FVEAA NEWSLETTER
May 1984

MEETING NOTICE

The Fox Valley Electric Auto Association meets on the third Friday of each month in the lower level of the Mid-America Federal Savings Building which is located at 250 E. Roosevelt Road in Wheaton, Illinois. Our meeting this month will be on May 18, at 7:30 p.m.

We would like as many members as possible to bring the cars they are working on to meeting. This will be a good opportunity to share with other members problems you have encountered and how you were able to solve them.

FROM THE EDITOR

Would anyone like to volunteer to make up the "dummy" of the Newsletter? I would take it from there.

FOR SALE '64 Renault Dauphine fully-restored car - $1500. by Roger Sutfin - 858-4788, or 858-2189 and leave message. Would also like to obtain a narrow, 3-wheel electric scooter. Something that could be fixed up would be all right.

FOR SALE '81 Fiat Strada four-door Hatchback with sun roof. Lectric Leopard - blue- Model 96A - 3000 miles. Runs perfectly. Cost $14,000 new - asking $3400. by John Kennedy - 312-687-6398

FOR SALE electrified Fiat '74 four-door, GE motor, 72 volt system, 12-6 volt batteries, SRC Control. by Marion F. Bramel- (312) 553-5344.

FOR SALE '75 Ford Pinto - two-door - Engine, and the exhaust and fuel systems have been removed. Would like to get $500. by Richard Cole 682-9317 or 665-8045.

FVEAA

fox valley electric auto association inc.
624 Pershing St. Wheaton, Il.
60187

MINUTES OF FVEAA REGULAR MEETING
April 20, 1984

The meeting was called to order by our Vice President, Mr. Dana Mock at 7:44 p.m. Our President, Mr. Joe Pollard was out of town.

The treasurer, Jack Cahill, read his report. Our balance last month was $1098.06. This month it is $1142.76, based on income of $47.00 and expenses of $2.30. The treasurer's report was approved as read.

The minutes of last month's meeting were published in the April newsletter. They were approved by the membership as published.

The desirability of making information contained in the California Electric Vehicle Newsletter available to all our members was brought up. John Ahern, our Corresponding Secretary, gets a copy of this newsletter and has been turning it over to the President for disseminations. From time to time we have in the past included noteworthy articles from that newsletter in our own newsletter. It was resolved that this practice would continue. In addition it would be the policy of the FVEAA to have the California newsletter available for members to read at our regular meetings.

The prospect of having a rally this year was brought up. The membership was in favor of such an event. The club is in need of a volunteer to put such an outing together.

Jack Randerson brought and displayed one of the Alco 2000 batteries purchased at $38.25 each from the EZ-GO Golf Cart Battery Company in Lake Zurich, IL. It appears to be a very good buy!

The meeting was officially adjourned at 8:12 p.m. It was lightly attended by 21 members.

Following the regular meeting, our member, Andy Chernivsky gave us a talk on the use of wind power for generating electricity. Andy discussed the history, technology and current state of the art of applying windmills to the generation of electricity. Andy has an actual working power-generating windmill on a 45' tower in his back yard in Downers Grove. His recounting of the trials and tribulations which he had to overcome to realize his ambition were very interesting and highly informative, particularly to anyone who might be considering such a project.

EV Development 'Firsts' Cited at Annual Conference

The electric company that has logged more than 250,000 miles on its fleet of electric cars, Detroit Edison, has made a significant contribution to the development of electrics. This was evident as the International Electric Vehicle Council Conference, held this week in Dearborn, MI, highlighted the major progress made in the electric vehicle industry.

"Enthusiasm, acceptance, performance and efficiency have been high in our ongoing electric car demonstration program," said Philip J. Lenihan, Detroit Edison vice-president for marketing and customer relations. "The technical knowledge gained at our electric car service center and passed on to others in the field has been invaluable."

The utility has been successfully operating a fleet of 24 electric cars in a demonstration program funded in part by the U.S. Department of Energy (DOE) since 1981. The electric cars are driven daily by employees and their families to demonstrate how well electrics fit the urban transportation needs of the typical family.

At the conference the company displayed and reported on many electric vehicle "firsts," including a credit-card-operated "Park-n-Charge" meter that looks like an automatic teller and is designed to be used in public parking areas. Also presented were details of the first battery monitoring program resulting in increased reliability and dependability for electric vehicles.

In another first, Detroit Edison has signed a *new* contract with the DOE to conduct extensive electric vehicle component evaluation, according to Lenihan.

The company's evaluation will mark the first on-the-road testing, outside a laboratory setting, for many vehicle components.

