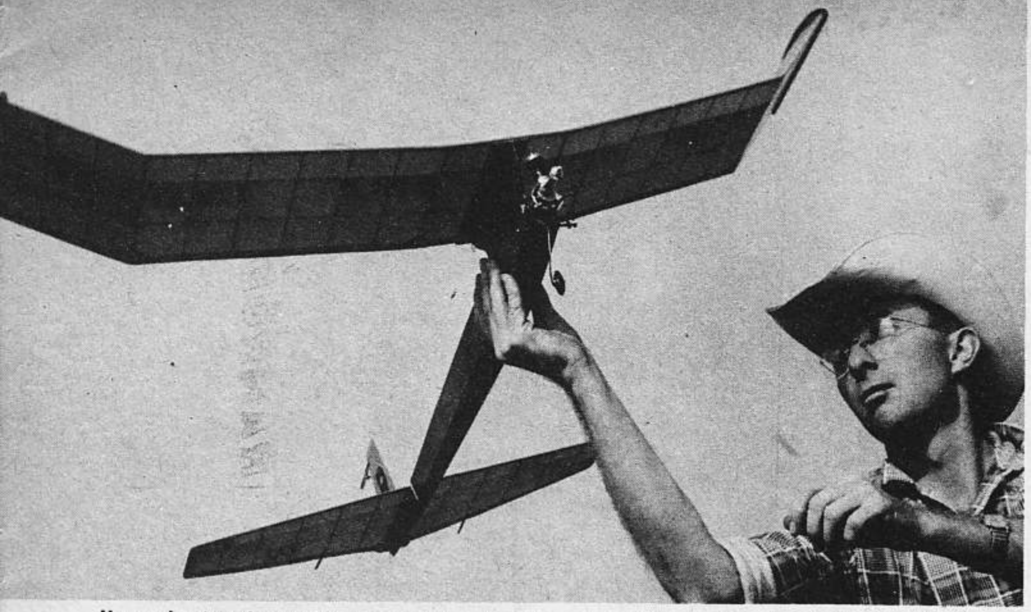


Here releasing the Half-A Ramrod for a hand-launched flight, St. Jean has just pulled the timer.

RAMROD 250 . . . By Ron St. Jean

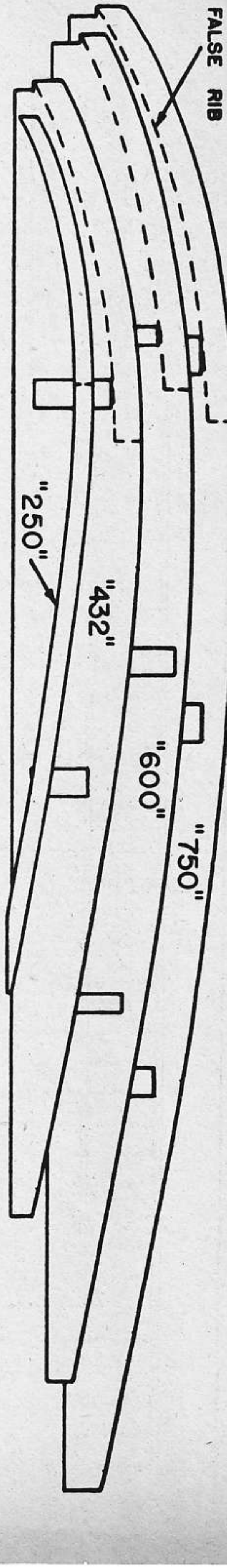
Biggest winner of the 1955 season, in all sizes and in many hands, was this California design. Plans show the Half-A.

