



Velocette MAC 350cc

Rebuild Project Part Two

November 2018 to November 2019

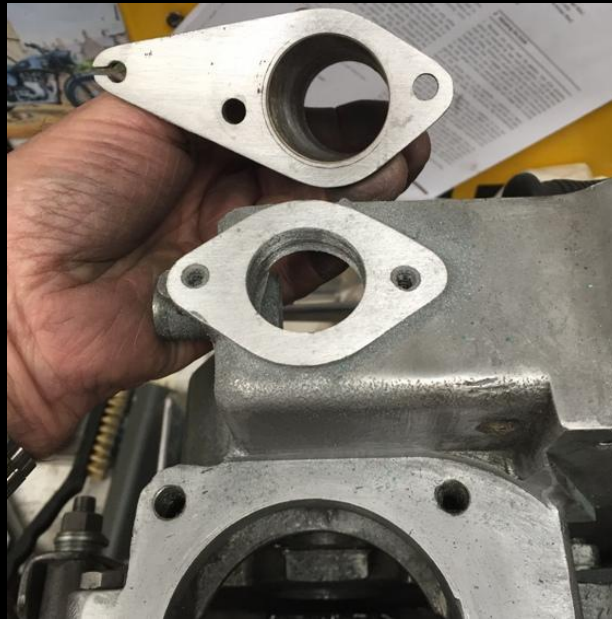
Copyright © 2019 Keith Jones, All Rights Reserved

This is the continuing story of progress and work done to my lovely little 1953 / 1954 Velocette 350cc MAC, in my second year of ownership. This Blog illustrates in pictures & words the future trials & tribulations, repairs & rebuild modifications &/or improvements made in Year Two.

The Following Photos & Blog begin at the start of November 2018 onwards . . . Part Two, Year Two: Read-on:



I've added this sepia photo of my Velocette as it represents 'What my MAC Looks Like' at the present time (well okay, NOT exactly as it is now, seeing as the Engine & Gearbox is out of the Frame, and is in tiny BITS But this is 'What' it looked like 'Just before' removing the Engine & Gear Box from the frame.



The Push Rod Tunnel and base '*leaked oil*', where the bottom pushrod tube fits, and was such a poor fit - tube wobbling about all over the place. No wonder oil was *pizzizing* from there too.

See the before & after photos (top left). I can guarantee no more oil will emanate from this part of the engine, because . . . I have rectified this problem by '*Re-Facing*' both parts '*Flat & True*' to provide a perfect fit.

I also did the same to the top Pushrod Tube & Rocker-box '*Face*'. Both ends to be sealed with Hylomar gasket sealant & new gaskets.

On **Saturday 10th November 2018**, Rick & I drove over to Veloce Spares Ltd (VSL) at Huncote in Leicestershire and I bought a LOAD brand-new MAC Parts – in readiness for the Big Rebuild.

To compliment the reconditioned Push Rod Tunnel Tube bases, I also bought the new VSL Gland Nut & O-ring Seal (part No. M52/A & M261/2), which replaces the antiquated system (of using asbestos string to seal the push rod tunnel).

I managed to buy two new Inlet & Exhaust Valves; '*Plasma Nitrided Stems*', and a pair of high duty Venom Colsibro Valve Guides (x2). Needless to say, I'm replacing the old ball race Clutch Thrust bearing with the much improved Roller Thrust Race (part numbers VSL094 & VSL095).

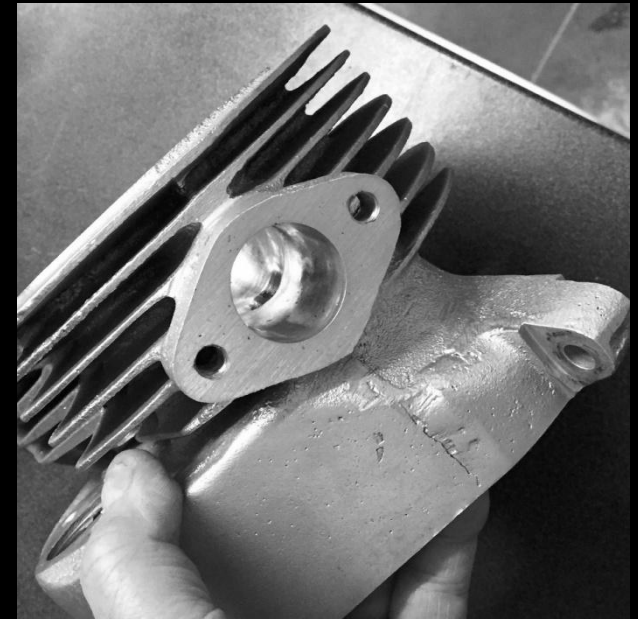
Plus; I bought LOADS of other much needed Velo '*Stuff*' such as; gaskets, shims, circlips, washers, seals, etc. etc.

As well as a pair of brand new Petrol Stop Taps (Petlocks as the Americans call them) VSL part number VSL420; that I was assured "Guaranteed Not to Leak"!



After a great deal of thought on the matter, and following advice and guidance from several venerated and sagacious '*Velocette Experts*', I decided to fit Roller Bearings (for both Main Bearings), that is; on both the Drive-side and the Timing-side of the engine. This replaces the Ball Race Bearing that is traditionally fitted on the Timing-side Crankcase. I am also going to experiment with the idea of '*Not*' fitting the Copper Head Gasket (this will also raise the compression ratio a Tad) by '*Lapping*' the Head & Cylinder '*Faces*' together (similar to Ducati engines – that do not use a cylinder gasket for their head seal). I have read in several '*Fishtail*' articles (the Velocette Owners Club Magazine) about such '*Modifications*' being successfully done to MACs' (without any mechanical problems or adverse issues related to this modification), so I thought I would give it a go . . .

So '*Here Goes . . .*'



(Photo above Left) My new Inlet & Exhaust Valves with 'Plasma Nitrided Stems' and a pair of high duty Venom Colsibro Valve Guides to be fitted, as well as a pair of new Valve Seats to be inserted (suitable for Non-Leaded-Petrol) which will be expertly machined to fit as I have entrusted this job to Criterion Engineering Ltd. I removed the old Guides after heating the Head in the Kitchen Oven for 35mins, and then polished the rest of the Valve Port (nearest the combustion chamber) to match the already polished inlet manifold end. Tony Mortimer (via Criterion) will be fitting the new Alpha Bearings Big End to my MAC Flywheels.



First photo below left = The old Clutch Cork Inserts removed and replaced with Bonded Linings by Saftek Ltd (a sensible upgrade)

Photos below & right: *Blinged-up* Timing Gear Steady Plate (M199/2), done whilst waiting for the return of my Flywheel & Cylinder Head. Internally, it's gonna 'Look' Gr8. I'm going to have the prettiest internal MAC engine around! Yes! I do realise NO ONE will see it



Once more, I need to Thank Rick, who managed to source a pair of MAS118 Cam Rockers / Followers, via a VOC acquaintance of his. This enabled me to purchase a pair of MAS118's. They did cost an 'Arm & a Leg' and are apparently "as Rare as Hens Teeth" or as my old Granny would say . . . "these Followers are as Rare as Rocking Horse S**t"! Okay! Granny would NEVER have said that, but these 'Followers' are 'Quite Rare'. Also; because there are NO MORE NEW ONES available . . . the condition is . . . Well! They are; "as they are, and as they come, and as you can find them". So, I just had to buy them whist I could!

I would also like to take this opportunity to thank Brian Coldicott (of the VOC), who runs / organises the West Midlands Area VOC Meetings, because he also spread his search for these elusive MAS118's to a contact he has in America (but to no avail), however "Many Thanks Brian", for taking the time to help me.



Photos below: A selection of different views of my polished MAS118 Cam Rockers. I know this is a bit OCD, but I've even got each 'Cam Follower' to weigh exactly the same. I have increased the probability of the Cam Followers getting 'MORE OIL' to the Bearing Surfaces & Follower-Shaft by increasing the size of the Lubrication Hole in each Follower and then 'Counter-Sunk' each oil hole (to provide a mini-funnel effect) to help guide vital lubrication to where it was originally intended to go.

Well, yet again . . . that's the Plan



Yes! I know . . . you are probably thinking . . . "What!" more internal (& never to be seen) Bling'. YEP!!! More Bling!!!

Following a series of articles on 'Oil Pumps' by Dai Gibbison (printed in the last three editions of the Velocette Owners Club (VOC) magazine (Fishtail No's 453, 454 & 455), I decided to dismantle & inspect the Oil Pump fitted to my MAC. First of all – 'Part One' (of said series of articles) helped me to identify the age of the Oil Pump Body, and then to identify each of the 'individual' component parts fitted to my oil pump. *"Dai, what brilliant information and excellent timing"*.

Just as I reached this stage of my build . . . "serendipity, karma, providence, fate, divine intervention", call it what you like, but definitely "excellent timing".

It became obvious from the excellent photographs and the accompanying Chart (listing all of the parts, part No's, measurements & statistics, plus 'What models these parts was originally intended for) that My MAC Oil Pump was a bit of a Mongrel, or rather a 'Hybrid'. There are parts in there from the 'K' series models as well as from 'M' series models (parts used from at least three different decades of Pumps). I know this because of cross-referencing Dai's Charts with my own Micrometer readings to confirm each individual oil pump part. The Loose Feed Gear should be 0.186" but was 0.249" (K82) with a Drive Spindle Dia. 0.374" and Body Height of 1.000" (K78), instead of 0.875" (M78/4). The Drive & Loose Return Gears = 0.436 (are the same as the K81 & K83 Gears).

The first two photos (below Left) identified the Body of the Pump was from an 'M' Series 1936 – 1941 model (M217). But on dismantling, and measuring all of the individual gears and drive spindle, etc. it became obvious the Pump was a 'Bitsa' (*i.e 'bits of this fitted & bits of that fitted'*). Plus, over the course of what appears to have been a 'Hard Life', the internals and external state of the Pump shows signs of brutal and clumsy handling and treatment of this VIP (very important part). The internal gears & spindle *are in relatively good condition*; although they need careful 'Lapping-in' of the bearing faces & then re-assemble.



As you can see from the bottom row of photographs (the first two photos Left), I have re-ground the Base-Plate on the internal bearing face. I used fine Grinding Paste (mixed with oil & paraffin) and very laboriously 'Hand-Ground' the Base-Plate on a Machined Steel Flat-Plate. The result is quite evident.



The next two photos (Right): Show the brutal hammer marks that some ham-fisted moron had inflicted on this poor little Pump fitting it into the Engine Crankcase.

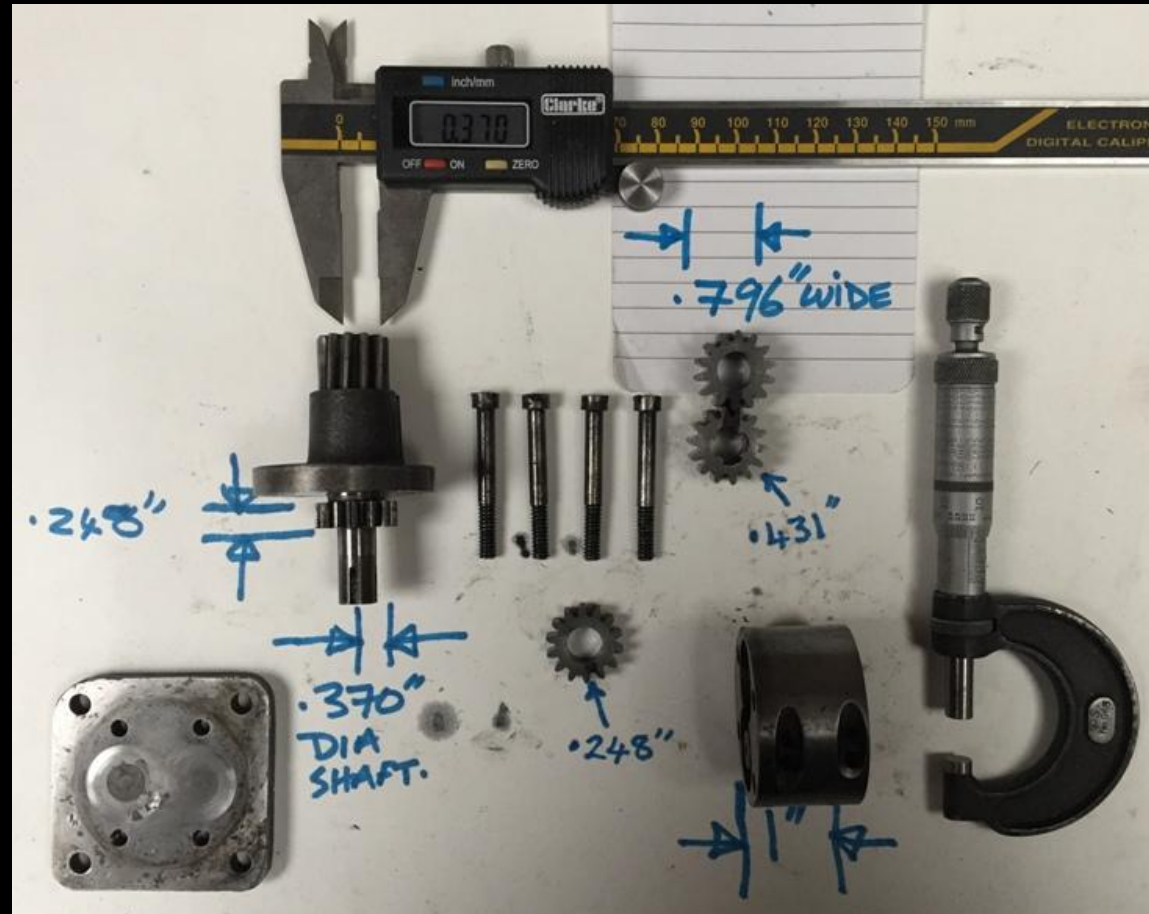
The condition of the external Base-Plate is more cosmetic and so 'Linishing' the dents & marks out was a lot easier and a less arduous job.



p.s. the last photo (above right) shows a half-done base-plate

Unfortunately, the 'Hammer-Marks' on the base of the Oil Pump are not the only signs of damage. It looks like some ham-fisted *Numptie* had tried several attempts to hammer-home the oil pump into the crankcase (Dhoe!!!), and in doing so, has caused quite a few unwelcome gouges & worrying marks. I will obviously have to sort this problem-out before the Pump goes back in, although I'm not exactly sure how I am going to overcome this 'Challenge' yet.

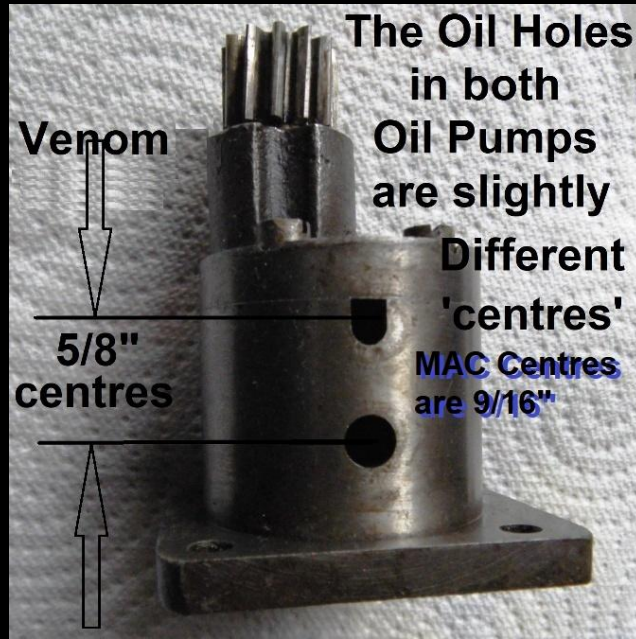
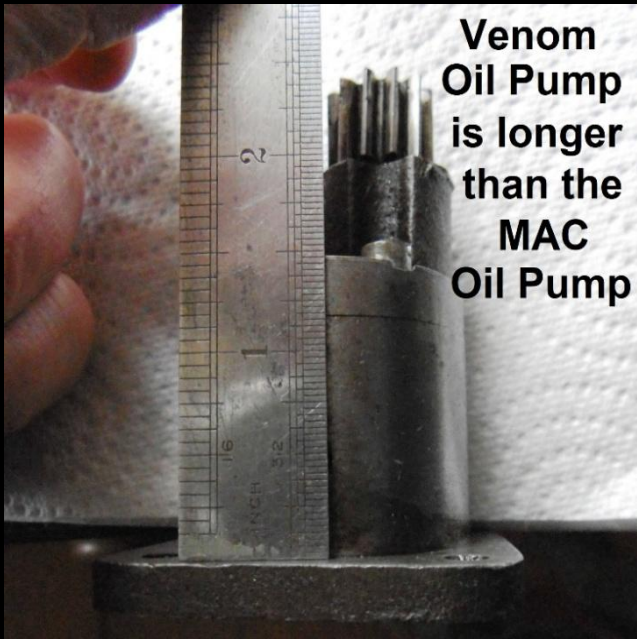
Extreme Cleanliness is paramount at this stage; to the successful assembly of this Pump and will pay dividends in the long term.



I've managed to 'Lap' everything together (MAC Pump-wise), wash the whole lot in Petrol, clean & dry it using compressed-air, and then reassemble the original MAC Pump and it's now probably as good as it will ever be. In fact, I would go so far as saying this reconditioned Hybrid of a Pump is 'Better' than the 1953 / 1954 Pump that should have / would have been fitted.

However, Rick has donated his old Venom oil pump to my engine rebuild project and I have decided to fit Rick's Pump instead of reinstalling my reconditioned oil pump. The Venom pump is a much better bet, with bigger gears, larger drive shaft & greater flow capacity and is the obvious choice (if & when available).

