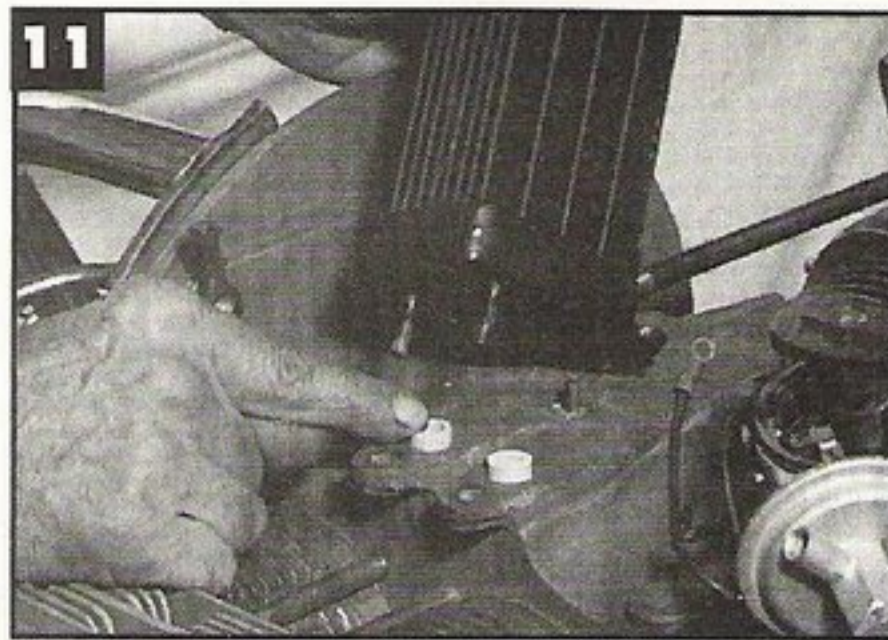
8 - Check the fuel pump block for cracks; many become cracked by folks who try to cure oil leaks by over-tightening things.



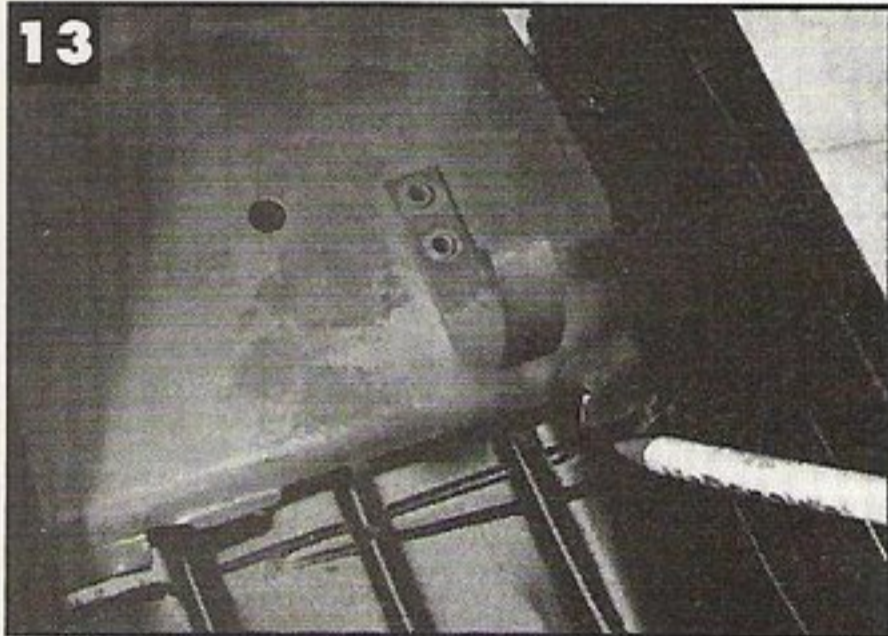
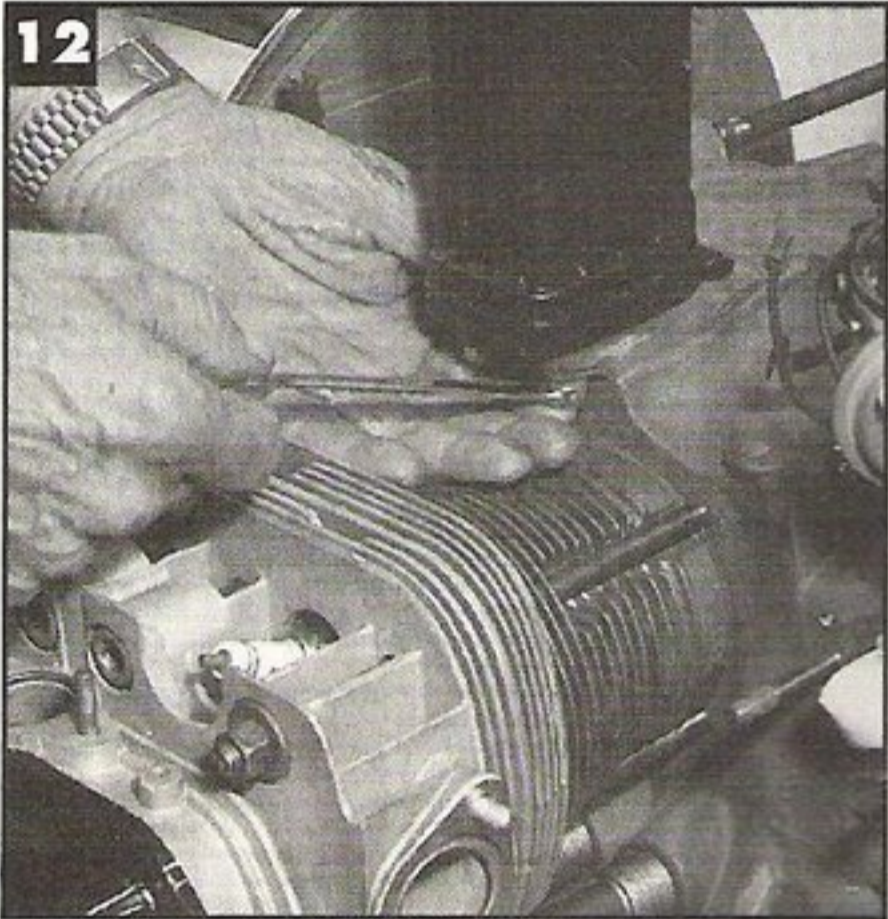
9 - Install the crankshaft pulley sheet metal and pulley, then torque the bolt to 85 lb/ft.



10 - Coat one side of the valve cover gasket and the lip in the valve cover with sealant, and let it become tacky before joining the two glued sections to each other. When installing the valve covers the tacky gasket will not slip out of place. Never use sealant against the cylinder head.



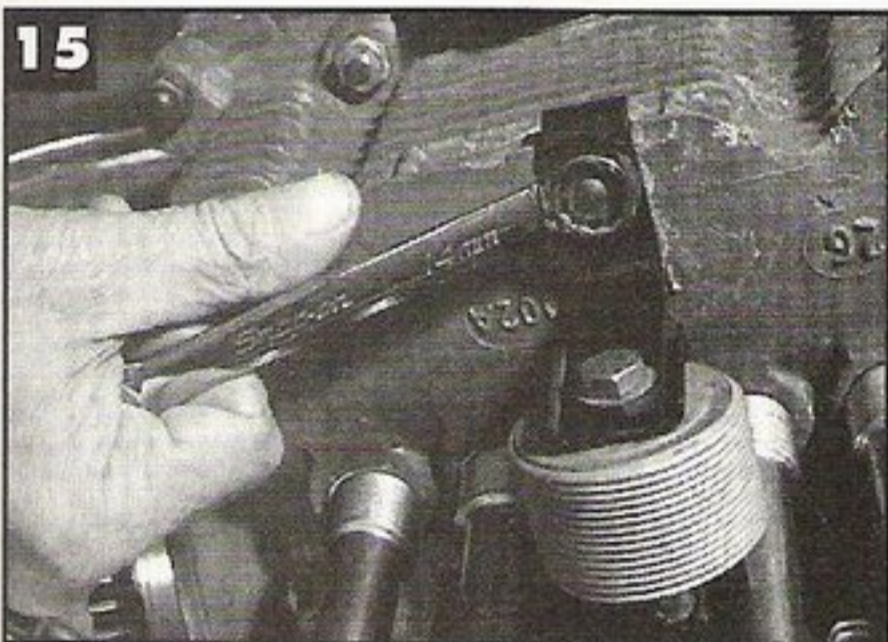
11 & 12 - Install the two oil-cooler seals and tighten the three nuts and washers. I prefer an upgrade from the original at this location and use Nylock nuts. They have a nylon insert that grips the threads and won't work loose.



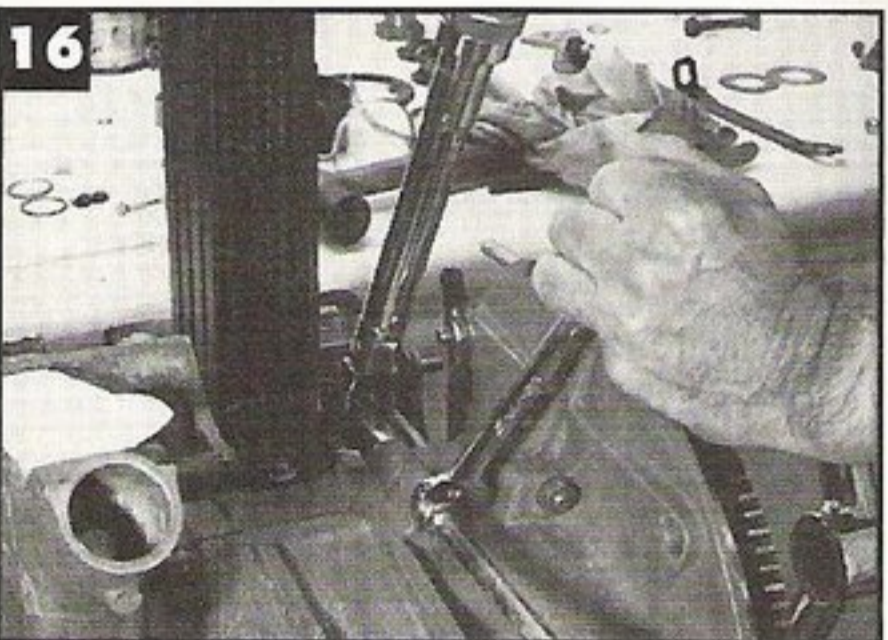
13 - Each of the heater control flaps have two tabs that ride in the slots shown. This tab was broken off and a piece was welded back on. The curved bracket is for the pull rod.



14 - Here is why many tabs may be found broken. They are secured with a slight twist on the outside of the heater channels.



15 - Attach the thermostat bracket. The thermostat bolt can be left loose at this stage, as it will be checked for adjustment after the air control ring is installed.



16 - Place the cylinder head cover on numbers one and two cylinders, which are not shown here for a more clear illustration. Install the air control ring shaft and mounting assembly with return spring and thermostat control arm, seen lying on the cylinder head.



17 - The control arm connects to the thin rod coming up from the thermostat at the space in the cylinder head fins. Check for any interference.

IF YOU DONT SEE THE PARTS YOU NEED GIVE US A CALL!!