Over the next year Detroit Edison will evaluate nickel-zinc batteries, state-of-the-art lead-acid batteries and a new electric battery monitoring system.

"The new DOE agreement gives Detroit Edison the opportunity to acquire on-the-road experience with highly advanced battery systems and components beyond the experience gained as a result of the company's ongoing electric car demonstration program," Lenihan said. "This contract is another important step in developing the electric vehicle industry and bringing electrics closer to mass-production."

Under the new agreement, Detroit Edison is operating two electric cars fitted with nickel-zinc battery packs from the Delco-Remy Division of General Motors Corp.

In a separate demonstration Detroit Edison also installed state-of-the-art lead-acid battery packs from Johnson Controls' Globe Battery Division in two of its electric cars.

In addition to testing batteries, Detroit Edison will examine a thermal-management system designed to keep battery packs at a uniform temperature in both hot and cold weather. The system was installed in the two Detroit Edison electric cars equipped with Globe batteries. Keeping the temperature constant, near 90 degrees Fahrenheit, will help extend the batteries' range in cold weather.

Detroit Edison also is evaluating a new electric car battery-monitoring system from Alber Engineering, Inc. This system will identify and locate weak or defective batteries *while the vehicle is being driven* and may help prevent premature battery damage or failure.

All testing and maintenance on the electric cars will be performed at the company's Electric Car Service Center. The center, a first-of-its-kind facility, is dedicated to servicing the company's fleet of electric cars. Results from the projects will be given to the DOE.

Detroit Edison's efforts are enhanced by the recent formation of the Electric Vehicle Development Corporation (EVDC). Detroit Edison is a founding member of EVDC, the first organized effort by electric utilities to encourage the rapid development of electric vehicles, according to Lenihan.

"The purpose of EVDC is to direct a unified national effort to help put electric vehicles into commercial use where the mass-produced electric vehicle has a cost advantage for fleet operations," Lenihan said.

EVDC will complement the research and development activities of DOE, the Electric Power Research Institute and individual manufacturers by planning and organizing large-scale joint vehicle purchases and demonstration projects.

EVDC activities already underway include the completion of a national electric vehicle introduction strategy and business plan, specifications for an initial electric vehicle fleet and a detailed market analysis. The founders hope to initiate broad electric vehicle introduction within the next five years.

$LiSO_2$ Battery Military Applications

The Advanced Battery Systems Division of SAFT America Inc., a leading manufacturer of energy systems for the defense industry, is producing a new Lithium-Sulfur Dioxide Battery for use in military battery packs.

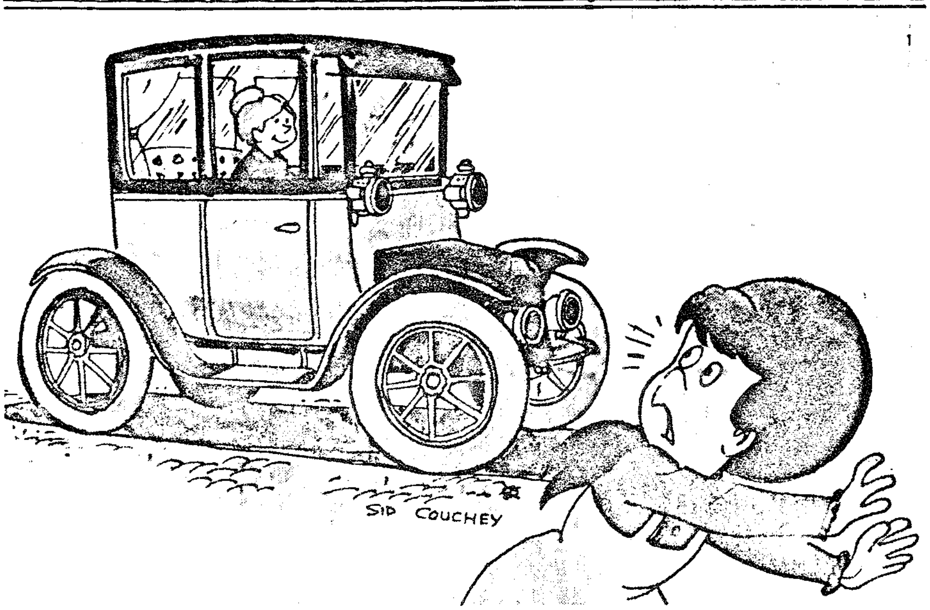
The $LiSO_2$ couple is a reliable electrochemical power source used for defense communication systems, according to Bob Calvert, director of marketing. The battery is a spiral construction of cylindrical cells.