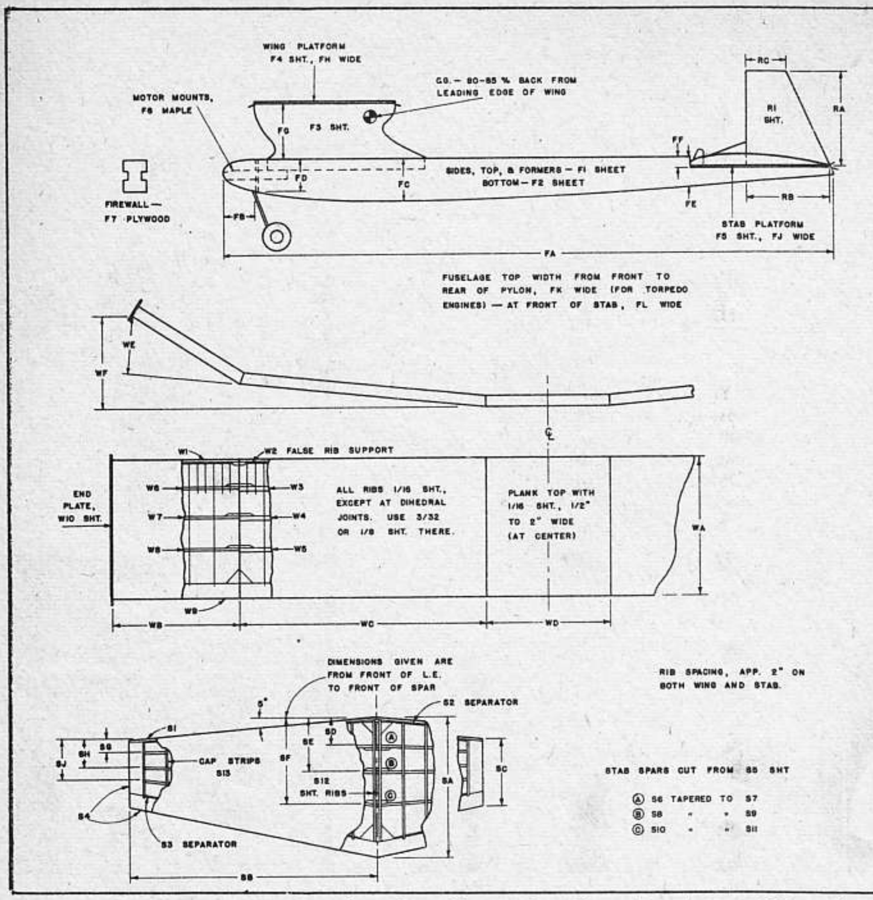
► Ramrod was seven years in the making, but has just recently established itself as one of the most consistent winners in California and at the 1955 Nationals. Let it win for you in 1956.

The ship is easy to construct and even easier to adjust, most of them checking out in three flights! Performance is excellent— *honest* dead air time is four to five minutes, depending upon size of model, weight and engine. Some 7 a.m. flights of seven minutes-plus on what I like to call "dew thermals" are not uncommon. The phenomenon mentioned is caused by the re-absorption into the air of dew lying in grass or hay after the morning temperature rises above the dew point. This results in a slight buoyancy, making many a modeler believe his four-minute gassie is a six-minute bomb. (Believe it or not, there are sometimes thermals at night—I know; a "750" with lights flew away at 10 p.m. one evening and it has not been heard from since!)

Like other successful gas models—

What the man with the stop watch sees a couple of seconds before the release. Tripod is for VTO.





RAMROD

"432" — "15" ENGINES, FOR F.A.I. COMPETITION
"600" — "19" TO "23" ENGINES, CLASS A OR B
"750" — "29" TO "35" ENGINES, CLASS B OR C

