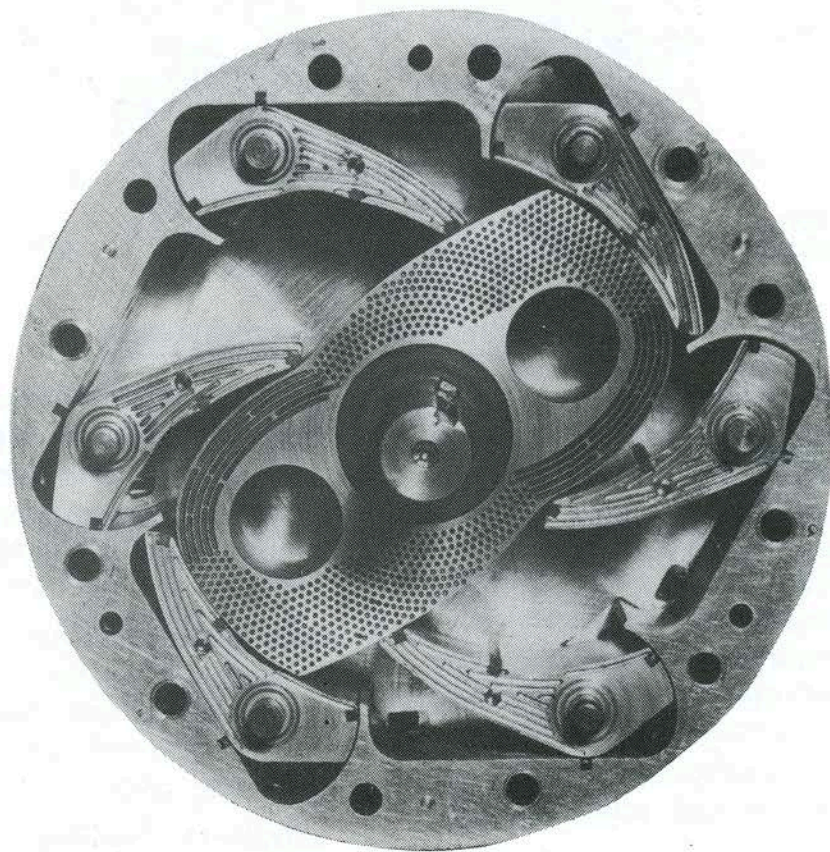


HINCKLEY RADIAL ENGINE



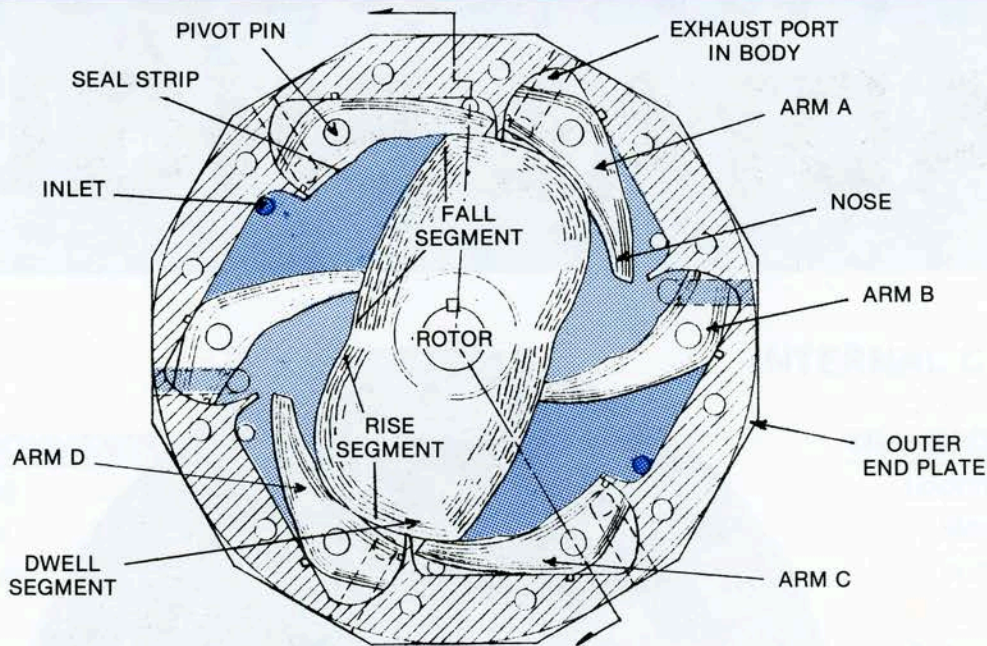
“AN IMPROVED THERMODYNAMIC CYCLE”

AIR • STEAM • INTERNAL COMBUSTION

HIGH TORQUE • LOW SPEED



A NEW MECHANICAL PRINCIPLE W



External Combustion Engine; Air-Steam

Simplicity in Motion. The Hinckley Engine's double-lobed rotor rotates through six arms. The sliding valve of the steam, or compressed air chest, admits high pressure fluid behind each arm, starting just before the nose of the arm leaves the dwell segment of the rotor. Steam admission ends (cutoff) from 10 to 60 degrees of rotation later, while the nose is on the fall segment of the rotor. Expansion continues (between arms B and C above) until the latter arm (C), by following the rotor, automatically opens the exhaust port for the preceding chamber.

