

VKA FIRS

The Official Vintage Karting Association Magazine



February 2013
Rolf Hill – Dick Teal



TURN

Jacksonville Winter Warm-Up

GREAT WEATHER



People's Choice -- '61 Fox Go Boy -- Ernie Shores

In this issue:

- Jacksonville Winter Warm-Up Results
- "Stock Appearing" Alcohol Mac Carbs
- The Man Who Started It All
- 1959 Kart Engines AND MORE!

www.VKAkarting.com

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VKA Logo Courtesy of Tom Medley

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2013 VKA TOUR EVENTS & TBO

1/24 – 26	Jacksonville, FL	8/9 – 10	Circleville, OH
1/31 – 2/1-2	Riverside, CA	8/31 – 9/1	Fremont, OH (TBO)
3/14 – 16	Barnesville, GA	9/6 – 8	Quincy, IL/MO
4/27 – 28	Whiteland, IN	Oct TBD	Atwater, CA
5/9 – 11	Camden, OH	9/26 – 29	Alton, VA (VIR Sprint & Enduro)
5/24 – 25	Springfield, IL	9/27 – 28	Delmar, IA
6/13 – 15	New Castle, IN	10/11 – 13	Cuddebackville, NY
7/11-13	Brodhead, WI		
7/26 – 28	Avon, NY		

TBD = To be determined

TBO = The [R.E.A.R.] Big One

VIR = Va. International Raceway

Please check the official schedule posted on the VKA web site for any last minute corrections (www.VKAkarting.com).

KARTING TRIVIA QUESTION BY BILL MCCORNACK

Question: In what year was the first G.K.A.C. National held ?

Answer on p. 5.

EDITOR'S COMMENTS

FIRSTTURN® is the new name of the VKA Magazine. Let me know what you think of it at KartNumber4@Yahoo.com or on the VKA Forum.

I just got back from Jacksonville *Winter Warm-Up*; just in time for this issue of FIRSTTURN® to include results before going to press. Also, given the new Stock Appearing Class, we do have an article in this issue that may help you in that class (see p. 9).

Last month, the January FIRSTTURN® was combined with the VKA Event Schedule. That saved VKA on the order of \$500. Nearly 600 people get the Event Schedule (which includes about 300 VKA Members). It is one of VKA's ways of promoting events. But you, as a member, can help promote the organization by telling your racing buddies about the interesting technical and personal articles in each issue. They won't get FIRSTTURN® unless they are a member.



As you get your Membership Renewal Notice, you might see the VKA Application has a new area on it. You can now indicate your skills or interests you could offer to VKA to make us a better organization. There is a mountain of experience out there. Put it to work for VKA.

Rolf Hill - #4









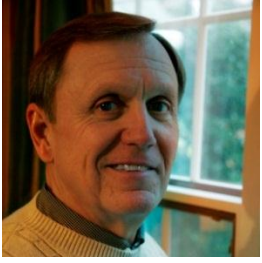

LETTERS TO THE EDITOR

Nice article [in the December 2012 *VKA Magazine*] on Earl Larson. The person who wrote it, James Holmes, was the PR person for Max-Torque. He wrote many of the new product announcements for Max-Torque and when I bought the company in 1989, he owned 10% of Max-Torque. He use to tell me he had 100's of pictures and 8mm movies of the early days of karting and he was going to give them to me. He never did, and when vintage karting came along, I contacted him to ask him to look into it once again and give me that old stuff, but he died before he got around to it. He had moved down to the Virginia Beach area and was a reseller of "JUNK". He would buy overstock and obsolete stuff and had a huge warehouse. Someone sent me a clipping of his obituary and sale of his warehouse. I couldn't believe the pictures of all the stuff he had collected. **Jim Donovan, Sr., President, Max-Torque, Ltd.**

[The Editor reserves the right to print only complementary letters. 🇺🇸]

DECEMBER BOARD OF DIRECTORS' MEETING - SHORT SUMMARY

The Board voted on the 2013 VKA Board.

		
Pres.: Jeff Campbell	VP: Carl Billington	Secretary: Louie Figone
		
Treasurer: Bob Lapke	Membership: Jim Thompson	Judging: Jack Murray
		
Safety: Dean Kossaras	Safety: Ernie Shores	PR: Lake Speed
<p>The Board Member position of <u>Editor</u> was replaced by The Publications Committee Chairman, Rolf Hill, and Technical Support, Dick Teal.</p> <p>The <u>Executive Director</u> Board Member is open, so if you are interested in coordinating the Regional Event Coordinators, contact a Board Member.</p>		 Past Pres.: Carl Weakley

In December, eighty Membership checks were received and pending deposit. Member Numbers will no longer be put on Membership cards. Additional classifications of memberships (lifetime and custom) were discussed. Combining the January Newsletter and the 2013 Event Schedule was approved. Membership Applications will be included in those mailings to non-members. Promoters' Packages will include additional emphasis on "flags" and "tech inspections." The December 2012 VKA Magazine was posted on the website. The Guidelines Committee presented its recommendation for 2013 Classes. (Stock Appearing was defined, as well as minor recommendations to Historic and Over-60.) The Board Meeting closed with "thank you's" to Bill McCornack and Dick Teal for their contributions to the VKA.

The balance as of 12/31/12 was \$10,710.77.