Oh! By the way: I've just read Len Moseley's Book "My Velocette Days" – an excellent 'Read' and I can highly recommend it. I found this gem printed at the back of the book – in one of the photos that expresses well what is needed when doing any work on these Velocettes. It was a simple inspirational Motto used at Veloce Ltd, in the form of a 'Sign' hanging up in their Workshop, and it reads = "For a good job look to detail". [How True !](#)



As stated above; my Velo Mentor & Friend Rick has provided me with this Venom Oil Pump, which is in great condition (see photos Left).

I decided to fit a Venom Oil Pump into my MAC Engine after talking to Stuart at Criterion Ltd who had already successfully fitted the Bigger Pump into his own MAC.

I've checked the Oil Ways/Oil passages on both Pumps (Venom & MAC) and whilst there are differences - the Oil Holes (in the Timing-side Crankcase where the Pump fits) more or less 'Line-up'.

Also because the Venom Oil Pump has a longer Body Length (than the MAC Pump) a packing plate / distance piece is needed to compensate for the different dimensions.

See the home-made packing plate I've made below on the next page.

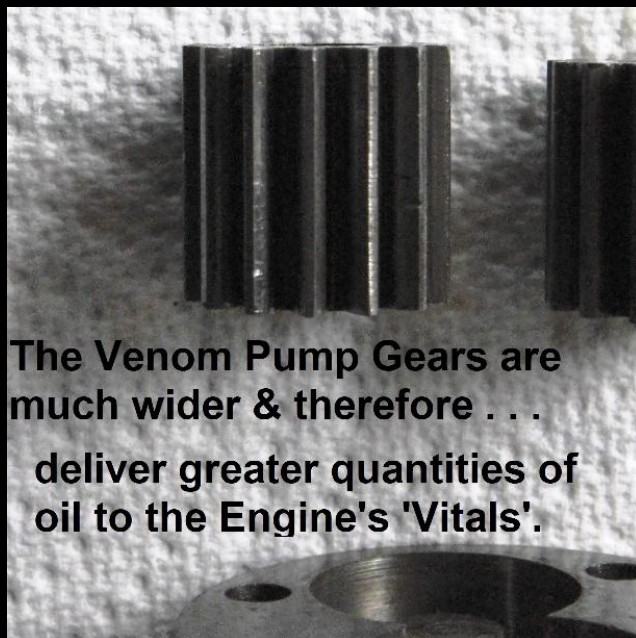
The work I did on the original MAC Oil Pump was not wasted because with the experience and skills gained reconditioning My MAC Pump, it gave me greater insight into the workings & construction of these 'Little mechanical Hearts' (as well as a great deal of respect for them too).

I decided to 'Fettle & Hone' Rick's Venom Pump.

It didn't need too much work doing to this Pump as Rick had already inspected the internal parts and had used a smooth oilstone to clean-up any marks on the Gears and a little 'Tip-Relief' & 'Easing'.

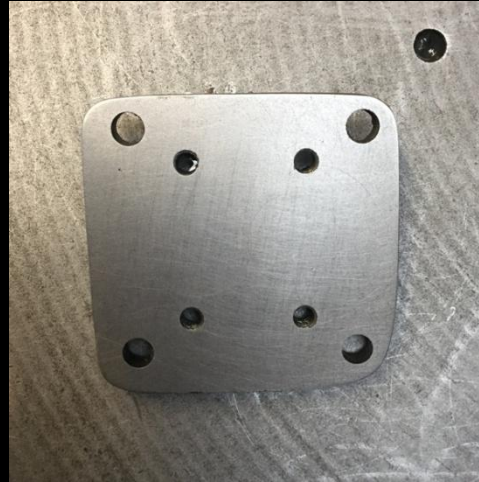
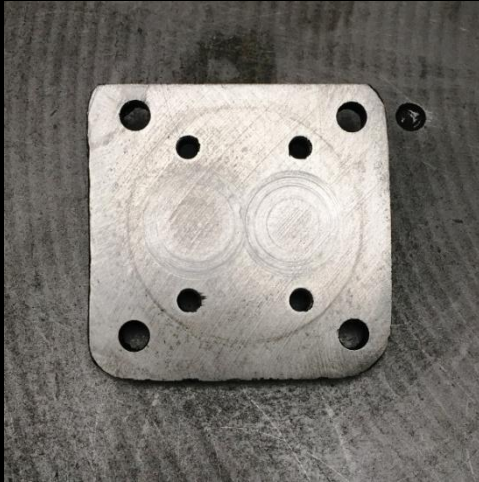
So all I had to do was to Lap the base-Plate 'Flat' (like I did on the previous Pump), and thoroughly clean the Pump carefully before reassembly.

Once more, just as I did with the MAC Pump, paying stringent attention to 'Cleanliness', washing in Petrol & finishing-off with compressed air.



You know the saying: "Cleanliness is next to . . ." etc.

First Photo below left = Venom Base-Plate, showing only slight marking (made by the Gears). Second photo below left = shows the base-plate after it had been 'ground-flat' on my Surface Plate (fine-grinding paste, oil & paraffin). I also used my own 'improvised Tool' for lining-up the Pump Body; instead of Veloce Tool X2719 (photo No.4 below right). Yes, it's a simple Jubilee Hose-Clip, but it appears to do the job of the more expensive version just as well.



I used a sheet of 6mm Duralumin plate (I've always known this as duraluminium) to make the 'Packing Piece' for the Venom Pump. I milled it (& then hand-ground it) to the desired thickness (see the first two photos below), ready to be re-shaped and drilled to fit over the Venom Pump Body. The difference in height between the two Pump Bodies is 5mm. I was also going to 'recess' this plate with a couple of chamfers on each 'Face' to accept 'O-Rings' to help seal this additional packing plate, but after some thought, I reckon a gasket between each plate (together with Hylomar sealant) should work just as good as the original.

There is a great article in November edition of Fishtail #456, written by Brian Agnew about Alfred Wilm, the Polish born metallurgist who invented *Duralumin*.



The photographs on the next page show the new 'packing plate' being completed; i.e. drilled, filed, sanded, sawn, and a final lapping, etc (for Venom Pump).
Another 'Job' . . . near completion.



Whilst waiting for the Flywheel / Big End & Cylinder Head to be returned from Criterion Engineering, I turned my attention to sorting out all of the smaller, mundane but essential cleaning-up jobs, starting with the Engine Cases and internal components.

The Timing Case (photo right) shows the gasket-joint-face of the inside cover that I ground flat. Once more, using fine grinding paste & oil mixture, I lapped the timing cover 'Flat' on a Steel Ground-Plate. Using a figure-of-eight motion for some considerable time, but the end result was well worth the effort.

**I've only just noticed 'It's' smiling!
Or, is it smirking at me?
Well, whatever . . . it looks happy at least.**

I intend to do the same procedure to the corresponding crankcase, so that both gasket 'Faces' are perfectly 'Flat' once more (just like it was when it left the Veloce Factory Sixty Four Years ago).

This process should ensure a completely oil tight joint between these two covers (fingers crossed!)



"For a good job look to detail".

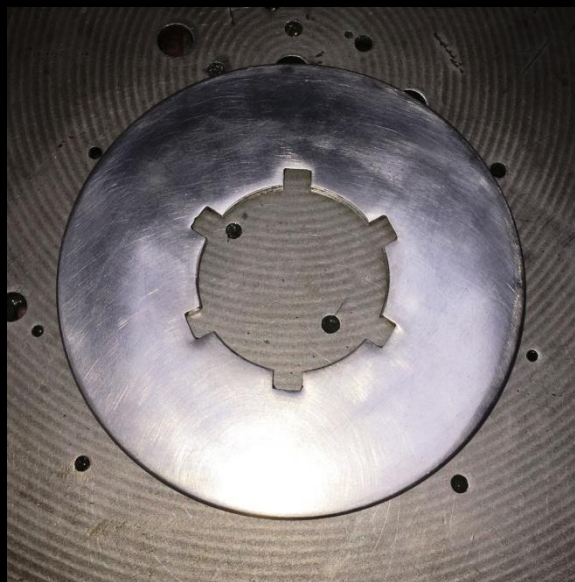


Listed above; all of the work done up to & including Thursday 6th December 2018

CLUTCH FRONT PLATE (Velo part No. KC2/25)

BEFORE PHOTO (below): showing deep-pitting and groove made by the Chaincase Felt Ring (Velo part No.F309) plus the usual corrosion.

DURING PHOTOS (below): showing 'KC2/25' half-done 'Lapping & Grinding' on Flat Steel Plate



AFTER PHOTOS (above): showing the finished 'Flat Surfaced' Clutch Front Plate ready for the New & very much improved Nitrile Seal (VSL part No. F309A).

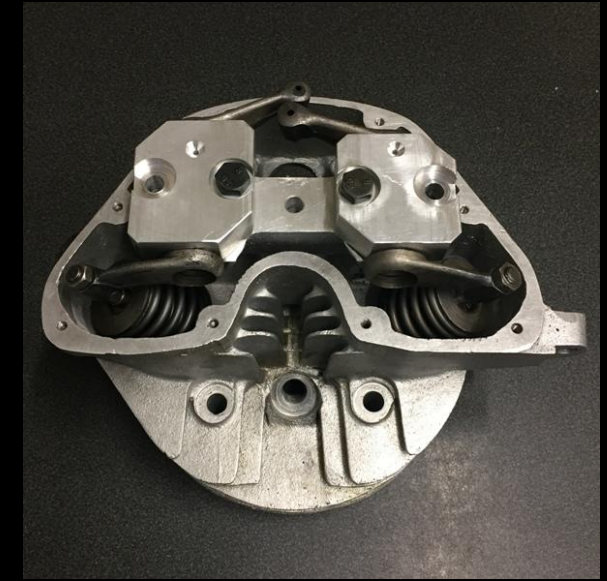


The first photo on Left, show the face of the Oil Pump Base (at the bottom of the crankcase) in poor condition due to abuse, with deep scratches, grooves & dents, and chisel marks.
The second photo on Left shows the Metal Scraper Tool that I used to 'Scrape & Level-out' the Pump Joint-Face.
The last photo on Left (bottom photo) shows the finished (Scraped) surface of the Oil Pump Base.



Photo below: shows the Timing-side Crankcase, after 'Lapping' the gasket-face (on my Steel Ground Flat Surface Plate), ready for the *re-faced* Timing Cover (that in true Blue Peter fashion I prepared earlier). The expectation from this rebuild is quite high; regarding the matter of 'Oil tightness'. I'm expecting it to be as oil tight as a 1950's Bike can be.

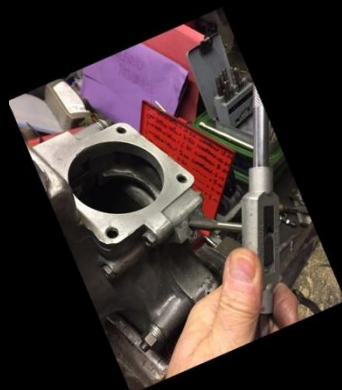
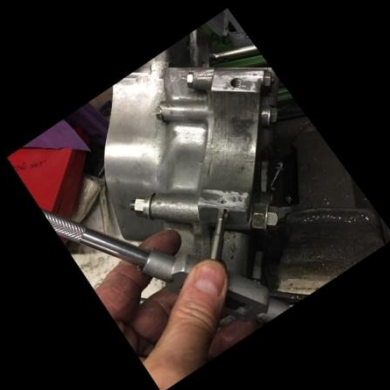




The reconditioned cylinder head & crankshaft (& a completely new & improved Rocker Pedestal) collected from Criterion Engineering on Friday 14th December. An excellent service provided by Stuart & Tony, that will provide me with hours and hours (and hours) of fun, games and enjoyment – reassembling this lot, back together again over the Christmas Hols. Yeah! Just a quick recap: the main new parts fitted being: new 'Plasma Nitrided' Valves, new Colsibro Valve Guides, new Valve Seats, Re-ground Rocker-shafts fitted to new pedestal. Plus new Alpha *Big-End* Bearings fitted into the original MAC Flywheels. Fab-Job-Well-Done.

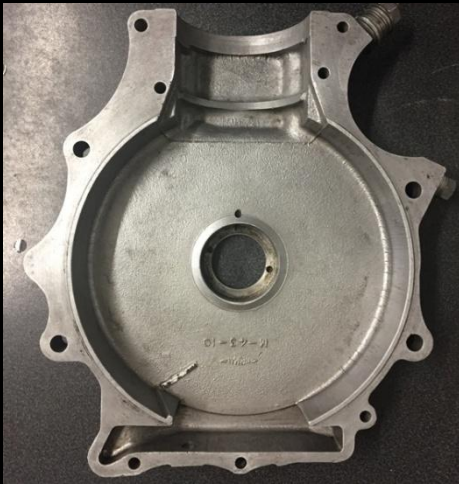


On Thursday 20th December, I managed to get back into the workshop and do a bit more to the MAC Crankcases. I 'chased' all of the threads & re-tapped the 'stripped threads', as well as cleaning-up the remaining clogged-up & dirty thread holes. As you can see in the photos below (some before & after images) showing the 'Milled - Faces' of some of the engine flanges (engine stud-bolt holes). This detail allows a little more room for a Ring Spanner to fit the relevant nut &/or bolt head.



Compressed-air was then used to blow-off all of the swarf & crud etc. before washing-off both crankcase 'Halves' in petrol (followed by more compressed-air).

The next stage was to 'Soak' the Crankcase 'Halves' in boiling hot water & Vanish Gold (30 Seconds Amazing Stain Removal – so the Adverts tell you). Well! I left them to soak for half-an-hour, and then (just for good measure) washed the whole lot again in Fairy Liquid and hot water. As you can see from the photos below; this process has certainly removed all of the 'Burnt-in Oil Stains and I'm pretty sure that they are now clean-enough and ready for the 'Rebuild'. . . Yeah!



The end photo (above right) shows the slightly larger (drilled-out) Oil-ways to match the Venom Pump Oil-ways. Well, that's the Plan.

The first three photos below; show the Intermediate Gear Spindle, before & after polishing.



The end photo (above far right): Shows the modified oil feed to the Camshaft Brass Bush, this modification allows 'pressurised-oil' to be 'directed' to the Camshaft Face, where it rests (& runs) against the inner crankcase 'Face'.

Christmas Eve 2018, the latest work carried-out . . .

The next job was to 'Set' the 'End-Float' on both Camshaft Pinion & Intermediate Gear Pinion. A SIMPLE JOB (one would think), but quite fiddly. The previous end-float on both of these pinions was in excess of 'Ten Thou" each pinion. The Velocette 'Good Book' states; 'End-Float' should be no more than 0.0015" (i.e. one & a half thousandth of an inch in 'old money').

Note the new Bellville Washer (first photo below left) next to the two Bottom Rockers – aka Cam Followers. This Bottom Rocker Thrust Washer (Veloce Part No. M216) rests next to the Crankcase and takes care of the end-float between the pair of Bottom Rockers (pivoted on the Bottom Rocker Spindle) and the Timing Gear Steady Plate.



This bit of the rebuild took me ages to do because after fitting the Gears & Timing Gear Steady Plate (Veloce Ltd Part No. M199/2) and checking the end float (with Feeler Gauges) the next stage was to remove the whole lot again and make the necessary adjustment (to each Pinion) before re-fitting the whole lot back together again and to re-measure and re-check the remaining end-float.

As you can imagine, this process involved numerous attempts to get said end-float to the required measurement. *i.e.* "Timing Steady Plate On, Measure and then plate off again, re-adjust. Plate back on again, re-measure, etc. etc. Job Done! 0.0015 end-float achieved (but with an embarrassing number of attempts).

Photo Left: The Camshaft Nut (that secures the Camshaft Spindle to the Timing Gear Steady Plate), being 'Milled-flat' so that when it is screwed-into-place, it is in line with the gasket face of the Timing Cover (as checked with the straight edge of a steel engineers Rule).

Like the Veloce Ltd inspirational Sign said; "For a good job look to detail".

Oil System Modifications:



The first photo (left) shows the Return Oil Way drilled-out from $\frac{1}{4}$ " diameter to 6.5mm (larger diameter than the original oil way by 0.059"). This modification (together with the 'mod' in the next two photos right) is intended to help get more oil from the bottom of the engine back to the Oil Tank – quicker.

The photos right: shows the detail of the modification mentioned above re; bottom oil pickup area.

As can be seen; material has been removed from the 'off-side-crankcase', so that 'drained engine oil' can be picked-up from both sides of the bottom of the crankcase (instead of just the near-side-crankcase).



I read an article about a similar modification being done to a race engine that helped with oil return, "So here goes . . .".



This Timing Cover Oil Hole was 'Restricted' due to 'thread swarf' partially blocking the oilway. Plus; the Timing Cover Oil Jet was also out of line adding to the restriction.



The photos left show the Timing Cover Oil Jet (Veloce Part No. M212) which feeds the Crankshaft Big End, as well as the corresponding Timing Cover 'drilling' where it fits.

I enlarged the oil hole in the Timing Cover by removing 'thread swarf' & have widened the groove because said 'Oil Groove' didn't line-up properly with the 'Oil Hole' in the Timing Cover.

