APRIL 1989

MEETING NOTICE

The next meeting will be Apr. 21st. at *CRAGIN FEDERAL SAVINGS & LOAN* 330 W. Wesley St. Wheaton, Ill. -Time - 7:30 P.M. *sharp* Guests are welcome and need not be members to attend the meeting.

THE PRES SAYS

We have a lot of subjects to cover at our April 21 meeting. The first item will be a decision on disposition of the club car. This was postponed at the March meeting due to absence of several FVEAA members. We decided in January to first offer the car for sale at a minimum $2000 price. To date no bids have been received. The second alternative to donate the car to Triton will now be considered.

The FVEAA has several electric car events scheduled; Consumer Week at Moraine Valley and Chicago, the May 6th Rally at Triton, and an additional request for car exhibition at Moraine Valley's Open House on Sunday, April 30th.

If time permits, we will also continue discussion of the petro-electric car design project. A summary of previous analysis is included in this Bulletin for your information.

Bill

F.V.E.A.A.

FOX VALLEY ELECTRIC
AUTO ASSOCIATION
624 Pershing St. Wheaton, Il 60187

FIRST CLASS

ADDRESS CORRECTION
REQUESTED

FEDERAL ENERGY MANAGEMENT PROGRAM - FEMP
USE ENERGY WISELY COMMITTEE

Department of Energy
Chicago Operations Office
9800 South Cass Avenue
Argonne, Illinois 60439

CALL OR WRITE: DOE-FEMP
DR. KAREL KLIMA, P.E.
TELEPHONE: 312/972-2284

March-April 1989

"PRO BONO PUBLICO"
USE ENERGY WISELY
IN ILLINOIS

TO: ENERGY MANAGERS AND COORDINATORS - FEDERAL, PUBLIC AND PRIVATE SECTORS IN ILLINOIS - THE PUBLIC AND CONSUMERS IN CHICAGO, COOK AND DUPAGE COUNTIES

FROM: K.K. THE ENERGY COMMITTEE, DOE-FEMP; THE GREATER CHICAGO COMMITTEE TO USE ENERGY WISELY; THE ASSOCIATION OF ENERGY ENGINEERS CHICAGO CHARTER CHAPTER AND ILLINOIS; THE NATIONAL ASSOCIATION OF POWER ENGINEERS (NAPE); ENERGY AND ECOLOGY COMMITTEE OF NAPE

SUBJECT: 1989 ENERGY CONSERVATION PROGRAM AND REGULAR MONTHLY MEETINGS IN APRIL; THE NATIONAL CONSUMERS WEEK CELEBRATION IN CHICAGO AND IN ILLINOIS - THE 1989 THEME IS: "CONSUMERS OPEN MARKETS"

-TWO MEETINGS WILL BE HELD ON APRIL 27,1989 at 1 to 5 P.M.-

City of Chicago

CONSUMERS OPEN MARKETS

The National Consumers Week will be observed April 23-29, 1989. The sponsors in Chicago, Cook and DuPage Counties, Illinois are planning two meetings for consumers, as follows:

I. The State of Illinois Center, 100 West Randolph Street, Chicago, Illinois, April 27, 1989, Conference Room 9-031, 1:00-5:00 p.m. Agenda: Program Chairman, John Evanoff, Manager, Illinois Department of Energy and Natural Resources -

1:00 p.m. - NO RESERVATIONS ARE REQUIRED TO ATTEND THE PROGRAM:

- Ozone episodes in Chicago, Cook County and in Illinois
- Useful tips for corrosion protection of vehicles in Illinois
- The carpool hotline and ridesharing services in six counties in Illinois
- City of Chicago's sanitation services for citizens/consumers
- City of Chicago's Energy Commission and energy rates for electricity
- City of Chicago's Department of Consumer Services programs for consumers
- New window view films and energy conservation techniques for consumers
- Uniform licensing of power engineers for safety of public and environment.
- A SESSION ON BATTERY DRIVEN ELECTRIC CARS by FVEAA.
- Question and answer period for attendees of the program and consultations

(USE PUBLIC TRANSPORTATION: CTA, RTA, METRA - PARKING IS AT THE PREMIUM)

II. Moraine Valley Community College (MVCC), 10900 South 88th Avenue, Palos Hills, Illinois, Center for Contemporary Technology, Fogelson Theater, 1:00-5:00 p.m. Agenda: Program Chairman, Dr. Karel Klima, P.E., CEM, Use Energy Wisely Committee -

1:00 p.m. - NO RESERVATIONS ARE NEEDED. FREE PARKING LOT.

