FVEAA NEWSLETTER

NOVEMBER 1986

MEETING NOTICE

The next meeting will be friday **NOVEMBER 21st**, 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.

THE PRES SAYS

This months meeting will be a continuation of our discussion on *HYBRID VEHICLES.* Lets have your opinions and ideas on this concept.

We also will go over in detail the rough draft of the *OWNERS MANUAL* that was passed out at the Oct. meeting. Please bring *your* copy as additional copies are in short supply. A final version will be made available.

Also on the adgenda is the matter of *NOMINATIONS and ELECTIONS* of club officers for the 1987 term. If you would like to volunteer for any club office feel free to submit your name to the nominating committee (Bill Shafer) before or at this next meeting.

Every year this comes around like clockwork. *DUES ARE DUE.* An application for renewal is included in this newsletter. Please return the application with your cash, check or money order to our treasurer - Vladimir Vana.

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

FIRST CLASS

ADDRESS CORRECTION
REQUESTED

JOHN S. NEWTON
22[illegible] AHLSTRAND DRIVE
GLEN ELLYN ILLINOIS 60137

October 3, 1986

Dear Bill:

I've done some fundamental work on a Diesel hybrid on the basis that the engine will be operated at all times at only full torque or at idle. The amount of fuel consumed at idle for a Diesel is inconsequential so I have used one number and that is 0.4 lbs of fuel per brake horsepower hour. The speed can be anything in between maximum and minimum with a range of about 3 to 1 so that the horsepower output and therefore the fuel consumption will vary also by that 3 to 1 figure. The figures in the tabulation below are for a 3000 pound curb weight passenger vehicle. You understand that the engine will either furnish propulsive power and/or energy to the batteries, which I have assumed to be SLI type with 1000 amps cold cranking power in a type 27 case, weighing about 50 pounds each-six batteries. It will be fun working out controls for the system, but not too difficult as the batteries can be perfect absorbers. This may be worth a get-together before the next meeting.

MPH	13	15	20	25	30	40	50	60	70
HP	1.0	1.15	1.75	2.5	3.45	5.85	9.6	15.0	22.4
Fuel #/HR	.40	.46	.70	1.0	1.38	2.33	3.84	6.0	8.96
GALS	.06	.066	.100	.140	.197	.333	.550	.858	1.28
MPG	228	227	200	175	162	120	91	70	55

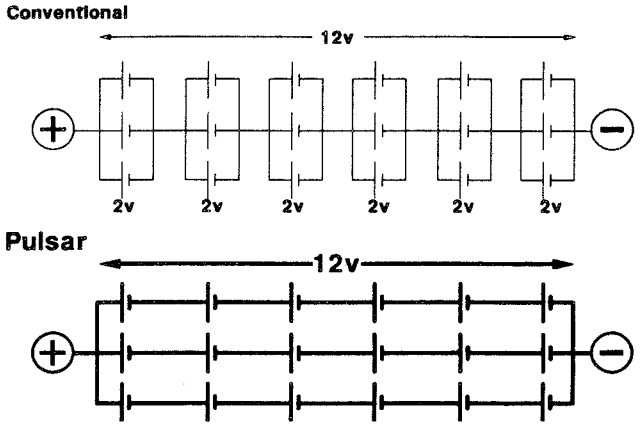
It would be interesting to aply these figures to one of the schedules used by the government wherein the car accelerates to a speed runs for a bit and then brakes (typically to a stop

THE PULSAR BATTERY

Alex Stitt

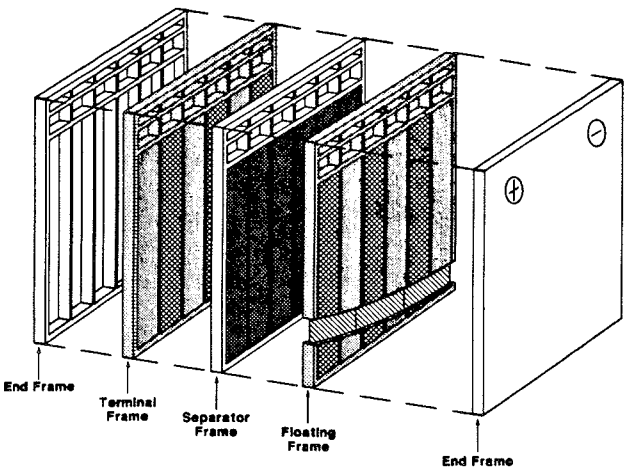
—as presented at the 48th IBMA Convention, October 1985

The Pulsar PowerPak, in essence, is a conventional lead-acid flooded battery, and chemically operates in exactly the same manner as any lead-acid battery with similar constituents in its active and grid materials. At this point, however, all similarities with a conventional battery end. Pulsar is a unique method of producing a material-efficient PowerPak in a fully mechanized high-speed production line.



