

F.V.E.A.A. NEWSLETTER

DECEMBER 1986

MEETING NOTICE

The next meeting will be friday **DECEMBER 19th**, at **CRAGIN FEDERAL SAVINGS & LOAN** 333 W. Wesley St. Wheaton, Illinois.
- Time - 7:30 P.M. sharp. Guests are welcome and need not be members to attend the meeting.

GOLF CAR/EV BATTERY

East Penn Manufacturing Co., Inc. recently introduced an innovation in the construction of their golf car/EV battery that dramatically increases cycle life.

New deep pocket envelope separators give the battery substantially longer life by protecting all four sides of the plate to virtually eliminate the damaging effects of internal shorting.

These special glass-filled envelopes are made of durable, flexible polyethylene to eliminate cracking or chipping. The glass fiber material imbeds itself into the plate surface, locking active material to the grid and significantly retarding plate shedding.

The quality, cycle life and performance of the Golf Car/EV battery are also enhanced by computer-controlled production techniques and an improved temperature-controlled plate formation process. The high density oxide used increases capacity with cycling. The polypropylene case and cover are lightweight and crack-resistant.

The battery is available with 92 and 110 minute capacities. Three different terminal configurations are also available.

The golf car battery is one of several specialty batteries produced by East Penn, a manufacturer of automotive, industrial and specialty batteries, cables and accessories. For more information on East Penn's Golf Car/EV battery line, write to East Penn Manufacturing Co., Inc. Lyon Station, PA 19536.



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

FIRST CLASS

MERRY CHRISTMAS

ADDRESS CORRECTION
REQUESTED

2

THE PRES SAYS

Officers for 1987 were elected at the last meeting. They are:

President	Bill Shafer
Vice President	John Newton
Secretary	Kenneth Woods
Treasurer	Vladimir Vana
Prepoerty Custodian	Dana Mock
Director At-Large	John Emde

After paying all our bills, Treasurer Vana reports we have:

In our checking account	-	\$ 893.14
In our savings account	-	<u>758.73</u>
Total		\$ 1651.87

This is a good time to remind members that next year's dues of \$15 are payable now. Most of the 20 members attending the November meeting paid up. For those members who cannot make the meetings, but find our Bulletin contains useful information and wish to keep up with news about electric cars, please send your check to Vana, 5558 Franklin, LaGrange, Illinois 60525 to continue receiving the FVEAA Bulletin next year. Next year, we will be reporting on our hybrid investigation with a series of papers as work progresses.

The RAFFLE CAR has been titled and licensed. It has been turned over to Property Custodian Mock for assignment to members who wish to use it for a month or so. Member Mock suggested that we review our decision to raffle the car next spring in favor of keeping it for member use. This will be further discussed at the December meeting.

I received a note from Member Bob Reek informing me that his monthly commute to our meeting has been extended to 1700 miles with his retirement and move to Arizona. Best wishes to Bob.

At the December meeting, Member Stockberger will show the videotape he made of the EAA Rally held last fall. We will also discuss our relationship with this Organization.

There was insufficient time to begin our Hybrid vehicle discussion as originally scheduled at our November meeting. My apologies to the gentleman from Rockford who drove to the meeting anticipating that discussion. We will defer taking up this topic until January. By then your prexy will be retired from his 38-year association with COMMED and should have a bit more time to develop the promised tutorial paper.

Bill

FIND THE WORDS

PUZZLE NAME : DEC-FVEAA PUZZLE

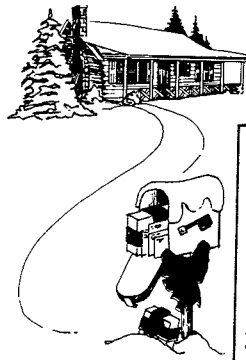
- ACID
- BATTERY
- CHRISTMAS
- CONDUCTOR
- CONTACTOR
- DEVICE
- GAUGE
- HEATSINK
- IGNITION
- INSULATION
- MERRY
- MODULE
- PULSE
- RECTIFIER
- SHUNT
- VOLTAGE

H O R A M H R G A U G E E A S O I M C O
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 V M L C H R I S T M A S H R L E U A C A

SOLUTION NEXT MONTH

SOLUTION TO LAST MONTHS PUZZLE : NOV-FVEAA PUZZLE

M I C O N V E R S I O N I F E
 C O C K P I L L I E S
 F E U C O S I D E R I C H O I D
 S I M M E R I N G T H E F I R E
 T A D E R I C O S T A T E F I R E
 C A P A C I T O R



The Road to a Friend's House is Never Long.

