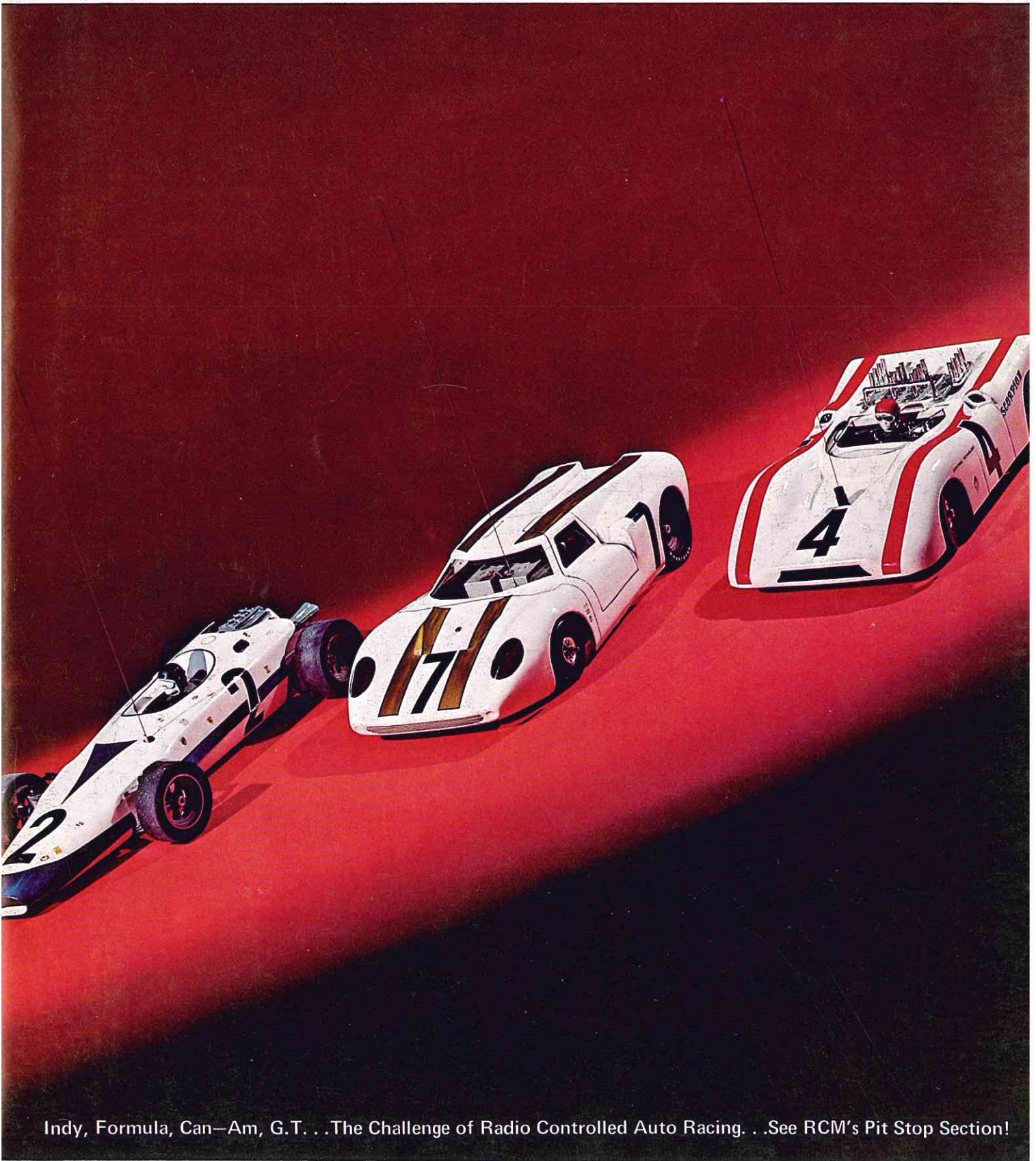


July 1970 75¢



RC MODELER

THE WORLD'S LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS



Indy, Formula, Can-Am, G.T. . . The Challenge of Radio Controlled Auto Racing. . . See RCM's Pit Stop Section!

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...the imagination nor created as much
...as auto racing. This month's cover is of three
...from Control Technology, Ektachrome by Robert
...**FRONTSPIECE**: Eric Fearnley of Grimsby, England, built this
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weight 6 lbs. Two O.S. .19's with silencers.

VH-UTV

VIEWPOINT

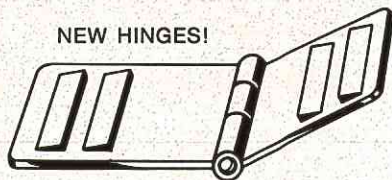
By DON DEWEY



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The following editorial, by Stew Vance of the DCRC Club, is presented in the public interest, and in the interest of the safety and preservation of our sport and hobby. We urge you, as an individual RC'er to read it carefully, and to present it to your fellow RC'ers at your next club meeting. The ideas presented herein have the unqualified endorsement of R/C Modeler Magazine and reflects the opinion of the editorial staff of this publication.

Now that our esteemed fellow club member and columnist for the DCRC NEWSLETTER, none other than BAKICI, has pointed out the need for a community public relations program to organize modeling at the local level and to get the sport and hobby on the right track in the local arena, (Viewpoint, April 1970) the time has come to take a look at what must be done to prevent public reaction against radio controlled miniature aircraft.

Our sport has grown mightily in the past years. From a few hundred specially skilled, and particularly patient, people scattered thinly over the country, the sport has grown until untold thousands fly a variety of radio controlled miniature aircraft. Reliable radio gear, a variety of practical kits and ARF planes, and the proliferation of good engines, make the sport available to an ever-increasing segment of the population. The segment which we now reach is the new leisured class. With time on their hands and the usual need to do something, all manner of people flood into our hobby as they inundate all other outlets. In our case they need two things besides time - they need the interest and above all, they need money. As the new leisured class often has enough money to support the activity of its leisure, radio controlled modeling brings in a lot of people. The problem, though, is that these people are not really the same kind of people who began the hobby. They are not people who were intrigued by the problem, nor with the technological aspects of the hobby and, thus, they have little in common with most of the early modelers. The newcomer is looking for fun! Along with the aspect of "fun"

comes the demand for speed, power, flash and show, and excitement.

If the two groups in the hobby are not really in communication, then the problem becomes more acute. The modeler who came into the hobby a few years ago built clubs and associations in the 'mutual help' scheme - "We all need help, let's help one another". Many of those same clubs still exist, but new members who are just there for fun and excitement are now part of these groups. And the original leaders are being ousted, while the newcomers fill the sky with high-powered ARF craft which they fly with little regard for safety of others - after all, it's very unlikely that the pilot will hit himself!

So, at long last we come to the problem. The name of the game is flying safety! That's the other side of the community relations program. While the patient workers of the clubs may, after many long hours and even months of work, enlist the community in the interest of the radio controlled miniature craft, it will only take one serious accident in that community to wreck those tedious hours of building up public acceptance.

Enough has been written about the rules for flying safety. We don't choose to go over that route again. The line here is that the clubs, whatever their makeup, that desire to obtain and retain public acceptance, and thus acquire and retain flying sites and public assistance of a variety of type, must police the air!

Only a very few clubs around the country have a definite program by which a person is found qualified to fly a radio controlled miniature aircraft at their sites. We wonder why this is so. Will the membership fail to support such a program? Is the club unable to enforce it? Whatever the reason, the minimum essential program for maintenance of the public regard is being missed when the club fails to establish minimum flying standards.

We wonder why our R/C clubs have not noted that a large number of fraternal orders and other groups in our country have degrees of membership contingent upon achievement of certain degrees of knowledge, familiarity, and skill. Those who have reached

the higher degrees wear them with pride. Why is it inconceivable that the pilot of a radio controlled miniature aircraft that flies 100+ mph, weighs 6+ pounds, and can kill on contact, is not seen also wearing a license which says that he has reached pilot status? We license drivers, pilots (of full scale aircraft) and, in some areas, license the use of guns. Why should we not take some action to license the use of these potentially lethal gadgets?

The reader will notice that I am speaking of clubs when I speak of licensing. It is our contention that the clubs — the organizations needing the local aid the most — should be the first movers in the licensing game.

We suggest that each club should have a procedure by which at least three degrees of membership exists.

1. **Non-flying membership**
2. **Apprentice pilot membership.** In this degree the flyer receives his apprentice license only after he has demonstrated that he understands the safety rules established by the club.
3. **Pilot membership.** An apprentice pilot becomes a pilot when he has demonstrated controlled flight of his (or another's) aircraft through a set of simple maneuvers. For starters, I would suggest: takeoff, figure eight, loop, Immelman or split S, and procedure landing.

We also suggest that clubs insist that their flying (apprentice and pilot) members wear the badges of their qualification. It is also possible for the clubs to also offer badges for test pilot, instructor pilot, racing pilot, or (if deemed necessary) acrobatic pilot.

The real trick in the above procedure is that the apprentice pilot will not be permitted to fly alone at the club's fields. It should be mandatory that a qualified pilot be immediately at hand whenever he practices his skills toward the point when he becomes a pilot.

Perhaps the AMA can help us by providing a badge (that is not a license) until stickers indicating qualification are affixed thereto, and let the clubs establish their rules for issuing the qualification stickers.

There is a danger in licensing! Some bad comes with the good. If a licensed pilot creams some little old lady, the press will certainly reflect their opinion of the licensing authority. This should keep the clubs' standards high and their policing and withdrawal of privilege at a reasonably high level of care!



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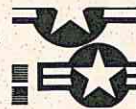
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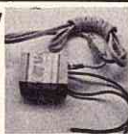
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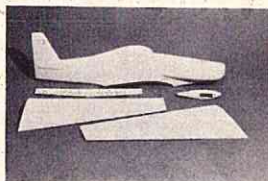
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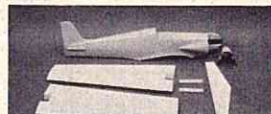
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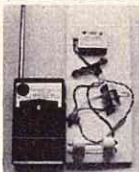


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THE MODEL WIFE

By JEANETTE THRONE

Guest Editor

Many of the articles which I have seen in R/C Modeler have been written by men, partaking in radio control flying for the interest and aid of their fellow hobbyists. My article however, is a bit different. I am the wife of a radio control hobbyist. This article concerns my contact with the hobby through my husband. Actually the article concerns my battle with The Airplane. It is written in the name of all those wives who are deserted on beautiful Sunday afternoons, inhale enormous quantities of dope and glue fumes, keep their arm muscles in shape by sweeping tons of balsa chips, and repair broken husbands after sudden crashes.

This true story begins in 1963 before Walter and I were married. When I met Walter, I knew his hobby was radio control flying, but I didn't realize exactly what it involved. Before we got married, I saw a lot of Walter and little of airplanes. Soon after we were married, I saw a lot of airplanes and little of Walter. I had been advised as to the usual problems that face couples in their first years of marriage, but no one had given me any advice as to what to do with a rival airplane! For the first few months I waged a direct attack. I thought of getting a herd of termites. I suggested new color schemes for Walter's airplanes, as sky blue and field green. I thought I was making some progress when Walter starting suggesting that we take car rides. Yet no matter in what direction we started off, we always made a rather lengthy touch-and-go at the flying field. I soon realized that I was beating my head against a balsa wall. This became especially clear one evening when Walter returned from a day at the field and offered to take me to a movie,

(continued on page 84)

ENGINE CLINIC

BY CLARENCE LEE



More and more letters have been coming in lately asking questions related to the glow plug and its operation. They boil down mainly to three basic questions. Do you need an idle bar plug for R/C operation? How do you know when to use a short or long reach plug? Complete confusion over the Fireball line of hot, regular, and cold plugs in both long and short reach. This month we will try and clear up the situation a bit.

Ray Arden is credited with being the father of the glow plug. Whether Mr. Arden was the actual inventor of the glow plug or not I do not know. He did make the first commercial glow plug available for model engines in 1946 or 47. Prior to this everything was ignition, complete with coils, condensers, points, and batteries. The majority of fellows in R/C today have never ran an ignition engine, and many have never even seen one. If you have problems running a glow engine, you should have been around in those days, dad! One of the first attempts at glow ignition was by the use of a special fuel called 'Liquid Dynamite'. The engine was started on the regular ignition system, and then disconnected. The electrodes on the spark plug would continue to glow and keep the engine running. I think that some of the other parts of the engine must have continued to glow also, as I ruined an Ohlsson .60 and Super Cyclone using this fuel! In all fairness, I must say that the engines in those days were not designed or stressed for glow operation. Many engines blew apart using a glow plug and regular glow fuel. The glow plug sort of separated the men from the boys when it came to connecting rods, wrist pins,

etc., that were marginal strength-wise. A lot of your pre WW II engine designs that were still being manufactured were put out of business.

My first introduction to the glow plug came in 1943. Some of you ex-Air Force types who flew, or worked on the big birds, may remember the auxiliary power units that some of the multi-engine aircraft used. These were usually referred to as the 'putt-putt'. They were just a small two cycle engine and a combination starter-generator that was fired up before starting the main aircraft engines. Their purpose was to relieve the starting load on the airplane battery. These 'putt-putts' utilized a glow plug. However, it was considerably larger than those that we use in our model engines, being the size of a regular automobile spark plug. How long before this glow plug had been in use I do not know.

Following Ray Ardens introduction of the glow plug, Ohlsson and Rice put one on the market. Although the Ohlsson and Rice partnership was broken up many years ago, Irwin Ohlsson is still in the glow plug business today, and makes the glow plugs for K & B. How many of you old timers out there remember the Ohlsson 'Pacemaker' kit? Irwin is still flying one of these R/C, on floats yet!

As simple of a device as the glow plug appears to be, it is actually more complicated than you might believe. You can't just stick a piece of platinum wire in the machined body and have it work. I had a hand in the development of the old Veco glow plug and can speak with some authority on this. The diameter of the wire, the number of turns of wire, the diameter of the hole or cavity where the element is welded, and the type of wire, all have an effect. Even the color of the plug will make a difference in the performance. You can completely change the characteristics of a glow plug by using either a black oxide or nickle plate finish. With all of these variables, just think of all of the possible combinations you can come up with for experimentation. Five turns of .010" wire — six turns of .008" wire, etc.

Most of your glow plugs started out

using platinum wire. It was later found that alloying the platinum with 10% Iridium would improve the idle characteristics. Duke Fox discovered that Rhodium instead of Iridium seemed to work even better, so several of the glow plug manufacturers have changed to this. Most of your plugs on the market today have evolved through trial and error. I have spent a few hundred hours 'trial and erroring' myself. Then there is the problem of the seal so that the plug will not leak, the welds that hold the element, etc. Although the glow plug has been with us for over twenty years it has taken a lot of sweat on the part of many individuals to bring it to its present state, and it still has a long way to go.

So much for the background of the glow plug, let's get into the proper plug selection.

First, let's clear up the long versus the short-reach dilemma. The choice, here, is simply a matter of the depth of the thread in the head. The short reach plugs are intended for the smaller engines with the thinner heads. A long reach plug would protrude too far into the combustion chamber and most likely hit the top of the piston when it is at top center. If you are in doubt, remove the head from your engine and check how far the glow plug protrudes. No more than the idle bar should extend beyond the bottom of the head. If any of the threaded portion of the glow plug shows, you should use a short reach plug. If you do not happen to have a short reach plug handy, use an extra washer under a long reach plug. Remember, when using a short reach plug to take it easy when tightening it down. You can strip out the threads in the head a lot easier than with a long reach. If the depth of thread in the head is deep enough, as it is in most all of your engines from .29 displacement on up, then it is best to use the long reach plug.

Next — is an idle bar plug really necessary? The function of the idle bar is to shield the element from the incoming fuel charge and prevent it from putting out the fire so to speak. For all around good idling and acceleration performance, an idle bar plug is a must. If you are not concerned with a good idle, then you do not need an



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FC-3 Zero Fighter 54	118. Fiat G.91
FC-4 Ki-43 "Oscar"	119. L. Constellation
FC-5 Ki-44 "Tojo"	120. Sopwith 1 1/2 Strutter
FC-6 Ki-61 "Tony"	121. Polikarpov I-16
FC-7 Ki-84 "Frank"	122. Albatross D-111
FC-8 Ki-100 Army Kawasaki	123. Mitsubishi A6M Zero
FC-9 F4U Corsair	124. F100CF-104
FC-10 P-47D Thunderbolt	125. D. Tiger Moth
FC-11 F4U SN Corsair	126. B-2, 28 & 26
FC-12 P-51 Mustang	127. Fokker G-1
	128. Dewoitine D-250
	129. Curtiss P-40
	130. Kittyhawk
	131. SAAB 91
	132. Bristol Scouts C & D
	133. Hawker Audax
	134. Nakajima B5N
	135. "Kate"
	136. Dassault Ouragan
	137. De Havilland Rapide
	138. De Havilland D.H.10
	139. Marconi S.M.81
	140. Ju 88 Night Fighters
	141. Lockheed La 5 & 7
	142. D. Avia B.1
	143. Avia B.534
	144. North American T-28
	145. Ryan PT-37 Series
	146. Mitsubishi G3M
	147. "Hell"

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7. P-51 Mustang	62. D.N. 9	121. Polikarpov I-16
8. Gloster Gauntlet	63. Lancaster I	122. Albatross D-111
9. Halifax 111	64. Vickers Valiant	123. Mitsubishi A6M Zero
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11. Sopwith Pup	66. Thomas Morse Scouts	125. D. Tiger Moth
12. Boeing P-26A	67. Nakajima Ki-84	126. B-2, 28 & 26
13. Hurricane 11C	68. Hawker Sea Hawk	127. Fokker G-1
14. Spitfire Mk. 111H	69. Vickers Viscount 700	128. Dewoitine D-250
15. SPAD S. XI 111	70. Sopwith Triplane	129. Curtiss P-40
16. Hawker Fury I	71. PZL P-11	130. Kittyhawk
17. B-24 Liberator	72. Boeing B-17E & F	131. SAAB 91
18. F-4F Sabre	73. Buepilot 28	132. Bristol Scouts C & D
19. Fiat CR. 32	74. Curtiss Hawk 75	133. Hawker Audax
20. BF 110	75. MiG-3	134. Nakajima B5N
21. Hurricane 11C	76. Mitsubishi Ki-46	135. "Kate"
22. Fokker D. VII	77. Boeing B-47	136. Dassault Ouragan
23. D. H. 4	78. Short Class Boats	137. De Havilland Rapide
24. F-100 Super Sabre	79. E.E.B.	138. De Havilland D.H.10
25. Spitfire Camel	80. Schuettler D.IV/V	139. Marconi S.M.81
26. Westland Wapiti	81. Fokker C.V.	140. Ju 88 Night Fighters
27. Gloster Gamecock	82. Savoia S.M.79	141. Lockheed La 5 & 7
28. Fairey Battle	83. L.T.C. Crusader	142. D. Avia B.1
29. Curtiss P-40	84. Bristol Blenheim I	143. Avia B.534
30. SAAB 129	85. Republic F-84F	144. North American T-28
31. Curtiss IM-4	86. Douglas DC-3	145. Ryan PT-37 Series
32. Fokker Monoplanes	87. Gloster Gladiator	146. Mitsubishi G3M
33. Supermarine Se-56B	88. P-51B Mustang	147. "Hell"
34. BF 109E	89. Kawasaki Ki-45	
35. Spitfire 1 & 2	90. Lockheed P-38J-M	
36. N.A. P-51	91. Grumman Bearcat	
37. Fiat CR. 32	92. Hamilton HO-1	
38. Fairchild 111F	93. Fiat B.R.20	
39. Curtiss Army Hawks	94. B-26C Marauder	
40. Vought F4U Corsair	95. E.E. Lightning I	
41. D. H. Vampire 5 & 9		
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43. D. H. Mosquito I to IV		
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idle bar plug. Now I know some of you have gotten fairly good performance using a non idle bar plug and do not feel that they are necessary. However, generally speaking an engine will perform better with the idle bar plug. Engines will vary even when of the same make. Some will be more tolerant of idle misadjustment and keep on ticking when others will quit, but, for every engine that will perform well without an idle bar plug, there are 50 that will show a decided improvement. Especially in the acceleration qualities. An engine with an idle bar plug will unload and accelerate much better when you give it the throttle.

Okay, how about the Fireball line with their range of hot, medium, and cold plugs. I know that this will go over real big with Swanson & Swanson who make the Fireball line and would like a piece of the R/C market, but it is my opinion that the Fireball plugs work best for U-Control, free flight, and the Formula I and II racing events. As I said earlier, I feel that an idle bar is essential for good all-around performance of an R/C engine, and none of the Fireballs come with an idle bar.

Knowing now whether to choose a long or short reach plug, and that an idle bar plug is desirable, we have limited the selection for R/C sport flying to two glow plugs, The Fox, and the new K & B. You can tell the new K & B from the old by the gold colored stem. Which one you choose is up to you as they both work equally well. Which do you like the best, the Ford or the Chevy?

Some fliers have wanted to know if it is okay to remove the O.S. or Super Tigre plug that comes in that particular engine and use a Fox or K & B. Why not! They are a better plug and the engine will perform much better.

So you don't care about the idle and want to know which plug is the best for your Formula I & II go-fast jobs.

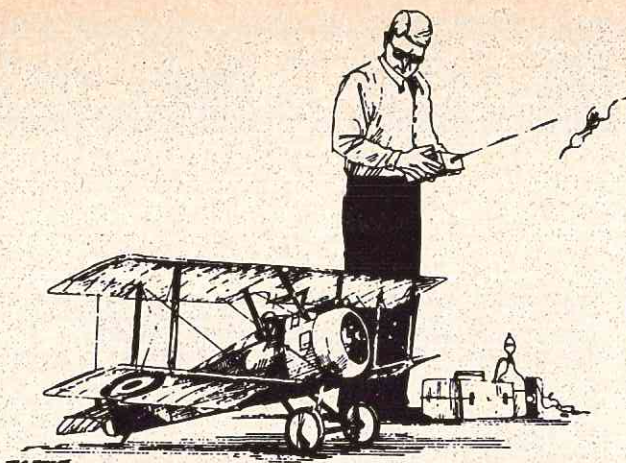
You will want to use the hottest plug that you can that will not pre-ignite or detonate. You can recognize this by the cackling-frying sound when the engine is peaked out. You want the engine to run clean. When it is peaked out there should be no detectable frying sound. If you go past the peak and hear it slightly, this is okay. You will know that you have the correct heat range plug. The correct heat range is going to depend upon the fuel that you are using, weather conditions, and condition of the engine. Even the prop has an effect. A

big prop that will not let the engine turn up, and loads it down, might cause some frying with the same plug that would run clean with a little less prop. The higher the nitro, the cooler the plug should be. This is where the Fireballs step into the act. The Fireball regular works fine with fuels having a nitro content up to about 40%. When you pass 40% the Fireball cold generally works better. However, this is not always true. On a cool dry day you might be able to get away with more nitro and still use the standard plug. On a hot humid day you might have to use the cool plug even with only 25% or 30% nitro, in order to get rid of the frying sound. The whole purpose of the Fireball line is to give you a range of glow plugs to experiment with as well as a plug to fit any occasion.

No one glow plug will be ideal for all racing conditions. If you are interested in absolute top performance from your racing engine, then you are going to have to do a little experimenting. The glow plug that works the best in one fellows ship may not be the best for yours. He may be running a little less prop, hotter fuel, have better cooling, etc.

Besides the Fireball line, Fox makes a standard and heavy duty plug without the idle bar. I have found the heavy duty to work very well in the 40's with higher nitro fuel. K & B also has a standard plug in long and short reach. Even though the head will accommodate the long plug, the short seems to hold up better, so while you are doing your testing, be sure and include the short K & B, and the heavy duty Fox.

Several columns back we asked if anybody who knew of a source of Baker AA castor oil, Lubricin, and other fuel ingredients in their area would let us know so that the information could be passed along to others. We received another source to add to the list this month. It is D & B "Go Pop" model engine fuel - 2445 Hamilton - Elk Grove, Illinois. D & B sells ready mixed fuel, and both Baker AA castor oil and Lubricin in quarts, gallons, and five gallon lots if you are a big spender. The price sheet that I received had a note that retail orders would be referred to a local dealer. So if you fellows in the area are in need of Baker AA castor oil or Lubricin, give D & B a call and find who their nearest dealer is.



by DAVE PLATT

(Designer — Top Flite Models)

SCALE IN HAND...

In this column, back in February, a writeup appeared advocating a standard set of rules for a new scale class, to be known as Class 2, or "Standoff", Scale.

That is to say; the rules we suggested, at the time were, not necessarily plugged as the best, but what we felt, and still feel, is that Class 2 will only "take-off" as a complementary event to AMA/FAI if there is one standard set of rules. The situation which currently prevails, where every club running Class 2 has its own rules; its own name for the event; and its own judging standards, is fine so long as nobody hopes the class will ever grow and become well-supported. But if this latter situation is the eventual aim, we MUST standardize.

Why? Most obviously, in fairness to the competitor who may travel many hours to a contest, and is entitled to know what he will find there. But also, because it is a matter of record that just about every new event in the hobby has a history that runs this way. First, there are many clubs and an equal number of different sets of rules. Next, standardization to one set that would be fairly agreeable to all. Finally, national status followed by a streamlining of the rules as experience with them indicates is necessary.

Probably the most recent case of this process, and a prime example of it, occurred with Pylon Racing. Not that the present disorganized chaos surrounding Class 2 Scale was avoidable; we've already said that everything starts this way. But it is now time to make a hat out of the cut pieces of felt. If it doesn't fit exactly right the first time that's OK — adjustments can be made.

Our recent column on Class 2 drew only a few (relatively) comments. This was surprising because we know that there is interest, in abundance, for the event. At the recent Toledo Show, we had many conversations on the subject

and seem to be finding some areas of general agreement. We will summarize these and give the reasons for them — note that these comments are not those of any one group but a mixture of the ideas of many.

First; Static Judging. Question 1 — do we need it at all? Most everyone says yes. The feeling here is that Finish, Color and Markings, that is, the entire paint job, is the most important aspect to the effectiveness of the model and should carry the lion's share of the static points. Most agree at 50%. Certainly, it must be admitted that an increased stab or a changed wing section do little to harm the appearance of a model — but a wrong color, even only slightly out, or a series of impossible markings can wreck the appearance of a Class 2 Scale model in short order.

Besides this, the buffs who demand accurate color scheming point out that it takes no more time to spray the right blue (say) than the wrong blue. It's hard to deny this logic!

As for the shape of the airplane, the feeling is that we don't need to pick the thing apart piece by piece — to judge the overall design as a whole is sufficient and is far simpler. The points here are rated as worth 25% of the whole.

The judge's job here is quite simple. He asks himself, not "is the stab incidence correct and are the elevators correctly hinged?" but instead "Does this model look like the real one? Does it retain the most important characteristics that make this airplane what it is?"

For example's sake, let's consider a couple of real ships and say what we feel are the major characteristics that ought to be retained on a Class 2 model of it.

1) Sopwith Camel Flat top wing with dihedralled bottom wing. Short nose. Say what you will; a Camel with dihedral on its top wing and/or a

lengthened nose just doesn't look like a Camel anymore. However "right" the rest is; the character of the real ship is destroyed. An increase in stab or change to fuselage width or depth are insignificant by comparison.

2) Curtiss Helldiver Short tail moment. Long nose. Large petal-shaped fin. Do what else you like, but alter one of these and you don't have a Helldiver. Other examples spring to mind. Can any of us imagine a Corsair or a Stuka with a straight dihedralled wing? Or a Hurricane without its "humped" canopy?

We can readily award our so-called "Accuracy" points on this basis — does this model have the "feeling of the real one?"

Finally, most modelers seem to be in agreement that Craftsmanship is worth 25%, that judging distance should be 10-15 feet and that the entrant must provide the judge with something, no matter how limited, by which to judge the model.

So, assuming a maximum static points of a handy 100, we get :

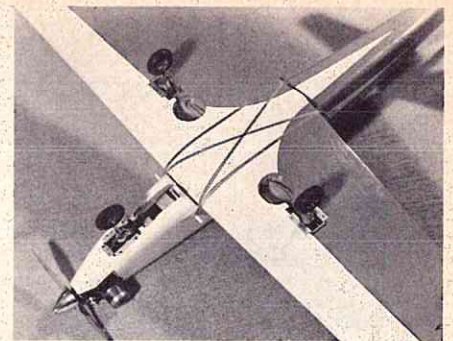
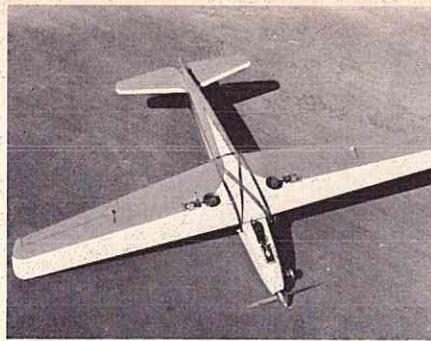
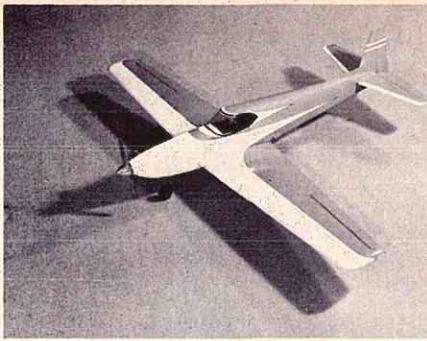
Finish, color and Markings	50
Accuracy	25
Craftsmanship	25
	100

Passing on to the FLYING part, somewhat less overall agreement prevails at present; just about the only undisputed point is that flying points (max. possible) should be equal to Static points — no more, but certainly no less.

The conflict arises out of what is to be the actual flight pattern. On the one hand, we have the group who demand that it be a laid-down schedule like the example here:

1. Take off
2. Straight flight out
3. Procedure Turn
4. Straight Flight back
5. Figure 8

(continued on page 82)



One of the early El Gringo prototypes. Retractable gear shown in both positions. El Gringo has won more trophies in past few years that almost any R/C design.