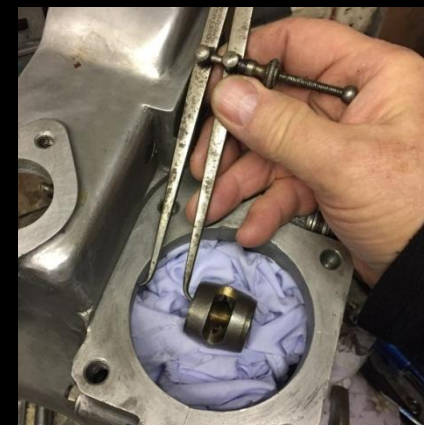
I'm surprised that any oil ever reached the vital engine components, as there was only a very small aperture exposed. I used a Depth Gauge (end photo left) to find the 'oil hole centres'.



No Wonder this engine 'Leaked'

These 'extra' holes (photo left) 'drilled' into the drive-side-crankcase (by previous owner) annoy me & surely cannot help engine oil-tightness.

The two photos right; show the gap being measured between the Con-Rod Small End and the Cylinder Barrel aperture. There is a difference of twenty-thousandth-of-an-inch". This means the crankshaft main bearings needs to be re-shimmed; i.e. 0.010" shim being moved from the near-side main bearing to the off-side main bearing housing (to centralise the Con-Rod in the 'Cylinder Bore'.



Well . . . as usual . . . that's the plan.

First two photos below: "Lumiweld" Alloy Rods successfully used to fill-in the holes in the crankcase.



I modified the *Timing Gear Steady Plate* (photo right), by elongating the large hole in the plate, in order to be able to get to the top & bottom adjusting bolts of the Intermediate Gear (to adjust the *Gear Backlash* without having to remove 'this plate').

You can see where metal has been *relieved* from the bottom of the Steady Plate. This modification provides enough space to allow a box spanner or socket spanner to be fitted onto all of the fixing bolts for adjustment.



The first photo (above left), shows the 'O' Ring fitted to the bottom of the Oil Pump, and my '*chamfered*' base plate (that fits chamfer-down, against the 'O' Ring). And, just behind the Oil Pump is the Valve Cutting Tool that I used to machine the chamfer. And just for good measure, I used Hylomar and a new gasket (between the distance plate & the crankcase) to ensure a good seal at the base of the pump (as well as utilising the 'O' Ring seal).

In the second photo (above) you can see the four threaded studs (each one just over two inches long) used as a guide – to help 'line-up' the Pump when inserting it into the heated crankcase. I'm glad to say ALL of the Oil Holes in the engine line-up with each Oil Port in the Oil pump. RESULT!

Once fitted, the next job was to squirt oil into the pump and rotate the pump to check oil flow. I can report that everything (Oil Pump-wise) works perfectly well - as expected I may add - and ALL is totally 'A'-Okay in that department. I am really pleased with the rebuild so far and cannot wait to start putting the whole lot back together again. Whilst the Crankcase was still warm – I re-heated it & re-installed the Mains Roller Bearing with appropriate SHIMS. This was followed by re-Shimming the other Crankcase Main Roller Bearing (again, after re-heating the other Crankcase 'Half').



Photo above left & photo to the right:
I decided to replace the hex-head bolts (that I fitted the other day) with new Cap-Head Bolts (3/16" Whitworth threads).

(I know, there was no real need to 'Lock-Wire' the Cap Head Screws, BUT . . . I really can't help myself - I've got these great Lock-Wire Pliers and I just love playing with them !!!).

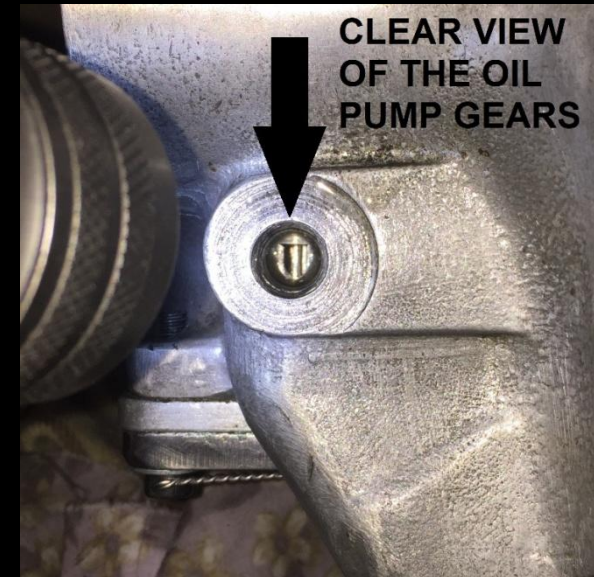
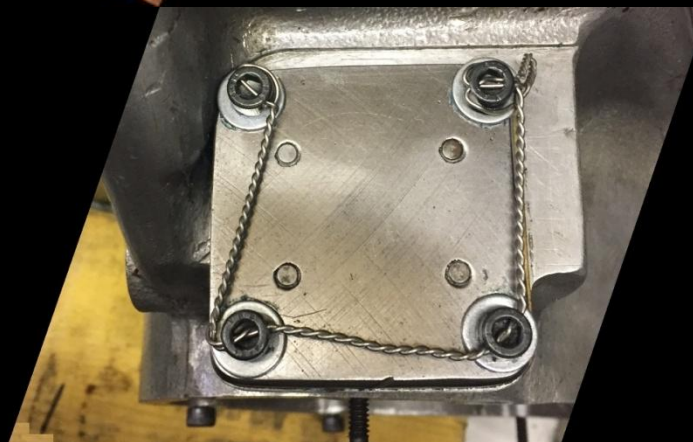


Photo above right:

This photo shows clearly the Oil Pump Feed Gear seen through the Oil Inlet (i.e. The Oil Feed Pipe that goes from the Oil Tank to the Engine).

And also . . . on the other side of the Pump Housing, the Oil Return Gear is clearly visible too.

This confirms to me that I did the right thing; drilling-out the oil-ways, ensuring that the Venom Pump 'Oil Ports' line-up properly in the MAC cases.



The Cylinder Head & Exhaust Flange was drilled, threaded & secured by this Counter-sunk Allen Pin (photo left).

The next photo (nearest right) shows the *Allen Pin* protruding into the inner-part of the Exhaust Flange (admittedly, not by very much), but nevertheless I felt the need to remove this miniscule thread to get rid of a potential '*Hot Spot*'.

(Photo far right) shows the culprit ground-level, which will undoubtedly have no measurable or significant improvement on exhaust gas-flow whatsoever.



The next job for today was to check-out the Rocker Pedestal modification (both photographs on the left). I used 'white Plastercine' placed onto the top of the new Criterion Rocker Pedestal and bolted-down the Rocker Cover.

I did this to check-out how much room there was between the inside of the 'Cover' and the top of the new Rocker Pedestal. This also provided me with an opportunity to see how close the original 'Oil Hole Jets' corresponded with the new 'Oil Feed Drillings' in the Criterion Pedestal.

The result was extremely impressive; I measured the compressed Plastercine imprint (checked with callipers & Micrometer) and discovered that the gap between the 'Jet & Feed Oil-ways' was a mere '*five / thirty-two of an inch (5/32)*'. But, more importantly, when I removed the Plastercine, I pushed a Needle through the impression where the oil jet was and on the other side of the 'imprint' the 'Needle' was absolutely '*Dead-Centre In-Line*' with the new Pedestal Rocker Oil Feed Drilling. *Very Reassuring RESULT !*

I had planned to make & install a new Direct Pressure Oil Feed system to the overhead Rockers (rather than sticking with the original Velocette 'Oil Spray' system). However, I am quite impressed with this new Criterion Rocker Pedestal, and I am convinced now that this new system will easily provide better Oil-Feed to the Rockers than ever before. This new Criterion system (although still relying on oil being delivered by the original 'Oil-Jets & Oil-Spray') is; by far more accurately lined-up than the original Velo 'Set-Up' and a 'Tad' closer too. PLUS: my MAC is now fitted with a FAR Superior 'VENOM OIL PUMP', which will undoubtedly provide far more Oil-Feed to the 'Rockers' that ever-before, "Thanks" to Rick (for the Venom Oil Pump) and Stuart (for the idea in the first place).

So, I may not now proceed with my *Direct Pressure Oil Feed to the Rockers*, as I firmly believe the previous 'Rocker Oil-Feed-Problem' is NO LONGER a worrying issue for me. Also; I took the opportunity to use Loctite Bearing 'Lock' on the Main Bearings – especially on the timing-side Crankshaft which was well worn & the inner-bearing-race was a loose-slide-fit on the shaft (instead of being an '*Interference Fit*' as was originally designed). I left the Loctite 24 Hrs to cure.



Photos Left: Con Rod 'Dead Centre'.

After re-assembling the engine 'Crankcase Halves' yet again (following re-shimming of the Main Roller Bearings for the final time), I then 'Bolted' said cases together and checked the position of the Connecting Rod in relation to the Cylinder Barrel Bore once more.

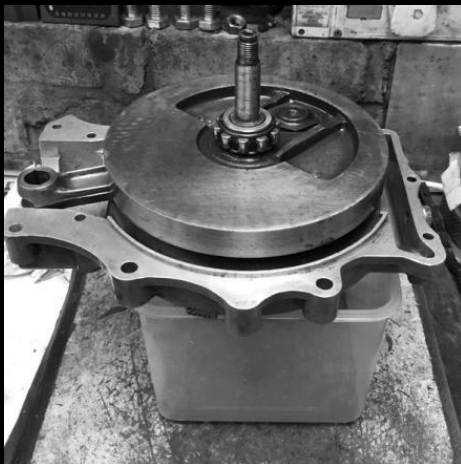
I'm glad to report that the Con Rod is NOW Absolutely 'Dead Centre'. Obviously, this is no accident or act of good-luck, but as a result of careful measuring and OCD-like attention to detail. This is exactly what one would (and should) expect from a quality engine build.

"For a good job look to detail".

These two photos are 'Stills' taken from the same Video (of the rebuild) which show the *Inside-Spring-Calliper* being used to check the distance between both sides of the *Small-End Faces* and the *'Crankcase Aperture'*. This measurement was Identical on both sides. RESULT!

The two photographs (Bottom Left) show the Crankcase Halves (after a thorough cleaning) being '*painted*' with blue Hylomar Sealing Compound. In my experience the secret to successful application of this sealing paste is to apply it very carefully with a paint brush, sparingly, evenly and quite '*thin*'.

'Think' more in the style of the Dutch painter Vermeer, or the Italian artist Canaletto and DEFINITELY NOT '*Splashed-On*' in the style of the American Jackson Pollock or Russian-born Kandinsky. Because, it will invariably be '*Squeezed-out*' both on the outside of the engine, but more importantly . . . will be '*Squeezed-out*' on the inside of the engine '*Faces*' as well, leaving you with UNWANTED GOO that is (A) difficult to clean-off. And; (B) has the potential of '*Clogging*' vital oil-ways.



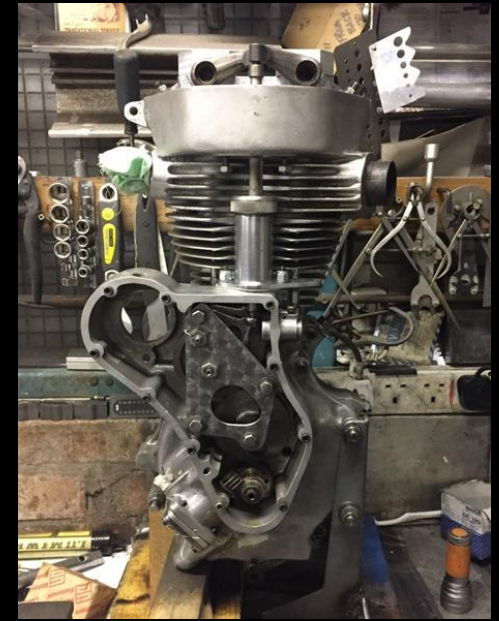
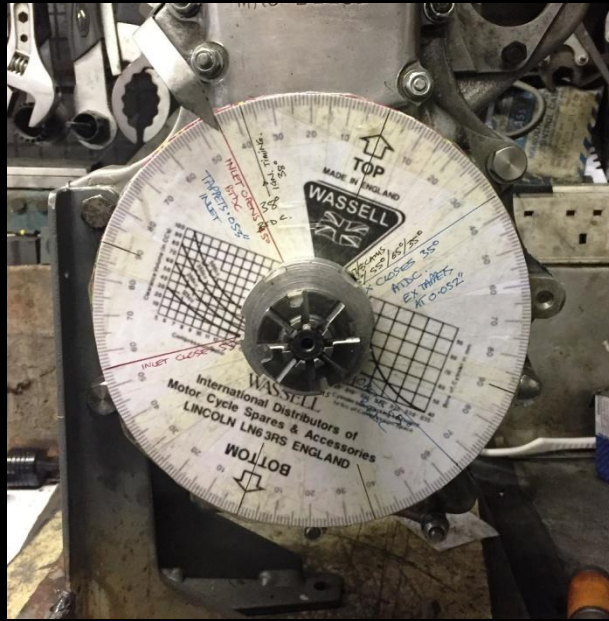
To ensure surplus Hylomar (that is inevitably squeezed-out on the inside of the crankcase) is thoroughly cleaned away I used a piece of bent wire - wrapped-in a clean cloth to wipe it away. It's a fiddly-job but essential.

I used soft white Tee-shirt material to remove the unwanted Hylomar from the inside of the Crankcases.

I also shaped a piece of bronze welding wire, to form a '*Scraper*' to get into the awkward spots right at the bottom of the Sump to remove sealant.

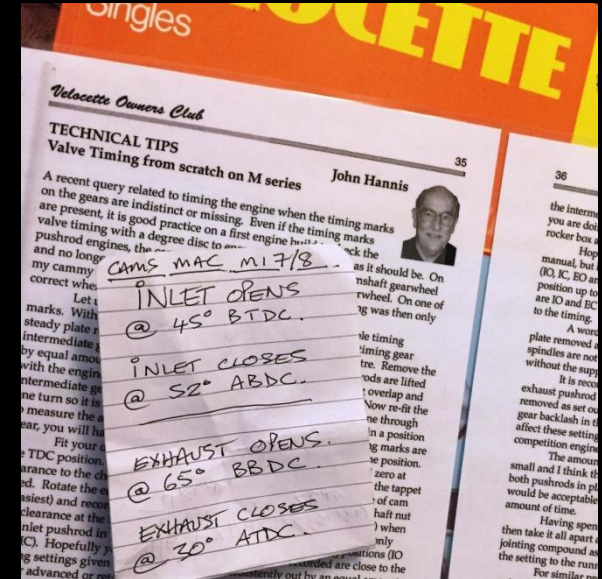


The RESULT is a THOROUGHLY CLEAN and Gasket Seal FREE engine (internally):

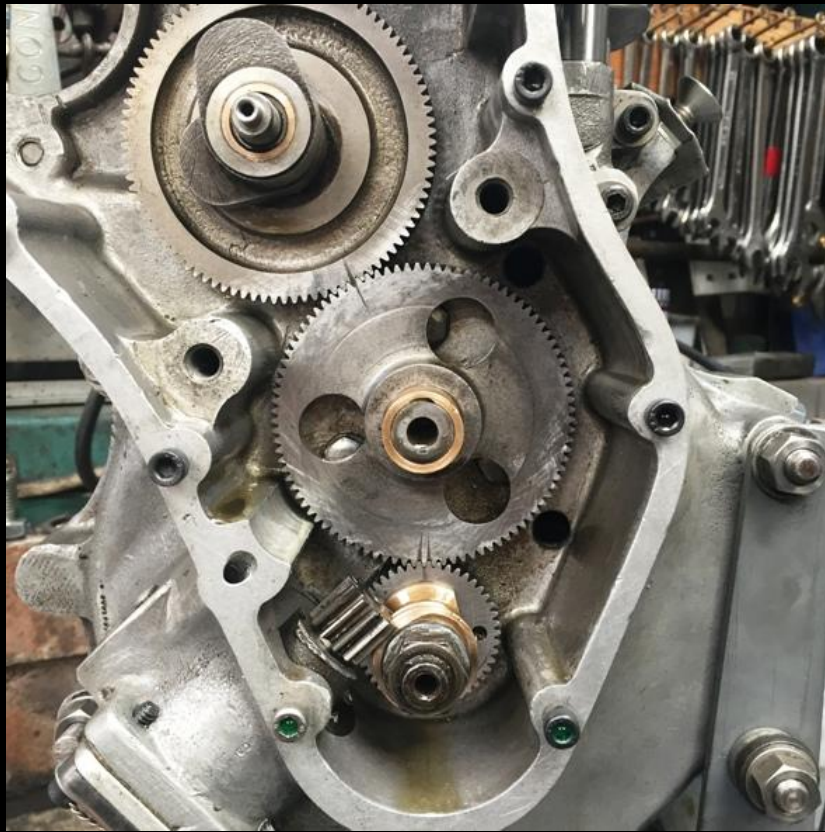


The three photos above show the next stage of the 'build'. 'Cylinder Holding Down Studs' (Velo part No. M249) re-tapped with an additional bit of thread (to take into account some of the work already completed). And with 'Timing Disc' attached & armed with VOC Articles & Mentor Advice (thanks to Rick & his information sheets) Timing begins.

Photo top right: Only one Pushrod fitted at a time and the Valve Timing is then SET individually. One side-at-a-time. Photo left (& below); show these M249 studs being polished back to a presentable level. Good Results.