1986	DECEMBER							1986
SUN	MON	TUE	WED	THU	FRI	SAT		
	1	2	3	4	5	6		
	7	8	9	10	11	12	13	
	14	15	16	17	18	19	20	
	21	22	23	24	25	26	27	
	28	29	30	31				

Argonne's new fuel cell sets a record

ARGONNE — A new, lightweight fuel cell that could deliver twice the power and fuel economy of an internal combustion engine of equal weight has set a performance record at the Department of Energy's Argonne National Laboratory.

The "monolithic" fuel cell, designed and built by Argonne, has produced the highest current density ever recorded for a solid fuel cell, said Darrell Fee of Argonne. Current density is a measure of the electrical current that flows through the fuel cell. A high current density means greater power output.

The record current density, he said, was 2.2 amperes per square centimeter — nearly twice the highest current density recorded by any other all-solid fuel cell.

THE RECORD performance, he said, confirms the cell's future potential as a high-power, low-weight energy source to meet a variety of energy needs. These include powering automobiles and airplanes and producing electricity more efficiently than today's electrical power plants.

"A fuel cell is like a battery with a fuel tank," Fee said. "As long as it gets fuel, it never runs down and never needs recharging." Suitable fuels include gasoline, alcohol, natural gas, synthetic gas made from coal or plant matter, jet fuel and a number of other possibilities.

"The key to the device," Fee said, "is that all its active parts are made of very thin light-weight ceramics bonded together like corrugated cardboard. We call it the monolithic fuel cell, because it is all in one solid piece."

IN MANY fuel cells, he said, many of the active parts — the electrolyte, for example — are liquid. As a result, the structure has to be supported by additional solid components that add weight without adding to performance.

In Argonne's monolithic fuel cell, however, all the active parts are solid and need no extra structural support, Fee said.

"For the power it produces," he said, "it is so light weight that it could even power airplanes some day."

An electrical power plant based on the monolithic fuel cell, Fee said, could have a potential efficiency of 60 percent. The efficiency of today's typical power plant is 30 to 35 percent.

In a power plant, he said, the fuel cell alone has the potential to produce electricity with 55 percent efficiency. Since its operating temperature is about 1,800 degrees, waste heat could be recovered and converted into more electricity to boost total plant efficiency to about 60 percent.

SEVERAL YEARS of further research and development are needed to make the monolithic fuel cell practical, he said. But it could help prevent increased dependence on foreign petroleum by stretching the depletion of limited world oil supplies.

This work was funded by the Defense Advanced Research Projects Agency, part of the U.S. Department of Defense. Argonne National Laboratory is operated by the University of Chicago for the U.S. Department of Energy.

OF INTEREST

One of our members - Harold Paschack - of Michigan City, Indiana, sent us an interesting thing from the past. A service manual dated 1934, titled: "THE THEORY, CONSTRUCTION, INSTALLATION, OPERATION AND REPAIR OF DELCO-LIGHT BATTERIES". The 28 page manual discusses principles of batteries, types of batteries, charging, discharging, gauges, general care, repairs, temperature effects, specifications, etc. Harold has been kind enough to donate this manual to the club library, for all to use. If you are ever in or near Michigan City, Ind., stop in and have a look at Harold's setup. I'm sure you will be more than welcome.



