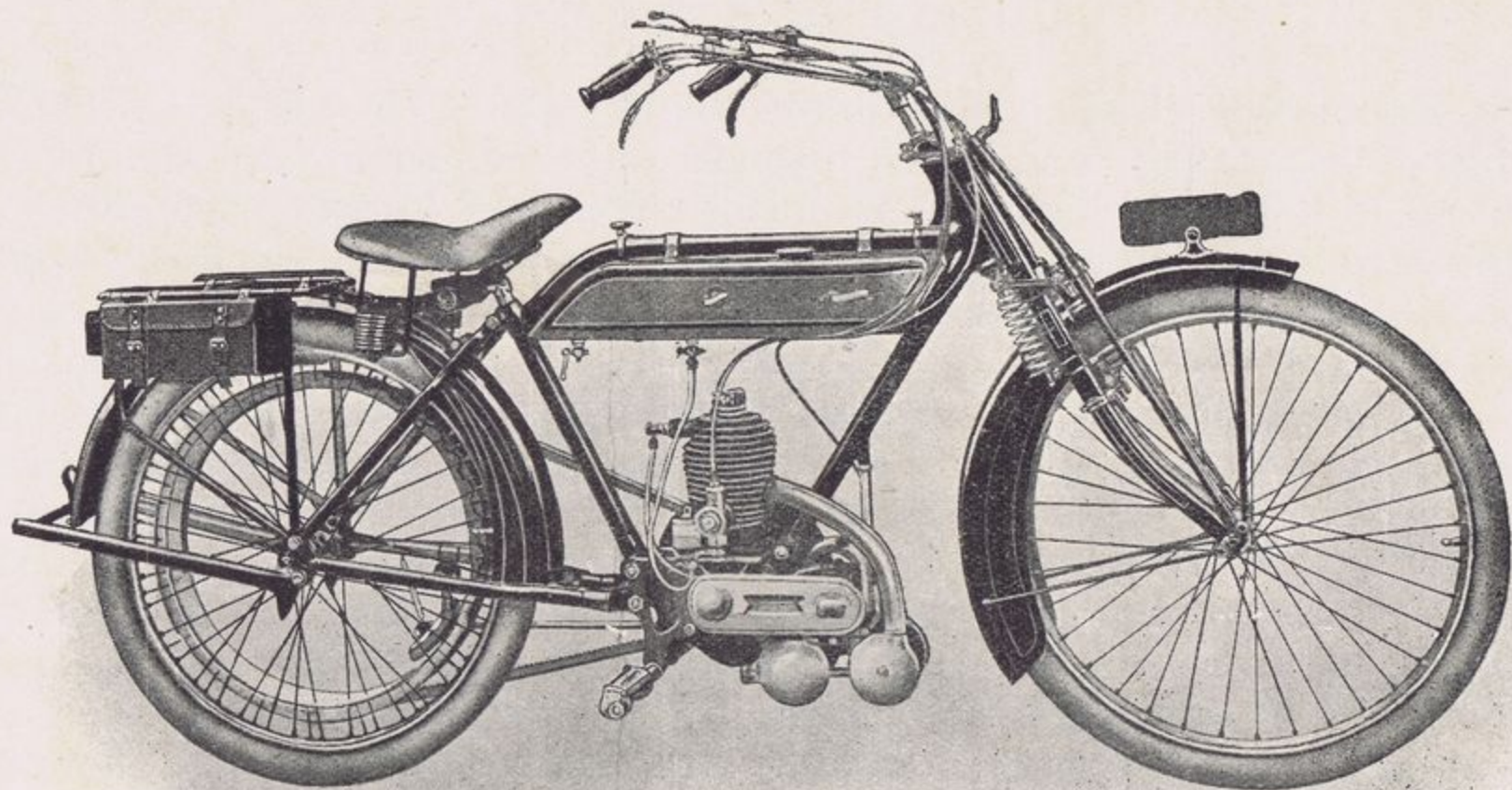


Two-Stroke

THE GOVERNOR

Motor Cycle

BARNSTORMERS.CO.NZ



“The Governor” 2½ h.p. Two-stroke Motor Cycle.