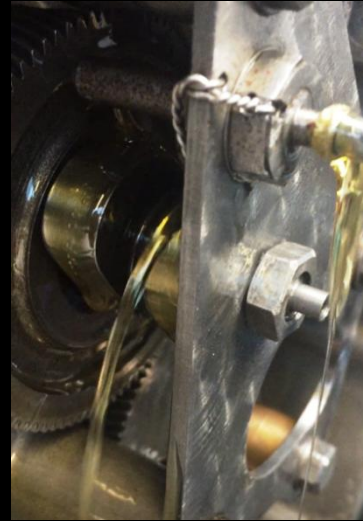


I am grateful for the expertise provided by the excellent Velocette Owners Club via their Members magazine, their web site & support team. Photo above; shows the John Hannis Technical Tips article that helped me 'Set' the Valve Timing. Timing-Marks were NOT present on two of the three Pinions, but even so, I managed to get both Inlet & Exhaust 'Opening Times' absolutely SPOT-ON. Although the Inlet closing was 3 degrees out & the Exhaust closing was 5 degrees out. I'm not too worried about this because in John's article, he says that "differences of 2 to 3 degrees are quite common with one position up to 5 degrees out not unusual". So! It's 'Coming-Along', slowly but surely. Although at times, it does feel like one step forwards & two steps backwards!



1st Photo (Left) shows the 'New' Valve Timing Marks – 'Set' - with the aid of a Timing Disc attached to the near-side Crankshaft (as above page) and a Dial Test Indicator for Valve movement. Tappets 'set' at the prescribed 0.053" Inlet & 0.052" Exhaust in order to take into account the effect of the 'Quieting Ramps' on Bottom Rockers / Cam Followers. RESULT!

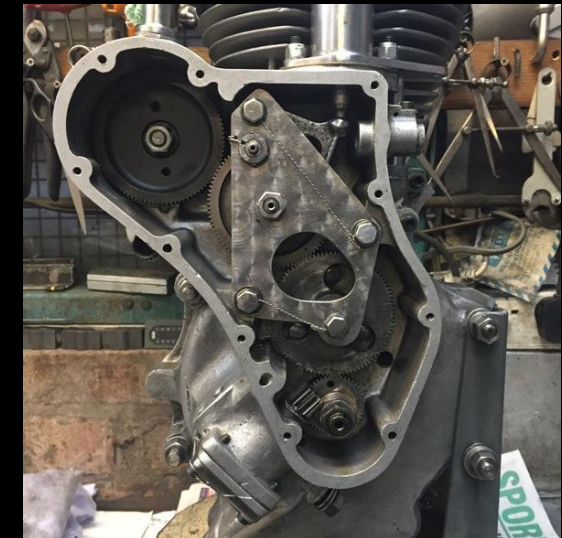
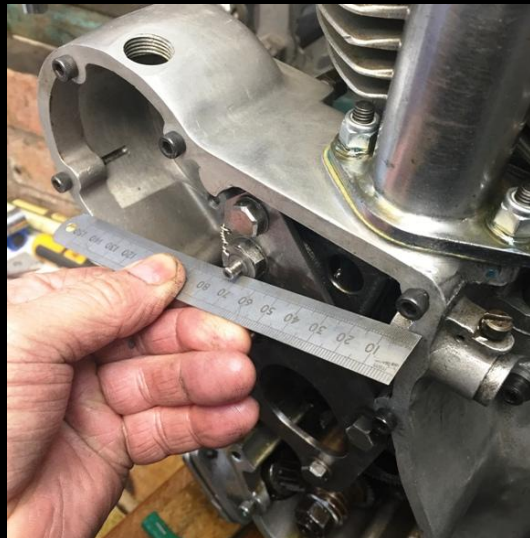
The Good Book says the M17/8 Cam Timing is listed as; Inlet opens 45° BTDC & closes 55° ABDC. The Exhaust opens 65° BBDC & closes 35° ATDC. As stated above, I managed to get the Opening of both Inlet & Exhaust to these tolerances / settings (SPOT ON) but the closing was out by the amount listed on the above page (But, I'm still happy with these results).



The middle photo and end photo above; shows the Oil Quill that lubricates the Cam 'Lobes', being 'Tested' with an oil can, and the Cam wheel spindle nut (Velo part No. M244), that I 'Milled Flat', being checked across the timing cover sealing face with a steel Rule.

The photo right; show the Cam steady plate oil jet nut (also Velo part No. M244, again *milled flat* being checked). This Mod should help reduce the oil loss from both 'Quill' oil jets by reducing the gap between Timing Cover & the head of these M244 Nuts (where oil usually escapes passed ill-fitting nuts and timing cover).

The end photo right; shows a better view of my modified *Timing gear steady plate*. This mod allows improved access to the three Intermediate gear spindle bolts (that are used to set the 'Backlash' between all three Pinions).

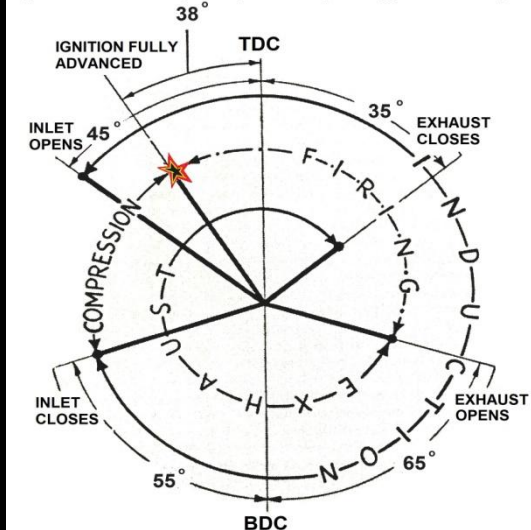


Each 'Small' modification eventually 'Adds-Up' to make a Big difference overall, which should be evident upon completion.



The photos above: *showing-off* my new dial indicator gauge. This Japanese-made Mitutoyo dial indicator calibrated to 'Imperial Measurement' as I prefer to work in *Imperial - thous" & inches, etc.* instead of this new fangled metric system that they brought out in the 1970's. Yes! I know . . . it's an age thing!

SUCK, SQUEEZE, BANG & BLOW
(a.k.a. Induction, Compression, Firing & Exhaust).



Velocette M17/8 Cam Valve Timing & Ignition Timing
TDC = Top Dead Centre. BDC = Bottom Dead Centre

Anyway, I had to buy this new dial gauge because I clumsily dropped my old Mercer, which I've owned & used for the past 50 years. BUMMER ! I was gutted. However, armed with this new & very accurate instrument I am once more back in business so to speak (in the measuring department that is).

AND . . . Just to make sure everything is 'as it should be', I re-checked the Valve timing yet again today – just to make sure! That's the OCD in me again. I was always taught to check & check again. That's just one of the many reasons why it takes me so long to do anything :-). That, and indecision . . .

You know what Carpenters & Builders say: Measure twice & cut once. Or, is it Taylors? Anyway, it pays dividends to re-measure. If only for My peace of mind!

Did I mention the Valve Timing is SPOT-ON. The Velocette Owners Workshop Manual lists the MAC Compression ratio as 6.75:1. My curiosity got the better of me and so I felt compelled to check the compression ratio as soon as the engine was 'Out'. I filled the combustion chamber with engine oil from a metered syringe (with both valves closed) and then recorded the result which was exactly 60cc of Oil. The Bore & Piston is +0.040" oversize (i.e. 68.96 mm dia.) and so I did the Math (as the Americans say) & using the formulae $A = \pi r^2 \times \text{height}$ (96 mm Stoke) = 358.55cc [358.55cc + 60cc = 418.55cc total; divided by 60 = 6.975:1].

Now that I've had all of the work done to the engine, and especially to the cylinder head (& also did I mention that I had 'Lapped' the Cylinder Head & Barrel together?); So, I repeated the above process & measured the 'metered oil' again and found the new figure to be 52cc. Using the same formula as before I have calculated the new Compression Ratio to be 7.895 t:o 1. (Nominally 7.9:1). Now obviously, that's NOT a large increase in compression ratio but I'm of the opinion that – "every little helps" (*Well! That's what I keep telling myself.*)

1st Photo Right: Caution: to all of you Velo 'M' Series Engine Builders . . . I discovered the bottom-left thread (arrowed) only has a small amount of space between the gasket Face & the Oil Pump body ('half-an-Inch' long maximum thread length). Therefore, if you use a longer screw – it will make contact the Pump body and either (a) damage the pump &/or thread. Or, (b) will not be able to seal the Timing Case at this particular fixing-point due to the screw bottoming-out.

The next photo (right) shows the Timing Cover; in place (no gasket fitted yet) and is just to keep unwelcome dust & dirt out of my clean engine.

The photos below: (1) New Valves, Guides & Seats fitted. (2) White 'Plastercine' on top of the Piston, used to check Valve to Piston Clearance (because of fitting the New M17/8 Cams & Valves, etc). Better to be safe, than sorry! (3) Yet another picture showing the Head & Barrel 'OFF' again. I've lost count now of how many times 'these' have been 'On' & 'Off' again (ad nauseam). The final Valve to Piston 'Clearance' was measured at 0.142". Great Result, as all I needed was about 0.040" clearance.



**CAUTION: LIMITED SCREW LENGTH
1/2" maximum due to Oil Pump Body**



(1)



(2)



(3)



After some thought on the matter; I eventually decided to modify the Criterion Rocker Pedestal by reducing the 5/32" gap between the existing 'Rocker Cover Oil Jet Feed Drillings' and the top of the new Pedestal 'Rocker Shaft Oil Feed Holes'. The idea being to 'Bridge this Gap' and get the Oil Jets to fit as close as possible over these 'Lubrication Holes'. To this effect I drilled&tapped each cap 1/8" BSP to accept two brass countersunk fittings (photos below).

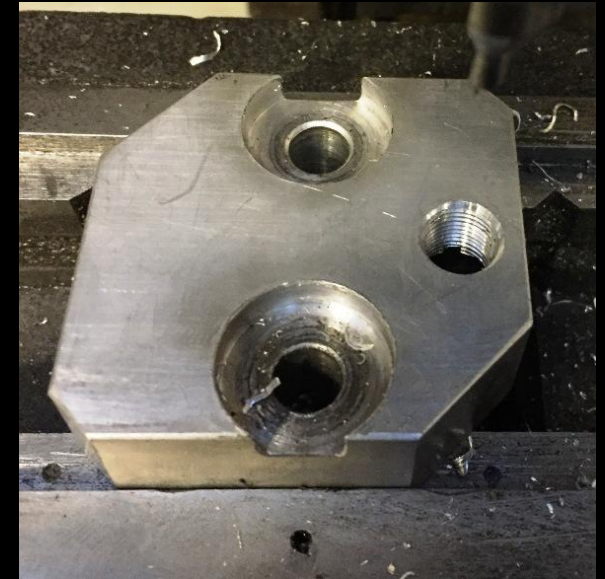


Photo right: shows the modified Rocker Pedestal bolted in-place onto the Head, ready to check the Rocker Cover 'Oil Feed Alignment' using Engineers Blue Marking paste.

As can BE seen; I have also removed the 'sharp corners' off each of the bearing tops and reshaped 'same' with a polished radius finish.

The 'Internal Looks' have improved (yet again) even though no one else will see any of these modifications once the engine is rebuilt & back in the Frame.

However, more importantly these improvised brass 'Oil Jet Tubes' should provide a more direct oil feed with greater pressure to the newly ground Rocker Shafts (more than the original Velo set-up).

I'm sure that ALL of these little *mods'n'jobs* will be worth the effort in the long-run (fingers crossed).



COME-ON ! You've got to admit . . . it does look 'pretty' now it's been modified and polished.

Photo below: shows the results of ('quite-a-lot-of-time-spent') 'Lapping' the Cylinder Head & Cylinder Barrel together. I've 'Lapped' these two components together several times now to get the required fine finish & super flat-surface (in order to be able to assemble my engine without fitting the usual Copper Head Gasket). And so, to ensure there is a gas-tight seal at this point, the 'Mating-Surfaces' need to be as near perfect as I can get them. I'm pleased with the result . . . but only time will tell if this was a worthwhile modification.

The three photos to the right: show the spark plug hole being re-threaded and 'Helicoiled'. This action was needed because of the amount of wear & tear found in this sixty-four year old engine (the original spark plug thread was in very poor condition). BUT . . . not any more, No More Loose, Wobbly Spark Plug.





First photo above shows: Setting the piston ring to an equal depth using an adjustable 'depth gauge', before checking the Piston Ring 'Gap' with feeler gauges (2nd photo above). The 3rd photo above shows the Valves being taken out for a light 'Lapping'. Even though the Head came back to me 'Assembled & ready to fit' I decided to make sure that everything was *as it should be*, just for my own peace-of-mind.

The 4th photo Top Right, shows my method of fitting Piston Rings onto a Piston (& into the piston grooves without scrapping the sides of the piston) by using individual feeler gauge 'Feeler Blades' placed equally around the Piston, and then carefully lowering each *Ring* over said Piston. Also, even though it's relatively easy to squeeze the Piston Rings into the Cylinder by hand, I still prefer to use a Piston Ring Clamp (bottom photo far right). A useful tip; '*Oil*' the inside face of the Clamp & the Rings slide into place a lot easier.

3rd photo below: Hylomar Sealing paste being used on the Cylinder Base gasket.





Zero Degrees in my Garage most mornings; hence the Big Winter Coat & Woolley Hat. BBbbbbrrrrrr! But, it's getting there, slowly but surely. The three photos down the right column show my home-made Gasket. The Gasket Paper was supplied by Velo Spares Ltd.



First photo below: Home-made Cranking Tool & home-made Bench-Mounted Engine Stand.

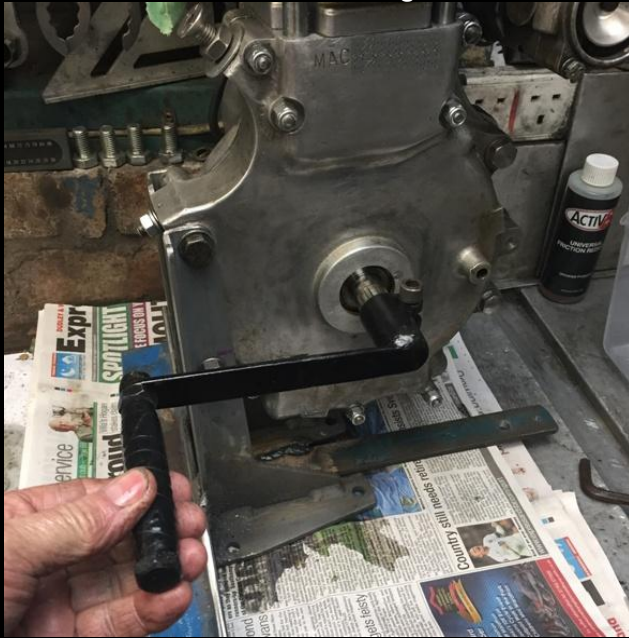


Photo left: Ignition Timing set at 38 degrees before top dead centre (38° BTDC) Fully Advanced. And the MAC Engine is now **READY-TO-GO** back into the Frame (Well! It would be if the Gear Box wasn't in need of a Strip-down for 'Inspection').

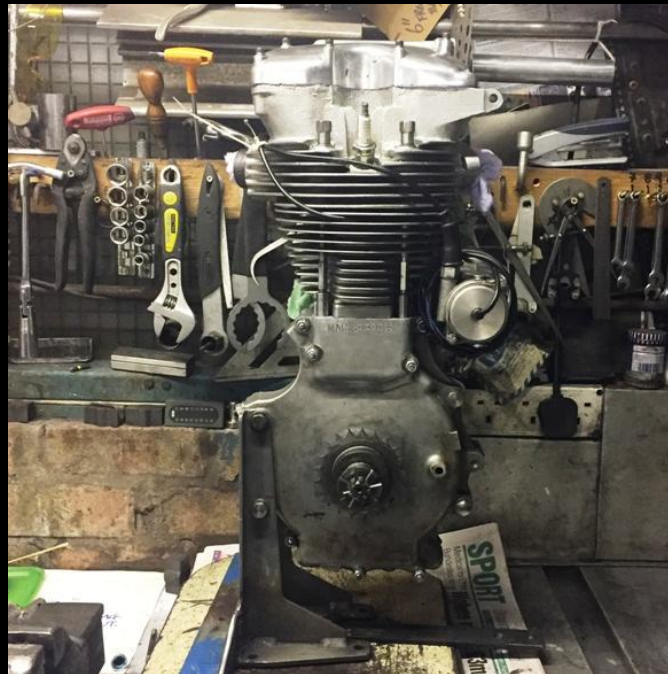
It has been suggested (by several VOC members) that I should try 32° to 36° BTDC advance (rather than 38 °). NOT TRIED YET.

The next two photos below; show the fully assembled Reconditioned MAC Engine.

All of this extensive & extremely expensive and time-consuming engine work has now been completed (I'm pleased to say).

I expect to start work on the Primary Drive and Clutch sometime next week (fingers crossed).

"It's Getting There . . ." as they say!



A better photo of my bench mounted Engine Stand



Parts below collected 20th February 2019:

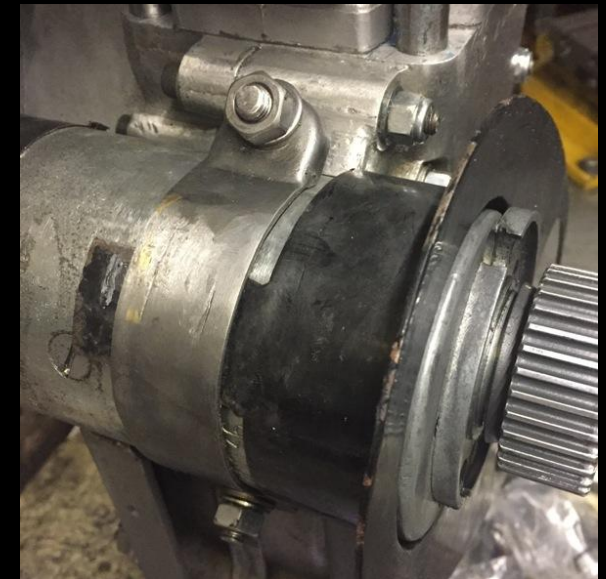


I collected the two parts (shown on the left) on Wednesday 20th February 2019 from my mate Rick who had kindly 'Turned' both of these items on his Lathe for me.