Komet

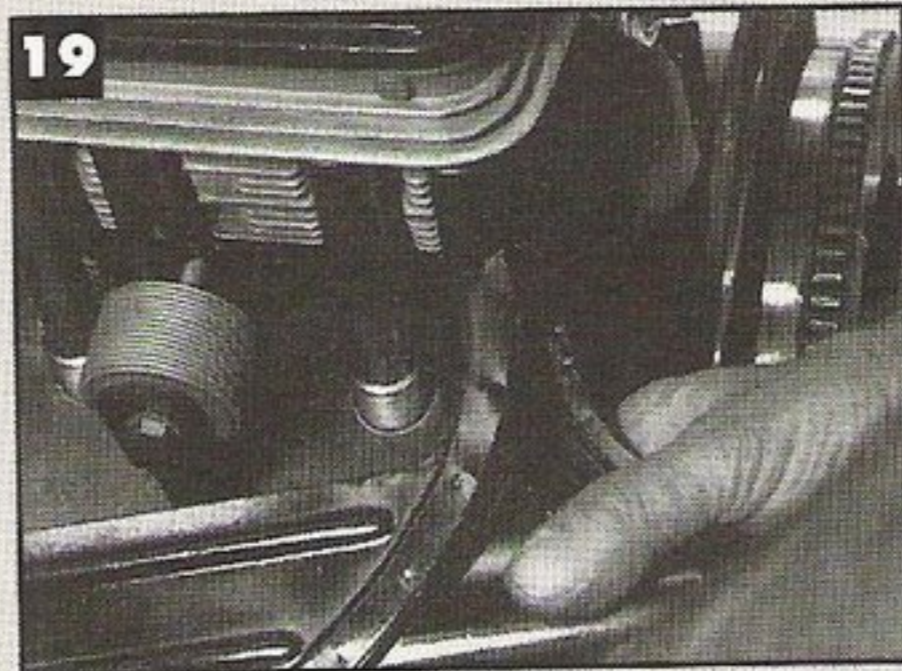
<p>HI-VOLUME PUMP ADDS OIL FILTER \$33⁹⁵</p> <p>FILTER PUMP</p>	<p>\$319⁹⁵ COMPLETE KIT</p>
<p>OIL SUMP INCREASES OIL CAPACITY BY 1-1/2 QUARTS.....\$35⁹⁵</p>	<p>DUAL CARBS EMPI DUAL 40MM CARBURETOR KIT INCLUDES EVERYTHING YOU NEED!!</p> <p>\$480⁰⁰ COMPLETED!</p>
<p>CLUTCH KIT \$48⁰⁰ PRESSURE PLATE DISC AND BEARING HEAVY DUTY \$101⁹⁵ - 1700LB -</p>	<p>SILICONE INTAKE MANIFOLD BOOTS WON'T CRACK OR DECAY LIKE RUBBER SILICONE INTAKE BOOTEACH..\$2.75 BAND CLAMPS EACH .95</p>
<p>QUICK FIX BOOT KIT QUICKLY AND EASILY REPLACES A LEAKING BOOT WITHOUT REMOVING INTAKE MANIFOLD. INCLUDES 2 BAND CLAMPS AND ONE BOOT\$4.50</p>	<p>STINGER SYSTEM INCLUDES EVERYTHING YOU NEED!!</p> <p>ALTERNATOR KIT \$92⁵⁰ W/INSTRUCTIONS KIT INCLUDES ALT, STAND, STRAP, 3PC BACKING PLATE REBUILT - SOLD EXCHANGE - \$12 CORE CHARGE -</p>
<p>BILLET OIL FILLER WITH SCREW ON CAP AND BREATHER FITTING. EASY TO INSTALL. \$9⁰⁰</p>	<p>STARTERS GENERATORS REBUILT 12V STARTER\$36⁰⁰ REBUILT 12V GENERATOR.....\$36⁰⁰ - SOLD EXCHANGE - ADD \$10 CORE CHARGE - BOSCH 12V REGULATOR.....18.95</p>
<p>BREATHER BOX RELIEVES PRESSURE BUILD-UP INSIDE ENGINE CASE \$18⁰⁰</p>	<p>MUFFLER KIT MUFFLER, TIPS, GASKETS, CLAMPS FITS BUGS, GHIA 66-73\$29⁰⁰</p>
<p>ENGINE CHROME OIL DIPSTICK.....\$2.25 OIL SUMP PLATE.....2.95 OIL FILLER WITH TUBE.....6.50 OIL CAP.....2.95 DISTRIBUTOR CLAMP.....1.95 CRANKSHAFT PULLEY.....15.95 GENERATOR / ALT. PULLEY.....5.25 GENERATOR BACKING PLATE.....3.95 CRANK PULLEY BOLT/WASHER.....2.75 GENERATOR PULLEY NUT.....3.25 FANBELT COVER.....9.95 GENERATOR/ALTRNTR STAND.....16.95 GENERATOR/ALTRNTR STRAP.....3.75 COIL COVER WITH MOUNT.....3.50 GENERATOR COVER.....6.50</p>	<p>STOCK MUFFLER FITS BUGS, GHIA 66-73\$19.95</p> <p>GERMAN MUFFLER FITS BUGS, GHIA 66-73\$38.95</p>
<p>CHROME SHROUDS ADD \$5 FOR HEATER DUCTS EARLY OIL COOLER STYLE\$35.95 DOGHOUSE COOLER STYLE\$43.95</p>	<p>SCREAMER KIT \$58⁹⁵ INCLUDES NEW COMPLETE GENUINE BOSCH 009 DIST, BLUE COIL AND RED BLUE, YELLOW, OR BLACK WIRES</p>
<p>CHROME ENGINE TIN CRANK PULLEY TIN.....-A-.....\$7.00 REAR BREASTPLATE TIN...-B-.....18.00 FRONT FIREWALL TIN.....15.00</p>	<p>ELECTRONIC' 99⁹⁵ SCREAMER KIT INCLUDES NEW 009 DISTRIBUTOR, ELECTRONIC IGNITION SYSTEM, WIRE SET AND BOSCH BLUE COIL. NO MORE POINTS OR CONDENSOR TO BURN OUT.</p>
<p>CYLINDER HEAD TIN CHROME DUAL PORT..PAIR.....\$17.50 BLACK DUAL PORT..PAIR.....15.50</p>	<p>PERTRONIX POINTLESS ELECTRONIC IGNITION SYSTEM, E-2 TO INSTALL. ELIMINATES POINTS AND CONDENSOR!!\$46.95 FLAME-THROWER IGNITION COIL 40,000 VOLT CHROME COIL.....29.95</p>
<p>SUPER COOL TIN CHROME COOL TIN..PAIR.....\$8.50 BLACK COOL TIN..PAIR.....7.50</p>	<p>BOSCH BLUE COIL..\$12.00 009 POINTS.....1.95 009 CAP.....5.50 009 ROTOR.....4.50 PLUG WIRES.....14.95 4-W8AC PLUGS...3.95</p>
<p>CHROME FIREWALLS 3PC FIREWALL.....\$26.95 3PC FIREWALL W/LOUVRES.....27.95 3PC FIREWALL INSULATION.....16.50</p>	<p>VALVE COVERS SOLD IN PAIRS EMPI HI-LIFT..\$31.95 ALUMINUM.....16.50 CHROME.....10.00</p>
<p>URETHANE TRANS MOUNTS FIT 61-72 BUG, GHIA INCLUDES HARDWARE 3PC SET.....\$13⁹⁵</p>	<p>SHIFT COUPLERS URETHANE SHIFT COUPLER HELPS ELIMINATE SHIFT LINKAGE SLOP RUBBER SHIFT COUPLER.....\$5.95</p>
<p>SUSPENSION SHOCK ABSORBER ..FT OR RR ..\$13.95 WHEEL BEARINGS..FRONT.....5.50 BALL JOINT ..STANDARD BEETLE.....7.50 KING PIN SET..PAIR.....10.50 LINK PIN SET..PAIR.....22.50 TIE ROD END.....9.95 TIE ROD END WITH HOLE.....13.95 STEERING BOX..STD..REBUILT..\$9.50 STEERING BOX..STD.....NEW.....79.50 STEERING BOX..SUPER..REB.....144.50 STEERING DAMPNER.....11.95</p>	<p>BRAKES WHEEL CYLINDER..NEW...STD.....\$5.95 MASTER CYLINDER..58-64.....14.95 MASTER CYLINDER..65-79..STD.....18.50 BRAKE SHOES..STD..FT OR RR..EX..8.50 RUBBER BRAKE HOSES.....5.95 GERMAN BRAKELINE KIT 8 PCS 28.95 BRAKE DRUM..4 LUG STD.....23.95 HARDWARE KIT..FT OR RR.....PR..5.50</p>
<p>AXLE BOOTS SWING AXLE KIT..GERMAN.....EA..\$6.50 IRS 69-79.....EA..5.95 IRS KIT, BOLTS, GREASE, GERMAN..9.50</p>	<p>GAS CAPS NON-LOCKING GAS CAP..62-79...\$6.50 LOCKING GAS CAP.....68-79...13.50</p>

MORE ON THE NEXT PAGE !!

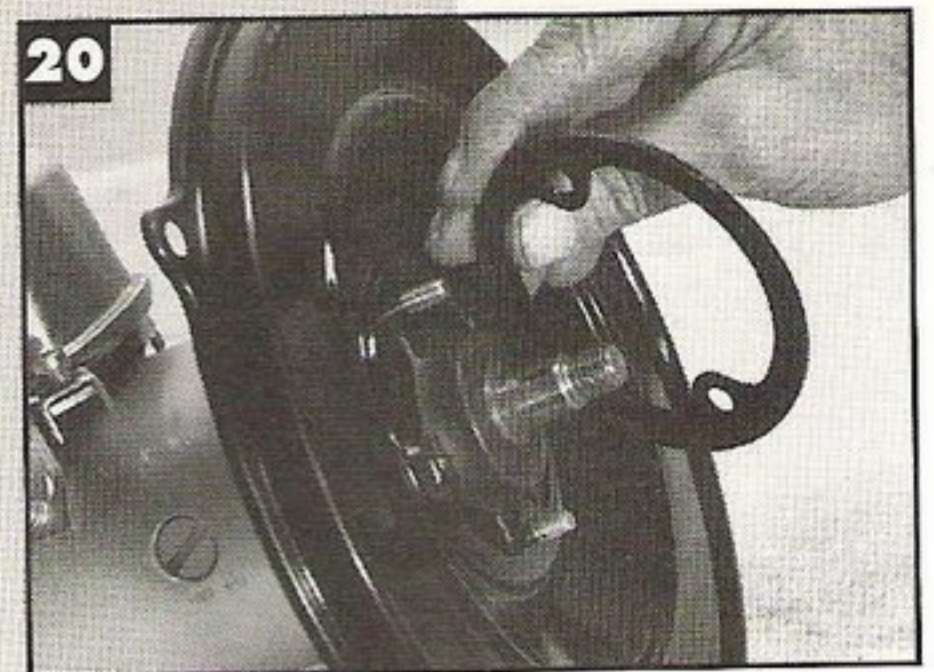
KOMET 213-721-2291



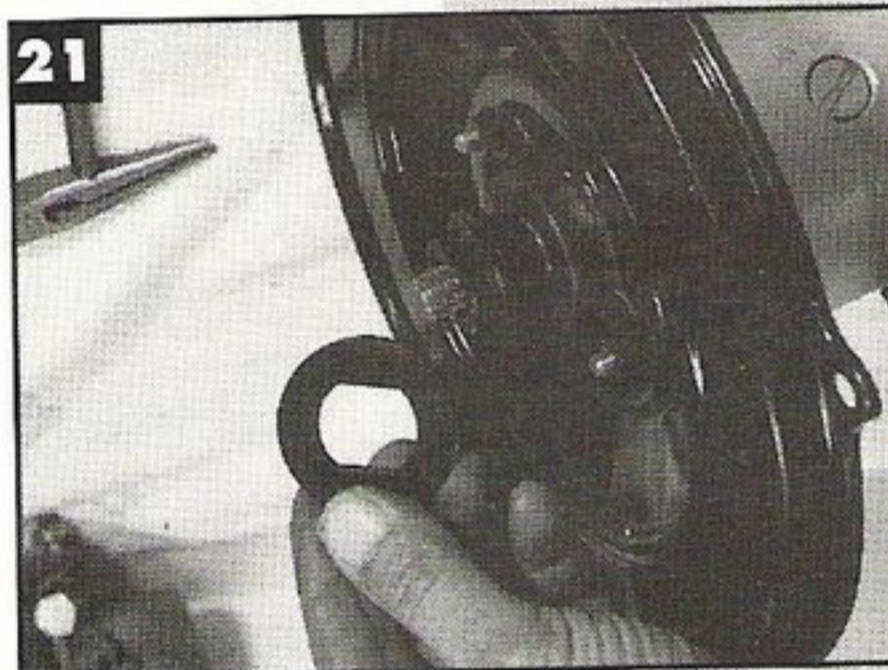
18 - The straight end of the coil spring points up and could interfere with the fan shroud installation later. The end of the shaft takes a horseshoe clip in a groove and the control arm clamping nuts are left loose for now.



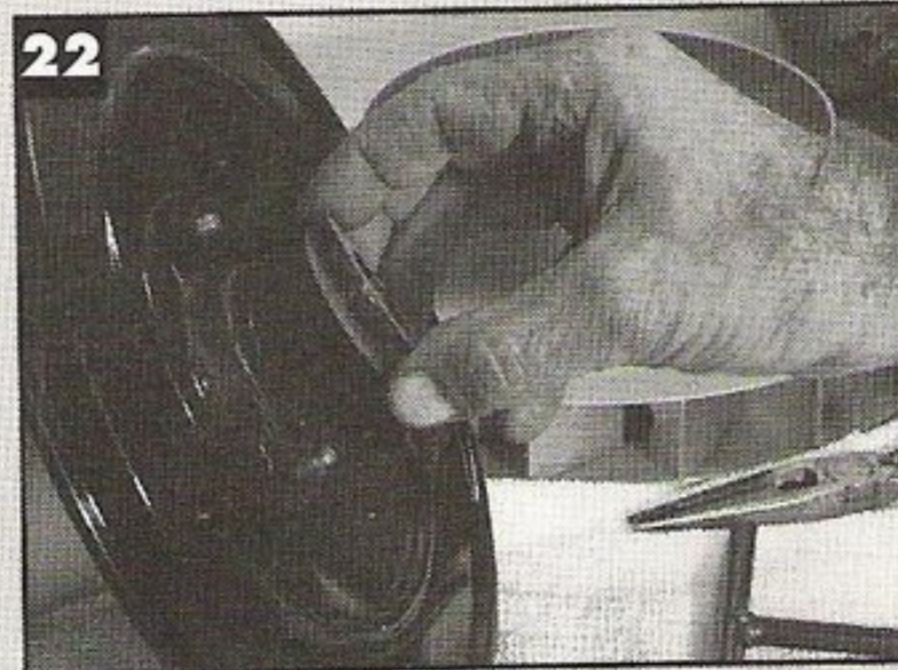
19 - Install the heater channels while checking that they fit properly between the case and cylinder head. Secure them with screws from the top.



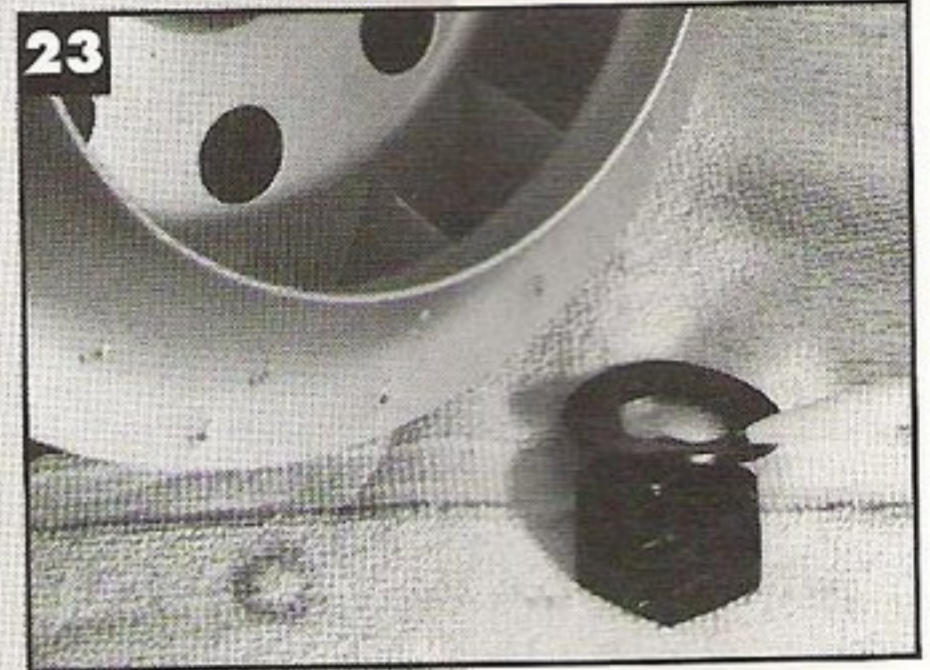
20 - Slip the generator backing plate on, along with the retainer ring. The folded edge of the ring goes toward the generator.



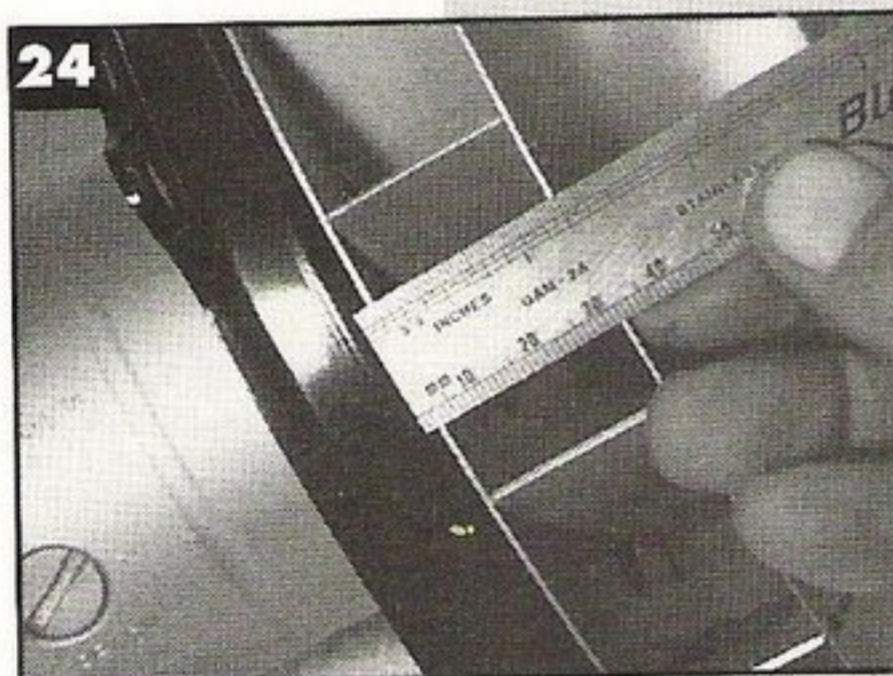
21 - Install the woodruff key, fan hub, and flat spacer on the generator shaft.