BARNSTORMERS.CO.NZ

FOREWORD

“THE GOVERNOR” Two-stroke Motor-cycle is, in its fundamental design, a totally new departure from standard motor-cycle practice as carried out in the older type of four-stroke engine. ¶ The particular effort of the designer has now been directed towards standardisation of parts, simplicity, and consequent low cost of production. The number of working engine parts has been reduced to a minimum (to four in fact), so that there is no complicated mechanism in the engine to get out of order; nor yet are there so many wearing parts likely to need replacing and paying for. Thus: the valves and timing gear of a single-cylinder four-stroke engine comprise from 35 to 54 working parts, all extremely expensive to make, which are entirely dispensed with on “THE GOVERNOR” two-stroke. ¶ “THE GOVERNOR” is designed on most graceful lines, and its finish and appearance cannot be surpassed by the most expensive motor-cycle. To the eye it resembles the more usual and expensive four-stroke type, but to the ear its “two-stroke purr” plainly advertises the smooth running, perfectly balanced motion of its valveless engine. ¶ The engine of “THE GOVERNOR” has equal bore and stroke of 70 m.m., a capacity of 269 c.c., and develops $2\frac{1}{2}$ h.p. at normal speed. ¶ Two-stroke motor-cycles have wonderful hill climbing capacity, whilst their speed and reliability on the open road have been proved by the fact that for the past five years they have held the record for the fastest lap in the senior T.T. race.

BARNSTORMERS.CO.NZ

FEATURES OF DESIGN



MAIN BEARINGS: In two-stroke engines the crank shaft bearings cannot be of the ball bearing type, as they must be air-tight. For this reason in "THE GOVERNOR" motor-cycle these bearings are of phosphor-bronze, and particularly long, viz., $2\frac{1}{2}$ inches. The leakage of air that can pass these bearings, closed as they are by a film of oil, is manifestly infinitesimal and of no consideration. Any tendency to wear is also minimised by the friction being distributed over the huge surface.

CRANKSHAFT: Both halves of the crankshaft are identical, and when connected by the crank pin form a balanced crankshaft with balance weights solid with the shaft. Thus conforming with the best engineering practice and conducing to the even balance of the engine.

CONNECTING -ROD: This is a one-piece steel forging; accurately machined and finished off as lightly as possible in keeping with the strenuous nature of its work. The big end bearing is a

"Hoffman patent roller bearing," which cannot possibly be seized.

FLYWHEEL: As an outside flywheel is used, it is made with a large diameter; though still saving weight in the engine. The large flywheel further improves the even pulling power of the engine.

LUBRICATION: Is effected by mixing Lubricating Oil with the petrol. This is, without doubt, the best system: as the oil and petrol are mixed in a predetermined and proper proportion, and therefore the lubricant is present in the exact quantity required for any given throttle opening and for any engine speed. By this means of lubrication a rapid formation of carbon in the cylinder is almost impossible. The quantity of oil should be in the proportion of a full half pint of oil to one gallon of petrol.

A small measure is supplied with the machine. Oil to four times the capacity of this measure should be added to every gallon of petrol placed

in the tank. In hilly districts, and where the machine has very heavy work to do, a greater proportion of oil may, by experience, be found advisable.

The oil is drawn through the carburetter and passes into the crank case in the form of vapour in suspension with the gas mixture. In the crank case the oil separates out, and settling on all surfaces runs down channels cut for the purpose into all the bearings.