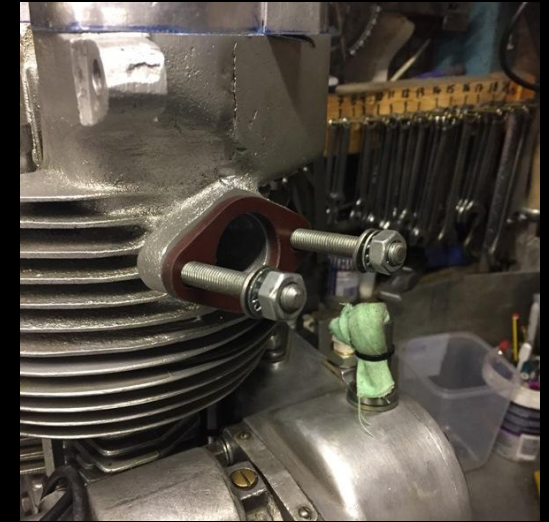
The top piece (left) shows a half-inch diameter *Blanking Plug* turned from aluminium bar, made to replace my very primitive Allen Bolt version that I fitted last year. This blanking plug fills the hole where the original Velo Exhaust Valve Lifter used to live. As you can guess, I have never had to use the *Valve Lifter* to start my 350 MAC. [Venoms & Thruxtons are a different matter!!!](#)

Photo left; the item immediately below the blanking plug is a 10mm threaded 'Stud' – this was reduced at one end and threaded to accept a 5/16" BSF Nut. The original 5/16" *Stud* that secured the top Dynamo Strap had been stripped and 'bodged' previously, so it was necessary to drill-out the old thread and re-tap to a larger diameter (obviously using a *course* thread in the aluminium casing).

The three photos below; show said dynamo fixing Stud fitted into the new thread.



(Two photos below) *Blanking Plug* (with two 'O' Rings) fitted to the Exhaust Valve Lifter Housing.



(Photo above right) Extra-long Carburettor fitting Studs needed for the new 1" long Inlet manifold Carburettor Spacer (Distance piece).

Just a few photos of MAC & Me during 2018 (taken by Debz' Helmet-mounted GoPro). Obviously taken before the engine came out for major heart surgery.

MAC & Me at the Quatford Café.



Photo two: MAC & Me at Carding Mill Valley.



Photo three: MAC & Me on way home



It shouldn't be too long before I get my reconditioned MAC 'Back Together Again' and Back-on-the-Road.

I can't wait to ride it again (soon I hope!)



22nd & 23rd February: The following photographs on this page show the Carburetter that I will be fitting to my MAC. The original one that was fitted was a 15/16" Amal Monobloc model.

The one illustrated (on the left & below) is an Amal 389/14 Monobloc (an Inch & one-eighth" Inlet Diameter) which was kindly donated to my project from my very good friend & Velo Mentor Rick.

Each photograph on the 'Left-hand-side' shows the *BEFORE PHOTO* (i.e. taken before cleaning-up & polishing said Carburetter). And; each corresponding photo to the '*Right of the Before photos*' shows the *AFTER PHOTOS* (post-clean'n'polish). All of which took quite a lot of dedicated '*Elbow-grease*' . . . to get it to this state.

but is well worth the effort (don't you agree?)

The final three photos below show the fully assembled reconditioned Amal 389/14 Carburetter ready for refitting to my MAC engine. The following 'Jets' are presently fitted; 260 Main Jet. 106 Needle Jet. 30 Pilot Jet. It looks like it has a 'C' Needle fitted, but is difficult to see exactly due to wear on the top of the Needle. I need to buy a new Needle anyway – just to make sure.

I will obviously have to use '*These*' as a starting point and adjust as necessary. However, I am open to advice from anyone who has already done similar work to their MAC and who through their experiences can suggest a suitable 'Carb Set-Up' for this configuration. This '389' is now looking as good as NEW!

Just like the motivational Veloce Ltd Works Sign said; "For a good job look to detail".





The final two photos (left) are of my 'Ready to Go! Blinged-Up' reconditioned Amal 389 (inch & eighth) Monobloc Carburetter.

It's now been treated to a new 'Float Chamber Extension Tube' and Full-Flow Air Filter, and is now just waiting to be put back into service.

The other photos (below) on this page show my home-made engine oil breather control unit. The idea being that scavenged oil (from the timing case / crankcase engine breather pipe) is directed to this little aluminium breather collector, where the oil & oil mist is separated and the remaining 'condensed oil droplets' are then returned back to the Oil Tank.

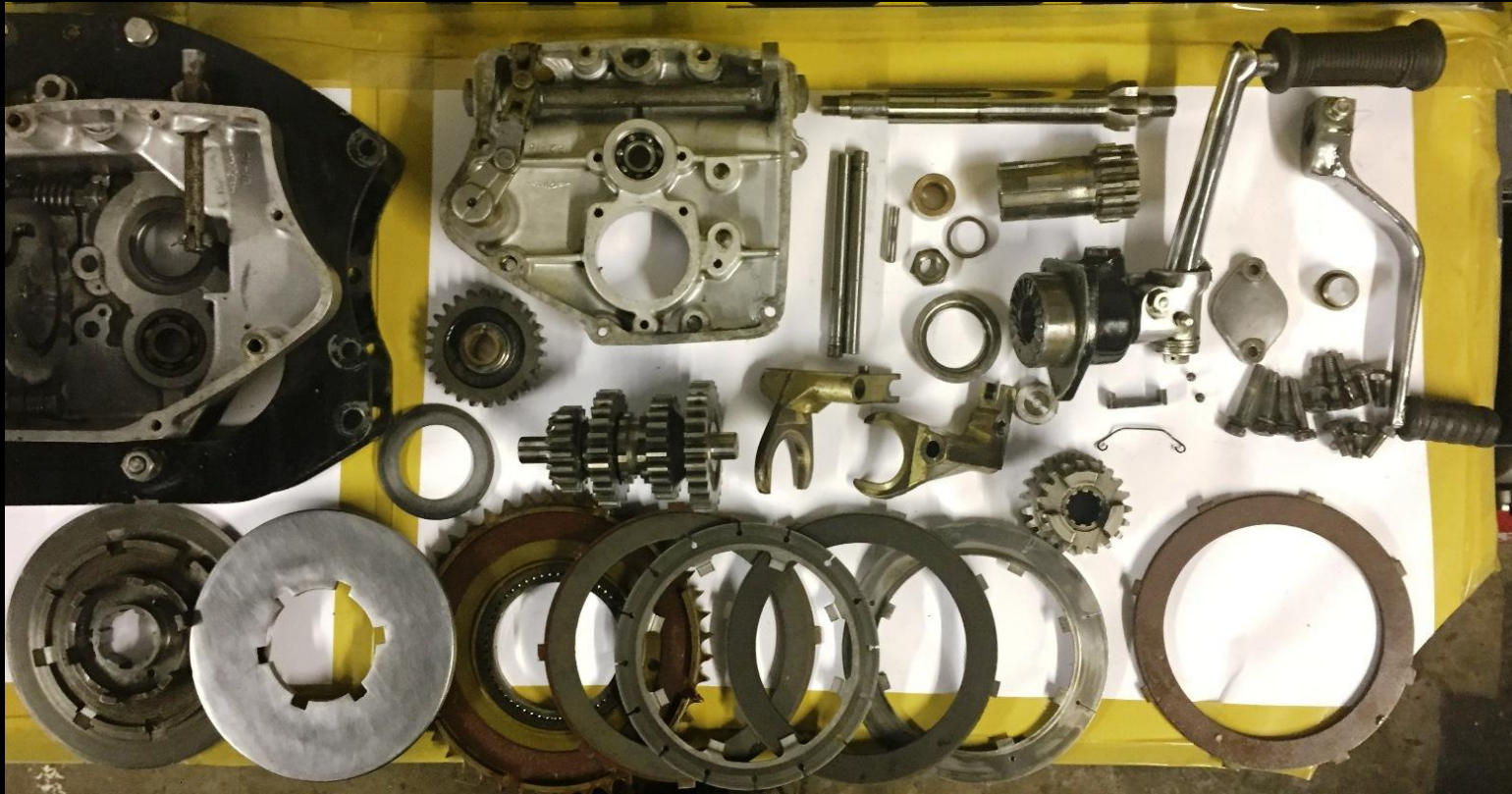
The 'Separated Air' in the collector box is vented to 'Atmosphere'.

Well! That's the Plan.

My aluminium Oil Separator unit was soldered-together using Lumiweld.



March 2019: Gearbox *dismantled* ready for inspection (with the help, guidance & expert eye of Mr Rick Essex). What did We find? Well, we discovered that '*ALL of the Internals*' ARE in really good condition. I was pleasantly surprised and positively reassured when I looked at the gear-clusters, gear-change selector-forks & change-mechanism (and bearings, etc.) as it appears that quite a lot of these internals had been replaced prior to me purchasing this MAC. To say "*I am pleased with the result*" is somewhat-of-an-understatement (after all of the *trials'n'tribulations* & extensive work already done on the engine and rest of the bike).



I managed to find some *New-Old-Stock* Bearings in one of my *Boxes of Bits* that match the outer cover bearing, making this gearbox quite an inexpensive repair.



Photo Left: The Gearbox casing being 'Ground-Flat' by hand on all Joint-Faces using a Steel Ground Plate (& fine grinding paste, mixed with oil & petrol).

Now that all Gasket Joint-Faces have been 'Lapped-Flat', it is almost ready for rebuilding (soon). The Gearbox has now been thoroughly cleaned inside & out to a really good standard.

Each individual component has been removed and polished-back to a presentable state, and all of the previous Gasket Goo removed (and all joints made-good). Each of the 'Threads' in the Gearbox have also been re-threaded (&/or cleaned-out) see photo below left.

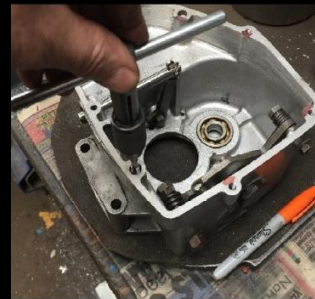
The Photo below right: shows the result of many hours of hard-work *Hand-Cleaning & Polishing*. But, it does look Good now.



Before Photos (above & below)



After Photos (above & below)



Come-On! Have you ever seen a cleaner Gearbox?



Whilst waiting for a few Gearbox parts . . . I started work on a bit of re-modelling of my Venom Oil Tank that I am going to fit onto my MAC (instead of re-fitting the original MAC Oil Tank). The two photos on the right (below) show a comparison between the MAC & Venom Oil Tanks. The Venom Tank has a 'Top Hat' Anti-Froth Breather tower on top. The MAC has a longer Filler Neck. One reason for modifying this Oil Tank is to discard the original Velocette Oil Filter all together, in favour of fitting a Remote (Canister type) Oil Filter (to be mounted under the Seat). With this in mind, I literally 'Cut-out' the original oil filter 'Tube' and welded a blanking plate onto the top & bottom of the Oil Tank.



Venom Oil Tank
with top hat Anti-Froth Breather



& MAC Oil Tank
with longer Oil Filler Neck



I then fabricated a 'threaded' flat plate & bronze-welded it to the top of the Tank, to act as 'Base' for a removable inspection cover (which will facilitate cleaning (last 3 photos below right)). This removable 'Cover' will also be where the 'New' Oil Return Pipe fitting will be located. Well . . . that's the Plan!



My intention is to reposition the Oil Tank a bit further back than normal, and also a bit lower than was originally fitted. I will also use 'Thruxton-style' Rubber Mounting 'O' Rings – or something similar - to secure the Tank to my MAC Frame. This 'new position' will also aid and compliment the fitting of a longer Inlet Manifold Distance Piece to the Carburettor, and by moving the Oil Tank back in the Frame it will also provide a little more room in front of the Oil Tank.

First Photo (below left) shows the 'Under-side' of the standard petrol tank (before modification work). This is a copy of Rick's Tank – that was done to accept a larger carburettor & longer inlet manifold. It was his idea that inspired me to do the same to my MAC Tank, as I had decided I wanted to extend the MAC Manifold.



The main problem with fitting a Longer Inlet Manifold is that the Carburettor fouls the Standard Petrol Tank. This Problem (re: carburettor to petrol tank clearance) is usually rectified by 'Raising' the Brackets at the rear of the Tank. This does the trick, but looks wrong (as the Tank is no longer level and slopes forward). I've seen several such modifications but don't think much of this particular option. The solution I chose (or should I say "Copied") was my preferred option. I 'Cut-out' part of the Tank (on the under-side) and re-fabricated this part of the Tank to 'make sufficient clearance' for the extended Carburettor to fit without 'Fouling' said Petrol Tank. BUT . . . I can't take the credit for the initial idea as it was Rick who pioneered the way for me and modified his Tank first.



First photo left: unfortunately, when I started welding a 'Load of Body Filler' fell off the Tank, exposing a massive 'DENT' in the side of the Petrol tank. Bummer . . .

This Venom Petrol Tank looked in really good condition when I first saw it (in its 'Grey Primed State'). So, as you can imagine, it was quite a shock when half of the 'Filler' Fell-Out! You can clearly see the extent of the damage.

Fortunately, I have a range of home-made 'Dent Removing Tools' especially manufactured for removing such Dents in Petrol Tanks (and a modicum of skill & experience in panel beating). Second photo left: shows the side of Tank after 'panel beating' session. I am quite pleased with the result.



The photo left: shows the under-side of the original (Standard) Venom / MAC Petrol Tank (unmodified).

The photo right: shows the modification to the carburettor-side of the Tank, which also included moving the off-side Petrol Stop Tap a Tad further forward (than standard).

Like stated on previous page, this modification was done to increase the clearance under the Tank, to accommodate the 'NEW' position of the Carburettor.

There is the added bonus of massive weight-saving, now it has 'shed' the weight of at least a pound & a half of body filler and a fair-bit of metal being removed from this corner of the Tank.

I have a few more modifications planned for the Venom/MAC Tank soon (check-out future blog photos) to see how both Oil Tank & Petrol Tank finally 'turn-out'.

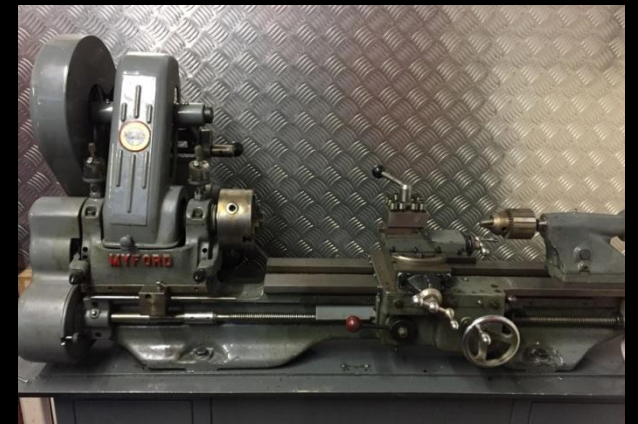
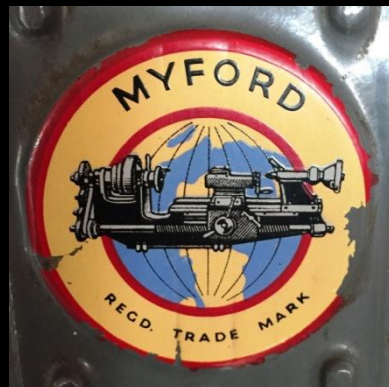
You can see in the photo on the right that I have completely removed the Rear Mounting Bracket 'Lugs'.

Compare the two 'Tank' photos to see what I mean.



STOP PRESS . . . Play STOPPED on MAC Repair Work . . . (and any other work too)!

Work has stopped on the MAC momentarily as I have finally managed to buy a Myford Lathe. So for the past week, I have been clearing out my cluttered & messy garage space and setting the Lathe-up in my workshop. Because the concrete floor is slightly uneven, I had to make a couple of Angle-iron 'Adjustable Base Plates' to ensure that the Lathe-Bed (the Cabinet Base) is 'Set Square & Level'. This 'Lathe' has been a Long-Time coming, as I have been looking for a decent Lathe for AGES. The next step in my garage work agenda is to free-up even more space by moving my Fiesta, my Lotus S7 (replica) & Mk1 MX5 out of the garage.





The Kick Start Housing was 'machined-out' by my good friend Rick Essex on his Lathe (quite some time ago now) to accept an Oil Seal on the Kick Start Shaft. The middle photo shows a 'close-up' of the fitted Oil Seal. The end photo (right) is a picture of the Oil Seal used. Great Job – much appreciated.



More recently (last week in fact – 26th April 2019), Rick prepared and painted my Primary Chain Cases too. Whilst he was doing his own KSS Chain Cases, he offered to paint mine at the same time. He painted both sets of Cases using a Twin-Pack Paint process. With excellent 'Results' (as you can see in the photo left) giving a 'High Gloss' black finish that is both durable and looks the part too. Rick also straightened-out the various dinks'n'dents and cleaned-up the main Seal area around the periphery of the Chain Cases (where the Rubber Seal fits) before painting both halves.

The final welding job (on the MAC Petrol Tank below) now completed; i.e. welding the steel screw-threaded filler neck (ready for the Monza Petrol Cap). Last week I bought a Thruxton-style 'Cruciform-shaped' Rubber Mount for 'Under-Tank' mounting (from Stafford Bike Show 27/04/19) as I have permanently removed the welded-on Rear Fixing 'Lugs' from the back of the Tank.



