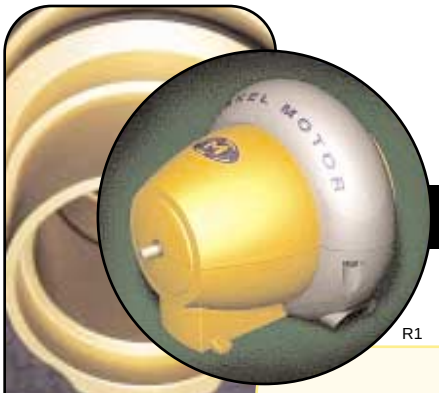

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THE MARKEL MOTOR – THE REVOLUTION WITH IMPULSE POWER

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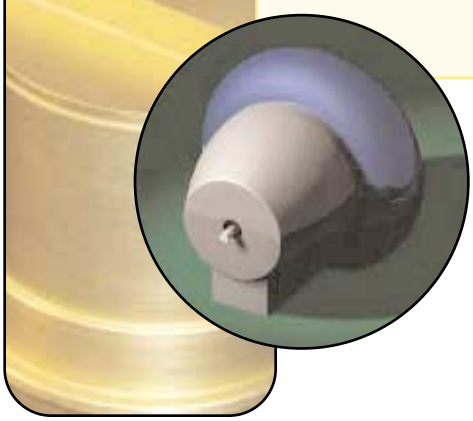


WHAT MAKES MARKEL MOTOR SO IMPORTANT?

It is a radically different kind of engine - a new paradigm in engine design. Problems left unsolved in all IC piston engines built since the earliest times have been addressed and conquered in this unique engine design. Parts and whole systems thought vital are now simply not necessary: cranks in the crankshaft; connecting rod 'big ends'; camshafts and their drive trains; the radiator, coolant, hoses and pumps; piston skirts and "skirt slap". Each cylinder needs only a single valve, the whole engine needs only 3 bearings. There are less than 100 parts in any of our 4 cylinder engines (up to 3.6L/530HP); internal friction is extremely low; each charge of fuel is used twice. Applying all of these advances produces an extremely light and efficient engine.

A VERY EFFICIENT ENGINE MEANS EVERYONE BENEFITS:

- Very High mileage cuts fossil fuel use by 1/2 or more
- Friendly to both the average person's pocket and the GNP
- Extremely Low emissions to help our Environment
- Meet future EPA regulations and breathe easily
- Increased performance means happy drivers

WHAT MAKES THE MARKEL MOTOR DIFFERENT ?

Everything is Different. The Markel Motor is fuelled like a blown 2-stroke and exhausts like a 4-stroke but there is *more*…when the exhaust valves open, special pipes on each cylinder act like a rocket booster. Each charge of fuel is used twice; first to power each piston, then as a burst of Impulse Power. This dramatically boosts engine efficiency.

The Markel Motor works under a totally different set of principles. While it still uses the Otto cycle: intake, compression, power, and exhaust; it does so in a completely different way.

The pistons go in perfect circles, not up and down. The cylinders and block also rotate. No radiators are needed because top dead center at the cylinder is 70 degrees at the crankshaft, improving engine thermodynamics. There are LESS THAN 100 PARTS in our four cylinder engine with available output of OVER 500BHP.

LESS IS MORE

In a lot of ways the Markel Motor uses the less is more concept.

Less parts…about 85.

Less weight…a 135Kg engine can put out over 500 HP.

Less friction…there are only 3 bearings; mechanical efficiency is 98%

Less fuel required…2 to 3 times better mileage in the same application

Less pollution…fuel is efficiently turned into power

Less waste heat…no radiator or coolant is required

Less time to repair…less parts in inventory…less spent on logistics…

Each charge of fuel used to drive the pistons is reused for a Burst of Impulse Power, dramatically improving performance!

IMPULSE POWER CAN CUT OUR FUEL CONSUMPTION BY HALF

THE MARKEL MOTOR TEAM

MARKEL MOTOR ESPAÑA, SA

Vicente Gamon

President

Vicente Gamon Polo is a distinguished Spanish inventor. He conceived the breakthrough design of the Markel Motor while developing fuelling systems.

