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RC MODELER

THE WORLDS LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS

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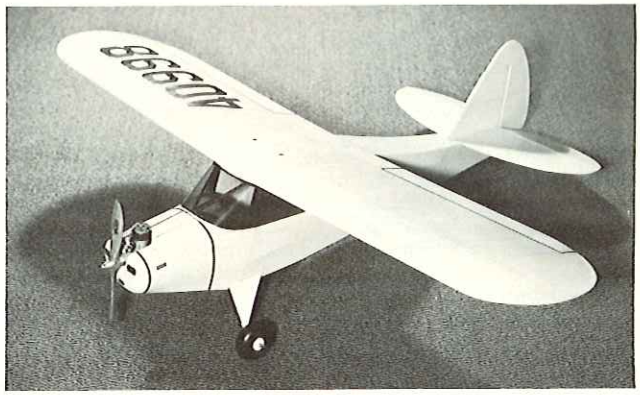
THIS MONTH



Bryce Petersen's semi-scale Piper Vagabond is slow and easy for relaxed flying. See page 19.

THIS MONTHS COVER

Darlene Hembree, 'Miss Weak Signals' for the 1972 Toledo Conference poses with Phil Fuller's modified Mach I, the latter winning 2nd place in the RCM Trophy competition. Ektachrome transparency by Bernie Murphy.

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VOLUME 9 NUMBER 7

JULY 1972

FROM THE SHOP

DON DEWEY

This has been one of those months.

In a word, frantic.

As you have probably noticed, in this issue and the one preceding it, we have added 8 more pages to R/C Modeler Magazine, making it the nation's most extensive model aviation publication. We hope, in this fashion, to be able to bring you more material concerning a sport and hobby that is exploding at the seams with the most phenomenal growth since the inception of radio control. Our volume of mail from newcomers has virtually quadrupled, and a glance at the advertiser index in the past couple of issues evidences the number of new businesses entering our industry.

Concurrent with this growth, the number of new kits, radios, and accessories coming in for review each month are almost impossible to handle, even with a staff as large as our own. The number of new aircraft designs, covering every phase of our sport, are being submitted at a rate we've never seen in our eight years of existence. New methods and techniques on almost any subject of building and flying that are received in today's mail are obsoleting the ones we were excited about yesterday. In short, it is a day-to-day dilemma as to what to include in the limited confines of a monthly publication. There is so much happening today in R/C . . . so many new products, new ideas and flying techniques . . . that we couldn't begin to present all of the material even if RCM was a weekly publication.

As an example of this, I undertook the project of building the Bell Huey Cobra helicopter as a step-by-step construction feature, part one of which appears in this issue. For those of us who have been around this sport for a few years, it seems that only yesterday we considered ourselves fortunate to make a successful flight with a rudder only aircraft whose single control surface was powered by a rubber band driven escapement. Now, we have a true helicopter which, for all intents and purposes, is a miniature replica of its full-scale counterpart that virtually flies in the same fashion. Designed by a brilliant German modeler named Dieter Schluter, this helicopter is truly a work of art. A great deal of credit must go to this innovative modeler for perfecting something that was, only yesterday, a dream to be reserved for the "distant future." Credit, too, must go to the German firm of Schuco-Hegi for having the foresight to realize the potential of manufacturing the various mechanical sub assemblies for Dieter Schluter's fantastic helicopter. And to Dale Willoughby, of Model Helicopters, in Tustin, California, for traveling to Germany, translating the few available instructions for assembling and operating the Huey Cobra, and for returning back to the United States and having a scale fiberglass fuselage built along with the other components necessary to put this into a workable kit for the R/C flier. By using Dale's components and guidelines, we hope that our comprehensive step-by-step instructions and photo sequences will make this helicopter a bit easier for those who would venture into this new era of R/C.

And, while in reflection, if this wasn't staggering enough, you will find a review in this issue of the new Kraft Series Seventy-Two proportional system. As an example of today's modern proportional systems, its design engineering and performance is almost staggering when compared to the radios of only a few years ago. In fact, the integrated circuit used in one servo amplifier contains more parts in a few square millimeters of space than our entire radio systems used to contain in total!

While working on these, and many other projects this month, we were also putting the finishing touches on our Anthology Library Flight Training Course - - - the most comprehensive and complete work of its kind to be published for the beginner and sport flier, covering virtually every detail necessary for the newcomer to get started as well as carefully helping him understand the myriad intricacies of this sport and hobby. A year and a half in the preparation, I somehow have the feeling that this effort will soon be obsoleted by tomorrow's new products and concepts and stand in need of continuous revision in order to keep pace with this sport's technological progress.

When you see all facets of this sport each month — all the new products, the new ideas, the new designs and concepts — each competing for your interest and participation, it's overwhelming, to say the least.

Model helicopters that fly exactly like the real ones . . . Proportional radio systems whose precision is beyond even the top fliers ability to use them to their full potential . . . Formula Racers whose average speed around the course is far in excess of the world's speed record of a few years ago . . . Balsa kits that are so highly prefabricated that they've broken the $100.00 mark . . . Manufacturers working late into the night, seven nights a week, trying to fill yesterday's orders while trying to complete the research and development on tomorrow's new products . . .

We see it all, and will try to present as much as possible to you as space permits. But, in a way, I pity your dilemma . . . the seemingly impossible task of selecting a single project to build from the multitude of magazine plans, and new kits; what radio to buy from an array of proportional systems that all work, and work well . . . What single project or facet of our sport to concentrate

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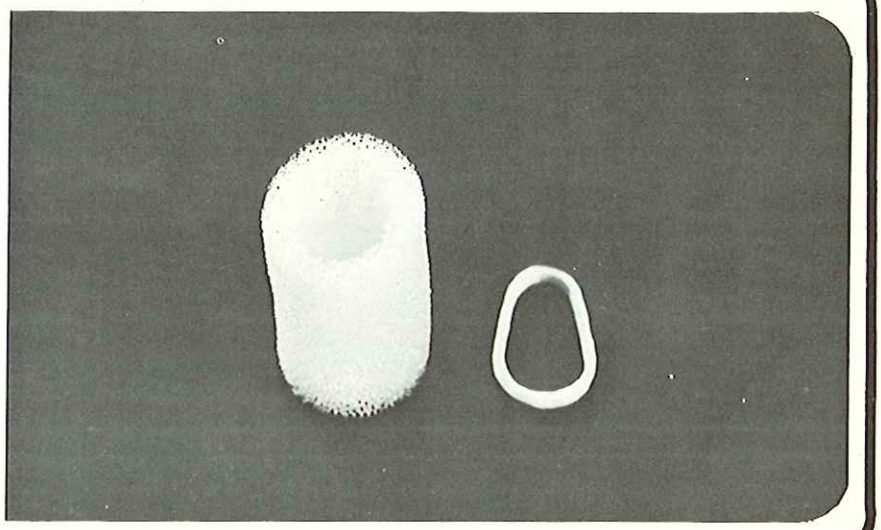
engine clinic

By Clarence Lee



As most of you probably know by now John Perry provides an air filter for his carburetors. Every month I receive several letters from fellows wanting to know when someone is going to make an air filter for the other makes of carburetors. K & B has had a simple little filter available for some time now and I made mention of this several columns back. Due to the fact that mention was made in an answer to a question sent in by a reader a lot of you must have skipped right over it. So, again this month, I would like to bring the K & B filter to your attention. I cannot express the importance of using an air filter on your engine too strongly. Even if you fly off of a paved surface you still need an air filter. After all, that paved surface is not exactly free of dust, sand, etc. If you think so, just put your sweaty hand down on it some time. What you see sticking to your hand is what also goes down the venturi of your engine. It only takes a couple of small particles to cut the inside of your engine up very badly. I get engines in for repair all the time that are cut to pieces by dirt going down the carburetor. When I tell this to the owner I often get letters back stating, "how can this be, I always fly off of a paved surface?"

How many of you break an engine in by running a tank or two of fuel through it in the airplane while sitting on the ground? I've got news for you: In most cases you have done more damage than if you had flown the engine right out of the box. When the engine never performs properly you are sure the manufacturer has put out another dog and stole your money. The end result of a good running engine is how it is broken in and treated afterwards. The engine hasn't been made that can tolerate any amount of dirt and sand going down the venturi and still put out maximum power. So, start using an air filter and give your engine half a chance. Too many of you abuse your engines in other ways by running them too lean, with low oil content home brew fuels, incorrect propeller sizes, etc. Using an air filter will not help these situations but will make one less problem for the engine to cope with.

The K & B filter is simply a small piece of hollowed out plastic foam retained by a small rubber band. As simple as this filter is, it does work GREAT! The head or upper part of the filter is approximately ½" thick. If this is fit down snug against the top of the venturi you will get maximum filtering action and a loss in rpm of 200-400 depending on the rpm of your engine to begin with. If the head of the filter is left about 1/8" above the top of the venturi so that air can be drawn in through the sides of the filter which are only about 1/8" thick there will be no power loss at all. You will not have maximum filtering efficiency but it will still be superior to no filter at all. The filters come four in a package for 89 cents so you sure cannot beat the price. Quite a few of you may have already seen these filters but thought they were only intended for the R/C cars. I know quite a few fellows have made this comment to me when I told them about the filter. This is not the case. They work well on any engine. Now for the rubber band to retain the filter there will have to be a slight taper to the neck of the carburetor venturi. Many carburetors do not have this so simply file a small groove around the base of the venturi neck with a jewelers file. You will add many hours of extra life to your engine by using an air filter.

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I received a letter from ex-N.M.P.R.A. president, Pete Reed, this past month. Pete and his partner Sam Griswold are now supplying a long needed service to modelers. How many of you have experienced the sickening sensation of stripping out the threads in your head while tightening the glow plug. This is not too serious if you can dash over to the local friendly hobby dealer and purchase a new head. But what happens when you're greeted with, "Sorry, don't have one in stock?" Then you wait many weeks while a new one is ordered. That is, if you are lucky! In the case of some of the foreign imports you may not be able to get one at all. Stripping of the thread in the heads of the .40's used for pylon racing is quite common. Especially after considerable lean running. The lean running actually crystallizes the aluminum head and fuses the aluminum to the glow plug. When you go to remove the glow plug – along come the threads. Many of your high performance .40's have the head matched to the engine, the distance between the bottom of the squish band in the head and the top of the piston being critical to .001" – .002". So there is your prize engine out of commission because you do not have another head matched to the engine. Sam and Pete have come up with a service to end this problem, namely to replace the stripped out threads in the head with stainless steel threads, or if you happen to be one of those few modelers who plan ahead, replace the threads in the head with stainless steel ones BEFORE they strip out. The new stainless steel threads are considerably stronger than the original threads and will not crystallize, gall, or fuse to the glow plug. This process has been available for many years and is known as Heli-Coil thread inserts. A special kit has to be purchased. The stripped hole or thread to be replaced is drilled out slightly larger. This hole is tapped with a special tap, and the Heli-Coil installed with a special installation tool. However, when it comes to our glow plug threads no repair kit was available. Sam and Pete had to contact the Heli-Coil people and have the necessary tools for the job made, at considerable expense. So, if you have a stripped-out head laying around that you would like to have renewed, or you want to eliminate the chance of stripping the threads in your racing engine, send the head to Sam and Pete. Their business name is GRR Enterprises, 19 Eastwood Drive, Plainville, Conn. 06062. The charge is $3.00 which includes postage.

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The first letter this month comes from John Brown. John, like myself, collects old time model engines. John, however, specializes in the ancient air motors that were popular back in the early '30's when there wasn't much available in the way of 'gas' engines. There has been a renewed interest in these old engines and many fellows are building and flying air motor powered models again. One of the old time air motors is being made again just for the fellows interested in this event. John Brown is doing considerable research on the old timers and is making a plea for help. Possibly some of you out there might have the information he is looking for laying around in a box or a drawer somewhere.

Dear Clarence,

Since you are one of the foremost authorities on model aircraft engines I'd like

ENGINE CLINIC

your help with the research I'm conducting on the early compressed air motors. Compressed air motors were being used with some success as early as 1910 and enjoyed wide popularity in the late '20's and early '30's. The introduction of practical spark ignition engines like the Brown Jr. about 1934 spelled doom for the air motors and they soon disappeared from the flying fields. Now 40 years have passed and I'm trying to collect whatever details and historical information that may remain in the attics, cellars, and back shelves of model builders everywhere. Needed are old books, brochures, instructions, photos, advertisments, machine drawings, recollections and, of course, original air motors and tanks. Badly needed, also, are plans for model airplanes which could be powered by compressed air. I write a regular column called 'Wind Mills' for the Engine Collector's Journal and I hope eventually to write a book on the history of expansion motors for model airplanes. I have a number of the early air motors and tanks which are displayed at hobby shops, contests, and club meetings.

Any letters from your readers will be answered and any loaned materials returned promptly.

Best regards,
John Brown
9611 Hillview Road
Anaheim, California 92804

While on the subject of old time engines, as mentioned previously, I'm a collector myself. My main interests being racing engines and multi-cylinder engines. Many of the old racing engines were losers in their day and couldn't compete with the Hornets, McCoys, and later on, Doolings. As a result, few were sold and companies folded. Now these engines are difficult to find and of interest to collectors like myself. If any of you old timers out there happen to have or know the whereabouts of a Bungay, Ball, Garfield Scout, or any of the lesser known racing engines, I would appreciate it if you would let me know. This holds true for any of the old time ignition engines. That old job you have had laying in a box in the garage for years might be valuable to an engine collector and worth some money. However, don't expect to get a fabulous sum just because you find an old engine with points on it. Some of these jobs were real junkers made by the thousands, with little value. Especially the engines that came out right after WW II. Some are valuable, and some are not. It depends on how many were produced and their availability to collectors today. Ohlssons are quite common. Thunderbirds, Orrs, Barkers, etc., are harder to come by and are desired by collectors. So, if you have an old ignition engine laying around gathering rust and dust, let me know. If I am not interested, myself, I may know of a collector who is.

Dear Mr. Lee,

I wrote to you several years ago from Australia concerning a Webra 20, and received a very helpful reply from you. My question this time, however, does not concern a specific engine, but rather, engines in general.

Starter motors are becoming increasingly common, and I personally would like to use one, since I have no great liking for being swatted on the fingers by the occasional tempermental engine. However, before buying one, there are a couple of points on which I would like your opinion:

1) On some motors, I have noticed that there is very little clearance between the crank pin and the back plate, and furthermore, there is often some end float on the crank shaft. Would the use of a starter tend to increase this end float and thereby eventually cause the crank pin to run against the back plate while the starter was being used?

2) Is there any liklihood of damaging rear rotor engines, in particular the O.S. Max 60 goldhead, by the use of a starter?

Yours faithfully,
Pete Allanson
Northwood, Salisbury, Rhodesia

Normally the use of an electric starter will do no damage to an engine. Especially if the crankshaft is supported by ball bearings. However, in the case of some of your sleeve bearing engines such as the old K & B .45, Fox .59, and some later models of the Fox, etc., it would be a good idea to make sure that end play in the crankshaft does not let the end of the crank pin rub against the back cover. If this happens, then the use of an electric starter could cause problems. The best way to check this clearance is with the crankshaft and back cover in place with a propeller on the engine, but the piston, sleeve, and head removed. Leave the con-rod in place as this may be wider than the crank pin is long, and rubbing will result. If the engine lacks sufficient clearance, then file off the back of the rod or grind the end of the crank pin, whichever may fit the particular situation. .005" – .010" is plenty and you can check this with a feeler gage available at any auto parts supply. It may be a little rough locating one there in Rhodesia but fliers here in the U.S. should have no problem. There should be no problem with your O.S. Max .60 Goldhead as it is a ball bearing engine, and ball bearings can take thrust loads in either direction, with limited end play.

