

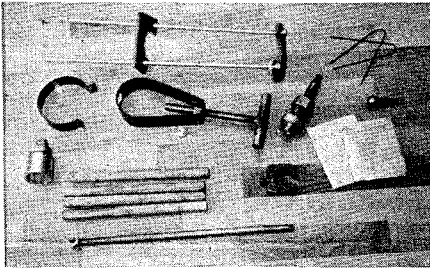


# VEE LINE

NUMBER 29

FEBRUARY 1967

## EXTRA HANDS



If you have access to a VW shop manual, you know you can't work on a VW without some special tools. Here are a few you won't find in the manuals. They were designed for work on a Formula Vee, and each was made on the spur of the moment, when needed, so finish and workmanship aren't exactly top-drawer. If you are one of those who look ahead and prepare, you'll be able to take your time and do much better:

FV-1 Shock absorber spring compressor - 1/4" plate cut to fit, and 3/8" "Redi-bolt".

FV-2 Cam follower retainers, used while assembling the engine to prevent the followers in the upper half of the case from falling out. Stiff coat-hanger wire.

FV-3 Ring compressor. Made of 1 1/2" strapping steel - the kind used to bind large crates for shipping. If you have three hands it can be used as is - if only two, the ears are compressed and held with a vise-grip pliers. Easily removed after the cylinder is in place over the rings.

FV-4 Wrist-pin remover and installer. Made of the same strapping material, with a 5/8" Redi-bolt screw and a 5/8" nut welded to the ends of the strap. A smaller screw would work, but with finer threads, would be slower. Make it long enough so that a pin can be installed, as well as removed. The little gadget just below it is a brass plug, shouldered to center in the pin, and recessed to center the screw. Otherwise the screw would pass through the wrist-pin. Eliminates heating the piston or, more probably, the hammering out of pins, with the possibility of bending rods or damaging bearings.

FV-5 The combination flywheel-lightening-and-balancing-arbor and clutch-plate-aligning-pilot, described in Vee Line #18.

FV-6 Instant cylinder baffles. For use when you discover after the head is installed that you forgot to install the  
(Continued on Page 2)

## DIRECTOR'S CORNER

Well, the election is over and the rules for 1967 are memorized by now (aren't they?) so maybe we can get back to racing again. Some of you, I understand, never really stop, but up North we have two seasons - the racing season, and the season between racing seasons. They're about equal in length, but it seems a lot longer from October to April than vice versa. It probably makes racing more enjoyable, though, than where it is conducted the year around. The first race in the Spring takes on an air of a family reunion that none of the following events can equal, and the So-long - see-you-next-years at the final race in the Fall make racing friendships something special, too.

Did you read the "Sports Car Graphic" version of the ARRC Formula Vee race? I hope you washed your hands afterwards - if any of that stuff dripped into a cut or a scratch it could poison you. Believe it or not, that's the same race described by several other observers (whose eyes weren't glazed at that hour in the morning) as the most exciting one of the meet! To give SCG their due, though, the Vee article they published last summer has now brought over 700 inquiries, many of which have resulted in new members and Vee owners; so consider that, too, before you cancel your subscription.

Response to the proposal for an additional 1500cc class in Formula Vee has been notable for its absence. Only a couple of comments have been received so far. Is it because everyone considers it as they do the other SCCA classes - just fine for anyone who doesn't like FV the way it is, "but I couldn't care less?"

## A LITTLE MORE ON RIVERSIDE

Of the nineteen Vees that started, only two DNF. All but one of the finishers were on the same lap, and Rick Abney was lapped by only two cars. Exactly half of the entrants were members of FVI. (Hope they were all displaying their insignia.) The DNFs were Dan Fowler and Boyd Hough, who took first and second in last year's event. Want to know how to set up a front runner? Well, take your choice - here's how it was done at Riverside (courtesy of the L.A. Chapter, FRA):

### A.R.R.C. Riverside

Well, gang, does your car compare with the winners?