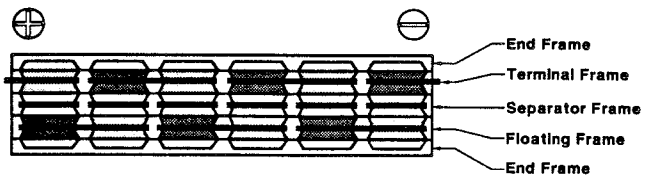
Before looking at how it is made, let us look at how it works. Diagramatically, one can draw the Pulsar PowerPak as shown in this slide. You will note that the conventional battery is a number of plates, both positive and negative, connected in parallel to form 2-volt cells, which in turn are connected in series to form a battery. In the Pulsar unit, pairs of plate frames form 12-volt batteries. These are then connected in parallel to form a PowerPak of any desired capacity.

PULSAR BATTERY CONSTRUCTION



This is accomplished by a unique method of construction which involves the injection molding of four distinct types of frames, a terminal frame, floating frame, separator frame and end frame. In each of the active frames, expanded lead is molded into the plastic and, in turn, is pasted with active material. The separator frame is produced by replacing the grid material with a separator material such as Daramic. When welded together, these frames form a 12-volt battery.

PULSAR SINGLE PAIR BATTERY



Current flow through a Pulsar PowerPak can be best illustrated by looking at a section of the battery looking from the top. Current flow is through the current connection on the terminal frame to the negative active material, through the electrolyte and separator to the positive active material. Current flows along the grid material through the partition to the negative active material in the next cell. This is repeated through to the positive terminal.

Any number of frames can be connected together to form a battery of any desired performance.

This unique battery is produced by first casting calcium alloy strip on a continuous-casting machine.

Rolls of strip are moved to the manufacturing area where they are fed continuously to an expanding machine, which in the case of the terminal frame machine also adds the copper connectors by straightening, flattening, and tinning copper wire and attaching this material to the grid.

The expanding machine is in line with a four-station injection molding machine into which the expanded, and now sliced and cut grid material is automatically introduced. The machine head rotates through an injection, cooling and ejection station where the frame is automatically extracted from the machine, trimmed, tested, and placed in a storage magazine.

Frames are stored in a special area and then moved automatically by a pick-and-plan machine to the pasting machine. These active plate frames are automatically pasted and then fed directly into a continuous curing oven.

After approximately 48 hours, cured frames are loaded into sequencing bins above the welding machine.

The frames are dispensed by the sequencing heads directly to the welder in a precise order of end frame, floating frame, separator frame, terminal frame, etc., until the pre-programmed battery size is completely built.

As the welding process takes several minutes, a number of machines are employed.

The completed PowerPak is conveyed to a terminal machine. This machine gauges the case width, cuts champers, drills and grooves a section of brass extrusion, which is then pre-heated, tinned and attached to copper conductors that protrude from the top end of the terminal frame.

Continued

The PowerPak proceeds down the conveyor where vent holes are formed by heated rotating heads.

Acid is introduced into a vacuum filling device, after which the unit moves directly onto the formation belt.

The belt holds twenty units which connect in series when they butt up against one another. Current is introduced through contacts that rub up onto the undersides of the brass termination. As the units move down the belt, altering amounts of current are applied, depending on the size of the PowerPak and the stage of formation.

At the end of formation, acid levels are readjusted, vents fitted, and labels attached, and the battery is ready for dispatch.

Other than the obvious advantages of a highly automated and continuous manufacturing process, what are any other advantages of making a battery in this manner?