BY TED WHITE

I would like to be able to say that I designed the "El Gringo" from scratch with no help, and that it was all mathematically and scientifically engineered. However, needless to say, this is not true. It is a combination of many airplanes that I have flown or have seen flown. There are three airplanes, in particular, that I considered to have both the lines, stability and maneuverability I wanted. One of them was Jack Butler's "Moody". Another was Martin Moad's "El Toro" and the third was Eddie Morgan's take off on the "Moody". Having flown the "El Toro" and Eddie Morgan's "Moody", they were found to be very fast and extremely smooth in maneuvers. However, wanting an airplane that I could call my own and incorporating some pet ideas of my own resulted in the design and construction of the "El Gringo".

Wanting stability in the wind, I figured that a high wing loading and rather long tail moment was needed. I also wanted my airplane to look as much like a real airplane as possible. I don't think that with proportional control, a full house stunt ship has to look like a model. Not wanting to add nose weight, the moment was made long by normal standards. 48" seemed a good length for the fuselage because this was the longest sheet balsa I could obtain! I decided that it didn't need the large horizontal and vertical stabilizers that most models employ due to the long tail moment. Another thing that was definitely needed was a symmetrical wing. I like a gentle airplane with a lot of neutral. The symmetrical wing gives me this.

The original "El Gringo" had a two wheel retractable landing gear. In order to prevent the tendency to nose over, the CG had to be at around 40%. This presented problems on the landing approach with the original vertical stabilizer, since it wouldn't hold a heading when slowed down. So, in order to live with this 40% CG, the vertical stabilizer had to be raised about 1½" to correct this tendency. After this modification, the airplane settled down and became what I had envisioned. The airplane has had nothing major done to it since then, except a tricycle gear has been substituted and the CG moved up to around 30%. It was found that the two wheel gear, whether retractable or not, was unsuitable because I could not get decent ground points at a contest.

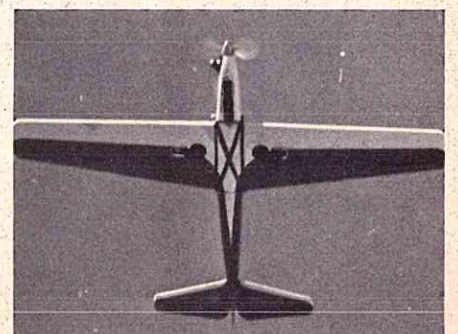
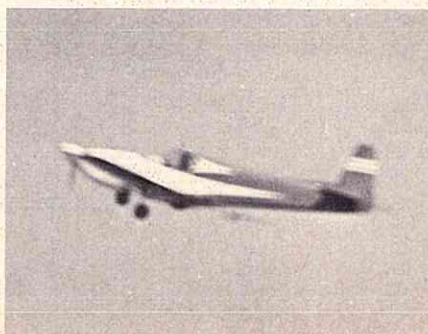
The "El Gringo" has given me many hours of flying fun. It has had what I consider to be rather good success in Meets that I have attended around the country. It was first built several years ago and it has, — well, I'll have to list a few things it has won. It won Second at Phoenix, First at Denver, First at Wichita, Fifth at the NATS, First at Oklahoma City (regular meet), First at the Oklahoma City Invitational "Tournament of Champions", First in Las Vegas and First at the RCM Winter Nats as well as bringing home the Grand Champion Trophy in 1968.

A lot of modelers around the country think that the "El Gringo" looks a lot like Martin Moad's "El Toro". The major differences between the two are the airfoil of the wing and the length of the fuselage. The outward appearance is somewhat similar although if you had them side by side, they wouldn't look too much alike.

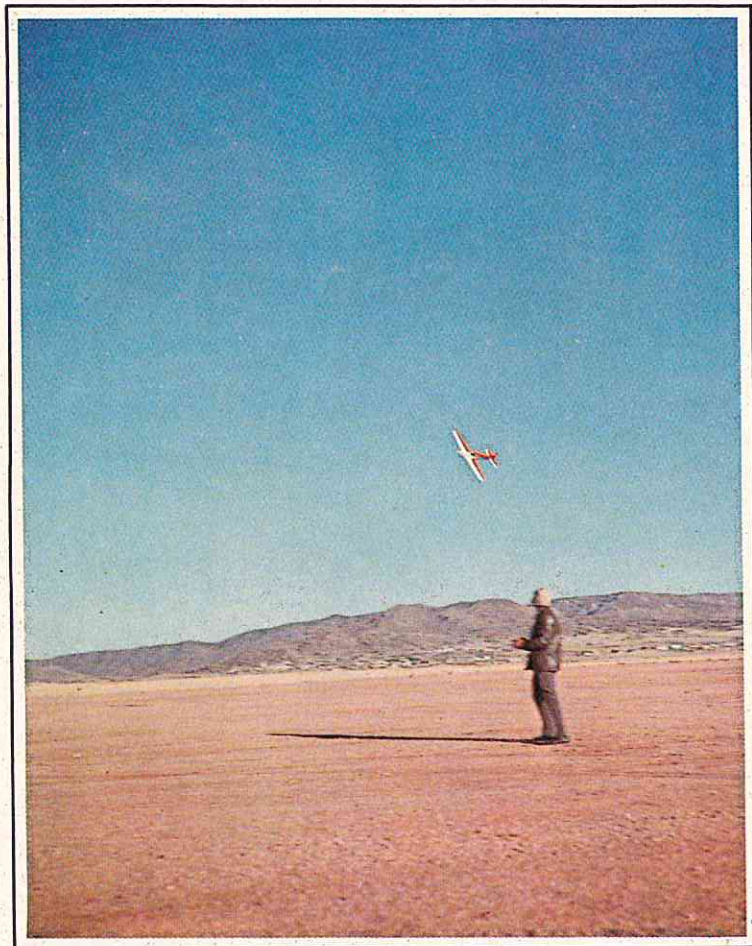
I do think that anyone who decides to build the "El Gringo" will enjoy it. I don't think that a model builder with any experience will have much trouble with the construction of this airplane.

I guess I'll start the construction advice with the fuselage. The fuselage top block can easily be traced from the plans and cut out with a band or jig saw. You should first cut a wedge off the 3" x 4" plank at one end about 1" x 12" x 4". Glue this

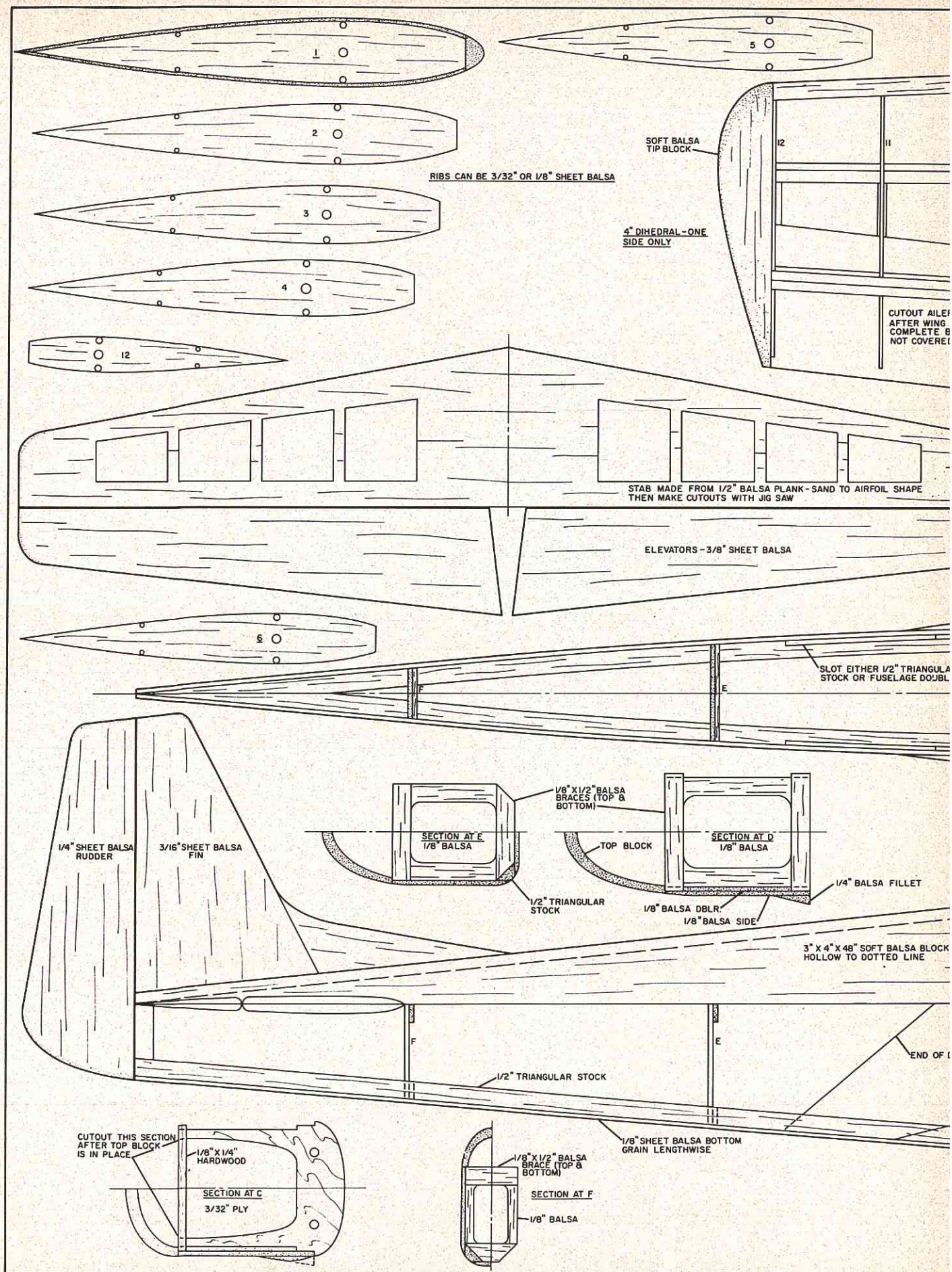
Photo of designer Ted White taken several years ago with a few of trophies the El Gringo garnered in first contest season alone.

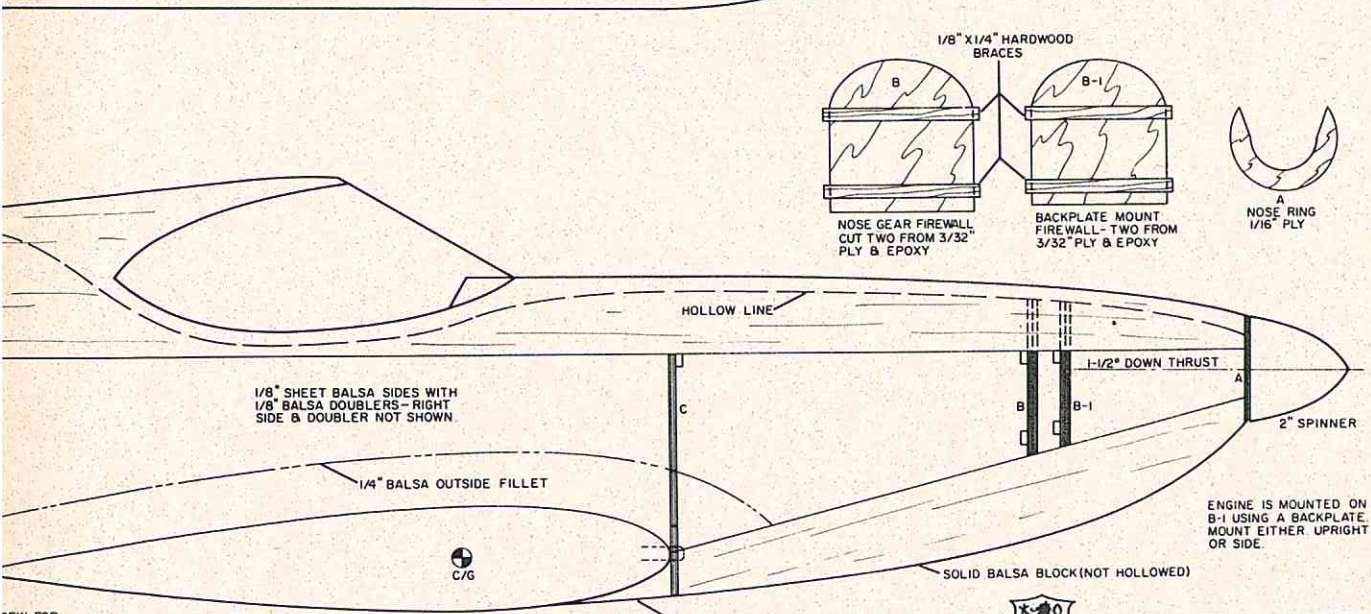
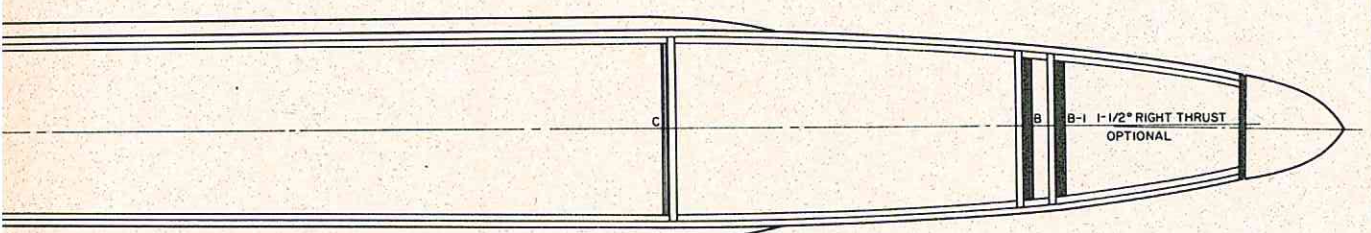
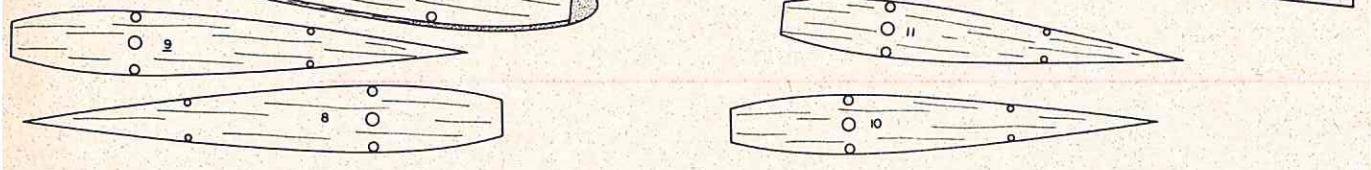
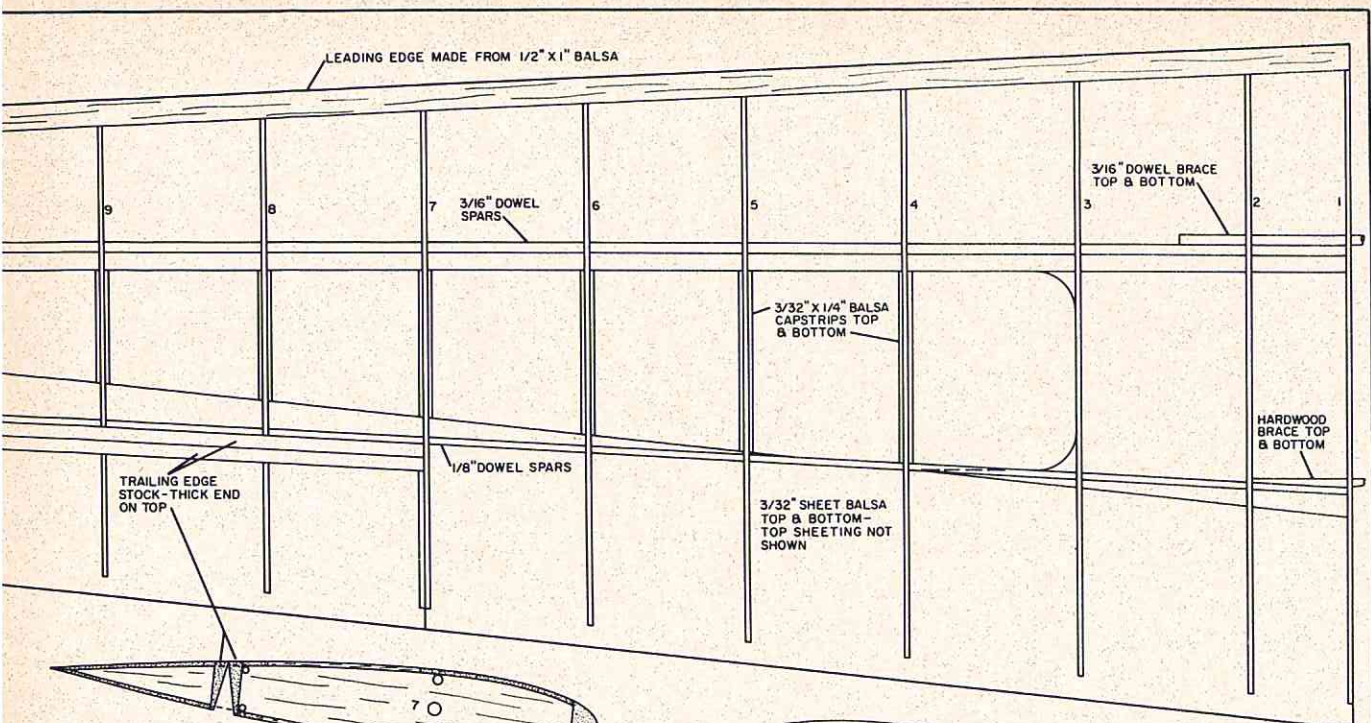


EL



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DESIGNED & DRAWN BY TED WHITE INKED BY DICK KIDD

EL GRINGO

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436

wedge on the block thick end forward just ahead of where the canopy is located. This is done because, right at the canopy, the block has to be a little over 3" thick. Then, trace the outline of the top block on the balsa plank. After you have cut this out of the plank, trace the fuselage curve on the block. Be sure to make your cut of this side curve a little bigger than you need. Then, just to be sure you get the fuselage straight, trace the top view curve on the bottom of your now roughly-cut plank. Now, put aside the plank and begin construction on the fuselage proper.

The lower fuselage construction is fairly conventional. Cut the sides out and glue the doublers in place. You'll note on the plans a 1/2" triangular brace at the bottom rear section! The main purpose for these braces is to allow the bottom of the fuselage to be rounded off. Glue those braces on and mark off where the formers go while the sides are pinned down to the work bench.



After cutting out the formers and gluing the braces in place, assemble the fuselage upside down on the plans. You'll notice on the plans that there is an additional doubler on the outside of the fuselage at the wing. This acts both as a fairing and, in my opinion, eliminates the principal weak spot on a fuselage. Something else, I usually do, and feel is almost a necessity for all airplanes, is to use epoxy glue on everything from the wing forward. Since I started doing this, I haven't had near the trouble with the engine mounts coming loose from vibration.

At this point, I would like to digress a moment and discuss an important factor in the construction of models, the mounting of the engine. From the experience of the modelers here in Albuquerque and also Las Vegas, Nevada, we have found that radial mounting of an engine (Tatone type or back plate) is far superior to beam mounting. Radial mounting is simpler,

causes less vibration, is generally lighter, allows easier and more positive thrust angle adjustments and provides more nose space for the fuel tank and battery pack. If you decide to use Tatone, or other type combination nose gear and engine mount, you should use the rearward firewall position. If on the other hand, you decide to use a retractable gear, you may back plate mount your engine and use the forward firewall position.

After assembling the lower part, less bottom sheeting, rout out a small section of the top block at the firewall. This allows proper mating of the



two parts of the fuselage. Align the tracing on the bottom of the top block to the lower part of the fuselage and spot glue. Then plane and sand the top block to shape. Remove and hollow out to approximately 1/4" thick. Then, glue it back on permanently. Install the bottom sheeting and bottom block at this time. Now, glue the 1/16" ply spinner back up (A) to the nose. Then, sand the fuselage to final shape before cutting out the engine compartment.

The construction I use on the stab is so simple you might even call it cheating. All it is, is a 1/2" plank, cut to shape and sanded to a symmetrical

airfoil. Cut out marked sections with a jigsaw. This lightens it considerably. Ninety nine people out of a hundred will think that you have a built up stab and it doesn't appear to weigh any more than one. The elevators, fin, rudder, and dorsal fin are all solid balsa.

The wing, as you can see on the plans, is of fairly normal construction. I prefer dowel construction because of the strength. With this type of construction, the wing is very easy to build. Many people prefer to use foam wings. If you are one of these, you can use the center (1) and tip (13) airfoil shape on the plans. Don't cut out the ailerons until the wing is complete but uncovered. The ailerons shown on the plans are hinged at the top. I have found most people prefer this. Personally, I don't. Mine are hinged in the middle with a slight amount of differential throw. Don't ask me to explain, scientifically, why I think they work better there, I just do. The control



hook-up was left to the builders discretion. The main gear installation, also is not shown on the plans because no two people seem to install them alike, either. I used the Taurus type mount. Another thing that I do on which there are varying opinions, is to set the airplane up on the ground with 0° or slightly positive angle of attack on the wing. The main reason for doing this, is that I have never seen a real propeller driven airplane set on the ground nose down like most models do. One of my pet peeves in contest work is the common usage of a short nose wheel which allows the model to either be slapped on to the runway way above stall speed or landed roughly without bouncing. Most contest judges seem to consider these burned on landings equal to or better than scale type flared landings. Real airplanes just don't land that way! A full scale airplane would most likely be

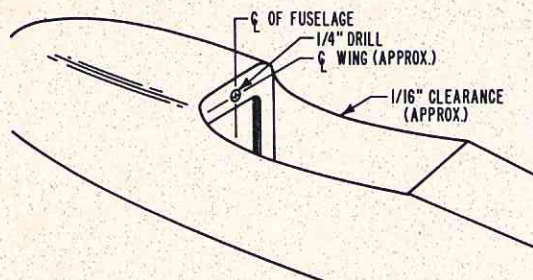
(continued on page 80)

EASY METHOD OF ATTACHING WING HOLD-DOWNS

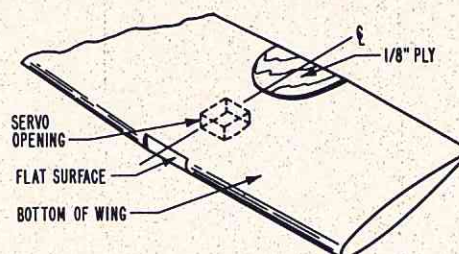
It seems that most construction articles handle the attaching of the wing with a sentence like "Attach wing using your favorite method." If you don't have a favorite method, try this one that works every time.

By DARRELL DALY

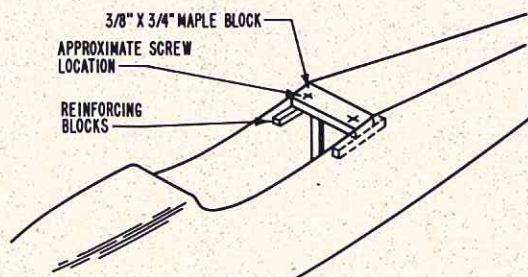
(1) Drill front bulkhead for a nice slip fit on $\frac{1}{4}$ " dowel. Back up bulkhead so you have at least $\frac{1}{4}$ " thickness. Cut out rough opening for wing. $\frac{1}{16}$ " oversize is just right. One dowel is plenty, but if you're nervous, use two.



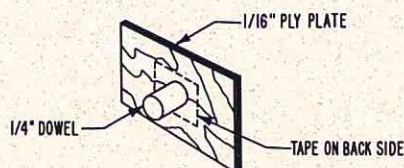
(2) Trial fit wing in fuselage. Cut flat at front, if necessary. Glue $\frac{1}{8}$ " ply on bottom rear center of wing. Make about $\frac{1}{4}$ " wider than fuselage. You should have $\frac{1}{16}$ " to $\frac{1}{8}$ " clearance between flat & bulkhead.



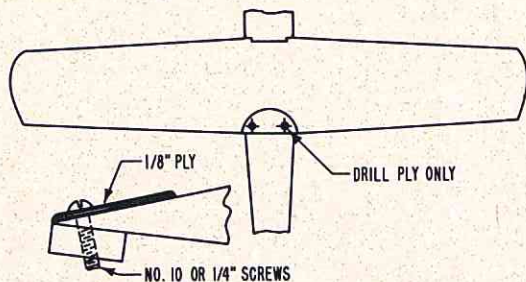
(3) Install $\frac{3}{8}$ " X $\frac{3}{4}$ " maple motor mount stock at rear of fuselage. Use epoxy and reinforce so it's plenty strong.



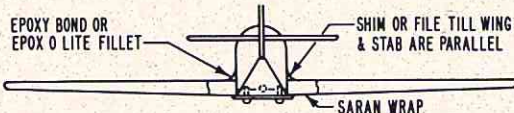
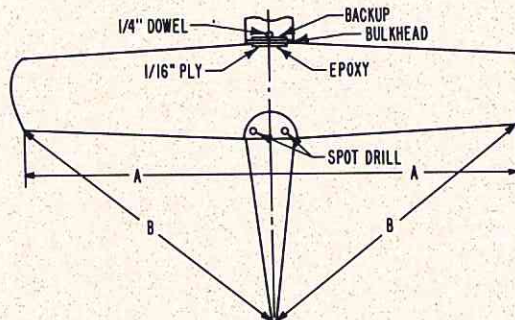
(4) Make a small piece of $\frac{1}{16}$ " ply and assemble with $\frac{1}{4}$ " dowel and tape as shown. The tape should just cover the dowel so that later on you can remove it.



(5) Assemble wing & fuselage and align. Mark wing reinforcement for two screw holes in location shown. Remove the wing & drill thru for snug fit on #10 or $\frac{1}{4}$ " screws. Keep holes square with ply.



(6) Assemble wing & fuselage & ply/dowel piece. Measure from wing tips to center of tail and make equal. Also centralize wing on fuselage. Epoxy $\frac{1}{16}$ " ply to wing. After curing, spot drill holes to $\frac{3}{8}$ " maple, making sure wing is still aligned. Remove wing, drill & tap maple.



(7) Remove short $\frac{1}{4}$ " dowel and drill into servo compartment and install long dowel. Spot glue only so you can get it out in event of breakage. Cover top of wing with Saran Wrap. Re-assemble. Viewing from rear, shim wing till aligned. Install epoxy fillet.



MAD THRASHER

.09 TO .15 POWERED VINTAGE-TYPE SPORT AIRCRAFT FOR GALLOPING GHOST OR SMALL DIGITAL PROPORTIONAL SYSTEMS. AN EXCELLENT AIRCRAFT FOR THE SPORT AND SUNDAY FLIER AS WELL AS FOR FLYING IN SMALL, CONFINED FIELDS.

BY IVAN MUNNINGHOFF

Several years ago, when Galloping Ghost was considerably more popular than it is now, RCM's Fearless Leader published a small scale-like German GG design of his called the Wolfmeister LR-3. It was a cute little .09 sized ship with typically German scalloped trailing edges, WW I markings, and somewhat of an Eindecker look about it. When one of the other members of our club built one, I decided that I needed a plane in the same category as a flying companion for the Wolfmeister. A British antagonist was in order! The final design combined the features that I liked best of several Allied WW I planes with the simplest possible construction techniques. The result was a British tail-flapper — hence: the Mad Thrasher. However, the dream of aerial combat was dashed prior to the Mad

Thrasher's completion when the German flew into a goal post and was wiped out. So now the Mad Thrasher flies alone — victorious by default. This design, by the way, won first place in the Model Aircraft Sport Design Competition held by RCM a few years ago.

When really small reliable digital proportional came into vogue not long ago, the Mad Thrasher became the test bed for my new Royal Classic. Even the relatively large PS-3 servos fitted into the small fuselage. The improved controllability provided by the digital radio greatly increased the performance of the Thrasher. It is now a pleasant change of pace from flying the hot pattern ships. Let's put one together.

Actually, the Mad Thrasher is a very simple plane to build. The fuse-

lage is the standard box-type that is dressed up a bit by the metal cowl and a built-up turtle deck. Start construction by cutting out all the required parts for the fuselage. As you can see, there aren't many. Start with the fuselage sides, laying them on a flat surface and putting in the 3/32" balsa doublers (cross-grained), the plywood reinforcing doubler, and the tail-end vertical bracing. (Don't forget to make one left and one right side!) While these are drying, put a coat of Titebond glue on the edges of all three bulkheads and also along the sides of the fuselage where these formers will be attached. Sew the landing gear to the plywood former with copper wire. When everything is dry, reglue the formers to one half of the fuselage. When these are about half dry, glue

(continued on page 76)



DESIGNED & DRAWN BY	IVAN MUNNINGHOFF	REDRAWN & INKED BY	DICK KIDD
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A
bit
of wind
carries
some great
bird high
into the free
world of the sky.
As it glides and plays
far above the level plane of the field below,
some unknown creature stands firmly on green ground
plotting every move it makes. Holding a strange box and gently moving
a narrow nob on it's side, this earthly god controls it's flying robot among the
tall trees.
This sleek
body of
precision
responds to
it's master
with grace
and smooth
movements
in time with
the restless and
tireless wind. Soon, this
high flying fantasy comes to an
end when it's flawless fuselage soars
swiftly to solid ground, to a pleased
flyer and sev-eral spectators,
who marvel at another
excellent flight.

R/C GLIDER DESIGN MADE EASY

By CHUCK CUNNINGHAM

Currently there is a phenomenal interest in building and flying R/C gliders sweeping through the radio control fraternity. In the past, this activity has been centered among the fertile West Coast modelers. But the idea is now reaching to other areas of the country. As most of you long time readers know, I like to encourage people to design their own aircraft, and glider flying is no exception. With is in mind, I thought that this month would be a good time to set down some guide lines for glider design. Naturally, the rules that I am going to explore are not hard and fast rules, nor are they the very "ultimate end" of glider design. Rather, they are rules that will assure that when you have completed your new bird, it will fly — and it will fly without major revisions and severe balsa whacking.

