

The Parmenter Rotary Valve Engine

A tribute to the late Jack Parmenter, engineer, by Jim Oed

My '38 Norton ES2 after a 2000-mile run in from new clocked 78 mph. After removing the cylinder head, cleaning, polishing parts and a few adjustments 82 mph was clocked. When serious tuning work and alterations were done, speeds in excess of 90 mph were attained.

In order to go faster, serious tuning appeared to be the only answer but Jack Parmenter had other ideas . . .

JACK was a very clever and dedicated engineer, he designed and made numerous intricate machines for various jobs. Jack was always ready to help out with any problems and was a good friend to me and many others.

It was about 1910 that Jack competed in the first Christchurch to Dunedin motorcycle event and continued to keep a keen interest in motorcycle activities until he retired about 1945.

Jack was also a great help to many motorcyclists and it was from him I gained a lot of my knowledge, especially flywheel balancing, cam design and valve timing.

Jack was well known for his 'Bitza', a 1923, 350 Bigport A.J.S. which was ridden with success by various riders. It gave stiff opposition to a lot of the more modern 500 machines and was always treated with respect. In one grass track event at the New Brighton racecourse there was a dead heat. Just before the start of the runoff Jack gave the 'Bitza' two or three extra pumps of oil and then drained the sump before the start. The 'Bitza' won without any signs of seizing. The 'Bitza' finally gave up in an acceleration test at Kelseys Bush in 1936.

Jack then acquired a dirt track Douglas which he breathed on and the revs of that engine I can still hear, it was fantastic. It finally blew up at Bethunes Gully hill climb in Dunedin, after some amazing performances.

Jack Parmenters workshop was at Saltwater Creek, Timaru, as was the aerodrome at that time. Jack was also involved with repair and maintenance work on numerous aircraft including The Southern Cross Kitten which was built at Saltwater Creek by the late Tiny White (later Group Captain RNZAF) and helpers.

It was on my return after the Cust Road race in 1938 that Jack said to me, "I think we will build an engine for you to ride next year, I have a few ideas and I think we will build something different."

It was several months later when we were talking that he said he had an idea for a Rotary Valve engine. I had read with interest about Rotary Valve engines being experimented with in England, namely the Cross and the Aspin engines, and was very keen to be involved with Jack

in his project, and would assist wherever I could. We then discussed ideas and details of what he had in mind.

The engine would be a dry sump job and a 500 A.J.S. crankcase seemed suitable to use as a pattern, with a few modifications, mainly four large ribs added going right down to the bottom of the crankcase. The idea being that the whole engine would be held together by four $\frac{1}{2}$ " high tensile bolts.

It was after Christmas 1938, before any real progress began. Jack had been busy designing and making patterns for the castings that would be used, whenever time permitted.

Charlie Austin had a foundry at Saltwater Creek and was a big help in doing all the castings for the engine except the flywheels. The flywheels were cast in steel at a foundry in Christchurch.

In the months January, February and March 1939, many long hours were spent by Jack machining and balancing flywheels, forging and making connecting rods and machining and fitting all the various parts.

For extra strength the crankcase was cast in bronze. The cylinder was cast iron, two cylinder heads one bronze and one cast iron. The cast iron one being finally used. The bevel gear drive and valve carrier box were also bronze with a cast iron cap, the whole assembly being bolted together with the four long bolts.

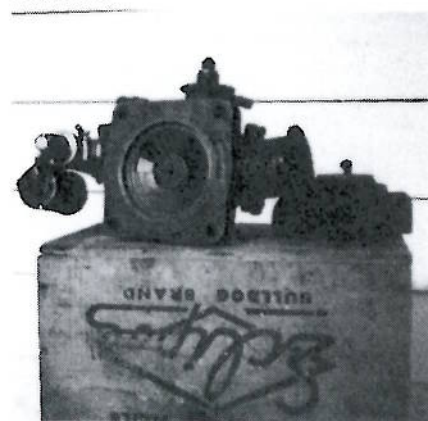
The connecting rod was forged from high quality axle steel, the piston used was a 79mm Norton, giving approximately 450 cc. Jack was sure the engine would run with a much higher compression ratio. The engine was finally running on petrol/benzol where as a conventional engine would have been on alcohol.