MEMBERSHIP REMINDER

New VKA Memberships are now issued for a 12 month period. Current members should receive a reminder along with your copy of FIRSTURN[®] two months before your membership expires.

Annual dues are: Full Membership = \$30; Associate Membership = \$10; Foreign = \$40.

Checks should be made payable to: "Vintage Karting Association" and mailed to: Mary Jo McCornack, 7N057 Weybridge Drive, Campton Hills, IL 60175.

CORRECTIONS!

OK, no one's perfect. In the January issue of FIRSTURN[®], my reference to the Membership info was NOT on p.8, but could be found on p.10. Brodhead was spelled wrong; how was I to know there's no "a" in "Broad?" Oh, but there is one in "head." Silly me. Most important, the contact info for the track should have been included: **N2236 Mt. Hope Road, Brodhead, WI 53520; (608) 897-2898**

Rolf

Trivia Answer: 1959 (From page 2.)

JACKSONVILLE WINTER WARM-UP RACE RESULTS

BY ROLF HILL & ED SAHAGIAN

Sunny and warm was the theme **again** for this season's opener, *The Winter Warm-Up*, in Jacksonville, FL. With snow, ice and cold weather plaguing the north ... 70's, dry and sunny was a welcome relief. **Ed Sahagian** introduced VIR sponsors from Airheart Brakes who were invited to see what VKA is all about. A total of 54 entries were divided among 13 classes. Mac-49, Dual Rear and Over-60 took the honors with the most entries ... tied at six entries each. There were no **Black Flags** and more importantly, no **Red Flags**. Two Heats, the Kart Show and a fried chicken dinner were all fit into the first day of racing. The Third Heat, 50/50 drawing, door prizes and trophy awards were all on the second day of racing and everyone got an early jump on the bad weather that awaited almost everyone. Here are the winners of the 13 classes:

	1 ST	2 ND	3 RD
Mac 49:	Jimmy Gay	Pam LeMay	Nip Swenson
Junior:	Sean Kavanagh	Trevor Armstrong	Kathryn Kavanagh
Rear 6.1:	Jim Merritt	Terry Armstrong	-----
Rear 8.2:	Pearl Gamble	Bill Winegardner	Marc Nagel
Dual Rear:	Lewis Cooper, Jr.	Gary Wlodarsky	Jerry Nagel
Historic:	Ernie Shores	Jerry Nagel	Mark D'Elia
Sportsman 8.2:	Lyle Caswell	Pearl Gamble	Debra Oakley
80-85 S/W:	Hal Orndorff	Sean Collins	Marc Collins
S/W Amer. 8.2:	Dick Charest	Marc Nagel	-----
S/W Foreign 6.1:	Austin Mack	Stan Davis	Marc Font
S/W Foreign 8.2:	Jimmy Gay	David Waddell	Vince Kavanagh
Dual S/W:	Hal Orndorff	Rodney Fish	Lewis Cooper, Jr.
Over-60:	Mike Birdsell	Gary Wlodarsky	Dean Scarbrough

JACKSONVILLE WINTER WARM-UP SHOW RESULTS

Rear Unrestored- '63 Lancer w/ Power Producess AH- 58s; Pam Nagel
Rear Restored- '60 Rupp Dart Super K w/ A490 Clinton; Chris Marchand
Rear Modified- '61 Bug Concession w/ Mac I-76 saw; Mark D'Elia
Sidewinder Restored- '77 Margay ExPert w/ Mc-90; Gary Wlordarsky
Sidewinder Modified- '76 Margay Panther X w/ Mc-91; Kathryn Kavanagh

People's Choice- '61 Fox Go Boy w/dual Power Product AN58s; Ernie Shores
 (See cover and www.VKAkarting.com for pictures of all winners.)

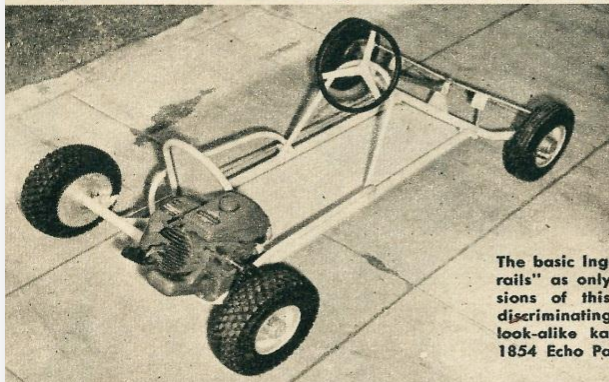
THE MAN WHO STARTED IT ALL

Excellent article from the March 1959 Rod & Custom submitted by Dick Teal.

THE MAN WHO STARTED IT ALL

ART INGELS did it. Started the karting craze, that is. At least it was he who brought to perfection the wee-sized cars that Dads have been building for their kids ever since out-moded lawn mower engines started showing up at wrecking yards. Little cars previously took the form of wooden-frame platforms, fitted with four (maybe more, maybe less) wagon wheels, steered by a rope and powered by a tired mower mill driving through

It was not by chance that Art developed a successful chassis design right from the outset for with 7 years behind him at the famed Kurtis Kraft shops he had a hand in every Kurtis-built Indianapolis car constructed since 1951, including the Cummins Diesel, Vukovich's first car, and countless others. Art showed his nameless little car to Frank Kurtis who was then (and still is) engaged in not only building winning Indy cars, but a



The basic Ingels-Borelli Careffa with the "sissy rails" as only added accessory. So many versions of this car have been produced for discriminating buyers that seldom do two look-alike karts ever roll from the plant at 1854 Echo Park Ave., Los Angeles, California.

a nightmarish combination of pulleys and levers.