The Lithium-Sulfur Dioxide Battery is a high-energy primary battery system with a service life of more than four times that of conventional batteries, Calvert said. It is capable of performance over a broad temperature range and has an exceptional shelf life of up to 10 years.

SAFT's Advanced Battery Systems Division specializes in design, development and production of thermal batteries for the defense industry. The company recently expanded its thermal battery line and diversified into lithium-sulfur dioxide, lithium-thionyl chloride and silver-zinc primary batteries, and produces lithium-manganese dioxide, lithium-copper oxide and lithium-silver chromate.

Lithium batteries are the power source for today's electronics and for the future, SAFT executives believe. Primary cells and batteries using the lithium anode combine energy densities up to 1,000 watt-hours per cubic decimeter with shelf/active lives of up to 10 years or more.

The Advanced Battery Systems Division is located in Cockeysville, MD about 15 miles north of Baltimore. The new 34,000-sq.-ft facility is completely equipped for electrochemical battery research, development, testing and production. Specialized analytical, environmental and inspection test equipment provides quality control and product performance in military specifications.



Adventures with Electric and Early Gasoline Automobiles

By Elizabeth S. Allen

My mother bought a Baker Electric Automobile when I was seven years old. It was called a "Lady's Automobile" because it was driven by a horizontal bar and had a hand brake on the side which made it easy to operate. It resembled a surrey (with no "fringe on top"), was large enough for two adults and one child, and had open sides with drop curtains for rain and also, a speed of fifteen to twenty-five miles per hour. Mother, who had ridden in fox hunts, driven horse and surrey, also raced in sailboats in regattas on the Potomac River, soon conquered this monster and named it "Nellie". She and I enjoyed daytime visiting, showing off to her less ambitious friends, trips downtown and around the Speedway, now Hains Point on the Potomac River.

The first time we drove Nellie to Alexandria, Virginia, we passed through a settlement where children were playing in the street. When they saw us, they ran home yelling, "Come see the buggy running with no horse!" About 100 people flocked around us and my big brother, Dell, gave rides to all who were not afraid.

One night when Dell was driving his girl and me around the Speedway, I asked him to teach me to drive. It was not complicated, I must move the bar on a straight course and keep away from the curb, angling it for curves; the hand brake was easy to use for slowing and stopping. Dell's girl also learned to drive that night.

I promised never to drive alone. However, like Eve, I disobeyed. One day Kann's Toy Department phoned to say that the bisque "Kewpie" dolls had arrived and one had been reserved in my name. Mother said she would take me downtown after lunch, but her aunt Fan came to visit, so Mother said, "We'll go tomorrow."

However, I had decided that two "Kewpie" dolls were better than one, so I got in "Nellie" and drove her carefully to Kann's, keeping alongside a street car, stopping when it did. Soon I parked Nellie and went to the toy department.

The saleslady let me sign for two "Kewpie" dolls instead of one, as she knew I was the pet of the family, my brother Dell being nineteen years older than me. She left to answer the phone and returned smiling and offered to show me some new things for my doll house.

I became so interested in the tiny cooking utensils, dishes, glasses and silverware that I jumped when Dell said, "Get your package and let's go home." On the way home he told me that I had caused Mother to report Nellie stolen, that a policeman had phoned him that her auto was running driverless downtown, also that mother was phoning my friends to locate me. It was only by the grace of God that I had not had an accident. I was very sorry, especially since my punishment was no allowance for two months. (My parents did not believe in whipping me.)

Mother decided, then and there, to sell the Baker auto and she bought a Rausch and Lang Brougham electric auto, which was too complicated for me to drive. This had a body which looked like the Royal Coach, upholstered in soft grey velour, with two cut-glass vases for flowers and silver topped cut glass vials for perfume, powder and smelling salts in the glove compartment. There was room for four or more people, depending on size. Mother named it "Dutchess". We drove it to Baltimore, Maryland, Alexandria, Virginia, and once on a publicity drive to New York City, stopping at friends' houses and cities with charging equipment for charging the batteries. Duchess could go forty miles per hour on some roads and showed no sign of wear and tear, but we blew out twelve inner tubes and four tires. Mother sold it to a friend in 1920 who gave it to the National Museum in Washington, D.C., in 1935.

