

Villiers Two-Stroke Engines (Part 1) 1913/33

Early history

Sunbeam bicycles were made in Wolverhampton from 1887 to 1937, the company founder was a John Marsden. In 1898 he sent his son Charles to America to obtain machinery to produce quality bicycle pedals.

The new machinery would not fit into the existing factory so larger one in Villiers Street, Wolverhampton was purchased. Charles was put in charge of the new factory that was called the Villiers Cycle Components Company. By 1902 Villiers were well established and around this time John Marston decided to sell Villiers to his son Charles for £6,000, the value of the company's machinery.

Also at this time the company looked at the demand then being created for freewheels for the cycles. After experiments, they devised their own and offered it to the market. It was soon decided to stop making pedals and concentrate on pushbike freewheels, see fig1.

The free-wheel, often referred to at the time as free pedals, became popular in the cycle trade in 1898. It was the sprocket fitted to the rear wheel so that when the rider stopped pedaling the pedals did not continue rotate, soon almost every manufacturer was offering at least one model so fitted.

By the 1930s Villiers' freewheels were used by almost all of the British bicycle makers and exported worldwide. The company also began to produce fixed hub sprockets and large numbers were made. Cycle components continued in production for many years but were eventually dropped in favour of engines.

Engine identification

First the Mark number is a Roman numeral the numbers from 1 to 20 are shown as follows, 13 was not used on pre war engines

I = 1, II = 2, III = 3, IV = 4, V = 5, VI = 6, VII = 7, VIII = 8 IX = 9 X = 10 XI = 11, XII = 12, XIV = 14, XV = 15, XVI = 16, XVII = 17, XVIII = 18, XIX = 19, XX = 20, etc.

The following gives the meaning of the letter after the Mark number

“-A” - 250cc engines 1922 to the 1960

“-B” - 350cc engines 1922 to 1960

“-C” - 150cc engines from 1922 to 1960

“-D” - 125cc motorcycle engines from 1926 to 1960.

“-E” - 200cc motorcycle engines from 1929 to 1959.

“-F” - 100cc motorcycle, chainsaw & mower engines from 1949 to the 1963.

“-G” - 70cc Industrial & horticultural engines 1950/to 1960

“-H” - 225cc motorcycle engine 1954-57, later enlarged to 246cc 1957-60.

“-K” - 50cc moped engine made from 1959.

“-L” - 174 cc unit construction motorcycle engine 1957/66

All engines produced up to 1945 had a prefix of one to four letters prior to the serial number; unfortunately no information is available to decipher the meaning of some three and four letter prefixes. As you will see I have made an attempt to decipher them.

The first Villiers two-stroke engines

These engines were originally designed for motorcycle use. The first purpose designed stationary engines were the Marks 20 & 25 four-strokes produced initially for the British military in 1941. As you will see the two stroke engines were adapted for use on mowers and other machinery from 1920.

In 1912 Villiers produced a 350cc unit construction motorcycle engine with two speed gearbox; the engine was a four-stroke with overhead inlet and side valve exhaust, see fig 2. It was not a commercial success so 269cc two-stroke was produced in 1913. It was the Mark I with the prefix “O” stamped before the engine serial number, it was produced until 1916, see fig 3.

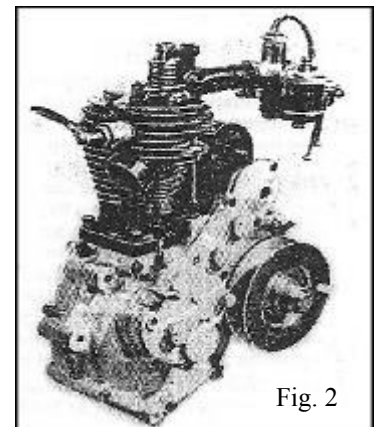
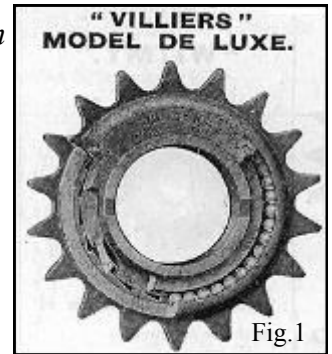
The 269cc engines did not have a letter after the mark number to show the capacity, the other engines in this range were as follows.

Mk.11 prefix A, produced 1916 – 20

Mk.111 prefix B, produced 19 20-21

Mk.1V prefix C, produced 1921

Mk.V prefix D, produced 1922.



The early engines used a chain driven magneto, some time back I was able to confirm from a period motorcycle magazine that the first Villiers engine to use their own flywheel magneto was the Mark III and this was in March 1920,

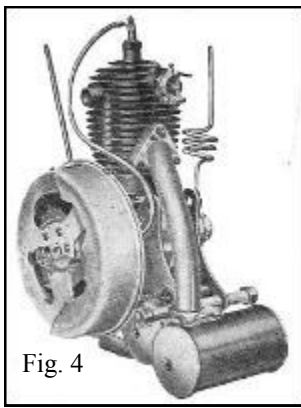


Fig. 4

see fig 4. The magneto armature plate clamped on the plain main bearing. A new cylinder was designed because the inlet pipe came out behind the magneto armature plate. The inlet pipe now went up the cylinder and came out near the head as part of the one piece cylinder/head casting. Atco used a Mark III on their first motor mower in 1920; I assume it had the fly-wheel magneto? The earliest motor mower I am aware of is a 24inch reel type Ransomes with a four-stroke engine produced in 1903. Starting with the Mark VI there was a range of three engines with capacities of 150cc, 250cc & 350cc. Identifying these engines was made easy because the following information was cast on the back of the transfer port. The first information is Patent 201354-23 that was granted to the Villiers Engineering Co & Frank Pountney (the chief engineer) on Feb 8, 1923, it patents the way the fins radiate symmetrically on the cylinder head followed by the Mark number.