Advanced electric car powertrain ahead

Dearborn, MI—A lightweight, low-cost, highly efficient powertrain for an electric car will be developed by Ford Motor Co.'s Scientific Research Laboratories under a three-year, \$6.8 million contract awarded by NASA's Lewis Research Center, Cleveland, OH.

The improved powertrain, conceived by Ford, will consist of an integral, concentric ac motor/automatic transaxle, an inverter/motor controller and a vehicle controller. Integrating the motor differential and two-speed automatic shift transmission will reduce size, weight and cost of the unit.

Ford will subcontract much of the electrical subsystem work to General

Electric Co.'s Research & Development Center, Schenectady, NY, which will develop motor, inverter and motor controller technology and conduct tests when the powertrain is built. Ford will be responsible for overall system technology, development of the transaxle and fabrication of the vehicle test bed.

The three-phase project, lasting 9, 15, and 12 months, respectively, will involve: (1) generation of a powertrain reference design and development of key component technology; (2) component fabrication and evaluation tests, and subsystem assembly and checkout tests; and (3) completion and testing of the powertrain. □

REVOLUTIONARY BATTERY DEVELOPMENT FOR ELECTRIC AUTO INDUSTRY

Lectra-Matic Automobile Corp., (OTC), the exclusive importers in North America, Canada, Mexico and the Caribbean of the "WHISPER" All-Electric automobile, in association with another company, plans to develop and produce a patented battery system which is expected to develop a range of 450 mile without recharging, an increase of more than 500% over today's existing products. This is the prediction of T. Emerson Ivey, Jr., President of Tech Systems International regarding the energy system known as the Fluid Circulation Storage Battery (FCSB).

Mr. Ivey states, "The electric vehicle industry has long sought the answer to an extended range, energy storage system for vehicles. Our FCSB system employs electrolytic particles suspended in fluid with special membranes and a miniature pump to circulate the fluid to provide energy to the motor of the electric vehicle. The new system will be lighter and more cost-effective, cutting the present weight of batteries by up to 50%.

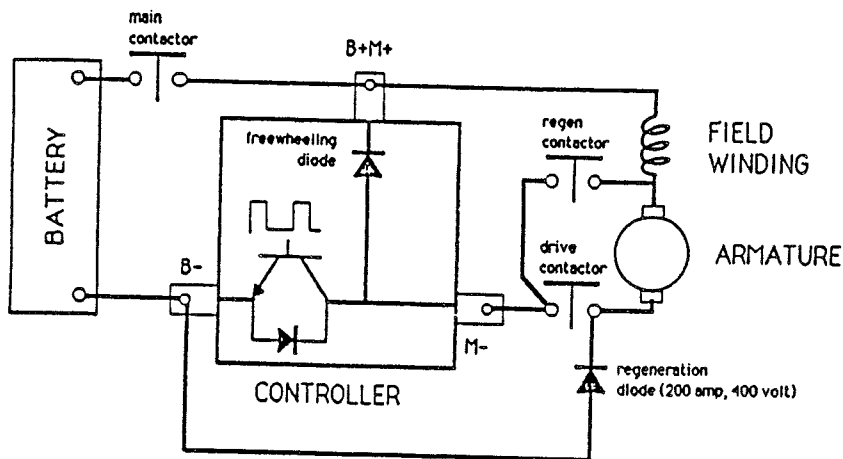
Since last October, when the first "WHISPER" automobile was introduced at the Fontainebleu Hotel in Miami Beach, hundreds of dealers and distributors have expressed interest in the 2-door "WHISPER," which comes with an automatic transmission, seats four, employs front wheel drive, rack and pinion steering, and McPherson struts. The new all-electric "WHISPER" automobile may be operated at a power cost estimated at less than 2¢ per mile.

Sydney Mass, Vice President of LECTRA-MATIC, predicts explosive growth in the electric vehicle market over the next few years.

Deliveries of the '86 "WHISPER" are scheduled to commence in January 1986, and will have a suggested retail price of only \$8,900.00 FOB Miami.