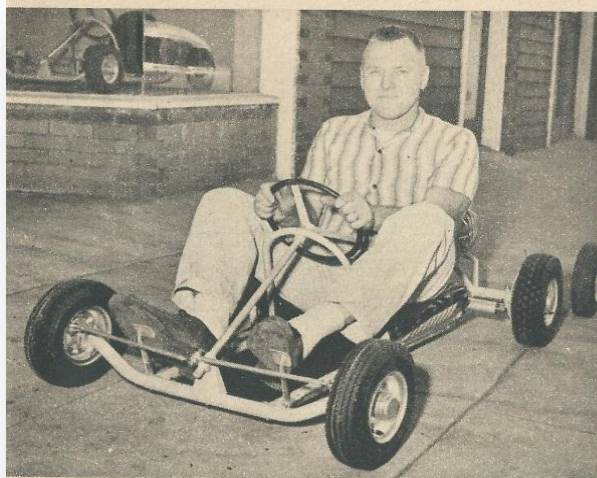
While rummaging through a surplus store in April of 1956, Art happened across a 2½ hp 2-cycle mower engine. He combined it with a set of semi-pneumatic tires, a unique frame design of light but strong tubing, and set off on a neighboring parking lot. The speed potential surprised him, for even with his own weight of 210 lbs., the little car scatted across the area like something possessed. Early bugs were eventually worked out of the basic design and soon Art had a real handling machine.

string of extremely successful midgets, from full midgets on down to quarters. Frank was interested in the little buckboard but felt it had no commercial possibilities (at the time).

One day a parts supplier, Bill Rowles, happened to see Art's car and became intensely interested in its possibilities. He tried, unsuccessfully, to interest either Art or Kurtis in going ahead with plans to further develop the car and begin building them commercially.

News of the car finally reached long-time hot rodders Frank Livingstone and Roy Desbrow—and Rod & Custom.

ROD & CUSTOM



Art Ingels rests his 210 lb. frame on one of his *Caretta*'s with ease. Art started the kart ball rolling over three years ago in '56.

photos by Spence

Frank and Roy pioneered commercial production of completed cars and assemble-em-yourself kits and that started the ball rolling.

Casting about for a name to tag on to these high-spirited stormers, an R & C staffer christened them Go Karts — and thus was born the name that Livingstone, Desbrow and new partner Rowles now call their cars.

Art Ingels watched with mounting interest as his original idea swept the hot rodding world, finally left Kurtis Kraft in order to spend all his time producing the *Caretta*, which name he and partner Lou Borelli chose for their own kart. Not wanting to try and buck the high production rate of the many manufacturers that have entered the field during the past year, Art and Lou market complete plans for their kart and are filling the need for basic parts for individuals who want to design and

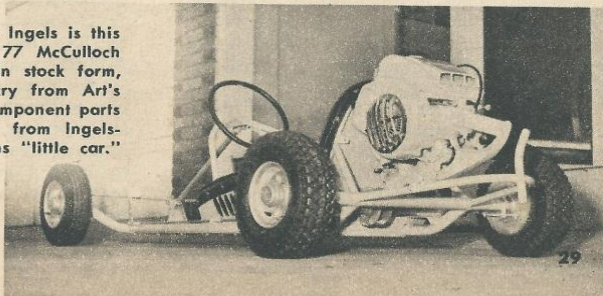
build their own kart but who prefer to leave the design of such important components as front spindles and dual brakes up to someone with know-how.

Production of the *Caretta* moves along at a slow but sure pace and can be compared to the way in which such firms as Maserati and Ferrari build their racing models. The cars are few but their quality is high and seldom are two made alike.

Today the firm of Ingels-Borelli is busily engaged in producing component parts and plans for do-it-yourselfers, and turning out specials which incorporate the basic *Caretta* design but include whatever additions or alterations the buyer might want together with practically *anything* in the way of 2-cycle engines for power.

"Karts are here to stay," says the man who started the whole thing just three years ago. ●

Typical of the specials built by Ingels is this *Caretta* powered by a Super 77 McCulloch chain saw engine producing, in stock form, 10 hp. This model is a far cry from Art's original kart. Both plans and component parts for such a kart are available from Ingels-Borelli. *Caretta* in Italian means "little car."



MARCH, 1959

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“STOCK APPEARING” MAC CARBS ON ALCOHOL

BY BILL MCCORNACK

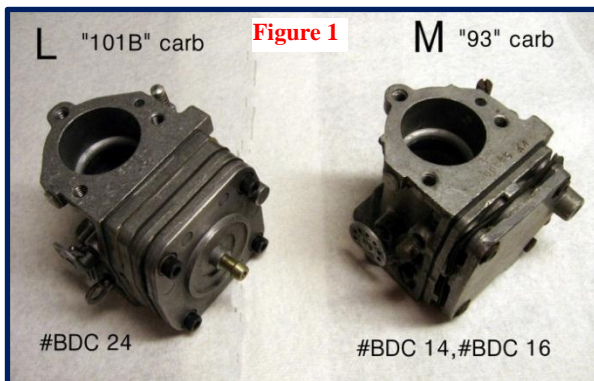
The ever-growing "Stock Appearing" class is now an official VKA event class (see last month's **FIRSTTURN**®). It all started with Paul Booth, the Springfield, Illinois promoter, about six years ago when he ran this class at his event. As of last season, there were three VKA events in the Midwest that had great success with this class – Springfield, Illinois; Quincy, Illinois; and Delmar, Iowa.