A METHOD OF OBTAINING REGULATED HIGH VOLTAGE CHARGING CURRENT FROM A 12v. ALTERNATOR AND REGULATOR FOR USE IN A SERIES HYBRID EV SYSTEM

- Ric Barline, Siskiyou Energy Systems (408/358-0289)
16892 Mitchell Ave.,
Los Gatos, CA 95030

In a series hybrid system, a DC generator is required to charge the propultion battery pack. Many designers use surplus 30v. generators for this purpose. As discussed in a previous paper, this approach has the problem of being unable to charge battery packs above about 36 volts. Another problem with using 30v. generators is that voltage regulation requires a surplus regulator which usually comes with no instructions or warranty.

Recently, Siskiyou Energy Systems (SES) has devised a method of obtaining regulated, high voltage charging current from a conventional automotive 12v. alternator and regulator. This approach is simple and relatively inexpensive. Automotive alternators are available up to about 100 amperes. With our system an alternator may be used to not only charge battery packs up to about 120 volts, but also to regulate the charge voltage and hence charge rate.

1) Obtain the appropriate alternator and regulator. The regulator must be external to the alternator. Either solid state or relay type regulators may be used.

2) Connect the alternator and regulator so that it will charge and regulate the first 12v. battery (or the first two 6v. batteries) in the propultion battery pack. See figure #1. Since this is how the alternator and regulator were designed to operate, any difficulties with this step should easily be solved.

3) Now disconnect the wire coming from the +BATT. terminal of the alternator and reconnect it to the most positive terminal of the entire battery pack. See figure #2. This completes the proce dure.

Theory of Operation: Since the regulator is still connected to the first 12v. battery in the string of batteries, it will continue to regulate the voltage on this battery. Now assuming that all the batteries in the pack are of equal condition, whatever voltage appears across the entire pack will divide equally over all the batteries. Therefore, by regulating the first battery, the regulator will likewise regulate the voltage of the entire pack. For example, say the battery pack consists of twelve 6v. batteries for a 72v. system. The regulator

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is connected to +12 volts away from zero (the most negative side of the battery pack). Now as the alternator charges the entire pack, the voltage of the entire pack will sooner or later exceed 84 volts (7v. x 12). When it does so, the +12 voltage will exceed 14 volts (7v. x 2), and the regulator will cut off current to the field of the alternator. Thus the total battery pack is regulated to 84 volts.

IMPORTANT NOTE: The alternator housing is internally connected to the negative side of the battery. Therefore, if the alternator is mounted to the vehicle chassis, the negative side of the propulsion battery pack will become electrically connected to the vehicle chassis. If an isolated battery pack is required, the alternator must be isolated from the vehicle chassis.