PAT № 201354-23

VILLIERS
MARK
VI-A

The VI-A had a 67mm bore x 70mm stroke = 247cc prefix J, fig 5 is a picture of a 6-A. The VI-B had a 79mm bore x 70mm stroke = .343cc prefix K.

A common crankcase with 70mm stroke crank used on both engines and continued to be used on these engines up to the Mk.X A & B. The VI-C had a 55mm bore x 62mm stroke = 147cc.

A one piece cylinder/head casting was used with the exhaust port and cast on inlet pipe facing forward on all three engines. This range was produced in 1922/23 and there were some early changes 147cc engines.

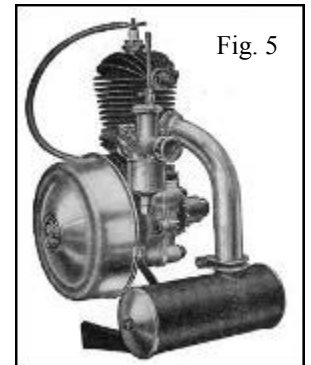


Fig. 5

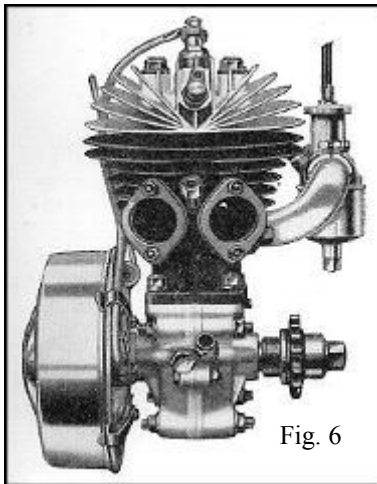


Fig. 6

The Mk.VII-C prefix L was produced 1923-24

The Mk.VIII-C prefix W was produced 1924-47

These engines were used on utility motorcycles and general purpose stationary work

The 250cc & 350cc Mk.VII range of engines were produced in 1924/25. These engines are similar to the Mk.VI's except the ports are said to have been improved to increase performance. The Mk.VII-A prefix S and the VII-B prefix M; the prefixes now don't seem to follow any alphabetical order

The Mk.VIII-A & B were produced in 1925/26 as shown in fig 6, but the MK.VII-A & B were still produced for general stationary work. The Mk.VIII-A & B motor cycle engines had a major redesign, they still used the same common crankcase. The some 3 port system was used but with an alloy piston deflector piston, a separate alloy head was now bolted to the cylinder. The cylinder had twin exhaust ports and an alloy inlet pipe that was bolted to the cylinder. The latter could be modified so as to place the carby where the motorcycle manufacturer wanted it.

The Mk.VIII-A was prefix X and the VIII-B was prefix AZ both engines had autolube, see fig 7. The Villiers automatic lubrication system was first released in 1924 for motor cycle engines. Oil was pumped from a separate tank to the main bearing, big end and also to the cylinder. Straight petrol was used in the fuel tank. This system was used until 1940 and predates similar systems used by on Japanese motorcycles by around three decades.

In 1924 172cc prototype motorcycle engine was built and sold to Monet Goyon in France; it was used in one of their racing motorcycles that won the French GP of that year. This class of motorcycle racing started around 1924 and probably finished at the end of the 1930's? 125-cc Grand Prix motorcycles have been around since the first official GP season after the war of 1949.

The first 172cc Sports engine of 1924 had the prefix T and was quickly replaced in that year by a Sports engine with the prefix TL with autolube. Along with the Mk.VIII-B prefix AZ were the first two engines to have two letter prefixes

The 172cc engine has a 57.15mm bore by 67mm stroke. Motorcycle engines that also used the 67mm stroke crank were the 148cc Mk.XII-C prefix GY with a 53mm bore) and the 196cc Mk.1E prefix IE with a 61mm bore.

Part two to follow in the next Tappet Chatter.
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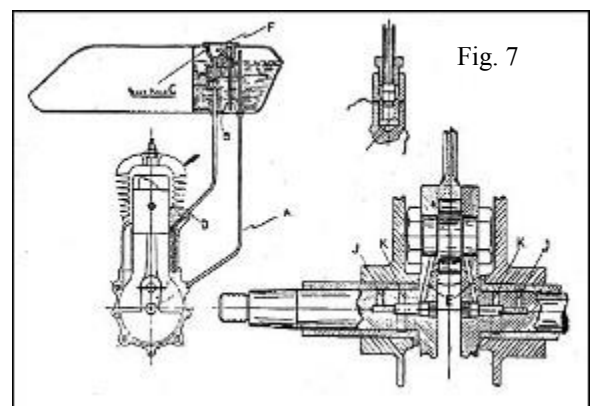


Fig. 7