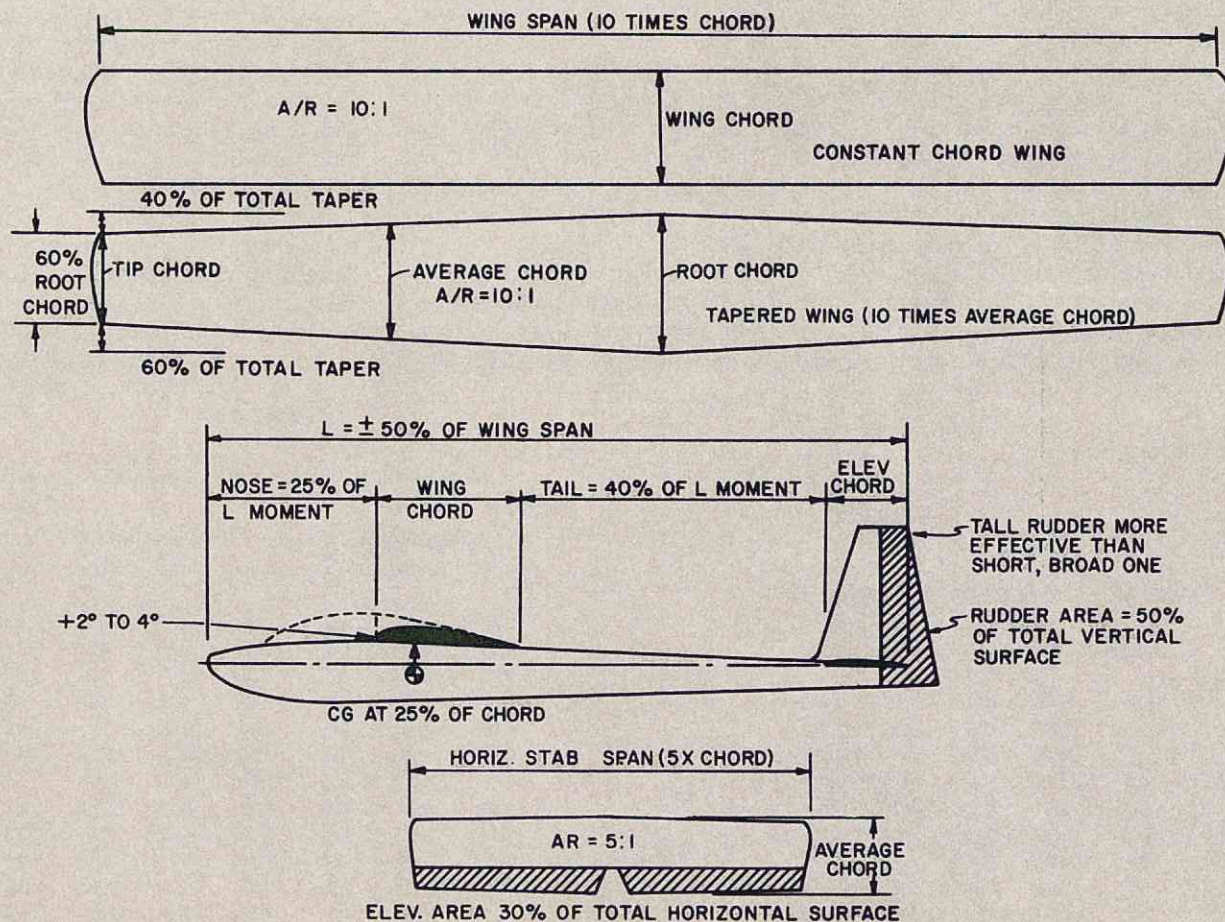
One of the first things to consider

when setting out to create your own glider is the location in which you are going to fly. If you live on the West Coast, and plan to get into slope soaring, it will take a different basic design than if you live in the flat lands of the central US and are going to thermal soar. If you are a European modeler, then you have other problems, especially if you are flying in England. I've noticed that most of the information in British magazines show quite windy sites, and I gather that most of the soaring is done in rather high winds. Again, this is a different breed of bird, but a little later on, I'll try and explain how gliders can be similar and yet different.

Another feature to consider at the very outset is the use of power assist to become airborne. If you are slope soaring, you can just pitch it off of the hill into the slope wave. But, if you

live in a geographical location where the need for "lift assist" exists, then you have to consider how you plan to get your aircraft up there. You can, basically, use one of four methods. The tow line way, the hi-start method, towing up by another aircraft, or by using an engine. Of all of these methods, the one that seems the most logical is to cram an engine into the model and use this power to get into the air. Of course, the very very "purple purists" will say I'm out of my gourd for even suggesting this, as no real gliders ever use this method. Well, gang, I've got news for you. Currently a small jet engine is being developed for use in getting full size gliders up into the air for a day of soaring. Our big brothers have exactly the same problem as we have, how to get into the sky. On many glider fields, this is a real problem, and one that can

BASIC GLIDER DESIGN



be simply and wonderfully solved by using their own power. Volkswagen engines on power pylon mounts have used, experimentally, on full-scale gliders for many years. The performance of a full size glider deteriorates with the drag of the engine and the prop in its flight, so that's why you don't see too many of them with small engines. Just after WW II there were a couple of experimental gliders with small engines mounted on a folding power pod just behind the cockpit. As I recall, Jerry Nelson's father had quite a bit to do with this design.

But, back to the subject. If you want to spend all of your flying time untangling your tow line from a bunch of weeds then by all means, use a tow line or hi-start method of launch. Tow planes are great for experimentation, but again, the problem is in getting someone to fly the tow plane. Of course, let's be reasonable: If we attach an engine to our glider, and use a lot of power, then we are in the radio controlled free flight business. Be reasonable, and logical, in the use of power assist. The engine mounted in the nose makes more sense to me, than does one on a power pod. You generally need nose weight anyway, so why not gain it in the form of an engine? Again, drifting back in time, just prior to WW II we were using folding props on our free flight aircraft to minimize the drag while in the glide. Since we are using low power on gliders, it may be safer to experiment with a folding prop now. The main reason from getting away from folding props is they have a nasty tendency to come loose and zing through your eye! If we are sticking with a medium power .049, or a .10 to get our bird into the air then a folder might work

rather well. This would be a natural accessory for some one like John Tatone.

Whether you mount an engine in your glider or not, the design reasoning is still the same. So, let's get into the basics of design, and see what works out best for you.

WING AND WING LOADING

On a glider, the one item of prime importance is the wing. The wing is really "everything". If you don't have enough wing, you're going to come down fast! If you've too much wing you may be flying too slow, and wallow around the sky. Hand in hand with the wing is the WING LOADING. These two factors take top priority in your glider design.

To begin with, we need to determine the size of the finished product. A great big twelve foot aircraft looks superb in pictures, and will fly well once it is done, but why not pick on something a little smaller for a first attempt, one that is easier to load in your car, and one that doesn't need all of Texas to fly in! Chart number one is a great mass of numbers that have been worked out to give you some idea of wing area derived for various weights and wing loading. Of course, it is hard to guess the finished weight of your model, but we have to begin at some point, so let's assume that we are going to shoot for a finished weight of three pounds. And, we are going to be flying in moderate winds, say up to fifteen miles per hour. This type of glider will be about average. If the wind gets higher then, later on, we will see how the full size glider guys take care of it.

Looking at chart number one we see that on the three pound line we have four wing areas shown. For a eight ounce loading, we have 864

square inches of area. For a ten ounce loading we find 691; for a 12 ounce loading we find 576; and for a fourteen ounce loading we have 494. Taking everything into account, the eight ounce loading would be simply great for thermal soaring, but the aircraft just might have to be so lightly built that any type of wind would wreck it before getting off the launching pad. The ten ounce loading would be a bit better. The twelve and fourteen ounce loads are too high for general soaring, but if you are pitching your glider off a cliff into a twenty knot breeze or better, then the higher wing loading is for you. Right now, let's stick to the ten ounce figure and work from this point.

With an assumed finished weight of three pounds (and you can make an assumption of the finished weight by weighing your radio, and engine if you use one, along with "guestimating" the weights of each finished component.) and an established wing area of 691 square inches we are ready to investigate the remainder of our wing design.

Full size gliders use very high aspect ratios (the mathematical relationship between the span and the chord) wings. 16 to one is considered just about the optimum. For our purpose, let's try and work in the realm of 10 to one. This will give us a good soaring wing without sacrificing strength. After all, our gliders will be flying in the same type winds as the big ones, and at the same speed, so we need to build-in a little margin of safety into our wings at their reduced size.

We can either use a straight, rectangular wing planform, or a tapered planform. The tapered is much more efficient for a glider, but a lot harder to design from the standpoint

(continued on page 73)

CHART #2

CHART #1						CHART #2							
Weight		Wing Loading (ounces/sq. ft.)				Wing Area		Horizontal Stab		Vent Stab			
#	Ounces	8	10	12	14	Aspect Ratio 10:1		Aspect Ratio 5:1					
						Area	Chord	Span	Area	Chord	Span	Area	
						384	6.2	62	57	3.4	17	29	
						432	6.6	66	65	3.6	18	32	
						479	6.9	69	72	3.8	19	36	
2	32	576	460	384	329	528	7.3	73	79	4.0	20	40	
2.25	36	648	518	432	370	576	7.6	76	86	4.2	21	43	
2.5	40	720	576	479	412	624	7.9	79	94	4.3	21.2	47	
2.75	44	792	633	528	452	672	8.2	82	100	4.5	22.4	50	
3	48	864	691	576	494	690	8.3	83	103	4.6	22.7	51	
3.25	52	936	749	624	534	767	8.8	88	115	4.8	24	57	
3.5	56	1008	806	672	576	806	9.0	90	121	4.9	24.6	60	
3.75	60	1080	864	720	618	864	9.3	93	130	5.1	25.5	65	
4.0	64	1152	921	767	658	921	9.6	96	138	5.3	26.3	69	



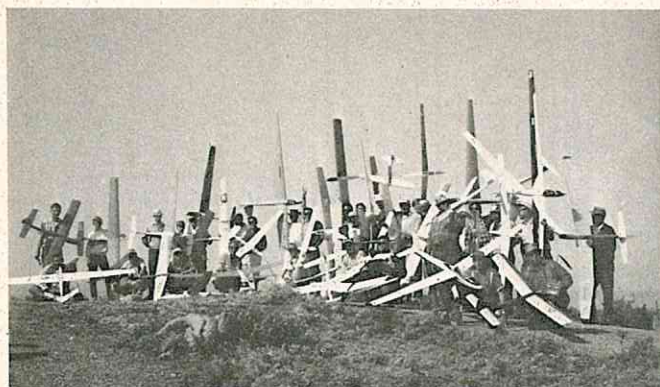
Flagmen at far pylon, 600 feet from starting line. Charles Sullivan, Bill Boone, John Nohrden, and Les Culbertson.



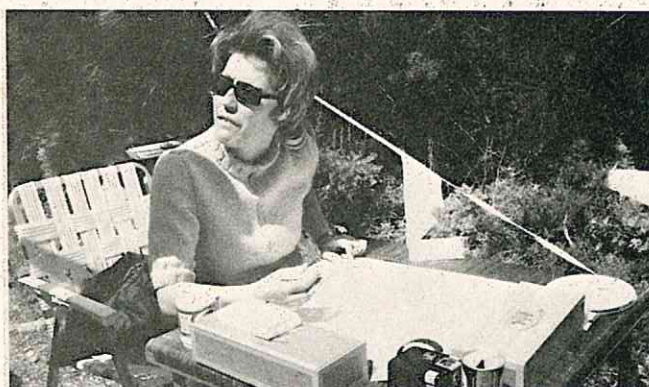
The beauty of soaring. Rex Taylor's Schweitzer rounding the pylon. Jerry Arana is the pylon judge.

THE 1970 RCM/SANTA CRUZ R/C BEES ANNUAL SAILPLANE PYLON RACING CONTEST

Andris, Walter, Willard win top honors at 1970
Glider Trophy Dash as thirty-six entrants vie
for the R/C Modeler Magazine Perpetual Trophy.



29 of the 36 contestants with their number one plane. Most entrants brought a backup plane for emergencies.



Mrs. Whitey Pritchard — registrar, heat assigner, recorder, score keeper, and girl Friday. Hardest worker of them all.



Pilots' meeting. Whitey Pritchard, contest director, points out the course.



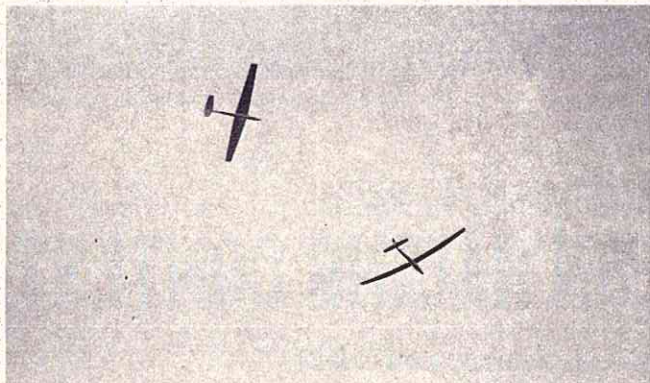
Roland Boucher checks the anemometer to determine how much weight to add to his Mailbu. Wind varied from a low of 6 mph on Saturday to 35, with gusts to 40, on Sunday.



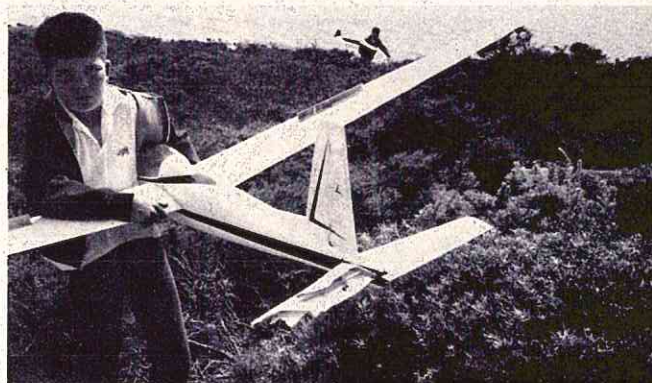
Gerry Wolfram's boy holds Jerry's racer up for identification and flag assignment at the far pylon. Jack Ronda, starter, at left.



Launching at start of first race. Jay Brehm, with Rick Walter as pitman; Ken Waldvogel with pitman Cort Lorenzen launching. Jack Ronda, starter, in foreground.



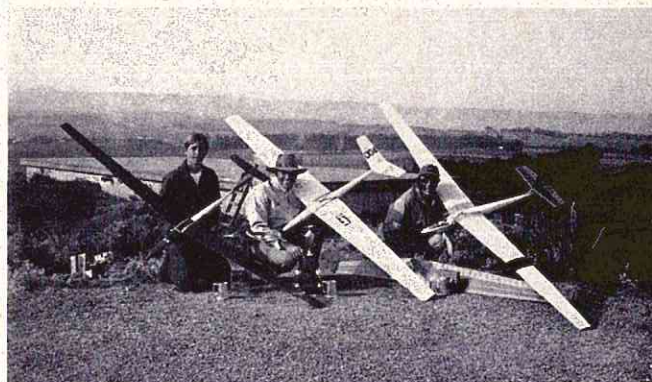
Bob Andris' Peregrine chases Dale Willoughby's Elfe round the far pylon. Turned inside and gained the lead.



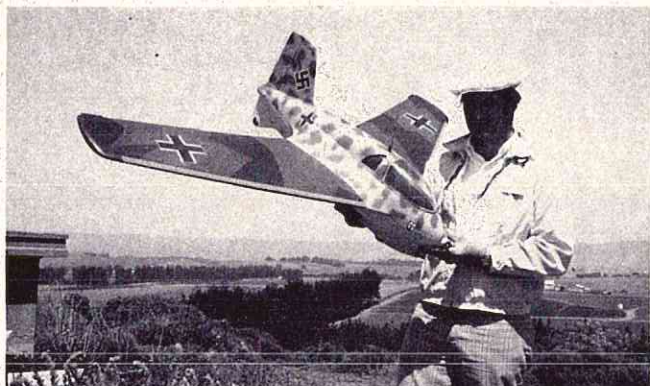
Midairs were frequent in fierce competition. Taylor's Schweitzer lost half the flying stab but continued on to win. Later crash wiped it out — tangled with KA-6.



Smallest glider, John Baxter's Nomad, surprised everyone by winning a place in the finals — even won a race against Dale Willoughby's Elfe!



The winners. Rick Walter; L, top, 2nd; Bob Andris, 1st; Ken Willard, 3rd. R/C Modeler Magazine perpetual trophy won by Andris Towers over permanent trophy cups, which were beauties themselves.



Bill Brenchley's unbelievable scale glider of the Messerschmidt M.E. 163B. Rex Taylor launches . . .



The Messerschmidt in flight has to be seen to be believed! Fantastic! Bill didn't enter it, although it was faster than most pylon entries.

The Fan Piper is a magnificent .60 powered ducted fan delta that is a real show-stopper, on the ground or in the air. Don't be deceived by its jet-like appearance — It's inherent stability makes it relatively easy to fly.

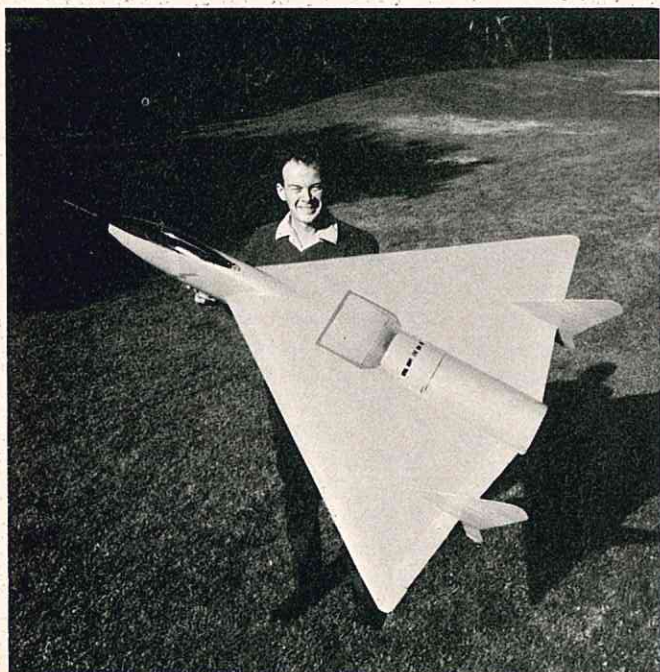


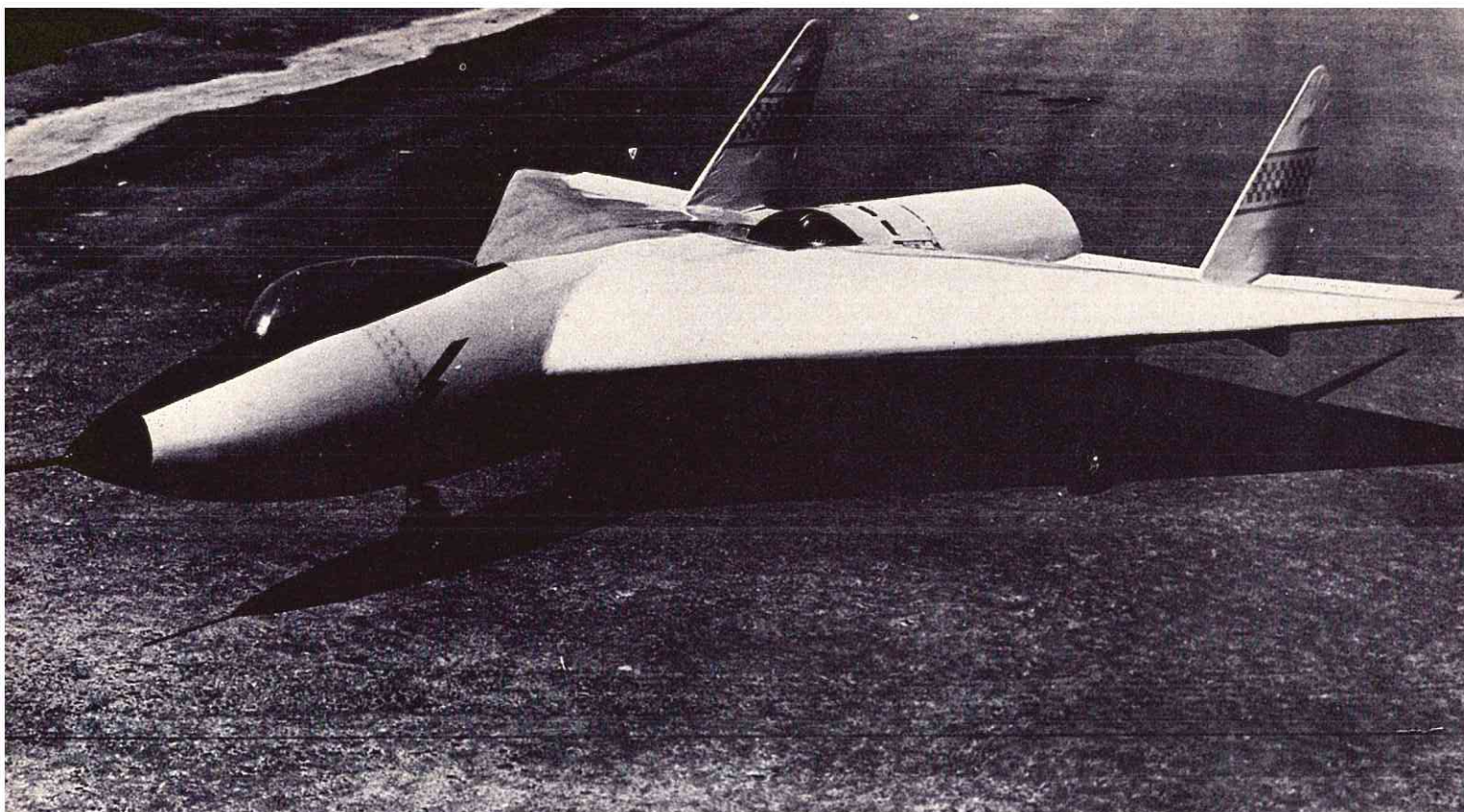
THE FAN PIPER

By E. D. BRIDGES

This design was inspired by an article in RCM (April, 1968) entitled "Banshee" by Capt. C.W. Peake. The photos and plans started up old fires which, after almost 30 years of inactive modeling, broke out in quite a blaze, cooling and flaring occasionally, as I progressed from plans through construction and taxi tests. Public reaction varied from "poor fellow" to "let me know (evil grin) when you try to fly it." I naturally thought positive, it had to fly; e.g., Bumble Bee Theory, and as miracles go, it flew right off the drawing board. It is very stable and trims hands off with no dutch roll or oscillations.

The guidance system is Heathkit with ailerons, elevator, and throttle control. Elevons were not used and proved unnecessary. The fins are fixed, no moveable rudder. The nosewheel is steerable from the ailerons and a nosewheel brake operating from the forward elevator. These two features were used to great advantage on the trial ground runs prior to first lift off. If your flying field is limited, in length,





a brake is extremely handy. This bird can really move on the ground after a long landing. Just to be on the safe side, an arresting gear has always been set up and ready. It saved the plane twice when the engine quit at an inopportune time.

The dimensions are 66" span, 81" length, 10¾ lbs. weight, and a wing area of 10 sq. ft. Power at present is an Enya 60-II TV.

The construction should be kept as light as possible consistent with good building practice since the thrust output is slightly limited (about 4 lbs), compared with the average prop driven model. Even with the present thrust, the climb out angle can be somewhat spectacular to say the least!

The plane is built around a crutch using "the old fashioned" spar, rib, balsa sheet covered wing and planked monocoque fuselage. Styrofoam might be a good way to go, but I haven't tried it yet. The original duct was made with 1/8" balsa planked on a form, but the duct shrunk when the weather warmed up and the prop had to be trimmed down several times to maintain tip clearance. I suggest the duct be made from 1/32" ply rolled with the grain lengthwise. The guide vanes, made from 1/8" balsa sheet, are rounded on the leading edge and tapered to a streamlined trailing edge. The guide vane center support is made with 1/16" sheet balsa strips planked on round 1/8" balsa bulkheads. Pin ½

bulkheads on plan, plank and when dry remove, add other ½ bulkheads and plank remaining ½. Make nose piece from a block or scrap balsa. Glue the guide vanes to the center support, 6 on the front and 6 on the rear, spaced 60 degrees apart and in line with each other fore and aft. Dope on the silkspan plus two coats of clear and two coats of a dark color. Dope the inside of the duct with three coats of clear and two of color. Use fuel proof dope as the inside of the duct gets quite saturated with exhaust oil. When dry, fit and glue the guide vane assembly in the duct with a pair of guide vanes, vertical in front and rear. To keep a perfect circle in the prop area, when fitting the guide vane assembly, I cut a circle of 1/8" ply just large enough to fit around the duct and slightly forward of the prop line. The disc that comes out of the circle can be used later on the engine, when installing the duct in the airframe.

The general construction layout is similar to Capt. Peake's Banshee. The crutch is cut from 1/8" Mahogany plywood. To keep weight down to a minimum I cut lightening holes in the crutch, all ribs, except R5, and in all fuselage bulkheads. The rib templates are laid out on light cardboard using the table of ordinates. Measure the chord on the inboard side of the rib from the wing leading edge to the trailing edge of the rear spar. After the ribs are cut to shape then cut off aft

ends 3/8 inch. This is a modified M-6 section and is very stable on this plane. Cut the templates to shape, then trace them on 1/8" balsa sheet. I had to edge glue several sheets together to fit R1 and 2. Draw the Θ base line on all ribs. Some ribs will be cut with reference to this line during assembly and the line will also be used to keep ribs aligned and true until the spars are glued in place. The main wing spars are cut from ¼" hard balsa. If your balsa is not long enough, use a long taper splice at the wing tip end of the spar.

The first stage assembly comes next. Lay the plan on a surface of soft wood large enough to span the wings and extend from the aft end of the crutch forward to F1. If you have a loft with a wood floor you are fortunate. The living room or the kitchen floor is probably out of the question, and the cement floor in the garage makes it very difficult to pin things in place, so a layer of soft wood is about the best answer.