REGENERATION WITH A SERIES MOTOR

CAUTION: THIS METHOD REQUIRES OVERDRIVING MOTOR. MOTOR MUST BE ABLE TO RUN AT HIGH SPEED WITHOUT DAMAGE TO ARMATURE. USE THIS CIRCUIT AT YOUR OWN RISK.

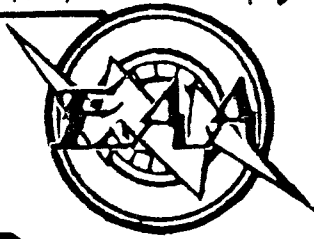


When drive contactor is closed, controller operates normally. But when drive contactor opens and regen contactor closes, controller excites field only, which causes motor to generate back emf. If back emf exceeds battery voltage, regeneration occurs through regen diode and freewheeling diode.

-Ric Barline
1986

Electric

Auto



NEWS

Association

NOVEMBER 1986

VOL. XVIII NO. 11

DEMI'S Mike & Charity Star @ 86 RALLY

MIKE & CHARITY CHEICKY OF DREISBACH ELECTROMOTIVE, INC. SANTA BARARA, CA

DISPLAYED THIER WORLD ACCELERATION RECORD RACE CAR & LITHIUM POWERED TOYOTA

The RALLY was beautiful to behold this year. We witnessed the first competition with Lithium/Air batteries, a sign of things in the 21st Century. We are sorry that so many of you remote members are unable to witness or take part in this annual event.

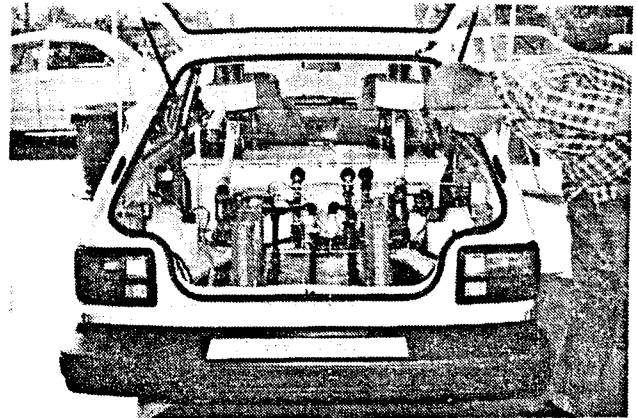
Following the Rally we had an unusually enlightening Symposium. We will try to share our experience at the symposium with you who could not attend.

The National Aeronautics and Space Administration provided us an expert scientist to talk about CO₂ accumulations in our atmosphere. Their authority, Mr. Jim Castings, presented the data from their long term studies of the earth's atmosphere. He presented charts showing variations in the ice caps over the eons of history as the CO₂ varied. He concluded we might see ½ degree C change in 100 years. The proximity of the sun to the earth seems to be the greatest governing factor and comes in cycles of 1100 years each. Fossil fuels will alter our atmosphere but his data at this time does not indicate that the changes will be catastrophic.

Next we heard from Rick Barlin of Curtis PMC of Dublin CA. Rick presented a circuit diagram for his regenerative braking system with a series motor and PMC controller. He emphasized the fact that there was little energy to be gained from his system. It is primarily a braking system. Two contactors and a diode must be added to your circuit. He recommended that you check with your control manufacturer before installing this circuit.

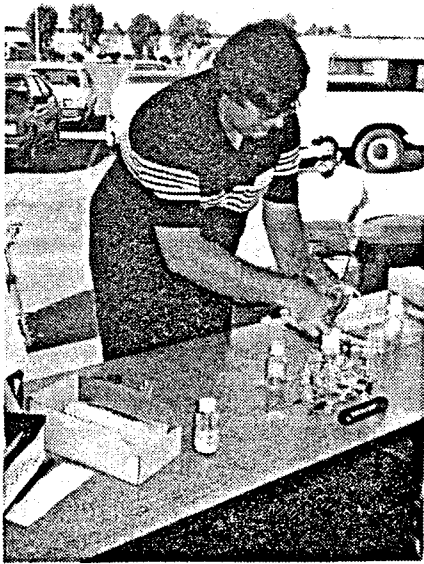
The most revealing and interesting talk was by Mike Cheicky of Dreisbach Electromotive, Inc. of Santa Barbara, CA. We have all been patiently following the Aluminum/Air