DIMENSIONS (INCHES)				WOOD SIZES (S = SHEET)			
MODEL	"432"	"600"	"750"	MODEL	"432"	"600"	"750"
FA	36	43	48	F1	3/32 S	1/8 S	H'D 1/8 S
FB	2	2-1/2	2-5/8	F2	1/16 S	1/16 S	3/32 S
FC	2-1/4	2-5/8	3	F3	1/4 S	H'D 1/4 S	3/8 S
FD	1-5/8	1-7/8	2-1/8	F4	1/8 S	3/16 S	3/16 S
FE	1-3/8	1-5/8	2	F5	1/8 S	1/8 S	1/8 S
FF	3/8	1/2	1/2	F6	3/8 X 1/2	3/8 X 1/2	3/8 X 5/8
FG	3-3/8	4	4-3/8	F7	1/8 S	1/8 S	3/16 S
FH	2-1/4	2-1/2	3				
FJ	1-3/4	1-7/8	2-1/4	R1	3/32 S	1/8 S	1/8 S
FK	1-11/16	1-7/8	2				
FL	15/16	1-3/16	1-1/4	W1	3/16 X 5/16	3/16 X 3/8	1/4 X 3/8
				W2	1/16 X 1/8	1/16 X 3/16	1/16 X 3/16
RA	5-7/8	6-7/8	7-11/16	W3	3/16 X 1/2	1/8 X 5/8	1/4 X 3/4
RB	5-1/8	6	6-3/4	W4	3/16 X 3/8	3/16 X 3/4	1/4 X 3/4
RC	2-3/8	2-3/4	3-1/8	W5	——	1/8 X 3/8	3/16 X 3/8
				W6	3/32 X 1/2	3/32 X 5/8	1/8 X 3/4
WA	8-1/2	10	11-1/4	W7	3/32 X 3/8	3/32 X 3/4	1/8 X 3/4
WB	7	8-1/2	10	W8	——	3/32 X 3/8	1/8 X 3/8
WC	16	18	20	W9	3/16 X 3/4	3/16 X 3/4	1/4 X 1
WD	7-1/2	10	10	W10	3/32 S	1/8 S	1/8 S
WE	3-5/8	4-1/4	4-3/4				
WF	5-7/8	6-7/8	7-5/8	S1	3/16 X 1/4	3/16 X 1/4	3/16 X 1/4
				S2	1/16 X 1/8	1/16 X 1/8	1/16 X 1/8
SA	8-1/2	10	11-1/4	S3	1/16 X 1/16	1/16 X 1/16	1/16 X 1/8
SB	15-1/4	18	20	S4	3/16 X 3/4	3/16 X 3/4	1/4 X 1
SC	4-1/8	4-7/8	5-3/8	S5	3/32 S	1/8 S	1/8 S
SD	1-21/32	2	2-1/4	S6	1/2	19/32	11/16
SE	3-1/2	4-3/16	4-5/16	S7	7/32	1/4	9/32
SF	5-15/32	6-9/16	7	S8	17/32	21/32	25/32
SG	27/32	1	1-3/32	S9	7/32	1/4	5/16
SH	1-21/32	2	2	S10	3/8	15/32	19/32
SJ	2-9/16	3-1/16	3-1/8	S11	5/32	3/16	9/32
				S12	3/32 S	1/8 S	1/8 S
				S13	1/16 X 1/8	1/16 X 1/8	1/16 X 3/16

Using this drawing, which is keyed to the table at the right, other classes of Ramrods can be made. Note wood sizes for three classes of ships.

Civy Boy, for example—Ramrod is the culmination of many years of trial and error designing. It all started in 1948 after the Olathe Nationals. Three other designs seemed outstanding in my mind and my purpose was to produce a model better than any of the three by combining what I considered the best points of each.

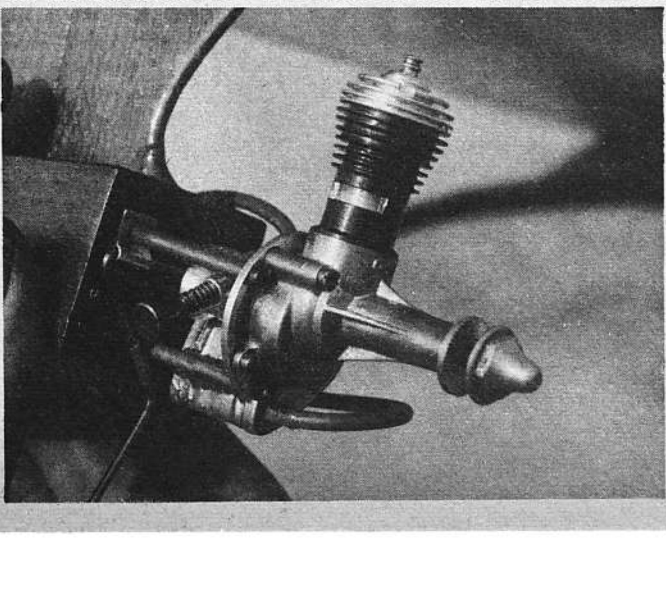
The first model, called Cowboy, had general proportions very similar to the 1948 Civy Boy, with simplified sheet balsa fuselage construction as in the Zeek, and thin airfoils, as in the 1948 Hogan. The first Half-A and A Cowboys were very successful, both winning first places in large local meets. Later "improvements," however, evolved models just full of bugs. On the basis of the first wins registered (1950), several plans were asked for and provided. Interest in Cowboy petered out, though, because it simply was not good enough to perpetuate itself. Ramrod, I'm certain, can sustain itself and grow, because it is a bugless design.

During the ensuing years, configuration was changed; construction was modified; airfoils were thickened; dihedral in tip sections was increased; tail and nose moment arms and stab percentage were reduced; pylon was shortened, then relengthened; retractable landing gears and one-bladed props were incorporated, then discarded; thrust line was raised, then relowered; that's enough to give you an idea.