Juan Carlos Imaz

Director General of Worldwide Operations

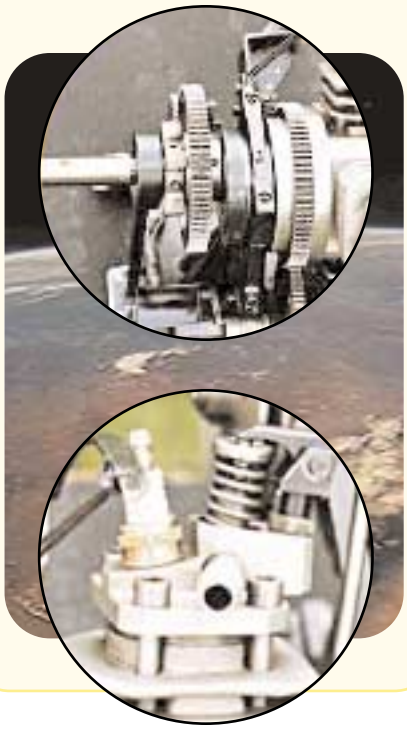
Irun, Spain

MARKEL MOTOR-USA, INC

Ken Hunter

Operations Manager and Director of Engineering

San Francisco, California



COMPRESSION

The block and cylinder assembly, rotating on two mechanical bearings, moves in a circle. The crankshaft, which is driven by pistons arranged in an "X", rotates in the same direction and at the same speed. The shaft is offset from the engine's center of rotation, which causes the two assemblies to track intersecting circles.

The segments of the circle are used by each cylinder in turn. There are four stages: intake, compression, power, exhaust. Compression happens when the piston, rising relative to the location of its cylinder bore as the engine rotates, approaches the intersection point of the two circles, which is then used as Top Dead Center: a spark added here initiates combustion.

COMBUSTION

Combustion occurs as the spark plugs (one mounted on each cylinder head) move past a fixed bus bar. There are no sparkplug wires or direct contact. The first spark occurs just before the point where the two rotating assemblies' circular paths intersect at "Top Dead Center". The spark is repeated many times during the ten degree combustion cycle. Top Dead Center for each piston is 70 degrees advanced with relation to the crankshaft thus power is always exerted at its best angle for efficiency throughout the combustion phase. Hot gases, expanding in the combustion chamber, are then turned into an extra burst of Impulse Power.

LOW VIBRATION

There are two rotating masses which make up most of the engine. One is the cylinder/block assembly, the other is the piston/crankshaft assembly. Both rotating masses are balanced by machines during assembly. The geometry of the connecting rods results in perfect primary balance during engine operation. There is almost no vibration.

QUIET ENGINE

The engine has an external case which collects the exhaust gasses. The case has a port for an exhaust pipe. Case baffles and a muffler in the pipe will produce an almost silent engine.

EXHAUST

Our engine has one valve per cylinder, an exhaust valve which is located in the head. When it opens, exhaust gases are routed out a port in the side of the head. The exhaust, forced to go opposite to the direction of rotation, is used for an extra burst of Impulse Power, which helps drive the engine. This exhaust system results in much higher fuel efficiency.

COOLING

The engine is air-cooled. Since so much of the fuel is burned and turned into mechanical energy, and because of the extremely low friction inherent in the design, very little waste heat is created. The thermodynamics of combustion is vastly improved. Since the fuel is more completely used by multiple ignition, there is far less pollution. The fan-like motion of the spinning cylinders' fins is sufficient to maintain an even operating temperature.

No radiator, hoses, pumps, or glycol coolant is needed because the engine operating temperature is 30 degrees centigrade lower!

With less than 100 total parts the Markel Motor is designed to be removed and rebuilt in three hours

THE MARKEL MOTOR IS DESIGNED WITH EFFICIENCY AND ENVIRONMENT IN MIND

INTERIOR COMPONENTS

4 pistons (no piston skirts are needed)

8 rings

4 connecting rods

8 wrist pins

1 "crank" shaft with no cranks

2 mechanical ball bearings

1 single lobe stationary cam

4 roller type cam followers

EXTERIOR COMPONENTS

1 Cylinder Block

4 Cylinders (each with 1 steel liner)

- *1 Head*
- *1 Valve*
- *1 Exhaust Pipe*
- *1 Valve Spring*
- *1 Spring Retainer*
- *1 Rocker Arm*
- *1 Push Rod*