The VKA Guidelines state that you should use the carb supplied from McCulloch Corp. at that time [2-stack only (no double pumper carbs)]. The most desirable 100 cc engine models for this class are: 91 (1967), 91A, 91B, 91B1, 92, 91 m/c and the 93 (1977). This tech article explains how to modify your BDC14/BDC16 gas carb models to run 100% alcohol fuels.

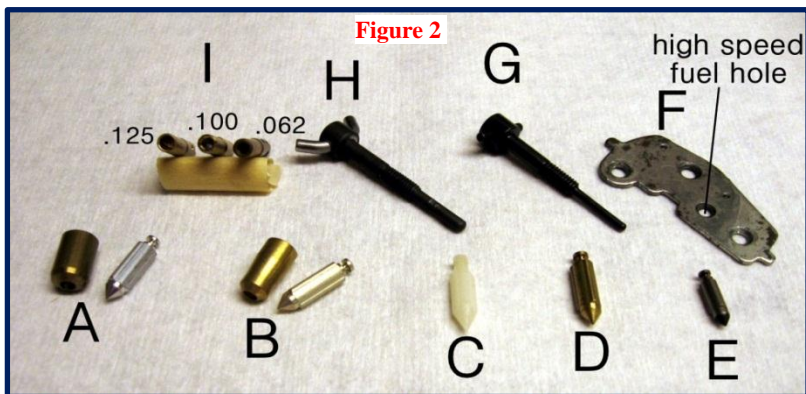
Basically, what we're doing is turning the 93 carb into a 101B model, but we're using the correct two, 93 pumper plates. **(If you already have a 101 BDC 24 carb body, you can just install the two 93 pumper plates and you're done!)**

Back in the early 1970s,

McCulloch boasted in an advertisement that their new 101AA model had an alcohol-ready carb. **This** article turns your BDC 14/ BDC 16 carb into that 101 carb without the double pumper plates.

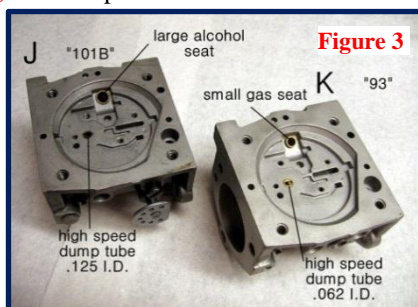


Let's start by explaining what all the parts labeled **A** through **I** are (see **Fig. 2**). **A**) GEM Product's alky needle/seat; **B**) High Speed Product's alky needle/seat; **C**) Nylon alky inlet needle; **D**) McCulloch's brass, alky inlet needle; **E**) McCulloch's gas inlet needle; **F**) Circuit plate; **G**) High adjustment needle for gas; **H**) High adjustment needle for alcohol; **I**) High speed dump tubes - .125 hole McCulloch 101B carb, .100 hole (this is what I use for best results), .062 hole (this is what comes in a stock 93 carb).

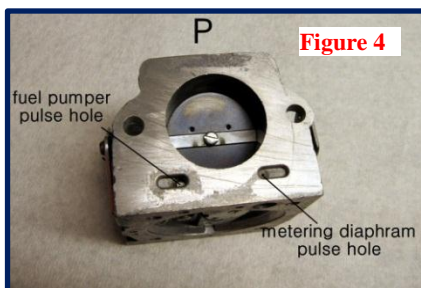


To modify the circuit plate (**F**), drill out the "high speed fuel hole" (shown above) to #39 drill (.100"), then file the underside of the plate smooth. To install (**A**) the new, larger GEM's 5/16" O.D. seat, use a 5/16" drill. To install (**B**) High Speed's 9/32" O.D. seat, use a 9/32" drill. Both seats are installed to a depth so the brass, large alcohol seat (**J**) sticks up .040 above the aluminum surface. You may use Loctite® "Red" as a sealer for a tight, sealed fit (see **Fig. 3**).

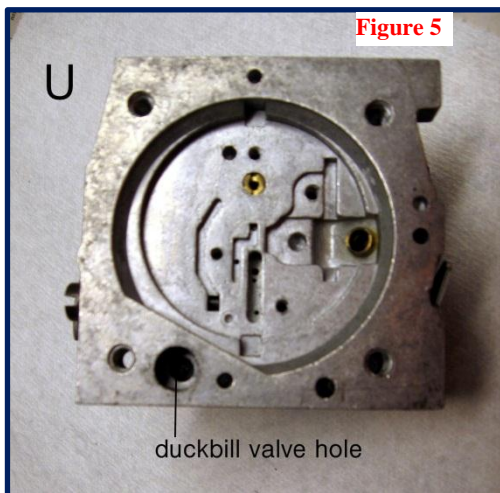
When installing the high speed dump tubes (**I into K**), you can just drill out the 1/16" hole through the center to #39 drill (.100") or install a newly made tube with a .100" hole through it. When drilling the side of the dump tube to take the larger diameter high adjustment needle (**H**), you can do a couple of different things. If you used the existing tube by drilling it out to the .100" diameter, just drill into the high adjustment needle hole (through the dump tube wall) with a #32 (.116") drill. If you installed a newly made dump tube, you must spot drill #30 (.128") to center it, before drilling through the dump tube wall with a #32 (.116") drill.