- Radon gas measurements in your residence for health and safety,
- MVCC employment training opportunities; small business consultation
- Managing energy in consumers environment
- Insulation contracts for consumers to prevent frauds on homeowners
- DuPage county recycling programs for citizens/consumers
- Citizens Utility Board; public participation in setting utility rates
  Energy audits: free business enterprise by Economic Development Corp.
  Energy loans -- for business; MVCC Small Business Development Center
- Panel discussions: Com.Edison, Ni-Gas, IDCCA & MVCC. - Economics.
- DISPLAY OF BATTERY DRIVEN EL. VEHICLES.
- There will be a question and answer period and consultation to consumers

The MVCC is located on 111th Street (south) and Route #5 (LaGrange Road). Plenty of free parking is available south of the Center for Contemporary Technology. The attendance is free. No reservations are required to attend. Bring a friend, neighbor or members of your family.

The Consumer Week Proclamations are available upon request (call 312/972-2284). "Consumers Open Markets" posters are available to organizations. The co-sponsors of the celebration and observation of National Consumers Week in Illinois should attend the scheduled consumers meetings in Chicago or MVCC.

MOTTO: " USE WHAT YOU NEED... BUT NEED WHAT YOU USE.... USE ENERGY & ENVIRONMENT WISELY."

HYBRID DESIGN UPDATE, PART II

14 April, 1989

Data developed for preparation of the "PERFORMANCE" series of papers in 1986, the design review of 19 February,1989, and discussions at the March meeting, have provided a number of parameters useful for definition of the FVEAA petro-electric car. These may be summarized as follows:

PARAMETER	MAGNITUDE	SELECTED
Weight	2500 lbs	(2/19/89)
Acceleration	0-30 in 6 seconds	(6/20/86)
Acc. Force	570 Pounds	"
Acc. Power	25.7 Kw (34 Hp)	"
Road Load	4.3 Kw (4.76 Hp)	"
Aero. Drag @ 60 MPH	12.9 Kw (17.24 Hp)	"
Hill Climbing	17 degrees	"
Top Speed	60 MPH	"
Power @ 60 MPH	18.7 Kw (25 HP)	"
System Voltage	100 Volts (Nominal)	(2/19/89)

From these quantities the following factors are derived:

Peak Current While Accelerating	257 Amps @ 100 volts
60 MPH Current	187 " "
45 " "	100 " "
35 " "	60 " "
25 " "	35 " "

As a first approximation, an alternator delivering 100 Amps @ 100 volts would be adequate to drive the car at a steady 45 mph and not require using battery stored energy. An engine to drive an alternator with this output must deliver 13.4 horsepower. It probably should be rated about 20 hp and operated at a reduced power level. The additional hp would allow the engine to also serve as a power source for a belt-driven air conditioner.

The 9 batteries making up the 100-volt system can be expected to store about 9-10 Kwh of electrical energy. Electrical consumption is expected to be about 300 watthours per mile in urban driving. The battery-only realistic range of the car is expected to be about 20-25 miles.

Operation analysis of the petro-electric car in urban traffic with the start-stops and varying speed requires a more sophisticated approach. This is a subject to be discussed at a future meeting. Perhaps some of our computer experts can devise a program that would provide an analysis of this type of operation.

W. H. Shafer

FVEAA

fox valley electric auto association inc

W H SHAFER
308 S EAST AV
OAK PARK IL 60302

10 March, 1989

To the Editors
Scientific American
415 Madison Avenue
New York City, 10017

The article by the team that built Sunraycer was informative but lacked information that would be useful: what energy consumption in watthours was required per mile travelled? It can be deduced from other data stated in the article as a mere 18 watthours per mile.