battery development thru the laboratories and into our golf carts this year. At the symposium we heard about Al/Air battery's big brother. He has stepped up to bat. He looks like a real pro. Mr Cheicky claims the Lithium/Air battery is the "Ultimate" chemical battery. We do not disagree. The technology is more powerful than gasoline and can be internally serviced under normal shop conditions with out special equipment.



- Here is a glance at Lithium propulsion:
- * Up to four times the energy density of gasoline.
 - * Greater than four times the efficiency of gasoline.
 - * Non polluting and rechargeable.
 - * Electric four wheel drive, allows computer control at each wheel independently.
 - * Spectacular acceleration and performance.
 - * Prospects for very ecomical operation, long term.
 - * Now ready for high performance race car development.
 - * A strong contender for many 21st Century general transportation applications.
 - * The storage of raw lithium metal is a safety problem which must and probably can be solved before the public can utilize this chemical battery.

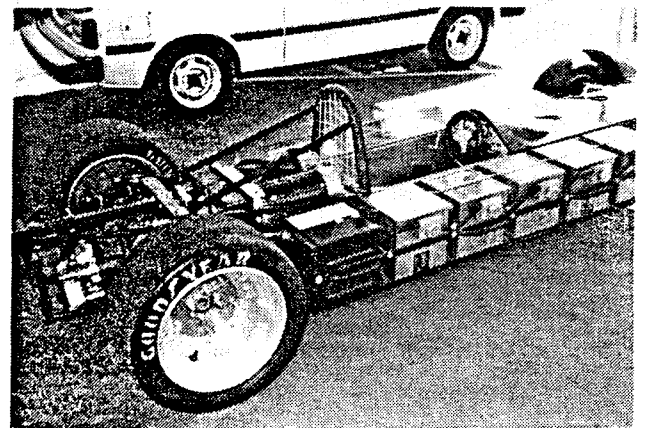
Turn to Pg. 6



DEMI

A small operating model was demonstrated. The lithium is continually reused. The components are mostly plastic. There is a cell stack much like a battery, an air compressor or fan which supplies pressurized air to the cathodes, an electrolyte which has varying concentrations of lithium in it, a circulating pump to circulate the electrolyte through the battery stack, a radiator for automobile applications because we can produce a lot of energy and have some waste heat, plus a precipitator which removes the lithium compound as lithium hydroxide or carbonate. The cell voltage is between two and three volts and they have run at power densities of about one ampere per square centimeter. Theoretically there is lithium, oxygen and water to produce lithium hydroxide plus power. Since it is not handy to carry water in a car they use carbon dioxide instead, resulting in lithium carbonate as a precipitant.

The basic patent was issued about 1977. Early experiments demonstrated 80% efficiency. The total efficiency from wall plug to motor has been measured at 56 to 65%. The system is low cost, clean, quiet, non polluting, no carcinogens and runs at room temperature. The ultimate system will allow the automobile owner to exchange a lithium cartridge at a gas station. The station would have the means of recharging or recovering the raw lithium.



DEMI X-1A ELECTRIC RESEARCH VEHICLE

OUTRANES ANY CURRENT PRODUCTION INDUSTRY STUDY VEHICLE, INCLUDING: PORSCHE, CORVETTE, OR FERRARI.