Place	Driver	Make of Car	Car Wt.	Exhaust System	Front Tires	Rear Tires
1st	Campbell	Zink	840	equal length equal diameter	Firestone 500-730	Firestone 550-810
2nd	Zachari	Autodynamics	840	-	McCoy Caps 500	McCoy Caps 550-590
3rd	Biren	BK Special	835	All pipes small diameter	Bruce Caps 500	Bruce Caps 500
4th	Tempelton	Zink	875	equal length equal diameter	Firestone 500-730	Firestone 550-810
5th	Noah	Bobsy	860	equal length not equal length	Goodyear R2-500	Goodyear R2-550
6th	Denison	Autodynamics	845	equal length equal diameter	Firestone 500-730	Firestone 550-810
7th	Burtis	Autodynamics	830	equal length equal diameter	Goodyear R2-450	Goodyear R2-550

## CHALK UP ANOTHER ONE FOR OUR SIDE

Another magazine devoted to racing has recently hit the news stands. Right now it's an every-other-month publication, but if it lives up to the last issue, it should move up to monthly before long. It's devoted to all forms of auto racing, which is not going to be all in its favor - those with narrow tastes will find a lot that they're not interested in. However, the reporting is excellent. In spite of the millions of words that have been printed about Jim Hall, for instance, they managed somehow to come up with an article that is new.

They've written for more information on Formula Vee. "...Auto Racing Magazine is very interested in Formula Vee, because here the emphasis is on the driver and not on exotic racing machinery. This is an excellent way to train new upcoming drivers for competition." How about that? "Auto Racing Magazine". Try it!

## 1500 CLASS?

"Dear Whit - At the risk of stirring up a 'Beetle's Nest,' I am compelled to offer a 'slow down' warning on your steamed-up approach to the 'Vee Explosion.' I appreciate and respect your opinions relative to the Vee problem and the possible solution, but I must suggest that caution precede action in this most important matter. In regard to your concern over the over-subscription of some FV races this past season, I would be a little hesitant at using this as a vehicle to introduce a new parochial class for Vees as the solution to the condition.

Frankly, to my knowledge there was only one race where FV drivers were turned down, and this situation was triggered because some contestants did not submit entries until a day before the race was scheduled. Had the drivers been prompt with their entries, the race sponsors would have made necessary schedule adjustment to handle the overflow.

I know of one Region on the East coast which handled an over-subscription with great ease. Its answer was the division of entrants, making two races. I might add that the event was on the Regional level - not a National. I know of no National that turned away drivers because of over-subscription."

Sincerely, "Red" McCurdy

"Dear Don - I would like to support the (1500) idea wholeheartedly from the point of view of overcrowding in the class - if that's what is happening down South. Unfortunately, there are not that many Vees per square yard here yet.

Vee 1500s would seem inevitable in one form or another (we have 3 or 4 around here). I would like to see FVI include both V1200 and V1500 classes. I also tend to agree that the 1500 engine in an absolutely stock form should be used.

Perhaps the most important matter is that of identification. There should be no doubt in (the public's) mind as to which car has which size engine. I presume we are in a position to recommend such distinctive class designations as V1200 and V1500. I think that anything less (V1 & V2, or VA & VB) would not be to our benefit.

I have driven a few practice laps with a 1500 Vee and was left with the impression that the details of suspension adjustment are much more important with such a machine, although the present set-up is by no means marginal. There seems to be a likelihood that the better drivers would look a little better, and the worse ones a little worse. . ."

Tony Wainman-Wood, Kingston, Ont.

". . .Whit's idea for another restrictive class is food for thought. But I wonder if perhaps drivers interested in going faster would not be wiser to go the route that Bruce Redding did - for about the same money get the complete EMPI hop-up kit, which turns a VW into a real screamer. Bruce was beating B and C cars right and left back East. I just can't see SCCA accepting another class for VWs, because it would be even more of a problem to police it."

Harriet Gittings, Fremont, Cal.

## THE VEE AND ME

Whit Tharin

One of the tactics frequently employed by successful race drivers is "late-braking." It means that a driver, in order to pass, goes deeper into a turn before applying his brakes than does his opponent. Whether that opponent happens to be the race leader, a car being lapped, or somewhere in between, is immaterial. It is a beautiful and vital maneuver, so let's examine how it is done.