Pulse Holes. **Fig. 4** shows there are two Pulse Holes. The fuel pumper pulse hole is OK. The metering diaphragm pulse hole needs to be drilled out to a #55 drill (.052"). This is the area where the duckbill valve operates.



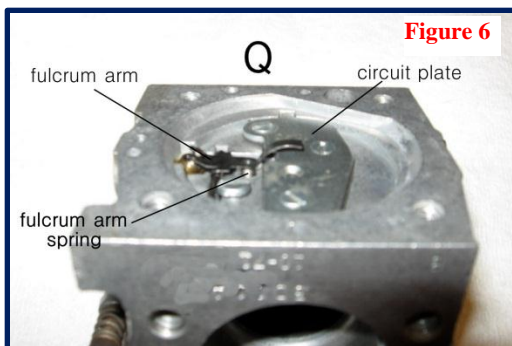
At the bottom of the duckbill hole (Fig.5) is another hole that goes through to the throttle bore. This hole is a pulse bleed-off hole that should be no larger than .030" in diameter. The carbs that have a little brass plug with a hole in it are fine. If there is just a hole drilled into the aluminum body, it is probably .055" diameter. That's too big! You'll need to reduce the size by carefully punching it down to about .030" diameter.



Fulcrum Arm Assembly (Fig.6). The height of this arm controls fuel flow and how long the inlet needle is open, allowing fuel into this area. The height should never be higher than just under the top surface.

Fulcrum Arm Spring (Fig.6).

A light tension spring will allow more fuel. A heavier tension spring will lean down the carb. This area is where rough adjustments of fuel are made. A higher fulcrum arm will allow more fuel this area.



The high adjustment needle is for fine adjustments. The range of your high adjustment needle should be 1/2 - 1 1/4 turns out. For alcohol, I recommend running the low adjustment needle shut because it just contributes to loading up your engine.

Figure 7 (Items **N, O, W, X** and **Y**) show these components in new condition. If they're not in good condition, your carb won't perform.

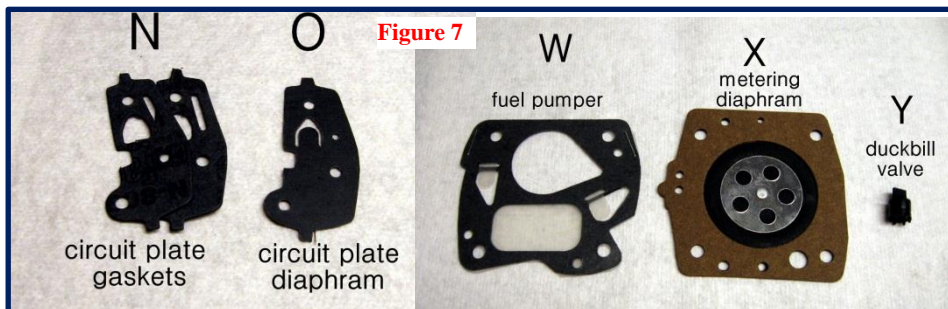
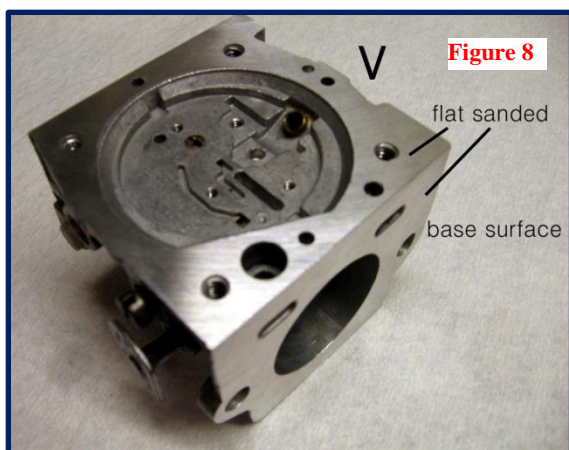


Figure 8 shows the surfaces flat sanded for proper sealing.



If you can't find some of the parts shown in this article, you can contact Terry Ives, Ed Sahagian (Fedco), or me.

You can find our contact information in the Resource Area (p. 18).