CARBURETTER : It is difficult to make any hard and fast rule concerning carburetter adjustment; more particularly in regard to the size of jet used. A size 30 jet will give maximum power, but a jet one or two sizes smaller will usually be found better for ordinary running, especially on a two-speed machine, and will give more economical results. Always use the smallest jet that will give regular running with sufficient power. It is advisable to see that there is no air leak in the carburetter and cylinder joint. A leakage of air will militate against easy starting and will prevent the satisfactory running of the engine at slow speeds.

SPARK PLUG : Owing to the extraordinary amount of heat generated by the two-stroke type of engine it is advisable that a suitable plug should be fitted. The most suitable is that in which the points are very heavy. The plug fitted by the manufacturers of the engine is the result of much experimenting, and this type should be adhered to. A spark plug is about the only spare part which it is necessary to carry.

SILENCER : The patent double silencer fitted to "THE GOVERNOR" greatly increases the power of the engine owing to the suction which it creates between the two chambers, whilst it almost eliminates the noise of the exhaust. When the machine is running on the road the noise resembles that of a sewing machine at work and is very little louder.

MAGNETO TIMING : This is somewhat different from the usual timing employed in the four-stroke engine, and should be set to occur rather earlier. For ordinary touring work the following rule gives very satisfactory results:—"With the spark lever fully advanced the platinum points should break when the piston is $\frac{3}{8}$ in. before the top of the stroke."

TWO-SPEED GEAR: The gear fitted is of the counter shaft dog-clutch type driven from the engine by a chain. The drive to the back wheel is by belt, which does not slip owing to the large gear box pulley, and gives ease and flexibility to the running.

The gear box is not fitted with a free engine clutch, as such is unnecessary with a light weight machine like "THE GOVERNOR." On the low gear "THE GOVERNOR" starts merely at a walking pace, and the rider has no difficulty in mounting the saddle. *Note.*—The engine must not be run with a gear lever in neutral position, nor must the motor-cycle be run down a hill with the gear lever in that position. The neutral position is provided solely to enable the motor-cycle to be easily wheeled.

RELEASE VALVE:—In the head of the cylinder is the release valve, operated by a pull-up lever on the handle bar. This lever is for the same purpose as the exhaust valve lever on four-stroke motor-cycle engines; that is, to interrupt the working of the engine and to facilitate starting. It opens the cylinder directly at all times to the air and so prevents the compression and explosion of any mixture within the cylinder.

ADJUSTMENTS:—There are only four working parts in the engine of "THE GOVERNOR" motor-cycle, and therefore it is almost impossible for such a simply constructed engine to get out of order or to give even the least inexperienced rider any trouble. The whole of the valves, valve tappets, cams, and gearing of the four-stroke engine have been dispensed with, and the work done by these expensive intricate parts is done in "THE GOVERNOR" by the piston in the ordinary course of its motion past the ports. As the ports are in fixed positions they cannot get out of adjustment. Possible defects in the working of the engine are limited as under:—Four-stroking is usually caused by using too large a jet; though too much oil mixed with the petrol will produce the same effect. Its presence may be detected by the unusually dark colour of the petrol in the tank. Misfiring may be caused by (1) a faulty spark-plug—detected by trying a spare spark plug; (2) stoppage or partial stoppage of the petrol due to the accumulation of dirt in the gauze strainer of the carburetter below the float chamber. Difficult starting may be due to a leakage of air past the joint of the carburetter to the cylinder. In such a case the engine, when running, will require less opening of the air lever than previously.

DIAGRAM OF "THE GOVERNOR" TWO-STROKE ENGINE.