Place the crutch on the plan and tack with light nails so it will stay put. Cut 40 or 50 three inch right triangles from cardboard. These are used to hold ribs and bulkheads square and aligned during assembly. Set ribs next. Cut the No. 1 ribs on the Θ -line and glue on crutch. Cut bottom pieces 1/8 inch below Θ -line and set aside. The reason for these cuts is that the bottom face of the crutch is the Θ -

(continued on page 58)



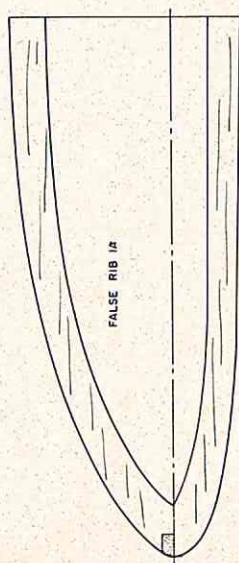
FAN PIPER

PLATE 3 OF 3

DESIGNED BY
DRAWN BY
E.O. BRIDGES
INATED BY
IMPERIAL



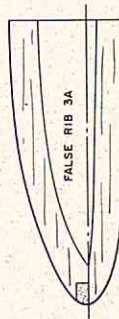
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FALSE RIB 1A

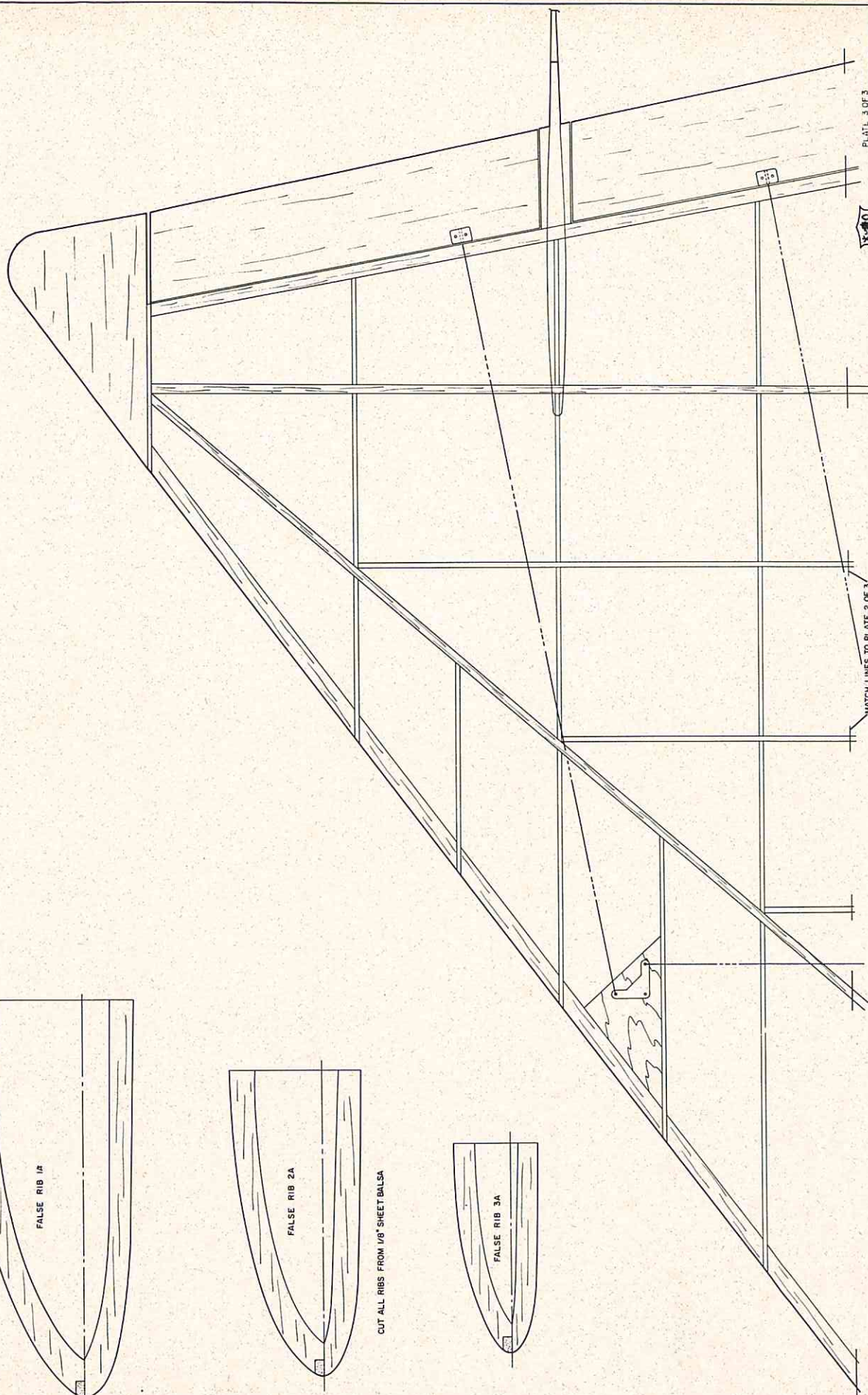


FALSE RIB 2A



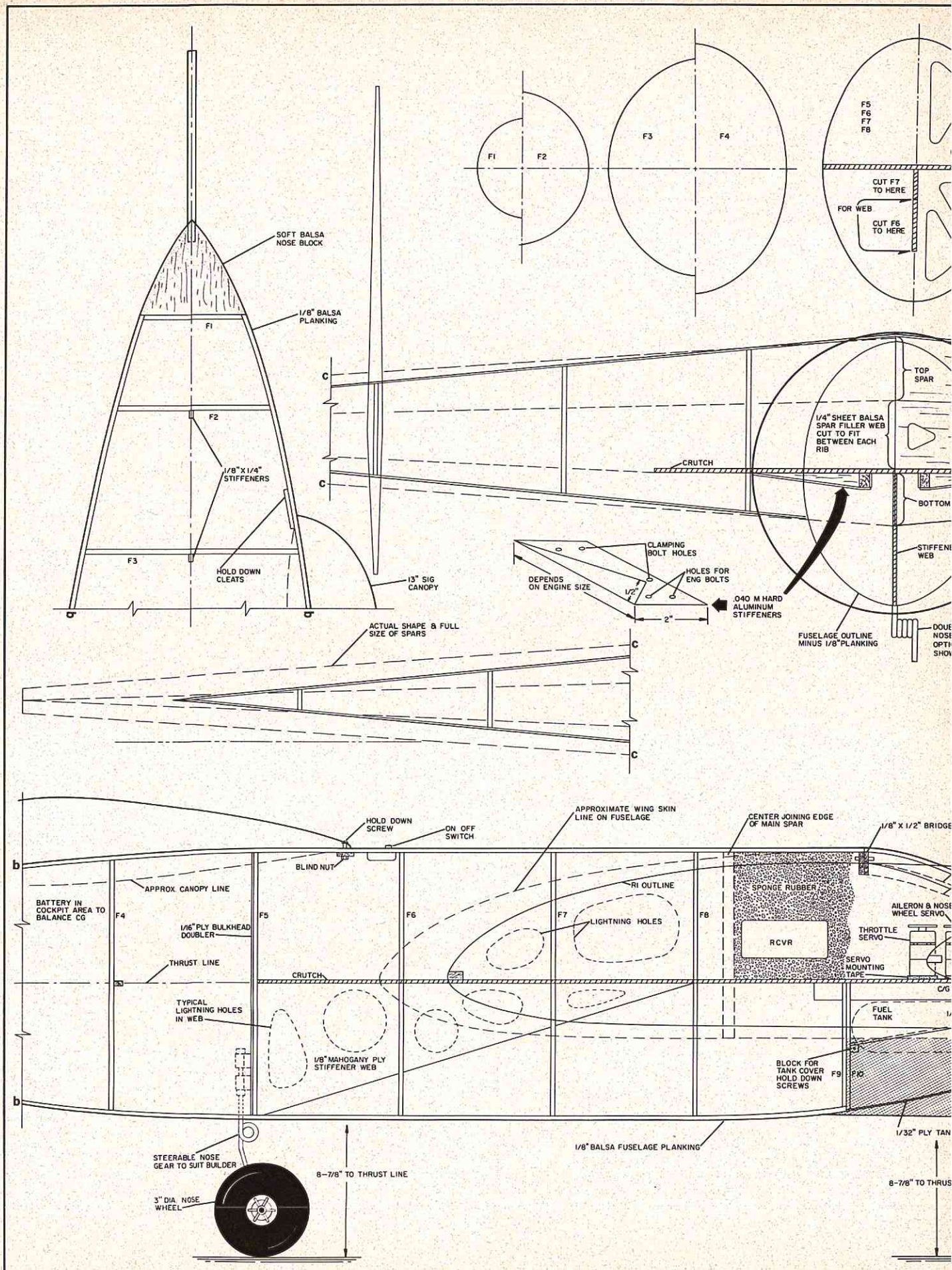
FALSE RIB 3A

CUT ALL RIBS FROM 1/8" SHEET BALSA

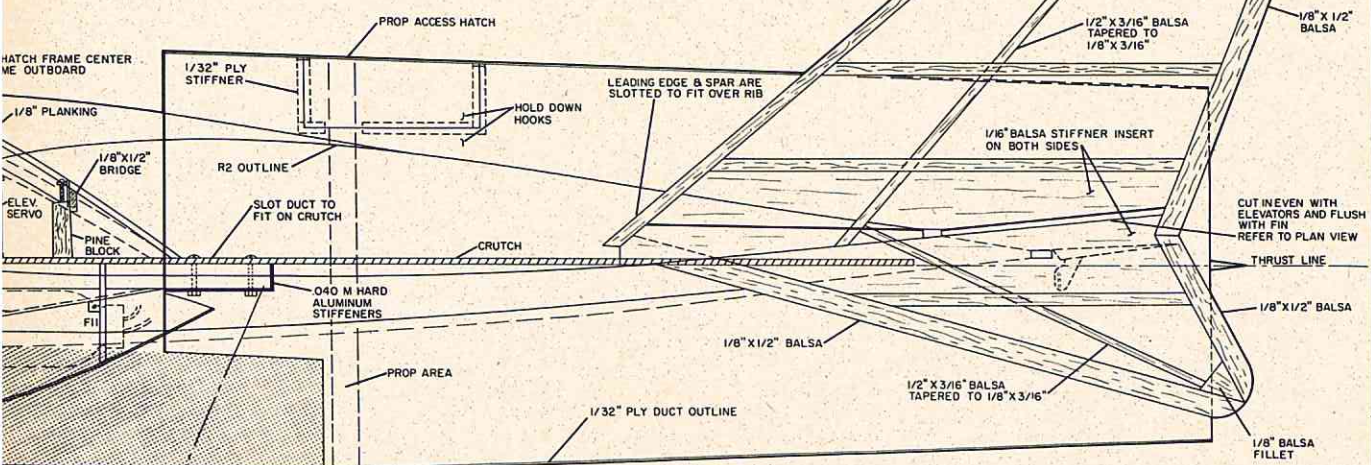
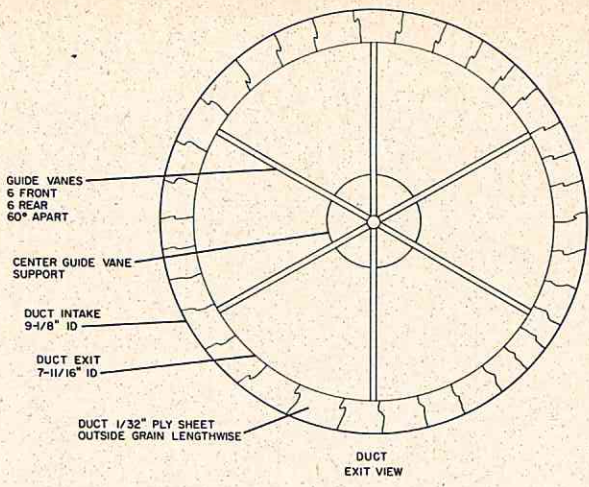
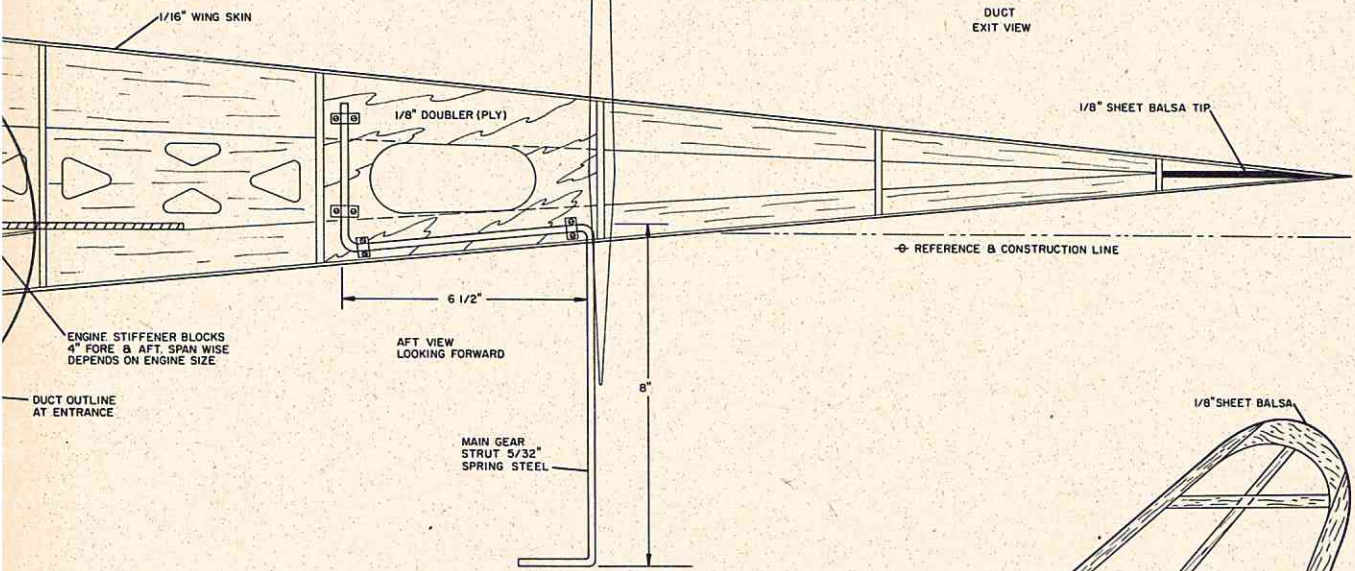
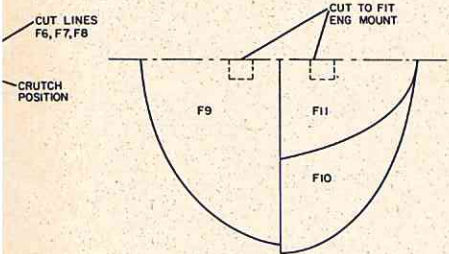


MATCH LINES TO PLATE 2 OF 3

FULL SIZE PLANS AVAILABLE --- SEE PAGE 88



7 TYPICAL LIGHTNING
HOLE CUTOUTS IN
EACH BULKHEAD
EXCEPT F5 DOUBLER



ENGINE SIZE — .60 TO .80

PLATE 1 OF 3

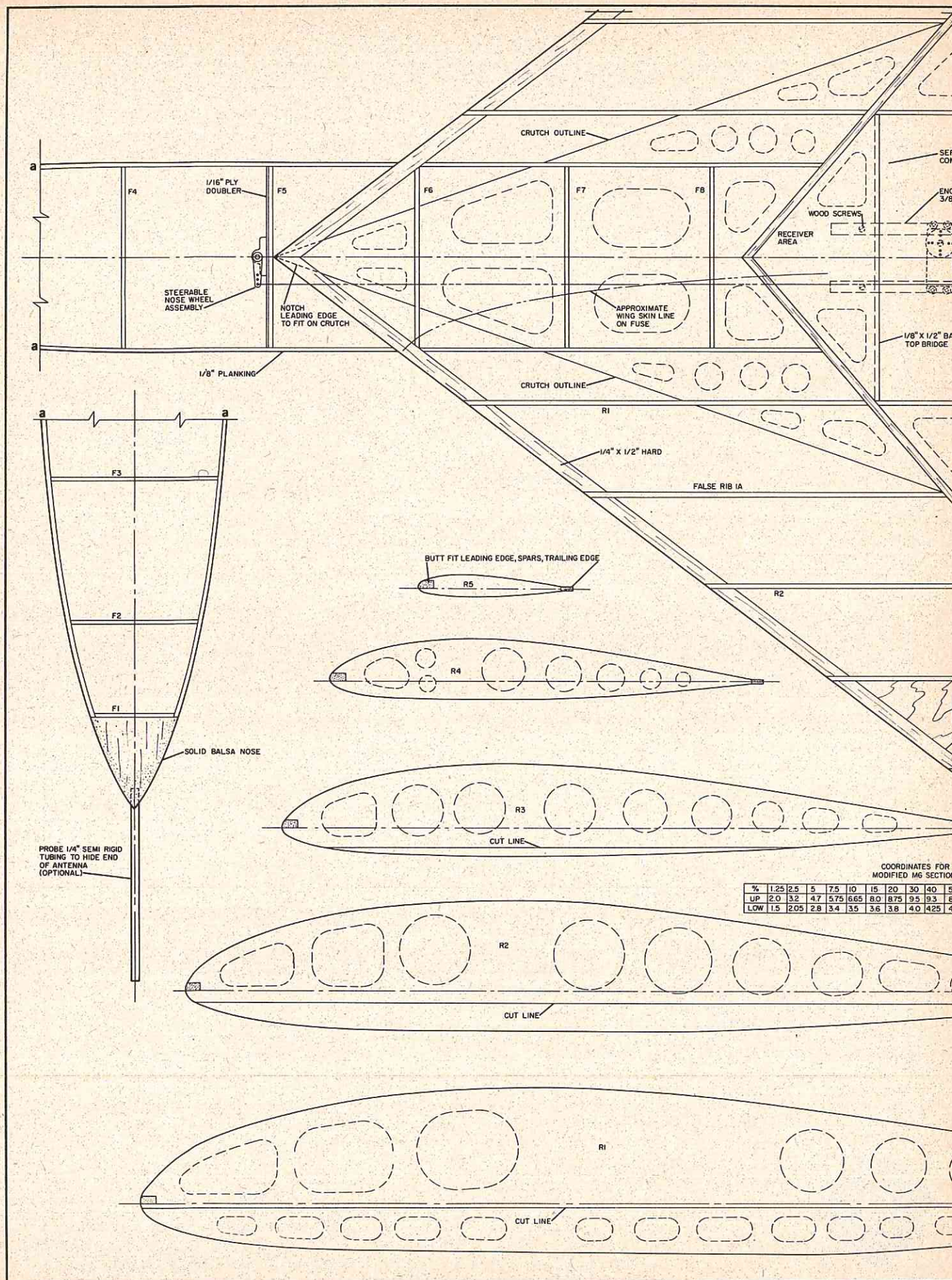
FAN PIPER

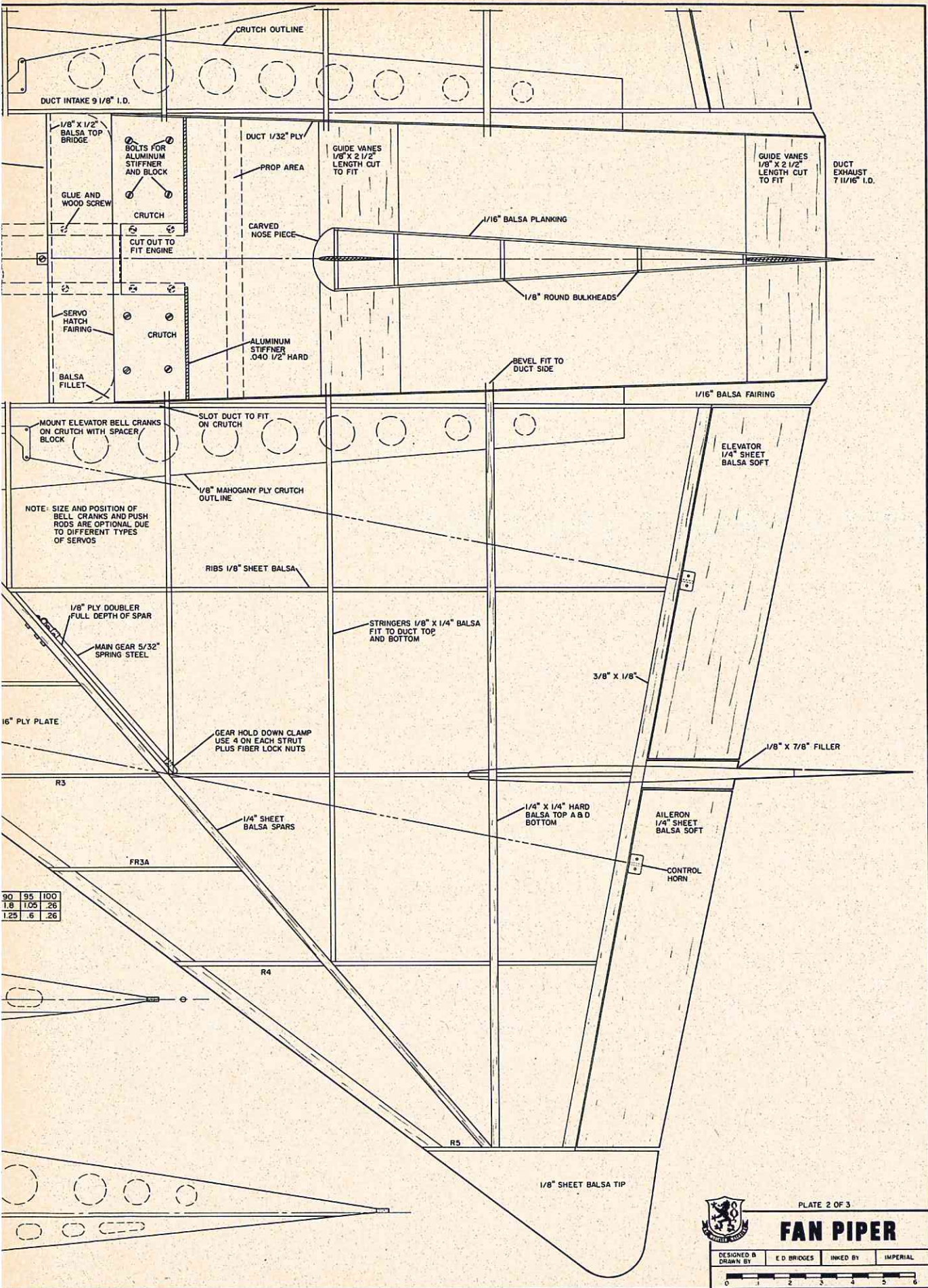
DESIGNED BY E. D. BRIDGES INKED BY IMPERIAL

0 1 2 3 4 5 6

434

FULL SIZE PLANS AVAILABLE -- SEE PAGE 88






FULL SIZE PLANS AVAILABLE --- SEE PAGE 88

90	95	100
1.8	1.00	.26
1.25	.6	.26

PLATE 2 OF 3

**FAN PIPER**

DESIGNED & DRAWN BY	E.D. BRIDGES	INKED BY	IMPERIAL
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0

1

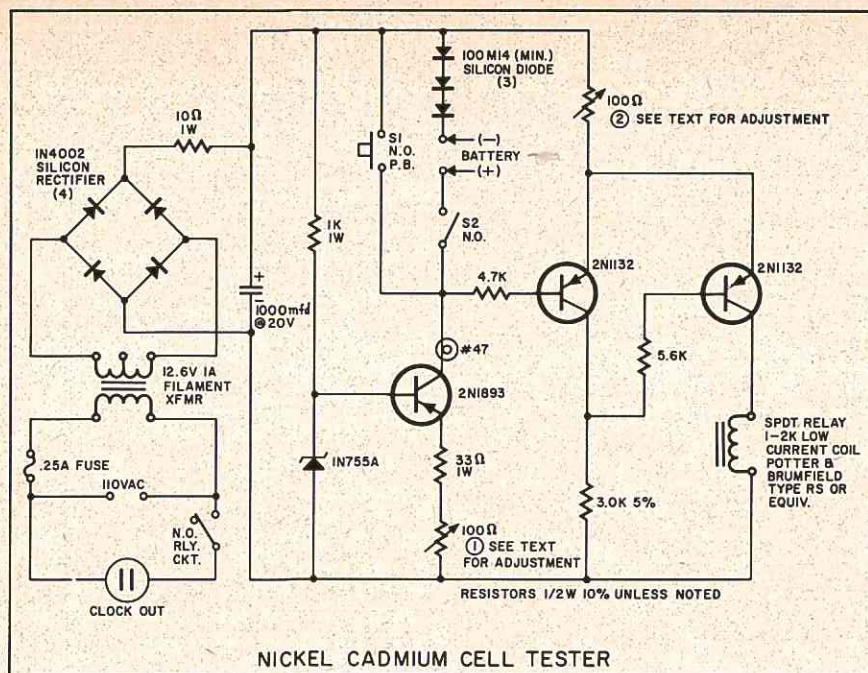
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3

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5

6



NICKEL-CADMIUM CELL TESTER

By DARRELL YONKER

The best and only positive way to test a nickel cadmium cell is to test its ACTUAL capacity by discharging it. It is time consuming and cumbersome to check a cell's actual capacity with a resistor, multimeter and clock or wrist watch. The tester described by Darrell makes cell testing easy and convenient. It will also allow you to run comparative tests between brands and types (button and cylindrical) for your own information. Darrell's unit was designed for use with 500-600 MAH cells using a 100 MA discharge current and this can be reduced to 50 MA for 225-250 MAH cells. With appropriate circuit changes it could be used with 1.2 AH cells also. It is not possible to go into detail here about discharge characteristics of nickel cadmium cells but here are some operating notes.

1. Insure that your cells are fully charged before testing them.
2. Multiply the elapsed time (in hours) indicated by the clock, at the end of the test, by the preset discharge current (in amps) i.e., 5 hours and 15 min. = 5.25 hrs. $X .1 \text{ amps} = .525 \text{ AH capacity} = 525 \text{ MAH}$. Your figure should be approximately the same as the batteries' rated capacity.
3. Do not discard cells that don't

pass the test the first time. Cycle them a couple of times (i.e., charge them fully and then discharge them with the tester) and see if they improve.

4. Don't risk your airplane and equipment with cells that aren't within 90% of their rated capacity, especially at the generous discharge current recommended by the author.
5. If your cells read consistently low check your charger current and length of charge. Also make sure the tester is adjusted and working properly before jumping to conclusions.
6. Get your friendly electronics type to fill you in about the care and feeding of your batteries, and to explain how to use the tester to best advantage.

Ed Thompson

There have been quite a few occasions recently where I have had some doubt as to the condition of a nickel cadmium battery pack. Since a visual check for leakage and a voltage check for obviously dead cells still left a lot of doubt I came up with the

tester described to solve my problem.

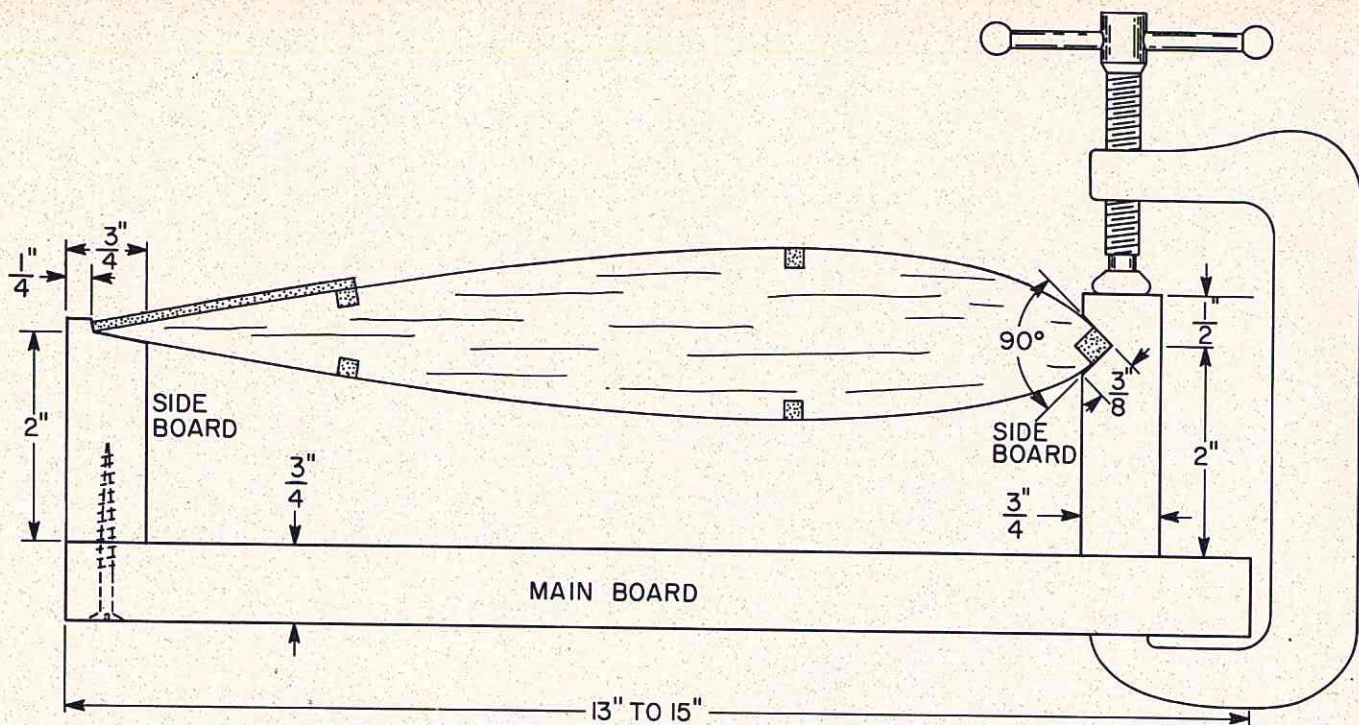
Since the layout of the device is not at all critical, and I doubt that it will be built by many non technical modelers, I have not taken the time to do a construction type write up. I am sure that your local club electronics type can build it with no trouble. I built mine with parts from my junk box, therefore, a parts list is not presented.

To make a test, plug an electric clock into the clock outlet and connect a, fully charged, cell to be tested to the Batt(+) and Batt (-) terminals. Set the clock to 12:00 close S2 and depress S1 momentarily. When the cell is discharged, to the preset end voltage, the clock will stop and the battery will be disconnected. The time on the clock will indicate how long this particular cell lasted. Do not make the test on more than 1 cell at a time or tester and/or battery pack damage may result. If you accidentally connect a cell backwards or test a dead cell the clock will stop and the pilot light will go out immediately upon releasing the pushbutton but no damage will be done.

To set the discharge current supplied by the 2N1893 connect a milliammeter across the Batt + and - terminals of the tester, with S2 closed, and adjust the current to 100ma with the 100 ohm pot (1). To set the end of test voltage connect a partially discharged cell to the test terminals and monitor its voltage with your meter. Push the pushbutton to start the test and set the 100 ohm pot (2) so that the relay drops out when the cell voltage falls to 1.0 volt.

The circuit is pretty simple. The 2N1893 is a constant current source that supplies the discharge current. The 2N1132's form a Schmitt trigger for monitoring cell voltage. The three silicon diodes are important, and must be there. All three are silicon. They supply a voltage offset so that when a charged cell is placed under test the first stage of the Schmitt is off and will turn on when the cell voltage decays to the end of test voltage. In addition they prevent shorting out the cell when the pushbutton is pressed to start the test. The pilot light is just for visual indication and can be eliminated with no adverse effects on the circuit.

Using this tester has been pretty enlightening. Almost all new 500ma cells will last for quite a bit longer than 5 hours for instance, but I have found that some brands of cells are consistently better performers than others.



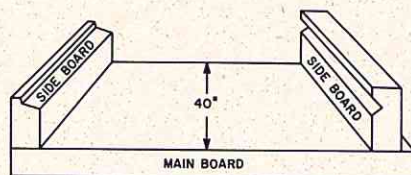
1970 RCM WING JIG

By ROBERTO WAGNER

A couple of years ago R/C Modeler Magazine presented the RCM Wing Jig which since then, has been used with a great deal of success by modelers throughout the world. The only disadvantage to this simple jig was the fact that, if the holes through the ribs were incorrectly drilled, either by hand, individually, or stacked together on a drill press, a built-in warp would occur. And, even if the holes were correctly drilled, and there was a long distance between the rear support hole and the trailing edge of the rib, a warp could be built-in when the trailing edge sheeting was applied. This jig, although slightly more difficult to construct, will completely prevent construction warping in the wing structure, providing you with a completely true and straight wing.

The basic jig consists of two main base boards constructed of $\frac{3}{4}$ " plywood with a length of 40 inches and width of 13 to 15 inches. There are two pairs of side boards for each of the main boards. These are cut with a circular saw to the shape shown on the drawing. These side boards are cut as long as your wing panel will be, or for the full 40" length of the base board.

The side board on which the trailing edge of the ribs will rest is epoxied



and screwed to the main base board. The side board in which the leading edge will be inserted is clamped to the base board. There are two jigs necessary for each wing panel, and will work equally well for tapered wings. After the top of the panel is completed, you can take one side of the wing out of the jig, reverse it, and put it upside down into the other jig for final planking.

The following is the proper method for using the new RCM Wing Jig. Take a sheet of transparent drafting paper and draw on it the leading and trailing edges of your wing as well as the position of their ribs. Cut $\frac{1}{2}$ " off from the trailing edge of your drawing and $\frac{5}{16}$ " from the leading edge so that the drawing will fit on your wing jig base between the two side boards. When you are ready to use the drawing in the other jig, simply insert it upside down.