Bill McCornack

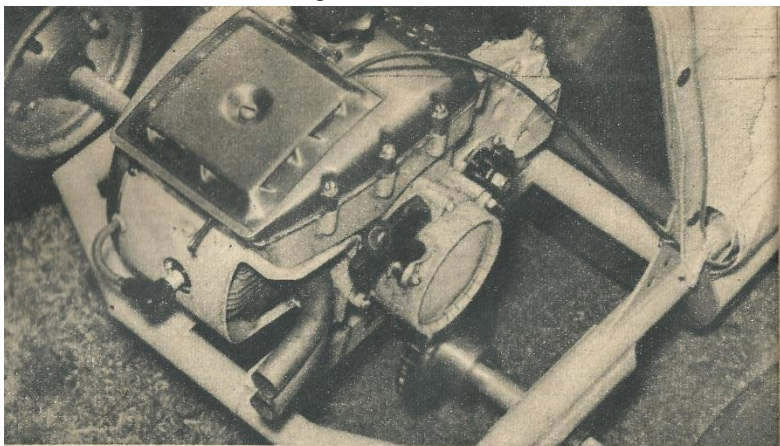
HELP US OUT!

The Staff of **FIRSTTURN**® would like to make a special request for Members' input, to share the wealth of their expertise with all readers. We would love to include your Technical Article or a Member's History ... a short story about a Member's karting life or karting experience. You can write it yourself, or we can help you. Find me at the track or email me at:

KartNumber4@yahoo.com.

Rolf

The evolution of kart engines was fast & furious in the 50's.



MORE ON GO KART ENGINES

manufacturers build for the kart market

By ROGER HUNTINGTON

THIS CRAZY GO KART sport is developing so fast that we writers are apt to find our "deathless pros" obsolete almost before it's printed. All we can do is keep pounding away and hope for the best. So, with that word of apology, here we go again on engines...

NEW ENGINE POSSIBILITIES

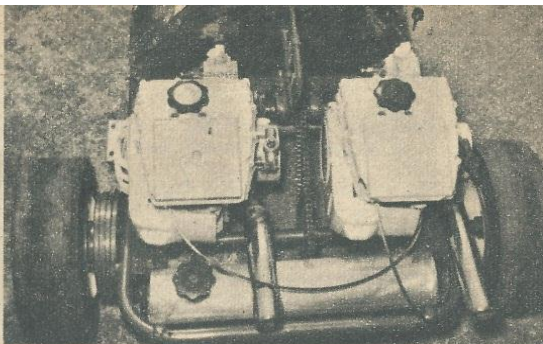
It's interesting to trace the evolution of attitudes held by engine manufacturers toward the go kart sport. A year ago, when the sport was in its infancy, they were thumbs down on the whole deal—wouldn't have a thing to do with any effort to *race* their products in all-out competition. They gave us clearly to know that the engines had been designed specifically for lawn mowers and chain saws, and

that they "wouldn't be suitable" for racing conditions. They wouldn't recommend, they wouldn't advise, they wouldn't guarantee, they wouldn't *listen*.

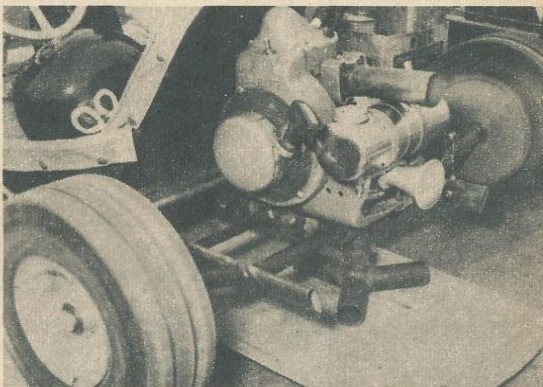
That's all changed today. Go karts have become a very important mass market for small lightweight two-cycle engines... and now these same manufacturers are actually *competing* to get their engines on karts! They're converting existing commercial powerplants with the proper mounting brackets, carb mounting, crankshaft ends, reversing procedure, etc., and really promoting them. They even guarantee. We've even got a little price and horsepower race going on! This is wonderful news for the karters. It means more variety in design, hotter competition, closer, more inter-

McCulloch Super 55A Conversion on Go Kart has an rpm of 11,000 and an hp of 6.8. The kart with a locked rear end live axle and a 7.5 gear ratio. Front wheels are 300 x 5 and 400 x 6 wheels are in the rear.

McCulloch employee Bob Ellison's Class B kart, with two Super 55A engines developing 7 hp each at 7000 rpm; note center chain drive from built-in-reduction gears in the engines...7.5:1 overall ratio



Center-mounted 4.9-cu. in. Homelite engine drives jackshaft ahead of engine — then to sprockets at outer ends of shaft to drive both wheels.



esting races.

One of the newer engine developments is the Clinton E-60. This engine was originally used on a Clinton chain saw, with right hand rotation—which meant it could only be used on the right side of a kart. It was no trick to reverse the rotation; but the bug here was that the E-60 used a beautiful die-cast cooling shroud with a spiral shape that would only work when the blower rotated clockwise. If you reversed the engine with this shroud (and many tried) you would overheat and seize up in a few minutes. So the potential of the E-60 went unappreciated for a long time.

Now the factory has gone to work on this engine—modified an A-400 stamped cooling shroud for blower operation in either direction, tooled a

new mounting bracket for the 400 bolt pattern, and a new induction flange to carry the diaphragm-type carb horizontal. The E-60 has an entirely different block and porting than the A-400's (even though displacement is the same 5.76 cu. in.), and give about 5 hp at 5200 rpm—compared with 2½-3 hp at 4500 for the 400's. Other important durability features of the '60: Forged steel connecting rod, needle rod bearing, ball mains, and a 3-ring piston for better cooling. The factory red-lines the engines at 6000 rpm for continuous operation, but they can be flashed to 6500 or even 7000 without danger of blowing. This new E-60 looks like a very important addition to the growing field of kart equipment—and the retail price of around

continued on p. 72

NOVEMBER, 1959

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GO KART ENGINES

continued from p. 71

\$90. seems very reasonable for a real heavy-duty, high-performance Class A powerplant.