The pattern and casting of the cylinder head required extra care as the positioning of the parts was critical to suit the valve timing.

The valve itself was like an inverted saucer which covered the whole inside of the cylinder head, with a vertical shaft or stem. This was suspended in a carrier with ballraces and was adjustable for clearance between the valve and head. The valve was driven by skew bevel gears (Ex OHC Morris Minor) from a horizontal shaft, which in turn was chain driven from engine mainshaft.

A special sealing ring was used between the cylinder head and cylinder to overcome compression leakage around the valve. The valve had one hole in it, which as it revolved, uncovered the inlet port and then the spark plug as the piston approached the top of the compression stroke, and then after firing, uncovered the exhaust port.

The final valve timing was achieved by shaping and enlarging the hole in the valve to give the opening and overlap required.



INLET port open.

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IGNITION!

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The engine was lubricated by a gear driven Norton oil pump, the oil also circulated through the valve carrier and bevel drive compartment. This added to the cooling of the cylinder head and valve.

An additional oil pump, Ariel plunger type, was fitted separately and was timed to squirt a jet of oil on the back of the valve when on the suction stroke.

The engine had been planned to fit into my 1938 ES2 Norton frame. Engine plates were made and an adaptor to the cylinder head for the Norton exhaust pipe.

Finally about 10 days before Easter 1939 everything was ready, petrol was turned on and we both looked at each other in silence. Jack nodded to me to kick her over. I gave the carburettor a tickle and slowly pushed the kick starter until onto compression (no valve lifter or decompressor) and slowly eased it over compression, and then one very persuasive kick. It burst into life and I can still see the smile on Jack's face and the satisfaction of all the work done was all there. A short run and a few adjustments made and all seemed well.

It was at this time that Bert Munro called in to see us, he was on his way to Christchurch for the flying ½-mile being held between Aylesbury and Kirwee that weekend before Easter. Bert was very interested and pressed us into taking the Rotary engine through and giving it a run, which we decided to do.

After a brief warm-up I started my run, but the valve timing slipped, I do not remember at just what speed, possibly about 70 mph.

Unfortunately that was the only time the engine was seen by the public.

On our return Jack dismantled and inspected the valve and did some minor adjustments. The motor was going again about the Tuesday for me to take for another run. This time I had got up to over 80 mph before the timing slipped again. The valve was driven by friction under tension so as when the timing slipped no damage was caused.

Jack got busy once again to see what he could do, while I got busy on my Norton engine as practice for Cust was the coming Saturday and I wanted to be there

with the Norton if the Rotary wasn't ready. It was Friday afternoon when I took the Rotary for a final run. Jack said to give it a good hard run. I took off and did seven or eight miles travelling up to and around 80 mph wherever possible, it was going great. I turned around and on the return run decided to give it the lot on the best section of the road. The speedo needle crossed the 85 mph mark and was hovering on the 90 mph when once again the timing slipped.

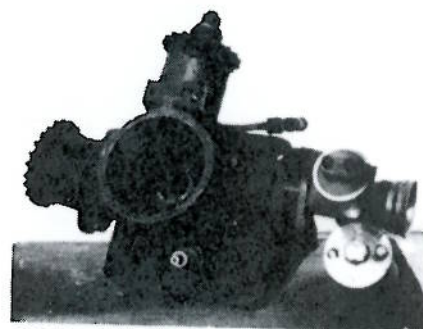
I got busy and fitted the Norton engine that night and was at Cust for practice the next morning. Jack said he would have another go at the Rotary engine and possibly bring it through on the Sunday. As I was hoping to finish the race this year, I decided just to ride the Norton.

I felt the Rotary engine needed more time and testing as it was only about 10 days since it fired its first beat.