The Fox Valley Electric Auto Association regularly utilizes this factor in comparing the efficiency of cars built by our members using available, reasonably-priced components. Eighteen members have constructed electric cars since the founding of our organization in 1974 following the distress caused by the original oil embargo. Driving these converted cars in urban traffic over a 10-year period have indicated an average AC energy input of 500 watthours per mile, as measured by a standard watthour meter.

We believe a practical 2-passenger car can achieve an energy consumption of about 150 watthours per mile as the efficiency of the electric car is improved using the techniques reported for Sunraycer. The interests of electric car enthuasiasts and solar energy proponents begin to converge at this level. Solar cells on 1 square meter of roof surface may be able to produce the required power and with suitable on-board energy storage, the major part of personal transportation needs can be met without depleting our limited petroleum supply and should produce air quality improvement.

We request your permission to reproduce the Sunraycer article in a future issue of our monthly bulletin, distributed to our 43-person membership.

Sincerely

William H. Shafer

William H. Shafer
FVEAA President

Note:

In the acknowledgement of this letter by Scientific American on April 4th, their policy does not permit articles from this magazine to be reprinted. If you are interested, you sould read the article since it is informative.

Smog plan calls for a new California

By Bruce Buursma
Chicago Tribune

CARSON, Calif.—A sweeping and politically explosive plan to clean up the nation's most toxic urban air moved toward adoption Friday as regional officials in southern California voted to impose sharp restrictions on motorists, industry, even producers of underarm deodorants and charcoal lighter fuel.

The plan, which still must be approved by state and federal authorities, would require that all cars be converted to electric power or "clean" fuels by the year 2007.

It also would nearly eliminate free parking in a 13,350-square-mile district covering the sprawling and smog-chocked Los Angeles, Orange, and parts of Riverside and San Bernardino Counties.

And it would ban gasoline-powered lawnmowers, outlaw back yard barbecues that require lighter fluid and require manufacturers of underarm deodorants to reformulate their products—whether aerosol or roll-on—to eliminate compounds that help form smog.

"This is a commitment to clean the air without royally screwing up the economy," Norton Younglove, chairman of the South Coast Air Quality Management District, said after his board approved the plan 10-2 Friday.

The Southern California Association of Governments, another regional planning agency that also drew up the plan, approved it 16-1.

In testimony delivered earlier at the hearing, the air-quality district's deputy executive officer, Pat Nemeth, voiced optimism that southern California would reclaim blue skies through this drastic initiative.

"With today's action, we cast off the attitude that this region is doomed to smog," said Nemeth, whose agency has been charged by the state to reduce air pollution in a four-county area in and around Los Angeles. "Just as we are destined to be the capital of the Pacific Rim, so too clean air, visibility and healthy lungs can be part of the future we demand for ourselves."

The plan, which contains 160 provisions to be enacted over the next 18 years, further envisions a major shift in work schedules to ease traffic congestion, along with proposals for companies to relocate offices closer to where their workers reside. One measure calls for "telecommuting," allowing employees to work out of their homes, linked to their jobs by computer and telephone.

Another warns that drive-through food stands might be limited to cut down on smog-generating engine idling while motorists wait for their orders.

In addition, motorists would have to pay more for tires because radial, rather than bias-ply, tires would be required on cars and light trucks. Radials last longer, and thus throw off fewer of the minute flecks of rubber that contribute to particulate pollutants. In car-crazy southern California, where an estimated 234 million miles are driven each day, that change alone would cut particulate pollutants by 3.1 tons a day, authors of the plan said.

The complex and radical proposal has been taking form for five years, prodded by a federal court order that would mandate the Environmental Protection Agency to impose its own plan if local governments failed to clean up southern California's air, which exceeded the ozone concentration standards on 176 days last year.

Critics of the action, including representatives of the oil and automobile industries, complain that the plan will be too costly and will severely hamper job expansion in an area where more than 12 million people now live.