I—Inlet Port. T—Transfer Port. E—Exhaust Port. C—Crank Chamber. F—Combustion Space of Cylinder

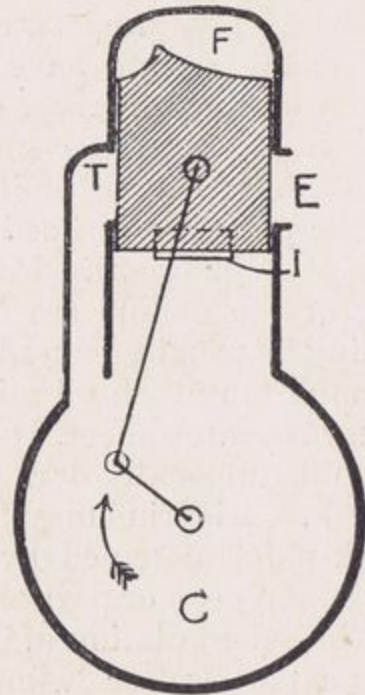


FIG. 1—Showing the Piston ascending and about to uncover the inlet port I. to allow gas mixture to enter the crank chamber.

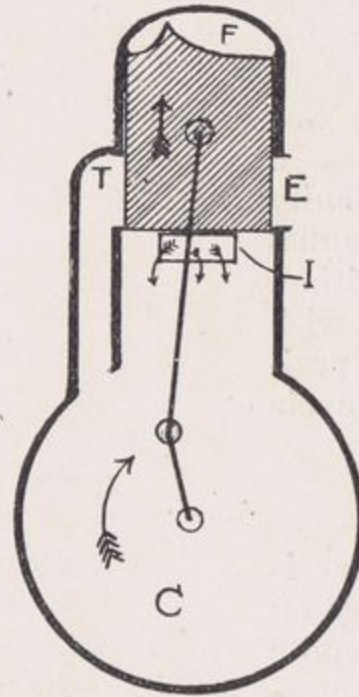


FIG. 2—Showing the Piston on the top of the stroke with the gas mixture compressed in the top of the cylinder F. The transfer and exhaust ports are closed and the inlet port I. is open to allow a fresh charge of mixture to enter crank chamber.

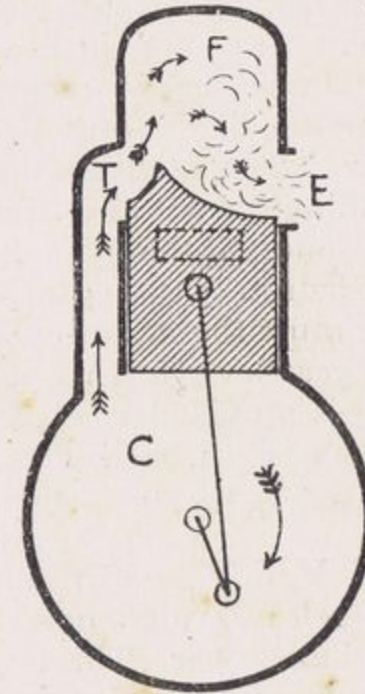


FIG. 3—Showing the down stroke of the Piston with the compression forcing the gas mixture from the crank chamber through the transfer port to the top of the cylinder and the inrush of mixture forcing the previously exploded gas through the exhaust port E. The inlet port is covered by the Piston.

Working Principles of the Engine.

THE two-stroke engine fitted to "THE GOVERNOR" is commonly described as a valveless engine. It has no valves except the release valve which is used only to start and stop the engine. The passage of gases during the cycle of operation is regulated by ports in the cylinder wall and these are covered and uncovered in correct sequence by the reciprocating movement of the piston. There are three such ports and they are shown in the accompanying diagrams.

- (I) Inlet Port, which leads from carburetter through cylinder wall to crank case and which is covered or opened by the bottom edge of the piston.
- (T) Transfer Port, which leads from crank case to cylinder and is covered and uncovered by the top edge of piston in its ascent and descent.

- (E) Exhaust Port, leading from the cylinder to the silencer and atmosphere and which is covered or opened by the top edge of the piston.