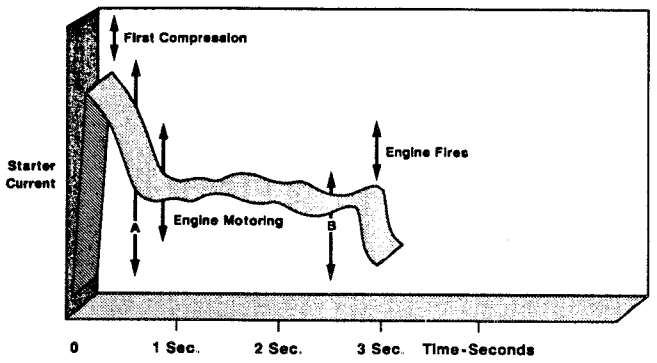
The construction virtually eliminates the normal current path of a conventional battery up the grid through its lug to a buss-bar and then through the partition to the next cell and so on. The Pulsar PowerPak allows current to pass directly across the complete edge of the plate to the plate of opposite polarity. There are no intercell welds, as such, and no cell buss-bars. This naturally leads to a very low impedance power source which has excellent short-term voltage characteristics.

BATTERY PERFORMANCE

		20 Hour	Reserve Capacity Minutes	30 Second CCA	Number of Plates	Total Weight (kg)
Conventional	7X	40	65	330	7	16.0
	9X	53	100	420	9	17.3
	11X	70	120	520	11	18.9
Pulsar	7 Pair	31	44	220	N/A	6.2
	10 Pair	44	66	320	N/A	9.8
	15 Pair	66	98	500	N/A	14.8

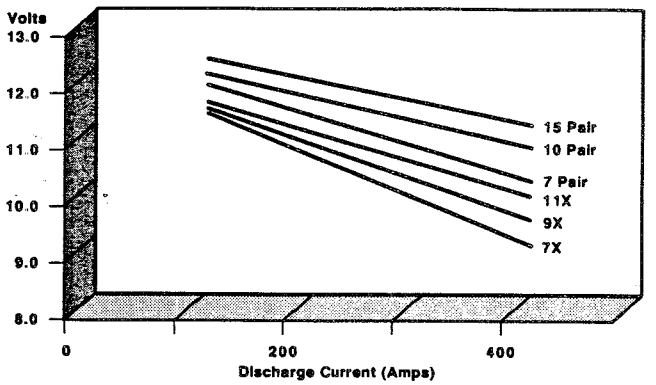
A 15-pair Pulsar PowerPak has a similar reserve amd 30 second cranking performance to a conventional 11-plate battery, and a 10-pair Pulsar unit to that of a typical 9-plate battery. Note that the Pulsar unit is a lot lighter than its flooded equivalent. It is packaged optimized; its size and weight move directly in proportion to any changes in designed performance. Note the relative performance of the 7-pair Pulsar unit, as I want to refer back to this particular unit in a later slide.

ENGINE STARTING CURRENT



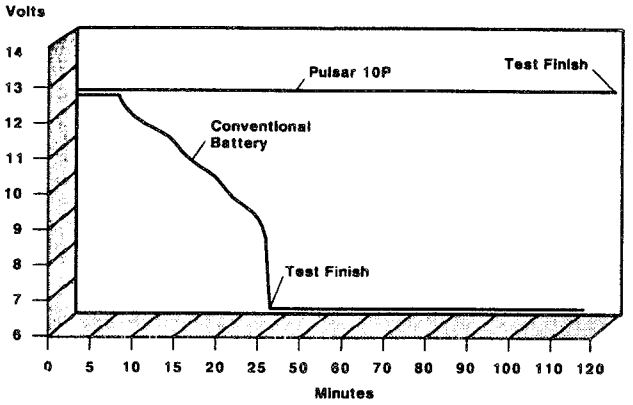
When a typical car is started, there is an initial in-rush current that starts the engine turning. This current then decreases to a constant cranking current, which continues until the engine fires. This whole process usually takes less than three seconds.

PULSAR VS CONVENTIONAL BATTERIES
5 Second Voltage @ 25°C



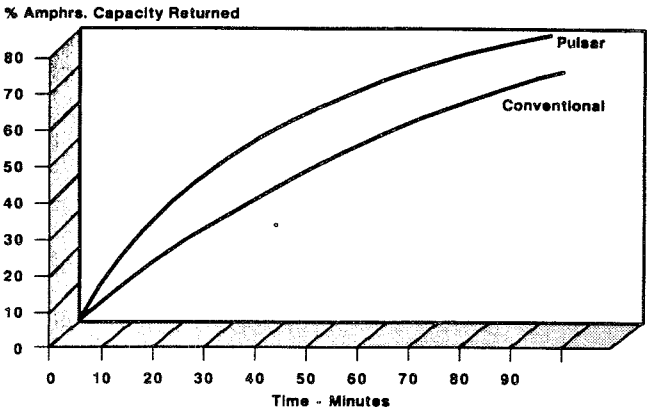
This graph shows the relationship between current and voltage at the end of the five-second discharge, or a discharge which is longer than the typical starting sequence for an automobile. At 400 amps, the Pulsar 15-pair unit gives a voltage of 11 volts compared to 9.8 volts for the equivalent flooded battery. Even the 7-pair Pulsar out-performs a conventional battery of almost twice the size. As you all well know, higher voltages to the starter motor give higher cranking speeds, lower cranking current, and usually shorter cranking time.