Dear Mr. Lee:

I was fortunate to have gotten a new Wankel lately. I ran it for the first time this weekend. They come with absolutely no paperwork or information. I wrote World Engines who did give me the prop size 9/6, and not to use a plug with a bar. The engine runs like a sewing machine but I cannot get a realiable idle. I have had the idle adjustment screw all the way in and all the way out. It doesn't make any difference. I am using 75/15/10 fuel and have the fuel tank center line in line with the carburetor intake. I don't have a foaming problem and the tank is new. I have an HP, Enya and a bunch of S.T. and they all seem to do fine on our club fuel.

Could it be that I need a fuel with more nitro or possibly enlarge the idle air hole?

I know I saw some information on Wankels, but after looking through the last year of RCM, I can't seem to find it.

Respectfully,
James Schneider
Lancaster, California

Jim, there are two possibilities. The engine is still new and tight. As it breaks in, the idle will improve. Also, you may be trying to idle it too slow. The Wankel's like to idle slightly faster than conventional engines so don't try to get a 200 rpm tick-over idle. Set it for around 2700. As World Engines told you, never use an idle bar plug. The engine just will not work with it. Always use an unshielded plug. The engine is very critical to plugs and O.S. makes a glow plug especially for use in this engine. I recommend that you use this plug. I have tried many different glow plugs in my Wankel and have found the one made especially for the engine works considerably better than any other.

You have another problem that you are not evidently aware of and that is the fuel mix you and your club are using. The 75/15/10 means that you are using 75% alcohol, 15% nitro, and 10% castor oil (or other lubricant). In no way is this enough lubrication. Even if the 15 and 10 were reversed this is still nowhere near enough lubrication. This, in itself, might have caused damage to your engine resulting in lack of idle. Never use less than 20% lubrication and preferably 22%.

Incidentally, the review of the Wankel engine that I did some time back is in the RCM Anthology series book, "The R/C Engine", available through RCM.

Dear Mr. Lee:

I have read that the pitch of a propeller plays an important roll as to how a plane acts in the air and on the ground.

I now use an 11-8 on my Veco .61. My 7 lb. Comet uses a lot of space in taking off (almost a 120 ft.) and climbs slow. Once in the air at the same throttle setting she flies like a jet.

Would lowering the pitch make the takeoffs shorter and the flying speed slower? When you lower the pitch, do you have to increase the length of the propeller in order to achieve the desired results? Thus, could I stay with an 11" prop or must I go to a 12" one? How many numbers, in pitch, should I drop below the 8 I now use? Will the increase in engine rpm's, resulting from the pitch change, result in very much added engine wear?

Yours,
David Sikora
Bonduel, Wisconsin

Dave, you either have an awfully sick engine or that airplane of yours weighs a lot more than 7 lbs! A Veco .61 with an 11-8 propeller should have no problem at all hauling a 7 lb. airplane off the ground. Make sure your brakes are not hanging up because something is sure wrong.

A lower pitch prop will cause the airplane to accelerate faster and come off quicker. Normally, when you drop an inch in pitch you go up an inch in diameter, i.e. from an 11-8 you would go to a 12-7. However, this does not always work out due to blade shape and area. In this case, a 12-7 would be far too much prop for the engine and a 12-6 should be used. In your case I would recommend you use an 11-7. I'm

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CUNNINGHAM ON R/C

Chuck Cunningham ready to "wipe 'em out" in the next Quarter Midget Race. Mini Midget Mustang model. George Rogers photo.

In the January 1972 issue, I asked you to answer a few questions concerning your interest in R/C. Your response was tremendous. Before I go any further, I want to thank all of you who wrote in expressing your likes and dislikes. Many of your letters were several pages in length and very interesting and informative. I am sorry that it has been impossible for me to answer all of the letters, but please believe me, I do appreciate your taking the time to answer these questions.

The questions that I asked were these: (1) Do you like to build from kits, or from magazine plans? (2) Do you like foam wings, or built up type construction? (3) Do you prefer powered flight, or silent flight? (4) Do you like simple construction or complex construction? (5) Retract gears or fixed gears? (6) What size engine and what size airplane are you interested in? (7) Do you hand launch, or take-off from a grass or paved surface? (7) Do you like a model that looks like a model, or one that looks like a full scale aircraft? (8) Do you like silk and dope covering, or plastic films? (9) Do you paint with dope, enamel, epoxy, or hardware store paint? (10) Is your radio set a 1970 or newer mini set, or is it an older, larger type radio system? (11) Do you like to fly in contests, pattern or fun fly, or do you just like to take-off, bang around the sky, and get back down again in one piece? (12) Do you like to use home brew fuel, or commercial fuel? (13) Do you prefer balsa or plastic models?

You know, when I first wrote these questions, I didn't number them, and now in review, I find that there seems to be 13 questions. Hummm, not a black cat among them.

Most of those writing in to answer these questions are fairly new to the sport of Radio Control building and flying. I don't believe I received a single letter from a confirmed contest buff, and this was just what I expected. The more proficient one becomes in any field, the less apt one is to seek outside help or information. A lot of you are model builders of many years experience, but pretty new to R/C. About twenty-five percent of those answering indicated that they were not generally hooked up with any club or organization, and just did their flying when they could, and from almost any type of runway. With the rapid growth this sport has experienced in the past several years it is no wonder that there are so many people asking for help, or any wonder that so much of the flying is unorganized. Most of the existing model flying fields are becoming more and more over crowded, and the interest in flying from any open spot seems to be growing. For example, not one of the answers mentions that the fliers were interested in flying Formula I racers. I feel that a lot of you fellows who wrote in would be very interested in the RCM Quarter Midget racers, but only so long as it remains a fun event, and not a let-it-all-hang-out professional racing event. But, let's get back to the questions and see what type of answers developed.

(1) Do you like to build from kits, or from magazine plans? Most wrote that they built from kits, but that they were now building from magazine plans, or that they were planning to build a magazine published aircraft. Almost 100% seem to have gotten started via the kit route but after a short time branched off into building from plans. About 10% were flying their own designs and, again, this figure seems to go up with the duration in the hobby of the writer. There isn't any question about it, both forms, either kits or plans, are of great interest to all builders.

(2) Do you like foam wings or built-up type construction? 80% said that they had never built anything but built-up type construction, but of these 80%, at least 75% went on to say that they were going to try the foam wing route in the future. One writer indicated that he used only foam wings with cardboard covering. This man is right down my own line. With the ever increasing cost of balsa wood, it's a wonder to me that more modelers don't take to cardboard covering, providing wing skins for about 75 cents rather than 10 to 12 bucks! But for those of you answering the survey, built-up definitely held first place by a large margin.

(3) Do you like powered flight, or silent flight? 90% of the answers told me that they liked powered flight, but a firm 10% are flying sailplanes. Perhaps the same questions in Ken Willards column would get exactly the opposite response. But again, most of you went on to say that you planned to give the bird-wing type airplanes a try in the near future. Sailplanes appear to be just about the fastest growing portion of this sport, and I don't doubt that a lot of you will be trying your hand at it this summer. Still, in my book, it's really the most painless way of learning to fly.

(4) Do you like simple construction, or complex construction? Boy, simple construction was a hands down winner! Only one writer said that he really liked to get involved in complex building. All of the rest of you believe just as I do, that the easiest way to get the bird all put together is the best way, and the real name of the game is up in the air, not on the work bench.

(5) Retract gears or fixed gears? 99% said that fixed gears were for them. But, quite a few indicated that they were going to give retracts a try on some future project. A lot of builder/fliers have stayed away from retracts because of the high cost involved. I personally haven't tried retracts, mainly because of the extra time involved in hooking them up. But, they are a definite addition to the aircraft field, and one which, a few years from now will, no doubt, be quite common.

Let me wander from the questions and answers for just a minute to toss in a bit of personal thinking. I fully believe that you get the most fun out of this sport if you don't let yourself get too over-invested. It is pretty easy to plunk down a lot of "butter-and-egg money" in this sport, and to get your wife pretty upset with you for such a deep involvement in it. Frankly, I believe that it is a good idea to be selective in buying what you want, and to try to resist the impulse to get everything new that comes out. There are so many new items coming on the market each month that it is pretty hard not to have the "wants" pretty badly. A very large number of those writing in went on to say that your wives hated everything about R/C, and that you followed this sport only with persistent static from the homefront. A lot of fellows smuggle in the latest purchase, and camoflauge the cost to a great extent. That probably can't be helped but, by excercising a bit of restraint in acquiring new items, and by trying to involve your wife in the hobby, to some extent, sometimes a frosty shoulder can be turned into one that will give you some support. (Not just after a crash, though, since you see a lot of hard work lying there bashed up in the grass, while your wife sees a bunch of dollar bills floating off over the horizon!) The easiest way to try to get your wife involved with you is to seek out her help in the areas where most women excell. Get them to help with the color scheme and the paint job. Not the actual painting, but with working out the colors, and in doing the trimming. Remember back when you were in grade school, and junior high, who made all of the good grades in art class. The girls did, didn't they? Well, play upon this a bit, get a little help from the female side of the family and, by a gradual bit of soft salesmanship, you can begin to change her thinking from one of "your expensive toy" to one of "look at our beautiful airplane." Get her interested a little at a time, and if you're lucky, she may even start flying with you, which isn't too bad after all. Maybe she will want retracts on the next model!

(6) What size engine and what size airplane are you interested in.? I was slightly surprised to learn that most of you like the smaller aircraft and engines. I had begun to

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SUNDAY FLIER

KEN WILLARD

Wow! Did I strike a nerve! And the letters are still coming.

A couple of months ago I described some rather unscientific tests that I made to compare various wing sections – and last month some of the airfoils that I talked about were published for whatever use you might want to make of them. Meanwhile, the pro's and con's regarding the way I checked them out came flooding in. Here are some excerpts:

"Your tests are absolutely worthless. You didn't check temperature, barometric pressure, compare with standard atmosphere, maintain consistent tow conditions or accurate release altitudes, or any one of several other pertinent aerodynamic factors that could seriously affect the true performance of the airfoils. Also, how accurate were the airfoils to the sections you quoted? . . . etc."

"Thanks for finally coming up with some practical suggestions for the average modeler as to how he can check his own 'gut' feeling regarding his favorite wing section. We need more practical information and less theoretical mumbo jumbo . . . etc."

In between those extremes were several worthwhile suggestions on how to make the tests more accurate without applying for time at the NASA Ames tunnel. Among the best was a letter from Edward Kolassa, of Jamaica, New York.

Dear Ken:

Anytime you do an article like the one comparing wings and airfoils, it has got to advance the state of the art of our hobby. Congratulations on a good job and I encourage you to go further. I like to design my own models (gliders, now) and this has got to help me. So thanks a million.

Now, I hope you do not mind if I make some mild criticism and suggestions. First of all, I would have liked to see all of the wings tested at the same weight. It would not have been difficult to add some lead, and why have another variable even if the weight differential was small (4 oz.)? My first test would have been of sink rate only, by towing all the wings to the same height. One way of knowing this, is to put up one of those weather balloons tethered to the ground. The tow would be higher than the balloon and when the model and the balloon are of equal heights, start the clock. You can make some fairly accurate sink tests this way. All the other tests including speed, towing, and distance would also result in more accurate data utilizing the fixed point in space – the balloon. But most important to the tests would be to have one wing as a standard and used in every test. All the wings would be compared to the standard.

Again, I say, I hope you don't mind my sounding off. You did a good job and this modeler is most grateful.

Sincerely,
Edward Kolassa

Now why didn't I think of that balloon idea? In the still air of the early morning, it should work perfectly.

Anyway, I guess I have to agree with all of you. Yes, the tests were not as closely controlled as they could have been. No, the airfoils were probably not absolutely true. But I figure they were about as true as the average Sunday flier will make his, so maybe the tests are representative of what the majority of us can expect. In any event, they sure stirred up a lot of interest – and I hope you will make some tests on your own and let us hear from you. Any good improvements – like the weather balloon idea – we'll pass on to the other enthusiasts. There's plenty to learn about R/C soaring.

In that regard, we can't overlook slope soaring, and there's a lot of activity going on right now. Due to printing deadlines, the RCM Trophy Races at Sunset Beach will have to be covered next month and, in the meantime, those of you who follow this aspect of soaring will already know the results. Also, the Torrey Pines Gulls will have completed their trials for the world's speed record. Dick Tichenor will cover the latter, and I'll give you some details on the Trophy Races. I've been testing a racing wing for the TopSailer – eight foot span, ten inch chord, of which three inches is full span "flaperons" that can be adjusted in flight for variations in wind conditions. You never know what the wind will be at Sunset Beach – two to three miles an hour or twenty to thirty miles an hour. So I tried to come up with a job that can perform well throughout the entire range. It does quite well but, in a warm-up race a couple of weeks ago, it took a solid shellacking from three of Bob Andris' Peregrine designs – one of which was modified by Jerry Wolfram and, unfortunately, suffered a broken wing, or Jerry might have done even better. But the weather was what we call "Peregrine weather"; the wind was hitting thirty to thirty-five mph during the last heats. Even so, it's going to take a mighty good design to compete against the Peregrine, because it's not only fast, but when it rounds the turn at the pylons, it doesn't slow down even though it turns quite sharply.

But not as sharply as the Gryphon, though. And for an all around fun machine on the slopes, the Gryphon still gets my vote. I don't race mine any more, but for sheer sport it's great. I like to do snap loops, where it rotates on the wing and comes out flying with no loss of altitude. Or do a snap stall, and when it rotates past the vertical dive position, just push down elevator and take off in the opposite direction, only inverted. A real crowd pleaser!

★★★★★

Probably one of the most popular shop aids for modelers in all fields is the Dremel Moto-Tool. Recently I had an experience with mine – an older model which I've used for several years – that resulted in the following exchange of correspondence with the Dremel Manufacturing Co.

Gentlemen:

A number of years ago (I've forgotten how many) I purchased one of your Model No. 2 Moto-Tools with accessory kit. The brochure refers to it as "Cat. No. 222 Moto-Tool Kit No. 2" and you may be able to figure when I bought it by the price – $23.50 at the time.

Now this tool has been the mainstay of my shop ever since I got it. As an Associate Editor of R/C Modeler Magazine, I write about R/C models, shop hints, designs, and whatever else comes to mind. Naturally, when building R/C aircraft, the number of uses for the Moto-Tool just can't be counted. And I use it – or rather, I did use it – any time of the day or night that the mood suited me.

Imagine my dismay to find that all this time, while using the tool, I've been a bad neighbor! Not from the noise; you can't even hear that in the next room. But it seems that the electrical circuitry of my tool is such that it feeds back into the house power. I was aware of this, since I did have to time the use of the tool to coincide with the TV commercials, else my wife would complain.

What I didn't know, though, was that not only was the operation of the tool making our TV act up, it was interfering with all the neighbors as well! Nice people that they are, they never said anything to me, until recently one of them politely asked if I would refrain from using it during a special TV show he wanted to watch. Surprised, I asked why; and then he told me. Talk about embarassed! Naturally, I quit using it entirely, because I discovered from the power company that the feedback into the power line went all the way to the transformer, and all the houses downstream of the transformer were being affected.