Now you are ready to assemble your wing. Pin the leading edge into the groove in the side board. Then affix the side board to the main board with C-clamps, installing the first and the last ribs in their positions according to the drawing you have placed on the base board. Afterwards, you glue and pin up the rest of the ribs in the jig according to their position on the drawing. Next, pin the spars in position and glue them into the ribs. Now you can glue up the tail edge planking. While this is drying assemble the other wing panel in a similar manner.

When both panels have thoroughly dried, change the wing panels by putting them upside down in the opposite jig from which they were built. Install the ailerons and finish the planking. The leading edge planking can be easily installed by gluing it up and holding it down with masking tape and putting it back into the jig.

Wings assembled in the 1970 RCM Wing Jig cannot be warped since they are assembled on straight supports that are parallel to the main board. All that is required is to cut your side boards carefully, and when assembling, make sure that your leading edge and the trailing edge of each wing panel match the other.



Overall view of the exhibition hall. Note the giant WWI paints (some as large as 8' x 10') lining the balcony. These added atmosphere and were loaned to the WRAM's by noted WWI artist, Lou Mallard, whose works are also on display at Rheinbeck.

RCM VISITS THE WRAMS 1970 EASTERN STATES R/C JAMBOREE

By KEN SMALLEY & JACK RUGGERIO

Did you ever notice that most of the great ideas for club projects are generated *after* the club meeting adjourns to the local, ahem — Coffee Shop? Well, that's exactly where the WRAM's Eastern States RC Jamboree got its start in the late fall of 1968. With just four short months to get the whole thing organized, work was started on the first, one-day version of the Show for 1969. The golden glow of coffee was soon worn off by the back-breaking effort and attention to what seemed to be an infinite number of details that kept coming up during the preparation for the Show. But, everything was accomplished and the Show was a success by everyone's standards with one exception... it was crowded.

When planning for the 1970 Show got underway, the club took the proverbial bull by the horns and contracted for the entire Westchester County Center, which is one heck of a big, barren blimp hangar when empty,

and costs a lot of money for one club's rather dissipated treasury. Talk about bridegroom's nerves and cold feet! There probably wasn't a single



Talk about new construction techniques! Adolph Sica's semi-scale Ryan ST uses planked balsa fuselage covered with thin sheet aluminum.

member of the WRAM's that wasn't having second thoughts about what the club had gotten into! However, as they say in show biz, "The Show Must Go On". And go on, it did!

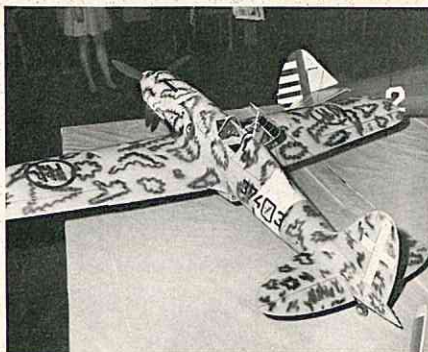
As this is being written, the second annual Eastern States RC Jamboree is history and it, too, was a success which was in no small part due to the outstanding cooperation of the RC manufacturers, the hundreds of modelers who brought planes and boats for exhibition, and the Herculean effort put forth by the entire WRAM organization. The Show was absolutely packed for two days, from opening at 10 AM to closing, with an overall attendance of better than 4,000 who came to see the wares of more than 40 manufacturers and the better than 200 planes and boats that were on display.

Since RCM has already covered, in rather exacting detail, all of the whys and wherefores of the new RC

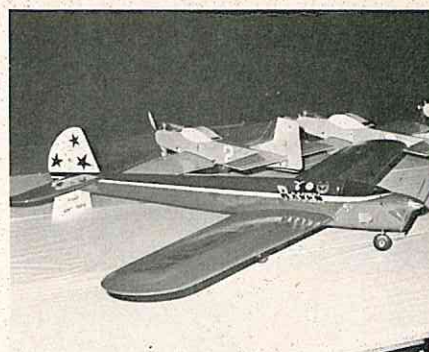
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Len Sabato's beautiful replica of the late Ed Weiner's racing '51. Won first place in post-WWI scale and is built to 1-7/8" scale with KDH retracting gear and ST-60.



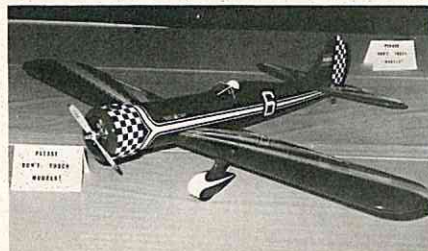
Unusual scale subject... Aero Macchi C-202-Folgore built by Romano Carabello. Retracting gear, split flaps, and Max .80 power.



Dave Gierke's Raven. They really have time to build them big in the snowy Buffalo Bison country. 1,050 square inches and an 84" span. Weighs just 6 lbs, 10 oz.



The Henchman flies as well as it looks. Magnificent finish on Ernie Weiss' original typifies the finishing effort that today's reliable radios warrant.



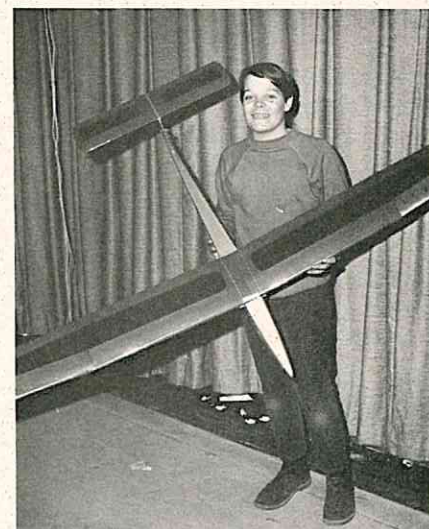
Sal Grosso's Scale Model has all of the earmarks of a stretched Bee Bee. Enya .60 power and 5 lb, 6 oz. weight give an idea of the performance to be expected.



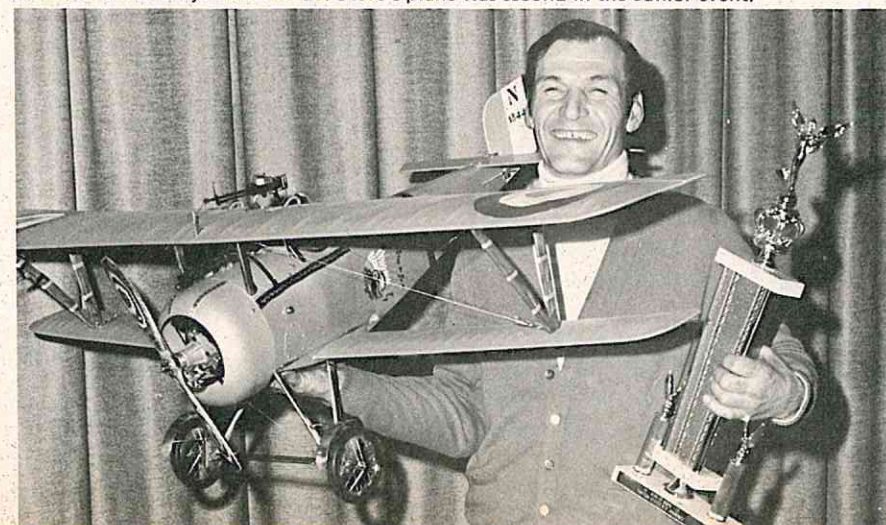
Just about as unique an RC boat as anyone as seen! Walter Whitefield's RC rowboat is actually powered by the gentlemen doing the rowing!



Lt: The second Albatross built by Lou Perretti. His first met an untimely fate at Rhinebeck last Fall. Lou also had his Triplane and wing-warping Eindecker on display. All beautifully detailed. Center: Walt Moucha and his exact scale Fly Baby and Miss Westchester Radio Modeler, Ginny Ehrlich, in a full size non-scale Fly Baby. Walt's model followed the original Bower's plans in construction detail while the full size model was modified to include a sliding canopy. Girl-carrying plane was supplied by the EAA. Rt: 13 year old Steve Gushue holds his "Lil T" glider. A truly magnificent Monokoteing job illustrates what the juniors can do. Steve's plane was second in the Junior event.



Above: More tough scale competition. Paris White's DC-3. Retracting gear, really detailed cockpit and flaps. Rt: John LaFonte holds White Plain's grand champion. His beautiful VK Nieuport walked away with WWI trophy and Best-In-Show award. Hand carved pilot had custom uniform complete with battle ribbons.



R/C MODELER MAGAZINE'S 1969 GOLDEN RULER AWARDS

RCM's coveted Newsletter Awards presented to those who have best measured an "Exercise of Excellence."

By JERRY KLEINBURG



Jerry Smith — N/L Editor-of-the-Year 1969! Cliff Bennett (R) does honors for Tri-Valley Club news chief. 'Best' in Tech. Presentations, also Hon. Men. in Photography and History groups. Howard Nelson club photographer...

Fifty seven editors and writers of 50 newsletters from around the world were named to share "Golden Ruler" honors for their work in RCM's 1969 'Best' newsletter selections. Topping the list to receive original and distinctive awards was Jerry Smith of the Tri-Valley RC Club who was voted to receive the RCM Newsletter Editor-of-the-Year Award for 1969.

Jerry's outstanding efforts as Editor of the TRI-VALLEY NEWS brought his nomination for Editor-of-the-Year as he was named on every ballot of RCM's editorial staff and newsletter editors who were invited to join in the selection process. To underscore the selection, Jerry and the TRI-VALLEY NEWS were also named as 'Best' in the "Technical Presentations" category and for Honorable Mention in the "Photography" and "History" classifications. The high score of "re-prints" — the number of times TRI-VALLEY articles were used in other newsletters — was a key element in naming Jerry and the TVN as tops over almost 300 other editors and writers whose newsletter efforts were reviewed for 1969 competition.

Also named for top honors was Perc Grondin whose resurrection of the MAAC FLYER of the Model Aeronautics Assn. of Canada brought recognition as the "Most Significant



"Most Significant N/L Development" — Dave Henshaw (L), pres. of the Model Aeronautics Assn. of Canada presents first "Golden Ruler" award to MAAC FLYER editor, Perc Grondin. A phoenix-like accomplishment...

N/L Development" during 1969. The newsletter has done much to weld together various Canadian modeling elements and to bolster the development of MAAC... (Among the honors included in the "Most Significant" and the Editor-of-the-Year is the privilege to join in selecting these top awards in future RCM newsletter competitions. So to Jerry and Perc — "Congratulations, and we'll welcome your nominees in January 1971")

The 1969 competition had several new categories added to the original 1968 list. These will continue for the 1970 awards... "Sustained Publication" honors — for longest quality publication — went to Clark Besancon for his editorship of PROPBUSTERS which has effectively recorded modeling matters of the Rapid City, S.D. area for 14 years. For many of those years Clark fostered the N/L at his own expense and he feels weather "Propaganda" for the local Chamber of Commerce is also appropriate material to be included regularly. The 14-man club, headed in 1970 by Dick Duncan, now sustains costs of producing PROPBUSTERS which continues to wield influence in modeling far beyond the environs of Rapid City...

"Service", another new category,

RCM — TOP OUT NEWSLETTER AWARDS FOR 1969
... for excellence of content and significant service to aeromodeling ...

Newsletter Editor-of-the-Year: JERRY SMITH
TRI-VALLEY NEWS Tri-Valley RC Club

Best Newsletters in specific categories:

Editorial Content	GLITCH
Dr. E.N. Campana	Soo Radio Modellers
News Coverage	DCRC
Stew Vance	Dist. of Columbia RC Club
Technical Presentations	TRI-VALLEY NEWS
Jerry Smith	Tri-Valley RC Club
Original Art	DELAWARE RC
Tom Parent	Delaware RC Club
Humor	SHARKS SPARKS
John Alexander	Shoreport Area RK Society
Literary Excellence	IMPERIAL ACES
Juan Alyea	Imperial Aces Flying Club
Photography	FLYPAPER
Jim Potts	RC Flying Club of Toronto
Production & Layout	HEAR YE
Ted Davey	Valley Forge Signal Seekers
Best Contributions	FBI NEWS
Jean Rivard	Montreal RC Club
Best First Year	CONDENSER
Joe Perez	Alamo RC Society
Best Issue	FLYSHEET
Sean McCullagh	S. African Assn. of RCers
Association N/L	FREE FLIGHT DIGEST
Annie & Bill Gieskieng	Nat'l FF Society
Sustained Publication	PROPBUSTERS
Clark Besancon	Propbusters RC Club
Service	NCRCC N/L
Bernice Williams	N. Connecticut RC Club
Leadership	SQUAWK SHEET
Bob Talley	Pt. Arthur Oily Boids
Historic Features	BIRMINGHAM NEWS
Jim McNeil	Birmingham RC Club
Perspective	PRINTED CIRCUITS
Bill Antoine	N. Jersey RC Club
Largest Circulation	BIRDS EYE VIEWS
Betty Stream	BIRD Club of Signal Hill

SPECIAL AWARDS

Most Significant N/L Development	MAAC FLYER
Perc Grondin	Model Aero. Assn. Canada
Best Junior Editor	STAR SKIPPERS
Richard Whitten	Flying Dutchmen MAC

1969 Newsletter Awards — Honorable Mention

Editorial	GLOW PLUG — Frank Schwartz
FBI NEWS	Jean Rivard
FLY-BY	Louis Tate
News	FREE FLIGHT — Annie & Bill Gieskieng
GLITCH	E.N. Campana
WATTS NEW	Roy Schlottbauer
Technical	CARRIER WAVE — Al Signorino
DCRC	Stew Vance
FBI NEWS	Jean Rivard
Art	FBI NEWS — Don Paquette
BUZZER-D	Forrest Waller
CARRIER WAVE	Bob Schwartz
Humor	DALLAS RC — Mike Shabot
GLITCH	E.N. Campana
ADVISOR	Jim Mowrey
Literary	SHARKS SPARKS — J. Alexander
GLITCH	E.N. Campana
WORKSHEET	Gene Drake
Photography	BREEZE — Lukaszewski/Hannah
VALLEY FLYERS	Reed Packard
TRI-VALLEY	Jerry Smith
Contributions	SCRAM — Chas. Johnson
CARRIER WAVE	Don Dickerson
WATTS NEW	Roy Schlottbauer
Production	RIVER CITY NEWS — Renner/Varellas
MEMPHIS MONITOR	Buddy Hord
SCRAM	Chas. Johnson
First Year	BIASED STATEMENT — Brent Reusch
COMET'S TALE	Don Smith
Single Issue	COMETION — Carl Wheelley
HIGH ASPECT	John Marriott
MAAC FLYER	Perc Grondin
COMPETITION	Carl Wheelley
Association	RC CUE — Phil Heller
PROP SHIAFT	Roger Stern
PROP WASH	Ray De La Veaux
Sustained	GLOW PLUG — Frank Schwartz
PRINTED CIRCUITS (*)	WATTS NEW (*)
Service	BIRDS EYE VIEWS — Betty Stream
MONMOUTH	Dick Sarpolis
WINNIPEG BULLETIN	Cliff Swarz
Leadership	AIRFOIL — Harold Downing
WRAM'S HORN	Art Byers
NVRC FEEDBACK	Jim Deckert
FLYSHEET	Sean McCullagh
FOREST CITY FLIAR	Vic Gianelli
TRI-VALLEY	Jerry Smith
Perspective	MODULATOR — Bernice Aurand
BROADCASTER	Al Rubin
CONTACTS	Chas. Reed III
Circulation	DCRC — Stew Vance
VALLEY FLYERS	Don Bultman
WAVE MASTER	Virginia Becker

saw Bernice Williams and the Northern Connecticut RC Club recognized for editorially spearheading successful action to develop and expand competition in the northeast. Bernice's help in Philadelphia during the 1969 Nat's in keeping the RC event a smooth-running affair was a significant indicator of her devotion to aeromodeling and her ability to translate desire into useful action to the benefit of a wide circle of aeromodelers...

Jim McNeil brought recognition to the Birmingham RC Club with his yesteryear articles in the club's newsletter during 1969. (One of Jim's "Back Page Headlines" was featured in the Dec. '69 RCM.) Jim, the club's new 1970 editor, took firm grip on the RCM "Golden Ruler" award at the presentation ceremony and vowed to repeat the performance for Best "Historic Feature" category for 1970...

"Perspective", the ability to reflect a broad overall balance and accurate picture of aeromodeling activity, was another new award category. Tops in 1969 was Bill Antoine and PRINTED CIRCUITS of the North Jersey RC Club. Bill recently rounded out 4 years as editor and was very active in WW I flying with his Nieuport 28C during 1969.

Clubs having a newsletter with a "large" circulation - 200, or over - have special N/L problems in meeting a wide range of needs and interests brought about by a large number of readers. Distribution also becomes a chore of major proportions as an example. To give recognition to this very practical facet of N/L operation, the "largest Circulation" category was established. Betty Stream and BIRDS EYE VIEWS of the BIRDS of Signal Hill MAC was selected for the initial 'Best' in the new category. Betty, by the way, was one of four 'Best' editors whose work brought feminine insights into newsletter publication and were recognized for their efforts in last year's contest. Besides Bernice Williams, Joan Alyea - 'Best' in the "Literary" classification - helped uphold the woman's claim to recognition for the right to put pen to paper for the cause of aeromodeling. Annie Gieskieng also joined the "fair sex" in the 1969 list for her work with her husband Bill as they teamed editorially to do a tremendous job in producing the FREE FLIGHT DIGEST of the National FF Society, the second time the DIGEST has been named tops in the "Associa-



"Best Contributions" - Jean Rivard (R) edits 50+ page N/L for Montreal RC Club. FBI NEWS had 20 contributors in 1969, 41 articles. Don Paquette (L) was lead-contributor, won H/M for great artwork.



1969 honors also went to 1968 Editor-of-the-Year Dr. E.N. Campana (R) who won 'Best' in Editorial, H/M in News, Humor and Literary categories. Herman Thiffault, Soo Modeller's 1969 pres. presents "Golden Ruler" to GLITCH N/L chief.



Above: Joe Perez (R) Alamo RC Society CONDENSER news chief, received "Golden Ruler" from ARCS pres. Bill Morgan. Lt.: John Alexander shares "Golden Ruler" award with wife Martha and daughter at club banquet where SHARKS pres. Buddy Horton presented award.



Above, Lt: Sean McCullagh in characteristic pose, won "Best Issue" category. S. African Assn. of Radio Flyers has active international RC program, finds FLYSHEET N/L valuable in keeping program moving, members informed. Top, Rt: Speechless, almost. Bob Talley (R) has husky grip on 'Best' Leadership award rendered by Cal Skully of Mr. Ed fame. SQUAWK SHEET editor joined by clubmates (L to R) Jack Fox, Leroy Speers, Bill Foote, Jeff Thames and Bill Feldschau. Above: 'Best' in Historic Features went to Jim McNeil of Birmingham RC Club. 1970 pres. Rubin Scott (R) does honors. For sample of Jim's work read "Back Page Headlines" in Dec. 1969 RCM...

tion" category.

One other special award was made this year — this one for notable "Junior" participation in newsletter work. The 1969 winner was Richard Whitten of the Flying Dutchman MAC sponsored by the excellent and noted Collegiate School of New York City, for his editorship of a gem of a newsletter called STAR SKIPPERS. Richard is a 10 year old dynamo who not only turns out a newsletter that's a credit to any adult, but also manages to retain the full flavor of youthful views and of every youngster tasting all the wonder and excitement of 'finding' aeromodeling and relishing every moment — the good and the bad results of flying — that he shares with his flying buddies. STAR SKIPPERS is a model blueprint of the reaction of youngsters to modeling everywhere . . . for all times, present, as well as the past . . .

Other 1969 top honors were garnered by 1968's Editor-of-the-Year, Dr. E. Nino Campana, as the GLITCH of the Soo Radio Modellers was named 'Best' for "Editorial Content" and for Honorable Mention in the "News", "Humor", and "Literary" categories. Another Canadian newsletter, the FBI NEWS of the Montreal RC Club, was selected for four classifications also — 'Best' for "Contributions" and H/M in "Editorial", "Technical", and "Art" categories. Jean Rivard edits FBI NEWS and has the artistic talents of Don Paquette in illustrating the monumental 50 plus page quarterly publication. He also has help from 19 other contributors who put together 41 articles covering 91 pages of FBI NEWS in 1969. In "newsletterdom" Jean's crew is tops . . .

Space limits preclude mentioning each of the winners and their individual stories of volunteer service and usefulness. Despite their individuality, however, they do share a common trait. They're historians. As we've pointed out here before, while N/L devotees don't consider themselves as "historians", this is the basic result of their labors. But it's a history of a different sort than the aversion learned in earlier years in grade and high school with respect to history. This time it's a record of memorable details of sharing a hobby with friends as individuals and as a club . . .

A newsletter offers the chance to preserve the voices of the club's fliers; their opinions and preferences, frustrations with planes, equipment and the

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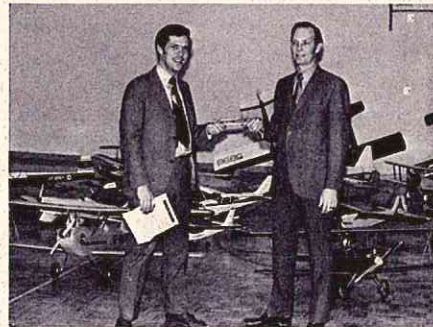
IMPERIAL ACES news chief, Joan Alyea, receives 'Best' in Literary award letter from Duane Alyea (L) while hubby Dale helps hold "Golden Ruler". Ray Magen pic made at Puebla, Colo. flying club ceremony.



Betty Stream of BIRDS EYE VIEWS received 'Best' in N/L Circulation award from CD Harry Gould at BIRD contest. Betty joined by Bernice Williams (Service) and Annie Gieskieng (Assn') to prove feminine abilities valuable for newsletters.



'Best' in new "Perspective" category, Bill Antoine (L) PRINTED CIRCUITS chief, received "Golden Ruler" award from Dave Jaggie, N. Jersey RC Club pres. CIRCUITS N/L one of oldest, Bill editor for 4 years.



John Brock (R) pres. of RC Flying Club of Toronto makes 'Best' Photography award to Jim Potts, FLYPAPER editor. R. Chapman photo includes part of club's big RC fleet on display at award ceremonies.



'Best' Original Art award for 1969 went to Tom Parent of the Delaware RC Club. Bob Veazey (L) DELAWARE RC editor does honors for talented Tom whose work was carried by many other newsletters.



Dick Duncan, Propbusters pres., presents award for 'Best' Sustained Publication to Clark Besancon (R), editor of Rapid City PROPBUSTER N/L. 14 years at the same typewriter . . . Scene was club banquet at new Howard Johnson's.

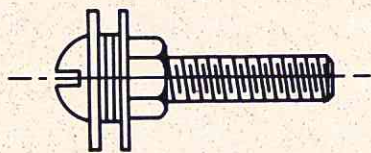


Best' Production & Layout — vital element in N/L publication — went to Ted Davey (C) 1969 editor of Valley Forge Signal Seekers HEAR YE N/L. Dick Barron (L) club pres. and Bob Lamey (R) share honors.



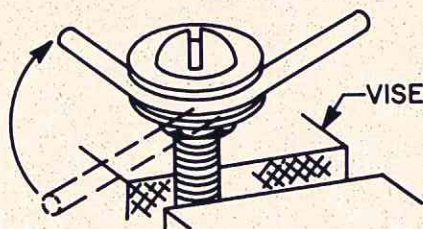
N. Connecticut RC Club newschief Bernice Williams (L) headed "Service" category. "Golden Ruler" is presented by Al Thresher, club prexy. Bernice was one of 4 feminine 'Best editors in 1969 competition.

FOR WHAT IT'S WORTH

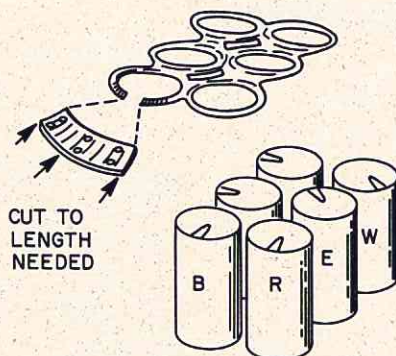


If you have ever tried to bend a piece of small brass tubing for a fuel tank, you no doubt discovered how easily it kinked or collapsed. The Indian City Radio Control Club "Tom-Tom" Newsletter suggests the following method. After one of their members tried heating brass tubing with a torch, which permitted bending, he found that after it cooled, the brass was so soft that it had virtually no strength at all. This simple tool does an extremely neat job of bending with only a slight amount of flattening occurring which does not prevent a flow problem in the fuel tanks. Here's how it is done. Start with a $\frac{1}{4}$ " or $\frac{5}{16}$ " screw that is at least $\frac{1}{2}$ " long and threaded all the way. Slide on a thick flat washer of one inch outside diameter or larger. Now select some small, equally sized washers, about 4 or five times the diameter of the tubing to be bent. Add enough of these to the screws so that their total thickness is equal to the diameter of the tubing. Add one more large washer. Clamp all the washers together with a heavy nut. It is important that the space between the two large washers form a snug fit for the tubing. Small tubing can be bent by hand around this device. This technique has been tried on $\frac{1}{8}$ " and $\frac{5}{32}$ " O.D. tubing.

Eugene Bryant of the Thunderbirds in Ft. Worth Texas has, so far, been unable to develop any good ideas for the use of Helmer Johnson's used beer cans (For What It's Worth RCM May, 1969). However, he did come up with a related idea that could be quite useful if you've found the need for a small hinge but have been unable to locate anything that you thought might do the job satisfactorily. If this is the case, then take another look at that six-pack holder that you just threw into the trash can. This plastic

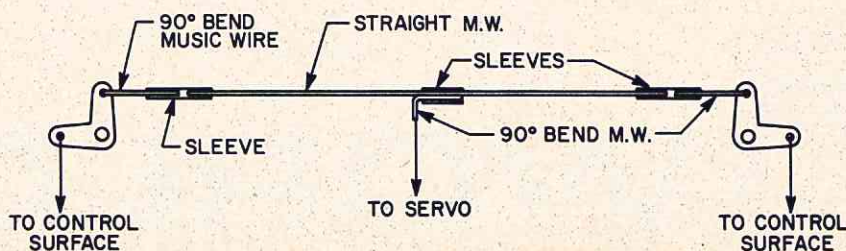


holder is as tough as a boot, and when cut into strips and inserted in the same manner as an ordinary nylon hinge, is very serviceable. Naturally, these hinges will need to be drilled and epoxied, or retained with round toothpicks, just as with any other nylon hinge.



A sure and easy way to make pushrods to the exact length for inaccessible areas, such as wings, without numerous bending and rebending, is by using DuBro Split Coupling Sleeves. With the servo and control surfaces in a neutral position, adjust and position the music wire. Now solder the music wire and Split Coupling Sleeve together. They come out right the first time, everytime, according to Stanley Gordon of Sepulveda, California.

If you follow Dean Bunger of Rochester, Illinois' idea, you will have



a windshield strong enough to support a seven pound airplane — that is if you want to pick it up by the windshield! These windshields, for open cockpit aircraft, can be made of $\frac{1}{16}$ " plexiglas using the following technique. First, cut a card stock pattern to the shape desired and fit it to the fuselage, as shown in Figure A. Using this as a pattern, cut a piece of .015 aluminum and a piece of plexiglas to the same shape. Next form the aluminum to the final shape desired (Figure B) and fit it to the fuselage. The aluminum can easily be formed with the fingers. Now place the aluminum form in the plexiglas on your wives cookie sheet and place in a 350° oven.

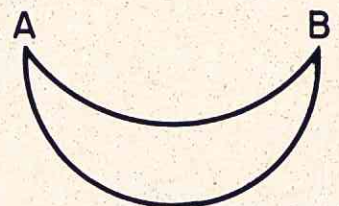


FIG. A

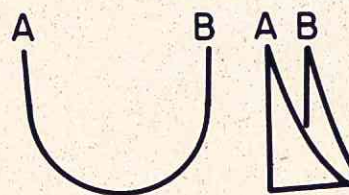


FIG. B

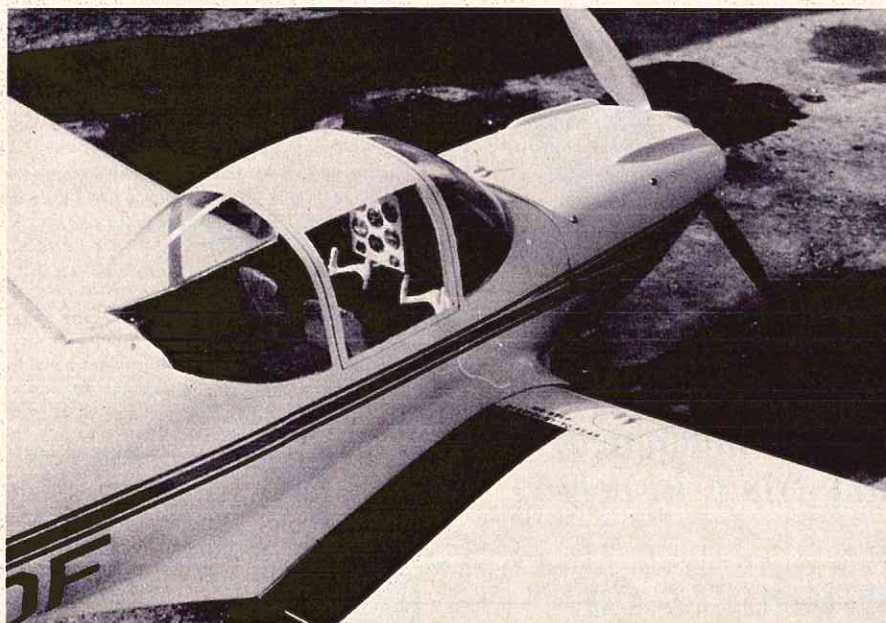
When the plexiglas becomes flexible, use a spatula to place the plexiglas inside the aluminum form. Keep the plexiglas in the oven for a moment more to be sure it is fully settled in the form. Then remove from oven and allow to cool. After it is cooled it should easily slide from the form. All that remains is to seat the plexiglas on the fuselage by taping a piece of sandpaper to the fuselage and drawing the windshield over it until it fits smoothly. The windshield can then be epoxied to the fuselage.