I might mention in passing that the trend now is definitely away from the sleeve-bearing lawn mower engines for karts. They just don't stand up — and you end up paying more for new engines or parts than if you bought a chain saw plant in the first place, for two or three times as much. I notice now where some companies are rebuilding used lawn mower models with needle-bearing rods, hardened cranks, and ball or roller mains — and retailing them at around \$40. This sounds like a real good deal.

Power Products engines are working out quite well in the karts, and proving reliable. Their best seller is the Model AH-81 chain saw engine, with 8.1 cu. in. and rated $5\frac{1}{2}$ hp at 5000 rpm. This has the anti-friction

bearings throughout, weighs only 14 lbs., and retails for a reasonable \$87.75. Biggest disadvantage here is that this is a Class B displacement, so one of these engines would have to compete with two Clintons or West Bends. They are not always successful in this situation.

For the fellow who can afford to spend a little more for an engine we have the McCullochs and Homelites — “Rolls-Royce” quality in minimum transportation. A year ago these companies, with strong reputations to protect, weren't having a thing to do with go karts. But now the economic facts of life have forced their hand, and we see McCullochs and Homelites available over the counter in kart equipment shops. I see where the McCulloch people have conveniently increased the stroke of the 1959 Model Super 55A by $\frac{1}{8}$ ” to make a very nice 5.3-cu. in. Class A engine. They have also offered dynamometer

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GO KART ENGINES

continued from p. 72

facilities to some factory employees who want to modify McCulloch engines for their own personal karts. Employee Bob Ellison has achieved about 7 hp from a 55A, using a big carb, filled head, ported lower end, and fuel. These engines peak their power at around 7000 rpm, and twist better than 11,000 at top speed on the track! McCulloch engines retail between \$220. and \$300.

The Homelite people still aren't having much to say — officially — but I understand they've been experimenting with their 5.0-cu. in. Series VII chain saw engines for possible kart applications, and a number have been distributed around the country for test. This engine is rated at 6hp at 5800 rpm and weighs 21 lbs. It would retail at around \$300. (Though possibly some competition between McCulloch and Homelite might bring this down a little.)

Incidentally, one feature of these expensive high-speed chain saw engines that should be noted: They have built-in reduction gears, which makes it possible to get radical overall gear ratios without running into problems of sprocket clearance and minimum number of teeth. This is an important advantage. Bob Ellison's McCulloch kart has 7.5:1 overall gear ratio — and my friend Chuck Frame, of Grand Rapids, Mich., has overall

ratios from 9.3 to 12.8:1 for slow courses with his Homelite kart!! These crazy gears dig something awful... and with a usable speed range up to 10,000 rpm or more, you can really get around a twisty course.

So dig down and see how much money you've got for kart power!

MORE TUNE-UP HINTS

We recently spent an afternoon at the Clinton factory in Clinton, Mich. talking to their engineers about various two-cycle engine problems — and I came up with a number of interesting points that should be passed along.

In the first place, any designer who has worked on two-strokes will tell you quick that you're working with a “chain reaction”. What they mean is that every operating factor has some influence on just about every other operating factor. For instance, if you raise the tops of the inlet ports in the cylinder wall to advance the effective “valve” opening you will also affect the exhaust scavenging, the performance of any tuned exhaust stacks, combustion rate, charging pressure in the crankcase, even the reed valve performance. The engineers say there's a string running through any two-cycle engine; you pull one end and *everything* moves! This is why nobody knows very much about two-cycle engine design. There are just too many variables to pin down. You

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GO KART ENGINES

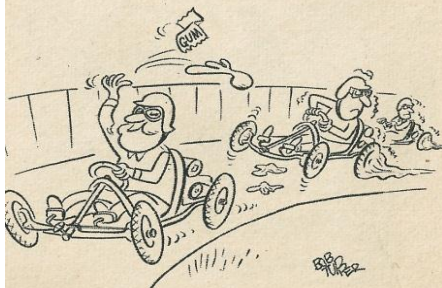
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design by experience and the seat of your pants — and hope.

Even with all this, though, the Clinton engineers could make a few general statements on certain areas of the tuning and hop-up problem. On the subjects of porting and charging, they said the major "bottleneck" (point of main restriction) in the inlet track is definitely at the ports in the cylinder wall. Porting at this point will do the most for performance. Porting out the reed plate and increasing carburetor venturi area — or even using dual carbs — are relatively less effective. The "charging pressure" in the crankcase at the time the inlet ports are uncovered is also an important performance factor. This will average about 6 lbs./sq.in. on Clinton engines up to 3000 rpm — and it's very hard in increase it (by decreasing crankcase volume) because of rod and crank throw clearance problems. Filling the crankcase with various plastic compounds can be quite effective. Some fellows rotate the crank with the filler in a soft state, to build up basic clearances — then use a knife to open them up a few thousandths more before it hardens. But don't be like the guy who had his filler crumble and clog oil holes!