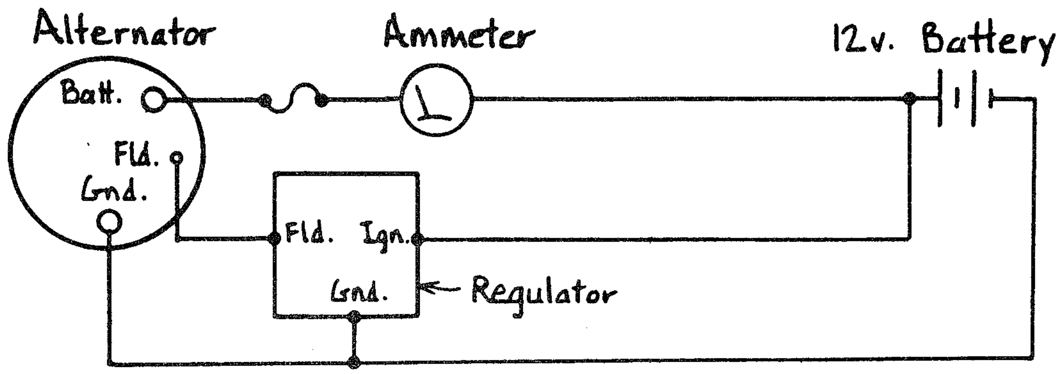


Figure # 1

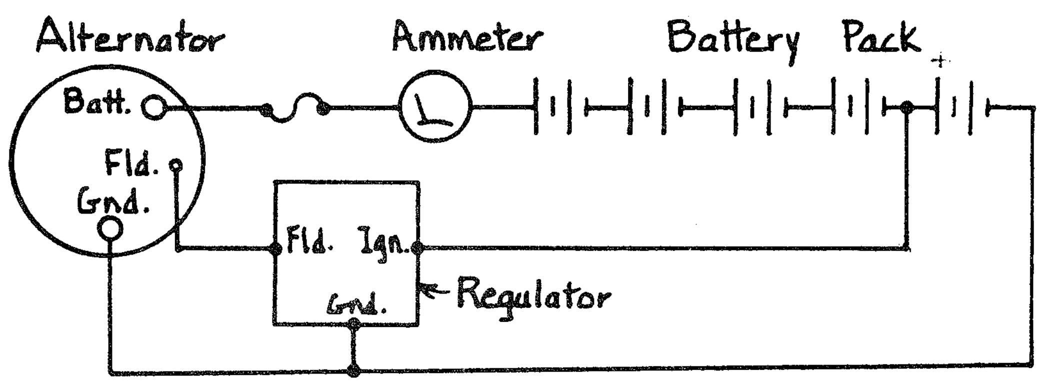
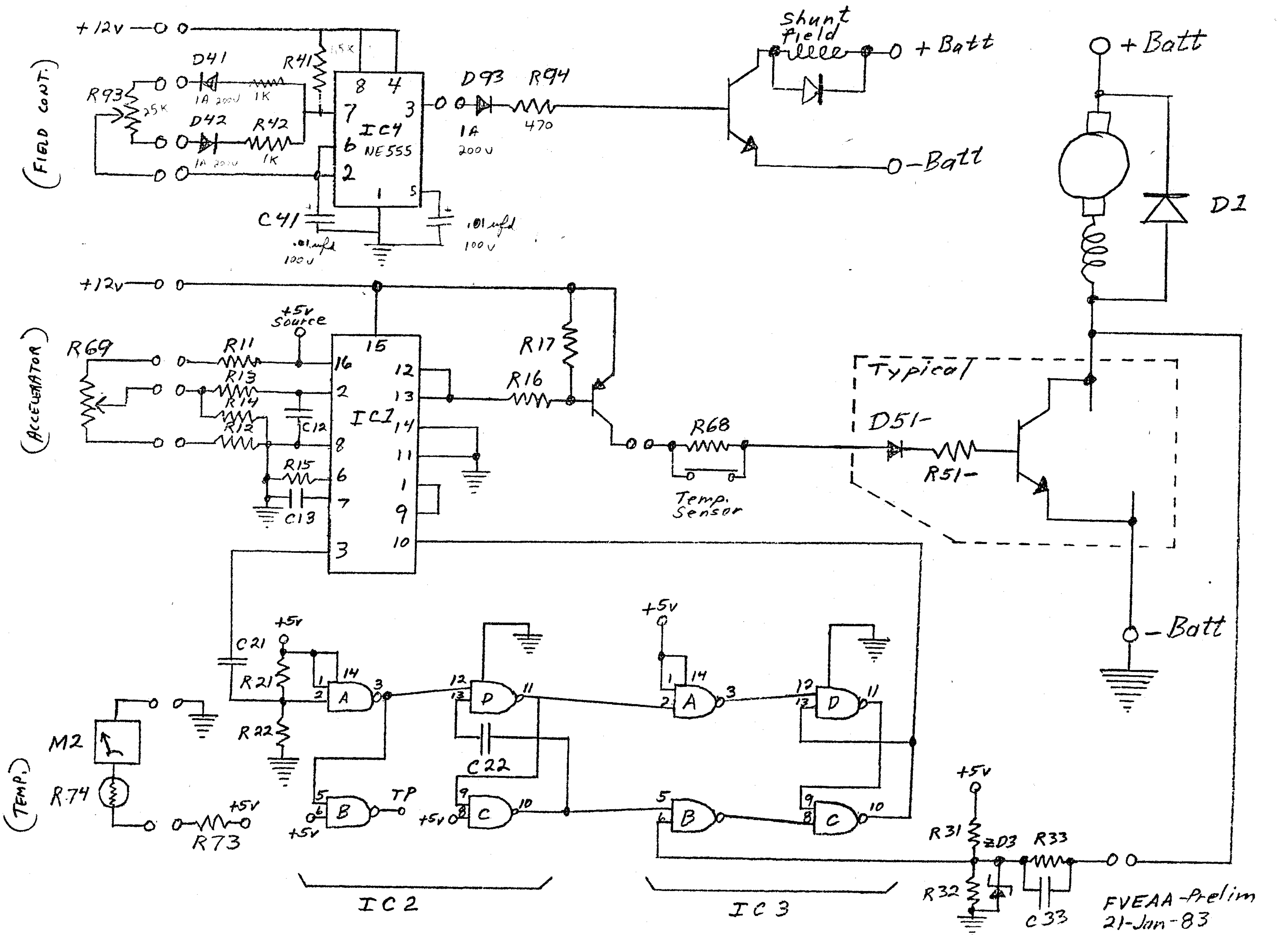