There is in sports car racing ("road racing", if you prefer) a tacit rule which says that the car in the lead has the absolute right to take any path he may choose, through any given corner. This does not relieve him of his responsibility to drive prudently and to leave road room for faster cars, but he has no obligation to let his opponents by. Quite the contrary! His normal line will start at the extreme outside, swing to the extreme inside at the "apex" of the corner, and then shift smoothly to the outside again, using the entire width of the course, not once, but twice. Therefore, with cars of equal power, the trailing driver must take the lead at some point to establish his right-of-way, or be hopelessly cut off. This is why he late-brakes - to take the lead at the beginning of a corner.

As the contending cars approach the turn from a straight, often nose to tail, the lead car will usually be toward the outside so that he can take a fast line through the turn. His pursuer will pull out of line, to the leader's inside, a short distance from the corner. When the leader brakes, the pursuer does not, and thus passes him. The passer then brakes extremely hard, but in such a manner as to remain in front. He will not be on the ideal line, nor will he be going as fast as he might, but he will effectively block the passed car and force it to slow down and yield the right of the way to the passer.

There are variations on the technique, but all require one thing - the late-braker must cue his own braking on the leader, and brake after he does. Therein lies the late-braker's vulnerability. If his opponent is of equal experience and skill, the late-braker may find himself taken entirely too deep into the turn, and thus be unable to keep his car on the course. Few drivers realize this, so the most common defense against the late-braker is to block him. Some avoid the outside and drive down the center. Some crowd very close to the inside.

Blocking-type defenses frequently discourage neophyte late-brakers, but an oldtimer will simply switch tactics at the next opportunity. He will take advantage of the fact that blocking tactics leave the defender very much out of position. A top-notch driver can, for example, late-brake from the outside position, though that is a very delicate maneuver.

This kind of action, counter-action and reaction, repeated turn by turn, lap after lap, is what we call a "dice." (This term also applies to any other actions that two or more drivers may take primarily because of the proximity of an opponent.) It is an exciting thing to watch, and that is why knowledgeable road-racing fans will take up positions near the corners. And they will be certain that nothing keeps them away when the Formula Vees run! One will see more close racing among the Vees than any other class, and it will be all through the pack - not just among the leaders.

(Whit wrote this column primarily from a spectator's standpoint, for "Foreign Car Guide". For Vee drivers, he might have added -

*Not only to foil competitors, but simply because it is the fastest way around the course, you should learn to "late-break" every corner - every time. First, find out just how fast you can consistently go through the turn. Watch your tach! Then start going in deeper each time around, braking harder to get down to your RPM limit. Pick a corner marker, or a tuft of grass, or a scratch on the pavement for a braking point. When you finally find the latest possible braking point for getting down to the maximum possible RPMs, you won't have to worry about late-brakers, unless, as Whit mentions, they try to brake even later. By the same token, if you have learned your limiting point you won't allow anyone to lead you past it, regardless. don)*

(Continued from Page 1)

FV-9 Push-rod-tube-liner-uppers. A 3-ft. length of 3/4" wood dowel, cut into 4 pieces. Keeps the tubes from dropping out while the head is being installed, and keeps them straight while the head bolts are being tightened. Dowels will have to be sanded down a bit - they don't come in millimeter sizes.

FV-7 Ball and stem from VW steering arm joint used to taper hole in steering arm from the under-side if you don't have a reamer. Heat the arm and drive the stem in to the proper depth. Remove quickly to avoid "freezing" in place.

FV-8 Flywheel-nut socket. 1-7/16" socket, with a piece of 3/4" square key-stock inserted. If you don't have a regular 3/4" socket handle use this with a large crescent wrench and a "cheater." Figure the length of the handle in conjunction with your weight to get the specified 217 ft/lb torque (2,604 in/lb, divided by your weight).

FV-9 Push-rod-tube-liner-uppers. A 3-ft. length of 3/4" wood dowel, cut into 4 pieces. Keeps the tubes from dropping out while the head is being installed, and keeps them straight while the head bolts are being tightened. Dowels will have to be sanded down a bit - they don't come in millimeter sizes.