I tried everything. Put in new brushes, added a ground wire, even tried a power filter in the outlet. No luck.

Seems to me there should be a solution – but the power company didn't have any, nor do any of my associates. So, as a last resort, I'm turning to you for help. Because of the widespread use of the Moto-Tool in the R/C fraternity, I will publish your reply as a public service, both for you and for the users of Moto-Tools, in the interest of better relations with the neighbors. Sure hope you can help.

Sincerely,
Ken Willard

Dear Mr. Willard:

The tool you mentioned in your letter of March 8, 1972, is apparently a No. 2 Moto-Tool and is quite old. Due to the technology available when this tool was designed, it does radiate quite a bit of rfi (radio frequency interference). Unfortunately, it is practically impossible to suppress this rfi, mainly due to the size of suppressor which would be required in order to handle this amount.

Since this time, however, the permanent magnet Moto-Tool has been developed, i.e., Models 260, 270 and 280. Due to a number of technical reasons, the rfi in these tools is at a bare minimum and has been found quite acceptable for household use as long as the tool is maintained in good condition.

About all we could suggest for your present tool would be to try a .1 mfd capacitor of at least 200 full working volts across the commutator. This would be from brush holder to brush holder. Tie one side of this to a ground wire through a .047 mfd capacitor, again of about 200 working volts.

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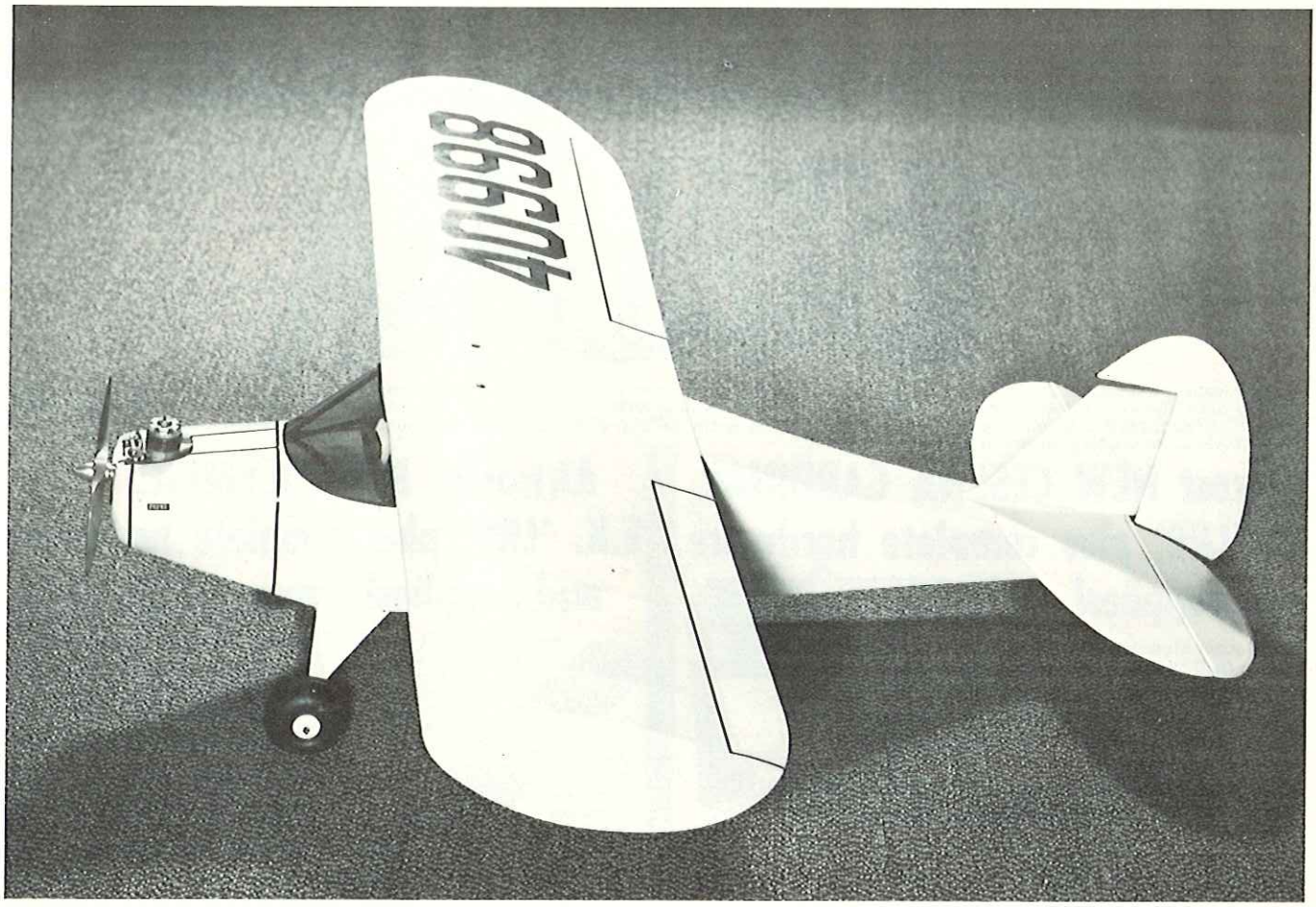
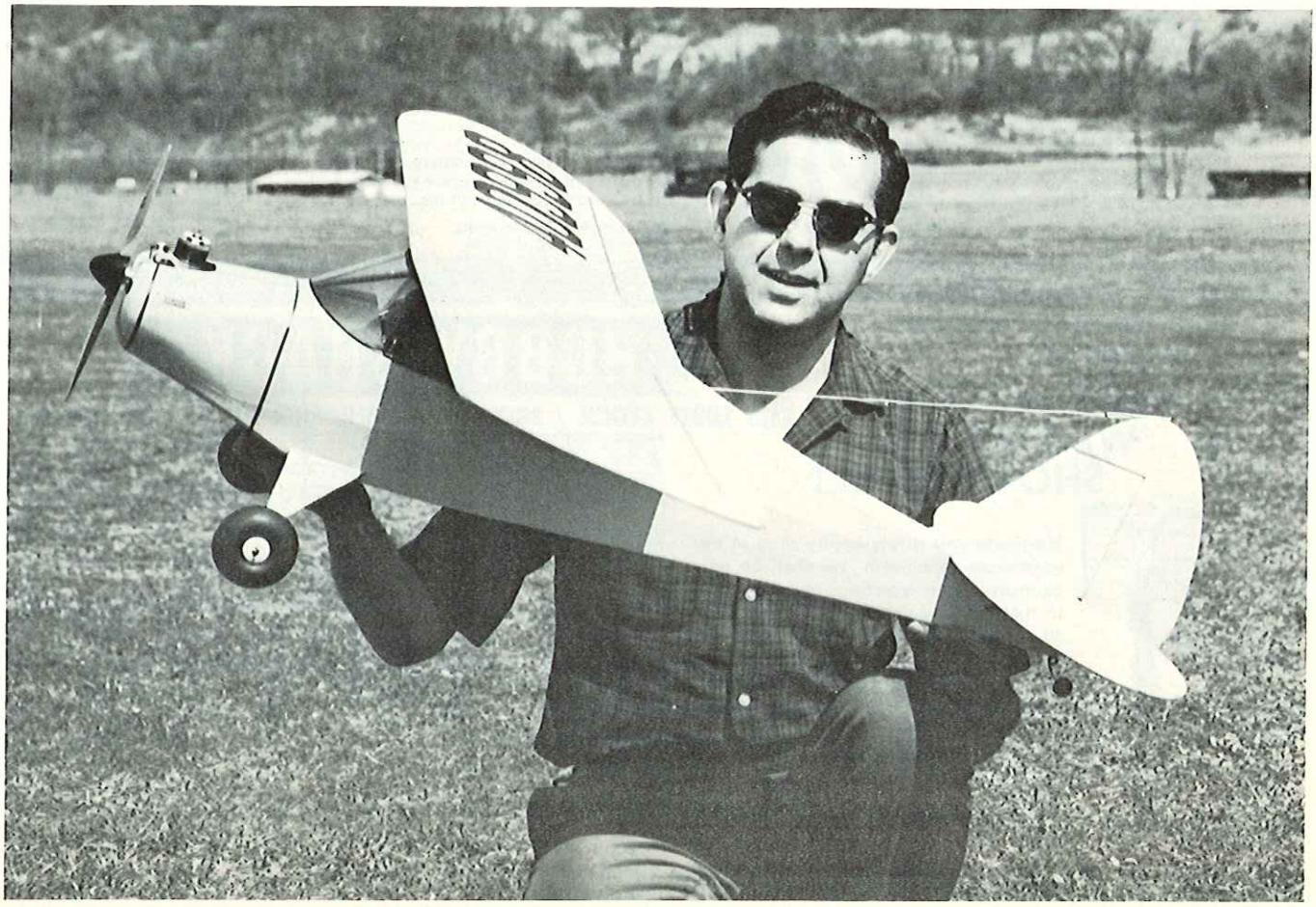


A three channel radio, a .19 engine, and some relaxed and easy flying . . . . . .



Slow and easy . . . . . air speed 10 mph, ground speed 0.

By Bryce Petersen

PIPER VAGABOND

Webster's Dictionary defines sport as: *"To play; frolic. A sudden spontaneous deviation or variation from type."*

For this reason, I call the Vagabond a **true** sport plane. It uses a different type of construction to perform a different kind of flying. Regardless of what your **thing** is at the flying field, whether it be pattern, racing or professional spectator, there comes a time to just have fun. So stick with me through this one, and I will guarantee you barrels of fun.

New designs should have something better to offer. They should be either lighter, stronger, cheaper, or be able to perform something **different** to make it unique. The Vagabond achieves all these goals to a certain extent. Another plus is that it is a **scale** design that may be entered in the "stand-off scale" competition that is gaining popularity around the country.

Now that you are convinced that I have eaten too many peanuts, I hope the word **foam** doesn't divert your curiosity to find out for sure. Foam is a marvelous building material that offers lighter and stronger structures that are practically warp free. The real trick is to use foam where the structure carries little load and beef up the areas with balsa and plywood where strength is needed. The foam acts as a **building block.** Because foam has no grain, it can be bent and formed or cut with a hot wire to absolute flat sheets for wings and fuselage sides. Ribs and formers can be added to form round areas.

Strength in model structures can sometimes work against you. You can beef up a model with the penalty of weight. This means more impact when you hit something. We have all seen the light rudder-only models take a pounding day after day without destruction.

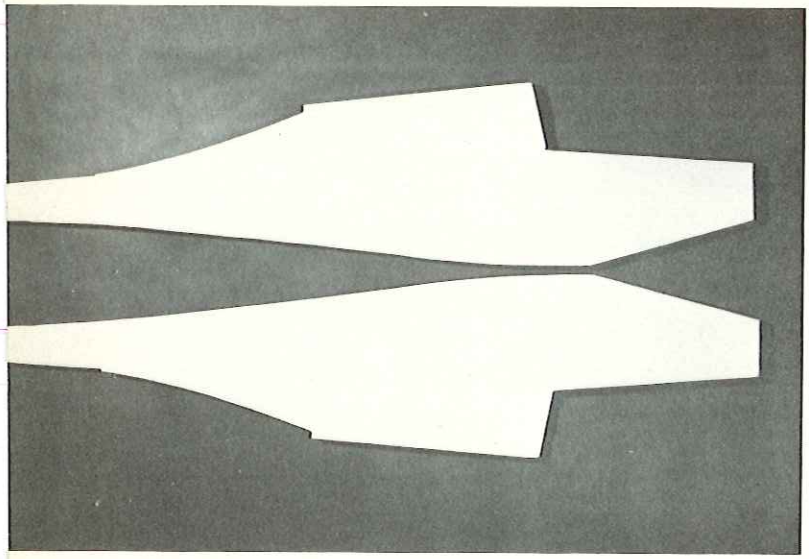
With foam, and careful planning, you can build a structure with half the weight – so the greater the strength. The full size Vagabond design was the outcome of experiments made with a clipped wing Cub. The shorter moments and enlarged rudder gave it much better response to controls. The little ship is so small you can touch the wing trailing edge and stabilizer at the same time. The name Vagabond came from the adventurous men that ferried the ships from factory to customer.

The model is a joy to fly. If you have a slight breeze, you can throttle back and fly backward. I have actually flown the model for five minutes without reaching the end of the runway. Some, who fly nothing but .60 powered bullets, may feel this is a step backward. Think of the fun they are missing!

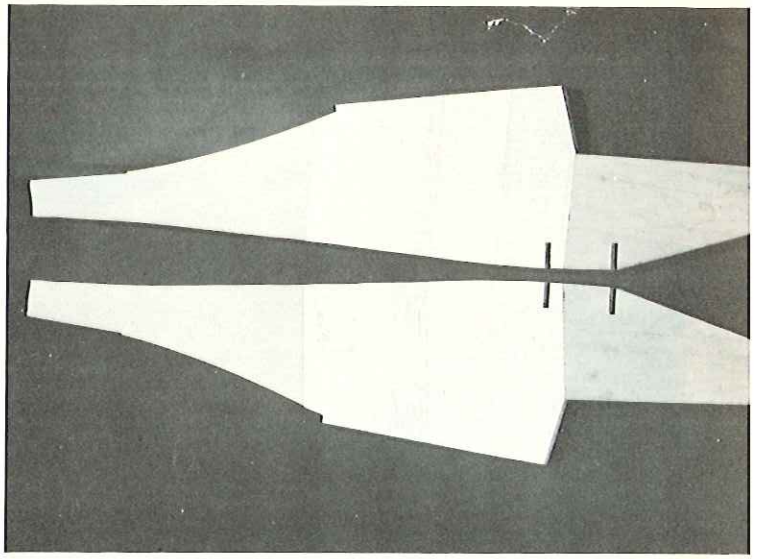
The entire model can be built from one block of foam. Be sure that the foam is the closed cell type and not the beaded type. This foam will give you a much smoother finish and can be sanded.

Select several choice yardsticks from your local lumber company. Look for the grain of the wood to continue from one end to the other. Place two of the yardsticks on the sides of your foam block and slice off the top first, using your hot wire. Then cut four sheets 7/16" thick. Now, cut both fuselage sides with a Dremel saw and sand smooth with light sandpaper.

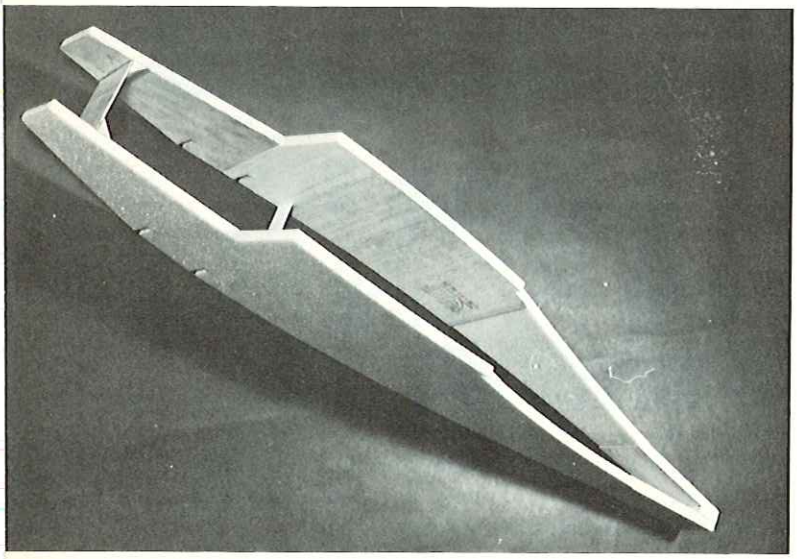
The plans give you a step-by-step building procedure so I will try to add a few tips. First, sand and wax the cutting edges of your yardsticks as . . . . . .