Figure #2

SISKIYOU ENERGY SYSTEMS
16892 MITCHELL AVE.
LOS GATOS, CA 95030
(408) 356-0289


FIELD CONT.
ACCELERATOR
TEMP.
+12v
+Batt
-Batt
Shunt field
D1
D41
D42
1A 200V
R41
1.5K
R93
25K
R42
1K
IC4
NE555
C41
.01 ufd
100V
D93
1A
200V
R94
470
+5v Source
R69
R11
R13
R14
R12
R15
C12
C13
IC1
R17
R16
R68
Temp. Sensor
Typical
D51-
R51-
C21
R21
R22
C22
TP
+5v
M2
R74
R73
IC2
IC3
R31
ZD3
R33
R32
C33
FVEAA-Prelim
21-Jan-83

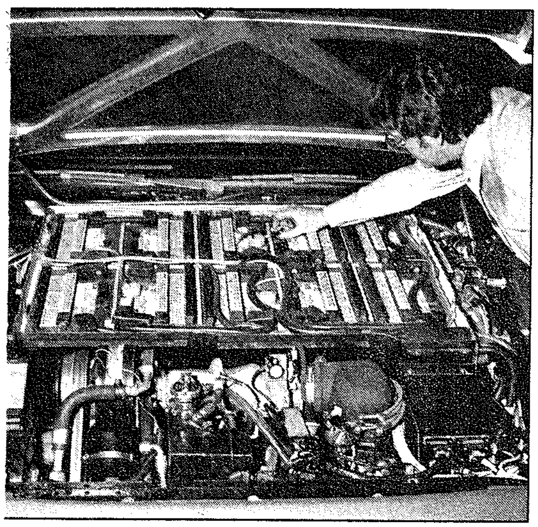
Nissan AC electric car

Nissan Motor Company has designed a novel electric vehicle that uses an AC motor—Japan's first such car—rather than the more conventional DC motor. The innovation results in reduced need for maintenance and extended range from a single charge, according to Nissan engineers.

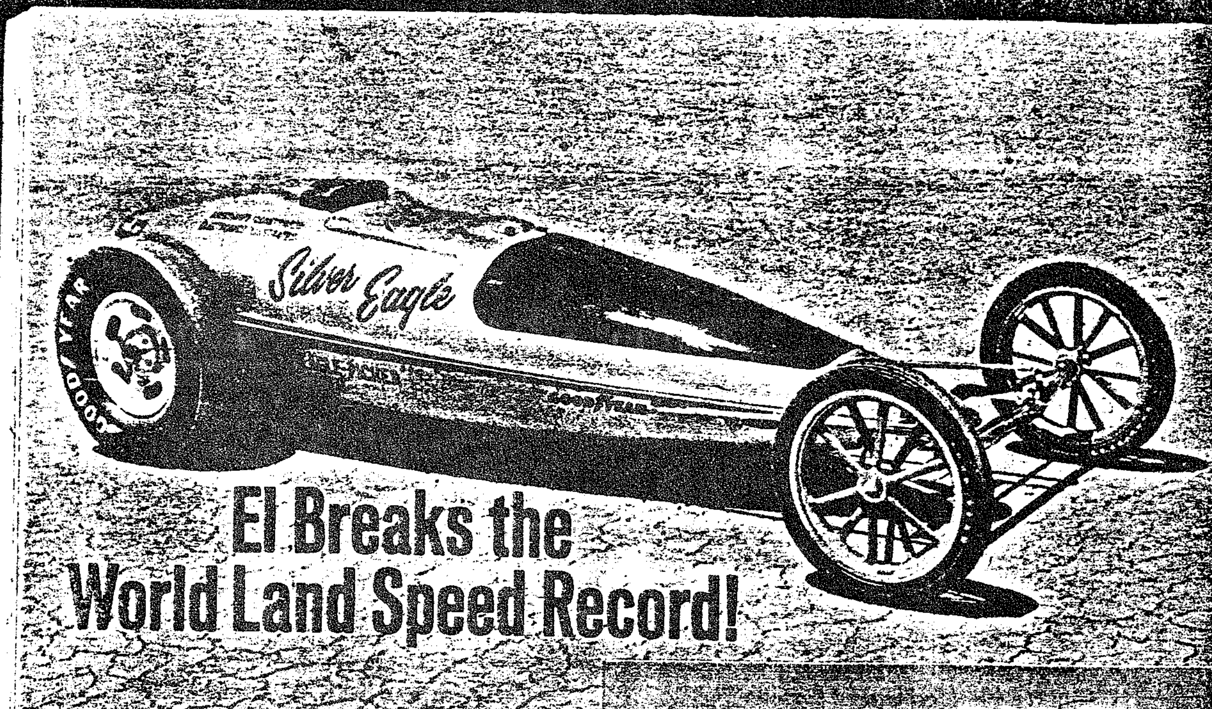
The experimental car, a modified Nissan March, appears in the bottom photo. Its transmission is an electromagnetic two-speed automatic—another first for a Japanese car. Its batteries are of the nickel-iron-alkali type. Nissan engineers developed a new transistorized inverter to change the direct current from the batteries to alternating current for the motor, and to serve as a speed controller. The car's maximum speed is 90 km/h (56 mph); its range is 160 km (99 miles) at a steady 40 km/h (25 mph) on a single charge. PS