FV-10 Tie-rod-ball-joint remover. Cut with a torch from 3/4" plate drill and tap for a 3/8" bolt. Will take a little fitting to get it to slip between the steering arm and the ball-joint. Bolt screws against the stem of the ball-joint, pushing it out of the hole.

FV-11 Transmission plug wrench. A 17mm nut welded to a suitable handle

By the way, if the next time you install rods on your crankshaft you can't find your "holding fixture VW310a," try this (FV-12) - Clamp the flywheel in a vise, at the rim; insert the crankshaft, screw in the crankshaft nut, and you'll find the shaft in perfect position.

**OBSOLETE?**

Very few *new* Formcars have been seen in the past year, but don't write them off — check the records. In proportion to their numbers they are still in there pitching, even though the majority of them are of '63 vintage. As has been mentioned here before, there is very little evidence to indicate that looks has anything to do with performance. Actually, the Formcar is probably the "cleanest" car of all, aerodynamically, especially if the belly pan is extended to the rear of the body (so maybe I'm a little prejudiced).

Due to their numbers (they were the original Vee) and "age" (up to four years), an increasing number of them are noted in the used Vee market — some of them at ridiculous prices. There also seems to be an increasing interest in "updating" them — possibly by the second crop of owners. Here are a couple of typical letters —

"Dear Don

Cannot tell you how much the back issues of VeeLine have helped. . . please send me all the 1966 issues. . .

What is the current status of the camber compensator? On the Formcar are people using the cable or an EMPI-type device?"

Bill Hildick, Grosse Pointe, Mich.

"Dear Don

Can you help me in regard to compensating devices for rear end on a Formcar? Have seen a lot of them with the cable & pulley type, and a few with a torsion-bar type.

Also, what is the widest tire that can be legally used? Does it have good results on the standard wheel, etc? Any advantage in using different sizes on front & rear?"

Robert H. Ruble, South Bend, Ind.

I certainly wish I could give you some good advice on tires — if I could, it would help us to make up our minds what *we're* going to use this year. If you will check the chart on page 1, showing the tires used on the first seven cars at the ARRC, you'll see what I mean. As far as legality is concerned, in this country anything goes, as long as you can get it on the wheel. (In Australia you would be restricted to sizes approved by the manufacturer for a given size wheel.) Even 9-plus inch tires have been seen on U.S. Vees, and according to the owners they work fine; but in my opinion, that's overdoing it.

One thing to consider in using wide tires is camber. It has been found on Formula One cars that wide, flat tires lose their effect if they aren't kept in total contact with the pavement. Obviously, with swing axles, camber changes will shift the contact area to one side of the tread or the other. If the car is set up with initial negative camber, this will tend to wear the inside edge of the tire, giving it a coned effect. If you hold the

point of a pencil so that it is in contact with a table, and roll it in a straight line, you will note that one end of the cone or the other will have to do a lot of sliding. This effect will extend to tires worn to a taper, too. The friction will not only increase the tire wear, but will be a source of "drag." To get the most out of wide tires, then, you would probably want to set up with as nearly neutral camber as possible.

SCCA declined to take a stand on the "camber compensation," so its status is still somewhat in doubt. Is it legal as a "camber control device," or illegal as a partial substitute for the coil springs — the specified "springing medium"? Apparently it will take a protest, and probably an appeal, to get a final, definite answer. On the other hand, from all reports it is not about to sweep the country by any means, so perhaps it is not all that good and will die a natural death. At any rate, there are a good many owners who are satisfied with less.

The simplest device is, of course, merely a chain or cable from the axle to the frame, on each side of the car, adjusted so as to limit rebound at the desired point. This does the job, but has a couple of shortcomings. First, there is no "give" in this arrangement; so when it reaches its limit, it does so with a definite shock. Second, it tends to lift the inside wheel in a corner — or hold down the inside side of the car, if you will — acting somewhat like an anti-sway bar. Vees are generally considered to handle better when this function is confined to the front end, especially if the frame is stiff enough to transfer the roll to the front suspension.