After the vote, Los Angeles County Supervisor Mike Antonovich lamented the action as a signal "telling business to go elsewhere." He also said the parking-fee proposal would hurt businesses throughout the region.

"It's crazy to charge people to go shopping at their markets and malls," Antonovich said.

The plan must gain approval by the state Air Resources Board and the EPA.

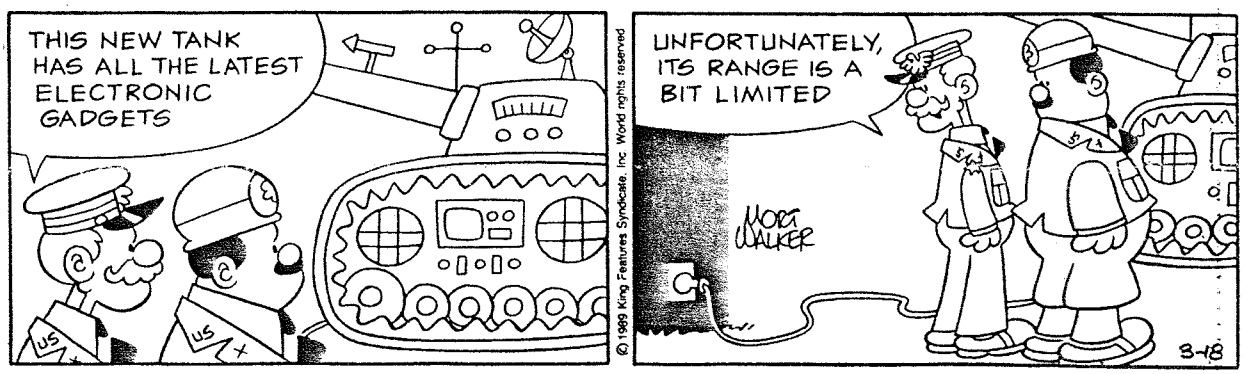
The affected area has about 8 millions vehicles registered with the California Department of Motor Vehicles. About 70 percent of the most critical air pollution is attributed to the traffic, according to William Kelly, a public relations officer for the South Coast district.

The 20-year plan is designed to bring the region into federal compliance for ozone, carbon monoxide, nitrogen oxides and particulate matter by the year 2010.

Proponents of the plan have estimated that compliance will cost $3.9 billion a year for the first five years. They also contend that it will create as many as 80,000 jobs by 2010.

But critics point to a study by National Economic Research Associates for the California Council for Environmental and Economic Balance, a document that predicts the program will cost every southern California household $2,200 a year, for a total of nearly $13 billion a year. That study further warned that 52,500 jobs would be lost.

BEETLE BAILEY



Integrated Inverter and Battery Charger

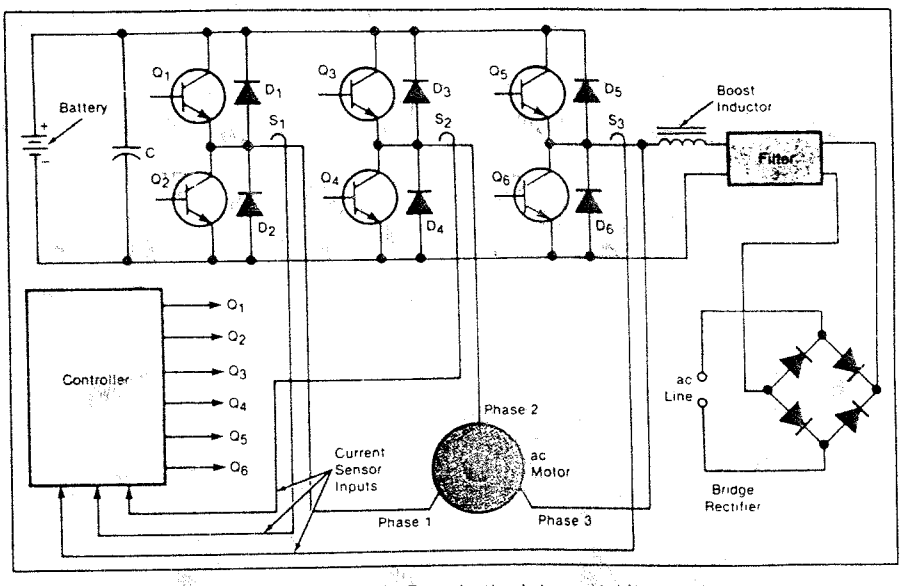
A dual-function circuit would obviate duplication of electrical components and structural parts.

