F.V.E.A.A. NEWSLETTER

MARCH 1985

MEETING NOTICE

THE NEXT MEETING WILL BE FRIDAY MARCH 15TH, AT MID AMERICA FEDERAL SAVINGS 250 E. ROOSEVELT RD. WHEATON, ILL. - TIME - 7:30 P.M.

LETTER FROM THE PRESIDENT

IT APPEARS WE ARE MAKING PROGRESS IN OUR EFFORTS TO IMPROVE OUR CLUB. YOUR BOARD OF DIRECTORS HAS DECIDED TO TAKE PART IN THE HAMFEST AT THE LAKE COUNTY FAIRGROUNDS IN GRAYSLAKE ON MARCH 31. THIS IS A SMALL SCALE EFFORT TO TEST THE WATERS FOR LARGER EFFORTS THIS SUMMER. WE WILL TRY TO SELL SOME ITEMS AND HAVE MAYBE TWO ELECTRICS ON DISPLAY. REMEMBER TO BRING YOUR DONATIONS OF SURPLUS ITEMS TO OUR MEETINGS SO WE WILL HAVE SOMETHING TO SELL AT THE HAMFESTS IN ORDER TO RAISE MONEY FOR OUR CLUB. ALSO AT OUR NEXT MEETING PLEASE COME PREPARED TO DISCUSS THE POSSIBILITY OF A NAME CHANGE FOR OUR CLUB. YOUR BOARD FEELS THAT THE USE OF THE WORD 'CLUB' RATHER THAN THE USE OF THE WORD 'ASSOCIATION' IS DESIRABLE. GEORGE ZARINS HAS HOPEFULLY RECOVERED ENOUGH FROM THE FLU THAT HE CAN GIVE HIS PRESENTATION ON AC DRIVES THAT WE SO EAGERLY ANTICIPATED LAST MONTH. SEE YOU ALL AT THE MEETING.

SINCERELY,

DANA MOCK

F.V.E.A.A.

FOX VALLEY ELECTRIC AUTO ASSOCIATION
624 PERSHING ST. WHEATON, ILL. 60187

FIRST CLASS

2

F.V.E.A.A. 1985 Membership list

Phone #	Name	Street	City State Zip
668-1426	John Ahern	624 Pershing Ave.	Wheaton Ill. 60187
968-7052	Alfred Brinkmeyer	4323 Devon St.	Lisle Ill.60532
629-3989	Jack Cahill	1 S 736 Vista Ave.	Lombard Ill. 60148
448-7676	Thomas Cheever	12319 S. 90th Ave.	Palos Park Il. 60464
228-5952	Dale Corel	595 Gates Head North	ElkGrove Vil. Il.60007
832-1675	Donald Drake	445 Riverside Dr.	Villa Park Ill. 60181
968-2692	John Emde	6542 Fairmount Ave.	Downers Grove Il.60516
.	John Foster	14318 University Ave.	Dolton Ill. 60419
815-877-7290	Hendly Hall	530 Lawn Drive	Loves Park Il.61111
232-0344	Everett Harris	214 Nebraska St.	Geneva Ill. 60134
674-6632	Paul Harris	9421 N. Kildare	Skokie Ill. 60076
834-0370	George Krajnovick	17 W 381 Eisenhower Rd.	Oakbrook Ter.Il.60181
437-0453	Donald Kubick	249 Arlington Heights Rd	ElkGrove Vil. Il.60007
469-8121	Robert Kyp	526 Geneva Rd.	Glen Ellyn Ill.60137
742-2052	Charles Miller	156 S. Weston	Elgin Ill. 60120
.	Jerry Mitchell	4517 Lilac	Glenview Ill. 60025
759-8033	Dana Mock	154 Denver Drive	Bolingbrook Ill. 60439
584-6057	Kenneth Myers	1303 Indiana	St.Charles Il.60174
889-7757	Richard Ness	2129 N. Narragansett	Chicago Ill. 60639
469-3434	John Newton	22 W 450 Ahlstrand Dr.	Glen Elyn Ill. 60137
255-1665	Frk Pietrolonardo	1122 E. Thomas St.	Arlington Hts.Il.60004
231-8160	Joseph Pollard	29 W. Childs St.	West Chicago Ill 60185
.	Bob Randerson	25 S. Spring	LaGrange Ill. 60525
255-4672	Robert Reek	108 N. Russel St.	Mt.Prospect Il.60056
383-0186	William Shafer	308 S. East Ave.	Oak Park Ill 60302
216-531-0550	Robert Shelko	1912 Nottingham Rd.	Cleveland Ohio 44110
879-0207	John Stockberger	2S643 Nelson Lake Rd.	Batavia Ill. 60510
349-8816	Carl Swick	14713 Holly Ct.	Orland Park Ill.60462
.	Garrett Swierenga	322 N. Cass Ave.	Westmont Ill. 60559
246-3046	Vladimir Vana	5558 Franklin	LaGrange Ill. 60525
668-5809	Horace Wetherbe	918 Howard St.	Wheaton Ill. 60187
584-8364	Andrew Wohlert	219 S. 6th St.	St.Charles Ill. 60174
682-1214	George Zarins	1454 W. Glenhill Drive	Glendale Hts.Il.60137
504-737-2391	Robert Barren	125 Midway Drive	River Ridge La. 70123