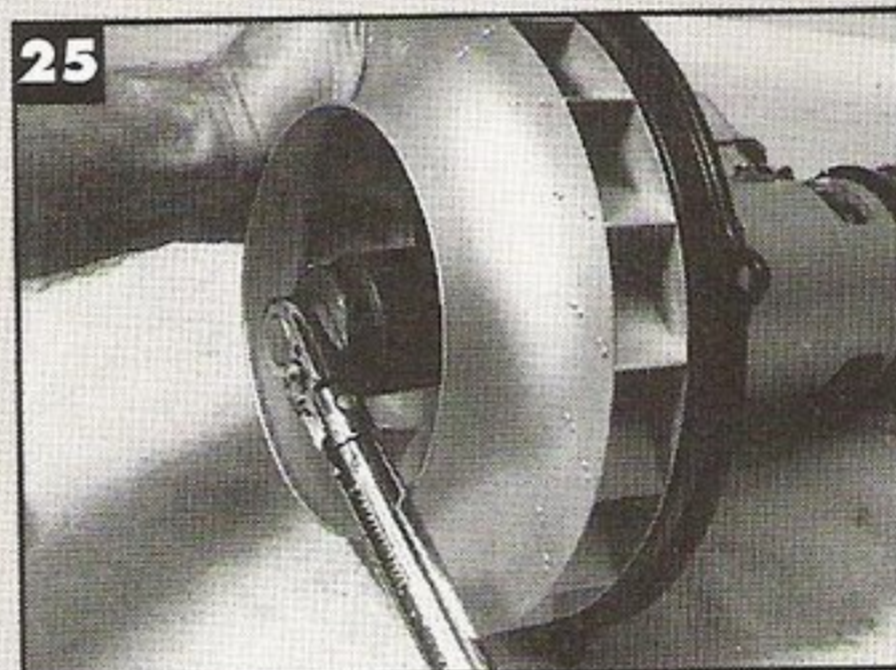
22 - Between the spacer and fan, shims can be added or subtracted to attain correct backing plate clearance.



23 - Install the fan, any extra shims, and wavy lock washer shown, and tighten the nut snugly for now.



24 - Check the fan-to-backing plate clearance for 1.8mm or .070 inches approximate. Spin the fan to check run out. If not true, find the spot of most clearance and tap the fan with a mallet. Keep checking until the fan runs true.



25 - Torque the fan nut to 43 lb/ft. Note the screwdriver in the pulley slot to prevent turning.



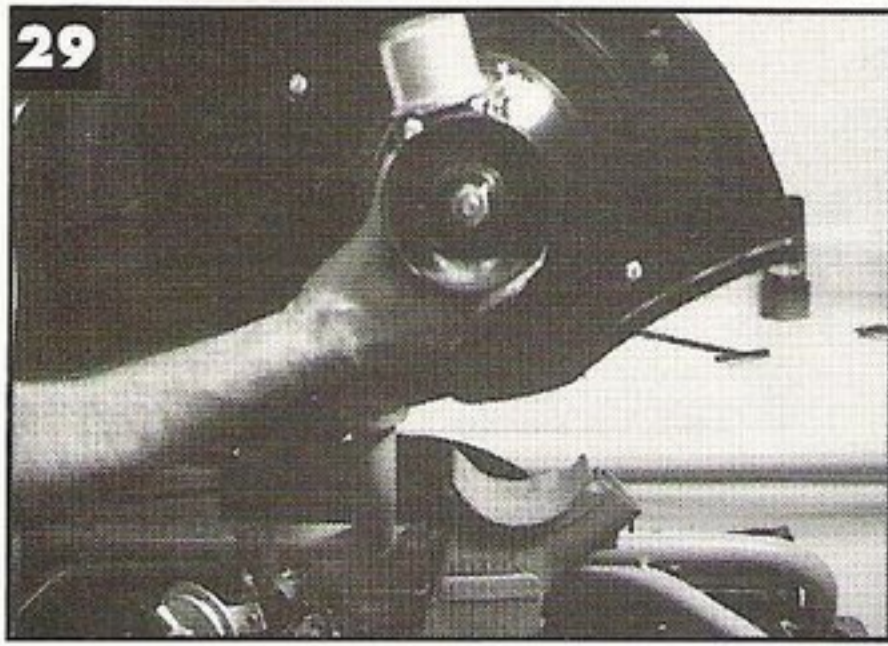
26 - Place the fan in the fan shroud and tighten the four bolts with a 10mm socket. Do not use sheet metal screws here as usually they won't be tight enough and will vibrate loose.



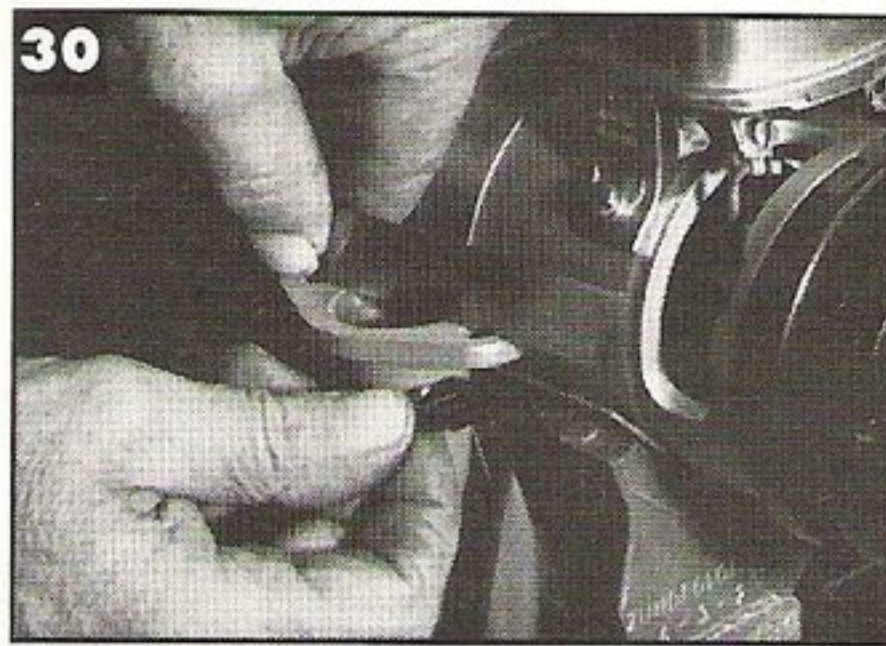
27 - Place the intake port copper gaskets in place with the split part toward the head and install the manifold and four nuts, but leave them loose for now. Before painting the manifold, check to ensure the heat riser passages are not clogged up. They can be burned out with an oxy-acetylene torch and lots of banging about. Another method is using an old clutch cable in an electric drill. Both ways are very tedious. Finding clear ones may be easier, check the large passages also. I once built an engine that sounded awful. After much-head scratching, I finally sawed the intake manifold in half and found the problem. It was a big chunk of melted carburetor wedged inside the curve of the manifold! Check all parts that can access the inside of your engine. Sand or bead-blast particles, for instance, will destroy your engine.



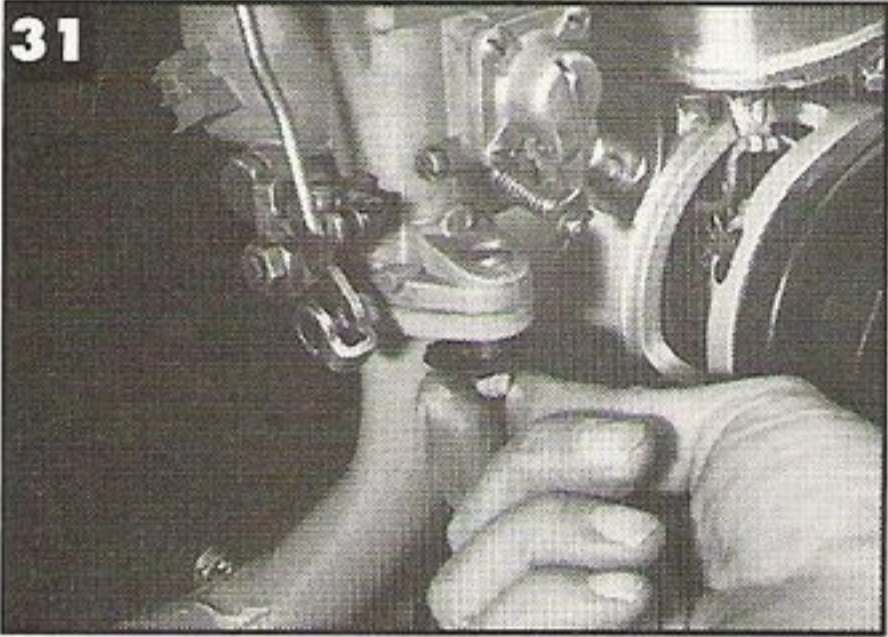
28 - The hole in the generator stand is open to the inside of the engine and the oil can flow out the top. A thin gasket must be made to fit this opening. Use gasket material and cut it a bit over-size because: 1) It can shrink with age and 2) It can slip a little when installing or changing the generator. If the case surface is a bit corroded, as sometimes happens, use a thin coat of a thick sealant.



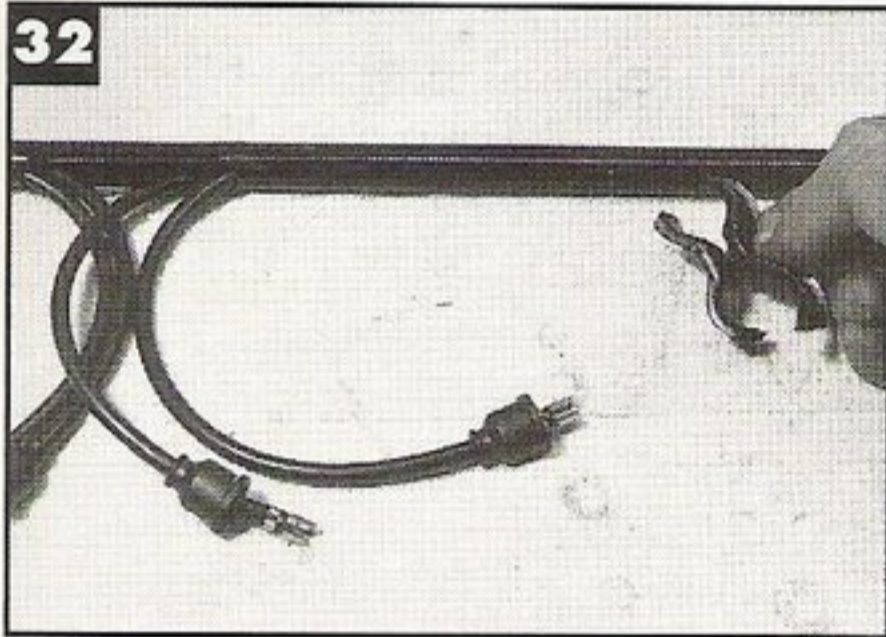
29 - With the new gasket in place on the generator stand, install the fan shroud and generator assembly. Install the two-fan shroud hold-down bolts and washers loosely, and then install the generator clamp and tighten it. Spin the fan a last time to check for interference.



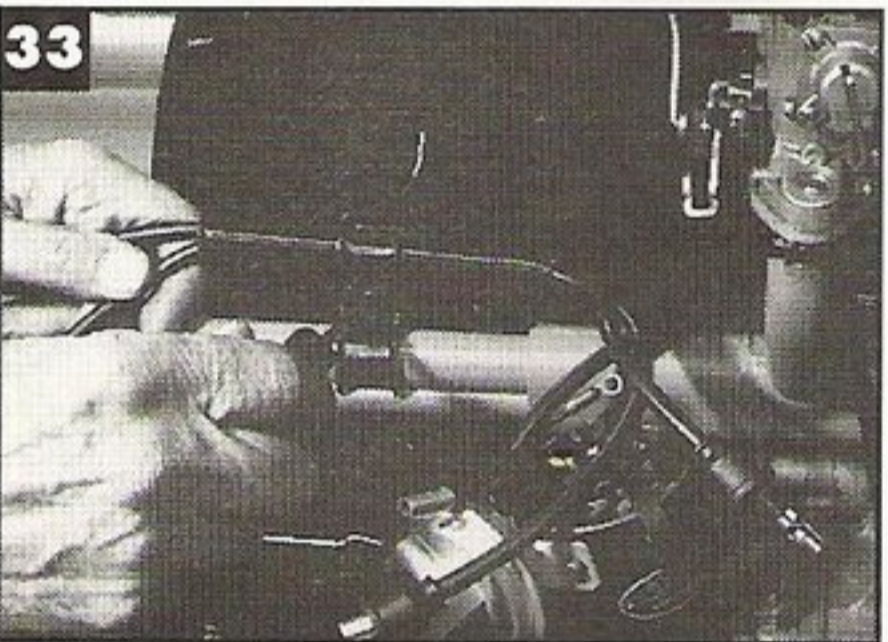
30 - Check that the carburetor flange is straight, as they are sometimes bent from having too many gaskets and over-torquing.



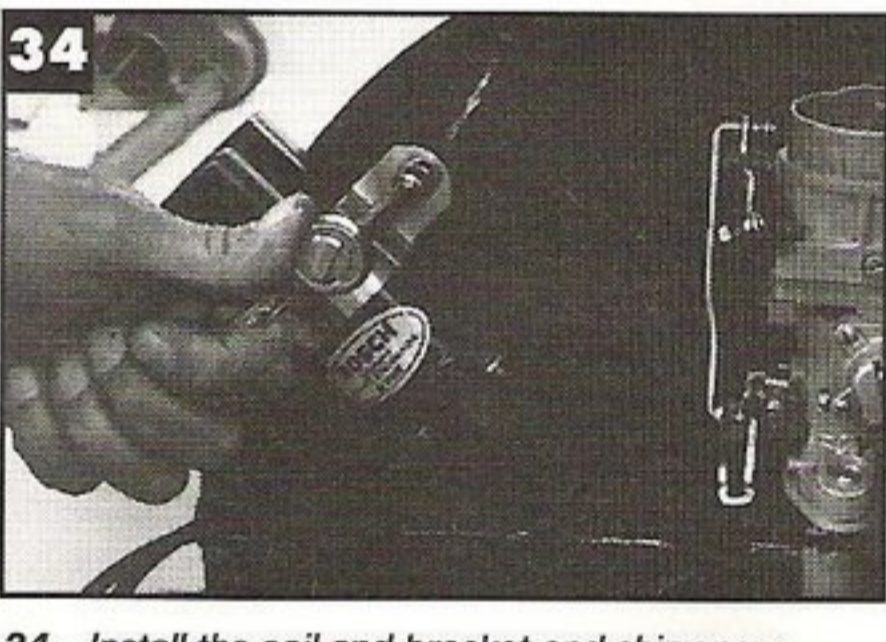
31 - Install the carburetor along with the manifold-to-case brace. Leave loose for now.