The first two photographs (below left) show the Tank before 'panel-beating-out' the raised areas (where the Velo Badges are fitted to the Tank).

The two photos (below right) show the Tank after panel beating.



Photos below: show the Tank with ALL paint totally removed, ready for final preparation.

Petrol Tap fitting 'Re-threaded' & new Tank Breather (option one).



Next project on my agenda-of-work; is to finish-off the re-purposed, 'modified' Oil Tank. Once both Tanks are finished and ready for painting I intend to 'Seal' both Tanks (internally) before painting. But unfortunately, I am back to paid-work again, which obviously gets-in-the-way of my Velo Work.

My Gearbox re-build is in the highly competent and experienced hands of my very good friend and Velo mentor Mr Rick Essex, who has very kindly offered to help rebuild it for me. He has taken pity on me because I am 'Snowed-Under' with work (both paid & unpaid work), and so has offered to ease my work-load by 'sorting-out my Gearbox' for me. My 'Plan' is to get my MAC back on the Road ready for this Years Annual Velocette Rally 'Ride-Out' . . . Well! That's the plan!

This photo was taken at last year's Velocette Annual Rally 2018 (Burntwood Rugby Club). My MAC in the foreground & Rick's trusty KSS situated just behind mine. And the Plan . . . (as I've already said) is to get my MAC back on the road again in readiness to attend this Year's Velocette Annual Rally in June 2019.



Well that's the Master-Plan!

Over the weekend of 11th & 12th May 2019, the weather was 'warm & dry' and so I painted the first coat of red primer onto the bare metal petrol tank and left it to dry in the lovely warm Sunshine. I am very pleased with the result and intend to apply the 1st coat of Black paint 'after Flattening-down' the surface of the Tank.



First photo (below left) shows the Venom gearbox, fitted in place, ready for measuring-up the new position for the modified Oil tank. I will be using a couple of Rubber Spool Mounting Brackets (like the ones used on British Leyland Mini Exhausts). These two exhaust mountings to be modified fitted to the back of the Tank (as in the 3rd photo below).

The steel plate (seen in the second photo below) was divided into two parts and then folded (90 degrees) at both ends. One plate will be welded onto the Oil Tank and the other steel bracket will be attached to the Rear Frame Tube, with the rubber mounting spools in between each bracket.



top photo: original tank position



bottom photo: new tank position

I will 'Cut-Off' the original top & bottom fixing brackets (in favour of the new rubber mountings) and fit a third rubber mounting spool (to the top rear-side of the tank), to make this Oil Tank totally rubber mounted and fully *isolated* from ALL direct metal contact. See new Tank Brackets being made (middle photos below) 'Fitted'. And, the forth photo (below right) shows the new rear mounting bracket, that I fabricated & welded to the Tank. This is then bolted to the rear mudguard stay, via the third Rubber Mounting Spool. The end photo (far right) shows the Tank bolted in place.



The first photo below left; shows the new position for the main oil feed pipe (& non-return valve) that carries oil from the oil tank directly to the engine, via the oil feed pipe. This Oil Feed Pipe now passes between the Swinging Arm & the Gearbox (instead of the usual 'outboard' position) – tucked out of harms way.



The final photos on this page (below right) show the detachable inspection 'Top Plate' with my home made Oil Return Pipe fitting bolted in place. The end of the pipe that is 'inside' the Tank has been made so that oil is directed downwards slightly (as it returns to the Tank).

The final photo (below) shows the plate, just placed in position (for a final repositioning check).





First photo above: shows the *Rubber Mounted* Remote Oil Filter position and return oil pipe.

The next four photos (above) show the Oil Tank in various states of *Preparation*. From bare metal, to 'Primed' and then 'Flatted', followed by several coats of different coloured Primer, each coat filling in the many tiny imperfections, scratches and dents (see also photos below).

The Four photos to the right show a new bracket, made especially to mount the Ignition Control Module (for the Contactless Coil Ignition system fitted).

The *blue cardboard template* was used to make a bracket (right) to fit onto the rear mudguard Stay, to allow for the Ignition Module to be rubber mounted and isolated from engine vibration.



Obviously, the Petrol tank also needs to have the same painstaking, laborious treatment as the Oil Tank, i.e. several more coats of primer-filler, lots of 'Rubbing Down' and further 'Tracer Coats' added in order to get rid of all of the scratches, dints'n'dents, etc. Before the Final Top Coat is applied. A Job for a Sunny Day!

The Good News (on the Gearbox front) is; the Gearbox has been rebuilt by my friend Rick and kindly returned to me for re-installation. So as soon as I have sorted the usual fiddly, but essential jobs out of the way, I can start to once more re-unite the engine, gearbox, clutch and frame back together again.

As you can see in the four photos below I have welded a bracket onto the near-side rear mudguard stay, with multiple drilled holes, to maximise adjustability options. One of these holes will accommodate the modified Coil Bracket (2nd photo below), and using yet another rubber mounting spool to isolate the ignition coil from vibration (see both end photos below right).



I know this is probably a bit contentious to some Velo enthusiasts . . . but I have decided to try a 'Non-traditional' sealed Burlen 6 volt battery. I have also replaced all of the original 6v Filament Bulbs with LED Bulbs, including a LED Head Light Bulb (WOW! It is so much BRIGHTER). And, as a result I'm expecting even Less 'Draw' & demand on the electrical supply than before. First two photos below left; show the modification to the original Battery Platform. I've reshaped it, and reduced the overall size of it. However, just in case I need to revert to a more traditional 6 volt lead-acid type battery in the future, I have left enough material on the battery platform base to accommodate the slightly bigger dimension of one of those Lead Acid Batteries.



The last photo (above right) is of Me, doing a bit of brazing.

10th June 2019: Only twenty days left to get my MAC back-up & running, ready to attend the Annual Velocette Rally on it. I know that it is a full two and a half weeks away, but when my MAC repair-time is as 'Limited' as it is – it is still going to be a challenge for me to get everything done in time for the Rally.

The 1st photo below; shows the new Roller Clutch Thrust Race that I have fitted (as supplied by Veloce Spares Limited, Huncote, in Leicestershire). The second photo shows the Assembled Clutch held together with a series of Elastic Bands. The assembled clutch and drive sprocket was then fitted with the new primary chain (*with Split Link*). Once the two sprockets and chain-run had been 'Lined-Up' accurately I used a dial gauge to identify the distance between the inner face of the Sprocket & the Crankshaft in order to make the required distance piece (*Shim*) needed to keep the primary chain in-line.



With the new shim made & fitted (and re-checked again for accuracy), I was then able to set the Shock Absorber to the correct position in order to make a suitable spacer, to be fitted between the outer part of the Shock Absorber Clutch (M91/3) and the castellated nut (M93 Shock Absorber Spring Collar) that secures the Shock Absorber Spring (M90) in place. The end photo shows the Velocette Tool (A229 Shock Absorber Nut Spanner) being used to tighten everything up for the final measurement check.



Now, I realise some people reading this blog will think all of this measuring and adjusting is a bit OTT, but like I keep saying . . . All of these little adjustments and modifications all add-up to make a Big difference in the long-run. *But only 'Time' will tell if it is ALL worth it?*

Photo left & below: show the new Nitrile Rubber Seal fitted to the inside of my MAC Primary Chain Case (supplied by Veloce Spares Ltd.), plus another Nitrile Seal for the Gearbox to Chaincase Seal too.



These new 'Nitrile' Seals replace the original Velocette Felt & Cork Seals and are much more efficient and less problematic than the originals. When the old type of Seal *'failed-in-use'* it usually caused clutch drag and other problems because the clutch could not disengage properly due to restriction cause by the damaged / fouled seal. There should be no such problems NOW though!



Chain Case Fixing Pins lock-wired into place

Clutch Assembly, Drive Sprocket & new Primary Chain fitted (with Split Link (photo below) Split Link Lock-wired (for peace-of-mind).



And, just when I was thinking everything was going nicely together & to plan . . . The Chain Case Strap Assembly (MAS16 / 2) *'Snapped'*. This was caused by a combination of 'Old Age' and suffering a 'Hard Life' (and Yes! Before you say anything, I am referring to both the Bike and to Myself). I obviously applied too many 'Newton Meters' to this 1953 fixing Strap bracket, and "SNAP" . . . Off it *Popped*. My solution was to Drill & Tap the broken bracket and to re-attach it to the 'Strap' with a couple of screws (see photos on next page below). I then finished-off the job by Silver-Soldering these two components together, ensuring this problem does not happen again in the future. It is an extremely strong repair (although the Chrome finish is now tarnished).

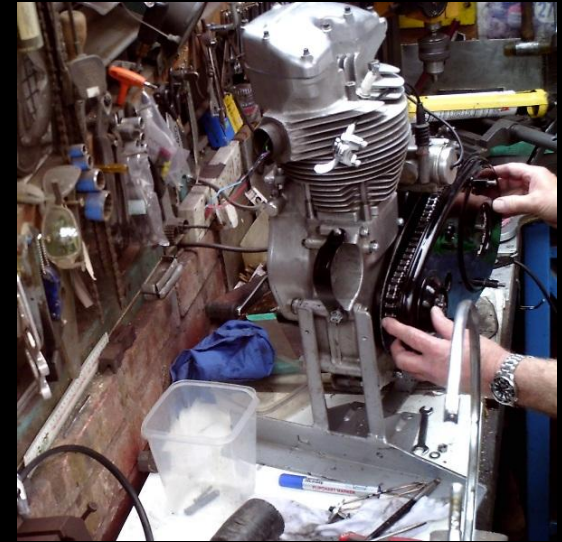
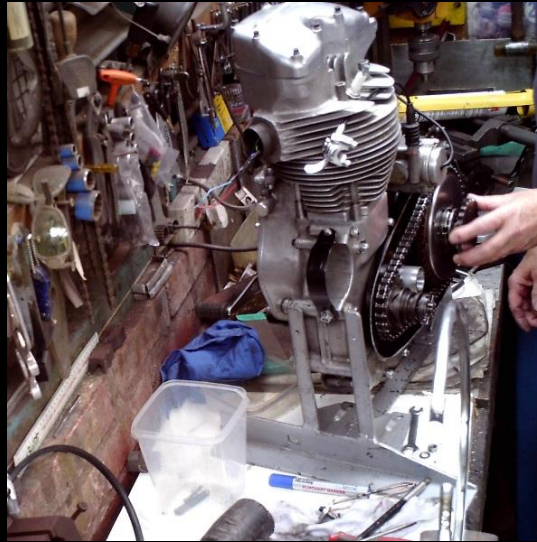
Drilled & Tapped to 4mm thread (x2, below). The Two screws held the whole lot together ready for the Silver-Solder to be applied. The screw-heads were then filed flat to provide a smooth finish ready for the New Seal profile. Although this little repair was quite annoying, I was lucky in one sense – that this happened in the workshop and Not when I was out-&-about on a 'Ride-Out' somewhere.



My very good friend & Velo Mentor Rick suggested that I used a 'Needle & Thread' to join the two ends of the Chain Case Joint Moulding Rubber (F284 / 2) together, to 'Aid' assembly. He also suggested I used RTV Silicon Sealant in the 'Grooves' of the Joint Moulding Rubber – to effect a reasonable 'Seal' to this usually trouble-some area of a Velocette engine (see the three photos below). It all went together really well. Much better than the first attempt & *Job Done!*



Inner Chain Case, Clutch Assembly & new Primary Drive Chain fitted again. Followed by the Outer Chain Case Cover, hopefully, for the final time.

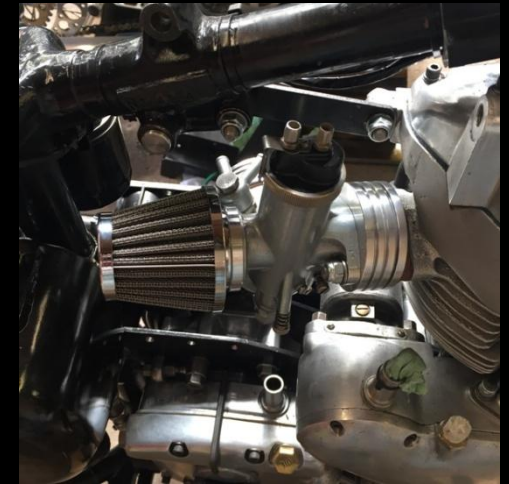
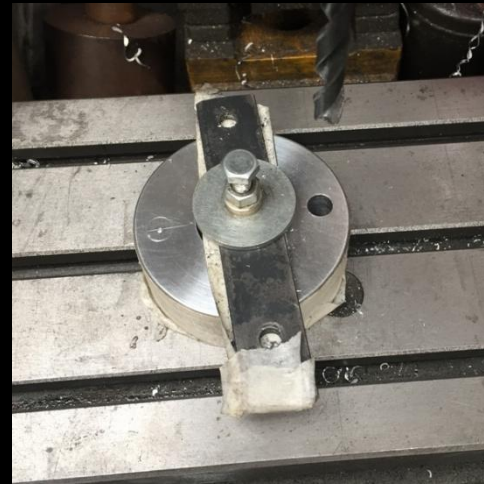


The repaired and much stronger Chain Case Strap was 'Re-Fitted' again, but this time without mishap or any other problems.

The Engine & Gearbox Assembly is now ready to be re-united with the rest of the Machine. It's getting quite close now . . . although there are still quite a few fiddly-little-jobs to do now. You know the sort of jobs I mean . . . Those 'Five-Minute-Jobs' that quite often end-up taking absolutely ages to complete.



The Engine & Gearbox went back into the Frame really easily, and without issue (I am pleased to report). Yet another step closer & 'Good Job Done'.



Photos above: showing-off my New Carburettor Inlet Manifold Spacer (expertly 'turned' by Rick Essex). All I had to do was drill the manifold Bolt Holes (obviously in the right place) to finish-off this new extension-tube modification. I think it's looking great now and I'm hoping it ALL works just as well too.

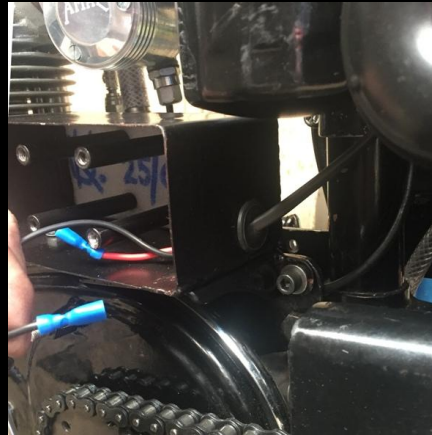
The Photos below show the reinforced plastic hose that I have decided to use for the engine breathers & oil feed pipes (as you can see in these photographs, I have lock-wired them onto their fittings – as usual).



The following photos below: show the fabricated Battery Box (version 2) being made – to accommodate the Burlen 6v Battery.



As you can see from the first three photos below: I decided to mount the Burlen Battery 'Horizontally' instead of the more conventional method of mounting the Battery in a vertical position.



The end photo (above right) shows the factory method used for setting the Rear Drive Chain Tension. With the Shock Absorbers removed, a 'Strip of Metal' with two holes drilled at 'Eleven & a half Inch centres'' is then used to get the correct position of the Swing Arm to Frame, in order to set the correct chain tension.

TANK CURE was used to 'Seal' the modified Petrol Tank. The instructions were easy to understand and were followed to the letter. You can see the results through the Filler Cap aperture (end photo below right). Just look how *shiny and clean* the inside of the Tank is *Now* the inside of the Tank is covered in this 'Cured Resin'. This Tank is now rust free and hopefully 'future-proofed' against anticipated possible changes to Petroleum based Fuels (in the future?)



Verwerkingstemperatuur min. 20 °C. Verwerkingstijd bij 20 °C is ca 30 minuten. Coating minimaal 7 dagen op kamertemperatuur laten uitharden voor dat de tank in gebruik genomen kan worden.

Petrol Tank Sealant. Clean petrol tank first with Tank Cure Cleaner and Rust Remover. Tank should be absolutely dry internally before you apply sealant. Mix (stir) the two components A and B thoroughly and put the sealant in the tank. Shut filler opening and slowly turn the tank in all directions. Make sure the sealant reaches the complete inner surface several times. After turning for 15 to 20 minutes drain off the spillage and remove all the plugs in the tank openings. Minimum temperature while processed 20 °C. Process time at 20 °C is 30 minutes. Wait 7 days (at room temperature) before applying petrol.

Benzintank Siegel. Tank entfetten und entrosten mit Tanck Cure Tank Entfetter und Rost-Entferner. Tankinnenseite vollständig zusammen gießen und intensiv mischen. Tank während 15-20 Minuten schlage



This procedure was carried out on Saturday 22nd June, allowing a full Seven days to cure before Petrol is added. The plan is to let it dry (& cure) properly and to put a basic coat of paint on the Tank – in order to get it ready for the Velocette Annual Rally (29th & 30th of June 2019 being held at Burntwood Rugby Club). This quick paint-job is intended only as a temporary measure – so that I can get the MAC back onto the Road asap. I will do a much better paint job (on the Tank) next year, after I've put a few more miles on the clock during this summer. Well, as usual . . . that's the plan.