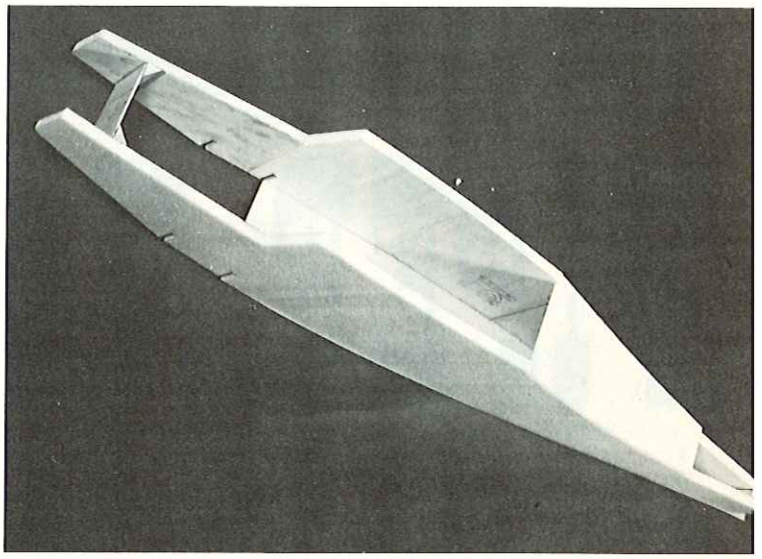
The foam sides are cut with a Dremel Moto-Shop saw.



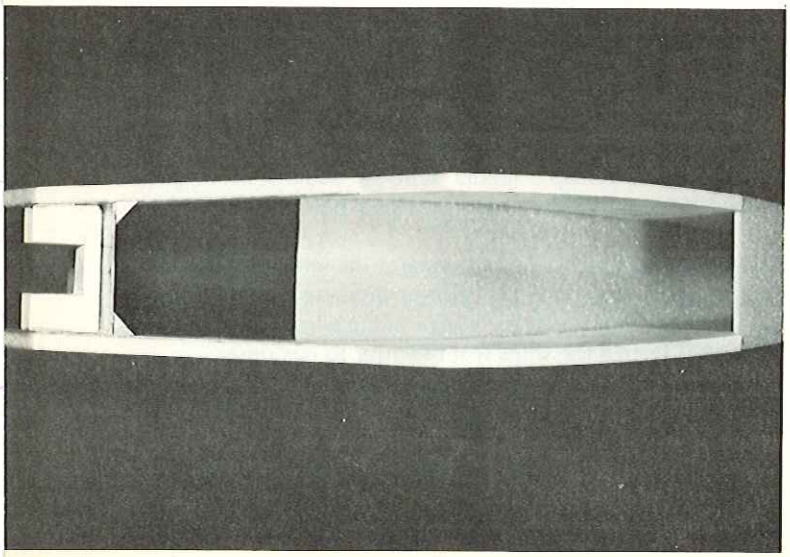
The 1/32" balsa and ply doublers are epoxied on the inside.



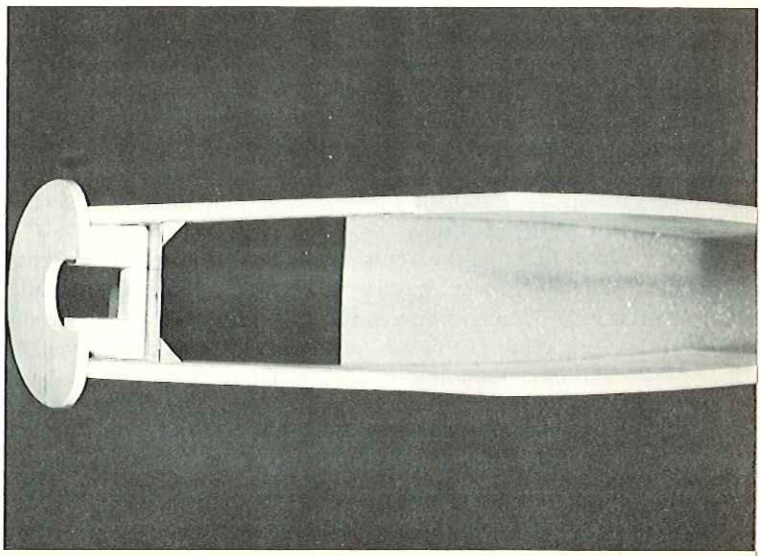
Former F-1 and firewall in place. The brace in the center is temporary.



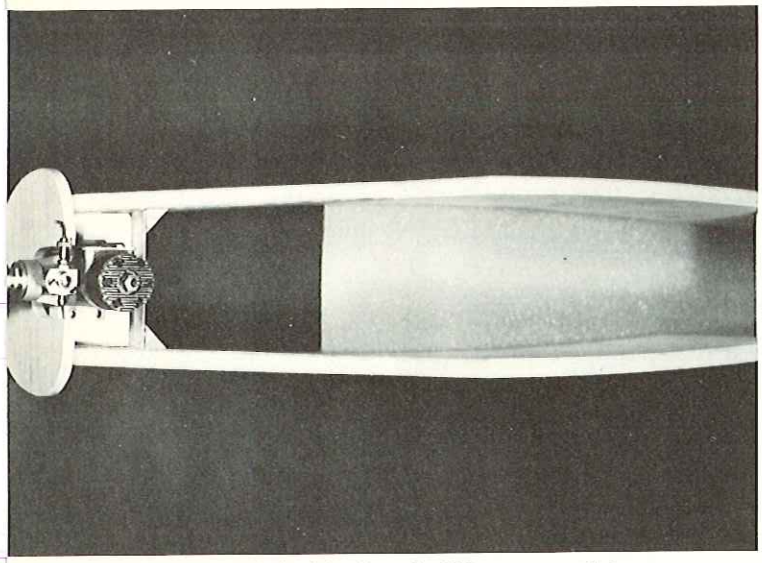
The ¼" foam top and bottom shown in place.



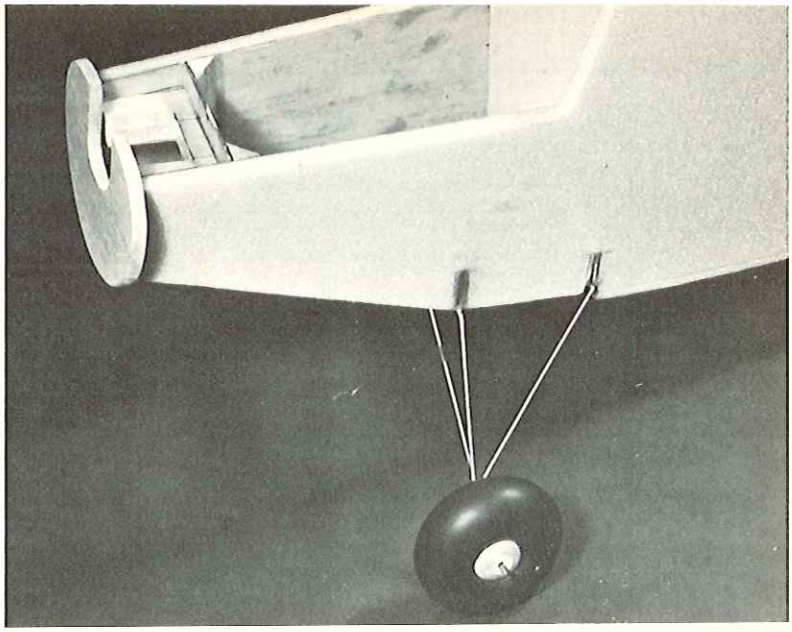
The engine mount shown in place.



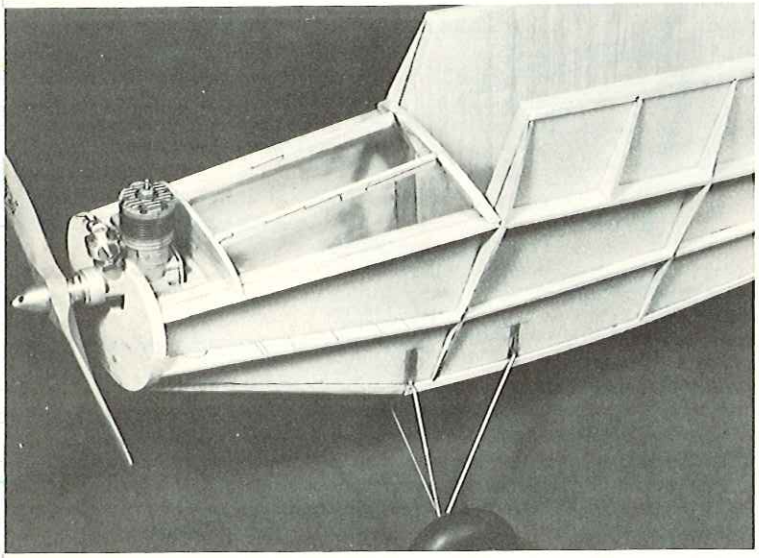
A photo of the sub nose block.



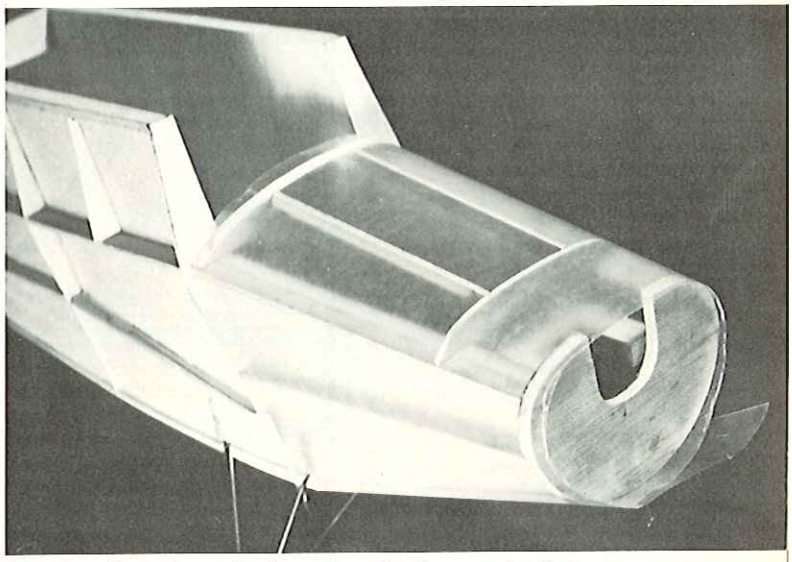
The engine shown bolted in place. A .19 is recommended.



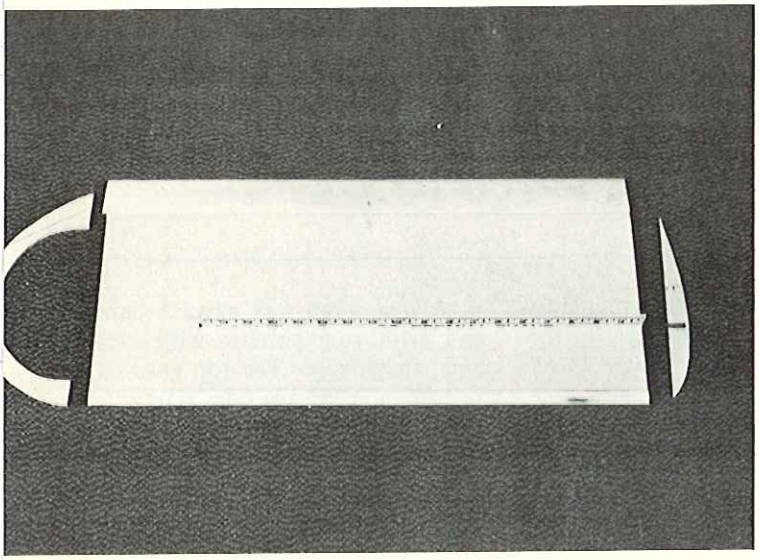
In this photo, the landing gear has been mounted.



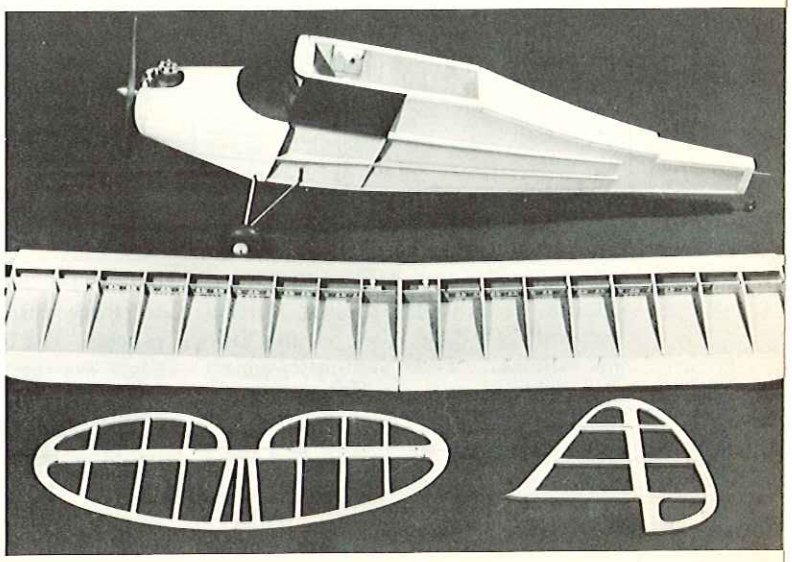
All of the framing has been completed, and the fuselage is ready for the nose sheeting.