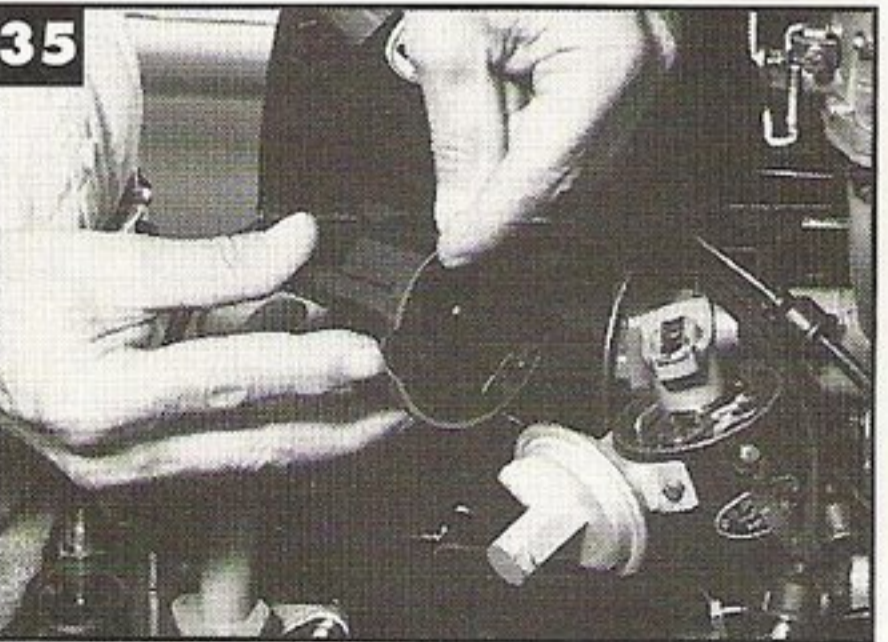
32 - After removing the seals, push the ignition wires through the loom, long wires to cylinders one and two and short wires to three and four. Loosely place the ignition wire loom clamps in place and put the seals back on the ignition wires.



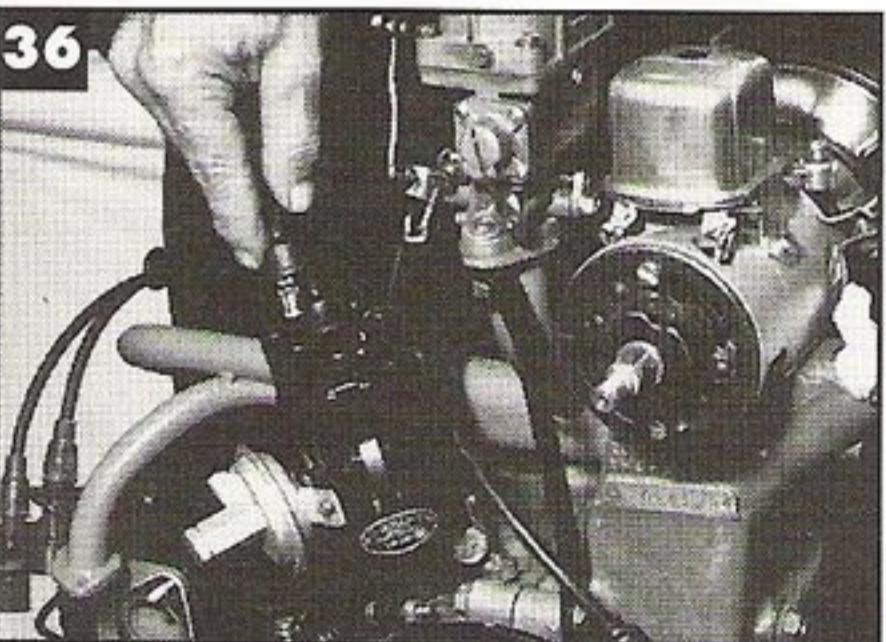
33 - Install the loom on the engine and tighten the clamp onto the intake manifold.



34 - Install the coil and bracket and shiny new Bosch decal. Defying logic, note it is upside down. It is meant to be read correctly when the coil is turned the other way, as it would be when sitting on a shelf. It was later corrected after being brought to my attention. From experience, the decal requires an additional dab of adhesive, and a light coat of clear Krylon will prevent the ink from fading.



35 - When installing the distributor cap, be sure this half round notch goes over the insulating washer at the distributor wire lead.



36 - By pushing and pulling the ignition wires in the loom, you can correctly connect number one plug to number one in the distributor cap, which is in line with the mark on the rim of the distributor. Follow through counter-clockwise at the top of the cap with numbers two, three, and four.

IF YOU DONT SEE THE PARTS YOU NEED GIVE US A CALL!!

Komet

CARPET KITS

- BLACK - ADD \$5 FOR GREY
- 7-PC STANDARD BUG\$32.50
- 7-PC SUPER BEETLE35.95
- TRUNK CARPET. STANDARD18.00
- TRUNK CARPET. SUPER19.00
- REAR WELL CARPET.....22.50
- SPRAY GLUE. THE GOOD KIND...5.95
- 4-PC FLOOR INSULATION.....15.95



DOOR PANELS

BLACK VINYL - EASY INSTALLATION

- FRONTS ONLY\$25.95
- FRONT AND REAR34.95
- ADD \$1 BOX CHARGE-



DASH WIRECOVER

COVERS THE WIRES IN THE TRUNK, AND HELPS KEEP OUT COLD AIR\$8.95



SEAT COVERS

BLACK VINYL - EASY INSTALLATION

- FRONTS ONLY\$42.95
- FRONT AND REAR.....57.95



SUN VISORS

RESTORATION QUALITY VISORS FIT JUST LIKE ORIGINALS. BLACK OR WHITE VINYL. 58-78 BUGS ..PR \$15.95



GLOVE BOX

THESE DURABLE PLASTIC GLOVE BOXES LAST MUCH LONGER THAN THE CARDBOARD GLOVE BOXES

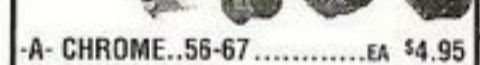
- 58-67\$11.95
- 68-78 STANDARD BEETLE11.50
- 71-72 SUPER BEETLE.....11.50

HEADLINERS

BLACK OR WHITE PERFORATED VINYL

- BUG SEDAN\$27.95

WINDOW WINDERS



- A- CHROME...56-67EA \$4.95
- B- BLACK...68-79EA 1.95
- C- HEAVY DUTY...68-79.....EA 2.95
- D- CUSTOM CHROME 56-79 EA 3.95



BEETLE FLOORMAT

DO YOU REMEMBER THESE? A CLASSIC VW ACCESSORY

- FRONT PAIR...\$19.00
- FRONT & REAR...35.95

DOOR RUBBER

- DOOR SEAL\$6.95
- VENT WING SEAL 52-789.00
- LONG FELT CHANNEL6.95
- SHORT FELT CHANNEL5.50
- 52-64 OUTER SCRAPER W/TRIM 10.95
- 65-78 OUTER SCRAPER W/TRIM 17.50
- INNER SCRAPER 52-644.25
- INNER SCRAPER 65-78.....12.50
- VENT FLAP SEAL.....3.00

LOGO MATS

PLUSH CARPET WITH VW LOGO

- FT PAIR \$27.00

COMPLETE KIT - INCLUDES ALL THE ABOVE PIECES - FOR BOTH DOORS

- 52-64 COMPLETE KIT.....82.95
- 65-78 COMPLETE KIT109.95

SEAT BELTS

2 POINT LAP BELT

- BLACK.....\$14.50

3 POINT SHOULDER BELT...BLACK...22.50

VENT WING LATCHES

- 52-64...EA...\$6.95
- 65-67...EA...6.95
- 68-78...EA...8.95

FRONT SPEAKER PANELS

CELEBRITY MOUNTS SPEAKERS TO THE FRONT KICK PANELS UNDER THE DASH

\$23.95 PAIR

WINDOW RUBBER

SET- FRONT, REAR, 2 SIDE-QUARTERS

- 4-PC CAL-LOOK. NO CHROME \$18.95
- 4-PC KIT W/CHROME STRIPS...76.00

REAR SPEAKER PANEL

ALLOWS INSTALLATION OF SPEAKERS BEHIND THE BACK SEAT\$24.95

BODY RUBBER

- HOOD SEAL... STD\$4.50
- DECKLID SEAL1.50
- FRONT TURN SEALS...PAIR.....5.50
- REAR TURN SEALS...PAIR5.50
- LICENSE LIGHT SEAL3.00
- FENDER BEADING...BLACK...EA...1.25

CUSTOM PEDAL PADS

EASY INSTALLATION

- BLACK WITH CHROME \$7.00
- 3PC SET

CHROME E-BRAKE

HANDLE WITH HARDWARE\$24.00

BILLET ROLLER PEDAL

POLISHED BILLET ALUMINUM ROLLER WITH CHROME PLATED SHAFT EASILY REPLACES FLAT ACCELERATOR PEDAL \$18.95

MIRRORS

- CAL-LOOK BABY TURBO. BLACK. \$4.50
- 52-67 ROUND CHROME. L OR R...10.00
- 68-78 BUG...CHROME...LEFT7.50
- 68-78 BUG...CHROME...RIGHT8.50
- 68-78 BUG...INSIDE REARVIEW...16.95

SHIFTERS

- EMPI DUAL HANDLE.....\$48.50
- ALUMINUM T-HANDLE45.50
- TRIGGER SHIFTER32.50
- STOCK REPLACEMENT...NEW.....21.50

STEERING WHEELS

PRICE INCLUDES MOUNTING ADAPTER AND HORN BUTTON

- \$49.00

WIPER BLADES

- WIPER BLADE 58-79\$5.95
- WIPER ARM 58-648.95
- WIPER ARM 65-6914.50
- WIPER ARM 70-7915.50

ADJUSTABLE SHOCKS

FINE TUNE THE RIDE HEIGHT OF YOUR VW WITH THESE SHOCKS. SIMPLE TO INSTALL. INCLUDES ADJUSTMENT TOOL

- EACH \$22.95

BODY PARTS

TWO FENDERS PER BOX SAVES MONEY ON BOXES AND SHIPPING

- FRONT FENDER STD 53-78\$46.95
- FRONT FENDER SUPER BEETLE 59.95
- REAR FENDER47.95
- \$8 FENDER BOX CHARGE

FUEL GAUGE

KOMET HAS ALL THE PIECES YOU NEED TO MAKE YOUR GAUGE WORK PROPERLY

- TANK UNIT 62-67\$19.00
- TANK UNIT 68-78 STANDARD13.00
- TANK UNIT SUPER BEETLE22.00
- GAS GAUGE 62-6725.00
- GAS GAUGE 68-78 STANDARD...29.00
- CURRENT REGULATOR 68-7813.00

NEW FRONT CLIP FITS

STANDARD BEETLES

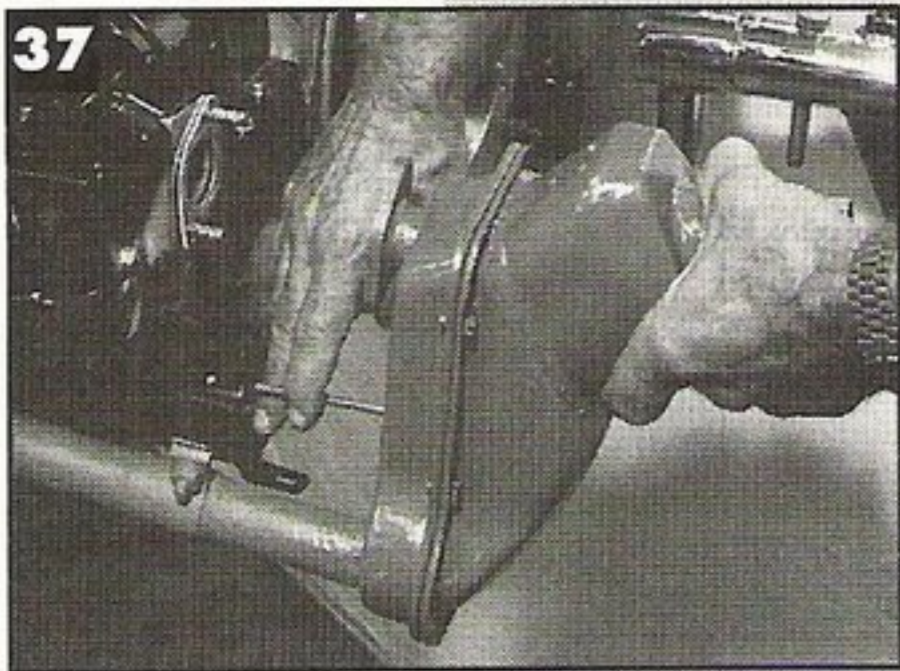
- EARLY BUG 56-67 \$89.00
- LATE BUG 68-78

FRONT APRONS

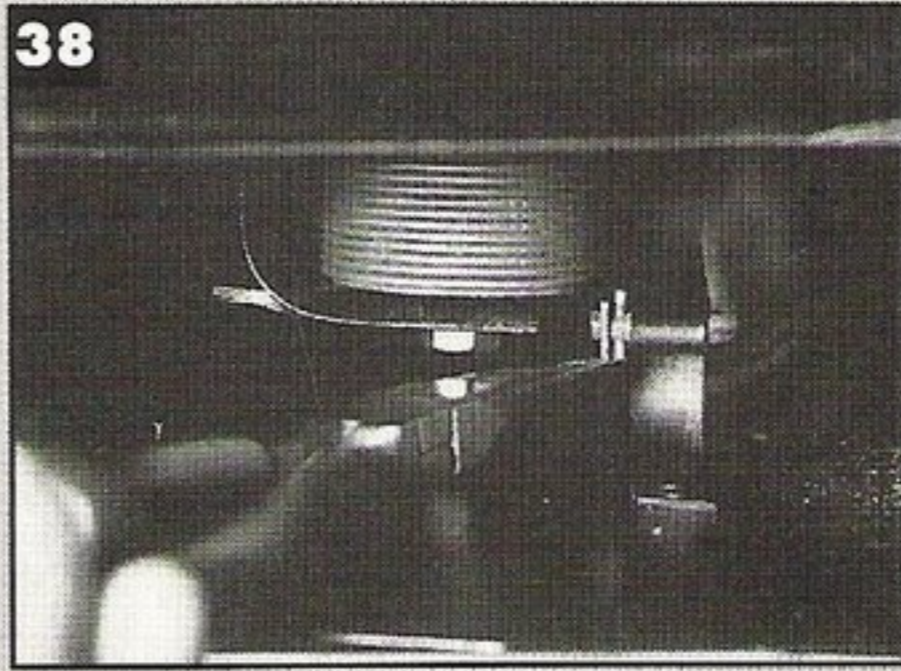
- STANDARD BEETLE 56-78\$17.95
- SUPER BEETLE W/LOUVRES49.95
- REAR APRON...68-7424.95
- BATTERY TRAY REPAIR PANEL...13.95

MORE ON THE NEXT PAGE !!