NASA's Jet Propulsion Laboratory, Pasadena, California

A proposed circuit would combine the functions of dc-to-ac inversion (for driving an ac motor in a battery-powered vehicle) and ac-to-dc conversion (for charging the battery from an ac line when the vehicle is not in use). The circuit would automatically adapt to either mode; there is no need to set switches and relays or disconnect cables.

The design of the integrated inverter/charger would eliminate the need for duplicate components, save space, and reduce the weight and cost of the vehicle. It would offer similar advantages in such other applications as load-leveling systems, standby ac power systems, and uninterruptible power supplies.

The circuit would include a three-phase bridge inverter employing pulse-width modulation, an input capacitor, a line filter, a line rectifier, and control circuitry (see figure). For inverter operation, the controller would switch transistors Q_1 through Q_6.



Many Components Do Double Duty in the integrated inverter/charger.

Many electrical components could be shared by the inverter and charger portions of the integrated inverter/charger. Other parts that would not have to be duplicated include the battery-connector plug, bus connections, heat sinks, cooling fan, housing, and supporting structure.

This work was done by Wally E. Rippel of Caltech for **NASA's Jet Propulsion Laboratory**. *For further information, Circle 89 on the TSP Request Card.*

Inquiries concerning rights for the commercial use of this invention should be addressed to the Patent Counsel, NASA Resident Office-JPL [see page 18]. Refer to

NASA Tech Briefs, September 1988

Suburban LIFE Graphic — Wednesday, April 5, 1989

Eight Argonne employees get patent royalties for inventions

Eight area inventors at Argonne National Laboratory received patent royalties last week for technics developed in conjunction with the University of Chicago.

John Ackerman, Dennis Dees and Joseph Dusek, of Downers Grove; Donald Busch, Hinsdale; and John Young, Woodridge, helped develop a monolithic, solid oxide fuel cell. According to Argonne, this fuel cell, which is like a battery with a fuel tank, has the potential to deliver twice the power and fuel economy of an automobile engine of equal weight.

Solomon Zaromb of Hinsdale contributed to the Chemical Parameter Spectrometer, a portable instrument that detects and analyzes airborne toxic gases.

Ronald Wingender of Woodridge helped invent Argonox, a chemical additive that can remove more than 70 percent of the nitrogen oxides from stack gases of coal-powered plants equipped with wet scrubbers.

Dieter Gruen of Downers Grove invented a method for making superconducting wire from materials that lose all resistance to electrical current when cooled to the temperature of liquid air.

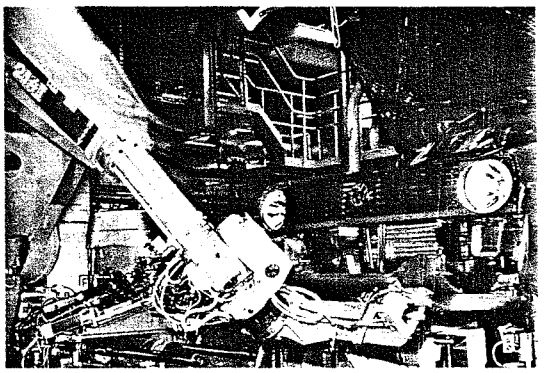
Engineering For Tomorrow... Today

Laser beams, high tensile composites, heat resistant ceramics, holographic interferometry and intelligent robotics are just a few of the bywords of an exciting and challenging new aspect of automotive research and development: materials technology.

This relatively new field originated from the philosophy that improvements in automobile construction, utilizing new technologies, would reduce the automobile's impact on the environment, and provide better economies in production and vehicle operation.