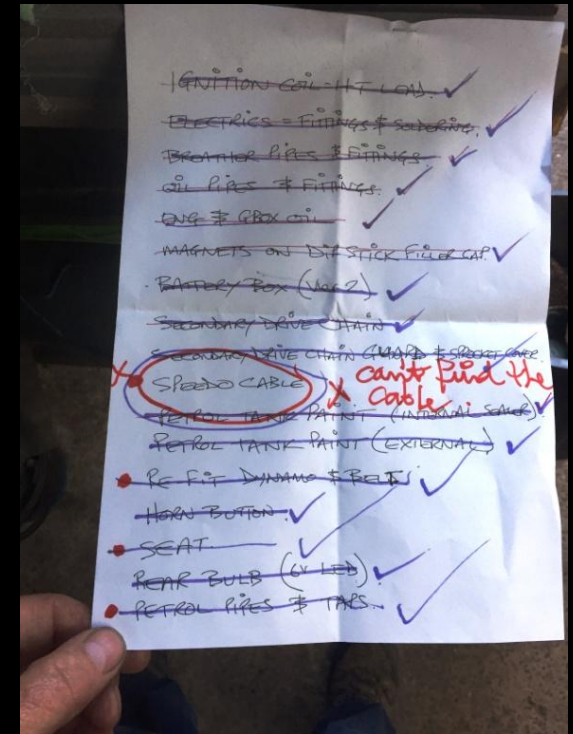


Friday Morning (28th June) before going to work I took advantage of this fabulous warm weather and 'Flatted-the-Tank-down', then washed it off and put a single covering-coat of black paint onto the Tank – just so that it looks a bit more presentable – when I attend the Velocette Owners Club Annual Rally.

1st photo below left: The Dynamo fitted (together with toothed-belt drive) and it is now ready (for tomorrow) to be 'Fired-up' for the first time following the complete engine & gearbox strip-down & rebuild. Yeah!!!

2nd photo below left: The underside of my modified MAC Tank, complete with Front Tank Strap and brand new Petrol Taps. The Tank Strap is designed to stop the base of the Tank from 'Flexing' (at the front of the Tank). If this Tank Strap is not fitted, there is a real risk that the Tank may develop 'Fatigue Cracks' along the Seams of the Tank, causing fuel to leak.

3rd photo: shows the new reinforced plastic petrol hoses fitted to the Carburettor. End photo: My Work List.



Sunday 30th June 2019: Burntwood Rugby Club, venue for this Year's Annual Velocette Owners Club Rally. Yes! I actually made it – on my fully reconditioned MAC. Okay, not fully reconditioned (because the Tank still needs painting properly and the decals putting back on the bike), however, ALL of the 'Mechanicals' (i.e. Engine, Gearbox, Clutch & Drive Chains) have been replaced and/or reconditioned back to 'as-good-as-new' condition.

I am very pleased with the results of my Labours and can report that all of that hard work has paid dividends. Loads more Power! Loads more Speed and Loads more Smiles per mile than ever before. Also, the MAC started 'FIRST KICK' . . . How BI**dy Brilliant is That! Matt Black Tank makes it Look 'Well-Used'.





The above wide-angle photographs (2 joined together) was taken shortly after we arrived at the Rally (10am).

Photo Left: shows a line-up of (Can you guess what make of Bikes they are?) . . .

The photo on the right shows Rick's trusty 1938 KSS 350 Velocette, in fine *Fettle* as usual and is a very reliable bike too.

The standard of these marvellous thoroughbreds was truly awe-inspiring. I took loads of photos (as usual) but as this blog is all about my MAC, I've only included a few images from 'The Day'. And, YES! As usual, it's all about ME, me, me, me & my MEGA-MAC.



Monday 1st July 2019: I drained the Oils (i.e. engine, gearbox & primary chain-case) and 'Refilled with correct Grades' to the appropriate 'Levels' with fresh new clean Oil. Even though the bike has only covered just over 50 miles (on it's first journey following a FULL engine, gearbox & clutch rebuild), the idea was to drain said Oil to get rid of any unwanted contaminants and/or metallic particles from the new 'Rebuild'. I also changed the plastic petrol pipes for more traditional black rubber type of pipe (more in-keeping with a bike of this era). The four photos below show three 'Options' re; the new Petrol Tank 'Breather Pipe' fitting.

Photo 1: Option One.



Photo 2: Option Two.



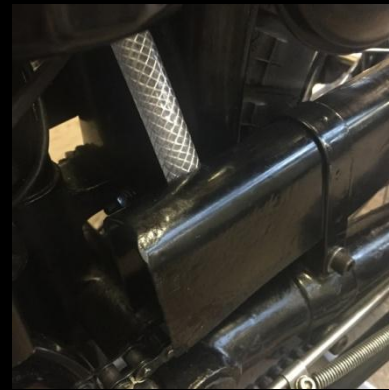
Photo 3: Option Three.



Photo 4: Option 3 Close-up.



Photo 1 (above) Option One showing the position of the petrol tank breather as tried & tested on Sunday 30th at the Velo National Rally. Photo 2 (above) shows Option Two, with a Banjo fitting allowing a parallel fitting for the breather-pipe. Photos 3 & 4 are similar to option two, but using smaller diameter piping (3mm dia.) black plastic pipe, instead of 1/4" clear plastic pipe that was previously fitted. I think option one is more efficient, but I think option three is less obtrusive and blends in well with the black bodywork of my bike. At the moment, I am 'Trialling' option three 'Breather-pipe' which also appears to be working well.



The BIG Breather Pipe: i.e. The Engine Breather from the top of the Timing Case (1st photo above), which was then reduced down in size as it made its way along the rear mudguard Stay to the end of the Mudguard (terminating in the little plastic bottle (middle photo above), this make-shift breather 'catch-tank' was fitted to see how much 'Oil Mist' was produced by this new engine. And the 3rd photo (above), as there was very little oil mist produced, I decided to shorten the Engine Breather Pipe & re-direct it to the rear Chain-guard, where any oil mist would 'condense' onto the Rear Chain and act as a chain lubricant & appears to work well.

The last photo above right: was taken on my 3rd ride-out (Friday 5th July 2019 = another 50 miles done) and offers a good 'shot' of the rear-side of the bike. This last photo shows the rear breather pipe has been moved and placed in the less obtrusive position (than that of the inaugural 'Run' on Sunday 30th June 2019).



SO FAR, SO GOOD and . . . As can be seen from the above photograph, the Petrol Tank is still in its Matt Black livery. My Mega-MAC is going extremely well, with a fabulous sound coming from the Fishtail exhaust and also delivering a good turn of speed too. **RESULT . . .** and Well Worth ALL of the hard work, time & money spent on this lovely little MAC over the last nine months. I have really enjoyed the journey.

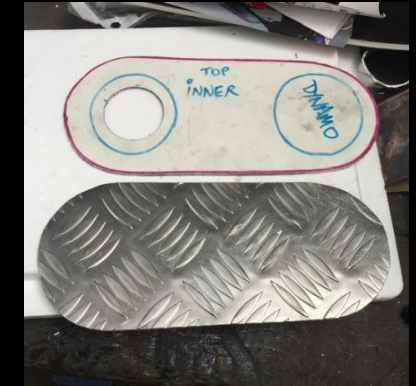
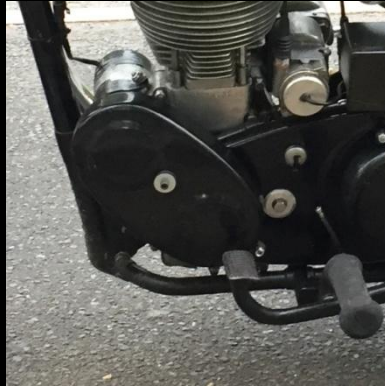
Was it worth it?
“A Resounding YES!”





First Photo Left: This is version #3 of my Chaincase oil level indicator Tube. As can be seen in this photograph, the clear plastic 'Tube' is now directed forwards and is held in place via a purpose-built 'Guide'. Using this method it is easier identify how much oil is in the Chaincase.

The remaining photos below show my new home-made (narrower) Dynamo Back-plate and Front Cover.



The Dynamo Cover project was *inspired* (if that's the word) by last week's visit to Bishops Castle Velocette Club Members 'Ride-out' where I saw another Velo Members modified Dyno-Cover.

I thought; I could modify mine . . . however, mine turned-out slightly different to the one I saw there.

Photo right: shows my Mac doing a bit of 'Levitation'. Well! It beats crouching down and bending over and struggling . . .

Bike Stand = ten-out-of-ten & highly recommended.



You may have noticed (on the previous page showing my Mac on the Bike Lift) that I have refitted my original MAC Petrol Tank. I have done this in order to paint my modified Petrol Tank again. But this time, to paint it properly with a Glass Black Paint finish (well . . . as usual, that's the Plan).



First photo Left: To help get the exhaust gasses out a bit quicker (not to mention the slight increase in sound . . .) I drilled-out the 45 Holes in the end of the Fishtail Exhaust Silencer from 4.5mm diameter to 6mm diameter. This modification was listed in an old VOC Magazine (ironically the club magazine is also called 'Fishtail' and comprised of 45 pages in that edition too).

Okay! I made that bit up about the number of pages in that edition 😊 (Joke)

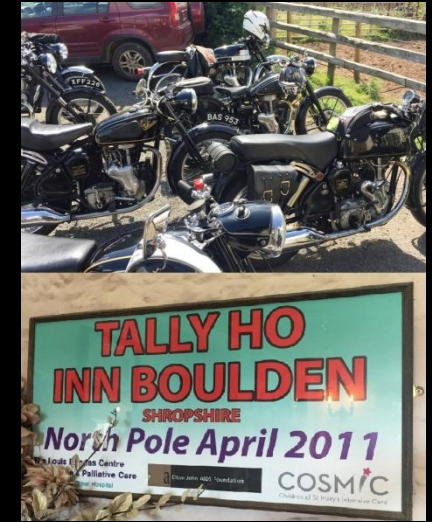
Second photo (immediate left) is my homemade Fibre Glass (GRP) Dynamo Cover which is intended to replace the alloy one that I made earlier. But, in the meantime (at least for the rest of this summer) I intend to get a few more *Miles on the Clock* before doing anything else to my new GRP cover.

The Photographs Below: Show my modified Petrol Tank . . . Prepped ready for painting (the first two photos left).



Finally, I managed to find the time to repaint my modified Petrol tank (two photos above right). It looks a bit better than my last attempt at painting, although it's still not perfect. However, it does look more presentable now.

1st Photo Left: Exhaust & Silencer removed, ready to 'Re-Seal' exhaust system (because of slight 'Popping-Sound' on throttle-back). Also, finally . . . I managed to fit the Oil Separator that I made ages ago. This was 'Trialed' on the 8th August on the Shropshire Velo Riders Outing at the Tally Ho Pub in Boulden. It worked, (after a fashion) but the 'Oil Pipe' collapsed when it got hot and the tight turns (route of the pipe) caused them to close up – as the pipe softened – thereby nullifying any engine breathing advantage. So . . . Version Two of my New & Improved Oil Separator / Breather Box to be built soon to replace *Version One*.



Photos below: This is my third Oil Change since my 'Rebuild' after completing the first 650 miles since I first 'Fired-Up' my little MAC (following the complete Engine, Gearbox & Clutch Rebuild). And, this is my First Oil Filter 'Change' since I fitted my new remote Oil Filter system. I obviously changed the Gearbox & Clutch *Oils* at the same time as changing the Engine Oil, to get rid of the initial 'start-up' swarf, as well as the usual bits'n'pieces that a new build generates.

This HAS TO BE one of the best modifications to make to a Velocette, as it is so quick and easy to change the Oil Filter. NO MESS, and as it happens – NO OIL SPILLAGE! **RESULT!** As can be seen (end photo right) I am using Smith & Allan 'Limitless Ultra 15W – 50 Fully Synthetic Motorcycle Engine Oil in my MAC.



I spent **Saturday 10th August 2019** working on two jobs. The first job (first photo below left) was to make a new Spring Retainer / Adjuster for the Brake Light Switch Return Spring (to replace my *Heath Robinson effort* that I made the other week). This job was made easier using my Myford Lathe. How on Earth did I manage without a Lathe for so long? This modification was a result of a suggestion by Rick, who had made a similar modification to his KSS. So I took a photo of his, and copied it. I must admit, it is far more 'engineered' now – rather than relying on the 'Lock-wire' version that I fitted earlier. The remaining photos on this page show the construction of my *New & Improved Oil Separator / Breather Box*. This time, I took great care (& measurements) to locate each oil pipe so that each one had a direct route to each fitting (with no sharp bends or kinks). The end result is a much tidier, neater, efficient job.



I've used exactly the same principle as the first 'Separator Breather Box', but it's fabricated in steel (not aluminium). 2nd photo above shows the internal part of the *Box* welded-up as a separate 'self-contained-unit' where the 'Engine-Breathed-Air' goes into the Top Tube - hits a 'Deflector Plate' and condenses & separates Oil particles from the Oil Mist. This 'Condensed-Oil' then flows down to the lowest part of the box where it re-enters the Oil Tank. The separated oil mist is then pushed-out of the 'Holes' drilled into the top of the separator box, which in turn is Pushed-out to 'Atmosphere' (or, in my case – it is directed to my Rear Chain).



Version Two Oil Separator / Breather Box is mounted directly to the rear mudguard (see last two photos above right) and is more efficient than *version one*.

12th August 2019: I painted three more coats of Rustoleum on to my Tank (photos below). I am happy with the finish now – however – this paint takes ages to ‘Cure’ and go hard, so I think I may have made a mistake in the choice of Paint I have used ??? ‘Rustoleum’ is what they used to paint the Scottish Forth Road Bridge with. Rustoleum, once ‘Cured’ is supposed to be an extremely hard-wearing & most durable paint finish . . . but only time will tell !



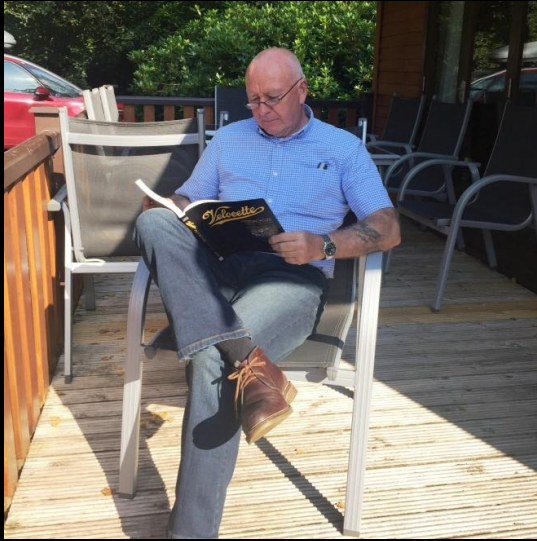
My modified Petrol Tank has now been re-united with the bike, and is looking just how I had planned it to look. I don't intend to put any Velocette transfers or pin-stripe lines back onto the Tank at this time. I just want to ride it around for the rest of the Sumer and ‘See’ how my Petrol Tank paint ‘weathers’ . . .

And at least get a few more miles on the clock!



(First Photo below): Whilst on this Year's Family Summer Holiday, I took advantage of the R&R time (aka 'Restin-&a-Readin' time). I managed to read through, once more, Rod Burris' book *Velocette Motorcycles* & Burgess & Clew's book *Always in the Picture*. Both highly recommended 'Reading'. There was reference in both of these books re; ". . . some trouble was experienced . . ." and refers to some 'M' series engines; ". . . Every once in a while individual engines would be found to smoke excessively because of incomplete scavenging . . ." (page 88 of *Always in the Picture*).

Now my MAC on the last couple of journeys (ok, probably more than a couple of journeys if I'm honest) has tended to 'Smoke' a little (a little more than I would like!). So reading this set me to thinking whether my engine was scavenging as much as it should be? Not forgetting it had a complete Rebores & new Piston & Rings when I purchased the MAC. So I'm guessing its not just Rings & worn Cylinder Bore, etc. (New Valves & Guides also fitted less than 700 miles ago).

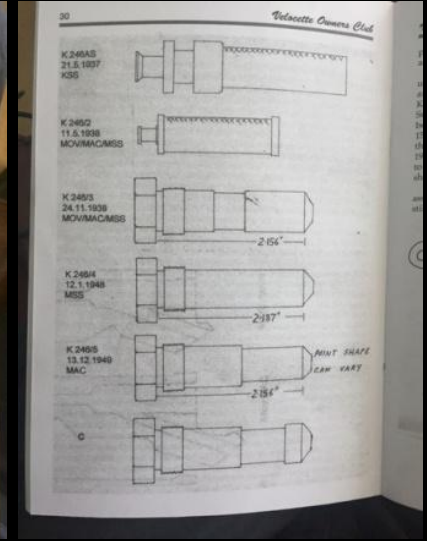
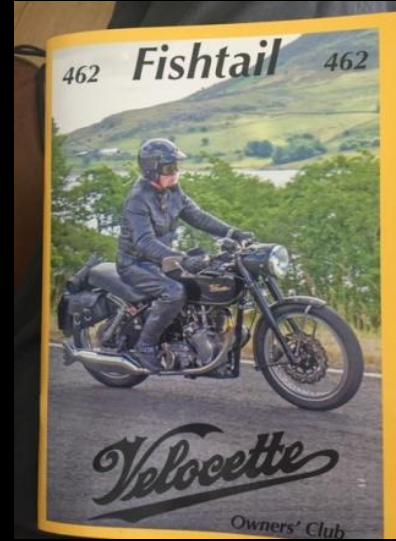


Upon return home from my Holiday I discovered the latest copy of Fishtail was waiting there for me. What a coincidence; to find an article on these very same 'Crankcase Suction Filter Plugs'. Pages 29 to 32. Also a reference in Colin Goodwyn's to Dai Gibbison's article in FT#450.