HAS BROKEN 8 PIA WORLD ACCELERATION RECORD FOR ELECTRIC VEHICLES (1982-1988)

PERFORMANCE	DEMI X-1A	DEMI X-1A	DEMI X-1A
0-1/4 MILE	14.88 SEC.	14.88 SEC.	90 MPH
0-1/2 MILE	27.78 SEC.	27.78 SEC.	114.78 MPH
0-1 MILE	47.58 SEC.	47.58 SEC.	147.58 MPH

HAS ACHIEVED THE EQUIVALENT OF 200 MPH AT 27 MPH

DESIGN GOALS: 200+ MPH AND 200+ MPH AT 20 MPH

RANGE: APPROXIMATELY 50 MILES AT 20 MPH

USES UP TO 12 JET STARTER NICAD BATTERIES TO PRODUCE 250,000 WATTS ON 200 AMP

THE DRIVE TRAIN AND NICAD "LOAD LEVELER" TECHNOLOGY IS DIRECTLY APPLICABLE TO HIGH PERFORMANCE LITHIUM VEHICLES

DEMI
PERFORMANCE ELECTRIC



EAA members were privileged to be witness to the initial testing of Lithium/Air cells at Lockheed Research Laboratories in Palo Alto, CA. We were delighted to see that Mike Cheicky has carried these most energetic and dangerous experiments to a successful conclusion and into road vehicles. Congratulations Mike & Charity. For more info: DEMI 212 Anacapa St. Santa Barbara, CA 93101 (805)965-0829.

NEW FORMAT A WINNER

THIS FINE REPORT WAS WRITTEN BY
OUR FEARLESS LEADER
John Newell

PHOTOS BY Bob Wheeler

1986 Rally

Many thanks to Rallymaster STEW PERKINS for all his efforts in bringing together our annual EVA Rally, held August 16th in Ontario. It was even more successful than our 1985 Rally which featured 11 vehicles. This year 12 EVs participated, and two of them surpassed the previous endurance record of 85.8 miles! As part of the program in our September meeting, Stew presented the awards and recapped the Rally with the following results:

PLACE	NAME	CLASS	TYPE	VOLTS	NO. BATT.	WEIGHT	LAPS	MILES
1st	Paul Akman	2-wheel	Homemade Moped	48	4	----	28	72.8
2nd	Paul Overpeck	2-wheel	10-speed Huffy	12	1	160 lbs.	8	20.8
1st	Ken Koch	3-wheel	Alco/KTA Trike	36	6	648 lbs.	35	91.0
2nd	Harry Riggs	3-wheel	Akkord Trike	24	2	----	12	31.2
3rd	Shawn Beltramo	3-wheel	Akkord Trike	24	2	----	10	26.0
4th	Vic Schisler	3-wheel	Homemade Trike	36	6	----	9	23.4
1st	Jack Ruebsamen	4-wheel	Mazda RX-100	96	16	2900 lbs.	38	98.8
2nd	Jason Beltramo	4-wheel	Electro Bug	48	8	----	24	62.4
3rd	Al Vivian	4-wheel	24 Mod. T Speedster	72	12	2000 lbs.	20	52.0
4th	Leo Schatzl	4-wheel	Honda 600	60	10	2500 lbs.	15	39.0
5th	(Vic Jager)*	4-wheel	Mazda RX-2	96	16	3030 lbs.	11	28.6
6th	Jay Boyce	4-wheel	65 Datsun Wagon	96	16	3000 lbs.	0	0.0

*Driven by various drivers.

LEO AWARD (Best Electrical Efficiency)--Jack Ruebsamen's Mazda

ED AWARD (Most Mechanically Innovative)--Al Vivian's 24 T

VIC AWARD (Most Practical)--Leo Schatzl's Electro Bug (driven by Jason Beltramo)

A tip of the EVA hat goes to LEO SCHATZL for single-handedly bringing 4 of the participating vehicles to the Rally!

DEVC 1986 EV RALLY

The 1986 DEVC Rally was held on September 27th on a route situated in the residential area northeast of Cinderella City shopping center in Englewood, Colorado. The rallying point was the Checker Auto Parts store parking lot at 111 W. Floyd. This was a new location as the previous Rallies have been held at the Northglenn Mall. Contact with the general public was somewhat limited as there was little traffic other than that at the parts store, but we did have a number of interested visitors. Following is a list of participants and the mileage attained. The course was described in last month's newsletter except that the south leg was moved one block north to avoid a construction zone.