KITS & PIECES

BERNIE MURPHY and DICK SONHEIM



Alon Aircoupe, built from Stafford Kit, getting scale points at Valley Flyers Contest.



Interior scale detail of Alon Aircoupe as built by Earl Harding.

It has been a long time since I sat down to write this column. Where to begin? First, with my apologies to the many readers who took the time to write inquiring about my return, and second with many thanks to Dick Sonheim for filling in and keeping the column alive.

As you read this, the 1970 flying season will be in full swing, but at the time of this writing, the first hint of Spring is just beginning to show...that first sunny Sunday afternoon when everyone shows up at the field to try out the new ship built over the Winter months.

We spent the afternoon at the field with an old airplane and a new radio. The ship is our three year old Top Dawg (Kits and Pieces, July '67), but the radio is the latest Kraft system—Series Seventy, with the ultra miniature KPS-12 servos. With three servos, receiver and battery, the total weight of the ship was 2 ounces less than with galloping ghost! And with non-flapping surfaces, it flies like a new ship! Nine year old son Don (no relation to F.L.) had a go at it via the "Buddy Box". This "Buddy Box" concept is about the greatest innovation that has happened to this hobby in a long time. I figure that Don "crashed" the ship no less than 25 times during the course of the day—yet a last second switch of control saved the ship each time, and after 10 flights it remained intact. It seems reasonable that he should be able to learn to fly without the usual series of crashes.

★ ★ ★

Some of the kits which we are planning to review in the future include: Top Flites R/C Nobler, VK's Cherokee Babe, DuBro's Sea Bird, Heathkits Spectre (R/C Car) and One Design's 3½ H.P. Moppie Boat. All of these have received initial inspection and appear to be excellent. The Moppie is complete and was run most of last year with great success.

★ ★ ★

Jack Stafford has been producing some excellent kits over the years and he's most noted for his Minnow Formula I racing plane. The Minnow has probably won more Pylon races during the last season than all other models put together. Recently, we received a kit of Jack's new scale Aircoupe. One of the better builders in the Southern California area, Earl

continued on next page



Earl Harding with completed Stafford Alon 'Aircoupe'.

Harding, was asked to build the kit and let us know his opinions of it. It might be of interest to some of you modelers that Earl was able to complete this scale kit in just over two weeks time. The following are Earls' comments on the kit:

The Alon "AIRCOUPE" is the newest in the Stafford line of kits, built to a scale of 2.1 inches to the foot. The particular "AIRCOUPE" that Jack chose to model is the ALON A2 version, all-metal type. With a wing span of 63 inches and a length of 41 inches it's a nice sized model, particularly since .45 to .50 power is adequate and recommended.

After moving the furniture out of the way I opened the box and the plans. I was a bit taken back when I found no full size fuselage drawing on the plans. Having built a couple of Northwest's 10c gliders without plans, however, I pressed on. In the Forward of the 10 page instruction book that's provided with the kit, Jack suggests this model for the "Novice or Sunday Flyer" to break into scale modeling and flying, all this done at the urging of Woody Woodard. I don't classify myself as an out and out Novice but Sunday Flyer I'll own up to, so let's have at it.

Construction is commenced with the wing and here we had better follow the instructions because there is 3/16" washout in each wing panel. True, this is a departure from the

standard trainer or pattern aircraft in R/C, but if you do it like it says in the "book", you'll come out just fine. I did edge glue the wing sheeting together before application to the wing (using the masking tape method), as I think this is an easier way of getting tight joints. Using contact cement to secure the sheeting to the wing ribs and spars, the construction at this point really moves along. The wing tip shape is a bit unusual and is really good looking. Don't panic and say that balsa will not take that shape, it will! Just follow the instructions Jack sets out on page 3 and "... go ahead and do it ...".

The kit that I had was short two 2" x 3/32" balsa sheets to complete the wing skins. Jack has been informed and it is safe to say that corrections are being cranked in. I would suggest that the short lengths of dowel needed in the wing hold down (up?) system be included in the kit. I had some on hand, and it was no problem, but it could be a cramp to a guy out in the middle of nowhere!

Let's rush on to the fuselage. I have some advice here for the novice builder... take your time, follow instructions, and continually check to see that you're not building a "banana"! This is the only real danger of building a fuselage in the air as the AIRCOUPE is done. All of the pieces fit, and you'll go through a roll of masking tape rather than a box of

pins. You may think can't get there from here, but before you know it, you have a completed fuselage before your eyes, all done up in about 20 yards of tape with not one pin in it! I did not use the kit method of securing the wing. I prefer the 1/4" Nylon bolts to hold the wing down. (There we are again).

The tail group is a bit unusual, but it's one of the things that sets the AIRCOUPE off for what it is. I went a separate way here, but I did follow the kit's program far enough to see that it will work. I just had a "thing" about exposing the rudder tie rod, so I buried it in a groove dadoed out in the bottom of the stab with a Dremel Tool and covered it over with some 3/32" sheet. Yes, it is more work that way, but I felt it was worth it.

The finish up work such as the canopy (which is huge by the way), landing gear, cowl, etc. - went well and as advertised. My model uses a Veco .50 mounted inverted (the plans recommend that you mount the engine as a "kind of" sidewinder) and a Micro-Avionics XL radio. I finished the model off with dope, Jap tissue, and acrylic lacquer. Sticky Mono-Kote was used for numbers and stripes, and some 320 wet or dry paper for wing walks dress it up a bit. I did not spend time with a cockpit or other "point" details, but you could go "gang-busters" on this one since almost all airports have an AIRCOUPE type

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around somewhere.

The biggest problem? Just the fuselage. Check your work continually to be sure you're not building some sort of "dress form". Personally, I would like to see the fuselage built upside down over the plan to assure it's being straight.

In the instruction book Jack suggests that the AIRCOUPE could easily be modified to an ERCOUPE or a MOONEY CADET, "— by adding a fast back faring and a single tail —". For those builders who are reluctant to try the twin tail set up, this may be the answer. Jack says he will make up detail sheets for the modifications if he gets enough requests. Here's my vote for this idea now — three scale airplane possibilities from one kit, AIRCOUPE, ERCOUPE, and CADET. I can't think of a better buy!

I would like to take this opportunity to comment on something else we all use, Tatone mounts. On this model I used a .45 to .60 size firewall mount. This unit fits the Veco .50 without a hitch, but why is it cast with the "down thrust" angle in it? This idea only works if the engine is mounted upright, assuming that you want "down thrust" to begin with. If the engine is inverted it becomes "upthrust" and if the cylinder is on the right side of the airplane, it become "left thrust". Why not just make it up zero-zero and let the builder take care of the problem of engine thrust?

Several months ago, in this column, we listed the names and addresses of a number of places where you could purchase a ready-built, ready-to-fly airplane. Since that listing, we have received many letters from individuals around the country who specialize in building custom aircraft. We recommend to those people who wish to advertise their services that they run an ad in the Readers Exchange section of this magazine. It was also brought to my attention by these individuals that it is very difficult for them to quote prices until they can determine from the purchaser to what extent the plane is to be finished. I recommend to all those who are purchasing a custom built model to spell out in complete detail what they expect from the builder so he can quote accordingly.

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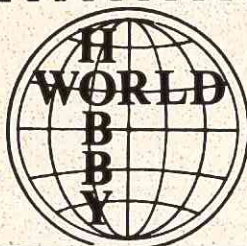
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ceived during the last few months. The first of these is Positive Identification Frequency Tubes. This consists of a pair of colored plastic tubes which fit over the base section of your transmitter antenna and identifies the Tx frequency. Tubes are available for all 15 R/C frequencies. We have found these tubes to be excellent markers, and prefer them to the flags since they stay put, and are not constantly flapping around — they also present a very neat and professional appearance. Available at your hobby shop or direct from Tony Bonetti, 161 Linden St., Hackensack, N.J. 07601.

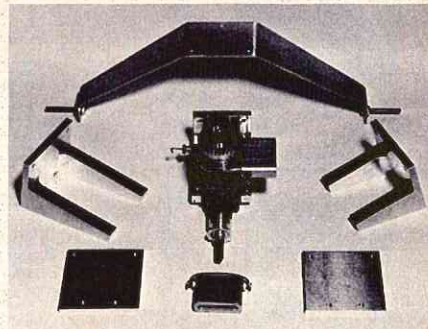
Another new item is the Min-X Audio-Tac. The Audio-Tac is an accurately calibrated sound source which can be used in determining the speed of a two cycle engine. In operation, the tone of the Audio-Tac is matched to the tone of the engine by varying the frequency of the oscillator by means of the front panel knob. When matched, the engine R.P.M. can be read on the dial of the Audio-Tac. As the Audio-Tac tone approaches the same frequency as the engine exhaust note, a pulsing will be heard. As the tones approach each other the pulse will slow and then when matched,

stop. This is the point where the R.P.M. reading is correct.

A unique feature of the Audio-Tac is the ability to read engine speed with your ship in the air, when your engine is really turning top R.P.M.'s.

Nelson Model Products, 1414 West Winton Avenue, Hayward, California 94545 now stocks both the wood and nylon Graupner propellers. The wooden version is similar to the maple prop sold in this country with the exception that the center hub is much thinner. Due to this one factor alone, these props will reportedly add several hundred RPM to your engine. We have been using the Graupner 11-8 prop for over a month with excellent results. The nylon version sells for \$1.35 each and the wooden props are \$1.50.

E.L.K. Electronics, P.O. Box 239, Milpitas, California 95035 is producing a complete line of precision machined engine mounts in firewall backplates. For the Formula I racing fans E.L.K. also produces precision made exhaust extensions and the C.B. carburetor with an airborne adjustable needle valve. These, and other top quality products from E.L.K., will soon be available from your local hobby dealer.



For those of you who have purchased a Heathkit radio control system and never got around to building the unit, or would like to have one of the well known Heath proportional systems but don't want to tackle the building job yourself, Transistor Specialists, 1801 West Main Street, Jefferson City, Mo., will build and completely test your unit for only \$55.00.

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required in the way of finishing is to simply spray or brush two coats of your favorite color giving a lasting and beautiful finish. The tensile strength of MYCO is 40,000 lbs. per square inch eliminating the necessity for spars. This material, which is similar to drafting mylar, is not affected by heat, frigid temperatures, raw fuel or any type of solvents. MYCO has been tested for a one year period on the East Coast with outstanding results. Covered with this material, your wings will withstand impacts that you would find unbelievable since the material bounces right back and retains its shape. If you wish to change the color of your wings, simply wipe MYCO with thinner, and off comes your color and the material is ready for another finish. To apply lacquer, it is only necessary to spray with auto primer first, although enamels are recommended by the manufacturer. Tested, approved and recommended by RCM.

Shore Hobby Supply, 62 White St., Red Bank, N.J., who recently acquired Angle Mini-Flite Co., announces the release of the all-plastic champion "PRO". This is the newest addition in their line of highly successful "Fly for

Fun" series, and like the other models, is 90% true scale. This little model closely follows the configuration of the prototype produced by the Champion Aircraft Co., manufacturers of the "CITABRIA".

The "PRO" features light weight, semi-symmetrical, plastic covered wings with full length spars and scale wing tips; a one-piece removable cowl; a fully assembled plastic fuselage with a bottom access panel; and pre-formed and plastic covered stab and fin with exclusive polyethylene core and "smooth outline" construction. The model is supplied in pure white and may be painted, doped or MonoKoted.

Hardware includes a one-piece welded cabane, formed landing gear, aluminum motor mounts, die-cut firewall and ply parts, cement and most nuts and bolts. A giant illustrated instruction sheet is supplied with each model and assembly is fast.

The wing span is 48", overall length is 33" and all up flying weight with standard gear, three servos and a .19 engine is only 2-3/4 lbs! The model is designed for single through three channel operation and will accommodate engines from .15 to .29.

The price of the standard version with pants will be \$34.95. Models are

available through leading dealers or direct from the Mini-Flite Co., 48 Princeton St., Red Bank, N.J. 07701.



Astro Flight Incorporated, 2301 Cheryl Place, Los Angeles, California has released their kit of the Fournier RF-4, a real beauty scaled after the Volkswagen powered ship Miro Slovak flew across the Atlantic. This is an easy model to build and to fly using only 2-channel RC gear in a .09-.10 engine, yet is fully aerobatic. With a light weight finish you will have a real thermal chaser and can get a thousand foot climb and a 6 to 8 minute glide. Fly for 15 minutes on 1 ounce of gas! For scale enthusiasts the RF-4 can be equipped with full-house radio equipment and a single retractable landing gear. Touch and go landings are spectacular on the single gear under-



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carriage. Span is 69 inches and the kit is of all balsa construction with plastic cheek cowl. Priced at \$29.95, the Fournier RF-4 is tested, approved and recommended by RCM.



Jet Line Products, Box 22, Bellevue, Tenn. 37021 has packaged 1 inch and 1-1/4 inch T-Pins in two separate accessory packages. The 1 inch length is ideal for pinning outside sheeting to wings, fuselages, stabilizers, etc. The slim shafts will not make excessively large holes in the wood that would need refilling when finishing the model. The longer length is suitable for pinning work to the workbench and the major hand assembly type of construction. Either size is packaged at .79 each. In testing the smaller size of the T-Pins, we found that it is not

advisable to insert these pins through material glued with any hard setting adhesive, such as epoxy, since the heads will snap off. They are, however, ideal for use with standard model airplane cements where the smaller size T-Pin is required.

Flight Line Products, 320 34th Street, Lubbock, Texas 79410, well known for their Performance Checked Kits in the control line field, has released their Skooter II, a 48 inch span RC multi which features a keel built fuselage with one piece, notched top to assure true alignment. Other kit features are a one piece, matched, machine shaped sides for perfect fit; precision shaped foam wing with one piece gear block; exclusive, new "Foamskin" wing covering, with self-sticking adhesive; all parts precision cut from the finest materials. The kit is simple, light, and strong with 4 to 6 hour assembly and can be built as a



low wing or shoulder wing with tricycle or conventional gear. The wing area is 480 square inches with a fuselage length of 38 inches. All up weight is 3 1/2 lbs. for .19 to .40 engines.

For a change of pace, you might try the new Astron Sprint by Estes Industries Inc., Box 227, Penrose, Colorado 81240. For experienced rocketeers, this new product gives a unique opportunity to build a high-altitude competition model. Designed to give the highest performance in its class, the Astron Sprint incorporates the most efficient aerodynamic shapes for the velocities it will encounter. Use one C6-7 engine and that sleek bird will soar to altitudes nearing 1600 feet. While thrilling the advanced rocketeer who is looking for tops in performance the Sprint will also appeal to the beginner who wants a kit he'll have an easy time putting together. The kit is priced at a modest \$1.75 and includes pre-cut fins and tail cone, two color emblem decal, plus one color trim decal and complete illustrated assembly instruction sheet. Engines are not included.

See you at the field!



NEWSLETTER AWARDS

(continued from page 42)

painful search for flying know-how and skill, as well as their moments of success and triumph... It also traces development of the club, reflecting its collective wisdom and foolishness... Very often in the desire for an immediate goal such as flying, we focus solely on that goal and forget about keeping a record. And so there's sometimes an impatience with those who speak of newsletters and such, a tendency to give it low priority for expenditure of time, energy and funds. It's natural to do so, and we do, feeling memory will serve us in good stead as a record. But ah! we soon learn vital details and essences that spell life and meaning and accuracy are soon lost. We argue about past dates and who did what... or how it was done... To convince yourself spend a couple hours going through your club's N/L file if you're lucky enough to have a complete one, and see how many of the good details have slipped from a fallible memory...

"Happiness", the Greeks say, "is the exercise of vital powers along lines of excellence." With the effort of a growing number of newsletter writers, the "exercise of excellence" — that is, the flying of models and the sharing of that experience with fellow fliers — will not be lost because we took time to record our moments of happiness in this fleeting life...

WRAM'S CONFERENCE

(continued from page 38)

equipment and planes that are setting the trend for the 1970 season, let it suffice to say that the equipment shown at White Plains is smaller and about as "shrunk" as it is going to get. There is also a very obvious trend (that's the wrong word, landslide is better!) to ARF's of all types, and believe me, the "state-of-the-art" is progressing at a fantastic pace! RC cars

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are really coming into their own as illustrated by the growing number of manufacturers who are entering this facet of our sport, as well as the crowd around the car booths at White Plains. "Instant" coverings and finishes are also really taking hold.

How about models? Well, let me tell you about scale since models in this category far outnumbered all other types at the WRAM's Show. What was considered to be an excellent model just a short year ago could be way down the winner's list this year. The competition is getting absolutely fierce. Walt Moucha's Fly Baby is a good "for instance" — 3" to the foot scale and built directly from Pete Bower's plans for the full size aircraft, and complete right down to the scale construction which utilized

metal trailing edges and plywood sides. I forgot to ask Walt if he even used plywood ribs per the original also. Lou Perretti's Albatross was an exact duplicate of Von Hippel's machine including working fuel gauge and a scale and operating seat harness. Lou's Eindecker features roll control via wing warping per the original. Pattern, sport and Goodyear's all exhibited an attention to finish that is unbelievable. Today's ultra reliable radio equipment, of course, keeps planes around longer than was possible just a few years ago and makes the extra effort worthwhile.

All-in-all, the 1970 Eastern States Jamboree was well worth attending and I'm sure is being looked forward to in 1971 by manufacturers and modelers as well as the general public.

FAN PIPER

(continued from page 30)

reference line for construction and also the center line of thrust. Cut ribs No. 2, 3/8 inch below θ -line. Cut ribs No. 3, 5/8 inch below θ -line and save the rib bottoms. Set all ribs on the plan using blocks under R4 and 5 and triangles to hold them true and steady. Next set the top main spars on the ribs and mark and cut in the slots for the spars. Be careful to make your cuts parallel to the spar and true vertical. If the spar slots are cut properly, the top of the spars will just lay flush with the

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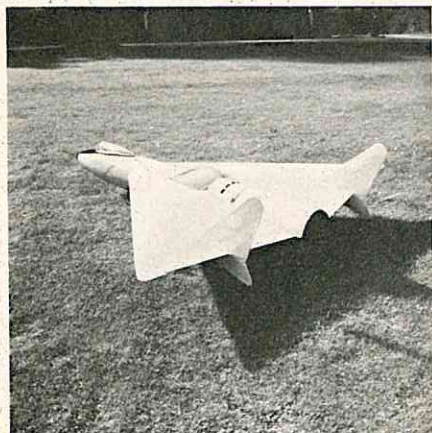


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ribs all the way to the tip rib. The spars butt to the tip ribs. The same holds true on the bottom spars. Center mating ends of spars are beveled for a good butt fit. Cut the nose of the ribs so that the bottom face of the leading

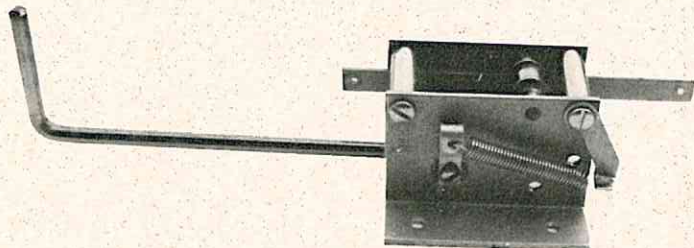
edge is on the θ -line of all ribs and then install. Install the top false ribs and later the bottoms; these can be eyeballed to fit. Bevel all ribs on top, and later, on the bottom edges, from the leading edge to the main spar so that the wing skin will lay flat on the rib edges. Glue on the rear spar.

Cut out all fuselage bulkheads from 1/8" sheet medium balsa. Cut F 6,7 and 8, 1/8 inch above θ -line and glue the top halves to the crutch. Put the bottom halves on θ -line and set aside. Pin the top halves of F 1,2,3,4, and 5, to the plan using triangles. Plank two 1/4" x 1/8" balsa strips, one on each side, from F1 back to the wing leading edge, laying the edges of the strips flat on the plan. Plank the second row 1/2" x 1/8" all the way back to the main spar. After the glue is dry remove all

the nails, pins, etc. Now you can put the frame on a large table or bench if you don't have a permanent set in your back by this time. Plank the rest of the fuselage top. Turn the frame over and install the stiffener web, glue on the rib and bulkhead bottoms, if you can find them in the mess, cut and glue in the bottom spars and the false ribs. Install the engine mount including stiffener blocks and solid 1/16" ply nose wheel doubler bulkhead. Dope the complete engine, fuel tank, and servo areas with at least four coats of fuel proof dope. Install the steerable nose gear and NyRod and nosewheel brake cable or wire, if used, also the fuel tank and vent. I used a 500 cc plastic hip pocket whiskey flask with a clunk type feed. Pad

(continued on page 70)

CAS RETRACT GEAR

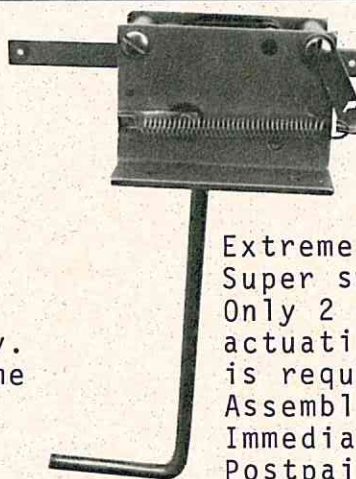


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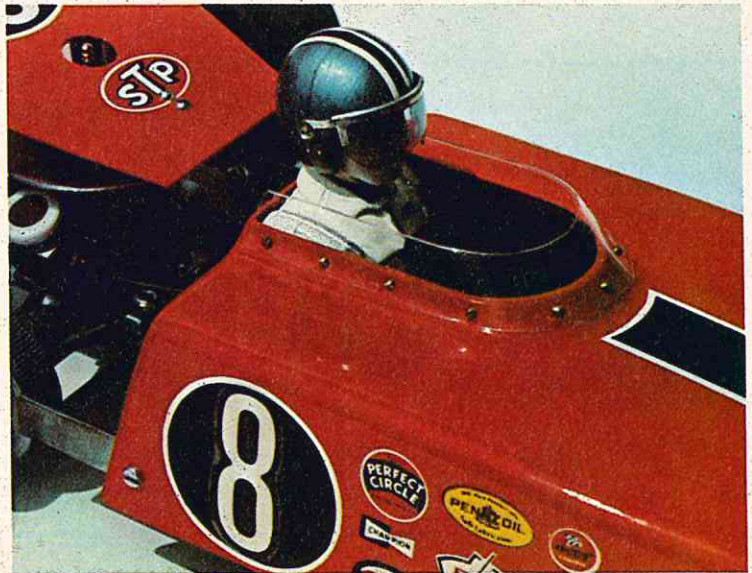
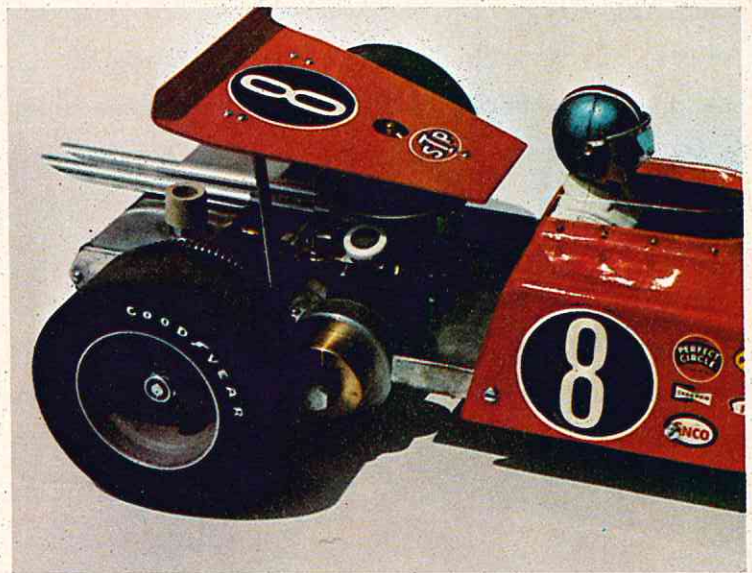
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MAGIC MULTIPLIER

BY GUS MORFIS

Some problems loom up immediately when you decide to go into flying scale. Deciding on the prototype and what size the model should be are only two of them. After you have made your prototype selection and established your scale, you are left with the problem of making your drawings.

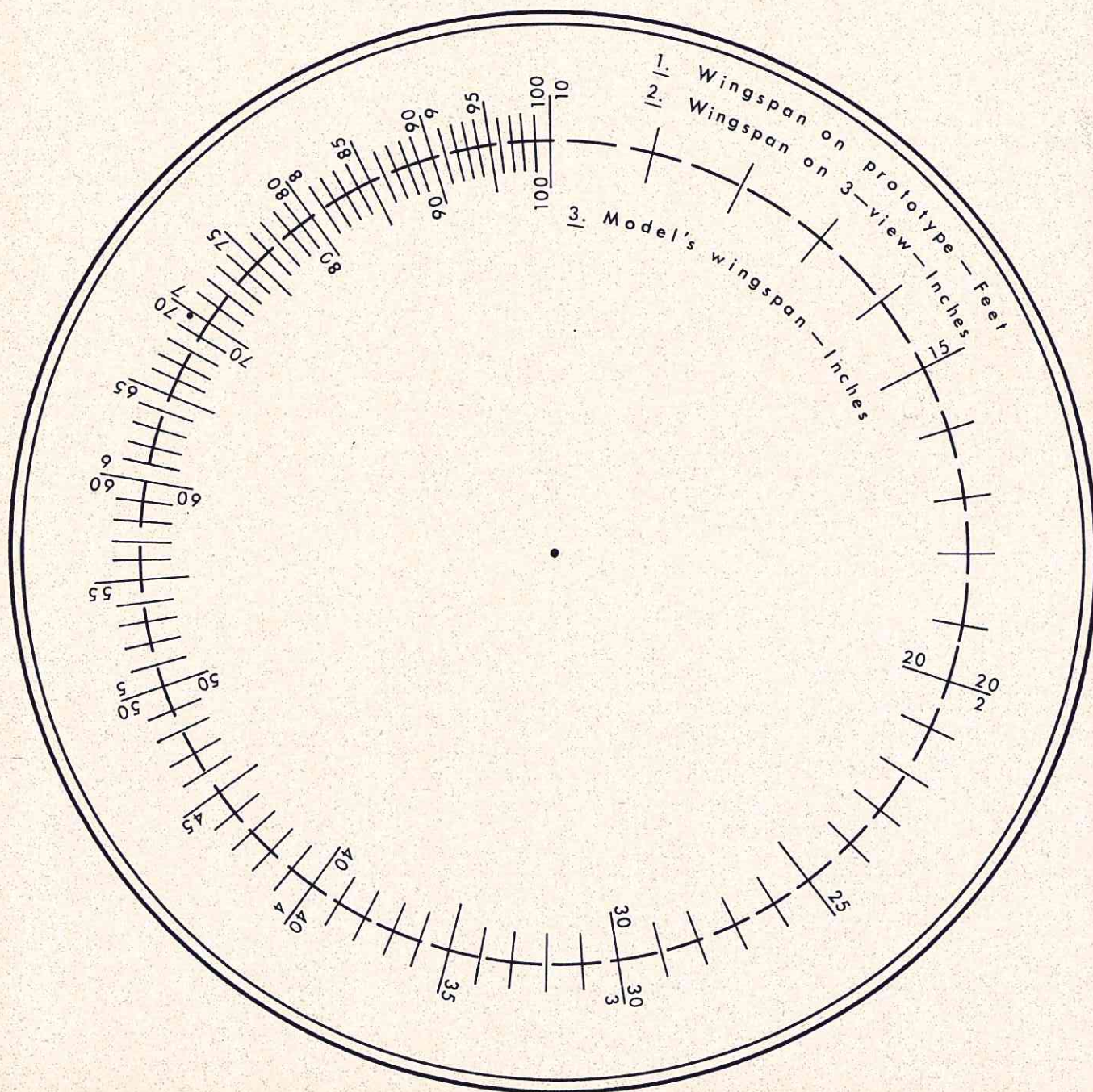
If the drawings you will work from

are an even submultiple of the size you want to make your model, you have it made. All you have to do is make your drawing four times as large, or whatever it works out to be in your case. However, if your luck is like mine, your 3-views are 3.7 inches wingspan and your model's wingspan works out to 59.5 inches, or some other strange

combination.

The device I have illustrated is nothing more than a circular slide rule, shorn of all auxiliary functions and complexity. It will permit you to measure something on a small 3-view and read off exactly how big it is on the real plane or how big to make it on your

(continued on page 87)





SUNDAY FLIER

KEN WILLARD

Well, your letters are still coming in, telling me what you want in a beginner's R/C airplane. By now, the number of responses (up in the hundreds) is big enough for the analysis to begin. That's the way it always is; after a while, you have enough information to know what the answer is, and the rest of the letters confirm those that have gone before.

But the interesting thing about your letters is that you not only filled out the questionnaire — some of you had pretty strong feelings, which you expressed quite clearly.

Take the letter I received from Dennis Breene, way over there in Hong Kong. Dennis writes:

Dear Ken,

I've been reading your articles for a long time, and have been flying Radio Control for 3 years.

I disagree when someone says you should start with rudder only. I started with a rudder only plane and I think it is very discouraging. I flew (or tried to) 5 airplanes with rudder only before I got smart.

After that bit I got an O.S. 3 channel set and flew 4 or 5 airplanes. This was how I learned to fly Radio Control. Sure there were some crashes but not on every flight like it had been with the rudder only system.

Rudder only, in my opinion, is free flight with an occasional turn.

I now have a Logictrol 5 channel in a "Sun-Fli". I like to fly fast sporting low wing planes and I wondered what your opinion is of the "Flea Fli + 10", the "Aquarius", and the "III Perfection".

I plan on coming to the 1970 "Nat's" and I want to fly class III. The club I'm in has directors to teach A.M.A. Pattern Class 3 and F.A.I.

Sometime in the next two years I'm coming to your flying field. Could you tell how to get there from International Airport in L.A.