34 RECORDS PRINTED

BATTERY LIFE AND USAGE PROFILE

D.R.Gillis

This is an interim report on the Battery Usage/Life Survey. We have been compiling data for 10 months and have enough respondents to give you some meaningful feedback.

First I would like to thank those that took the time to respond to the survey, your efforts will be appreciated by many others. A special note of thanks is due John Newell, John has been diligent about getting the surveys to all the members.

This summary is restricted to information supplied by vehicle owners/users and does not include any hearsay.

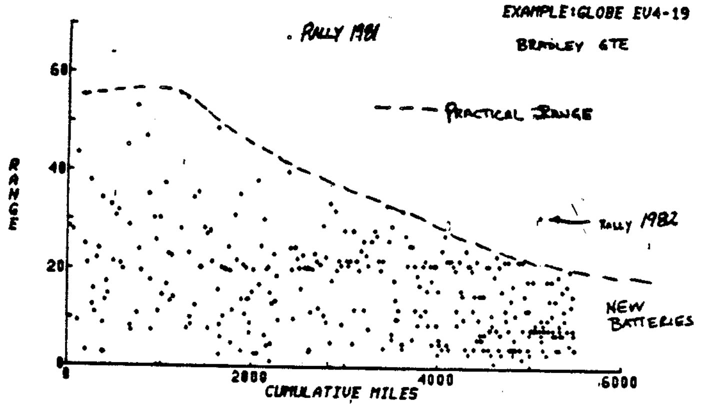
* A total of 31 vehicles were included in the survey.
* The response rate was 3.8%
* The average vehicle weight was 2470 pounds
* The average number of batteries per vehicle was 12.
* The average distance between charges was 22 miles.
* The average maximum range for a single charge was 43 mi.
* The average mileage at pack replacement was 3578 miles.
* The maximum miles on any battery pack was 10,000.

The satisfaction** of the respondents is listed in the table below for the battery manufactures with more than 10% response.

Manufacturer	Yes I would purchase again (percent)	Will NOT purchase again (percent)	No Response (percent)
Globe Union	38	50	12
Trojan	50	0	50
Alco	66.6	0	33.3
Exide	33.3	33.3	33.3

** As more responses are received we will eventually report satisfaction in terms of MILES AT REPLACEMENT.

Those who gave a detailed listing of their usage profile allowed a complete analysis, as listed below for a set of Globe Union Batteries.



9/28/82

The survey has been rewritten and will be continued, your response will help keep us all informed.

Battery Weight Ratio

It's your first and most important EV decision

In the EV rallies it's no accident that the leading cars have a high battery weight ratio. In the 1982 Santa Clara rally the 20 battery cars averaged 43%, the top 16's 40%, the top 12's 33%. The 12's didn't do too well until in 1983 Bob Steinfeld went 73.8 mi. with 40% battery ratio. A high ratio does not guarantee high mileage unless other things are done right, but it guarantees better acceleration and hill climbing characteristics.

The problem is how do you correlate your desired mileage and other characteristics with a practical car? If you're a newcomer to the game you probably couldn't get an answer to this question.