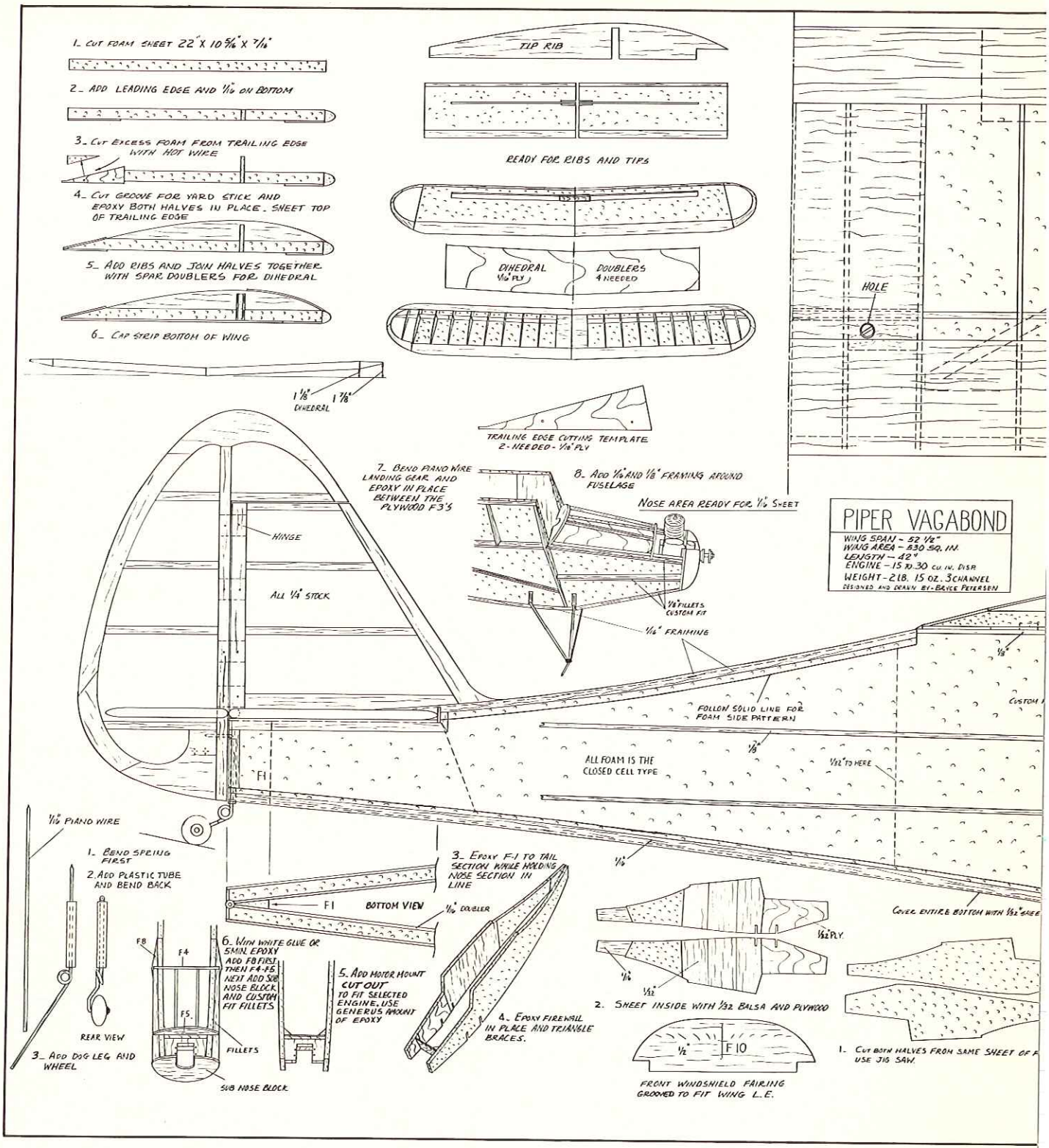
Wax paper is used to make the patterns for the nose sheeting.



A view of the basic wing components.



The Piper Vagabond, ready for covering.



smooth as possible so your cutting wire will not drag. Also, be sure they are **straight**. Use 5-minute epoxy around all frontal areas. When framing the fuselage with 1/16" balsa, white glue works fine. Be careful that your choice of glue will not attack the foam.

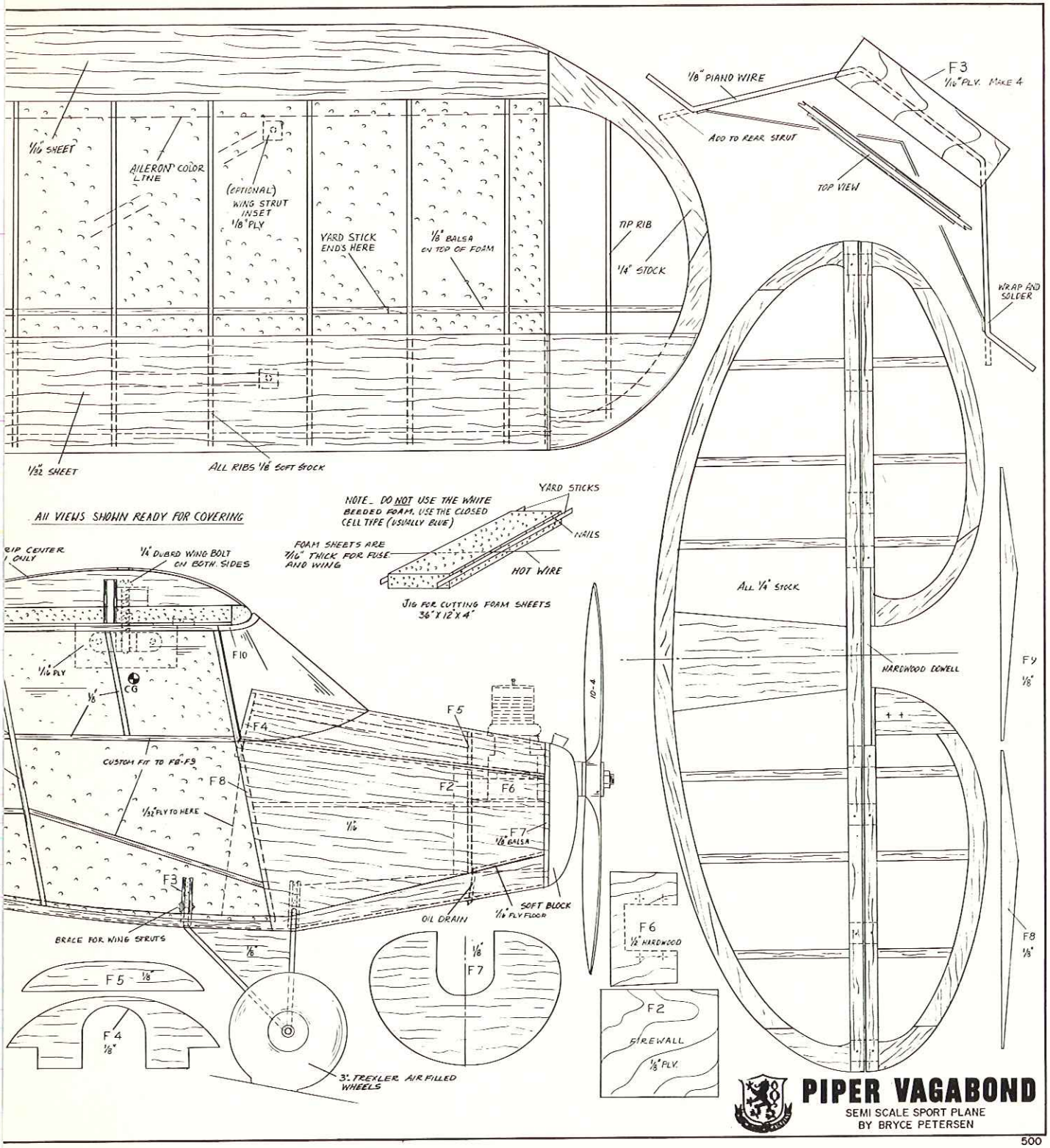
After the foam structure is complete with motor mount and sub-nose-block, start the framing with F8 and F9 on both sides. All other pieces fit to these formers by the cut-and-fit process. The 1/16" cap strips on the edges are marked by holding a 1/16" sheet of balsa against the sides, top, and bottom, while you mark your patterns. The nose block is secured after the nose sheeting is complete and should be slightly oversize for sanding. Sand all stringers and edges slightly round so the fabric can stretch around them.

When you are ready to sheet the nose area, wrap wax paper around it and mark your patterns with a scribe and straightedge. The top goes on as one piece, as do the sides and bottom.

Wing: Follow the step-by-step on the plan. The 1/16" cap stripping on the bottom is ¼" wide and is placed in the same position as the ribs on top.

Your choice of engine is important. Try not to go over a .20. You simply don't need it. The high drag of this model will just waste the extra power.

FULL SIZE PLANS AVAILABLE – SEE PAGE 110



Also, be sure your engine will idle properly. If there are a few extra revs in your idle, your model simply will not come down.

Covering: My model is covered with silkspan and dope. This is a little dangerous because of doping so close to the foam. If you do this, be careful. I would recommend one of the new mylar covering materials like the new silk spun Coverite, because it will save you a few ounces of weight. The cabin sides and windshield area are painted with flat black water base latex, right over the foam on the sides. Be sure to test your paint.

My control system is a Kraft, with 3 KPS 12 servos and a 225 mah pack, weighing only 9 ounces total. Connect the rudder servo to the aileron command on the transmitter. The rudder is very sensitive to roll rate. The only adjustment the pilot must make is steering on the ground. Ailerons would add little value to the Vagabond because of its slow air speed.

The fuel tank should be fit under the windshield as high as possible to allow normal fuel draw. The tank can be held in place with foam padding.

So from here, it is up to you. I know it is great sport to go whizzing straight up out of sight at 100 mph but, consider the nice soft touch and go . . . . isn't it the greatest maneuver of all? □

★ALL STAR★

BY ROMEY BUKOLT

THIS EYE-CATCHING 34" SPAN MODEL IS A MINIATURE COMPOSITE OF THE EAA HOME BUILT BIPLANES. USING TWO ACE FOAM WINGS, IT IS DESIGNED FOR TWO OR THREE CHANNELS AND A .10 ENGINE. EASY TO BUILD AND EASIER TO FLY, PROTOTYPES HAVE BEEN FLOWN WITH ENGINES FROM .049's TO .15's.

The Biplane nut knows who he is! Anything that flies turns him on. If it has two wings he goes into an inverted spin. Even a Dragonfly will attract a second glance.

I'm one.

Way back in the Summer of '42 and the adjacent years, I spent many hours out at the local "Air Patch" watching an old barnstormer named Felix Gauthier, clad in a leather jacket, helmet with goggles, and riding jodphurs, trace lazy aerobatics all over the sky in an orange and black open cockpit Waco biplane. I was only seven then, but the memory of the sights, sounds, and smell are all still vivid in my mind as I re-live them frequently, particularly when I come across a Biplane photo. World I's, vintage mail planes, early WW II military trainers, and the currently popular small homebuilt two wingers all cause that same subtle nudge of adrenalin.

For a number of years now I've collected the various air periodicals, and always looked forward, especially, to the Air Progress Homebuilt Annual, containing the latest creations of these imaginative, energetic modelers whose eyes and appetites grew beyond the limits of the 36" balsa sheet. Then, last Summer I had the priceless, unforgettable pleasure of attending the Experimental Aircraft Association Fly-In at Oshkosh, Wisconsin, truly one of the most outstanding aviation spectacles in the world. There, on one field, at one time, a collection of the finest homebuilt and restored vintage aircraft were to be seen, touched, heard and watched as they stood, parked in endless rows, along the runway as hundreds more flew an endless chain of Touch and Go's from dawn 'til dusk. There, is where one could see Biplanes! Literally hundreds of them graced the field. Some were over fifty years old and still flying, while others were chromed and polished and brand spankin' new.

The typical homebuilt is sort of like a scale model of a model, like 72" = 1'0" scale. They build them nearly the same and they look and fly just like their slightly smaller counterparts. I say "slightly" because that's just about the size of them. These Pitts Specials, Smith Miniplane's, Baby Great Lakes, and many others are hardly larger than an R/C model. One can stand along the wing and rest his hand on the cowl while touching the wing tip, but they fly. Boy, do they fly! Precision aerobatics you wouldn't believe! If your euphoria is biplanes, then this EAA event is your "fix."

I've been building R/C models for the last seven years and have wanted to build a biplane ever since I first became interested in the hobby, however it seemed that the only scale-like realistic looking biplane kit available was the Andrews Aeromaster whose size and price were a little out of my reach. Many times I'd think up a design but always seemed to run up against some sort of phobia that said, for all the effort required to build up two wings, getting the alignment just right, with proper incidences, balance point, etc., I'd probably demolish the aircraft before I could trim it out, anyway. So, whenever my T'winger urge came up, I would draw a few sketches and doodle around with the design ideas and gimmicks until the feeling wore off, or I became buried under a confused muddle of unknown design factors.

Last Summer I finally broke through this "barrier" by using the "cheap and dirty" attitude – throw something together quick and easy with whatever is handy and if it turns out to be a "bummer", no great loss! So, naturally, the quickest way to a finished biplane is to start with foam wings. A couple of Ace Mini-Foam wings were gathering dust within an arms reach of me so I started with them. Using Chuck Cunningham's design parameters (RCM 3/69), I developed the correct fuselage and tail dimensions.

Probably one of my main psychological hang-ups about biplanes was always the cabane strut mess. I never was much good at wire bending and soldering. For a landing gear one can get by with a mediocre job, I suppose, but building a platform for a wing to be in proper alignment with another wing, seemed to be just a little more than I thought I could handle. Then, the idea of the plywood cabane struts struck me (nothing new, Ken Willard used it in his "Classmate" design, years ago). I decided to construct that area first so that if the idea didn't work I could abandon the whole project without expending too much effort. How's that for a positive attitude? Well, as it turned out, the cabane strut assembly came together with no effort at all. From that point on, construction of the remainder of the plane was no different than any single low winged aircraft. Since I got this far, I decided to go beyond the "cheap and dirty" boxy design I originally envisioned and, instead, lean more towards a scale-like image. Thus, the All Star homebuilt type sport biplane was created. Of course I still had no idea what I'd be up against in trying to get the airplane trimmed in its initial flights before it would plant itself in the sod or, for that matter, whether it would fly at all. Here again, my fears were eventually proved to be unfounded. Construction continued easily and the model was completed in a surprisingly short time.

The prototype was equipped with a Max .10 engine and three channels of an MRC – 710 radio for rudder, elevator, and throttle control. With all the flying surfaces looking reasonably square with each other and the center of gravity located as per Chuck Cunningham's suggestion, the plane was fueled up, started, and cautiously taxied around the grass field. It handled surprisingly well on the ground, so, with tongue in cheek, I turned the plane into the wind and faced the moment of truth. With a gradual increase of throttle, the model began picking up speed and, in about 20 feet, the tail lifted off the ground with no help from the transmitter. This brief moment is one of the main reasons nearly every model I build is a "tail dragger". It's a scale-like maneuver you just can't get out of a hot pattern ship.

The takeoff roll was smooth and straight. Remembering too well how I destroyed another aircraft on its maiden takeoff by too eagerly feeding in up stick pressure before the model gained sufficient flying speed, I decided to hold off as long as possible before applying only a slight touch of up-elevator. The plane continued across the field with its tail in the air for another 100 feet, then broke ground, lifting slowly into the blue. A cautious application of left rudder put the plane into a large gentle left turn. This told me that the aircraft was not overly sensitive to the rudder control, and a light pressure on the elevator control showed me the plane was not overly sensitive to the elevator control, either.

With this load off my mind, I was able to make a few necessary in-flight trim adjustments and suddenly "discovered" myself flying my own biplane instead of just thinking about it. What a pleasure! The balance of the flight was pure fun. I found that the plane was docile and smooth in flight with no apparent bad faults. After a few gentle maneuvers, I throttled the engine down until the airplane could

"Stunning" Tricia Bukolt, professional fashion model of Madison and Milwaukee, Wisconsin poses with the All Star, an all-star performer.

no longer sustain flying speed and then eased in up-stick pressure until the plane was mushing along sort of like a lightly tossed folded paper dart. It continued to hold this attitude and showed no tendency to fall off on one wing or the other. The stall characteristics were excellent. You could fly this plane all over the sky at about half throttle and make slow lazy passes in a most scale-like fashion.

The landings are slow, easy, smooth, soft, and whatever other adjectives one can use to describe just about the prettiest thing you ever saw on the flying field. The landing roll continued smooth and straight, on grass yet, with no tendency to ground loop or nose over.