Volkswagen AG, recognizing the need for centralized research and development in the ever expanding materials technology arena, constructed a new, modern facility in Wolfsburg, West Germany, in 1984. Called the Volkswagen Group, this division leads a global effort toward streamlined manufacturing techniques.

One aspect under development involves the substitution of fiber-reinforced plastics for commonly used steel. Reductions in fuel consumption through reduced weight, as well as decreased component vibration, are but two of the advantages of materials substitution research. New ceramic materials are being tested for heat absorption (piston heads are just one application). A piston coated with ceramic material, for example, created less friction and heat in test results. This aspect could lead to longer engine life and increased fuel economy.

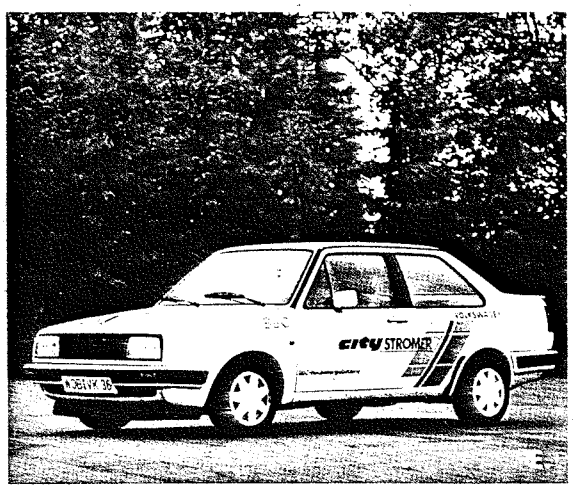


Holographic interferometry is a phrase that means the measurement of an object using dimensional light waves. This technique can show the amount of vibration a particular component is subjected to during the course of vehicle operation. Some of the vehicle components being tested include brakes, wheels, axles, exhaust systems, and engine crankcases and connecting rods. Reducing the vibration inherent in vehicle operation can increase component life.

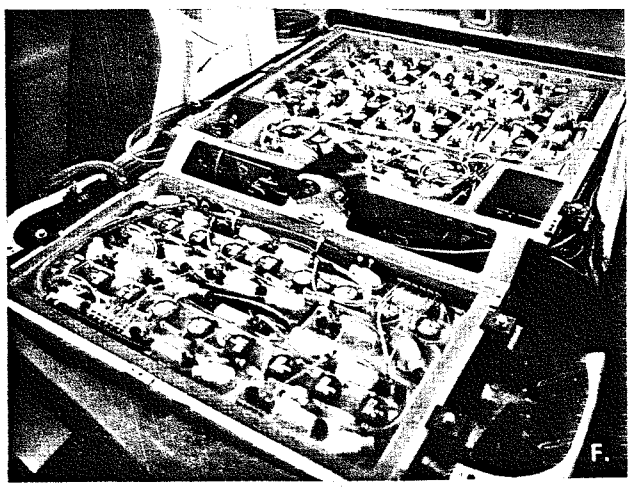
Another exciting aspect of materials technology centers around the use of laser beams. Laser technology is being used to investigate the fuel flow and combustion processes within the engine. These tests may make possible improvements in the design of engine combustion chambers, aimed at reducing fuel consumption, noise and emissions.

A leader in automotive robotic assembly since as early as 1962, Volkswagen is currently pioneering computer-controlled robotic systems that have limited decision making capabilities. For example, new robotic equipment can now check component production accurately; machines monitoring machines. Over 1,200 robots have been brought into service to date.

Far-reaching in consequence, borrowing from fields as varied as spaceflight and medicine, the researchers at the Volkswagen Group are striving for ever-increasing economies and efficiencies. The end results of these efforts may one day be seen in Volkswagen showrooms, and, ultimately, in your driveway.



E. The Volkswagen CitySTROMer, an electric powered test vehicle, has already shown to be suitable for use in innercity traffic or short commuter distances. Power costs of the electric vehicle are less than fuel costs for petrol-engined vehicles.



