

WITHOUT YOU
THERE'S NO
THEM



LaVerne Schumann
"Tribologist"

Engine Lubrication Engineer • ER-VAC E.P.A Technology

P.O. Box 128, Blue Grass, IA 52726 • Bus. Phone: 563-381-2416 • Bus. Fax: 563-381-2409 • www.schumannssalesandservice.com

SCHUMANN'S SALES & SERVICE, INC.

Power Train Warehouse Division

E.P.A. CHALLENGING DILEMMA

Engineering ability to double or triple gas catalytic convertors or diesel oxidation catalyst convertors life span!!

WHAT IS "ER-VAC"?

"ER-VAC" TECHNOLOGY IS "E.P.A." STATE OF THE ART, CRANKCASE EMISSION CONTROL SYSTEM.

Energy Recovery oil pump technology operating in an internal engine sealed vacuum. First time ever, engines will not be vented to the environmental atmosphere or require atmospheric 14.7 P.S.I. pressure to prime the oil pump and maintain operational characteristics of same oil pump.

Schumann's engineering Technology by 15 patents issued, pending, applied for!

ENGINEERING OVERVIEWS

- E.P.A. crankcase of the future emissions.
 - Internal vacuum operational engine.
 - Turbo charged pressure of oil pump intake stream.
 - Crankcase oil mist recovered and recycled.
 - Oil pump not requiring atmospheric pressure to prime or operate.
 - Enhancement of intake suction flow to gear housing main body by pressurized jet stream of oil flow discharge into the suction intake passage. Promotes additional oil volume flow without vented atmospheric pressure and enhances suction of oil pump gears in mesh.
 - Transition of operational horsepower from "spent energy" to "applied recycled closed loop pressurized operational oil stream" into the intake suction cycle of pump.
 - Energy saver operational principles are beneficial to the engine sump oil pool depth with pick up intake tube submerged. The closed loop pressurized by-pass discharge oil injected into the intake suction cycle is not dependent upon gravity drained back of used lubricating oil into the pool depth of the pan sump. Engine and vehicle chassis movement in mild or violent modes relative to the stable level operational ideal attitudes will not affect the closed loop oil injection to the intake suction cycle.
 - Engine horsepower efficiency is enhanced as normal spent volumetric pressurized oil is re-, directed into closed loop energy activated into the working intake suction function.
 - "Energy Recovery" design diminishes the input effort required, yielding the same gallons per minute (gpm) volume and pressure as high-effort pumps. Normal internal hydraulic pump by-pass lock-ups are eliminated. Unique energy recovery engineering converts spent energy into active input oil supply flow and are 30% more efficient and significantly reduce the power needed to drive the pump.
- * Horse-power gains.
* Fuel mileage gains.*

The above proven high performance engine principles, are initially offered for evaluation to traditional E.P.A. compliance engine applications.

E.P.A. ENGINEERING

Combined with established vacuum pump / pan usage by electric, belt or mechanical drive mechanisms, and "ER-VAC" is created. Harmonious technologies at work for performance, automotive O.E.M., industrial or agricultural to obtain horsepower **gains**, fuel mileage **gains** and E.P.A. emissions **gains**.

CRANKCASE VOLATILE VAPORS

- Total volumetric treatment of vapors.
- Vacuum pump evacuation movement of crankcase vapors.
- First phase treatment by mechanical gravity separator.
- Second phase electronic grid separator.
- Third and final active charcoal filtration.
- All treatment phases (1, 2, 3) provide positive lube oil return to oil pan containment sump.
- Positive oil return to sump yields less oil consumption under work load conditions.
- Lower oil temperatures created by vacuum evacuation of hot crankcase vapors.
- Less carbonization of lube oil deposits on all internal crankcase exposed engine components.

"ER-VAC" E.P.A. CONFORMABILITY WITH O.E.M. EXHAUST TREATMENT OPTIONS.

- "ER-VAC" technology is "fuel flexible" in use with: Gasoline, E-10 or E-15, E-85, diesel fuel blends, compressed natural gas, L.P. gas, ethanol, and alcohol or hydrogen.
- "ER-VAC" is compatible with EGR (exhaust gas recirculation) systems.
- "ER-VAC" crankcase technology reduces work load and extends usage life of catalytic convertors. Conventional oxidation catalysts (COC), three-way catalysts (TWC), combination (TWC & COC) convertors are applicable.
- "ER-VAC" diesel oxidation catalyst (DOC) convertors and passive regeneration or active regeneration exhaust filters are benefitted with "ER-VAC".