After a full Summer of flight testing with a wide range of equipment and trim variables, I can safely say that **nothing** is critical in affecting the performance of the All Star. It has been flown with engines ranging from the TD .049 to the Max .15. Wing loadings from 16 to a heavy 23½ oz./sq. ft. were tried. Incidences were varied on each wing from 0° to 3° without any adverse reactions. The center of gravity was shifted ½" either way from the ideal position without impairing performance. A variety of propellers and fuels were tried. None of these experiments put the aircraft in any marginal performance attitude. Therefore, the model should be easy to build, easy to trim, easy to fly, no matter what kind of builder you are and regardless of what kind of equipment and control you prefer. The plane is small, but don't brush it off as an over equipped R/O job. With a Max .15, it is a real live one. It loops, spins, flies inverted, rolls, all with the greatest of ease. Touch and Go's are effortless. In short, it is an All Star performer.

CONSTRUCTION

Fuselage:

Begin by placing each of the nose, battery, and servo doublers on the fuselage sides. Check each for proper matching and location. Before cementing the servo doubler, plan your servo installation and make the necessary servo rail cutouts in the doubler. If you intend to use a heavier engine such as an Enya .09 or Max .15, the battery pack could very likely end up under the cockpit. Also, the pushrods must clear the bottom of F-3, so keep these factors in mind when positioning your servos.

After the doublers are installed, cement the firewall, F-2, and F-4, to one side making sure that each is perpendicular to the fuselage side. I'd recommend using epoxy, at least on the firewall. As a matter of fact, one set of small tubes of Devcon 5-Minute epoxy will be adequate to assemble the entire plane, including the foam wings which must use epoxy, and because it sets up so fast, there's no waiting for parts to dry before proceeding with the next step.

Install the two servo rails and the second fuselage side, taking care to make sure that both sides are parallel and square with each other.

Pull the tail ends of the fuselage together and sandwich a 3/32" x 1/4" filler in-between. When joining the tail, check for proper alignment by setting one straight edge across the fuselage at the cockpit and another across the fuselage at the stabilizer cutout. Then, while sighting down the center line of the fuselage, adjust the tail glue joint so that the straight edges are parallel.

Mount former F-6 at the front edge of the stabilizer cutout and former F-5 half way between F-4 and F-6. Add spacers, cut from 3/32" x 1/4" stock, directly below F-5 and F-6 along the bottom of the fuselage.

Everyone uses their own pet techniques in building, but if you follow this suggested sequence in constructing the front end of the fuselage you might save a little time, trouble, and extra effort. The objective is to get a good fitting well aligned removable hatch-cabane strut unit.

1) Glue the small hatch mount block with the 3/16" hole, to the top back side of the firewall.

2) Cut the hatch block to the proper dimensions, 3" x 9" x ¾" high at the front and 1¼" high at the rear.

3) Lay out the saw cut lines on the hatch surface for the cabane struts, per the location shown in the top view of the plan. Note that the two lines converge a bit towards the front. This is because the top surface is inclined and they must converge if the cabane struts are to be parallel to the longitudinal axis of the fuselage.

4) Cut the two cabane strut slots 1/16" wide and at 60° angle with the bottom surface. This can easily be done on a Dremel saw or even a saber saw with a tilting head.

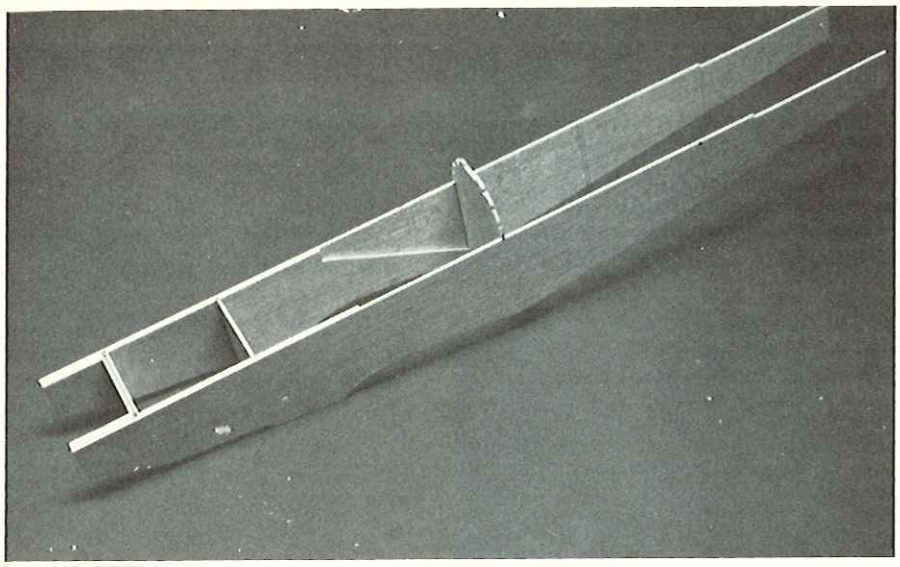
5) After you've drilled the ¼" hole in the F-3 former, use the former as a template to locate the hole position for the retainer dowel at the rear of the hatch block. Position the former so that there is 3/32" space between the top of the hatch block and the top of the former to allow for the cockpit coaming that will cover the top edge of F-3. Mark the hole location and drill a ¼" hole ¾" deep into the end of the block.

6) Now, before shaping the hatch block, insert the ¼" dowel so that ¼" of the dowel sticks out. Slide the F-3 former onto the dowel and carefully fit the assembly to the fuselage. When you are satisfied with the fit, and while the former is still on the block, apply cement to the bottom side edges of the former and install, using the hatch block as a holding fixture. Tape the assembly to the fuselage until dry. This procedure will guarantee a good fit between the fuselage and the hatch.

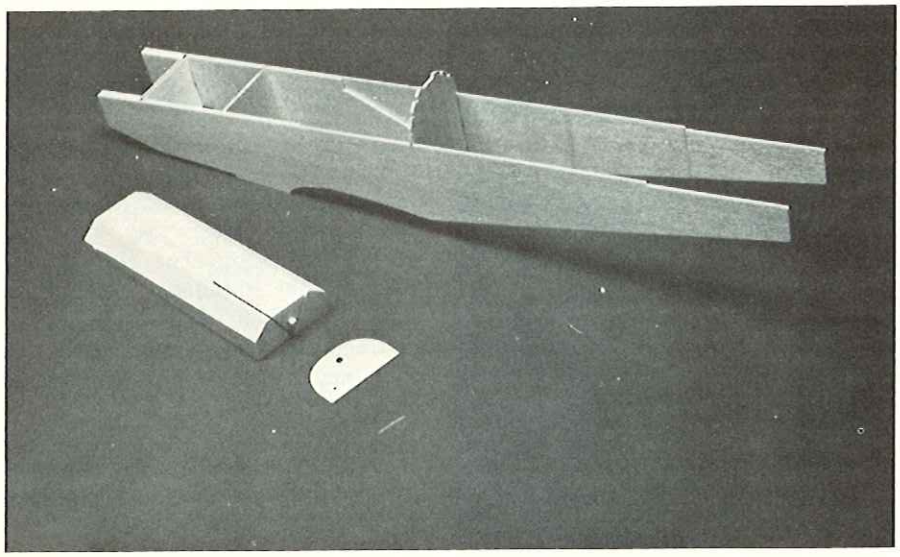
7) While the block is taped in place, turn the fuselage over and, through the hole in the small hatch mount block, mark the spot where the hatch mounting screw will come through the block.

8) Next, install the cockpit floor, followed by the two cockpit coaming pieces. This can be easily done if the hatch block is removed first. Once the coaming pieces are secured to the top edge of the fuselage, they can be moistened, bent, cemented and taped in place over the edge of the F-3 former.

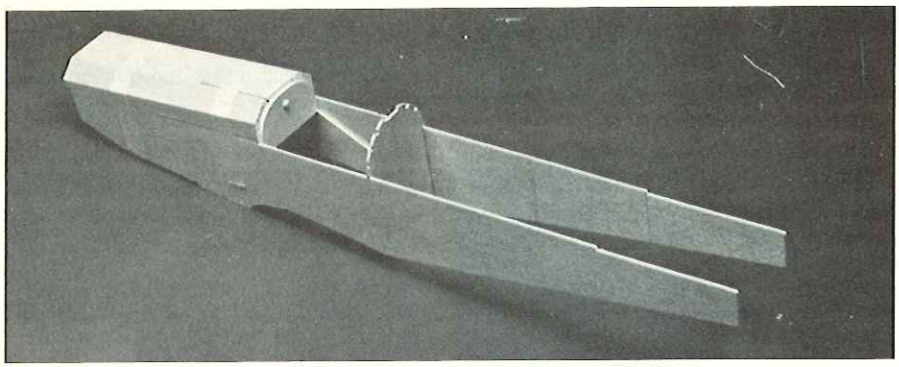
9) Fit and glue the ¼" shim blocks to the bottom of the fuselage, and add the ¼" cowl face piece. When all this is dry, replace the hatch. Now the fuse-



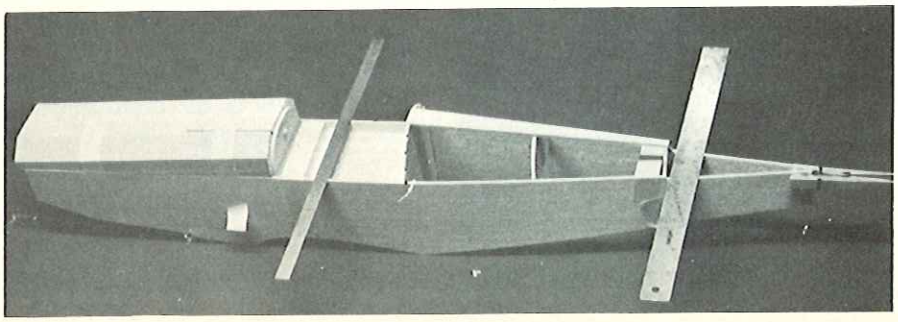
Fuselage assembly with doublers, firewall, F-2, and F-4 in place.



Hatch block and F-3 former ready for installation.



F-3 is cemented in place using the hatch block as a fixture.



Use two straight edges to align fuselage when joining tail.

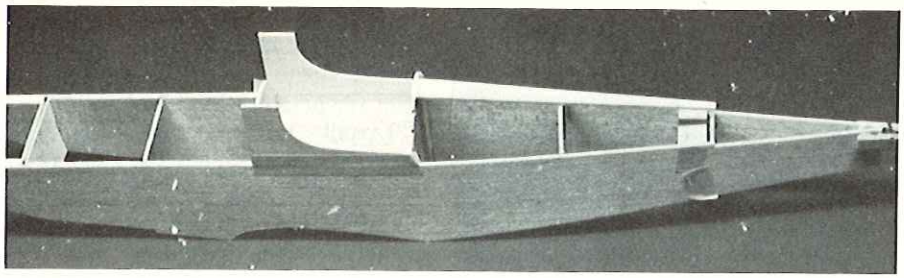
lage is ready for carving and sanding to its finished shape. Note, that the cabane struts are not installed until after the hatch is shaped and sanded.

Install the stabilizer, carefully checking its alignment with the fuselage. After gluing the rudder post to the fin, add the fin to the tail assembly, again, checking its alignment with the stabilizer and fuselage. The turtle deck spine is added next, followed by the six 1/8" stringers. The fuselage is sheeted cross grain with 1/16" balsa. The headrest is added after the turtle deck is covered with the covering of your choice. I personally prefer Quick-N-Easy Products Topcote because it can be painted.

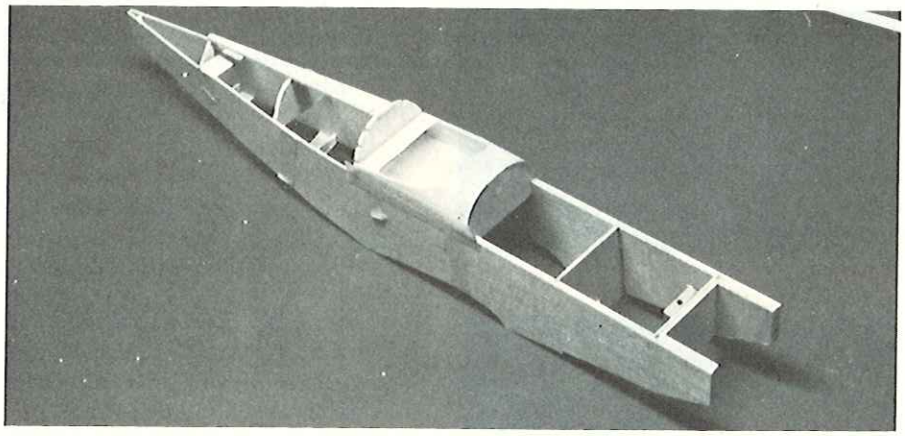
At this stage, the fuselage is ready for its initial coats of finish. Note that the cabane struts, wing dowels, landing gear and L.G. support plate are still off. I prefer to minimize the obstructions while applying the numerous undercoats that require a lot of sanding.

When the fuselage is ready for its color coats, the cabane struts can be installed. If the bottom edges of the struts are flush with the bottom surface of the hatch block, the correct top wing alignment will be automatic. Bend the 1/16" music wire top wing saddle per the top and side views of the drawing and secure it to the plywood cabane struts with carpet thread and epoxy.

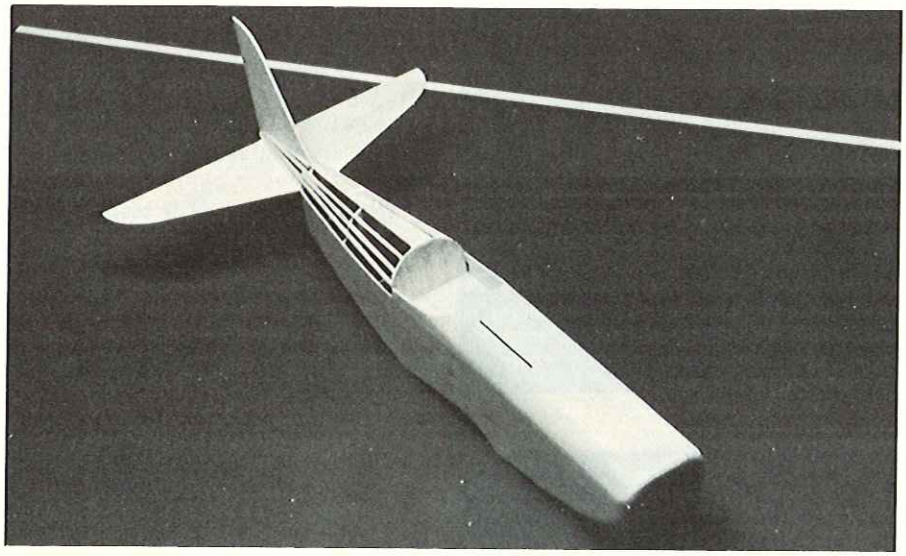
Bend the 3/32" main landing gear wire to the shape shown on the drawing and slide into the slot ahead of F-2, then add the landing gear



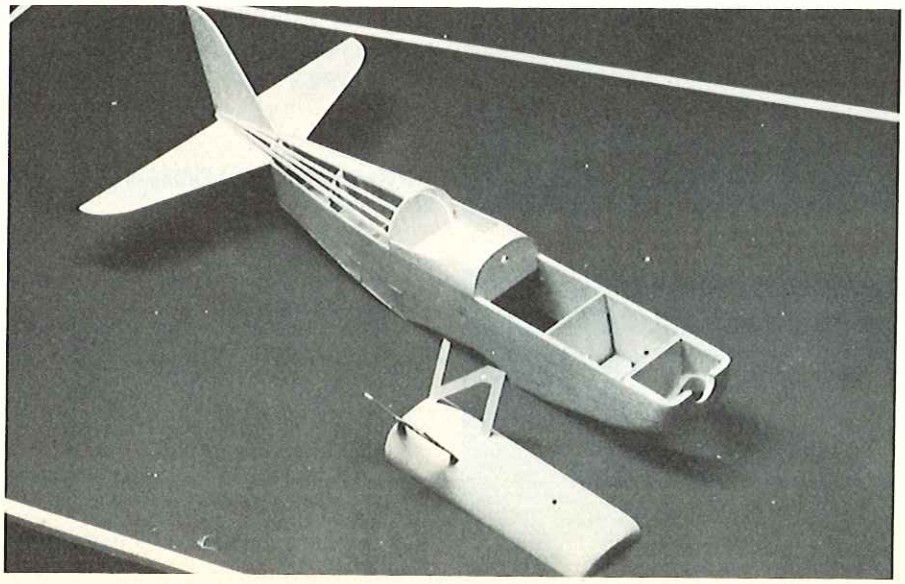
Add the cockpit floor and coaming. Moisten coaming before wrapping over F-3.