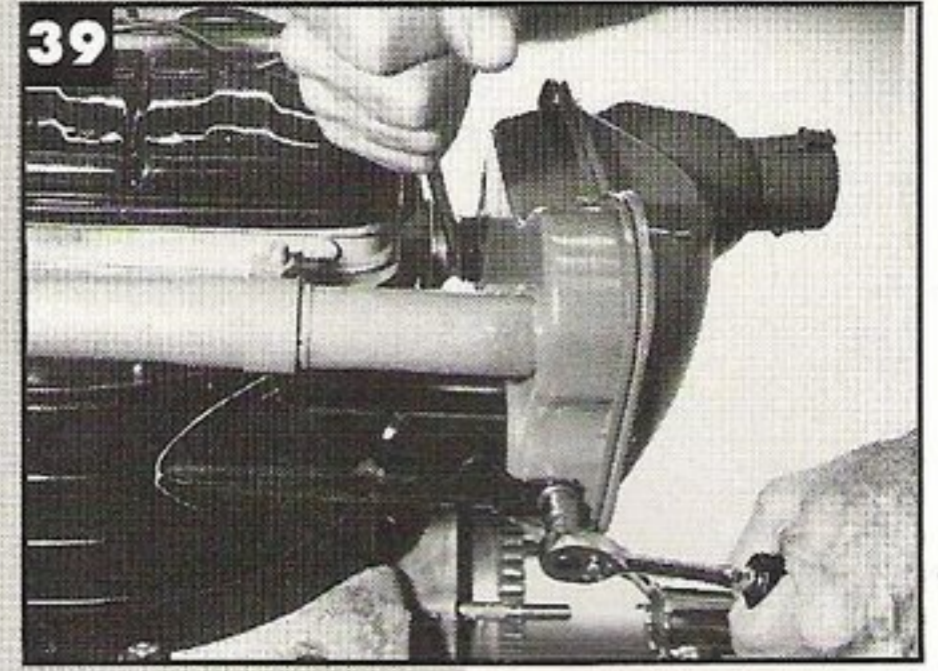
KOMET 213.721.2291



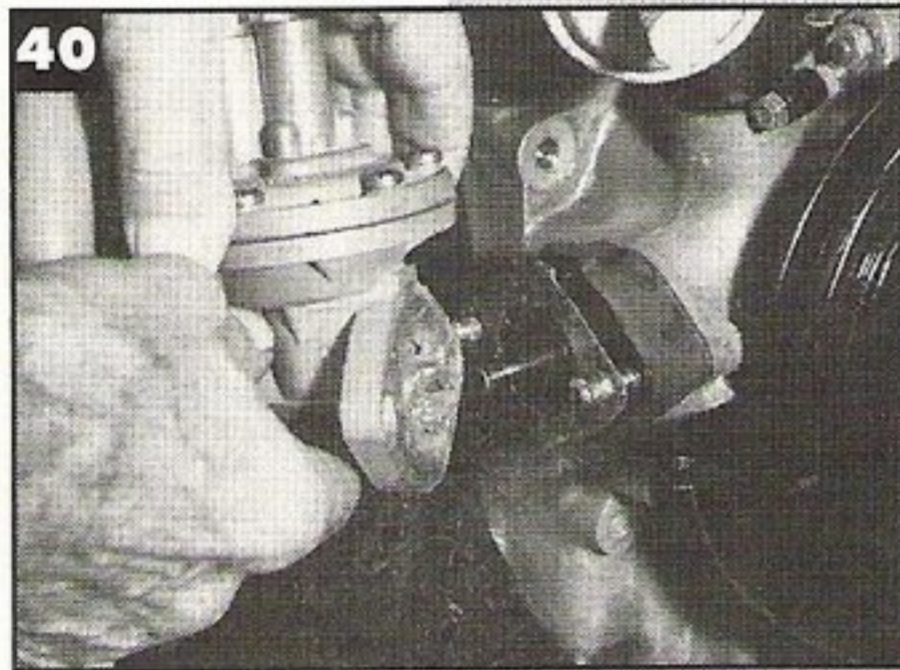
37 - Install the heater junction boxes. Note the control rod in my right hand. The junction boxes should be refinished in heat-resistant dull gray or semi-flat paint.



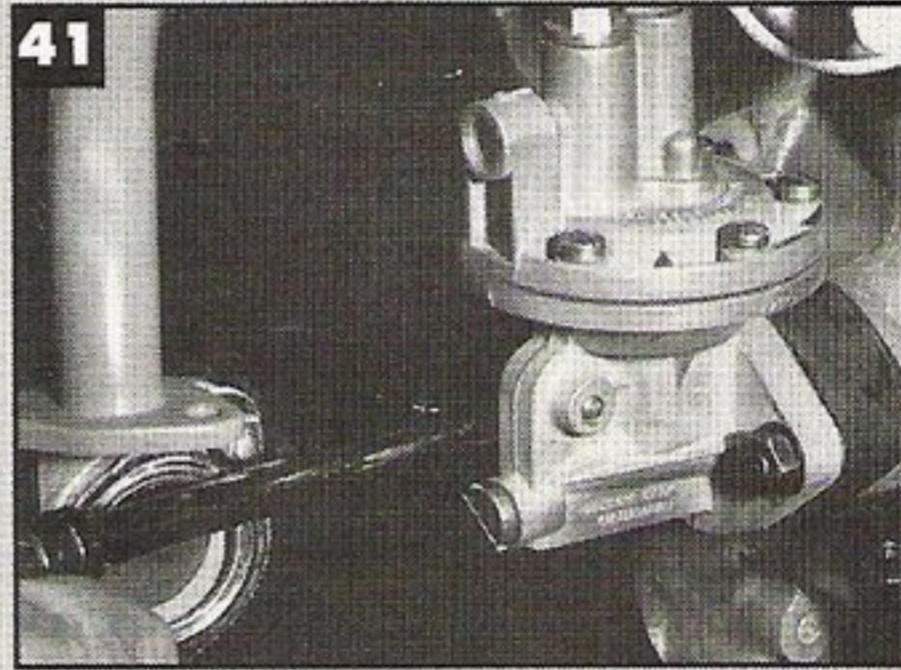
38 - Insert the control rod into the flapper arm and secure with a cotter pin.



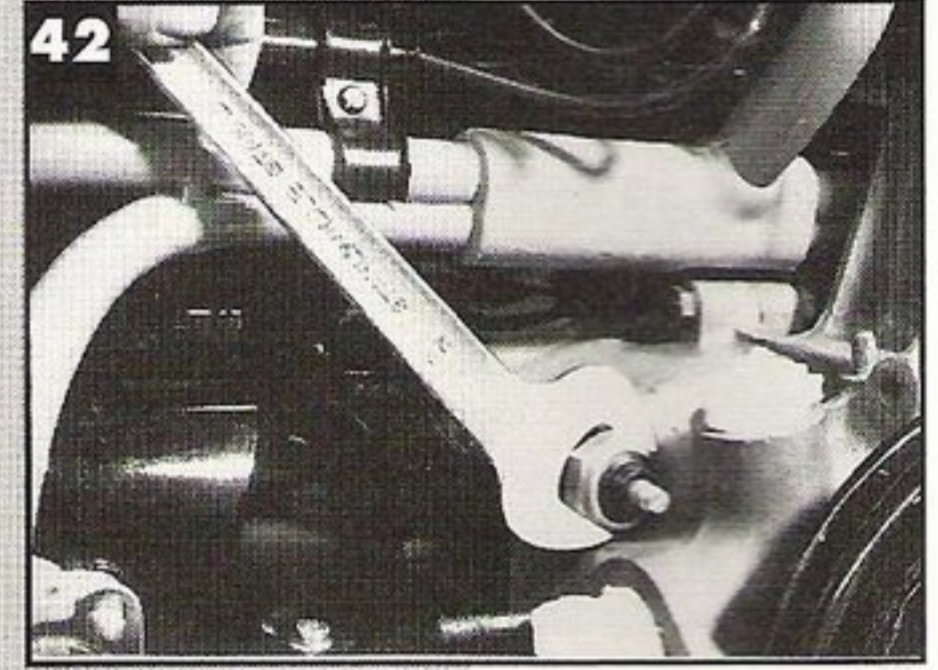
39 - Tighten the header pipe to the cylinder head and the bolt on the bottom that joins the heater channel and junction box. Check the control flaps for free movement.



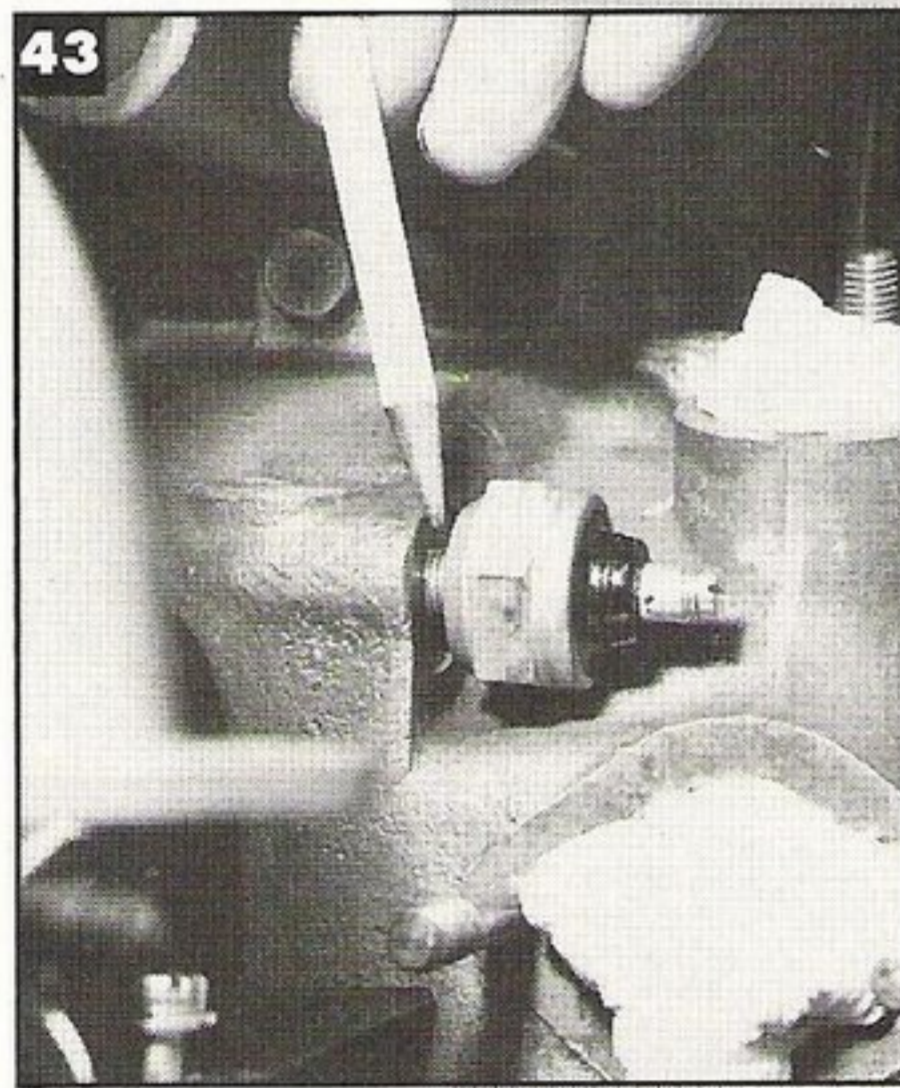
40 - Check the fuel pump flange with a straight edge and pack the recess with universal grease. Install a gasket on both sides of the fuel pump spacer block with a thin coat of sealant. Match the tab on the gasket with the fuel pump and spacer block. The tag goes up.



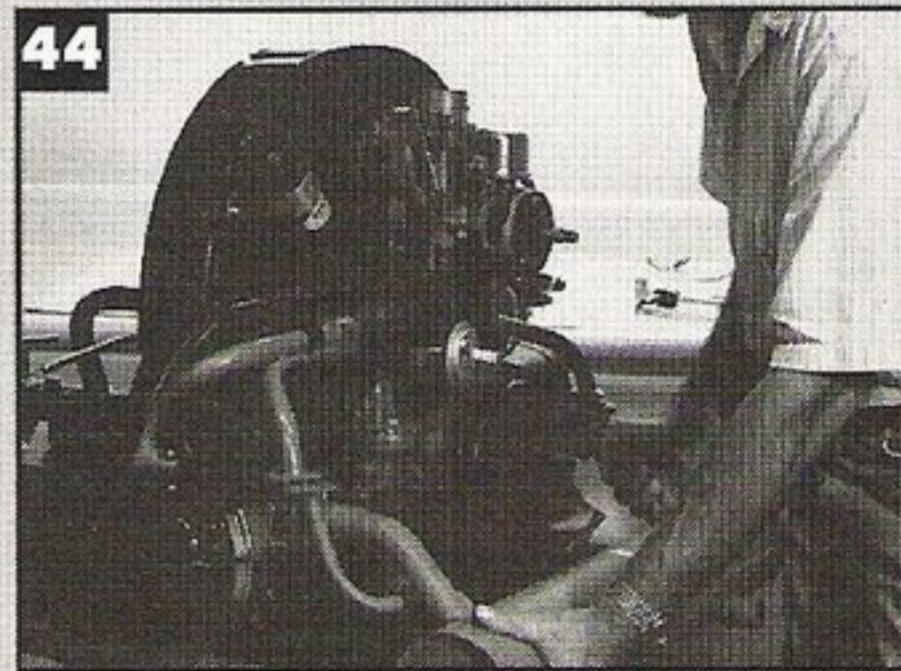
41 - Now is the easiest time to access the fuel pump nuts. The factory torque spec is not given. It says "tighten, but do not over-tighten." Over-tightening will crack the fuel pump spacer block.



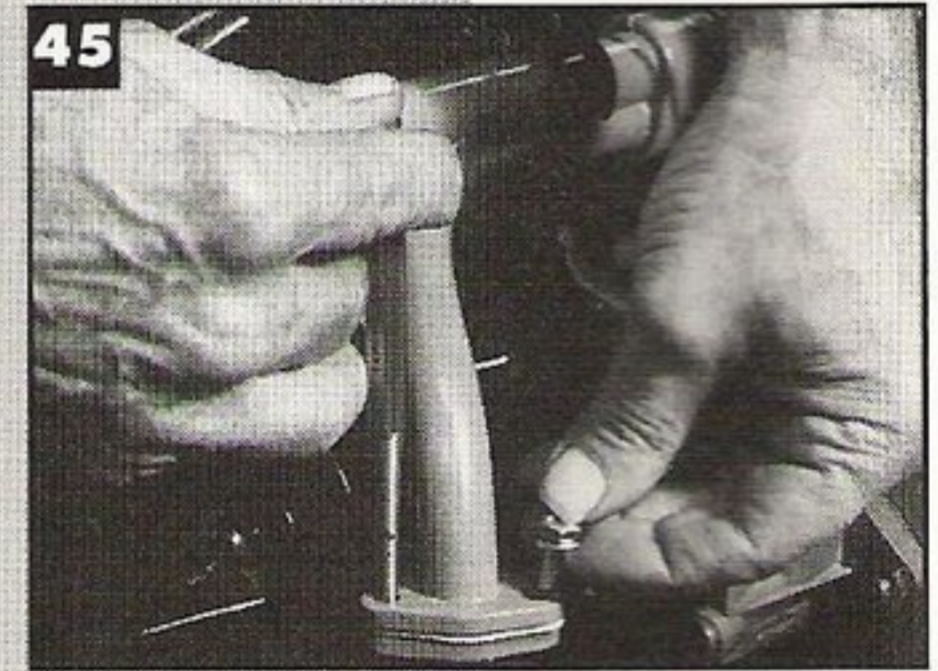
42 - Install the oil pressure warning switch. The later switches used a push-on spade terminal, but the 54 Oval this engine is going in has an all-new original-style electrical harness, and so here the correct screw-type terminal is used on an NOS oil pressure switch.



43 - Now this is one of my pet peeves seen on many VW engines of any year. The oil pressure switch has a tapered thread. The more you turn it in, the more it wedges outward on the case. I've seen so many cranked in all the way flush up against the case. This only pre-loads the case so severely that during a hot running condition the case can crack and lose oil and oil pressure. Leave space as shown here. If the case threads are worn, try using blue Loctite lock and seal, just a little on the threads, not in the oil gallery. Teflon tape will work, but is so slippery it will feel loose and give a false sense of being in far enough. Don't ruin your engine over such a simple thing. Insert the sheet metal piece under the fuel pump and loosely attach with one sheet metal screw.