THE COMPANY AND PERSON: Schumann's Sales & Service, Inc. founded in 1970 by LaVerne Schumann, to service engine builders with high performance and original equipment replacement internal engine components. The company has been instrumental in design, engineering and manufacturing of diverse components (pistons, piston rings, valve train, gaskets and currently performance oil pumps) delivered to the high-performance industry. Founder, LaVerne Schumann is a registered Senior Member of the Society of Manufacturing Engineers (#1237387) and has networked engineering projects with peers in engine development. Schumann's engine technologies are patent issued, pending, or applied status.



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(12) **United States Patent**
Schumann

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(45) **Date of Patent:** Oct. 29, 2024

(54) **PUMP SYSTEM**

(56) **References Cited**

(71) Applicant: **Laverne Schumann**, Blue Grass, IA (US)

U.S. PATENT DOCUMENTS

(72) Inventor: **Laverne Schumann**, Blue Grass, IA (US)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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OTHER PUBLICATIONS

(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation of application No. 17/034,910, filed on Sep. 28, 2020, now Pat. No. 11,493,037, which is a (Continued)

Primary Examiner -- Jacob M Amick

(74) *Attorney, Agent, or Firm* -- Simmons Perrine Moyer Bergman PLC

(51) **Int. CL**
F04C 15/06 (2006.01)
F01M 1/02 (2006.01)
(Continued)

(57) **ABSTRACT**

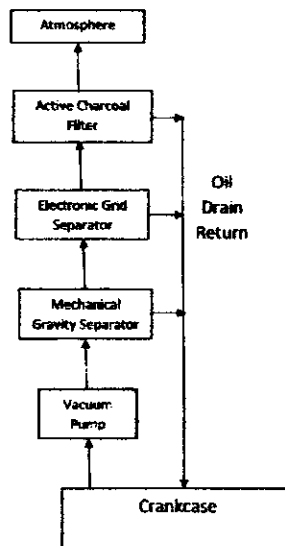
One embodiment of a method for operating an internal combustion engine under a pressure less than atmospheric pressure includes the steps of positioning a vacuum pump such that said vacuum pump is in fluid communication with a crankcase of said internal combustion engine, connecting a discharge of said vacuum pump to a separator, wherein a discharge of said discharge of said vacuum pump condenses in said separator, connecting a vapor discharge of said separator to a filter, wherein said filter removes a portion of volatile organic compounds from said vapor discharge, and venting said filter to an ambient atmosphere.

(52) **U.S. CL**
CPC *F04C 15/0042* (2013.01); *F01M 1/02* (2013.01); *F01M 13/021* (2013.01);
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(58) **Field of Classification Search**
CPC F04C 15/0042; F04C 15/06; F04C 2210/206; F01M 1/02; F01M 13/04; F01M 2013/0422; F01M 2013/0427; F01M 2013/0461; F01M 2013/0466; F01M 13/021; F01M 2013/027; F02M 35/1022

See application file for complete search history.

5 Claims, 29 Drawing Sheets



The
United
States
of
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Seal
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UNITED STATES PATENT

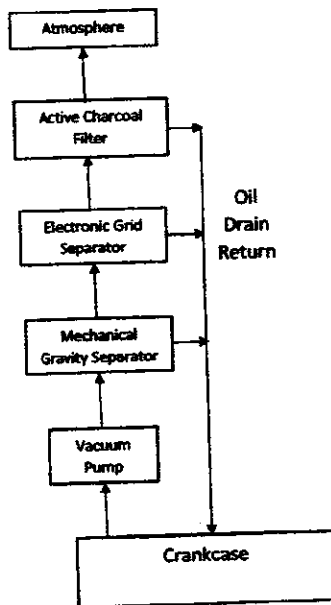
Granted on October 29, 2024

LaVerne Schumann

INVENTOR

12,129,849

PUMP SYSTEM



One embodiment of a method for operating an internal combustion engine under a pressure less than atmospheric pressure includes the steps of positioning a vacuum pump such that said vacuum pump is in fluid communication with a crankcase of said internal combustion engine, connecting a discharge of said vacuum pump to a separator, wherein a portion of said discharge of said vacuum pump condenses in said separator, connecting a vapor discharge of said separator to a filter, wherein said filter removes a portion of volatile organic compounds from said vapor discharge, and venting said filter to an ambient atmosphere.

The Director of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law. Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term of this patent, subject to the payment of maintenance fees as provided by law.

Katherine Kelly Vidal
Director of the United States Patent and Trademark Office