Cockpit coaming is installed before hatch block is carved.



Front end is shaped and sanded before cabane struts are installed.



Hatch removed to show spacious radio compartment.

support plate.

Install the 1/8" bottom wing hold dowels.

With the main landing gear wire in place, bend the 1/16" wire rear landing gear support strut to fit and rubber band it to the leading edge wing dowel to act as a holding fixture while the two wires are soldered together at the axle. Install the strut webs between the landing gear strut wires, using epoxy and fiberglass cloth or covering material.

Now, mount the steerable tail wheel, holding the nylon bearing tube in place with epoxy and fiberglass or cotton tape. Make the necessary engine and equipment cutouts and complete the finishing of the fuselage assembly. When cementing the two elevators to the 1/8" dowel be sure that they are in line with each other.

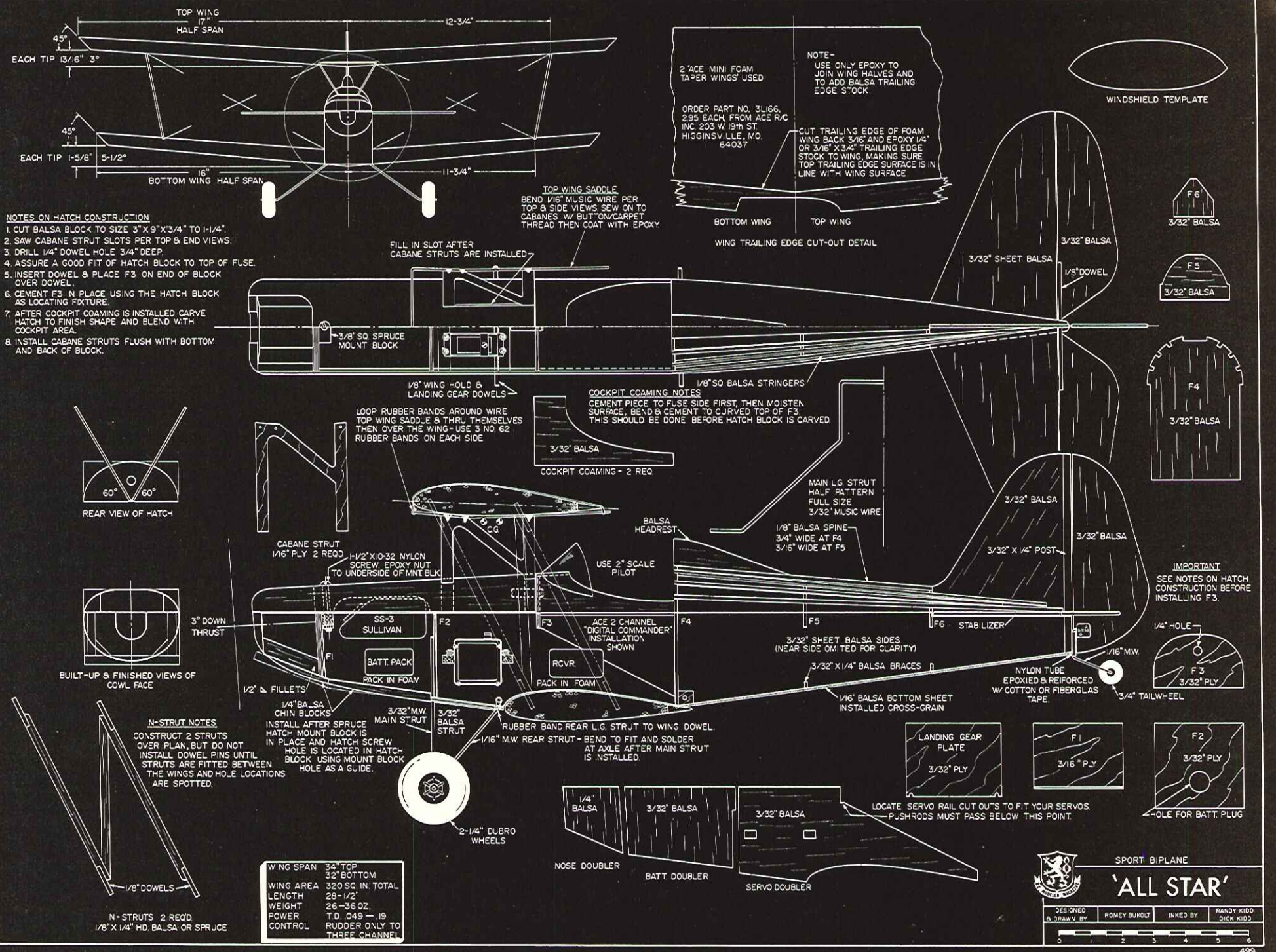
Wing Construction:

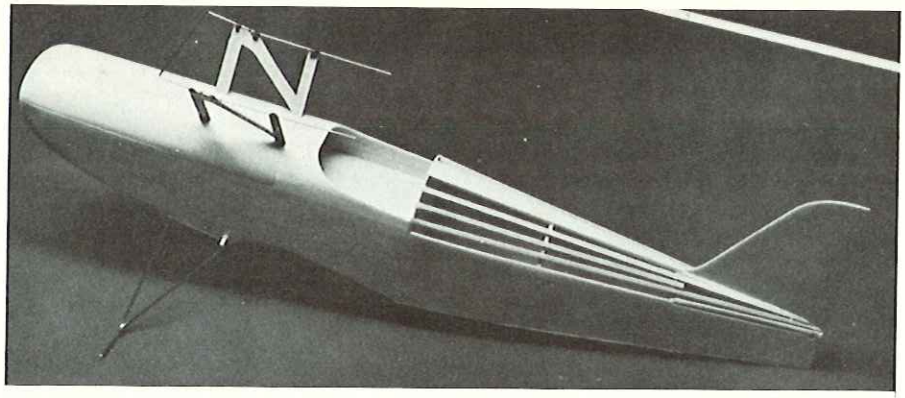
Complete instructions for joining the foam wing halves and for finishing are included with each set of Ace Tapered Mini-Foam wings.

Using a straightedge and X-Acto knife, cut 3/16" off the trailing edge of each wing panel. Be careful to hold the knife at the correct angle so that when the ¾" trailing edge stock is epoxied onto the wing the top surface of the wing will be in line with the top surface of the trailing edge.

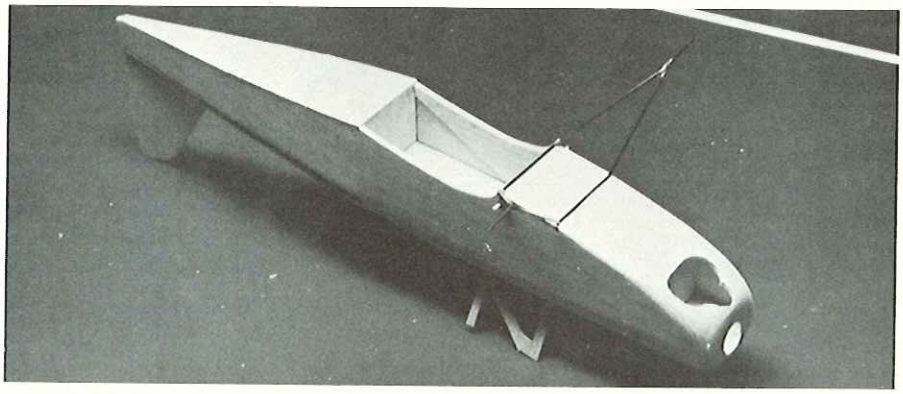
Sand the center faces of the wings to the correct dihedral angle using the technique described in the instructions included with the wings.

Cut the tips off at a 45° angle per the front view in the drawing. These raked tips definitely affect and improve the roll characteristics of the

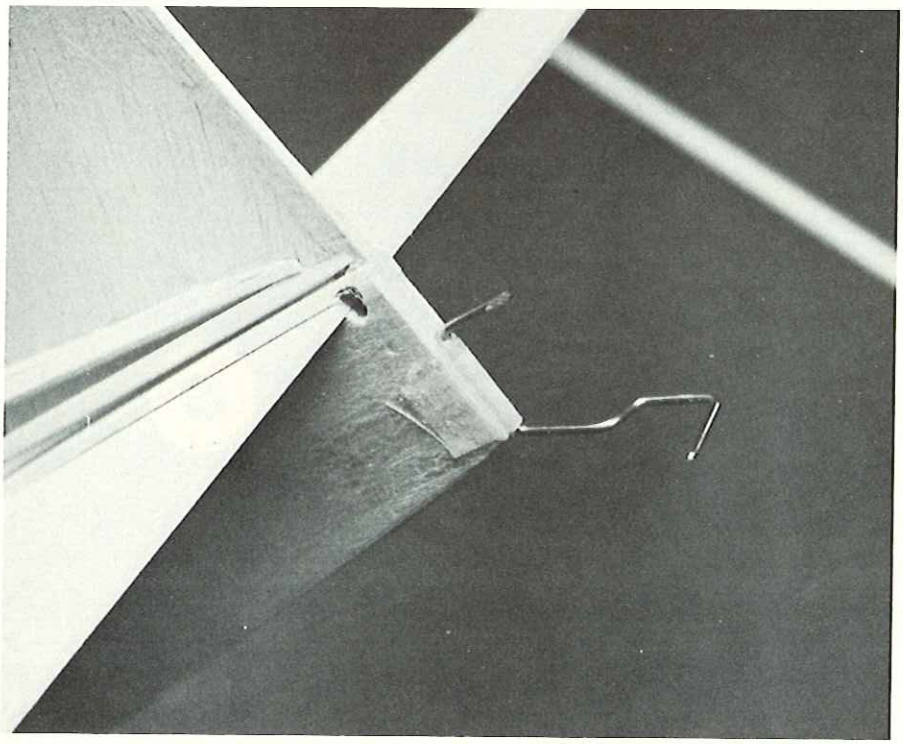

TOP WING
17"
HALF SPAN
12-3/4"
45°
EACH TIP 13/16" 3°
45°
EACH TIP 1-5/8" 5-1/2"
16"
BOTTOM WING HALF SPAN
11-3/4"
2 "ACE MINI FOAM TAPER WINGS" USED
ORDER PART NO. 13L166, 2.95 EACH, FROM ACE R/C INC. 203 W 19th ST HIGGINSVILLE, MO. 64037
NOTE- USE ONLY EPOXY TO JOIN WING HALVES AND TO ADD BALSA TRAILING EDGE STOCK
CUT TRAILING EDGE OF FOAM WING BACK 3/16" AND EPOXY 1/4" OR 3/16" X 3/4" TRAILING EDGE STOCK TO WING, MAKING SURE TOP TRAILING EDGE SURFACE IS IN LINE WITH WING SURFACE
BOTTOM WING
TOP WING
WING TRAILING EDGE CUT-OUT DETAIL
WINDSHIELD TEMPLATE
NOTES ON HATCH CONSTRUCTION
1. CUT BALSA BLOCK TO SIZE 3" X 9" X 3/4" TO 1-1/4".
2. SAW CABANE STRUT SLOTS PER TOP & END VIEWS.
3. DRILL 1/4" DOWEL HOLE 3/4" DEEP.
4. ASSURE A GOOD FIT OF HATCH BLOCK TO TOP OF FUSE.
5. INSERT DOWEL & PLACE F3 ON END OF BLOCK OVER DOWEL.
6. CEMENT F3 IN PLACE USING THE HATCH BLOCK AS LOCATING FIXTURE.
7. AFTER COCKPIT COAMING IS INSTALLED CARVE HATCH TO FINISH SHAPE AND BLEND WITH COCKPIT AREA.
8. INSTALL CABANE STRUTS FLUSH WITH BOTTOM AND BACK OF BLOCK.
TOP WING SADDLE
BEND 1/16" MUSIC WIRE PER TOP & SIDE VIEWS SEW ON TO CABANES W/ BUTTON/CARPET THREAD THEN COAT WITH EPOXY
FILL IN SLOT AFTER CABANE STRUTS ARE INSTALLED
F6
3/32" BALSA
3/32" BALSA
3/32" SHEET BALSA
1/8" DOWEL
F5
3/32" BALSA
3/8" SQ. SPRUCE MOUNT BLOCK
1/8" WING HOLD & LANDING GEAR DOWELS
1/8" SQ. BALSA STRINGERS
F4
3/32" BALSA
LOOP RUBBER BANDS AROUND WIRE TOP WING SADDLE & THRU THEMSELVES THEN OVER THE WING - USE 3 NO. 62 RUBBER BANDS ON EACH SIDE
COCKPIT COAMING NOTES
CEMENT PIECE TO FUSE SIDE FIRST, THEN MOISTEN SURFACE, BEND & CEMENT TO CURVED TOP OF F3. THIS SHOULD BE DONE BEFORE HATCH BLOCK IS CARVED.
3/32" BALSA
COCKPIT COAMING - 2 REQ.
60°
60°
REAR VIEW OF HATCH
CABANE STRUT 1/16" PLY 2 REQD.
C.G.
BALSA HEADREST
MAIN L.G. STRUT HALF PATTERN FULL SIZE 3/32" MUSIC WIRE
1/8" BALSA SPINE 3/4" WIDE AT F4 3/16" WIDE AT F5
3/32" BALSA
3/32" BALSA
3/32" X 1/4" POST
1-1/2" X 10-32 NYLON SCREW, EPOXY NUT TO UNDERSIDE OF MNT. BLK.
USE 2" SCALE PILOT
IMPORTANT
SEE NOTES ON HATCH CONSTRUCTION BEFORE INSTALLING F3.
3° DOWN THRUST
SS-3 SULLIVAN
F1
F2
F3
F4
F5
F6
STABILIZER
ACE 2 CHANNEL "DIGITAL COMMANDER" INSTALLATION SHOWN
BATT. PACK
PACK IN FOAM
RCVR.
PACK IN FOAM
3/32" SHEET BALSA SIDES (NEAR SIDE OMITED FOR CLARITY)
1/4" HOLE
1/16" M.W.
F3
3/32" PLY
3/32" X 1/4" BALSA BRACES
NYLON TUBE EPOXIED & REIFORCED W/ COTTON OR FIBERGLAS TAPE.
3/4" TAILWHEEL
1/16" BALSA BOTTOM SHEET INSTALLED CROSS-GRAIN
BUILT-UP & FINISHED VIEWS OF COWL FACE
1/2" R. FILLETS
1/4" BALSA CHIN BLOCKS
INSTALL AFTER SPRUCE HATCH MOUNT BLOCK IS IN PLACE AND HATCH SCREW HOLE IS LOCATED IN HATCH BLOCK USING MOUNT BLOCK HOLE AS A GUIDE.
3/32" M.W. MAIN STRUT
3/32" BALSA STRUT
RUBBER BAND REAR L.G. STRUT TO WING DOWEL.
1/16" M.W. REAR STRUT - BEND TO FIT AND SOLDER AT AXLE AFTER MAIN STRUT IS INSTALLED.
N-STRUT NOTES
CONSTRUCT 2 STRUTS OVER PLAN, BUT DO NOT INSTALL DOWEL PINS UNTIL STRUTS ARE FITTED BETWEEN THE WINGS AND HOLE LOCATIONS ARE SPOTTED.
1/8" DOWELS
N-STRUTS 2 REQ'D. 1/8" X 1/4" HD. BALSA OR SPRUCE
2-1/4" DUBRO WHEELS
LANDING GEAR PLATE 3/32" PLY
F1 3/16" PLY
F2 3/32" PLY
HOLE FOR BATT. PLUG
1/4" BALSA
3/32" BALSA
3/32" BALSA
LOCATE SERVO RAIL CUT OUTS TO FIT YOUR SERVOS. PUSHRODS MUST PASS BELOW THIS POINT.
NOSE DOUBLER
BATT. DOUBLER
SERVO DOUBLER
WING SPAN 34" TOP 32" BOTTOM
WING AREA 320 SQ. IN. TOTAL
LENGTH 28-1/2"
WEIGHT 26-36 OZ.
POWER T.D. .049 — 19
CONTROL RUDDER ONLY TO THREE CHANNEL
SPORT BIPLANE
'ALL STAR'
DESIGNED & DRAWN BY ROMEY BUKOLT
INKED BY RANDY KIDD DICK KIDD
0 1 2 3 4 5 6
499



Wire landing gear and top wing saddle are added prior to painting.