VEHICLE	OWNER	DRIVER	NO. OF BATTERIES	MILES
Corvaire	Tim Cutforth	Tim Cutforth	18	48.4
Gransee Special	David Gransee	Genny Clark	8	31.8
Mars IIR	Jim Closius	Jim Closius	12	27.2
Electrek	Unique Mobility	George Gless	16	15.2
Mars IIG	Univ. of Colorado	George Gless	12	14.2*
MGB/GT	George Gless	George Gless	8	9.5*
Honda Hybrid	DEVC	Not driven	9	0.0**

*Mileage not official as not completed before close of Rally (Note that both have 10 year old batteries)

** Not quite street legal yet

8

FVEAA CLUB ITEMS FOR SALE

QTY.	DESCRIPTION OF ITEM	PRICE EACH
456	SOLID BRASS BATTERY CONNECTORS 00 & 000 POS. OR NEG.	.75
18	STEEL LAMINATED CHOKE CORE FOR SHUNT MOTORS	5.00
10'	HEAT SHRINK TUBING 3/4" SHRINKS TO APPROX 1/2" PER FOOT	.50
2	200 AMP RELAY 24-28 VOLT COIL	15.00
6	400 AMP RELAY 12 VOLT COIL	45.00
1	2/0 BATTERY CABLE 5'	4.00
1	6 VOLT BATTERY WET 7" X 16"	5.00
1	6 VOLT BATTERY DRY (NEW) 7" X 12"	10.00
3	25 AMP CONTACTOR	3.00
1	400 AMP 28 VOLT CONTACTOR	10.00
1	200 AMP CONTACTOR	5.00
2	200 AMP 28 VOLT CONTACTOR	5.00
1	3AG CHASSIS MOUNT FUSE HOLDER	.50
2	IN-LINE 40 AMP FUSE HOLDER	1.00
2	IN-LINE 20 AMP FUSE HOLDER	.50
1	MJ10021 MOTOROLA TRANSISTOR	1.00
1	2N3791 TRANSISTOR	1.00
1	MR862(7620) MOTOROLA DIODE	1.00
1	1N3934B DIODE	1.00
1	Y10 OR 80063-SM-A-749148 DIODE	5.00
2	JOY MFG MOD. AV-3.5-2.75-120D 28 VOLT 60 CFM BLOWER	5.00
6	HEINEMAN CB279 28 VOLT TOGGLE RESET 3HP	1.00
3	CONVENTIONAL SIZE BATTERY HYDRACAP	3.00
2	LARGE (ABOUT 5000 WATTS) RESISTORS	15.00
4	LIKE NEW TIRES P155-80-R13 ON '69 TOYOTA RIMS	10.00
1	36 VOLT LESTER-MATIC BATTERY CHARGER	50.00
1	30 VOLT SERIES GE 400 AMP 3-8000 RPM MOTOR	150.00
12'	#12 STRANDED WIRE	1.00
2	1/0 BATTERY CABLE W/TERMINALS 2'9"	3.00
1	1/0 BATTERY CABLE W/TERMINALS 3'6"	3.50
1	1/0 BATTERY CABLE W/TERMINALS 4'	4.00
1	1/0 BATTERY CABLE W/TERMINALS 5'	5.00
1	1/0 BATTERY CABLE W/TERMINALS 6'	6.00
2	2/0 BATTERY CABLE W/TERMINALS 12'	10.00
2	0/0 BATTERY CABLE W/TERMINALS	1.00

OTHER ITEMS FOR SALE

1 2CM76 MOTOR \$125.00
 10 250 AMP DIODES \$6.00 ea
 5 24 VOLT 400 AMP CONTACTORS \$30.00 ea
 1 48 VOLT TRANSFORMER (HEAVY DUTY) FOR CHARGER \$20.00
 8 6 VOLT EXIDE GOLF CART BATTERIES (BRAND NEW) \$40.00 ea

CALL - DON CONDGN 553-9543 eve & wk ends