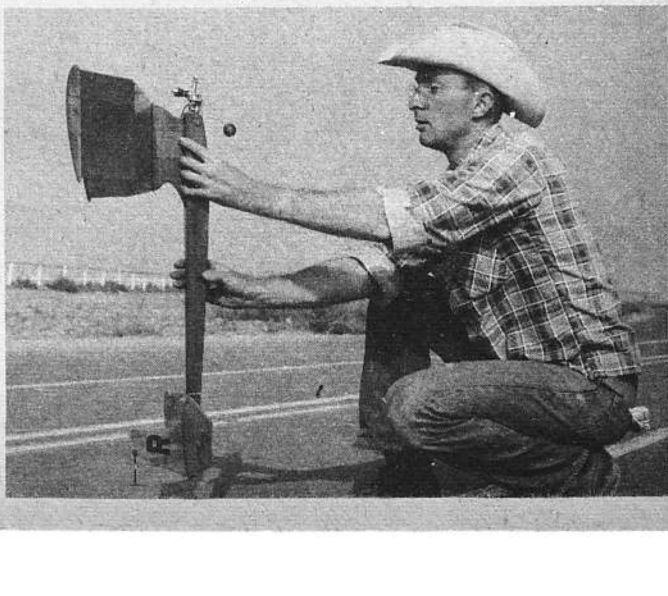
The design was not finalized until late in the fall of 1954, but at that time another problem arose: what was the best *size* model to build for each of the engines I was using?

Until that time I had been going on the "the hotter the better" theory, where one attempts to put his little skyrocket all but out of sight in the allotted 20 seconds, hoping it will take five minutes and 40 seconds to fall through, even with its poor glide. At this time the .19 – .23 Ramrod had 350 sq. in. of wing area. This was a four minute model but had the following bad features: 1. it was stable under power, but hard to control, since (*Continued on page 46*)

Method of mounting the Thermal Hopper. Note special tank and how the fuel line doubles back to the timer. Firewall tilted for downthrust.



Functional, debugged design, with designed-in adjustments, make this airplane a threat at any contest. Demonstrated is a VTO technique.



Ramrod 250 . . .

(*Continued from page* 16)

it was so sensitive to rubber adjustments; 2. a re-check-out was necessary at each flying session, because of very slight warp changes; 3. the glide was fast enough with its high wingloading to cause many broken props and rips in covering.

There disadvantages of the "the hotter the better" theory began to make clear the advantages of the "powered glider" theory. Building a model as large as possible without going far overweight does away with all the disadvantages of the small ship and in addition does one more important thing: it reduces the *sinking speed* of the model so that it can be suspended by a weak thermal, while the smaller one would drop right through.

With this in mind, the "350" Ramrods were put aside and "500's" built. Still the glide was not all it could be, so a "600" was built, over 70 per cent larger than the original model. The "600" has an excellent glide and will thermal at the drop of a hat. In a similar manner, size was found for the Half-A at 250 sq. in. and for the B-C at 750.

Since the Ramrod contains "something borrowed," I think it is only right to recognize those who made contributions. The ideas of both Lew Mahieu and Paul Gilliam had a profound influence on the design of Ramrod. Their help is sincerely appreciated.

Before moving on to the construction of Ramrod, I would like to say a few words about a theory regarding the age-old controversy of spiral stability. It is the direct application of this theory which makes Ramrod one of the most spirally stable free flight models yet designed.

Advocates of both sides of the question produce convincing arguments to back their theories, but both make *assumptions* in their theories—assumptions which may not be true in each case. As an example, one assumes that his model is slipping while in a steep turn, as well may be the case. But *my* model might skid under similar circumstances. Hence, what would act as a stabilizing force in one case might well be a destabilizing force in the other!

I firmly believe that we can safely throw most of our old spiral theories into the scrap balsa box and substitute what I shall call, for lack of a better phrase, the "top rudder theory." My contention is that to insure a design to be spirally stable we need do only two things: 1. provide in the design sufficient decalage, dihedral and rudder so that we will have, respectively, ample longitudinal, lateral and directional stability; 2. design or adjust our model so that it will climb against rudder. In this way the rudder offset will help hold the tail down in a steep bank. It's as simple as that.

Ramrod is just about as simple to build as a free flight model can be, but a few step-by-step hints may help keep you out of trouble. The first step, of course, is to scale up the plans; for the "250," multiply all dimensions on the drawing by three for full size. If building one of the other Ramrods, use the table for all dimensions and wood sizes. If a construction detail seems unclear or incomplete, refer to the "250" drawing for clarification.