The chart below is intended to answer that question. First pick the mileage you want -- make this double your commute or routine daily mileage. This allows some reserve mileage and a limit of discharge to 80% to prolong battery life. Then if you have a car go to the right from mileage to the approximate pre-conversion curb weight. If it's in a band lower than 35% add 2 batteries -- you get more mileage and might go up 5% in battery ratio; 2 more might get another 5. Now if you have room for the batteries, fine; if not, drop down two -- satisfied? If not, consider another car and go through the process again.

This chart was based on analysis of the 1981 and 1982 East Bay rallies and was checked with the 1982 Santa Clara rally. Full results of the 1983 International rally would further verify or modify the chart.

BY--HANS KOSKI

Expected Rally miles		EV curb weight/Pre-conversion curb weight						Battery weight ratio
		Number of Batteries						
105min. batt.	135min. batt.	10	12	14	16	18	20	
15	20	3200/2650						
20	25		3900/ 3200					
25	30	2500/1950		4600/3800				
30	40		3050/2400		5300/4325			20%
35	45	2025/1475		3600/2800		6000/4900		
40	50		2500/1800				6700/5450	
45	55	1700/1150			4175/3200			
50	65			2975/2150		4750/3550		25%
55	70	1450/900	2100/1400					
60	75				3450/2475		5300/4050	
65	80	1250/700	1800/1100	2500/1675				
70	90	1100/550				3900/2700		30%
75	95		1575/875	2150/1325	2900/1925			
80	105						4375/3125	
85	110		1400/700			3300/2100		
90	115			1875/1050	2500/1525			35%
95	120							
100	130			1650/825			3700/2450	
105	135				2200/1225	2850/1650		
				50%	45%	40%		

Using a PFET To Commutate an SCR

Accidental turn-on is prevented.

NASA's Jet Propulsion Laboratory, Pasadena, California

A power field-effect transistor (PFET) can limit the rate of forward voltage application to a silicon-controlled rectifier (SCR). The PFET does not exhibit secondary breakdown, which can destroy bipolar transistors performing the same function. It is desirable to limit the increase of forward voltage because at higher than specified values, the SCR can accidentally switch on, even in the absence of the firing signal. The new circuit can be used in all types of single-phase and polyphase inverters and in buck-, boost-, and flyback regulators.

As shown in Figure 1, the basic circuit includes an SCR in parallel with a PFET and a 10-volt power supply, along with drive sources. When the SCR is turned on (by a drive voltage applied to its gate), current flows through it to the load. Shortly (of the order of a microsecond) before the time for turning off the load current, the PFET is turned on. The load current is thus diverted through the PFET and the 10-volt power supply.

The 10-volt power supply back-biases the SCR, forcing the current in the SCR to reverse and then become zero. The PFET is held on during the SCR commutation time and is then turned off at a controlled rate so as to limit the rate of forward voltage reapplication to the SCR. The maximum current that the PFET must carry is equal to the load current plus the recovery current of the SCR.

Since the SCR commutation time is small in comparison with the switching period, the power dissipated in the PFET is low. The low power dissipation allows the PFET to handle currents higher than its continuous rating and to commutate a number of SCR's. Topologies that utilize one PFET to commutate a number of SCR's are economically attractive. The concept is illustrated in Figure 2, where one PFET is used to commutate SCR's S1A through SNA. When commutation of a particular switch SiA (where i = 1 . . . N) is desired, the corresponding commutation SCR switch SiB is turned on. The current in SiA can then be diverted through the PFET as described above. The result is controlled switching