A cable run from one axle, over the frame and down to the other axle limits the camber without lifting the inside wheel by allowing each wheel to seek its own level — or by allowing the frame to roll even while under restraint. Some installations utilize pulleys to support the cable, some use stationary guides, curved to minimize chafing where the cable turns downward, and some merely shield the cable in plastic tubing or friction tape.

To eliminate the shock when the slack in the cable is taken up, and to provide a limited amount of springing even under rebound conditions, a spring is sometimes incorporated into the cable somewhere. A pretty heavy spring is required, as the arrangement must be strong enough to support both wheels at approximately neutral camber when the car is raised off the ground.

The system described here is that used on our Formcar; but with appropriate modifications, it should work equally well on most any make. The cable is 3/16" aircraft control cable (scroungeable at any airport). The pulleys are a simple lathe job, turned from 1/2" stock and grooved deep enough to completely bury the cable. The bushings are 1/4" pipe (which is actually 3/8" ID) cut long enough so that the 3/8" bolts can be drawn up tight without binding the pulley. The cable retainer is a piece of sheet

metal drilled and bent to fit. It keeps the cable in the pulley groove while it is slack — which is most of the time. It would be simpler to mount the pulley above the shock mount rather than below it, actually. As shown, a hole must be cut with a torch in the back of the mount for the cable to pass through, but it looks a little neater.

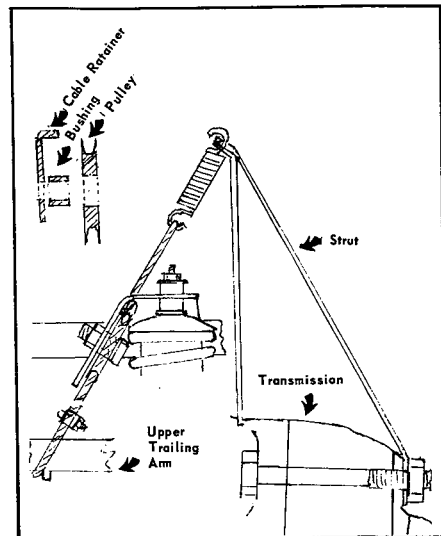
In order to keep the cable in line with the pulley it runs forward to the upper trailing arm, where a "button" is brazed to the arm to keep it from slipping back. (A small hose clamp would serve as well.) Ordinary cable clamps (1/8" rather than 3/16") are used to adjust; and fasten the cable. Tighten the first one enough to carry the load, and then use a second one to make sure. If you have a torch, cut the cable by melting it — it will fuse the wire ends and prevent raveling.

The strut from which the spring is suspended is of 1/8" x 1" flat bar, doubled at the top and drilled for the spring, and then bent to fit. The rear leg is held in place by the top bolt in the "gear carrier" section of the transmission. The front leg is merely notched with a file to fit over the longitudinal rib on the case — it can't go anywhere. For dimensions, bend one up from wire, first, trying it for fit until you're satisfied. Ours is about 9" high.

The spring is about 4" long, overall, and is comparable in weight to those seen on some folding beds. Under normal conditions there is enough slack in the cable so it is still loose, even when pulled up in the middle and hooked into the spring. Under rebound or "tuck-under" conditions it tends to straighten out, of course, putting the spring under tension.

Adjustment is a matter of opinion. We run with a couple of degrees (eyeball) of negative camber, and adjust the cable so that when the car is jacked up the wheels hang with "just a little" positive camber. If we go to wider tires this year — as we probably will — this will have to be re-evaluated.

Does it work? Well, *we* think so — and I believe most of our competitors would agree.



**ELECTION RETURNS**

This year's election was marked by a great deal more interest - and competition - than last year's. Whit Tharin, unopposed, was given 46 votes last year; Harvey Templeton our new President, received 152. 74% of the ballots were returned, with only 4 received after the deadline! Any other organization want to match that?