2.2 AMP. DISCHARGE
10G's VERTICAL ACCELERATION AT 50Hz



RESISTANCE TO VIBRATION is inherent to the Pulsar design. The test shown was completed at a very severe 10g 50hz rate that killed a conventional battery in a matter of minutes, while the Pulsar was unaffected after two hours. (Leaf hybrid)

CHARGE ACCEPTANCE 20°C



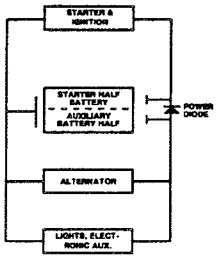
Continued

The Pulsar product has an **EXCELLENT CHARGE ACCEPTANCE** at all applied voltages. The curve is somewhat deceptive, but if you look closely, you will note to recharge to a 50% level, the Pulsar unit needs to be charged for only slightly more than half the time of a conventional battery to achieve the same state of charge.

The Pulsar design **CAN VERY EASILY BE MADE INTO A DUAL BATTERY** without any size or cost penalty. It is because the basic building blocks of the Pulsar battery are 12V units connected in parallel. These units can be divided with an additional partition to give the battery configuration illustrated here. This would be a typical OE installation, and you will note that the diode allows the alternator to charge both the starting battery half and the auxiliary battery half. On discharge, this diode only allows the auxiliary battery half to deliver a load to the lights and electronics, etc. If the auxiliary half of the battery is allowed to go flat because, for instance, the lights are left on, the starting half will be left fully charged and available to provide power to the starting and ignition circuits. Under normal operating conditions, the auxiliary battery half would be available to assist the starter half by passing current through the diode to the starter and ignition circuit. Similar configuration can be designed into a typical replacement battery.

Just a closing word regarding the inventor of this product, Mr. Bill McDowell, who first started work on the Pulsar PowerPak in the late 60s. The basic patents for this battery were issued to Dunlop Olympic-Australia in early 1970, and the factory that you have seen illustrated in these slides was built in Geelong, just outside of Melbourne, Australia, and was commissioned earlier this year.

PULSAR DUAL BATTERY SYSTEM



NORMAL OPERATON -

STARTING "Starter Half" of Battery
Starts Vehicle and Under Extremely Harsh Conditions is Assisted In Starting by "Auxilliary Half" of Battery Via Power Diode

RUNNING Alternator Supplies Power
for (1) Electrical Auxilliaries and Charges "Auxiliary Half" of Battery Directly
(2) Ignition System and Charges "Starter Half" of Battery Via Power Diode

STATIONARY (1) Electrical Auxiliaries
Are Powered by "Auxiliary Half" of Battery
(2) "Starting Half" of Battery
Is Protected from Auxiliary Loads by Power Diode and Remains Fully Charged for Starting

Alex Stitt is President of Chloride Incorporated, Tampa, Florida. Chloride Incorporated recently became Pacific Chloride, through a recent acquisition by Pacific Dunlop of Australia.

FIND THE WORDS

PUZZLE NAME : NOV-FVEAA PUZZLE

CONNECTOR	RELAY	SERIES	PARALLEL
HYBRID	MICROCOMPUTER	CORROSION	RESISTOR
CAPACITOR	ENERGY	CONVERSION	CHOKE
FUSE	METER	DIODE	SULFATE

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S E U L U N B C I U I B E C L S C L R E
R E T M U C O N V E R S I O N N S Y I R
M P N H I E O R L C O B C O L E R R R E
O E S R H C R P E E M O P E I E M N F P
L O A L R E R T A C E N O R B Y E R S E
U N O I P F A O M C R E E O E B M F N C
S Y U F A F U C C C O S L C C U S S N U
R O M M L I C S S O F C H P H O P R O T
A E S U C L C O E C M U S S O I A S E F
C E S E M R C O R E P P F A K O N U L C
I L R I E N M C N R C A U E E O R N B C
R E R E S S P E S N O C R T O E C M L C
S O C N F T Y H T M E S O A E C A O S A
C S M B E A O C Y E P C I P L R O H C C
S H C I L U Y R N B R M T O C L C O E R
A N S E S G S E E R R C S O N C E S N M
R O R L R U C F S C I I O C R Y A L L U
U L E E S O N C S Y R C O H E E C O R F
H R N F M E R Y C A P A C I T O R I C
E E I M L N M E R R A P P I C A E S R E
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SOLUTION NEXT MONTH