The Ramrod "250" wing is a little unusual, since it is not built with conventional ribs, as the larger ones are. This "semi-rib" enables one to build as light a wing as possible and greatly reduces the time consumed in cutting out ribs. With an aluminum pattern, ribs can be chopped out in practically no time. The "semi-rib" is not used in the larger Ramrods since more strength is needed and weight is not at such a premium at is it with the Half-A's.

Start your "250" wing by pinning down to the drawing the LE and the notched TE. The 1/16 in. sq. bottom ribs are then added, followed by the two spars and the rib support, which is cemented to the LE. Make sure there is no cement fillet left, which could later hold up the front of the ribs and false ribs. Note that at the center of the wing and at all dihedral joints, full ribs are used, since extra support is required at these places. Finally, cement in place the top ribs and false ribs, except at or adjacent to dihedral joints. These are put in place after the sections have been joined. Shape and sand the completed wing to the section shown and cover it with Japanese tissue. Add the end plates and then spray with water to shrink the tissue. After the water has dried, brush on two thinned coats of dope followed by a hot fuelproofer.

Begin stabilizer by pinning down LE, notched TE and tips. Bottom cap strips are added, followed by the two center ribs and tapered spars. These spars are most easily cut from sheet wood. As in the case of the wing rib support, the stabilizer cap strip separators should be carefully checked for cement fillets immediately after they have been added. At this point the stab should be allowed to dry for at least two hours. Upon returning to work, unpin the LE. Shim it up along its full length 1/32 in. and repin (this figure is 1/16 in. for the "432" and the "600"; 3/32 in. for the "750"), making sure the front spar is well pinned down, except at the stab center. Top cap strips are cemented in place and again the stab is allowed to dry *thoroughly*. Rudder, dorsal fin and the plywood key are added after the stab is covered, but before it is water doped. Again, use only two coats of dope, as with the wing.

Those of you who have built Mahieu's Kiwi will whiz right through your Ramrod fuselage, since the construction is the same. It is built upside down on your workbench—or in the air, if your bench is not flat. Note that a 10° angle has been cut at the front of the fuselage for downthrust. Unless there is something wrong with your model, it will require every bit of the 10°, so build it right into any Ramrod. The pylon position shown is approximate and will vary somewhat with each model. For this reason we recommend that you strap your completed wing and tail to the fuselage, which is complete except for bottom sheeting, pylon and dope; then adjust the wing position until the CG falls within the specified range of 80 to 85 per cent of wing chord back of the LE. Cement pylon in place in such a way that the wing will be directly above the place where balance was obtained. Add bottom sheeting, sand, dope and hot fuelproof. (It is not necessary to cover a fuselage built from sheet wood.) Now your Ramrod is ready for some pre-flight adjustment.

Before you take your new Ramrod out for its initial flight, it is wise to do some pre-adjusting at home. The first step consists of steaming out warps over the old teakettle. The trick here is to estimate accurately the amount of return and compensate for it by overwarping 50 to 100 per cent. Experience has shown that it is best to have the stab flat and the wing warped *slightly* for a left turn. That is, the right sections should be washed-in (positive incidence), the left wing washed-out (negative incidence), or both. If possible, let steamed surfaces set a week or more in your garage or shop before flying. If your estimation of warp return proves poor, try again. After the model has aged, put a few sticks of balsa wood in your back pocket and take the ship to your favorite test-gliding field. Add incidence as required and shim up the left side of the stab so that a medium to wide left-hand circle results.

When you are finally ready to check out your new Ramrod, there should only be one thing left to adjust: the rudder tab. I generally leave the back of the tail unkeyed, and adjust by shifting the whole tail, then keying the back. This eliminates having to crack a rudder tab into your model, but is just a little dangerous, since you can't set a fuse dethermalizer with the stab pinned down. The first test flight should be made with the rudder set slightly to the *left*. Start with the engine running a little rich and the prop on backward. The model should have a shallow bank to the *right* (15-30°). If so, it is safe to turn the prop around and try another flight. Unless you experience difficulty in finding the correct rudder setting, you should have your new Ramrod fully tested in three or four flights! If you have followed instructions carefully, you will note that the angle of bank under high power is almost the same as it is under low power. This is one factor which makes the Ramrod so easy to adjust.

Although the Ramrod uses no sidethrust, it is the 10° of downthrust which facilitates vertical take-offs. The downthrust is very effective at low air speeds and will lean the Ramrod (or any model with a great deal of downthrust) forward into a normal flying attitude soon after it leaves the ground. Thus it is unnecessary to lean this type of model forward *on* the ground for a VTO. Try it sometimes. You will be amazed at the ease with which your model will VTO.