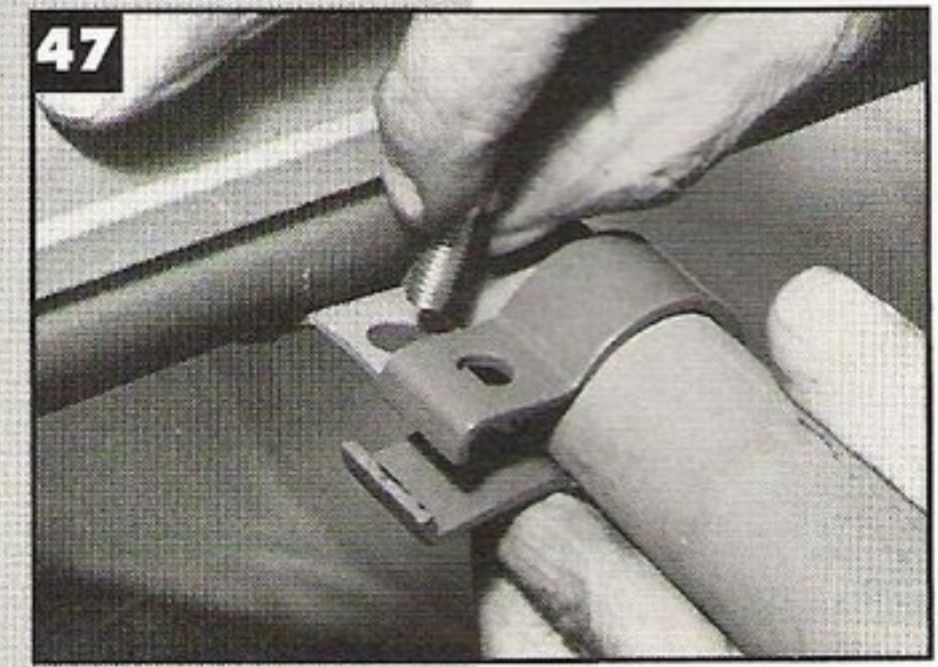
44 - Slip the muffler onto the header tubes and cylinder heads.



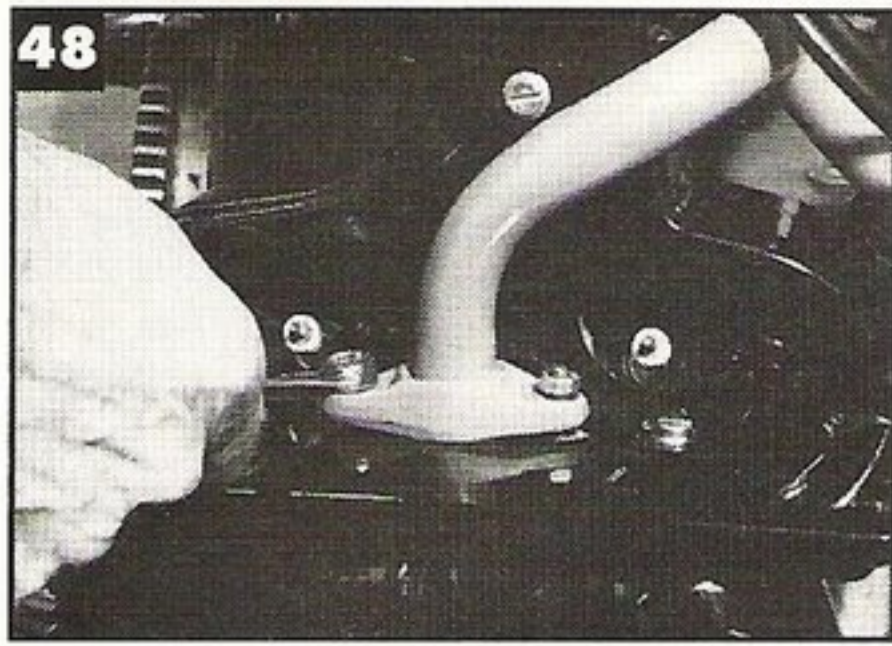
45 - Insert the muffler and heat riser gaskets and use a drift punch to align the heat riser and install the bolts loosely.



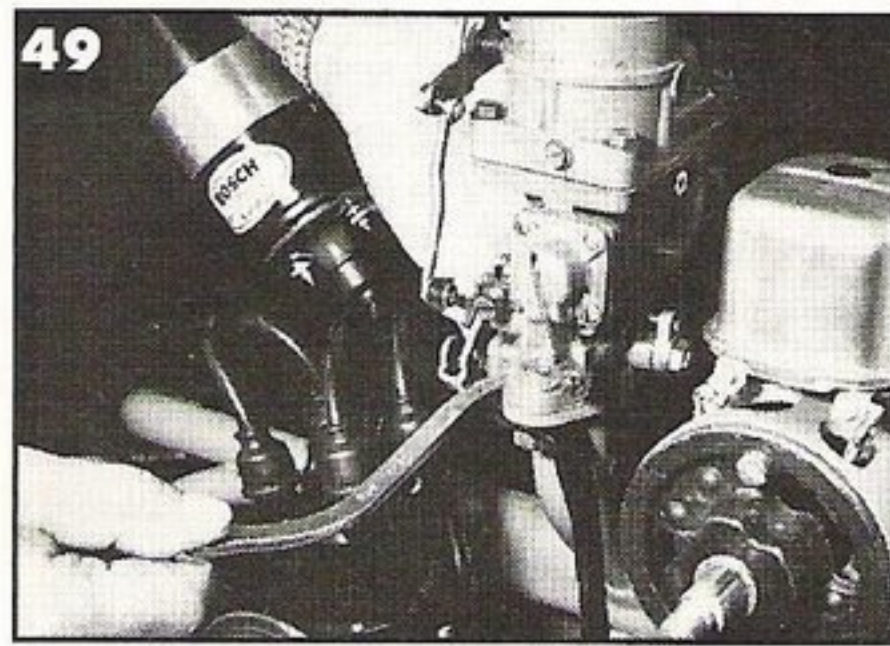
46 - The 36 hp engine doesn't use the later-style asbestos donut gaskets and clamps. It uses a simple slip fit and clamp as shown. Please, no American muffler clamps here as they crush and distort the tubes.



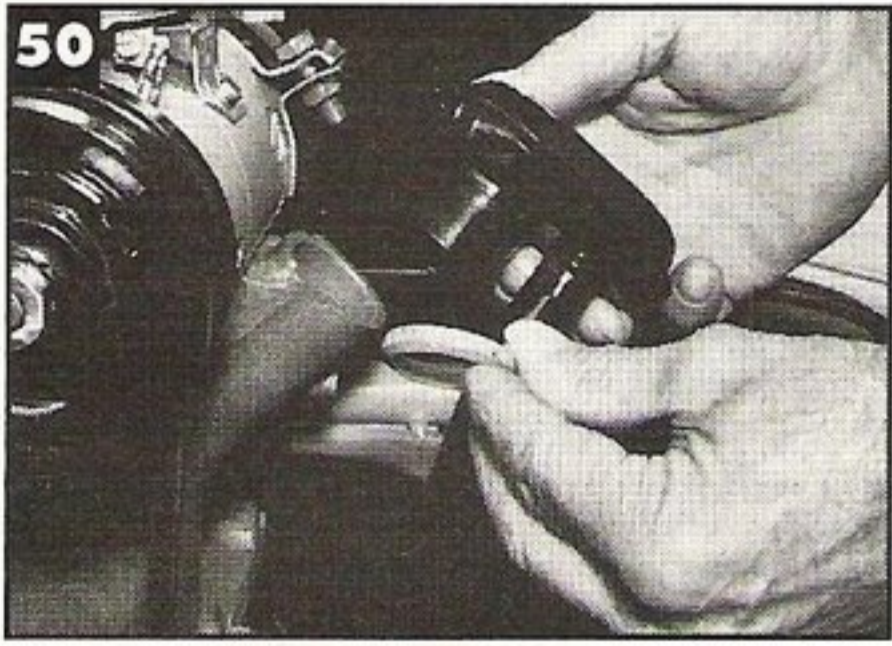
47 - In 1954 VW still used a single tip tailpipe clamped the same as the header pipes, plus a bracket on the muffler.



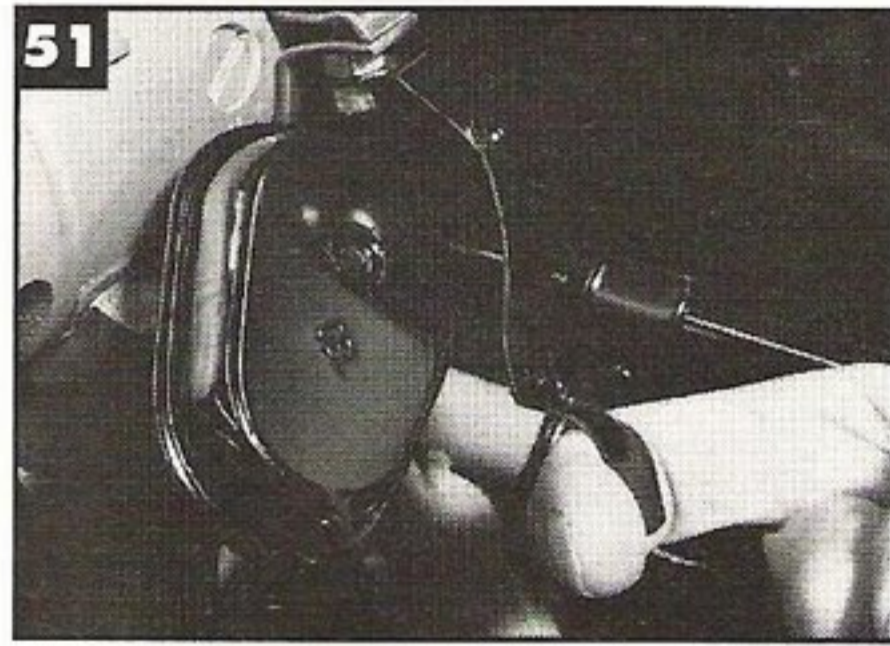
48 - Remember all those nuts, bolts and screws we left loose? Now they can all be tightened. Start with the intake manifold, alternating torque to squeeze down evenly onto the copper crush gaskets.



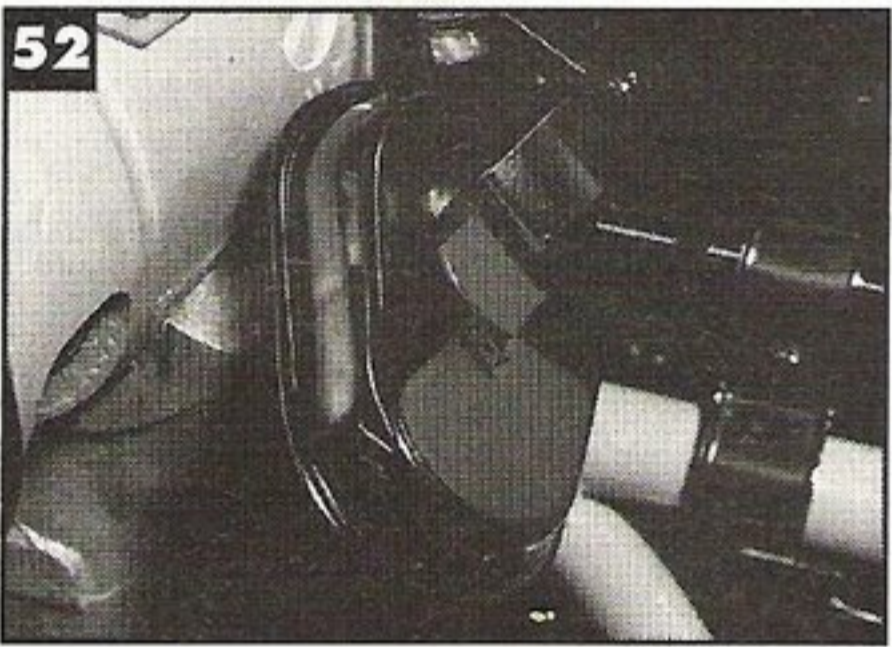
49 - Now the carburetor and carburetor brace can be tightened, along with the heat riser bolts.



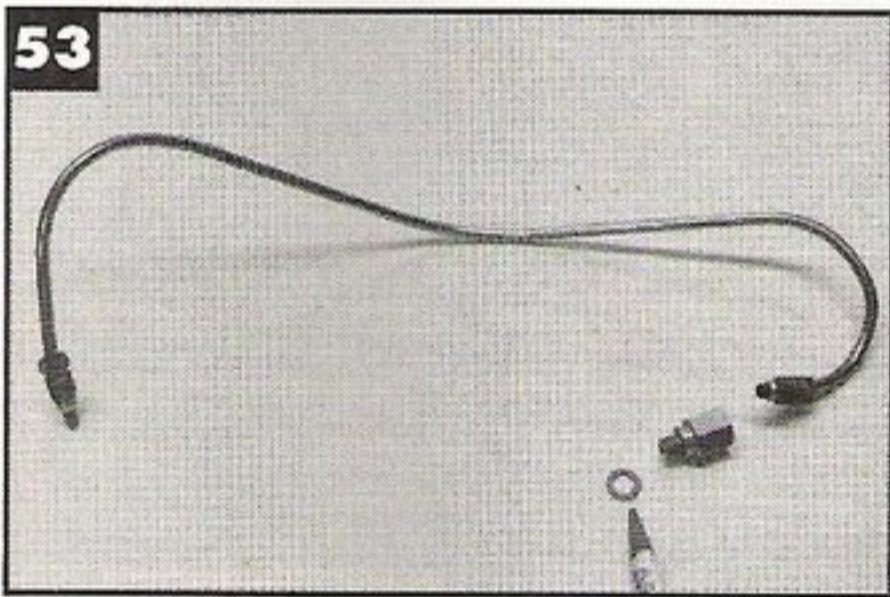
50 - Up to 1954 VW used this rather strange method of adding oil: an integral breather housing and road draft tube with no oil cap or tab to screw onto the case.



51 - The method of holding it in place was a spring steel clip and bracket attached to the generator clamp that rests in a dimple in the housing and is pivoted away so the housing can be lifted out of the oil-filler hole in the case. A rubber grommet slides on the neck to seal it. In 1955 it was similar, but had a tab to screw onto the case permanently and a regular oil cap. Both styles use a rubber grommet on the road draft tube to sheet metal junction.



52 - Here is the spring steel clip in place. If you have this setup be forewarned, as the generator strap and bracket position are crucial to a tight fit. Mount the bracket on the bottom of the generator strap and adjust positions; however, do not attempt to bend or tweak on the spring or bracket, as it will break easily. Believe me - I've tried.



53 - This is the metal distributor vacuum line. The adapter and crush washer on the right go to the carburetor. Both ends of the line have tapered sleeves to seal air tight, but the gasket is required between the adapter and carburetor. The gasket is one of a few you won't receive in a gasket kit, but a spare oil sump copper gasket works well. If you have a centrifugal distributor, the carburetor must be plugged at the adapter fitting to prevent a severe intake vacuum leak!



54 - Blow through the fuel lines to clear them and install at carburetor and fuel pump. They may need to be bent a little to prevent cross-threading. The inlet line to the fuel pump must have a rubber grommet where it passes through the sheet metal or the sharp sheet metal will wear through the soft copper fuel line, causing fuel leaks, engine stoppage, or a big ball of flames! By my thumb is the vacuum advance line at the distributor. It snakes around behind and to the right rear of the carburetor. Be careful not to cross-thread it.

IF YOU DONT SEE THE PARTS YOU NEED GIVE US A CALL!!