SOLUTION TO LAST MONTHS PUZZLE : OCT-FVEAA PUZZLE

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- - P A - - - N E G A T I V E - - - -
- - - O M - - - E L E C T R O L Y T E -
- - - - S M - - - - - - E - - - - - - -
- - T - - I E T - - - - - L - - - - - -
- - - R G - T T - - - - - E - - - - - -
- - - - A E N I E - - - - - C - - - - -
- - - - - N N S E V R - - - - T - - - -
- W I R E - S E B E - - - - - R - - - -
- - - - - - I R A A - - - - - I - - -
- - - - - - - S N T T - - - - - C - -
- - - C U R R E N T O R - - - - - R M -
- - - - - - - - - - E R R - - - E - O -
- - - - - - - - - - - - - Y - G - - T -
- - - - R E G E N E R A T E R - - - O -
- H O R S E P O W E R - - - H - - - - R
- - - - - - - - - - - C - - - - - - - -
- - T E R M I N A L - - - - - - - - - -
- - - O I S C H A R G E - - - - - - - -
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BASIC AUTO THEFT PREVENTION

Automotive Information Council

More than one million vehicles are stolen each year, costing the public between four and five billion dollars. Insurance industry statistics reveal that in 1983 one of every 48 cars was either stolen or broken into, up from one in 58 in 1975. Because of the rise in auto theft, the Automotive Information Council (AIC) recommends the following precautions:

Remember the basics of theft prevention whenever parking. Lock the doors, close the windows and take the keys.

Park in busy, well-lighted areas whenever possible. Never leave expensive items in plain sight; this only encourages potential thieves. Also, never leave driver's licenses or car registrations in the glove compartment. Losing these makes reporting important information to the police and insurance companies difficult. It also helps thieves avoid detection.

When parking, turn the steering wheel sharply to the left or right. Locking the steering column this way makes it difficult for the professional auto thief to two away a car. Try to park in the middle of a neighborhood block since cars positioned at the end of a block are easy targets for auto thieves with two trucks. Use a variety of locations when regularly parking on a street, since thieves often rely on predictability. Remember to lock a garage's door as well as the car's doors. The more locks and doors a thief encounters, the less likely he or she will succeed.

When taking a trip and leaving a car at home, ask a close friend, neighbor or relative to keep an eye on the car and drive it periodically. Giving the impression that the owner is at home and regularly using his or her vehicle should deter most thieves.

evaluate their current security procedures and take the necessary steps to prevent car theft.

AUTOMOTIVE ANTI-THEFT DEVICES

As the number of stolen vehicles continues to rise, more car owners are purchasing auto security devices. Forecasters estimate auto security device sales will reach $200 million dollars in 1986. Many theft-deterrents cost under $50, require little professional assistance and provide good protection from professional car thieves. The Automotive Information Council (AIC) provides the following overview of the most common auto security devices:

Traditional auto alarms usually scare away even the most daring car thief. In most systems an opened door, trunk or hood will activate a wailing siren or blaring horn. Other alarms sound when a special device is not deactivated by the car owner upon entering the vehicle. These more elaborate (and more expensive) systems often have special digital keypads or accompanying beepers which the owner carries in a purse or pocket.

A motion detector sounds an alarm when, for example, a vehicle is lifted in an attempt to steal the tires. Glass breakage detectors are also available.

Another popular anti-theft device is a hidden "kill switch." When activated, this device prevents the engine from running for more than a few seconds at a time, bringing attention to the stalled vehicle and a would-be thief.

Hood and trunk locks are also good theft deterrents. Without them, a skilled thief can deactivate most auto alarms or engine cut-off switches in seconds. Special locks are also available for the ignition, steering wheel, brakes, car stereo and wheels.

Etching the car's vehicle identification number (VIN) on each window or on metal body parts can be an effective security measure because a thief would have to replace or discard them before selling the car or its parts. Most thieves will think twice before stealing such a marked vehicle.