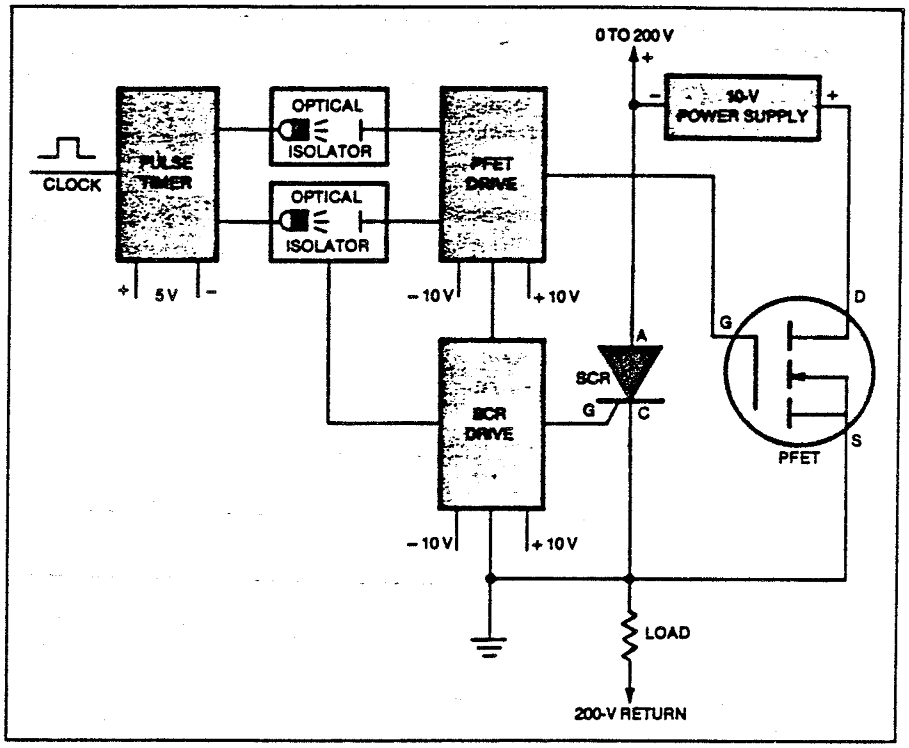


Figure 1. A **PFET Diverts the Load Current** around an SCR to prevent false SCR triggering from current and voltage switching transients.

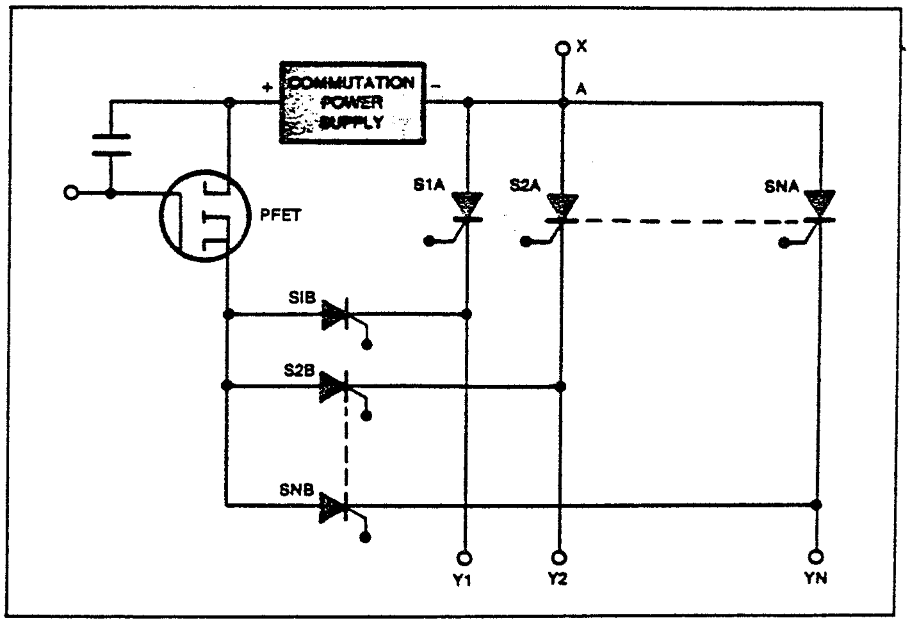


Figure 2. **One PFET** acts in cooperation with SCR's S1B through SNB to commutate SCR's S1A through SNA.