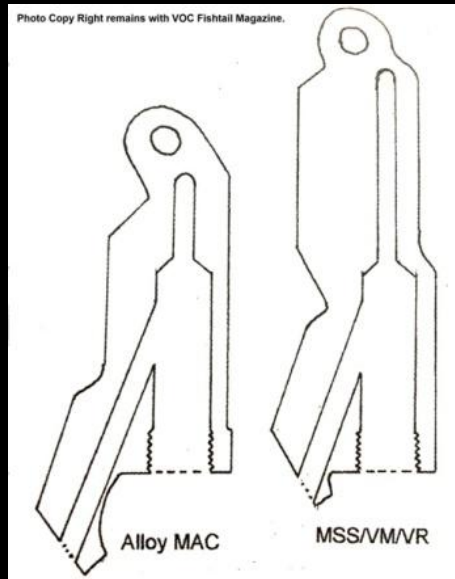
So, I thought I would do a bit of investigating & measuring-up of my own re: (C/C Suction Filter Plug) to see if I could understand what might be happening within my very own MAC engine.

I also have a Venom engine that is dismantled, to use for comparison of both 'Filter Plugs'.

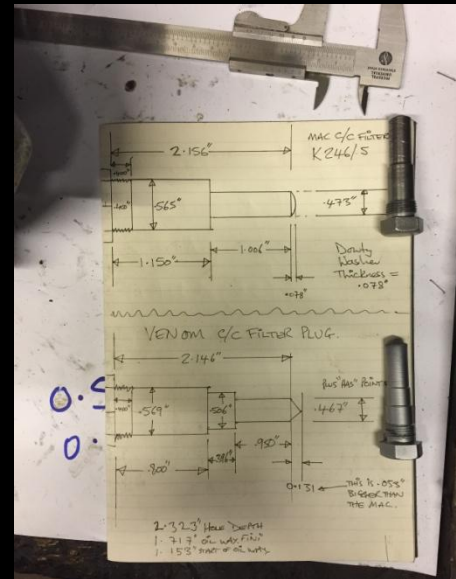
Below; first photo (comparison of both Filter 's).



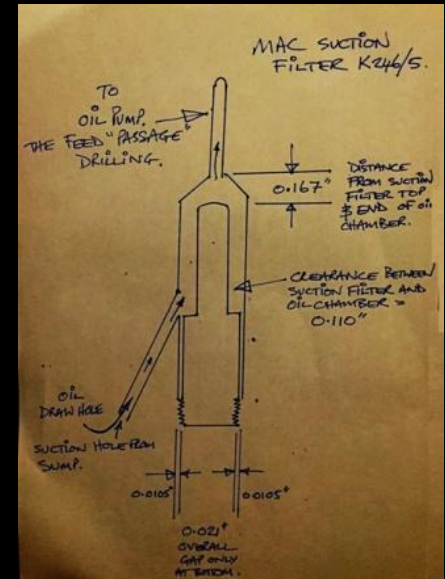
1



2



3



4

I discovered that the 'Myth' of having only 0.020" gap between the Suction Filter Plug (Velo part# K246/5) and the Plug Chamber (leading to the Pump) was 'just that' – a myth. After measuring everything with depth gauges, dial-gauges & micrometers (etc) I discovered the gaps involved were much bigger than expected.

The first photo above (previous page) shows the Venom Filter on the left and the MAC Filter on the right. The Venom Filter didn't match any of the diagrams or measurements listed in the Fishtail article. But the diagrams did confirm that MY MAC Filter was in fact a K246/5.

Photo number 2 (above) shows a comparison between the Alloy MAC 'Oil Chamber' drilling and the MSS, Venom & Viper drillings. Both measured the same internal dimensions, and the angle of the drilling that enters the side of the chamber is the same on both engines (as is the hole size from crankcase 'Sump' to 'Oil Chamber' where the Suction Filter Plug 'Lives' (0.125"). After measuring the lengths of both Filter Plugs I found a 'Gap Difference' of 0.167" on the Top of the Filter Plug and a side gap of 0.110" between the reduced part of the plug at its narrowest point. The Step from standard plug diameter to the reduced diameter of the plug ends just a fraction below the entrance side drilling from the Sump (into the Oil Chamber).

It was pointed out to me that "... late Velocette engines were built without any filter plug ... and blanked off by gearbox filler plug BK40". I've taken Colin's advice (and that of my good friend Rick) and cut-off the Filter, at the point where it reaches the 'lowest part of the diagonal side drilling' & inserted several small but powerful Magnets into the working end of My Filter Plug. (See photos below).



I drilled down the centre of the Filter Plug and then 'Cross-Drilled' as can be seen in these photos.

I inserted two 5mm Dia. magnets into the vertical drilling and then placed two 5mm Dia. magnets into the cross-drilled hole.

Even though the magnets Can Not 'Fall-out' of the Plug (because there is only 0.021" gap between chamber & plug at that point) I still 'Peened-over' the edges of the drilling to ensure the magnets could not possibly enter the chamber &/or the Oil Pump. I finished off with a radius on the top of my modified Filter Plug.

Obviously, I will report the findings of this latest modification in my next addition to this *Blog*. Hopefully, on my next Ride-out I am expecting that my slight 'Engine Smoking' problem will be either:

- a) The same as before (**Bummer! That means I need to investigate Rings, Bore, Valves etc. to find the real cause**).
- b) Reduced Engine Smoking. (**Result-ish, it means that this had a bearing on matters but not the whole problem**).
- c) Completely fixed & No further Engine Smoking (**Major Mega Result! – it will be “the Cakes & Tea Lads, are on me!”**).
- or; d) Problem made much worse!!! With Smoke Bellowing-Out Everywhere . . . (**Oh Well! I need to buy a new K246/5 Plug**).
(**Or; try the Venom Crankcase Suction Filter Plug**).

However, I cannot see how this modification will make things worse, especially as the later Velocette engines (Thruxtons in particular) had no Filter Plug fitted.



Photos Above: show the Fork Oil being replaced with new Oil (120cc in each Leg) after draining old oil. (4th photo = gearbox oil).

I have adopted a '500 mile ALL Oil Change' regime which is intended to prolong the life of all of those components that I have already reconditioned i.e. in the Engine, Gearbox & Chaincase. ALL replaced with the appropriate grade of new oil for each 'Part'.

I have kept an accurate record of the Mileage completed so far. Right from when I purchased this MAC, right up to this present time and the Total number of miles covered is 3,066 Miles (up to & including the 17th September 2019).

RESULT!



The Photo Above Right: shows my latest addition to my MAC: Vincent Straight Handlebars fitted.

And . . . The photo on the left shows a modern Carbon Fibre straight-through Exhaust Silencer fitted (in place of the traditional Fishtail).

The name for this latest piece of equipment is most certainly an oxymoron. This 'Carbon Fibre Silencer' is far from 'Silent'.

In fact, it is VERY LOUD.

On the positive side, it appears to have increased the responsiveness and top speed (by at least another 10 mph faster than with the Fishtail fitted). Well . . . it sounded faster???

Because, on test, it went up to 70mph quite easily (albeit Very Loud).

The answer to the question regarding "Suction Oil Filter & Smoking Engine problem"; I can report that after covering a further 300 miles = There was no change or difference 'what-so-ever'. It STILL Smokes, So it looks like I need to investigate Piston Rings & Bore now to identify the cause of my smoking engine.

After fitting the Vincent straight handle bars to the MAC (see previous page), they somehow just did not look right. So . . . I cut off almost two inches from each side of the handle bar. They now look great (I think so anyway!). However, unfortunately, when I turned the handle bars from left to right and back again, both levers on the 'Bars' make contact with the top of the petrol tank. Bummer . . . I really should have tried the *Levers* first before 'Cutting-Off' the ends.



Anyway; my choices were; 1) Get hold of another pair of handlebars (or re-fit the original bars). 2) Put a Bigger steering 'Bump Stop' on to the bike (this would be the easiest option), or 3) Make a pair of Handle Bar 'Raisers' (extension Clamps). Option 3 was my preferred choice. The first photo above Left shows a piece of $\frac{3}{4}$ " aluminium plate (from my recycled scrap-metal box) that I used and drilled a hole in the centre (the same size as the handle bars) and then 'Cut' it in two.

I then drilled the two fixing holes in each half to match the drillings in the top of the Steering Yoke, and then started to shape the 'Raisers' so that they dovetailed into place neatly, where the original Handle Bars were clamped-into-place.



The remaining photos (above): show the various stages / processes that I went through to produce the finished Clamps / Raisers. This entailed 'Loads' of sawing, drilling, milling, filing (and Loads More Filing) before finally polishing them and fitting them to the bike. The height the handlebar was raised to allow plenty of clearance between the Bars & Levers and the Petrol Tank was; nine sixteenths of an inch ($\frac{9}{16}$ "). A lot of effort, but I am quite pleased with the result.

As you can see from the pages above; after draining the Forks of oil, I replaced the oil in each Leg with 120cc of lovely clean oil. But to my dismay, upon return to 'Home' from my latest 'Ride-out' it was obvious that these Forks could not keep the oil in the Forks, and was leaking from several places. I removed the off-side front Fork Leg and discovered it was quite badly scored, pitted & also rusty in places. Fortunately for me, I have the Venom – in bits – and therefore have spare fork stanchions that I can use for the MAC (and at a later date either get the MAC Forks reground, hard chromed & reground back to original 'Size' ready for the Venom rebuild, or buy New Forks Tubes for the Venom (to replace the ones that I will be using on the MAC . . .).



I also found a leak in the 'Bottom off-side Fork Slider' (photo right), where the bottom of the Fork 'Casting' is soldered to the Slider Tube.

This bottom Fork leg requires re-soldering & re-painting before reassembly.

The two photos below show the best of the Venom Fork Legs - 'Set-up' - in the Lathe being checked for run-out and for cleaning & a light polish.



At least this Venom front Fork leg has now been cleaned-up & checked 'true' in the Lathe. The Leg is ready for new Bushes and Seal, then re-assembled and fitted back onto the MAC.

The photo below shows the assortment of fork legs that I have to work with. Three pairs of Forks, the original (knackered) MAC Forks, plus two other pairs of Velocette Forks. One pair of well worn Venom Fork Legs (original but too worn & rusty for use), plus; another pair of Old stock / New Venom Fork Legs; that came with the bike, all wrapped-up by the previous Venom owner, with the intention of replacing the worn-out 'original' Forks on the Venom.



When I bought the MAC in 2017, the Sales Advert stated; “. . . Forks Stripped cleaned and overhauled . . .” (see MAC PART ONE / Year One for details). I’m not sure ‘what was done’ to these forks . . . but their definition of “overhauled” and my definition is shall we say *‘Different’*. The actual MAC Fork Legs are in such bad condition that merely fitting bushes & seals could only ever be termed a ‘Temporary short-term Fix’ and DEFINITELY NOT a proper overall. I can confirm this because after riding my MAC around since the Engine & Box rebuild – I discovered the Forks just WILL NOT keep Oil in the Legs. An additional problem was found to be a small hole in the Soldered Joint between the bottom Slider Lug (which needs re-soldering before re-assembly). I have decided to fit the cleaned-up New / Old Stock (NOS) Venom Fork Legs (that I got with the Venom) to the MAC and hopefully my fork leg oil leaking problem should be solved.

Fingers Crossed.



3rd October 2019 (photo left)
I managed to clean-up & Solder the damaged Front Fork Slider from the MAC.

This is where the Fork Bush 'Tube' is soldered into the Bottom Casting (that the Front Wheel Spindle goes through & where the front mudguard stays are fitted to)

I am hoping that this operation will be successful, with no further leaks from this point.



The photo above (middle photo) shows the MAC Forks 'OUT' and ready for a Full rebuild. The top & bottom Steering 'Yokes' have also been removed.

The Fork Legs (photo top right) was ordered from Nick Payton on 3rd October and delivered on 'Next Day Delivery' (4th October). What a Fantastic and most Brilliant Service . . . "Thank You Nick" = Venom Legs GREAT!



Here's the Plan: as I have already stated, I've decided to use the (NOS Legs) New / Old Stock Venom Fork Tubes / Legs on the MAC.
The other bits (photo above) are for the Venom Gearbox rebuild.

The NEW 'Nick Payton' Forks will go onto the Venom and the remaining Fork legs will go into my 'Parts Store' for future use or for sale at a much later date – to help pay back a bit towards my Velocette 'Fund'.

You may be thinking . . .
How Many Fork Legs does anyone NEED for just two bikes?

6th to the 9th October 2019.

Photo right (from a top view):

I filled in both 'Holes' of the Frame Top Tube & the front Down Tube (as they enter the Steering Head Boss), with Expanding Foam.

The reason for the Expanding Foam is to stop excess 'Grease' going down each of the 'top & bottom' Frame Tubes, when grease is applied to Grease the Steering Head Bearings.

Well, that's the plan!



Photos below: I have 'Drilled & Tapped' the Head Stock ready to fit a Grease Nipple (as a Grease Point for the New Steering Head Bearings). New Taper Roller Bearings (Top & Bottom) fitted to the Steering Head (instead of the usual Cups & Cones Bearings, with lots of individual Round Ball Bearings to lose). These self-contained Taper Roller Bearings are a well-worth modification and help enormously with assembly-time. (& no Lost Balls).



(Above photos) This Grease Nipple modification aids essential and regular grease maintenance



Photo 1:



Photo 2:



Photo 3:



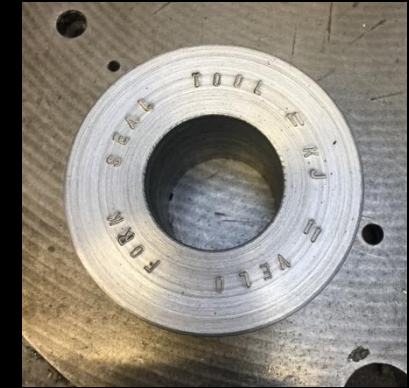
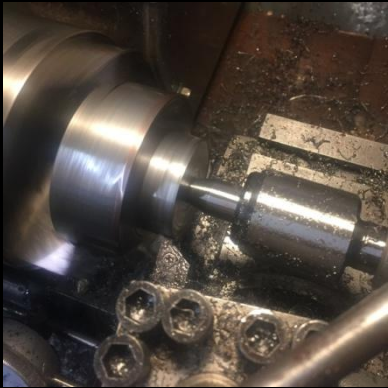
Photo 4:



Photo 5:

Photographs Above: Photo 1: shows the old Fork Shroud being 'Sawn-up' ready to accept the new Rubber Gaiter. Photo 2: shows the Fork Bush & Seal Fitting Tool being used (designed & made by Rick Essex). Obviously New Bushes & Seals used throughout. Photo 3: shows a specific Tool being used to aid Fork Leg fitting and correct location of Fork Leg into the Top of the Steering Yoke, again this little tool was made by Rick (many thanks to RE for the loan of these tools). Finally photos 4: & 5: show the new Gaiters being fitted into position. These Gaiters offer an improved 'dirt and moisture seal' than the original Velocette Fork Shrouds. I have fitted mine to the modified 'Shroud' by means of 'Black Cable Ties'. Jubilee Clips are the most common method to secure Fork Gaiters in place.

I am taking advantage of 'Borrowing' Rick's Fork Tools, to make my own Fork Tools (using Rick's original design specs & measurements). To this end I purchased some Metal Stock from the Stafford Bike Show (19th October) and have started to 'Turn' my own set of tools for future use. I am managing to build up quite a collection of home-made Velocette *specific* workshop tools now. How on Earth did I manage before, without my Myford Lathe?????



On the 3rd October, I thought that I had fixed the Oil Leak coming from the Soldered Joint on the Front Fork Slider (see photo left). BUT NO ! NOT FIXED !

After reassembling everything back together again, and refilling the forks, I took the MAC out for a Road Test and to my dismay – the *Effing* Fork Slider still Leaks. BUMMER!

Obviously, when I attempted my first soldering repair fix, there was too much contamination to allow the Solder to adhere properly.

Photo Right: (25th October) No Option Now . . . but to dismantle the whole lot again and do the Job properly this time. The Plan is to 'Tin' both parts with proper 'good-old-fashioned' Lead-Solder and then 'Sweat the two parts together, and 'Wipe-the-Joint' to effect a good oil-tight seal.



10th November 2019.



The first two images above; show the finished *Soldered Fork Leg Joint*.

The end photo above right; shows a very sorry looking forkless MAC. That'll teach me in future to do the Job properly 'the first time'.

After a thorough cleansing wash, to get rid of the entire Soldering FLUX residue, I tested the Fork Slider for leaks before priming and painting with a top coat of black gloss paint (two photos on the right).

End photo right; The Leg assembled with yet another new Seal and ready to go back onto the Bike . . . yet again!



This will be the last blog-instalment for this 'Chapter' of my MAC rebuild / restoration Project (i.e. Part Two – Year Two).
The Forks have now been reunited once more – fitted back onto the bike, back to where they should be . . .
And ALL is now well with my Lovely 1953 built / 1954 registered Velocette MAC 350.

The Photo below was taken in July 2019
(The MAC Tank was still Matt-Black at this time).



The photo below taken on the 17th November 2019
but this time with a shiny Gloss Black finish on my Petrol Tank
& Vincent Straight Handle-Bars fitted to my
home-made Handle Bar Raisers.



Click on this photo-link above to go back to the home page
(as you can see, I've refitted the 'Fishtail' exhaust silencer).

All of the work done up until this date (20th November 2019) and All of the photos etc. represents everything achieved thus far from the beginning of November 2018 (the start of my second year of ownership), right-up-to and including all of the work carried-out and updated on 20th November 2019.

Further MAC photos & write-ups will be included in PART THREE / YEAR THREE of my Rebuild Project Blog . . . but not until the New Year – 2020.
Please check out my VENOM Project Blog via the 'Home Page' (<http://www.wyjc.co.uk/bikes.htm>).