Lee Wachs, facing the double handicap of "only one officer per state" and Harvey's national publicity due to the ARRC, was the low man on the totem pole. Vi Hendrickson, who was unopposed, was endorsed by all but two write-in votes. Harriet Gittings, again the only nationally-known candidate, outdrew both her opponents, combined, for Executive Secretary. The official tabulation:

<b>President</b>	
Harvey Templeton . . . . .	152
Lee Wachs . . . . .	12
<b>Vice President</b>	
Vi Hendrickson . . . . .	162
<b>Executive Secretary</b>	
Harriet Gittings . . . . .	87
William Denison . . . . .	37
Terry Farrel . . . . .	34

**SEE IT THROUGH**

From the Canadian Automobile Sports Clubs - ". . . Many thanks for the copy of 1967 Formula Vee regs. . . CASC enforces these regulations and unfortunately has found them troublesome - many competitors attempt to "cut corners" and we have had more than a reasonable number of protests with resultant disciplinary action. We hope that the situation will improve."

*(It will - if you continue to maintain strict enforcement. SCCA had the same trouble, for the first year or so. Seems people just can't believe that FV rules are to be observed to the letter until they've had it proved to them. don)*

**WHAT THE NEIGHBORS ARE DOING**

As has been mentioned here before, news from Canada is rather hard to come by, but we did get some recently.

First, there is another Vee builder now - in the West. So far they don't have a firm name, but they have cars, and a name for them. For more information on the "Dingo," write to Gary Silver, 13367 108th Ave., North Surrey, B.C. Canada.

I've also tracked down the builder of the "Kelly" Vee. Seems he's in the Canadian Air Force, and builds Vees - and other racing machinery - on the side. He's Wayne Kelly, c/o Royal Canadian Air Force, Trenton AFB, Ont. Canada.

At last report (some time ago) the "Huron" Vee was still being built by Wilim Inkret, 125 Huron St., Toronto, Ont., Canada.

**UPDATING**

If you feel you are stuck with an old Vee, you don't have to be. You can change it into something else. If it's a Crusader you can turn it into one of the new models for \$88. That's the price for the new fiberglass parts which will fit on the old frame with no alterations. Or for around \$600 you can turn it into a new Bobsy. That's the price for the parts you'd need in addition to those you have already - VW components, rear shocks, instruments, pipes, etc.

Sorry, but there's still no word on the gas-tank fireproofing process. All I can do is pass on what I get "It will be forthcoming in a few days."

If you've been searching "Sports Car" Magazine for a tabulation of cars, by class, give up. They didn't keep track last year.

**The VEE LINE of  
Formula Vee International  
Don Cheesman, Director  
Box 291  
Ephrata, Washington 98823**

**NOW HEAR THIS!**

"Dear Don:

I hope this will clear up the questions in your Jan. 15th letter regarding the 1967 rules:

1. Sec. 4.3 a.6: The term 'standard steering arms' refers to the ones on the spindles. The arm on the steering box is the Pitman arm.

2. Sec. 4.6 Paragraph (a) specifically allows the use of *any* standard VW gear set that can be fitted without modification. In other words, transporter ring-and-pinions are legal.

You requested something quotable on the legality of modifying 36hp heads to accept 40hp valves, and regrinding 40hp cranks to accept 36hp rods. The point to remember in cross-pollinating parts from the two series of engines is that you can't use an illegal means to attain a legal end. In other words you can't make an illegal modification to install a legal part. OK?"

Sincerely, Jim Patterson  
Deputy Competition Director, SCCA

*(Thanks a lot, Jim, for the cooperation. don)*

**UNCLASSIFIED ADS**

FOR SALE: Formcar, '65 SE Div. Champion. Still one of the fastest in the U.S. Sacrifice for \$975 if you'll treat it right. Whit Tharin, Rt. 1, Box 149, Allendale, S.C.

FOR SALE: Back issues of "Vee Line" (except #3) 25¢ ea. 7" "FV" emblems (active members only), metallic car emblems, jacket patches, 50¢ each. FVI, Box 291, Ephrata, Wash. 98823.

FOR SALE: 2 Autodynamics, used, taken in trade. 1 MK II, 1 MK III, in excellent shape. \$1400 each. 2 "Nassau" models, used only at Nassau, \$2400 ea. Autodynamics Corp., 2 Bamard St., Marblehead, Mass.



**Formula Vee  
International**

**BOX 291  
EPHRATA,  
WASH. 98823**