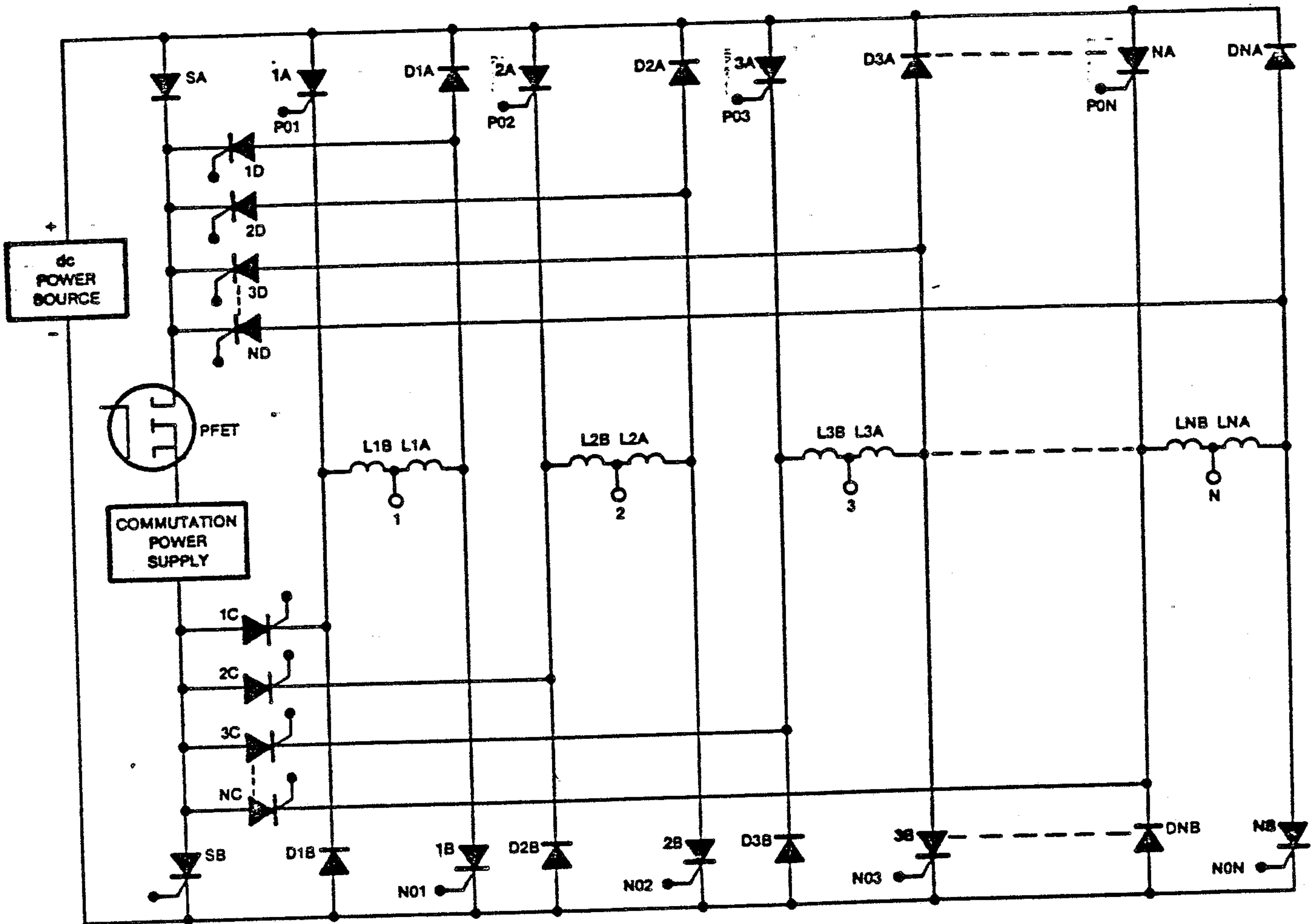


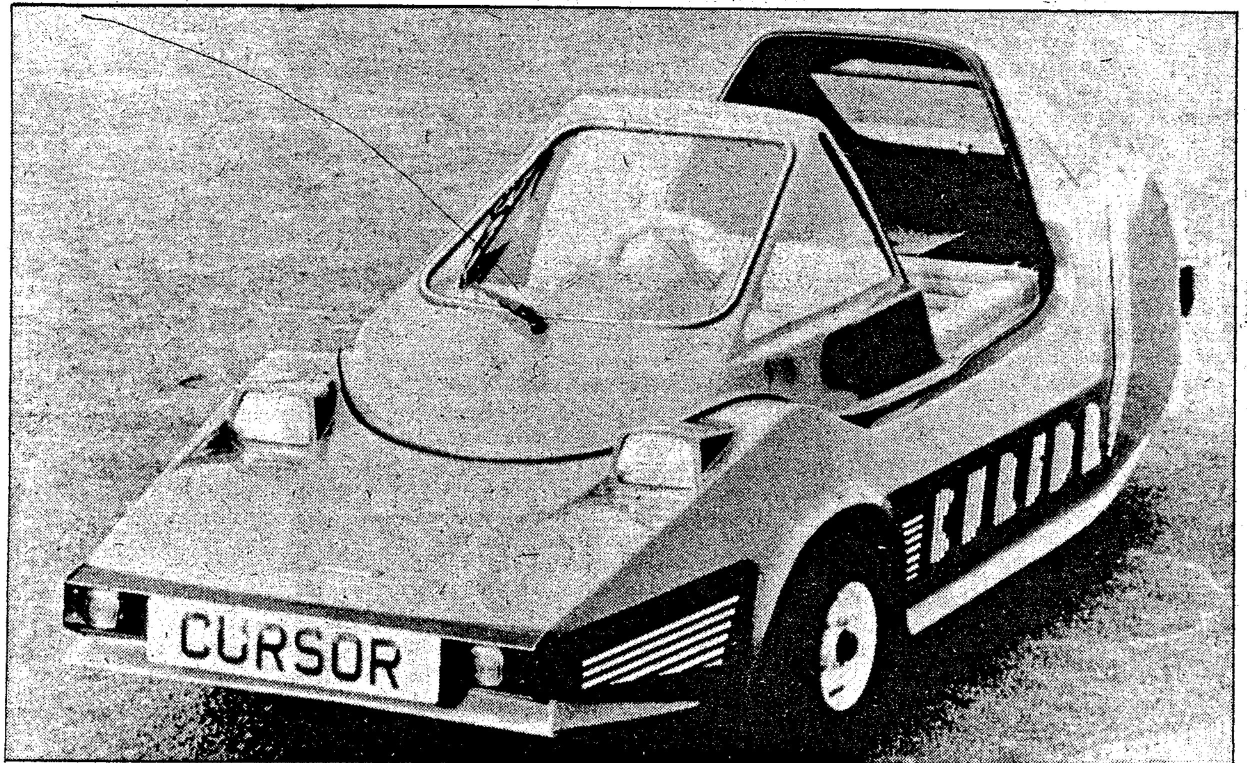
Figure 3. **A Polyphase Bridge Inverter** employs the single-PFET commutation technique.

of unidirectional current from an input terminal X to selected output terminals Y1 through YN.

The techniques of using a PFET to commutate a number of SCR's can also be extended to polyphase bridge inverters, as shown in Figure 3. The circuit achieves commutation of SCR iA by diverting its current through SCR SA, the PFET, and the commutation SCR iC. Similarly, the commutation of SCR iB is achieved by diverting its current through the commutating SCR iD, the PFET, and SCR SB. The inductors L1A through LNA prevent large circulating currents from flowing through the antiparallel diodes D1A through DNA during the commutation interval of SCR's S1A through SNA, respectively. The inductances L1B through LNB serve a similar purpose for the diodes D1B through DNB during the commutation of SCR's S1B through SNB. A 10-kW version of the inverter shown in Figure 3 was fabricated and tested.

This work was done by Dean B. Edwards and Wally E. Rippel of Caltech for **NASA's Jet Propulsion Laboratory.**

Inquiries concerning rights for the commercial use of this invention should be addressed to the Patent Counsel, NASA Resident Office-JPL
Refer to NPO-15282.



Chicago Tribune, AP Laserphoto

3-wheel economy

The Cursor, a three-wheel vehicle that, with its 49 cc. engine, can reach a speed of 30 miles an hour and get 90 miles a gallon, makes its debut in Faversham, England. The invention of Alan Hatswell, head of Replicar of Dunkirk, will go into production in April and will sell for about $1,600. Hatswell, whose company builds replica vintage cars, reportedly designed the Cursor for his son Ian, 16.

A CVT Backgrounder

The use of belts and split pulleys that come apart and move together to change gear ratios is an old concept. An American named H.G. Spaulding patented the principle in 1897. From 1900 to 1910, the French Fouillaron was built with a variable V-belt transmission; however, it was driver-operated via a lever. Even today, some industrial and farm equipment uses the principle.