Komet

<p>BODY CHROME</p> <p>HOOD CREST.....\$18.95 ROUND HOOD LOGO.....9.50 FRONT HOOD SCRIPT.....9.00 REAR ENGINE LID SCRIPT.....9.00 53-66 SIDE TRIM 7pc.....9.95 68-78 STD SIDE TRIM 7pc.....8.95 71-79 SUPER SIDE TRIM 7pc.....23.00 - ADD \$1 TUBE CHARGE FOR SIDE TRIM -</p>	<p>5-SPOKE 5 LUG 5-1/2" WIDE \$597.99 EACH WHEN PURCHASED AS A SET OF 4 WITH CAPS AND LUGNUTS FULL SET.....\$289.95</p>
<p>STAINLESS GRAVEL GUARDS FRONT OR REAR PAIR.....\$9.50 TALL REAR.....18.95</p>	<p>8-SPOKE 4 LUG 5-1/2" WIDE \$557.99 EACH WHEN PURCHASED AS A SET OF 4 WITH CAPS AND LUGNUTS FULL SET.....\$265.95</p>
<p>RUNNING BOARDS ORIGINAL</p> <p>BILLET ALUMINUM \$78.95 PAIR</p>	<p>POLISHED 5-SPOKE \$977.99 EACH WHEN PURCHASED AS A SET OF 4 WITH CAPS AND LUGNUTS FULL SET.....\$449.95</p>
<p>MUD FLAPS \$14.00 PAIR WITH BRACKETS BLACK OR WHITE</p>	<p>ALUMINUM CENTERCAPS POLISHED ALUMINUM W/ WOLFSBURG LOGO SET OF 4.....\$42.95</p>
<p>53.95 EACH 1956 - 1967</p>	<p>RIM STUFF 3PC LUGNUT...\$1.95 1PC LUGNUT...1.50 LUGLOCKS SET 16.95 BLACK CAP...2.95 CHROME CAP...4.95</p>
<p>BUMPERS 52-67 EURO BUMPER BLADE EA \$19.00 52-67 EURO BUMPER GUARD.....5.00 68-73 BUMPER.....19.00 52-67 BUMPER BRACKET.....4.00 68-73 BUMPER BRACKET.....4.75 CHROME BOLT,NUT,AND WASHER .75 -ADD \$4 BUMPER BOX CHARGE-</p>	<p>HUBCAPS 49-65..5 LUG..\$6.00 49-65 BIG VW 12.00 66-67..5 LUG...7.50 68-79..4 LUG...6.00 NIPPLE CAPS..14.50</p>
<p>BUMPER BARS THESE CHROME PLATED BUMPER BARS ARE A POPULAR VINTAGE ACCESSORY. SEEN ON MANY MAGAZINE CARS. OUR KIT INCLUDES ALL THE HARDWARE, PLUS THE SQUARE-TUBE STIFFENERS. FITS 53-67.FRONT AND REAR SET...\$99</p>	<p>TIRES 135.....\$55.00 TUBE FOR 135...8.50 145.....64.00 165.....39.00</p>
<p>PORSCHE 911 HEADLIGHT LENS GENUINE GERMAN BOSCH HEADLIGHT LENS, NOW FITS 56-66 BUGS EACH \$42.95</p>	<p>WHITEWALL INSERTS 15 INCH - SET OF 4 3 INCH WIDE..\$44.95 1-3/4" WIDE..\$39.95 BUS 14".....\$42.95</p>
<p>HEADLITE EYE BROWS EASY INSTALLATION CHROME..PR..\$5.50 HEADLITE RING..EA.5.50</p>	<p>BLUE BEAM HEADLIGHT BLUE-WHITE LIGHT 12 VOLT HEADLIGHT W/ BLUE BEAM BULB \$18.95 EACH</p>
<p>HEADLITE CAT EYES THEY DO NOTHING THEY LOOK COOL EASY INSTALLATION CHROME..PR..\$5.50</p>	<p>STANDARD H-4 HALOGEN HEADLITE WITH CLEAR BULB \$10.95 EACH</p>
<p>TURN LENSES -FRONT- 58-63 BUG..CLEAR,AMBER.....\$6.00 64-69 BUG..CLEAR,AMBER,GREY..6.00 70-79 BUG..L OR R...AMBER.....11.00 -REAR- 62-67 BUG.....3.50 68-70 BUG.....5.50 71-72 BUG...L OR R.....18.00 73-79 BUG...L OR R.....14.00</p>	<p>SMOKED TAIL LIGHT INCLUDES LENS AND BULBHOLDER FITS 73-79 BUGS \$26.50 EACH</p>
<p>DOOR HANDLES 60-66 WITH KEYS..L OR R.....\$13.95 68-79 WITH KEYS..L OR R.....12.00 2 HANDLES W/ MATCHING KEYS..29.95</p>	<p>TURN SWITCH 66-67..TURN SIGNAL SWITCH..\$81.00 68-70.....32.00 71 ONLY.....37.00 72-79.....28.00 12 VOLT FLASHER RELAY.....6.00</p>
<p>WALK-IN CUSTOMERS PLEASE CALL 213-721-7675 WALK-IN STORE PRICES VARY FROM MAIL ORDER PRICES ADVERTISED</p>	<p>DECKLID RAIN- \$28.00 GERMAN..FITS 68-79..W/ HARDWARE KEEPS ENGINE FROM GETTING WET</p>
<p>WALK-IN CUSTOMERS PLEASE CALL 213-721-7675 WALK-IN STORE PRICES VARY FROM MAIL ORDER PRICES ADVERTISED</p>	<p>CAR COVER \$48.95 EXCELLENT QUALITY FOR BUGS, 3-LAYER WATERPROOF, U-V RESISTANT, W/ BAG</p>

Komet
 TO PLACE AN ORDER OR FOR SHIPPING INFORMATION PLEASE CALL
• 213-721-2291 •

2506 W. BEVERLY BLVD, MONTEBELLO, CALIFORNIA, 90640
 YOU MUST SPECIFY YEAR, MAKE, AND MODEL OF YOUR VW!! • INCLUDE YOUR PHONE NUMBER • NO PERSONAL OR BUSINESS CHECKS • \$25 MINIMUM PARTS ORDER • ALL ORDERS ADD \$5 HANDLING CHARGE • CALIFORNIA RESIDENTS ADD 8.25% SALES TAX • WE ONLY SHIP TO BILLING ADDRESS OF CREDIT CARD
 50% DEPOSIT ON C.O.D.S • NO SHIPMENTS TO APO OR PO BOXES • PRICES DO NOT INCLUDE SHIPPING • CALL FOR FREIGHT QUOTE • SOME PARTS LEGAL FOR OFF ROAD USE ONLY • CHECK YOUR LOCAL LAWS • PRICES AND AVAILABILITY SUBJECT TO CHANGE • ALL PRICES MAIL ORDER ONLY • THIS AD SUPERCEDES ALL PREVIOUS ADS • HOURS - 9AM-7PM MON-FRI • 10AM-5PM SAT-SUN
 HABLAMOS ESPANOL - WHOLESALE INQUIRIES INVITED - FAX.213.721.7655

IGNITE YOUR VW

If you're looking to improve the performance of your Volkswagen, MSD offers a variety of parts!

An MSD 6AL Ignition Control delivers hot, capacitive discharge sparks that will efficiently burn any fuel mixture. Below 3,000 rpm the MSD produces multiple sparks which improves throttle response and mid-range power. Plus, the 6AL has a built-in adjustable rev limiter that will protect your engine in case of missed shifts.

- Multiple sparks burn the fuel mixture completely for more power.
- Capacitive discharge sparks are at full voltage at any rpm.
- Smooth and accurate Soft Touch Rev Control.
- Easily connects to points or late model electronic ignitions.



6AL Ignition Control, PN 6420
CARB Approved, E.O. D-40-14

Billet Distributor, PN 8485*

The MSD Billet Distributor for Type I Volkswagens features a magnetic pickup for accurate trigger signals housed in a sturdy, billet aluminum housing.

- No more points to adjust, replace or that float at high rpm.
- Easy-to-adjust mechanical advance for custom ignition curves.
- Billet aluminum housing and sealed ball bearing guide.

**Not legal for sale or use on pollution controlled vehicles.*

8.5mm Super Conductor Spark Plug Wire

- The MSD 8.5mm Super Conductor Wire is the ultimate performance wire!
- Only 40 - 50 ohms per foot with high EMI suppression capabilities.
- Tough and durable sleeve and heat resistant boots.
- Dual Crimp Terminals grip the wire and the conductor.



Extra heavy glass braid and strong dielectric insulator

Large crimp tabs grasp the sleeve of the wire preventing terminal pull-off.

Separate conductor crimp tabs securely grip the conductor.

Stainless steel locking tab "clicks" on to the spark plug terminal.

MSD

IGNITION

For our latest catalog, send \$3.00 to:
Autotronic Controls Corporation
1490 Henry Brennan Dr., El Paso, Texas 79936 • (915) 857-5200
Check out our website at: <http://www.msdisignition.com>

TECH LINE
915-855-7123

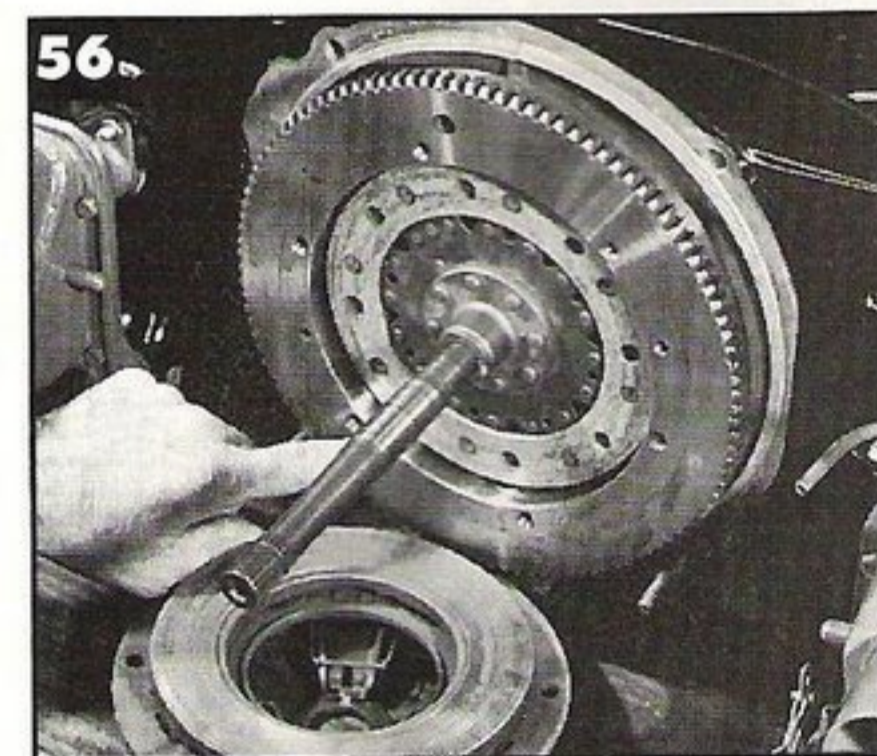
IGNITIONS • COILS • DISTRIBUTORS • REV LIMITERS • SPARK PLUG WIRES • TIMING ACCESSORIES

continued from page 31



55 - All the 36 hp engines originally came with an annular Venturi-style thermostat and controlled air-regulating ring at the fan shroud air inlet. Many are missing, at least on the West Coast, perhaps because someone along the way thought it was unnecessary in a warm climate or didn't understand how it worked and/or how to adjust it, and just threw the dang thing away, dubbing it the toilet seat by its appearance. Leaving it in place and adjusting it properly will extend the life of your engine by assisting it to reach operating temperature sooner. The S.A.E. (Society of Automotive Engineers) showed the predominant cause of wear in any reciprocating engine is during starting and warm up.

To try to simplify the method of adjusting, remember two things: 1) During assembly, the cold setting is closed and lightly preloaded against a rubber stop at the fan shroud (Rubber stop shown is temporary for testing - not original). 2) With the engine hot enough for the copper bellows thermostat to expand out to the top of the mounting bracket stop, the lip of the air ring should be 20mm or .79 inches from the top lip of the fan shroud. The adjustment is made at the control arm clamp using a 10mm wrench as shown here. If an adjustment error is made and the ring opens too far before the thermostat bracket limits travel, it will make contact with the spinning fan along with a horrible screeching and grinding noise. Maybe that's another reason so many are missing. Adjust it properly. Check that the bellows hits the top stop or the bracket with the air ring at 20mm distance, and enjoy the extra longevity of your engine. The thermostat can also be checked in water heated to 149°-158° F. It should then measure 46mm, or 1.8 inches.



56 - Install the clutch disc with an alignment tool such as this old pilot shaft. At the pencil are tabs, which center the pressure plate inside the flywheel. If not careful, one could catch the edge of the flywheel and warp the clutch when the bolts are fully tightened.

continued on page 76



THE ULTIMATE RESTORATION!

We are now offering complete body off restorations with brand new bodies. All body parts and most components are manufactured by VW of Mexico. This is as close to a new Bug as you can get in the U.S..

That's right! Almost all of your bug will have brand new components, including this beautiful factory built body. Call us today for more information about the ultimate restoration.

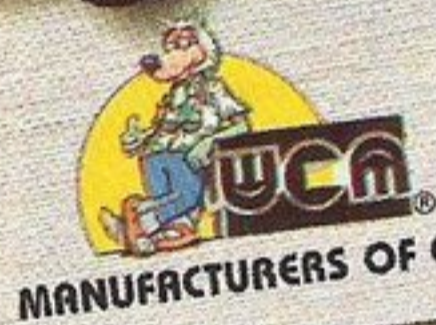
Stephen's **V-Dub** Restorations

PO Box 1107, Anacortes, Washington 98221-6107 • (360)293-3641

Restore It Right

CATALOG 18
500c

FREE



GLOVE BOX
EDITION

MANUFACTURERS OF QUALITY RESTORATION PRODUCTS

Get your **FREE** 1998 edition of WCM's Restoration Catalog. It is the **most comprehensive in the world** with over 220 pages of high-quality restoration parts and accessories, plus art, apparel and collectibles for Air-Cooled Volkswagens.

You get...

- Manufacturer-direct Discounts!
- New and Improved products for 1998!
- A real Lifetime Guarantee!
- Products that we Quality Test! (So you do not have to)
- Money Back Guarantee!
- A quality product, prompt and professional service, and the best value in the business!
- All under one roof, for over 20 years!