1 Stationary (Main/Plain) Bearing

3 Support Plates (for Mounting)

4 Toothed Belt Sheaves

1 Jackshaft

3 Toothed Belts

1 Supercharger

1 Carbeurator (or Fuel Injector System)

1 Ignition System

3pc Engine Case/Faraday Shield/Muffler

FUEL EFFICIENCY

Thermal efficiency is up 14%. Overall engine efficiency is 63% (current engines are appx 28% efficient). Fresh fuel mixture is forced into the combustion chamber by the supercharger. It is compressed, ignited, and produces mechanical power because the expanding gases act on the piston, and force it away from the head. When the exhaust valve opens, the thoroughly burned gasses rush out the exhaust port on the side of the head and back along the direction of rotation, so each exhaust pipe acts as an impulse engine, re-using the remaining energy in the burned fuel.

Each Charge of Fuel is Used Twice!

FUEL INTAKE

The fuel system is fed by a belt-driven supercharger. Pressurised fuel mixture, either carbeurated or injected, enters a central chamber through the front of the engine block. The fuel mixture is forced into each combustion chamber in its turn via passages in the cylinder castings. They feed radially arranged ports in the cylinder walls, 'valving' timed by piston motion relative to cylinder motion.

FUEL CHOICES

Gasoline has a very high power density, and infrastructure for its easy delivery exists all over the world. That makes it the fuel of choice for now and the foreseeable future. We can burn it more than twice as efficiently, so we chose it as the prime fuel type, however, **it can be adapted to any fuel**. We have a Diesel design and Military fuel design near completion.

In order to speed the completion of our unique diesel design and our alternate fuel models and hybrids, funding for Research and Development is actively being sought.

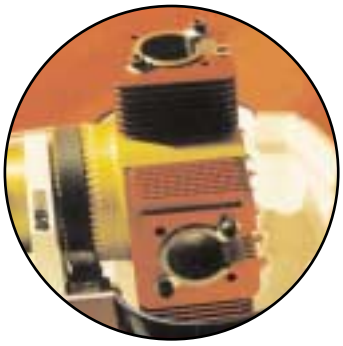
POWER

Power has been produced in essentially the same way since the James Watt's time. The existing engine paradigm is of a piston going up and down in a stationary cylinder with a heavily deflected connecting rod swinging a crank in very wide circles. The new paradigm is a radial four cylinder engine that rotates, with no cranks at all. The Markel Motor's pistons move in a perfect circle, and all of the moving elements are driven in the same direction, at the same speed, yielding very high efficiency with very few parts.

Markel Motor pistons track in perfect circles. Engine RPM is no longer limited by piston strength, since the pistons no longer need to stop and reverse direction four times in each power cycle. When under power, the lever arm to the crankshaft is always at the optimum angle for efficiency. The forces tied up in the rotation add to the power equation.

These and other advances causes the engine to operate in a totally new way. You will see drastically increased overall vehicle efficiency, with up to triple the mileage in any given application.

LOOKING AT THE FUTURE OF ENGINE TECHNOLOGY



CONCLUSIONS:

- **The Markel Motor design has finally advanced the Paradigm of the internal combustion piston engine.**
- **All previous piston engine designs are now obsolete.**
- **Future engines will weigh less, use dramatically less fuel, and Pollute far less.**
- **All existing vehicles can be easily retrofit!**

WHAT THIS MEANS TO ENGINE MANUFACTURERS AND CONSUMERS

We have advanced from the principles of the 17th century into the 21st century bridging an important gap that can lead to a better future for all of us

We believe our designs are an important contribution to state-of-the art engine technology. We want to benefit the country and the world with the introduction of this unique prime mover. We will stretch our fossil fuel supply and clean up our air pollution problems by more efficient fuel use.

Engine tests and studies for power curves and emissions are under way, funded by the US Department of Transportation and the EPA.

The Markel Motor Group is seeking investors and partners to work with us in developing our engines to their full potential.

Please contact Ken Hunter (415-350-3787) with any inquiries, comments or interests regarding participation with Markel Motor. We are seeking business relationships to actively advance the state of the art of **Multi-fuel Prime Movers.**

OTHER WAYS TO CONTACT US:

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The Revolution MARKEL MOTOR with *Impulse Power*