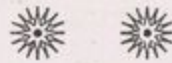
As the crank shaft revolves the piston travels up and down in the cylinder. In its ascent it creates in the crank chamber a partial vacuum which increases until the bottom edge of the piston passes over and so opens the inlet port (I) and allows the gas mixture from the carburetter to be sucked into the crank chamber until the piston reaches the top of the stroke. In descending the piston closes the inlet port (I) and compresses the gas mixture in the crank chamber until the top edge of the piston has passed over and uncovered the transfer port (T). The compressed gas-mixture is thus forcibly injected through the transfer port into the top of the cylinder (F) and helps to force out through the exhaust port (E) the

Working Principles of the Engine (*continued*).

burned gas of the previously exploded charge. This exhaust port is uncovered by the top of the piston immediately before the transfer port is opened and remains opened with the port (T). The piston having now completed its down stroke in the cylinder, the revolution of the flywheel again brings it up to the top of the cylinder, closing both the exhaust and transfer ports and simultaneously opening the inlet port below the piston. A fresh charge of gas mixture is thus allowed to enter the crank chamber through the inlet port (I). The upward stroke of the piston compresses the gas mixture in (F) where the sparking plug is placed. The spark explodes the mixture and the force of the explosion causes the piston to descend. The power thus given to the piston is transmitted by the crank shaft to the flywheel and thence by chain or belt to the rear wheel of the motor-cycle.

In its descent the piston again compresses the gas mixture that has meanwhile entered the crank chamber, thus commencing the operation of the engine again; the explosion taking place each time the piston reaches the top of the cylinder.

The shape of the top of the piston of "THE GOVERNOR" has been specially designed. When the gas mixture from the crank chamber passes through the transfer port to the top of the cylinder, it is directed by a deflector at the top of the piston and sweeps around the dome top of the cylinder so as to force the exploded gases through the exhaust port. The free passage of the exhaust gas, with an entire absence of "pockets," is assured by the bevel at the top of the piston declining towards the exhaust port (E). The whole top of the piston is, moreover, ground smooth so as to offer the least resistance to the outflow of exploded gas.



SPARE PARTS.

1914 MODEL



Catalog No.		N.Z. Price.			Catalog No.		N.Z. Price		
		£	s.	d.			£	s.	d.
G1	... Piston ...	18	6		G18	... Crank Pin with Nuts ...	12	6	
G2	... Piston Rings ...	3	3		G19	... Roller for Crank Pin ...	1	0	
G3	... Gudgeon Pin ...	3	6		G20	... Driving Shaft ...	1	0	0
G4	... Cylinder ...	2	10	0	G21	... Driving Shaft Nut ...	1	6	
G5	... Cylinder Stud ...		6		G22	... Woodruffe Key for driving shaft		9	
G6	... Cylinder Stud Nuts ...		3		G23	... Flywheel ...	1	10	0
G7	... Release Valve ...	3	6		G24	... Belt Pulley ...	9	6	
G8	... Release Valve Spring ...		4		G25	... Magneto Driving Sprocket	7	6	
G9	... Release Valve Seating ...	7	6		G26	... Magneto Driven Sprocket	7	6	
G10	... C & A Washer for Seating		3		G27	... Magneto Chain Cover (inside)	8	6	
G11	... Release Valve Lever ...	1	9		G28	... Magneto Chain Cover (outside)	8	6	
G12	... Release Valve Lever Screw		3		G29	... Magneto Base Plate ...	4	0	
G13	... Release Valve cable drawbolt & nut	1	0		G30	... Silencer End ...	9	6	
G14	... Crank Case (Right half) ...	19	6		G31	... Silencer End (exhaustpipe side)	9	6	
G15	... Crank Case (Left half) ...	19	6		G32	... Silencer Barrel ...	2	6	
G16	... Crank Case Bronze Bush...	6	6		G33	... Exhaust Pipe ...	6	0	
G17	... Connecting Rod ...	15	0		G34	... Tail Pipe ...	3	6	

BARNSTORMERS.CO.NZ

PRINTED BY
W. J. LANKSHEAR,
BARNSBURY PRINTING WORKS,
354 LAMBTON QUAY,
WELLINGTON.

Barnstormers.co.nz