Call for a **FREE** catalog! (310) 325-0005 fax: (310) 325-9733

Express Order Hotline: **1-800-247-3202**

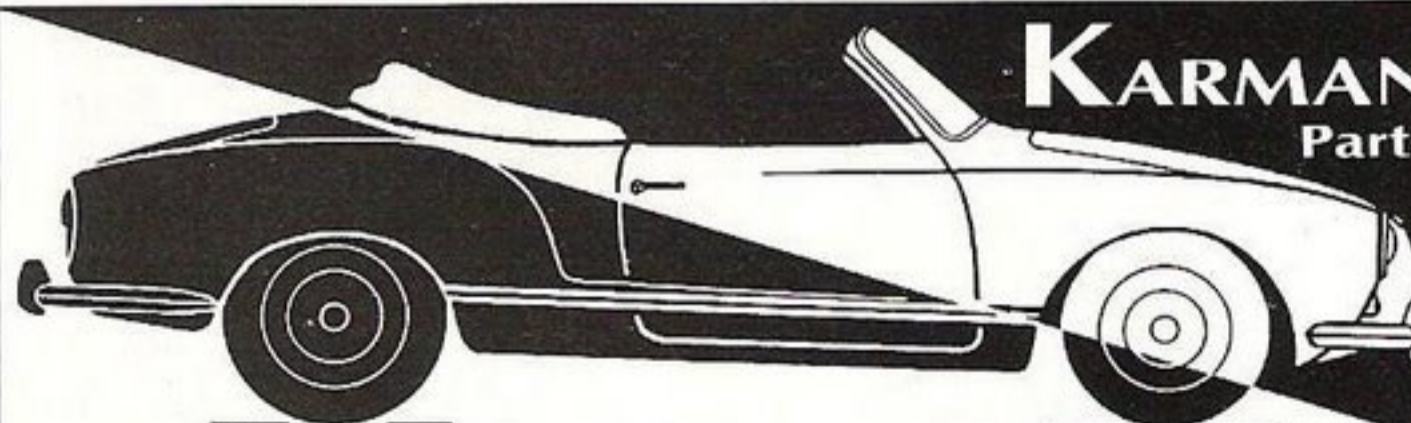
24002 Frampton Ave., Harbor City, California 90710

Internet Ordering: www.westcoastmetric.com Autocode 306

WEST COAST METRIC INC.

Manufacturers and Importers of Quality Restoration Products

We are the VW guys! We own them, restore them, drive them, race them, show them and we love them...



KARMANN GHIA
Parts & Restoration

The Mark Of Quality



WE LOVE GHIAS... AND GHIA OWNERS LOVE US.

KARMANN GHIA PARTS & RESTORATION Is The Only Source You'll Ever Need For Your Karmann Ghia. We Manufacture And Reproduce More Ghia Parts Than Any One On Earth! We Buy & Sell NOS & Used Parts! #1 In Ghia Parts!

LOWEST PRICES! Toll Free Order Line (Orders Only) 800-927-2787

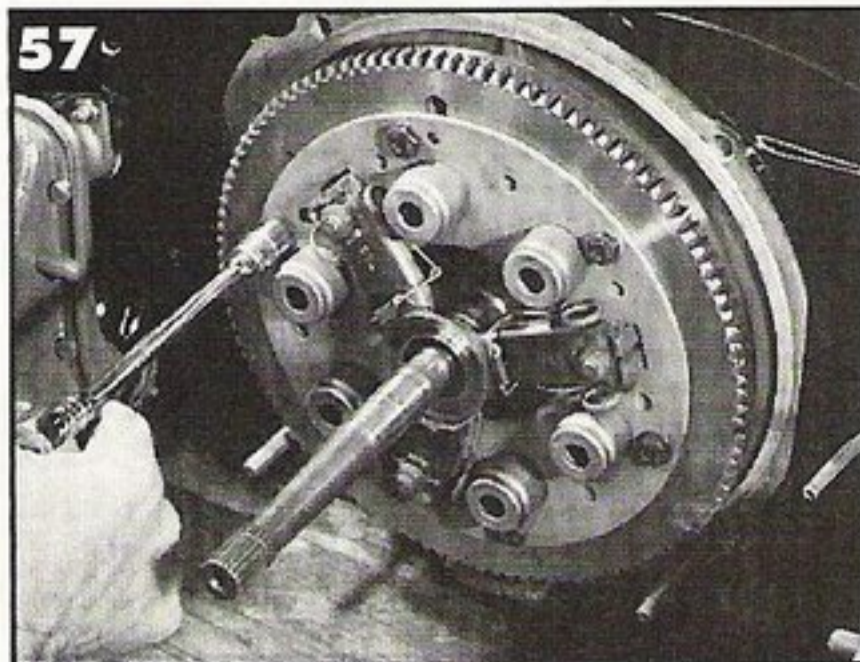
Info: 805-652-1974
Fax: 805-641-3333

FREE CATALOG
U.S. ONLY.

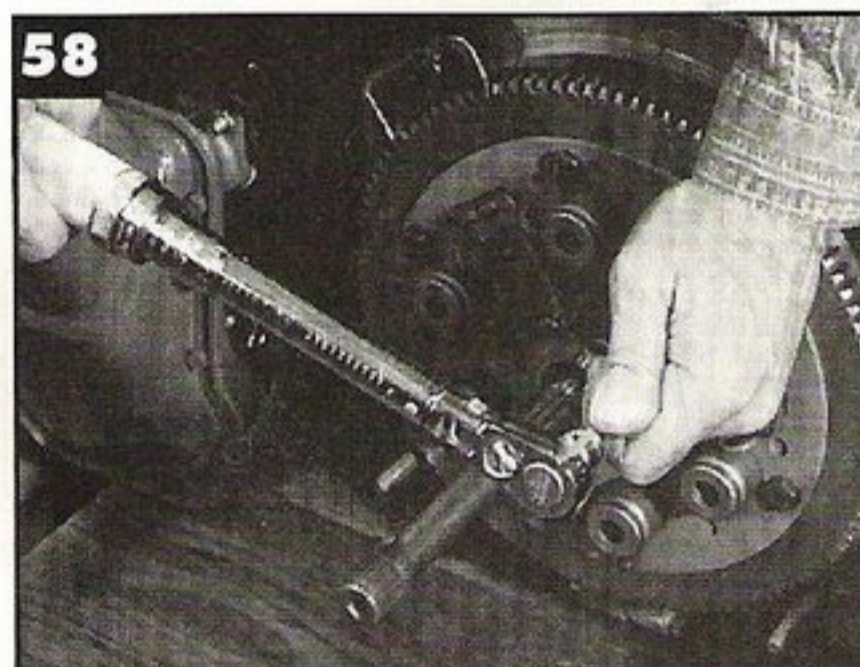
FREE CATALOG!

Karmann Ghia Parts & Restoration
P.O. Box 997, Ventura, CA 93002-0997

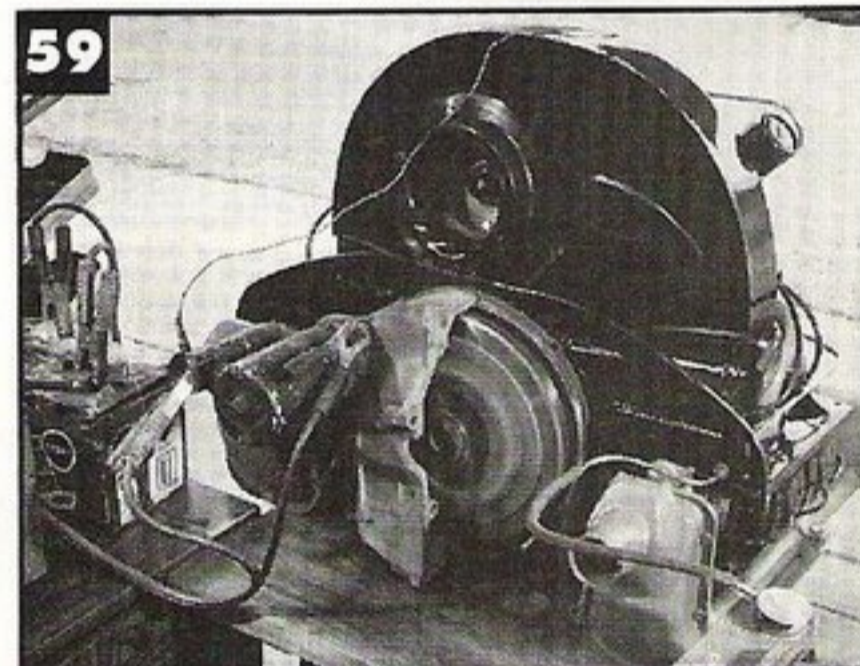
continued from page 32



57 - Draw the pressure plate in evenly by alternating turning the bolts in a little at a time in a crisscross pattern.



58 - Torque the clutch bolts in a crisscross pattern to 25 lbs/ft. Check that the throw-out bearing release plate is parallel to the flywheel.



59 - With the starter half of a transmission housing, a starter, battery, gas, jumper cables, and a hot wire to the coil, you can run your engine.

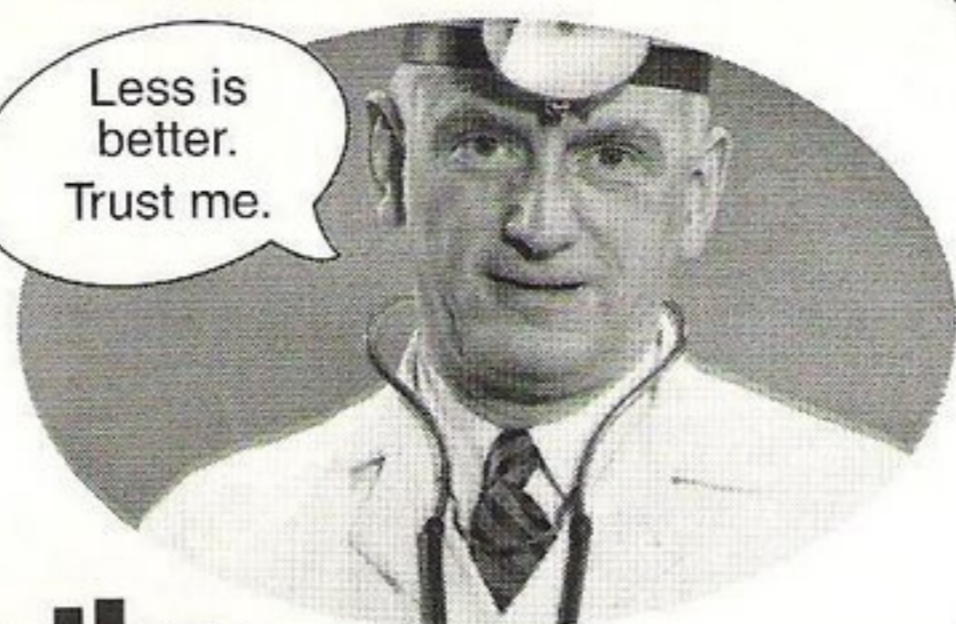


60 - Here the engine is fitted to the restored '54 pan at West Coast Classics, with the '54 oval body in the background.

continued on page 78

Experts say: "Get less for your money with the new, improved Ignitor™!"

Less is
better.
Trust me.



(Distributor
not included)

Now, with a smaller module, less hardware, and just one screw, you can more easily convert to electronic ignition, and "never change points again!"™

We've re-engineered the Ignitor for VW applications so it's easier than ever to convert your point equipped distributor to the Ignitor breakerless electronic ignition system. The entire unit fits entirely under your distributor cap to keep the engine compartment looking stock, and delivers all the benefits of systems costing hundreds of dollars more.

- "Never change points again!"™
- More horsepower
- Better fuel economy
- Longer spark plug life
- 30 month warranty

The Ignitor utilizes Hall cell technology, proven for over 20 years in over 100,000 Volkswagen engines.

New high performance spark plug wire sets and coils.

New low resistance, high performance spiral wound plug wires featuring silicone jackets to resist heat, with fiberglass reinforcing braid.

Choose from "Stock-Look" 7.0mm plug wires in custom sets; or "MAGx2" 8.0mm plug wires in universal sets, both available in a variety of colors.

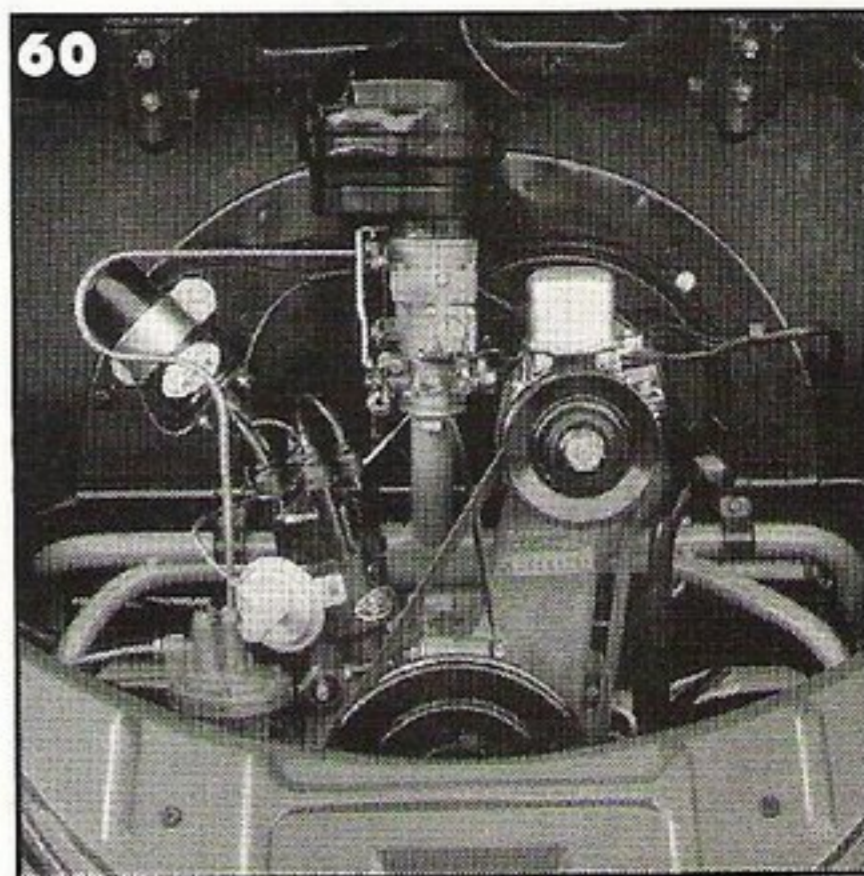
Our 40,000 volt Flame-Thrower coil increases spark energy, allowing larger plug gaps for added power, smoother response and better fuel economy. Choose from oil filled chrome or black, or vibration-proof epoxy.

IGNITOR

See your dealer or order Toll Free, VISA or MC, 1-800-827-3758, Ext. 16

PERTRONIX inc. San Dimas, California (909) 599-5955

continued from page 76



61 - Here is the completed engine in a restored 1954 Beetle.

SOURCES

WEST COAST CLASSICS
1002 E. Walnut, Suite A, Dept. VWT
Fullerton, CA 92631
(714) 871-1322

BFY OBSOLETE PARTS
1460 N. Glassell, Dept. VWT
Orange, CA 92667
(714) 639-4411

WOLFSBURG WEST
1051 N. Grove St., Dept. VWT
(714) 630-9653

VINTAGE PARTS
317 N. Victory Blvd., Dept. VWT
Burbank, CA 91502
(818) 848-2833

RIMCO MACHINE
520 East Dyer Road, Dept. VWT
Santa Ana, CA 92707
(714) 549-0357

GENE BERG ENTERPRISES
1725 North Lime Street, Dept. VWT
Orange, CA 92665
(714) 998-7500

OVALS ONLY
(714) 731-8849
P.O. Box 1488, Dept. VWT
Tustin, CA 92681-1588
(714) 998-7500

JOHNSON'S BUG MACHINE
Santee, CA
(619) 448-9110

HANK ROED
(714) 441-0151

VW Instructional Volume #1 "VIDEO" Bugs, Ghias, and Early Buses

OIL CHANGE
PLUGS AND POINTS
ADJUST VALVES
CARB. CARE



ADJUST BRAKES
ADJUST CLUTCH
FAN BELT
MUCH MORE

\$29.95 + S.H. (\$4.95) CALL - 1-800-662-0071 VISA/MASTERCARD ~ OR SEND CK. OR MO.
BUG ME VIDEO P.O. BOX 4176
N. Ft Myers, FL 33918~4176

<http://members.aol.com/BugMeVideo>