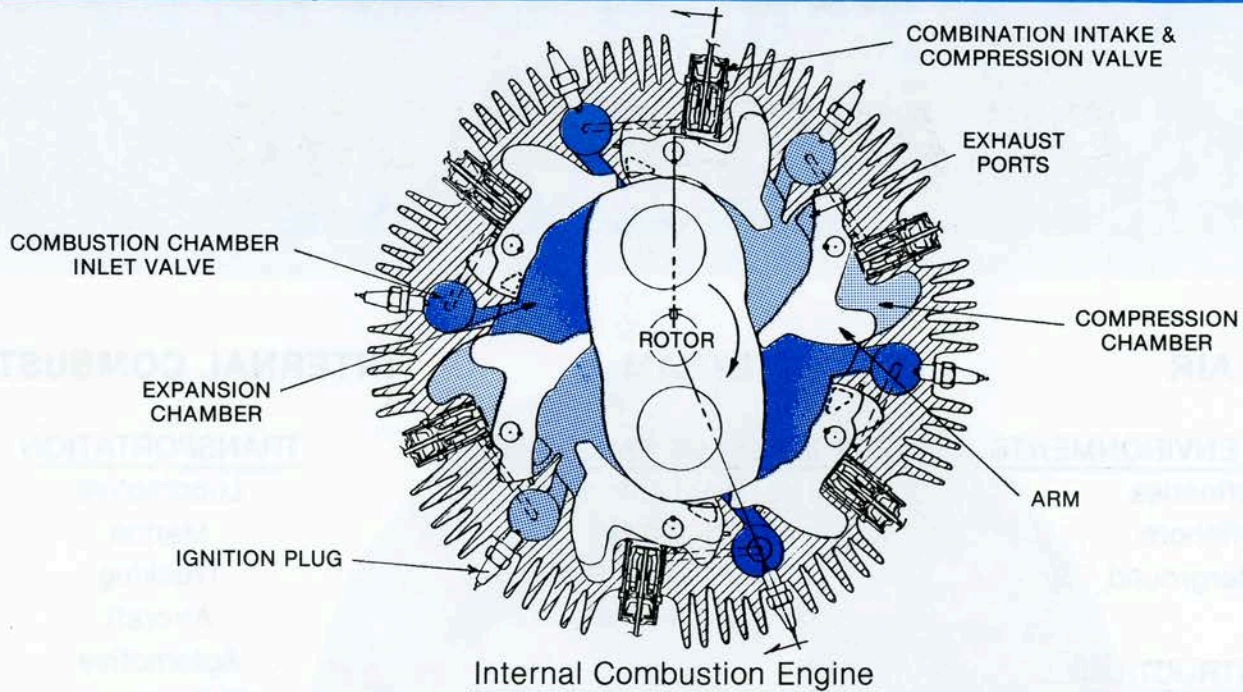
High Torque. Working in pairs, each arm directs balanced force to opposite sides of the double-lobed rotor twice per revolution. This provides *12 power impulses per revolution*, which is equivalent to a 24 cylinder piston engine.

Low Speed. The Hinckley Engine, unharmed by repeated stalling or overload, produces high torque at low speeds. Low speed operation reduces wear and the need for extensive gear reductions and transmissions.

Labyrinth Sealing. Innovative patented design provides effective sealing between arms, rotors, and endplates.

- * **Simplicity** Half the parts of a piston engine, reducing weight and initial cost.
- * **Radial Engine** There is no eccentric shaft, or in effect, a "crankshaft".
- * **Balanced** Symmetrical design eliminates vibration and main bearing load.
- * **Efficiency** Excels; due to (1) energy applied to main shaft at nearly 90 degrees, (2) overlapping of consecutive power impulses, and (3) fewer moving and power-robbing parts.

WITH UNIQUE DESIGN ADVANTAGES



Separation of Events. Adapting the Hinckley design to internal combustion offers even more innovative features, most significantly, the complete separation of events. The compression, combustion, and expansion chambers are independent from one another. This allows for a feature impossible in the piston engine –

*an expansion: compression ratio
greater than one!*

By allowing combustion to continue for up to 60 degrees of rotation insures taking greater advantage of available pressure during expansion. A separate combustion chamber allows

cooler engine operating temperatures, reducing toxic exhaust gases (e.g. NOX).

Mechanical Efficiency. The innovative design of the Hinckley engine applies the expansion force at nearly 90 degrees to the rotor throughout the entire cycle. The pairing of these simultaneous impulses balances the main bearing load so that all available energy is converted into torque.

"The Hinckley Radial Engine, with its revolutionary design and inherent advantages, is ideally suited for applications requiring high torque and low speed."

- * **Low Speed** 0 – 1000 rpm; reduced wear, lower maintenance costs;
- * **High Torque** Provided through simultaneous and overlapping power impulses.
- * **More Complete Combustion** Due to the expansion: compression ratio of up to 2:1.
- * **Adaptable** Easily modified to accept several types of fuel.

A WIDE VARIETY OF APPLICATIONS

AIR

EXPLOSIVE ENVIRONMENTS

Refineries
Offshore
Underground

CONSTRUCTION

Track Drills
Hoists
Winches

TRANSPORTATION

Starter Motors
Golf Carts
Ultralight Aircraft

INDUSTRIAL

Pay-Offs
Conveyers
Take-Ups

STEAM

GENERATION OF ELECTRICITY

Solar Concentrator
(prime mover)
Cogeneration
Portable Generators

POWER PLANTS

Fans
Blowers
Feed Water Pumps

MARINE

Propulsion
Power Generation
Ventilation

INTERNAL COMBUSTION

TRANSPORTATION

Locomotive
Marine
Trucking
Aircraft
Automotive
Motorcycles

INDUSTRIAL

Stationary Power Generation
Compressors
Material Handling Equipment

CONSTRUCTION

Heavy Equipment
Portable Power Generation

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The technology presented here covered under one or more of the following U.S.
patents: 3,924,976 - 3,684,413 - 3,824,044 - 3,801,236 - 3,660,978 - 3,741,170 -
3,773,021 - 3,759,640