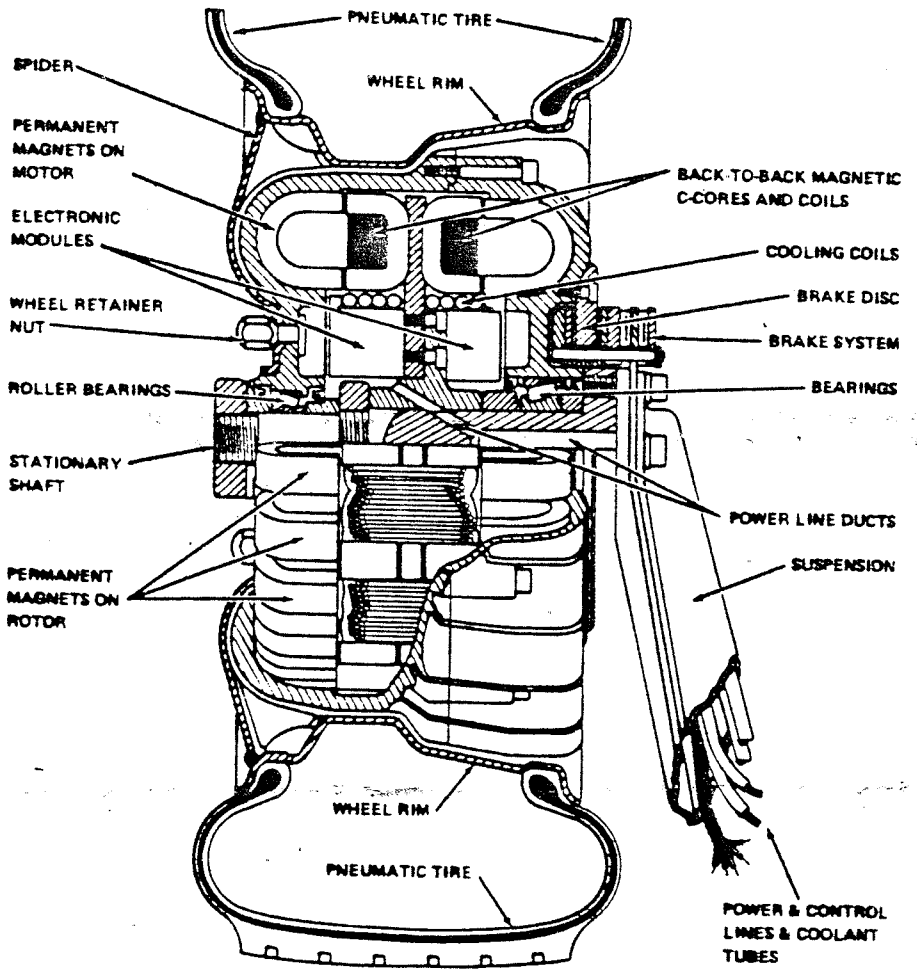
F. High-energy batteries store about 4 times the energy of traditional lead-acid batteries. The battery can be recharged at a conventional 220V plug in.

POWER WHEELS

There is nothing new about putting electric power plant directly into the wheels of a vehicle. In fact, the first patent granted in 1898 used a D.C. motor coupled through planetary gears to the wheel and more than fifteen consecutive patents used different variations of the basic concept. In practice the idea was used for pre-rotating the aircraft landing wheels or actually driving eight-foot diameter wheels on the giant vehicles used in difficult land explorations.

The latest patented Power Wheel is different in construction since it does not use planetary gears. It uses permanent magnets in the rotor and magnetic coils in the stator controlled by a sophisticated, electronic system of brushless commutation. As the electric current is fed into the electromagnets of the stator, the magnetic fields thus created exert push-pull forces on the permanent magnets forcing them to rotate the whole wheel being attached directly to it.

The Power Wheel's speed control is provided by the cyclo-inverter electronic control system, located outside the wheel; the system uses micro-programmed control for a forward or reverse operation, which can also provide regenerative power for the batteries under coasting condition. The most practical advantage in using the Power Wheels is the application of a 5 hp wheel in a four-wheel-drive electric.



POWER WHEEL by Beishline & Goldman