RESEARCH TRENDLETTER®

Microcomputer key to 'hybrid' auto operation



THE ROAD TO ENERGY INDEPENDENCE may be driven on in the future by "hybrid" cars. Recently, General Electric researchers successfully completed their program to develop a car that runs on gasoline and electric power. The two separate propulsion systems, GE researchers say, give the auto a significant advantage over conventional gasoline and battery-powered cars. The GE car runs on batteries for most "in town" uses, but eliminates the electric vehicle's primary drawback—range of operation. With its gasoline engine, the hybrid automobile can make long, even cross-country, trips without depleting its batteries. The car consumes about 50% less gasoline than a conventional car under certain conditions. A microcomputer controls which propulsion system the car uses—the 40-hp electric motor or 80-hp gasoline engine. Basically, in speeds of less than 40 mph (65 kph) the electric motor is used, with the gasoline engine handling the highway driving. In situations where more power is needed, such as passing, the load is automatically shared. The microcomputer reacts to the driver's "foot pedal" commands, monitors a number of driving parameters including the charge state of the batteries, and controls overall vehicle operation. The Hybrid Test Vehicle (HTV) was built by a consortium of companies headed by GE under contract to the Dept. of Energy.



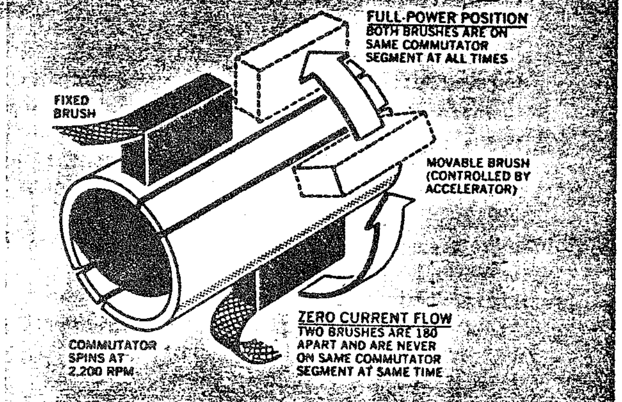
EI Breaks the World Land Speed Record!

THE world Land Speed Record for electric cars finally is ours! Late last summer the Silver Eagle, a battery-powered racer of which Electronics Illustrated was a co-sponsor, set a new record of 146.437 mph for the flying mile on the Bonneville Salt Flats in Utah.

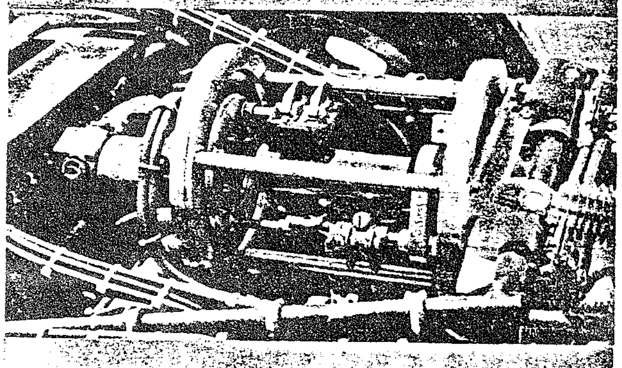
The Silver Eagle had its origins in a tiny electric car built as a project for our companion publication, Mechanix Illustrated, in 1967. The rig turned out to be unsuitable as a build-it-yourself electric car (so far, no one has designed a successful homebuilt electric) and was put on the shelf. Then in 1968 the Autolite Division of the Ford Motor Co. established a new world record for the mile at Bonneville with its Lead Wedge, operated by lead-acid batteries. The mark was 138.862 mph.

At that point MI and EI, in co-operation with Eagle-Picher Industries of Joplin, Mo., set about to redesign the old MI car and give it enough muscle for a go at the record. Needless to say, the first design turned out to be impractical and at least two other designs were discarded before the successful one was arrived at.