It was a Dutchman, Hub Van Doorne, who adapted the principle to a continuously variable automatic transmission, which he called the Variomatic.

His first model, in 1959, was mated to an air-cooled, two-cylinder 600cc, 18-hp engine, in a car he produced called the DAFfodil.

Unlike the CVT used by Volvo today, the rear pulleys were in line with the axle shafts and power was transferred from the rear pulley through a set of reduction gears directly into the axle shaft and wheel. There was no cross shaft or other connection between the rear pulleys. In effect, each front and rear pulley set was a separate transmission.

This eliminated the differential yet provided a limited slip differential effect. But it posed some real problems.

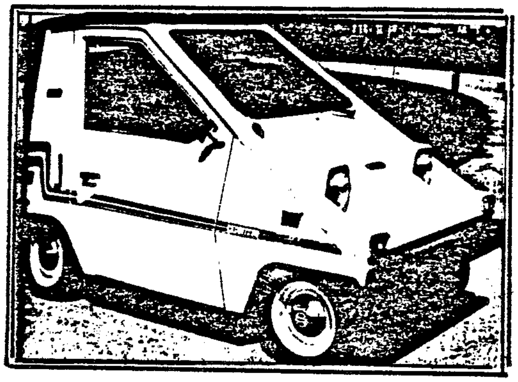
Under some conditions, 70 percent of the torque would go through one belt, so the spring loads in the rear pulleys had to be raised to accept this. Once that was done, the spring loads were so high that at very low speeds conventional differential action was poor. Belt life also was reduced by the high-spring loads. In city driving, where a lot of differential action was necessary, belt life was very poor, running 10,000 to 12,000 miles.

So in 1966, the rear pulleys were moved a bit forward, and as at the front, a cross shaft was installed between them. The cross shaft was geared in the center and drove a gear that fed power into a conventional differential just to the rear. Although this differential was built into the CVT, it effectively took the driving-conditions factor out of the CVT belt-life equation. This CVT layout is the one used today.

In 1972, Volvo bought a third of the DAF car operation; in 1975 another 42 percent. Volvo had financial problems in Holland and the Dutch government made an investment to save the operation. At present the Volvo share is down to 30 percent, even though all the cars made are Volvos.

Van Doorne had built up a successful truck operation, which continues to this day, with no connection to the Volvo car operation.

Dr. Van Doorne kept a laboratory going as a separate operation after the Volvo purchase. Until his death in 1979, he experimented with various advanced forms of the CVT, including steel belts, but without any notable success. —*P.W.*



For Sale CITICAR Sebring Vanguard
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Rebuilt contactors 8 6volt batteries.
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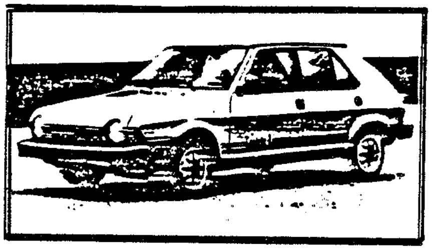

FOR SALE 1981 LECTRIC LEOPARD
Model 96A Fiat Strada 4 door
with sun roof Runs perfectly $2000.00
John Kennedy 687 - 6398
15800 Terrace Dr.
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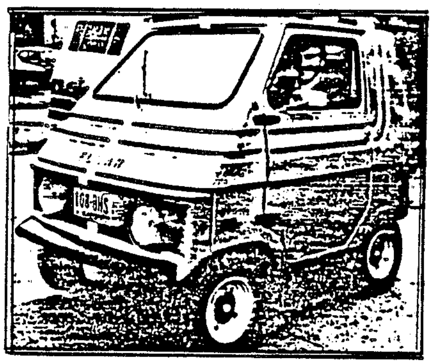

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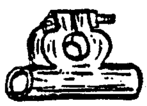
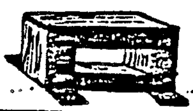
SOLID BRASS BATTERY CONNECTORS
solder on type fits # 00 & 000
can be used on either pos. or neg. terms.



75 ¢ each

STEEL LAMINATED CHOKE CORE
can be wound with 10 turns of # 00
cable. (approx. 12 ft.)



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