I will send pictures of my planes, our flying field and the club. The club I'm in (Hong Kong Model Engineering Club L.T.D.) is really great. We have 50 members, all Chinese, and an old Post War airfield that we rent for \$100.00 Hong Kong. In U.S. currency that is about \$17.00 a year! We fly every Saturday and have a ball.

Oh, I think about the best training plane around is the "RCM Trainer".

I have a subscription to RCM and I love it.

I'm 15 years old and wish you would answer my letter.

Yours,
Dennis Breene

P.S. I'm going to build the "Show Master" because I think it's great. s,

Dear Dennis:

Thanks for your letter. It sounds like you have a real active group of R/C modelers there in Hong Kong.

Your remarks on the way to learn to fly are very interesting. Of course you know there are some fellows who disagree with you. As a graduate of the "rudder only" progression system (when I was learning, all we had was rudder control!) I know the problems, and when we introduced the "kickup elevator" feature it helped to get the models out of trouble — but sometimes the pilots weren't able to use the elevator effectively and had even more trouble.

There's no question about it, though. If you have full controls, and an instructor, that's the only way to learn to fly. Without the instructor, no matter which route you go, you're going to have more than your share of crashes before you learn all the tricks of controlling an R/C model. Even full scale pilots have trouble, because their orientation is different. That's why I still think that the best all around trainer is a basically stable sport free flight design that will recover from any attitude (if it has enough altitude) and resume a normal flight position. Like you say — a free flight with an occasional turn, and the frequency of the turns can be increased as the self taught pilot gains confidence.

Boy, would a lot of R/C clubs give their treasury a shot in the arm, and also the club morale, if they could get a chance to rent a whole air field for \$17.00 a year! Hope you fellows realize how lucky you are.

Both Don Dewey and I appreciate your loyalty to R/C Modeler Mag-

azine, and we'll try to continue to earn it.

Another letter that had an unusual idea came from F.J. Charavay up in Rapid City, Michigan. He writes:

Dear Mr. Willard:

Your monthly RCM articles have great interest for me. I entered my last contest (F.F.) in 1938 or so —

I started RC with reeds and had my share of controlled crashes. At the time I was racing full scale sailboats — consequently had one of the early RC sailboats — and that taught me R/C flying.

I guarantee anyone that can steer a boat through a simple slalom course — in any direction and no "wrong turns" will make a lot less balsa splinters.

The boat could be as simple as a piece of foam — glo or electric power — so long as there is enough speed for positive control — radio can be anything even single channel so long as it's stick controlled.

Seems to me that after directional control becomes automatic, the rest is easy.

Sincerely,
F.J. Charavay
Rapid City, Michigan

Now it never occurred to me that learning to control a boat would be helpful in learning to fly an R/C plane. The big difference, as I see it, would be that when you turn a boat, it turns. But when you turn an airplane, it not only turns but the nose starts to go down unless you can feed in a little up elevator — or unless you make the turn so very gentle that the nose down effect is kept to a minimum.

Yet I've often said that modelers who fly control line before they go into R/C have at least some advantage in that they learn to "keep ahead of the model" as they control it. They, however, don't have to worry about rudder. So maybe by learning to keep ahead of a boat in the turns, where you don't have to worry about elevator, could be helpful at that. Anyway, it's a mighty interesting variation to this always interesting sport.

And speaking of control line, here's a letter from a modeler who went back to it after a fling at R/C. Olin Williams, Jr., of Carrollton, Texas, writes:

★ ★ ★ ★ ★

Dear Ken:

Having just re-read your "Sunday Flier" article in the Feb. '70 issue of RCM, I couldn't resist the urge to write, greatest problem is: I have so very much I would like to say, but my time, paper, and your time, prevents such!

As things stand now, "I was an ex-control line flier, now ex-R/C-flier??, returning to control line scale building and flying"!!

My model building began back in the 40's, with many interruptions — like 11 years in the Army —

In '67 & '68 the R/C bug "bit me". At the very first a fellow worker at Braniff Airways told me, "If you can't afford the best, FORGET IT". I should have listened.

Before I go any further into this, please don't feel that I'm criticizing you, or R/C Modeler. Overall, I'm telling things as they happened to me — only —.

Your "Sunday Flier" articles gave me the needed encouragement, so I got "Testors Sky Hawk", with which I had my share of problems. I wrote to you and said, "Yours flies beautifully." To make the Skyhawk story short — I threw it away, plane, Tx., Rx., and charger — that hurr more ways than one.

Then I purchased a Min-dual pack, fast pulse, and had a fair amount of good luck. I tore up several planes by glitches and pilot error at the panic button.

I do feel that it really helped me in learning to do a 360 around the pea patch.

One disappointing thing was, not too many of the "Old Pros" at a nearby R/C flying site wanted anything to do with G.G.. Two or three went all out in helping, especially with my "Tauri, O.S. .35 powered Ghost". It looked and flew nice, but everybody said to go Propo.

Considering my large family I again bought what I thought I could afford, Heathkit GD47.

True, I had a ball building the Heathkit, now what do I put it in. Again a fellow Braniff worker (a pilot) came to my aid. He had a well-used Lanier Comet and Webra .61. Again I had the usual 'nervous jitters' on the stick, but got the thing around fairly well, except landing, as it was too heavy.

Finally, one day, trying a go-around, I hit full throttle, the ship snap rolled, and it was time for more planes and more problems.

I'd say around 50% of problems are me. The other R/C fliers at the field claim I need a lighter radio set — E.K. or Kraft, as the heavy Heathkit and Webra increase the wing loading. Probably I should have built a "Headmaster", put in 3 channels and my Veco .19 B.B., but again I guess that would be heavy.

So now off in a corner of my work room sits a good Heath radio with 5 servos, a fair Webra .61, and 50% completed "O.K. Navajo". The Min-X I was able to sell for \$50.00.

Frankly I believe R/C is the very most if you can afford it, and may some day finish the Navajo, or build a Headmaster, but until then I'll fly control line, and enjoy that. I'm sending my thoughts on your questionnaire to RCM.

Sincerely,
Olin Williams
Carrollton, Texas

I can sympathize with you, Olin, but my prediction is that you've been bitten by the R/C bug, and sooner or later you'll pull out the Navajo, put in the gear and the Webra, and try again. I've seen too many modelers "quit" only to succumb to the temptation again, and eventually they get enough experience and stay with the sport. You will, too. If it's any consolation to you, or to any other R/C beginner, I can recall totalling out at least five airplanes when I first started flying R/C. And I've busted up several more as I experimented with different designs. It's all part of the challenge of the sport, and although you may back away from it temporarily, you keep coming back until you master it.

One of the most useful letters that I received came from Bruce Bentley of

Springfield, Massachusetts. Bruce writes:

Dear Mr. Willard,

I've just finished reading your column in the Feb. issue of RCM, and just had to write this in regards to Mr. John R. Ott in Lafayette, Ind.

His cry for help rang a familiar bell. Six months ago I, too, felt the bite of R/C model aircraft. My experience of 15 years back parallels Mr. Ott's, control line and free flight. So, for what it's worth, here's how I went about finding out what makes this sport tick.

First off, I knew no one involved in R/C, so I purchased all the magazines I could that had any articles on R/C. These included current and back issues of RCM, M.A.N., F.M., A.A.M., to start with. As I read these, I began to realize just how little I really knew about R/C. "Ghost", "Pulse Propo.", "Analog", "Digital", "Glitch", were all new and meaningless words to me. However, in these magazines were advertisements for (5) different (magazine books) that really shed the light on modern day R/C.

To anybody who is in Mr. Ott's position, or even the rank beginner, I highly recommend the following books as a must reading!

(1) GETTING STARTED IN R/C by Howard McEntee. Available from American Aircraft Modeler, 733 Fifteenth St., N.W., Washington, D.C. 20005. PRICE: \$1.25.

(2) MODEL PLANE BUILDING A TO Z. Available from Flying Models, P.O. Box 2576, Palos Verdes Peninsula, California 90274. PRICE: \$2.00.

(3) R/C PRIMER 3RD EDITION. Available from Kalmbach Publishing Co., 1027 N. Seventh St., Milwaukee, Wisconsin 53233. PRICE: \$2.00.

(4) PROPO PRIMER. Available from Kalmbach Publishing Co. PRICE: \$2.00.

(5) HOW TO BUILD R/C MODELS. Available from Kalmbach Publishing Co. PRICE \$3.00.

These books are available in some hobby shops so it may not be necessary to go through the aggravation of sending for them.

Also, in the monthly magazines, are the listings of model airplane meets and their whereabouts. A two or three hour drive to one of the local meets is well worth the time spent. Invariably you can meet someone from your own locale who is involved in R/C. From the first person you get to know others, find fields of clubs and non-clubs that you never knew existed, and your new found world increases in leaps and bounds.

As far as models and the equipment to use in them, this is up for grabs. There are too many variables here. However, my opinion is an aircraft in the 4-6' range as good visibility in the air is of prime interest, high wing (cabin type), large wing area and light overall weight (4 to 5 lbs.).

Radio equipment, again, involves too many variables. Money is the big one!

My choice was the new Heathkit. I had no problems assembling this unit and it works well so far. (Plus the availability of 5 channels).

The "experts" in this area advised me to start with a single or multi channel trainer type ranging from a School Boy to a "Livewire" champ by Debolt.

Needless to say, being independent in nature, and having a strong liking for Scale, I chose the Sig. J-3 Cub with a 71" span to operate on rudder elevator and motor control.

It has yet to fly as the weather here in New England at this time leaves a lot to be desired. But the first flight will be with an experienced R/C'er at the controls.

Well, I guess I've rambled on long

enough. Hope parts of this letter can be helpful to someone.

Sincerely,
Bruce E. Bentley
Springfield, Mass.

I frequently receive letters asking about books on the subject of R/C, and the listing by Bruce is about as good as any that I have seen.

Now for a couple of letters from two modelers still in their teens, but good men, both of them, for my money. Take Dan Gerard, of Lynnfield, Massachusetts, who writes:

★ ★ ★ ★ ★

Dear Mr. Willard,

I have just finished reading your article in the February issue of R/C Modeler. I am very interested in your help to the junior RC'er. I was a junior until I renewed my AMA license. I have filled the questionnaire out with both multi-proportional and single channel indicated because, at this time, I am trying to convince my parents to let me buy proportional. I have saved enough for two Kraft sets but they told me to save it for college. My father thought that I might change hobbies after I bought a Robot and Mule by Controlaire. Last week I bought a motor control for it and showed them that I was progressing in the hobby. I need some suggestions, on how to convince them to let me buy the unit. I am in desperate need of suggestions.

The article is very good because this would give the early flyer a chance in getting the first plane up into the wild blue yonder. I have a bit to say about the juniors who say that they don't know where to get the green stuff. I went to work when I was 15, last year February 23. I worked as a dishwasher putting dishes on a machine and received \$1.65 an hour. Every Friday and Saturday night I went to work. Then I got a raise to \$2.00 per hour. I am trying to tell you if you didn't understand this letter that the kids who say they can't raise the money just don't want to bad enough. They just aren't ambitious enough. By the way I am now sixteen and fly nothing but single-channel R/C. I bought an Enya .09 with a Midwest Bonzo for the new motor control. Do you think this will be overpowered?

Sincerely,
Dan Gerard
Lynnfield, Mass.

With the kind of determination and perseverance which Dan shows in working to get what he wants, I predict he'll eventually wind up as one of the country's top multi flyers.

The other letter came from Rich McKee, at Fort Benning, Georgia. Here's what Rich sent:

Dear Mr. Willard:

I am writing to tell you what a wonderful man and modeler Major Pete Rawlings is. When I was 13, his son Scott invited me to a contest. I had about 90 dollars saved up and Major Rawlings decided it would be best for me to buy a Testors Skyhawk. He taught me how to fly it and on the third flight I soloed. That weekend I put 11 flights on it. A good friend of Major Rawlings is Col. Jacobson. He had an old Ariste Cat that he gave me. Major Rawlings let me use an old DeeBee Radio and a .56. I had been saving for a new 4 channel. That Christmas I got a

(continued on page 82)

PIT STOP

BY DON DEWEY



Contestants with their cars at the St. Louis R/C Car 1st Annual. Left to right, Front row: P. Scherer, R. Moody, J. Haines, D. Powers, Ed Hughey. Back row: J. Baxter, D. Palmeter, J. Lane, G. Campbell, Bob Dye, B. Campbell.

With the 1970 auto racing season already underway, we can look forward to a year that will go down in history as the one that marked the true beginning for this exciting sport. Although a great deal of the "fine tuning" and engineering will come about in the coming months and years, there are currently six manufacturers producing radio controlled racing cars, and at least 4 radio manufacturers who are in the process of developing and producing radio systems designed especially for our usage. In addition to this, there are a number of manufacturers producing various Indy, Formula, and an assortment of

GT-Can-am type bodies as well as car accessories. Each day more and more racing enthusiasts are joining our ranks from both other areas of modeling as well as from the general "non-modeling" public. With this in mind, the RCM Pit Stop section has planned a series of articles on how to get started in auto racing, in addition to keeping you abreast of the latest developments in new products, racing and driving tips, race coverage, as well as feature construction articles for RC cars.

Before we write off 1969 as "past history", we'd like to present a report by Frank Broach on the St. Louis RC Car Club first Annual race, held in the latter part of the year.

Twelve enthusiasts with 16 of their prized cars gathered on an overcast Sunday and proceeded to spend the day racing — or trying to race. One of the largest problems last year seemed to be reliable equipment. Beautiful scale bodies, as well as steering servos, just didn't stand up to the not-so-scale loads encountered in the heat of racing!

Since the RC cars were in their infancy, every effort was made to allow those drivers present to get their cars in running condition. After this, the driver was allowed approximately 5 minutes familiarization and then the time trials commenced. While the latter are important to the contestants, they do not offer the maximum in excitement from the spectators viewpoint. The actual racing consisted of three events; Slalom, Road Course, and Oval. The Slalom was laid out to

the original R.O.A.R. specifications and is a race against the clock. The winners were B. Campbell, 28.1 seconds; D. Powers, 28.4 seconds; and R. Moody, 28.9 seconds.

The Road Course was laid out on a 100 foot square area but in such a way as to have two straights, one 90 degree turn, two hairpin turns, and one "S". The road racing consisted of fifteen laps around the course and was run in heats. The first heat was run with five cars. The second heat was run with three new drivers and two fill-ins from the first heat. This was permitted by gentlemen's agreement and, while it put considerable pressure on the less proficient driver — car combination, it assured everyone of competing with the best. The winners of the road race were R. Moody, 5:05.2; B. Campbell, 5:31.8; and P. Scherer, 5:50.3.

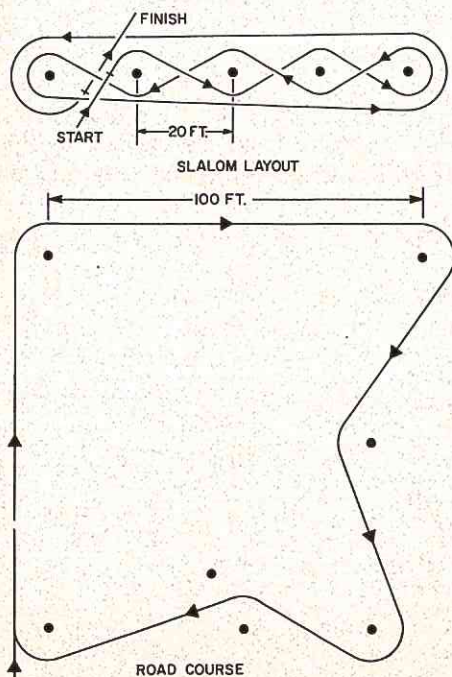
The Oval race was run using the extreme markers of the Slalom and this was also a fifteen lap event. The winners were Moody, 3:7.2; and Scherer and Campbell. Points were given for each event according to the order of finish — fifteen for first, twelve for second, and nine for third. The overall standing found Moody first, Campbell second, and Scherer third.

The Concourse de Elegance award for the best looking qualifying car was won by Joe Haines. The overall winner, Roy Moody presented a hard to beat combination of a good driver with a good, reliable car.

The 1969 contest would have to be considered a success and the St. Louis RC Car Club, the sponsors of the event, now have a dozen members and are interested in recruiting other interested persons in the St. Louis area. You can obtain information by addressing inquiries to the St. Louis RC Club, 4364 Selwyn Lane, Bridgeton, Mo. 63042. Please enclose a self-addressed stamped envelope.

FINE TUNING

If you're looking for an inexpensive lap counter, Walt Staff, Salt Lake City, Utah, suggests making them from the plastic counters normally sold for keeping track of your purchases at the grocery store. These counters cost about \$1.50 and when cut in half, make two lap counters. One counter will be from 0 to 20 while the other is from 0 to 10. They work exceptionally well, and can be quickly made according to Walt's sketch. Fill in the cut ends with scrap balsa and paint. The center section is lost in this



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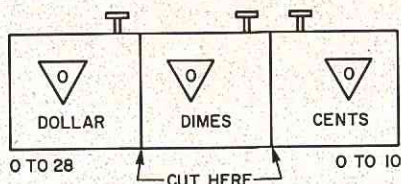


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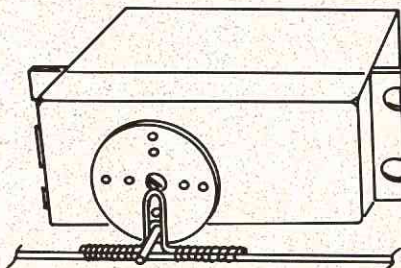
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process, but for less than \$1.00 each you have a reliable lap counter.

If you're using a rotary output servo, the idea of Ken Smalley's of Ossining, New York, will eliminate any "up-down" stresses on the servo or pushrod which can cause binding. This type of arrangement is only necessary

with rotary output servos such as the Kraft and Orbit units. The center pin in the rotary disc is a 2-56 steel bolt and nut which goes through the servo wheel. Insulate with inner NyRod tubing threaded on the bolt. The pushrod is a 1/16" music wire yoke. Bind and solder to the pushrod as per the sketch.



If you should crack an engine case around the carburetor housing, or if you strip out the carburetor hold-bolts, try Devcon Plastic Steel for repairs. Al Altemeier of Los Angeles, Calif., has an O.S. .19 which has had over three gallons of fuel through it since repairing it with this material and there is still no sign of fatigue. Be sure to clean the surface well and allow 24 hours for complete cure.

Although the proper method of painting your car body will be the subject of a complete article in a future issue of Pit Stop, we have been asked by a number of car enthusiasts how we paint the trim areas and circles for the racing numbers without any paint bleeding into those areas. First, obtain a RapiDesign No. 140 Large Circle Template from your local stationery or drafting supply house. We then use the 1-7/8" circle template to draw circles on the back side of adhesive backed contact-type shelf paper. These are then carefully cut out, the backing paper removed, and the shelf paper "circles" affixed in position over your base color which

has previously been sprayed on your car body. The final color is then sprayed, and when the paint has had a chance to set up, the shelf paper circles are removed. The result is absolutely perfect circles with no underbleed. This contact type shelf paper can be used for any type of simple or intricate masking design and is safe for use with dope, acrylic lacquer, enamel, or HobbyPox since it is a low tack type of material that will not lift the paint underneath.

John Munroe of San Mateo, Calif., suggests that you obtain a small memo timer costing about \$3.00 and affix it to the top of your transmitter case with silicon rubber. After you have run your car enough so that you know the duration of a tank of gas, you can set the timer so that it will buzz when your fuel supply is nearly depleted. For endurance type races, this will allow you to make it to the pits without coasting to an embarrassing stop in the middle of the track!

Here's a method I, personally, use for making simple Slalom Pylons for our practice sessions. Take five large plastic caps from cans of spray enamel or dope, and spray them with a couple of coats of quick drying fluorescent orange enamel. This is available at most hobby shops or hard ware stores. Inside the plastic spray can tops, is a small inner plastic top which creates a slight suction which proves to be just enough to hold the caps in place on the ground even in windy weather. The fluorescent spray paint enables them to be seen quite easily.

THE RACING SHOP

Across the counter this month came a sample of a material called Sta-Fil manufactured by the Revere

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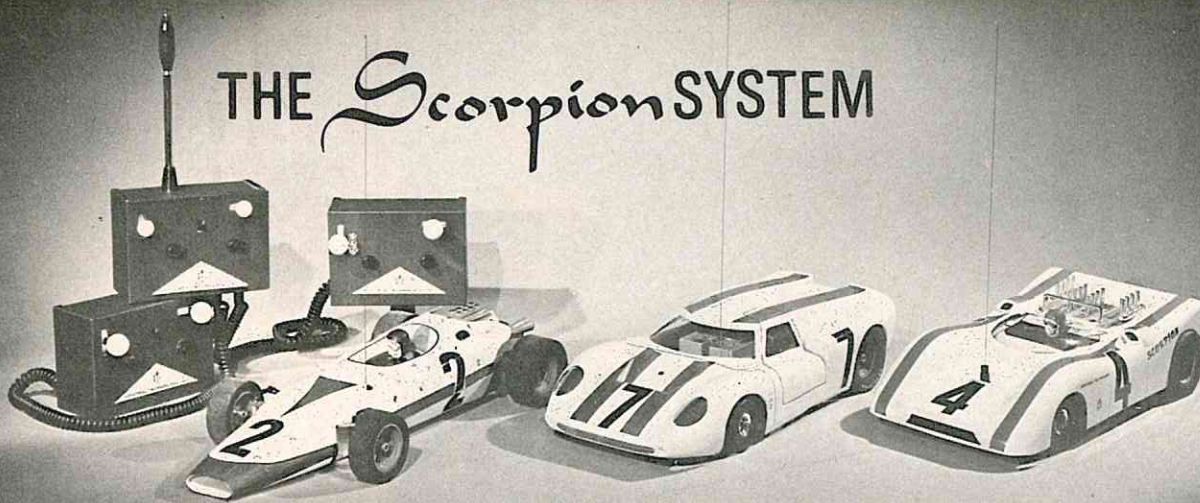
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Harvey's Hobbies, 338 West Lincoln Avenue, Anaheim, California 92805 has released their air cleaners for the following engines; McCoy .19, K & B .19, Veco .19, and the larger Veco .61 with Perry carburetor as well as the Enya .60. These filters are an absolute must for auto racing and are priced at one dollar each. Also available from Harvey's are satin finished aluminum exhaust stacks for use with the McCoy and Veco .19 sidwinder engines. These exhaust stacks are

mounted by a single screw that goes into the hole formally occupied by the exhaust butterfly restrictor hold-down screw. They are priced at \$6.95 and dealer inquiries are invited.

Since the RC car operates right on the ground and a lot of sand and dust finds its way into the air intake of the car engines, the result is reduced engine life and, even worse, sticking throttles. The Delta Air Filter eliminates both of these problems. The filter body attaches to the engine inlet with two setscrews and seals positively against an O ring. The filter element is replaceable or cleanable. This is an absolute must for the ultimate in reliability. No modification is necessary to your engines. If you are running a Veco .19, order the Delta AF 100 V kit which is priced at \$2.99. If you are racing with a McCoy .19, order the AF 100 M Air Filter kit, which is similarly priced. Additional elements for the air filter are priced at 49¢ for a package of four. If you are using another make of engine, the Delta AF 100 V is most readily adaptable by the home builder due to a slightly thicker aluminum wall section. Tested, Approved and Re-

commended by RCM. Delta Systems, Race Car Division, P.O. Box 754, Bridgeton, Mo. 63042.

The Screw Chek'r, an ingenious new tool, tells you the size and thread of any standard American or Unified screw from No. 1 through 5/16" quickly and accurately. It tells the size and number of wood screws, self-tapping screws, and shank diameters of rivets and cotter pins as well. Sturdy and attractive, the tool is 2-15/16" wide by 5-1/8" high and 3/32" thick, made of hardened steel and chrome plated for long, rust-resistant life. The Screw Chek'r also measures threads per inch and tapped drill and clearance drill sizes. It identifies tap series (N.C., N.F., or N.S.) plus basic diameter table and 2-3/4" scale for length measurements. In addition, it serves as a handy holder for screws that need filing on the head, slot, or end, and for straightening bent screws. The unit comes with a hardened cutter used for cutting size 10 and smaller screws to length. Price is \$5.65 post paid and it is sold by mail only from the Brookstone Co., 661 R Brookstone Bldg., Peterborough, New Hampshire 03458.



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FAN PIPER

(continued from page 59)

between tank and engine mount with sponge rubber.

Complete the bottom fuselage planking and cut the crutch away so that the engine fits flat on the engine bearers. Install an aluminum stiffener under the engine mount and bolt as shown on the plans. Align the engine in the mount, drill holes, and install the engine using Allen head bolts. With the duct installed, removal of the

engine is much easier with an Allen wrench than a screwdriver. I highly recommend an extension to the outside on the needle valve. This makes final peaking of the engine quit easy and extremely safe.

Trim the 1/8" ply disc to fit tight at the prop line and install on the prop shaft. Slide the duct over the disc into position and glue well to all edges touching the crutch. Make sure the duct is centered vertically and horizontally with the thrust line. Cut in and glue sub spars and stringers. Make the top and bottom vertical fins and install. Fill between the top and

bottom main spar with ¼" hard sheet balsa web as shown on the plan. I cut lightening holes in the filler web leaving an X-brace design. Glue on 1/16" ply doublers for the main gear as shown on the plan. Bend and install the main gear. Install 1/8" medium balsa wing tips. Turn or carve the nose cone from soft balsa and glue on F1.

Make control surfaces, sand to streamlined shape, and temporarily install it in place. Install the bellcranks and push-pull rods using clevis connectors and plastic control horns. Now remove the control surfaces.

Cover the top of the wing and, later, the bottom with 1/16" medium soft sheet balsa with the grain parallel to the leading edge. Center the bellcranks in neutral and mark on the servo rods where they come through into the servo compartment and cover the bottom of the wing. Trim and sand the wing tip and install the control surfaces with Super MonoKote or plastic hinges.

Make the servo hatch frame and plank with 1/8" soft balsa. Extend the fairing aft of the servo hatch right down to the rear crankcase of the engine and across the crutch. I used three dowels across the front of the servo hatch frame and a wood screw into a pine block glued under the aft center to hold down the hatch.

Mark and cut out the prop hatch with a razor saw. Now unscrew the prop nut and cut through the ply disc and remove. I used 3/8" x 1/32" ply strips glued to the inside edge of the duct as a ledge for the closed prop hatch. Be sure to dope and paint after installing the strips. Make two 1/16" piano wire hooks and glue on the aft corner of the hatch and just below on the duct. When the hatch is closed after starting the engine, a rubber band is wrapped around the two hooks on the outside to hold the hatch down for flight. I used Super MonoKote for a hatch hinge but it did not hold well so I later installed plastic control hinges which work much better.

I covered the entire model with Super MonoKote. It makes a beautiful finish and is very strong and lightweight, about 5 oz. total.

The canopy is a Sig 13 incher. Cut to fit and glue on the fuselage, then cut the fuselage ¼ inch below the canopy all the way around with a razor saw. Glue two pegs, or balsa strips, sticking out forward under the front of the canopy hatch. They slide in under the cowl and hold down the front of the hatch. Glue a 1/16" ply

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plate under the rear of the canopy opening, drill through the rear of the canopy and plate. Use a 3/4 inch long machine screw and blind nut to lock down the rear of canopy.

Mount the receiver behind the V of the main spar. I mounted the on-off switch behind the rear of the canopy and the battery in the cockpit for proper balance. The antenna is run forward inside the top of the fuselage and along the edge of the canopy and out through the nose. I used a piece of semi-rigid plastic tubing for the probe to hide the antenna.

Install servos. I highly recommend the servos be mounted on servo mounting tape. Mine were mounted on rails with the rubber grommets that came with the servos. This proved unsatisfactory due to engine vibration, at different engine speeds, raising heck with the servo feedback condensers and causing servo oscillations. The tape cured this problem and holds very well.

Rig the aileron and elevator

push-pull rods by aligning the marks previously made. This centers the bellcranks for equal travel. Center the servo actuators and fasten the rods to the servos. Lay a straight edge up under the last upsweep of the wing bottom and rig the ailerons 1/4 inch up (reflex) at aileron trailing edge, and the elevator flat on a straight edge. This was the magic setting on mine and, if the CG is right on, will fly the bird very nicely. The throttle is linked to the servo with NyRods.

I hand prop the engine with no difficulty. Tighten the prop with the blade at 1:30 o'clock on compression. Flip the prop smartly with a motion from 1:30 left and up to 11:00 o'clock using a good follow through. For the more "chicken" a small jar lid bolted behind the prop and a pull cord wrapped around the lid will also work satisfactorily.

Speaking of props, I mortised two 9/7 pushers together to make a four blade prop. Before gluing together, fit the props carefully and lay on a flat

surface to check that all tips track perfectly. If the duct is round and the engine set right, just a touch of sanding on the tips will give 1/16" tip clearance. This should give about an 8-3/4 to 8-7/8 diameter prop. A six blade 9/7 puts out about 4 lbs. of thrust as well but lugs the Enya down too much. With a powerhouse .60 to .80 engine the six blade should give performance plus. If wood pusher props are hard to find, the Enya and the Rossi rotation can be reversed. On the Enya, separate the front crankcase plate and rotate the plate 1/4 turn with normal engine rotation and reassemble. On the Rossi, rotate the back plate 1/4 turn with normal rotation. This will allow tractor props to be used in a pusher installation with a much wider selection of props.