The AIC advises all owners of cars with high-theft rates to consider purchasing an appropriate anti-theft device.

CHOP SHOPS INCREASING

Because of the rapid increase in auto theft Congress enacted the Motor Vehicle Theft Enforcement Act of 1984, reports the Automotive Information Council (AIC). The law, which takes effect in 1987, requires that the National Highway Traffic Safety Administration issue a motor vehicle theft prevention standard requiring permanent identification of the major original equipment and replacement parts of frequently stolen motor vehicles.

This law may reduce the growing number of so-called "chop shops." These booming businesses dismantle stolen vehicles and sell their expensive, unmarked parts for huge profits. Most shops can make three or four times a car's value by selling its parts. The chop shops work quickly and can dismantle a car in 1[illegible] minutes.

The prime parts are those usually involved in accidents and those r[illegible]y numbered: the front clip (front and hood), doors and rear clip of the car. Remaining shells are junked.

The majority of chop shops are small and operate in back alleys or private garages. Others are highly organized theft rings. These chop shops have tow trucks, crushing machines, rented warehouses for expensive parts, and burial areas for car hulks.

Chop shops often work on custom orders. For example, an autobody repair shop may need a complete front end for a damaged car. An autobody repair technician calls a legitimate salvage yard which then notifies other yards of its need for various parts through a salvage yard teletype network. An operator dealing in stolen parts will answer that he has the parts and will set a price. He then contacts a car thief, who delivers a similar model to the chop shop and ultimately the parts are delivered to the unsuspecting body shop.

Almost 70 percent of all stolen vehicles are run through chop shops; few are recovered intact. However, according to the AIC, new anti-theft laws and increased public awareness of chop shops may encourage their demise.

Rev. Dec. 1984

MEMBERSHIP

A MEMBERSHIP IN THE FOX VALLEY ELECTRIC AUTO ASSOCIATION (FVEAA) IS OPEN TO EVERYONE. CURRENTLY THERE IS ONLY ONE GRADE OF MEMBERSHIP REGARDLESS OF THE MEMBERS DEGREE OF PARTICIPATION IN ASSOCIATION ACTIVITIES. MEMBERSHIP IN THE FVEAA IS CONTINGENT UPON PAYMENT OF THE ANNUAL MEMBERSHIP FEE. THE MEMBERSHIP FEE CAN ONLY BE WAIVED BY SPECIAL VOTE OF THE BOARD OF DIRECTORS. EACH MEMBER IN THE FVEAA RECEIVES A COPY OF THE FVEAA NEWSLETTER EACH MONTH. THEY ARE ALSO ENTITLED TO ATTEND AND VOTE AT ALL ASSOCIATION MEETINGS.

ALL MEMBERSHIPS IN THE FVEAA RUN FROM NOVEMBER 1st TO OCTOBER 31st OF THE FOLLOWING YEAR. THE DUES ARE $15.00 PER YEAR PAYABLE AT THE NOVEMBER MEETING. **NEW** MEMBERS JOINING AFTER NOVEMBER SHALL ONLY PAY $1.25 FOR EACH MONTH REMAINING BEFORE THE FOLLOWING NOVEMBER. (see chart below)

NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
15.00	13.75	12.50	11.25	10.00	8.75	7.50	6.25	5.00	3.75	2.50	1.25

THE FOLLOWING FORM MAY BE USED TO APPLY FOR MEMBERSHIP OR TO RENEW YOUR MEMBERSHIP.

cut----------cut

APPLICATION FOR MEMBERSHIP OR RENEWAL

DATE _____

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE # _____

- ☐ JUST INTERESTED IN ELECTRIC VEHICLES
- ☐ I HAVE AN ELECTRIC VEHICLE (describe) _____
- ☐ I WISH TO BUILD AN ELECTRIC VEHICLE

AMOUNT ENCLOSED $_____ FOR _____ MONTHS.

MAKE CHECKS PAYABLE TO: FOX VALLEY EAA

MAIL TO: MR. VLADIMIR VANA, FVEAA TRES.
5558 FRANKLIN
LA GRANGE, ILL. 60525

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 FT	.50
2	200 AMP RELAY 24-28 VOLT COIL	15.00
6	400 AMP RELAY 12 VOLT COIL	45.00
2	6 VOLT BATTERY WET 7" X 12"	5.00
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
1	2/0 BATTERY CABLE 5'	4.00

FILE: STUFF, 36 RECORDS REPORTED