I was leaving for a working holiday shortly after the Cust race and Jack said the Rotary would be ready for further testing and running when I returned. However, war intervened, I joined the Airforce and the result was that the engine never went back on the road.

During the war, our old friend Bert Munro called on Jack and insisted on seeing the internals of the Rotary engine. Jack dismantled it and showed it to him, but unfortunately it was never assembled again.

Jack retired about 1945 and shifted to Pleasant Point, he later shifted to Geraldine and then to Temuka. I called on him on various occasions and suggested that I assemble and get the engine going again, but he insisted that he would do it and showed me various boxes of its bits and pieces, and always seemed keen to do it and have it going again.

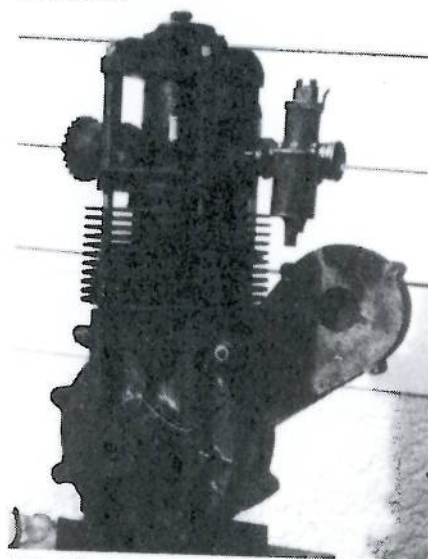


BEVEL drive to rotary valve.

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It was sometime after Jack's death that I called and saw his family who agreed to me having the engine to try and rebuild it. Unfortunately a number of important parts are missing and it is hard to remember some of the details as it is over 45 years since the work on this engine was done.

I have partly assembled the engine but as yet it is not in going order. The engine will eventually be going to a motor museum. The exhaust note of this engine was very different from that of conventional poppet valve engines. The main problem I am sure was distortion of the valve, and I am sure with modern steels available today the problem could easily be overcome. I hope that some day I will be able to do this.

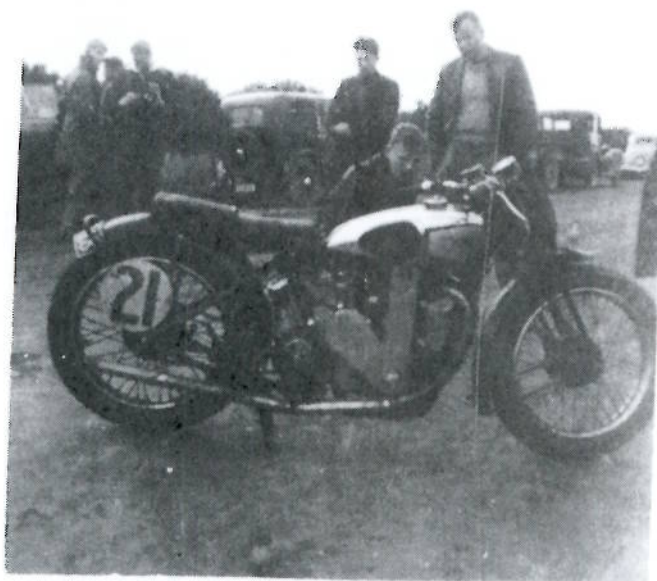


REAR side of completed motor.

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It is with great admiration and respect to a very clever man that I have written this article. The fact that this engine within about 10 days of its first starting had attained close to 90 mph, a remarkable achievement.

FOOTNOTE: The day I took the rotary engine to the flying ½-mile at Dunsandel, a new NZ motorcycling land speed record was set at 11.4.6 mph by Lew Evans riding a 500cc OK Supreme. The rotary engine may have attained a higher speed if the timing hadn't slipped as the throttle was only fully open for a few seconds. But as always, the best laid plans of mice and men . . .



ONLY known photo of the rotary valve in Norton ES2 frame. Dunsandel 1939.

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