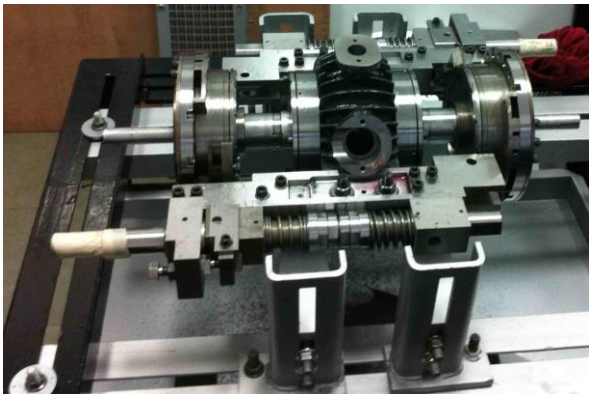
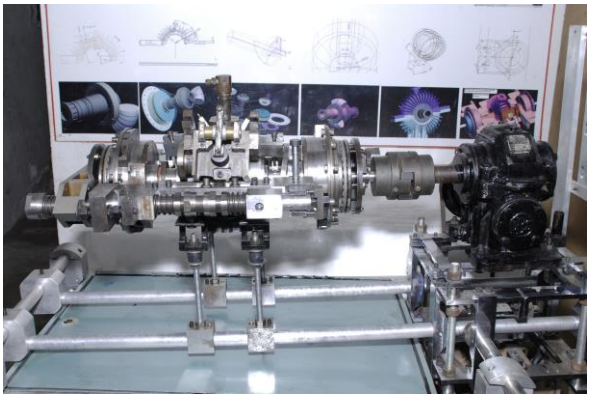
IC² INSTITUTE—GLOBAL COMMERCIALIZATION GROUP
THE UNIVERSITY OF TEXAS AT AUSTIN
3925 West Braker Lane ▪ Austin, Texas U.SA 78759 ▪ (512) 305-0331▪ www.ic2.utexas.edu

: RVCR Technology Based I.C. Engines





Description:

The Globally Patented RVCR Technology is about an assembly of an entirely new set of components with novel geometry that performs a unique sequential motion to be used for making new generation of I.C. Engines and Fluid Handling machines with superior features and higher performance capabilities.

RVCR Technology enables two highly desired features (globally pursued by auto and engine industry through the 20th century) in engines namely downsizing and 'Variable Compression Ratio' (VCR). Rotary and VCR engine concepts are known and various models were developed within industry but these technologies have remained commercially unviable. RVCR is a disruptive new kinematic mechanism with lesser components making a compact, lighter, lower maintenance and low cost machine that combines Rotary and VCR capabilities to deliver commercially viable Downsized Rotary VCR engines. Unlike conventional engines, used in cars which run on only a specific fuel like gasoline (petrol) or diesel, VCR engines can run on a range of differing fuels. Cars with RVCR engines can switch over fuel from petrol to diesel to green fuels like LPG or Bio Fuels, while in operation and delivers enhanced uniform improved mileage in all load conditions (both high way drive and in low gear city drive conditions), for any fuel that is being used.

RVCR Technology Allows smooth transition from 20th century fossil fuel usage to 21st century green fuel without disrupting the existing fossil fuel based economic structures, solveing the Fossil fuel paradox.

Distinctive Competitive advantage factors **of RVCR**

- Fuel efficiency increment: - By VCR 28%- 30%**;** Constant Volume Heat addition attained process (petrol)**;** Diesel Injection reaction energy capture**:** TDC advancing and Retarding
- Specific output increment : - Power generation on every stroke; Reduced FHP by elimination of piston slap; Reduced FHP by piston strokes per power stroke: Reduced VCR drive friction
- Fuel Flexibility : - analogous variation in Compression Ratio through wide range 6:1to 22:1: easy altering of VCR range by changing VCR actuator Plates:
- Downsizing: - Limiting Peaking Pressure on High Loads by reducing C.R; 2 Double acting piston per Unit; Switching to Higher calorific fuel
- Scalability: - large Scalable range, No reversing of inertia forces (out of balance forces).
- Emissions: - Enhanced combustion control by VCR.
- Reduced Weight and Size : -NO dedicated Flywheel: NO gudgeon, Top end bearing, No Connecting Rod: No Crank Case: Reduced Valve Gear.
- Reduced vibration & Maintenance: - No Piston chattering, No Con Rod angularity induced 2nd Order Vibration; Dynamically Balanced Rotor: VCR control External to Crank Case;
- Reduced cost of manufacture: - Reduced material cost; reduced number of Parts per unit Power.
- Disruptive Technology advantage:- Strategically circumvent technology lag with market leader.

Development Stage: -

- RVCR prototype assembly manufacture, mating, assembly, kinematic integrity tests complete.
- Compression tests underway.
- RVCR Computer based virtual models, engineering Design and RVCR specific knowhow, parametric structure involving the interdependencies of the various systems along with a systems integration Plan developed.
- RVCR manufacturing and design Process structure developed and Standardization underway.
- **GYATK** RVCR apparatus Private Limited, India, (Company founded by inventor for commercialization of RVCR) is currently in a Joint project for developing RVCR Engines with its Licensee as engineering design consultancy and R&D services provider.

Intellectual Property Rights: -

- The invention has granted patents in 51 Countries world-wide (including, USA, Countries of the European Union, Japan, China, India, brazil, Russia, South Africa, new Zealand etc.) covering all relevant economic Zones.
- Granted Continuation patents in USA.
- Filing of patents of custom subsystem in process
- Filing of patents for second generation multiple unit RVCR in process

Credits and Approvals: -

- **First Customer**: - An Indian Auto Major (*Confidentiality terms dictates disclosure by permission, subject to intent and purpose of knowing the details in writing*) with global presence acquired application specific exclusive license of the IP rights of technology in Part geography.
- **Commercialization** : - Being adopted and commercialized by the licensee and a Joint technology and product development with project GYATK (Company founded by the inventor's for commercialization of the technology) completely funded by licensee, currently at mid stage
- **External Funding** : -Funded through Angle funding Scheme by KSIDC (Kerala State Industrial development Corporation)
- **Grants** from Government of India. Qualified for and received financial Grants for technology development from DSIR (Department of Scientific and Industrial Research) Government of India.

Competition: -

- **RVCR Engines** : - None. There is no comparable/equivalent technology or product in the market.
- **Rotary engines**: -The only rotary technology available in the market is Wankel Rotary engines adopted by Mazda.
- **VCR technology**: - Various VCR engine test models based on Reciprocating crank Mechanism were developed by auto major's world-wide (including SAAB, Honda, Nissan, FEV, AVL, Lotus, Peugeot etc.) that established gains from VCR, however none were commercially successful for complexity,
- **Closest technology/product: -** Envera from USA, MCE-5 of France.

Requirements: -

- **GYATK** seeks : -Funding/ Investments/ Strategic Business Partner for any or all of the following: -
    - Marketing (Building Channels for technology awareness build up, Brand Building, Market research and sales force)
    - enhancing in-house infrastructure for Virtual engineering & proto manufacture, assembling testing facility
    - New RVCR technology product development to replicate its 1st customer Success.
- Licensee: - IP Right for commercial exclusivity of RVCR Engines and other applications (Wind Energy Power Generator)
- Joint venture: - License cum Joint or Independent product development contract
- Sales force: -

For additional information contact **Jim Vance,** Program Manager, Global Commercialization Group, IC² Institute, **The University of Texas at Austin:** 512-232-3590, 512-970-8442, jvance@ic2.utexas.edu