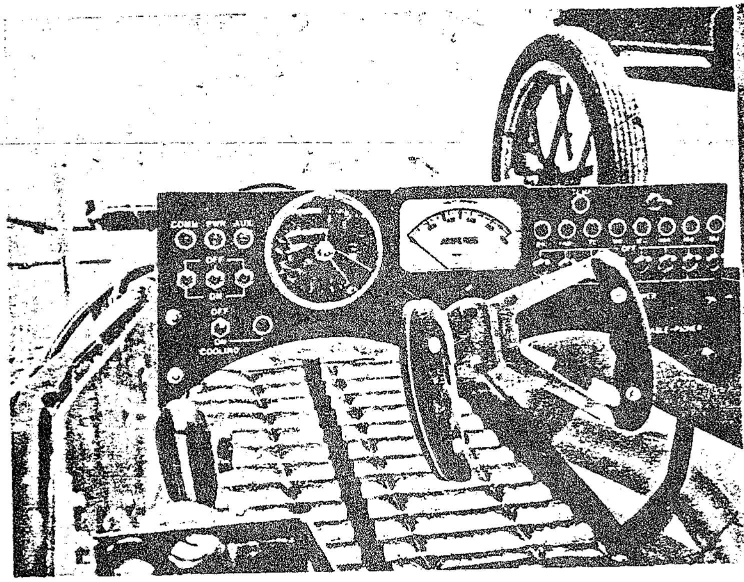
Two other companies—competitors—were involved in the project. In the fall of 1970 we took the Silver Eagle to Bonneville and tried for the world mark—running on Firestone tires. In 1971 our successful runs were made on Goodyear tires. The switching



Mechanical version of SCR controlled Eagle's speed; fixed and movable brushes are secret.



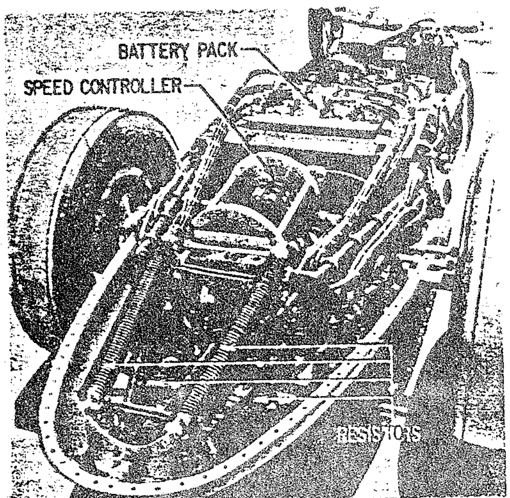
Side view of speed control, which is wired in parallel with resistors in photo at the right. Resistors limit current draw when motor starts.



Control panel of Silver Eagle sits in front of butterfly steering wheel. The buttons on the right are used to switch in banks of batteries among the 180 cells. The cells were split into 8 banks. Main power and blower switches are at the left. Tachometer and ammeter round out the panel.

of tires was not a factor in whether we succeeded or failed, so far as we know. It was a matter of availability and convenience.

Last July we brought you a report about that first visit to Bonneville—and our failure. The two propulsion motors, being spun by exotic silver-zinc batteries, simply were unable to take all the electrical energy available and convert it to mechanical force to drive the car. The result was warm and then hot motors . . . and they burned out.



General layout of Eagle with top of body off. Current-limiting resistors totalled .0825 ohms.

Over the winter much of the car was redesigned. In the successful runs in 1971, the car still used the Apollo-bred silver-zinc batteries (180 cells of 1.25 V each) but there was a single new drive motor. It is a 120-VDC model built by GE and designed originally to run in the first MIT Clean Air Car Race. It is rated at 25 hp at 5,000 rpm and can put out as much as 80 hp for short periods. In this instance, it was able to make the electrical/mechanical conversion.

The motor's muscle was not the only secret in the Eagle's success, however. A kind of mechanical silicon controlled rectifier—or a mechanical version of an SCR—played a key role in controlling the amount of energy flowing to the motor in such a way that maximum speed was obtained after the motor was nursed through its lower rpm range.

The world Land Speed Record was by far the most important of the marks established by the Silver Eagle but by no means the only one. As a matter of fact, in three days at the Salt, no less than 20 other records in two weight classes (under 500 kilograms and over 500 kg) were set by our bird.

The Silver Eagle was driven on its record runs by Californian Jack Reed. The first record run through the timed mile established a new one-way mark of 152.355 mph. The return run over the bumpy end of the Bonneville course, which was in pretty bad shape at the time, was clocked at 140.955 mph. The record is based on total elapsed time, not an average of the two runs.