I was especially careful to question the Clinton engineers about compression ratio. This is a very effective hop-up weapon on a four-cycle; how

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ROD & CUSTOM

GO KART ENGINES

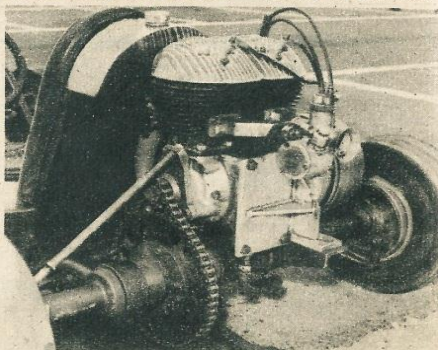
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about a two-stroke? It turns out that compression is sharply limited here by *pre-ignition*. An air-cooled cylinder runs a lot hotter than a liquid-cooled. Also the big deflector top on the piston in a two-cycle stores heat and acts as a big hot spot — which isn't helped by a 2-ring piston that can't efficiently transfer the heat to the walls. Result: When the compression pressure reaches 105-110 psi spontaneous ignition is almost inevitable. This limits volumetric compression ratio to the neighborhood of $7\frac{1}{2}$ or 8:1. Obviously alcohol fuel, with its cooling effect — if combined with a considerably higher volumetric compression ratio — should be a very effective hop-up trick.

I asked about re-contouring the deflector top of the piston, to improve air flow in and out of the cylinder. This is risky, too, as the incoming mixture must be made to go steeply upward and wash the spark plug. If the mixture were only deflected up 45 degrees or so the engine would likely not even run. With oil mixed with the fuel, of course, plug fouling is always critical. You've *got* to wash that plug constantly with fresh mixture — and this means air flow into the cylinder can't be as streamlined as we might like. And, on this same subject

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Twin-cylinder 15-cu. in. Excelsior motorcycle engine installation for Class C; rear axle drives both rear wheels — houses differential!



ROD & CUSTOM

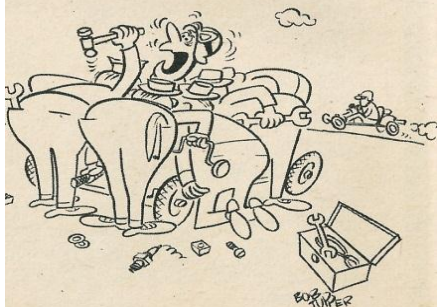
GO KART ENGINES

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of combustion, we should mention that a two-cycle engine requires relatively more spark advance under equal conditions than a four-cycle; but it seems to be more *sensitive* to advance at the high and low end. Clinton engineers doubted that a variable spark advance would pay for itself in go kart racing, as long as engine speed is kept above about 2000 rpm at all times. (Variable spark advance is mostly to smooth the idle.)

We talked a lot about fuel mixtures and tuning. It seems a lot of kart boys (myself included, I fear) have been laboring under the delusion that power and torque are very sensitive to both the air-fuel ratio and the fuel-oil ratio. Clinton engineers say this is not true. You can fiddle with the mixture needle all day and not gain 10% in hp. Or change from a fuel-oil ratio of 8:1 to 16:1 will make barely 5% difference in power and torque. We forget sometimes that the oil *burns*—and, in fact, the BTU's of heat released per pound are as much as gasoline. Of course the oil has a much higher flash point or ignition temperature, so it has the effect of slowing down combustion and requiring more spark advance. So Clinton goes right along with a recommended fuel-oil ratio of 8:1 for break-in, and 12 or 16:1 for regular running. Using plenty of oil costs very little in performance

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OUCH! HEY! The TOE, the TOE!

ROD & CUSTOM

GO KART ENGINES

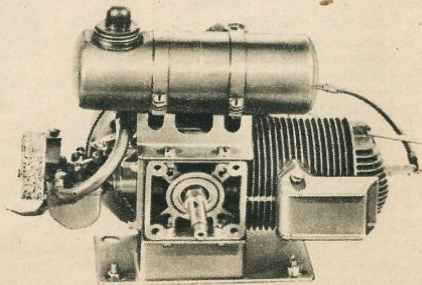
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— and is wonderful insurance.

On the air-fuel ratio, they say we tend to run *too lean*. Get this important point: Unlike a four-cycle engine, with the two-cycle the optimum mixture is much richer at *full load* than with no load. Thus if you adjust the mixture needle to run smooth when there is no load on the engine and it's running free, it will be too lean at full throttle. And vice versa. Best way to adjust the mixture is still to do it under full load on a dynamometer or on the track. But if you can't do this, then richen up the mixture till the engine misses and stumbles under no load... then it should be just about right at full load. Just remember that the same needle setting cannot be optimum at both light and full load.

So let's get those karts out there and go!

Last minute developments before press time show that engine manufacturers are definitely making progress on their kart engines. Clinton has announced the E-65 engine, available in both rotations for dual engine use. They call this one the "Challenger" and rate it at 4.5 hp. List is \$96.50. Also new in the lineup is West Bend's hot 5.8 cu. in. engine (slated to replace the 510 and 645 series. Pictured below, this model has new mounts for better adjustment and integral gas tank. No spill cap on tank and exhaust stack are further improvements made with karting in mind. No definite word from other companies... but they are working! (Ed.)



ROD & CUSTOM

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