Don't leave out the guide vane assembly. It is very necessary for strength and proper airflow. I cut rectangular holes in the leading edge of the prop access hatch to let in more air. The aft edge of the holes should be

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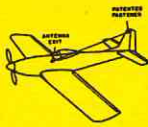
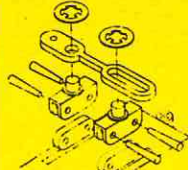
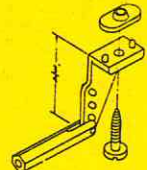





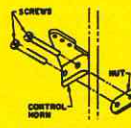
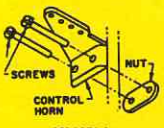
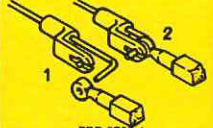








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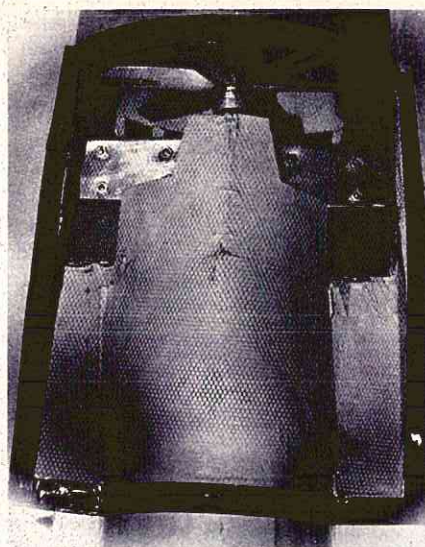
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about 1/8 inch forward of the prop line. The duct is tapered but the volume of air through it is constant. Be sure that the inside of the duct is as smooth as possible.

A 1/8" mesh nylon screen is used on the bottom intake. I used Super MonoKote around the edges to hold the screen in place. Glue a 1/32" ply, 1/4" wide doubler strip on the inside top of the duct leading edge and the same on the outside bottom leading edge, then dope and paint.

As a result of some unusual events, I subsequently met Capt. Peake. We had several long talks about models and D/F's in particular and since his "Banshee" article inspired this "flying stove pipe", as some have called it, and since he had considerable flying experience with his D/F Delta, I asked him if he would flight test the Fan Piper. He agreed, with great enthusiasm, and we set the date. With nerves on edge, (mine at least) we tried some acceleration runs. On the second run some loose rock was ingested thru the bottom intake demolishing the prop and part of the duct. This caused an on-the-spot modification to the bottom front of the duct to sort of even-up the jagged remains and actually resulted in a better intake opening.



View of bottom intake showing the aluminum stiffener plates, wood stiffener blocks, fairing, 1/32" ply tank area cover, and screen.

Later the screen was added to prevent further disasters.

On the first flights the bird took 3/4 to full back-elevator to rotate. This was due to the main gear being about 9 inches aft of the C.G. The gear was bent forward and extended to the position shown on the plan. This makes rotation and lift off more to scale and much less nerve shattering.

One thing is very important. Be

sure the wheels spin free and track true. Any wheel or ground drag will delay acceleration and greatly increase the ground run. On a calm day it takes about 250 feet to accelerate. At this point 1/2 to 3/4 back elevator is applied and, as lift off takes place, slowly ease the elevator forward toward neutral to establish a nice 10 or 15 degree climb angle. The plane will not stall and pitch forward from level flight. This is a characteristic of delta wings. It hangs in a nose high attitude with a high sink rate. This is called the back side of the power curve and should be avoided close to the ground on take offs and approaches. In this attitude though, aileron control is excellent.

For loops, a shallow dive to pick up speed is required, then up and over easy. Slow rolls are no problem. For an Immelman, start your roll as the top of the loop is entered, and it looks beautiful. For approaches on a calm day give it plenty of room. With power off or idle, the glide is very smooth with a nice angle. Caution: this plane does not have prop wash over the wing and control surfaces so do not rely on application of power to get out of trouble on a slow approach. This is just like a full grown swept wing jet, so keep a bit of power on the approach



THIS MONTH
IN THE SPOTLIGHT

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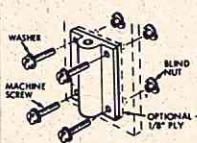


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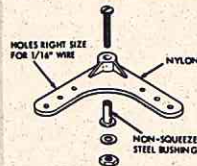
FITTINGS and ACCESSORIES

NOSE GEAR BEARING



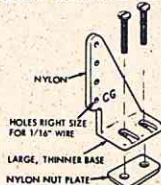
One-piece Nosegear Bearing mounts easily to firewall without alignment problems. If extra steering angle is desired, use 3/8" ply stand-off. Includes blind nuts, screws, etc.60¢

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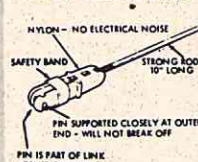
Control Horn has right size holes for 1/16" wire, and nut plate for simplest mounting to control surface. Horn is long for maximum range of throw; can be cut down. 50¢ for 2

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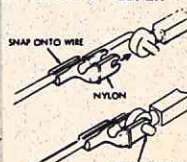
Ajusto-Link is used for adjusting linkage to control surfaces, throttle, steerable nose gear, etc. Nylon-tough and no electrical noise. Takes heavy load.29¢

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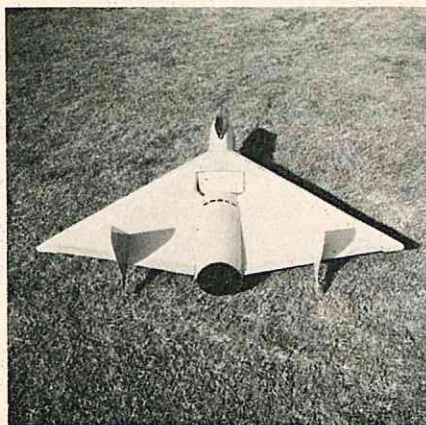
until you get used to the flight characteristics. Incidentally, the plane has been flown in a 15 M.P.H. plus wind and the stability in the gusts is excellent.

The Fan Piper, in the air, is a very rewarding sight and quite a show stopper proving that large D/F models are not as impossible as many people have thought. This field is wide open for the adventurous designer and builder. There are questions to be proven such as, multi blade propeller versus multi blade impeller. Blade number, shape pitch, and diameter for a particular engine size. Compressed volume versus constant volume, although I favor constant volume at this time.

Several things have been established so far. The spiral airflow from the prop must be straightened by guide vanes and the volume air flow must not expand in the duct. The duct must be as smooth as possible inside and straight through with no bends or curves. A propeller or impeller in the duct entrance gives the most thrust. The further back the prop is in the duct, the less thrust is developed. At this stage of the art, a tractor or pusher installation seems to have equal thrust capability.

One last note: 3-3/4 lbs static is minimum thrust for this plane. Be sure the engine is peaked at max R.P.M. before takeoff.

So, go to it. Build the Fan Piper or design your own. Join the poor mans' jet set. Good luck and good flying. ●



R/C GLIDER DESIGN

(continued from page 26)

of making the wing ribs taper. If you are an expert at tapered wings, then go this route, but if not, then use a

simpler planform. We will try and go into this tapered business, along with corresponding airfoils at a later date.

From chart #2 we can get a line on how big our rectangular wing will be with an aspect ratio of 10 to one. (Expressed as an AR of 10:1.) We find that the wing will have a chord of 8.3 inches and a span of ten times the chord, or 83 inches. This will give us a wing of about 690 square inches. When boiled down like this, it is a pretty big aircraft when placed alongside of a standard multi ship. Again, let me caution you that all figures are approximate, and they need not be any more exact.

If you want to build a tapered wing, with the end result of an aspect ratio of 10:1, and a finished area of 690 square inches, then let's make a few assumptions concerning the taper. First, the A/R is an average one, in that the span, divided by the average chord, will give you the ten to one relation. Very simply, if we have a root chord of 12 inches, and a tip chord of eight inches, then we would have an average chord of 10 inches. The root chord + tip chord divided by two. In our work, a taper ratio of about 60% makes for a pleasing looking wing. By that I mean that the

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tip chord is 60% of the root chord. We can plug all this information into simple math formulas and come out with an answer that will give us our wing. Let the root chord be X, the tip chord be .6X and we have $X + .6X = \text{Av Chord}$.

2

Since the average chord that we are using in our example is 8.3 inches we can find by our simple formula that the root chord is 10.4 inches and the tip is 6.2 inches. Couple this to our span of 83 inches and we have our tapered wing of 690 square inches. How much leading edge taper to trailing edge taper? Well, again, a pleasing looking wing taper will be with 40% of the taper at the leading edge and 60% of the taper at the trailing edge. As I've said before, what looks good will generally fly well, too.

If you want to work with other aspect ratios, and wish to do the mathematics yourself to get the finished product for say a 12:1 A/R then you can get these answers from this formula: Average Chord = $\sqrt{\frac{\text{Area}}{\text{AR}}}$. If you have square

root tables, or access to an electronic calculator, or can find square root on your slide rule, you're home free. Or, you can get one of your kids to remind you how to work out square roots!

With all of the above, we have finally worked out our wing planform for our glider. We have arrived at the size of the wing, both as to area and span/chord relation and, except for the airfoil, are ready to go on with the rest of the design. For now, let's skip the airfoil subject, other than to say that the best airfoil to use is a tried and true one. The Clark Y isn't bad. But, I want to save a deeper discussion of airfoils as well as controls for the next issue, cause old Skin Flint Dewey is going to accuse me of tying up all of his magazine space. Let's get on to the rest of our basic glider design.

TAIL SECTIONS

The horizontal stabilizer for a glider works pretty well at an average area of 15% of the total wing area. This is somewhat smaller than the elevator on our powered aircraft. As in the wing, the elevator looks better, and actually flies better if it is reasonably long and thin. An aspect ratio of 5:1 is a pretty good set up. Again, you can taper the planform of the elevator for a better looking surface. Work with the average chord to find the proper relation

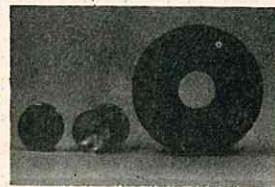
between the chord and the span. Table #2 not only gives you many combinations of wing area, chord, and span, but also has typical horizontal and vertical stabilizer areas shown, along with chords and spans on a 5-to-one ratio. The elevator portion of the horizontal stab should be around 30% of the total surface. A flying stab seems to give the best control in soaring, due to the elimination of drag caused by trimming the elevator, but the extra work of building a flying stab makes it seem a bit marginal to use until you settle on the design of your particular aircraft.

The vertical stabilizer should be larger than is generally found on most models. The reason is that the fuselage of most model gliders is relatively small. When the designer draws in the vertical stab he tends to make it scale to the fuselage. This tends to make a very undersized surface. The more nearly correct fin is one that is about 7.5% of the wing area. In this case, since the elevator is 15% of the wing area, the total fin area should be about one half as large as the elevator. It may look pretty large, but it will pay off in much better control of your glider. The rudder portion of the fin should be 50% or more of the total fin area. Again, much larger than you are accustomed to, but this control is definitely necessary, especially in slope soaring.

FUSELAGE

I've saved the discussion of the fuselage set up until the end, since it really is similar to a powered model. If you will examine the picture, you will find that the fuselage length should be about 50% of the wing span. It can be a bit larger or smaller. The nose length, or the distance from the leading edge of the wing to the tip of the nose is better if kept pretty long. And, it will help balance the glider properly. If you plan to use power, why not put it in the nose, rather than on a power pod up above the wing. There is far less total drag if you build it into the nose, complete with spinner. Generally speaking, the batteries, radio, and servos will probably have to be mounted in the nose section, rather than under the wing, due to the problem of balance. The tail moment arm should be between 40% and 50% of the total fuselage length. (The tail moment arm being the distance from the trailing edge of the wing to the leading edge of the horizontal stab.) The wing should be placed on the fuselage in such a manner that it rests

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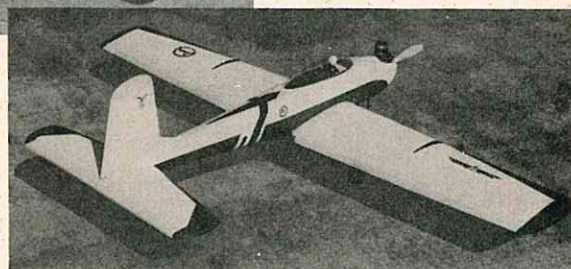
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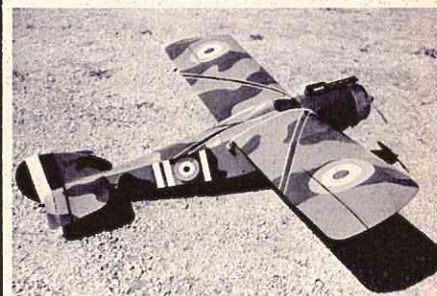


at about 4 degrees positive to the center line of the fuselage. The elevator line should be about plus 2 degrees. This set up will vary with various airfoils, types of flying, and wind conditions. You will minimize the drag of the air on the fuselage, though, if the line of the fuselage more nearly follows the glide path of the aircraft.

Next month I plan to delve into control systems, the use of ailerons as well as rudder, trimmable trailing edges, thermal seeking, airfoils, and in general, some loose ends that there wasn't time to cover this month.

Remember—keep the balance point at about twenty five percent of the wing chord. (Specialized thermal machines will require a more rearward C.G.) The dihedral should be between five and seven degrees in each wing panel. Dihedral is better than polyhedral, as it gives an aircraft that is more responsive to control, with a bit less built-in stability.

Good luck, and good flying. ●



MAD THRASHER

(continued from page 22)

the other side of the fuselage on, and wrap the whole assembly with rubber bands to hold it firmly in place while it is drying, and to make sure that the slight right thrust is maintained, while keeping all the other intersections square. Choose a piece of very hard 1/8" or 3/16" balsa for the floor of the tank compartment—it will lend a lot of strength to this area. (I hope that you remembered to sew the landing gear to the plywood former. If you waited until this state, you're going to have all sorts of fun getting it in there!) The entire bottom of the fuselage is sheeted cross-grain with 1/16" balsa. The 1/8" x 1/4" hard balsa tail post extends all the way to the top of the fin to double as a rudder post and to strengthen the rudder-fuselage joint. The top of the fuselage is spaced with the three

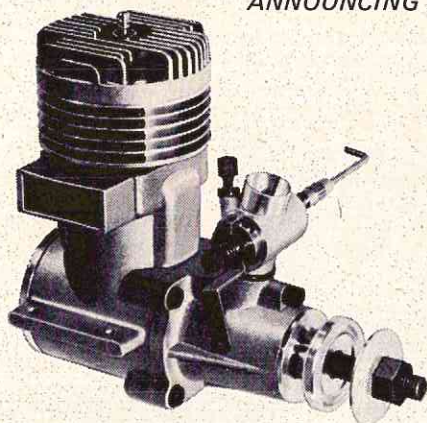


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formers shown on the plans, 1/16" square stringers put in place, and covered with Silkspan.

The rest of the fuselage is self-explanatory. Just put it on when you get to it.

The cowling is the cut-down top from a drink shaker. Simply cut off the rim and cut a hole in the center for the prop to stick through. From there on, the holes are cut to suit your particular engine. I used a K & B .09 on a Tatone mount; the fuel tank is a standard control-line-type mounted wedge down. A clunk tank is not necessary unless you plan to fly upside down or doing outside loops.

The stabilizer and the rudder are made of 1/8" hard balsa sheet. There are no anti-warp cross-pieces on either surface. No problem has been encountered when care is taken to dope both sides of the surface at the same time with about the same amount of dope. Stiffeners can be added, if desired, to add a "ribbed" effect to the tail surfaces. Make sure that your control horns are on the opposite sides of the fuselage to minimize the chances of their interfering with each other.

The wing is patterned after the wing on the Guillow Vanguard. It has the three spars on top and one on the bottom. The only sheeting is 1/32" balsa on both sides of the center section which also has four small plywood dihedral braces. Two narrow strips of Sig Celastic add the final touch to the center strength. The main difference between the Vanguard wing and this one is in the tips. The only problem here is to be sure that the tips don't warp when covering and doping. The original model is covered with Siron which doesn't warp easily, fills in with very little dope, and lets you take out any warps that you might get by simply putting on another coat of dope and blocking the surface to the correct position until the dope is dry. The windshield is a piece of thin celluloid cemented into a slip in the forward fairing. It's flexibility keeps it from being broken off too easily. The pilot is a 1-3/4" Williams Bros. standard. There should be 1-3/4" dihedral under each tip.

Painting is the most fun in building models since you can let your imagination run wild with the camouflage scheme. I used two shades of green for the upper camouflage and a tan for the bottom pattern with bright red applied to the nose and all stripes (Aerogloss all around). The insignia and numerals are decals, and all black stripes and all



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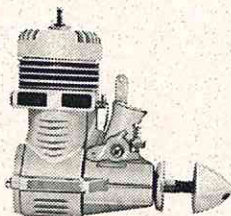
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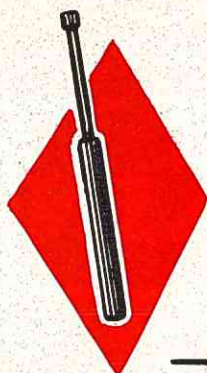


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white stripes are put on with Permacel tape. The wheels are Williams Bros. Vintage wheels with their center sections painted red. The machine gun is balsa with two dress snaps for fasteners so that it will pop off on hard landings.

Equipment installation is left entirely to personal preference. I originally used the Rand LR-3 servo, the World Engines NND-1 switcher, and CitizenShip relay receiver. The second system was a Royal Classic with strictly conventional mounting of equipment. All three servos were mounted side-by-side. Any of the new small digitals will fit easily.

That's about it. Unless you have some REALLY tall grass, I don't recommend that you test glide the Mad Thrasher. But with the incidences shown, and the center of gravity in the right place, there is no reason why you shouldn't have all sorts of fun right from the start.

It's a pretty plane — have fun!!!!!!

EL GRINGO

(continued from page 20)

severely damaged by this type of landing. Landing a model properly, that is, like a real one, has always been a challenge to me. The "El Gringo" is not particularly light. I think that the lighter the airplane the more it is at the mercy of the wind.

As you can see in the plans, there is no removable cowl in the nose. The fuel tank goes in from the rear with the battery pack under it. The latter should be packed in foam, then foam wedged around the tank, which will hold it securely. The fuel lines are run through the firewall and to the engine. You can fish them through with either wire or string. There is plenty of room in the radio compartment over the wing for about any type of radio gear I know of. Of course, I have always flown the "El Gringo" with the Galaxy proportional, however, I know several other modelers who have flown the model with other equipment. The large Top Flite elevator horn works well and is plenty long. As you can see in the plans, there is approximately 1-1/2° down thrust and 1-1/2° right thrust.

I suggest that you use very little throw on the elevator and ailerons at first. I think you will find this model stable, forgiving, and easy to fly.

I hope you enjoy building and flying the "El Gringo".



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4 channel PCS. My Mom had gone to work a month early to pay for it. Two weeks earlier, Col. Jacobson had given me an old Taurus. Two months earlier, Major Rawlings had given me a new Enya .60 for my birthday. On the 26th we flew the above. If it wasn't for these two great men, I couldn't be in R/C today (2 years later). Thanks again to Col. Jacobson and especially Major Rawlings who sent me a Lanier kit for Christmas.

Rich McKee

Fort Benning, Georgia

P.S. Mr. Willard, I have built and flown your Seafoam. I have an O.S. 10 and the big Kraft servos. It will probably get off water but it will take a long run.

Now that letter made me feel good for several reasons. First, Rich had worked and saved some money towards his objective of flying R/C. Second, a couple of older modelers pitched in and helped by donating some equipment and helping Rich learn to fly. Third, Rich was grateful for the help and decided to tell somebody about it. Fourth, I'm glad he picked on me to tell about it, because now I want to pass on the story to the whole R/C fraternity of Sunday fliers. So thanks for writing, Rich, and in case they don't happen to see RCM, tell Major Rawlings and Col. Jacobson that I'm speaking for all of us when I say "Congratulations to a couple of great guys!"

We need more like them.

SCALE IN HAND

(continued from page 14)

- 6-10. 5 options to suit aircraft type
- 11. Traffic Pattern
- 12. Landing.

Those who plump for this say that with all entrants doing the same pattern the contest is easier to judge, can be practiced by the modeler as part of his normal flying routine, and is good groundwork for the entrant who will eventually step up to Class 1.

Now, in the corner on your left, we have the "free and easy" group. They want a pattern consisting of Take Off, Landing, and in between, a fixed number of un-named options chosen by the flyer, and listed in advance of the flight on the judges form.

The view here is that the contest will be more interesting to everyone concerned—flyer, judge and spectator, and is more in keeping with a more relaxed type of event.

One thing your columnist would like to offer up for consideration here, is that a Touch & Go, always a risky

option and one that is hard to do well, needs some encouragement. A Scale job looks great doing a Touch & Go but we're not going to see many if it is only worth the same points as the other options. Yet, if we load it with, say, double points then this option will get to be a requirement for a good score and that's not what we want either. Our suggestion is to make Touch & Go count as 2 options and give it double points. This way the maximum score possible is the same for those who do it and for those who don't.

One final thought for Class 2, do we need a Builder-of-the-Model Rule?

And so, upon that touchy consideration we will leave the discussion. Again, we solicit letters on the matter and will judge the worth of the subject by the response. Future reference to Class 2 in the column will depend on the apparent interest.

★ ★ ★ ★ ★

Thanks to all those modelers who wrote the column (and the Editor) with favorable comments on the Folding-Wing and Retractable-Gear columns. The letters ran about 40 - 0 in favor. If that's what you like, gang, we can keep it coming!

★ ★ ★ ★ ★

1970 NATS

The news that this year's Glenview Nats R/C Scale event will be run to AMA rules may surprise some. After trying FAI rules one time (last year at Willow Grove) the AMA's Nats Executive Committee has decided against continued use of FAI rules for the U.S. Nats. Is the decision a good one? Why was it made? Will America eventually come to use FAI rules? Was last year's try-out unsuccessful?

To find the answers to these questions we talked to the Nats Scale Director and formed an opinion of the soundness of the action. First; yes, the decision was the right one, although last year's Nats was not considered unsuccessful. The point is, that since last year a change has been made to FAI rules which has made them of questionable merit. In terms of promoting improved standards of proficiency, attracting new followers and providing a healthy challenge to the wits of those already involved, this change (levelling out all K-factors for optional demonstrations, making all options worth the same points) is a

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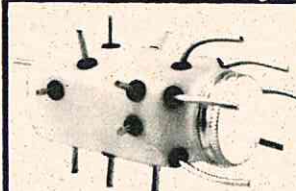
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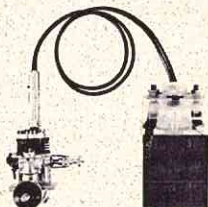
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giant leap backwards.

Clearly, we can say goodbye to the more interesting and challenging options, like retracting gear, multi engines, arrester hooks, crop-spraying rockets, bombs, folding wings and so on. Why bother, when the same points can be had for one loop or roll as for any one of those options? One guy we know is even working on a system for making the engine start itself on the ground! Are we going to reward this with the same points as he could have gotten for a Split-S?

Of course, there's no law against a modeler doing all these things. But for equal points, he'd have to be a bit short of marbles. It's always a risky business relying on some gadget in a contest, and it has been said with a good deal of sense, that contest-wise, a simple approach is best. But; a small reward of extra points brings out the inventiveness in a Scale fan. He takes a gamble — his ingenuity, against embarrassment and defeat. With the FAI rules as they now stand, there's no gamble anymore — it's a "heads the simple model wins — tails the complex model loses" situation.

Will the U.S. ever go FAI? In the circumstances, it's doubtful. After one try-out we may have been prepared to go with it, but the change has killed it.

So — we have AMA rules this year. Not that they are perfect (the multiplier idea has been described as "a method of producing the wrong winner by mathematics") but at least everybody gets a chance, whether he has a Fly Baby or a B-17.

Thanks, AMA!

THE MODEL WIFE

(continued from page 6)

"Those Magnificent Men and Their Flying Machines".

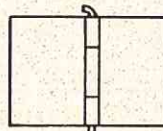
Our first summer together was coming to an end. With winter approaching, I put down my weapons, assuming that I was in for a season of peace. Little did I know that winter is the building season. I kept asking Walter why he seemed so serious, and then one fateful day he told me — he was trying to decide what model he would build that winter. Since we lived in a small house trailer at that time, I soon became engulfed by pieces of wing, rudder, etc. Although I kept telling myself that to be jealous of an airplane was absurd, it wasn't helping.

Things were bad enough when I

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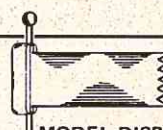
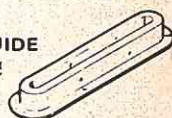
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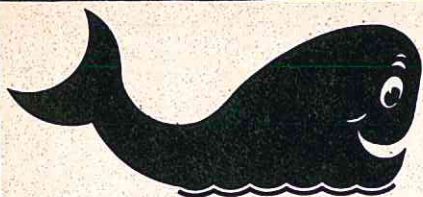
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started having in-law problems. No, it was neither my mother-in-law nor my father-in-law. It was my brother-in-law, Robert. This kindly soul kept Walter informed on all the up-and-coming meets and all the new equipment. He also had the terrible habit of giving Walter airplane kits for Christmas and his birthday. Trying to contend with one airplane lover was tough enough. Trying to contend with two was impossible.

So my next attempt was a little more subtle, in fact, it was very close to surrender. I decided to join the ranks! I would become a part of the hobby and build an airplane. Walter seemed overjoyed! Or was it shocked? Anyway, he rushed out and bought me a "School Boy" kit. I worked diligently. I was doing fairly well until the wing warped and I completely ruined it in an attempt to restore it. We had named the plane Bruce, but poor Bruce was never finished.

But never fear, Bruce was not entirely forgotten. The next summer, I gave birth to our first child, a boy; his name, Bruce.

The first summer we were married, Walter had rather outdated equipment with which to fly. He spent most of that flying season trying to make it work. With the aid of some fellow flyers and many hours of labor, he was ready to fly. He took me with him one evening to see the results of his attempts. He had a "Champ" at the time. He hand launched the plane and off it "flew". The Champ buzzed along ten feet off the ground and the whole flight ended fifteen feet from where it had begun. Walter was very happy about it. I thought he had flipped his lid! Either that, or he was doing an imitation of the Wright Brothers at Kittyhawk!

Naturally enough, the next stage of the cold war concerned the question of new equipment. We weren't exactly rolling in clover, so the proposal met with rather strong opposition. Walter counter-attacked with an accumulation of facts and figures. He placed the amount he wished to spend on his hobby against what other men spent on their hobbies, such as bowling, golf, etc. After thinking logically (for a change) about the situation, I gave in. The following season, with his new equipment, my husband flew much better and, much to my dismay, much more.

During the time we lived in Jamesville, New York, Walter was a member of the Syracuse ARCS Club. Occasion-

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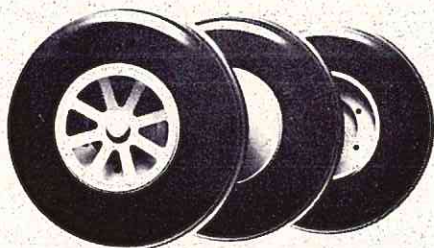
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ally I went with him to the flying field. There I met some of the other members of the club. Before I became acquainted with them, I thought that all they ever did was talk about airplanes. Much to my surprise, they talked about many other things. They were employed at very interesting and diversified jobs. Many of them, who were married, often brought their wives and children to the field with them.

The thing which most surprised me was the men's reaction to my building a plane. I thought that they'd either resent my efforts or make fun of them. But they were very interested in the plane's progress and were more than happy to give me helpful hints concerning its construction. Their friendliness was one of the biggest factors in my re-evaluation of my attitude toward the hobby.

It has taken me about two years to reach some fairly obvious conclusions. I have realized that the winter building season, if nothing else, keeps my husband home. In going to various meets with Walter, I have been able to meet some very nice and very interesting people, both men and women. I learned from experience that building a model from a kit is not the easy task I had supposed it to be. I used to think that a person merely glued a number of pieces of wood together and there it was, a perfect airplane.

I must admit that my husband has had to put up with quite a lot. One time I was nearly attacked by the whole club, when some air vehicle I thought particularly horrible, made a lovely vertical flight which ended in total disaster. I sat there laughing like an idiot! And then there were the days when it rained, or the wind was fifty miles per hour and I went about clapping merrily. These were some of the highlights of my usual grumbling and complaining.

Although my attitude has changed quite a bit, I have not given up the battle entirely. I still have a few words to say on some of those warm Sunday afternoons. And I still cringe a little when my husband suggests that we attend the Syracuse Hobo Meet and watch the films afterward. I swear I've seen a few of them before.

You may wonder what induced me to write this article. If the truth be known, my husband suggested it, and I have an odd idea that he did so to keep me busy while he spent a few peaceful hours working on his new airplane!

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MAGIC MULTIPLYER

(continued from page 63)

model.

The device is easy to make out of cardboard or thin (1/32" or 1/16") plywood. First, cut on the circular dotted line and separate the outer ring from the center disc. Then glue both pieces to two separate pieces of card stock. Give everything a few coats of clear dope or epoxy to keep it clean. Rivet or screw both discs snugly together so that they can turn, but not too easily, and you are done.

The device is really quite easy to use. To convert a 3-view drawing directly into dimensions in inches which you can use on your model plan, use rings No. 2 & 3. First measure the wingspan on your 3-view and locate it on ring 2. Then rotate the disc around to where your model's wingspan (on ring 2) comes opposite to it. Now all you have to do is measure anything off your 3-view and read across to get your model's actual dimension for the corresponding part.

You must keep two things in mind, and these will require explanation if you are not familiar with the operation of a slide rule. **First:** All dimensions, whether scaled off the 3-view, built into the model, or actually on the prototype airplane must be taken in decimal parts. Thus an airplane whose span is 36 feet 4 inches is 36.3 and a 3-view drawing of 4 1/2 inch length is read off as 4.5. **Second:** (And indirectly contradicting my previous statement) ignore all decimal points when setting things onto the device. For example, seven inches, seven feet and seventy feet are all the same to the slide rule, you must keep in mind what decimal values you have set in.

Ring 1 is basically the same as Ring 2, except that you enter prototype dimensions directly on it which are read off as model dimensions. You can also use this same setup to read off the airplanes actual dimensions on Ring 2 as you enter them on Ring 1.

You can also use this device as a circular slide rule, but we won't get into the details of all the different functions of a circular slide rule here. Check out a book about the slide rule and its uses from your library. You will get much more information from it than we could give you in an article in this magazine where we are pressed for space. ●

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