Underside view showing cutout for inverted O.S. Max .15.



Close-up of steerable tail wheel installation.

aircraft. The top wing span should be 34" and the bottom, 32" span. Note, that the top wing has a 3° dihedral under each wing and that the bottom wing has a 5½° dihedral under each wing. After the wing assembly is complete, cut out the recesses at the center trailing edge of each wing.

N-Struts:

Assemble the two N-Struts over the plan but do not add the 1/8" dowel pins yet. Mount the wings on the fuselage with #32 rubber bands. The top wing is attached by wrapping the rubber bands around the 1/16" wire saddle at the leading edge, looping the rubber bands through themselves, then over the wing to the wire extending beyond the trailing edge. Check overall wing alignment with the fuselage and with each other. Now, locate and position the N-Struts in their proper place between the wings. Some custom fitting may be required by shortening some of the ends of the struts until they all mate with the wings.

Mark the dowel pin hole locations in the wings and, while the struts are still wedged between the wings, poke holes into the foam using a 1/8" dowel sharpened to a point. Align the dowel to the correct angle parallel to the strut leg as you press the dowel into the wing. Be careful so you don't push it all the way through.

Cement the 1" dowel pins to the struts with epoxy.

Installation of the struts simply requires inserting them first in the bottom wing, then aligning and setting the top wing in place and with care press the top wing down on the dowels before securing it to the cabane struts with rubber bands. Do not cement the N-Struts to either wing.

That pretty much sums up the construction of the All Star. The windshield and pilot (2" scale Williams pilot would be just right) are added along with the engine and equipment. To add a little scale realism, wing wires can be easily installed by using elastic thread, available in any variety store. Cut four lengths approximately 18" to 20" long, tie loops on the ends and loop over the N-Strut dowel pins while installing the struts.

When installing control horns, use Carl Goldberg horns mounted so that the horn will cover the portion of the rudder where the tail wheel tiller is inserted. The horn will greatly increase the strength where it would otherwise be quite weak.

When installing the tank, it may be

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building the BELL HUEY COBRA r/c helicopter

PHOTOS AND TEXT BY DON DEWEY

ASSEMBLING THE BELL HUEY COBRA HELICOPTER

The radio controlled model of the Bell Huey Cobra was designed by Dieter Schluter in Germany and was the first completely successful radio controlled model helicopter in the world as well as the first to be offered as a commercial kit.

Available in the United States from Model Helicopters, 14695 Candeda Place, Tustin, California 92680, the Huey Cobra kit consists of several sub-kits. The first is the precision machined mechanical parts kit consisting of cooling fan, clutch flywheel, clutch housing, fan housing, starting belt, transmission with six high speed ballbearings, tail rotor assembly, aluminum motor and transmission mounting plate, main rotor shaft, swash plate assembly, main rotor assembly, rotor see-saw, blade holders, flexible tail rotor shaft with couplings, all special hardware, bolts, nuts, and Allen wrenches. The second "sub-kit" is the main and tail rotor blade kit consisting of milled hardwood and shaped balsa for a precise airfoil as well as covering material, etc. The highly detailed one piece fiberglass fuselage, formed butyrate canopy and cockpit assembly, internal framework, skids, and training landing gear consists of yet another "sub-kit." And, of course, full size plans of this fantastic radio controlled helicopter are included. Also available from Model Helicopters in Tustin, California, is the 1/32 scale Revel plastic kit of the Bell Huey Cobra Helicopter, a highly detailed static model which can be used for scale reference when constructing the cockpit and external scale details of the Huey Cobra.

The specifications for the Huey Cobra are as follows:

Rotor diameter – 63"; Rotor Blade area, single – 90.75 square inches; Air Frame length – 73"; Air Frame weight (net) – 36 oz; Helicopter flying weight, with four channel radio (dry) – 11-11.5 lbs.; and the scale to the full sized Bell Huey Cobra is 1:7.5.

GENERAL

The Bell Huey Cobra, available in the United States from Model Helicopters, Inc., is a kit of perfectly matched precision components which has been field proven throughout the world as a reliable and true flying helicopter in every sense of the word. However, it is mandatory that each step of the manufacturers instructions be followed step-by-step including a preliminary reading of the instructions and a study of the illustrated parts catalog and parts call out sheet. As pointed out in the instructions, you have invested a considerable sum in your Bell Huey Cobra and you can be assured that it will fly for you if you follow the instructions to the letter. No modifications of any type or form should be attempted. In addition, this helicopter is definitely not for the beginner in R/C. While, although the beginner could learn to fly it with as much ease as the proficient R/C flier, since it involves a whole new method of learning to fly, the manufacturer could not possibly cover all the phases of building and flying in his instruction sheets that you should know prior to attempting the construction of the Model Helicopter's Bell Huey Cobra. Again, we urge you to study the instructions through carefully as well as identifying and inventorying the more than 200 parts in the mechanical kit prior to assembling your Bell Huey. We hope that our photo sequence of assembly will aid you in the assembly of this magnificent machine.

The mechanical parts kit for the Huey Cobra are placed into six groups. Group 1 consists of the motor, fan and clutch assembly; Group 2 is the transmission assembly; Group 3 consists of the main and tail rotor drive; Group 4 consists of the tail rotor and gear box assembly; Group 5 is the swash plate assembly; and Group 6 is the main rotor assembly. We will begin with Group 1.

MOTOR, FAN & CLUTCH: GROUP I

It is strongly recommended that you obtain a German-made Veco .61 R/C engine with Perry carburetor and muffler which has an extremely high horsepower rating and is ideally suited for the Huey Cobra due to its exceptional idling and non-tempermental fuel draw characteristics. The construction of the RCM prototype uses the German-made Veco .61 and it is shown in all photos accompanying this article. Other engines that have been used on the Huey Cobra include the Super Tigre G .60 RV, the Super Tigre G .71 RV as well as the front intake O.S. Max Goldhead .60 R/C engine. Again, however, we do recommend the use of the German-made Veco .61 which is available from Model Helicopters, Inc., and is ideally suited for your Huey Cobra.

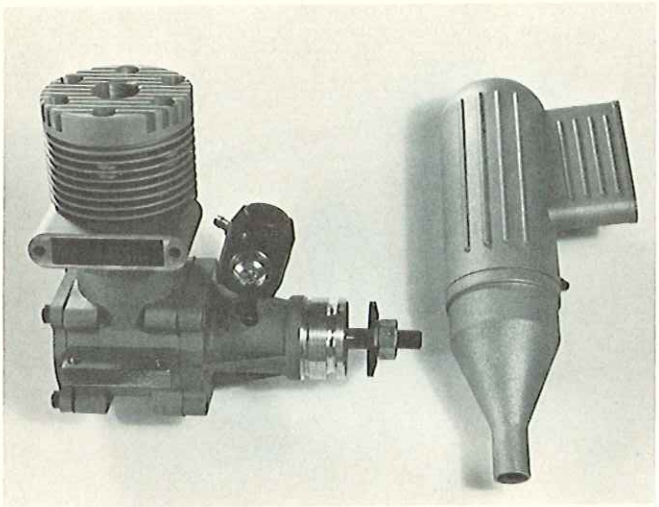
The first step is to remove the two set screws that hold the Perry carburetor in place on the engine and remove the Perry carburetor complete with O-ring gasket. Next, place the Veco .61 engine in your wife's oven which has been preheated to 450 degrees F. Allow the engine to set in the oven for 20-30 minutes. Now, remove the engine (using a hot pad to protect your hands) and remove the drive washer-front bearing housing with a pair of pliers. Remove this assembly carefully and, if you find it difficult to remove, stand the engine on its prop shaft and, with a small hammer and a piece of brass tubing, tap the drive washer-bearing housing loose until it comes off the shaft. Do not use a screwdriver or other steel item to drive this mechanism loose from the shaft since you may damage the bearings inside. Remove the housing and the brass split lock ring which will no longer be used with the engine.

Next, slide the prop shaft spacer and split lock ring (01.04) onto the shaft of your engine with the narrow end facing forward. Now, take the fan, starting pulley, and machined spring clutch assembly which comes as one unit (01.10) and carefully clean off any burrs on the fan casting with a small fine file. Insert the assembly on the shaft of your engine with the fan towards the crankcase and fitting over the prop shaft spacer and split lock ring which you previously installed on the prop shaft. Next, take the coupling hex nut and clutch housing needle bearing assembly (01.08 and 01.09) which is one unit and, with the ball bearing end facing forward, screw it through the front of the machined spring clutch assembly and on to the threaded prop shaft of your engine. Use a standard four way glow plug wrench for tightening this down securely onto the prop shaft of your Veco .61. Make sure that this is extremely tight. This completes the basic assembly of the motor, fan, and clutch in Group 1.

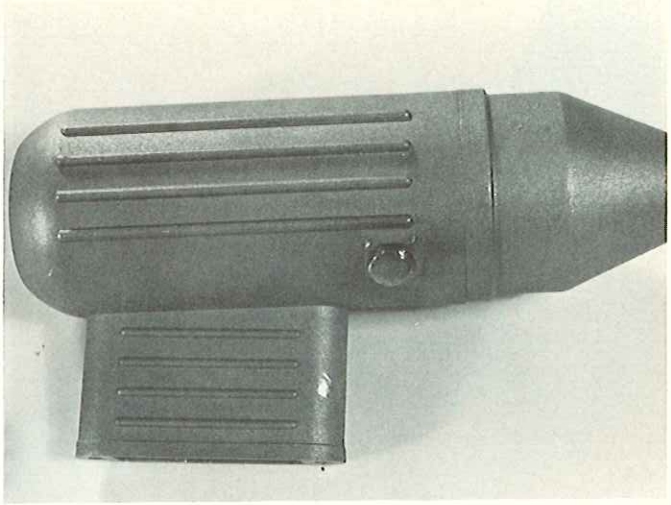
While you're at it, and since you will use the muffler on your Veco .61, remove the pressure fitting from the side of the muffler since it will not clear the fiberglass fuselage when finally installed on your engine. You can either replace this pressure fitting with a metric screw of the same size to close off the hole, or you can simply use a Dremel carborundum blade and cut off the protrusion above the hex nut and fill the internal hole with silver solder as shown in the photographs. We would like to point out at this time that this engine will not be broken in in the conventional manner with the propeller but rather will be broken in as a single unit with the transmission later on after assembly is completed.

TRANSMISSION: GROUP 2

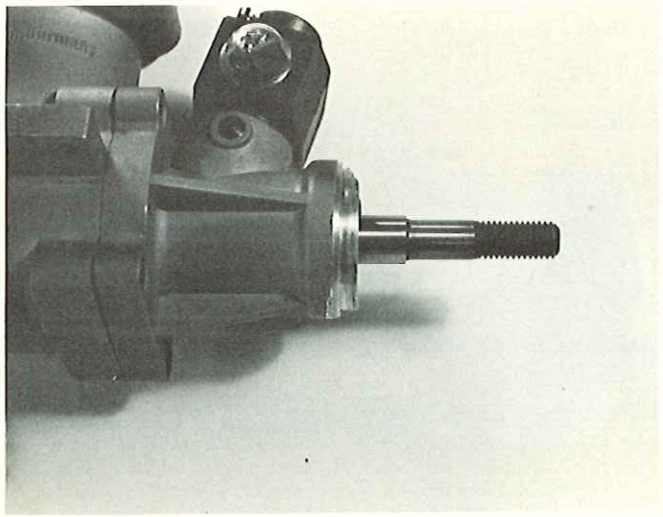
The next step is the assembly of the transmission. This consists of the cast transmission case (02.16), the main rotor drive transmission gear sub assembly, the tail rotor drive transmission gear sub assembly, and the clutch drum and drive shaft assembly, as well as the transmission case mounting screws and the two oil level screws. The first step is to remove the six nuts and bolts (01.02 and 01.03) from the transmission case halves thus dissassembling the cast transmission housing. Very carefully remove all burrs and flashing from the inside edges of the housing with a small fine file. Next, thoroughly clean the entire transmission case halves with acetone, removing all traces of sand, grit, and filing residue. This step is also necessary in order to remove any oil or grease in preparation for applying the Stabilit Express, a special epoxy which is provided with your kit. This is a fast setting (20 minute) epoxy with no tendency, whatsoever, to run or drip. It will be used in this step to join the bearing of the main rotor



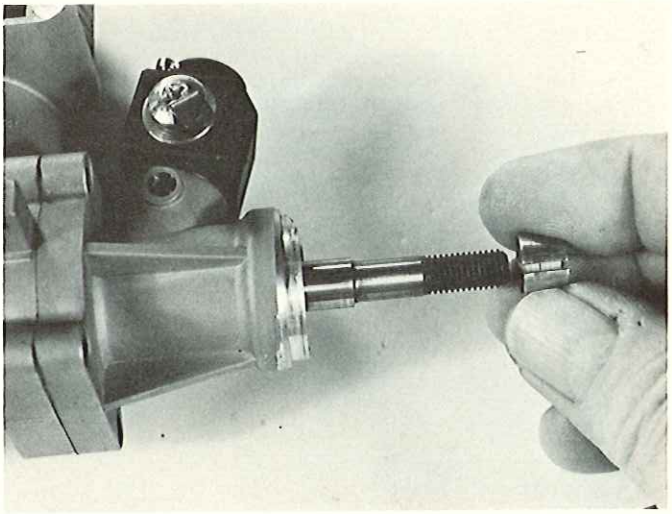
The German Veco .61 engine with Perry carburetor and muffler. The pressure nipple must be removed from the muffler prior to installing on the engine.



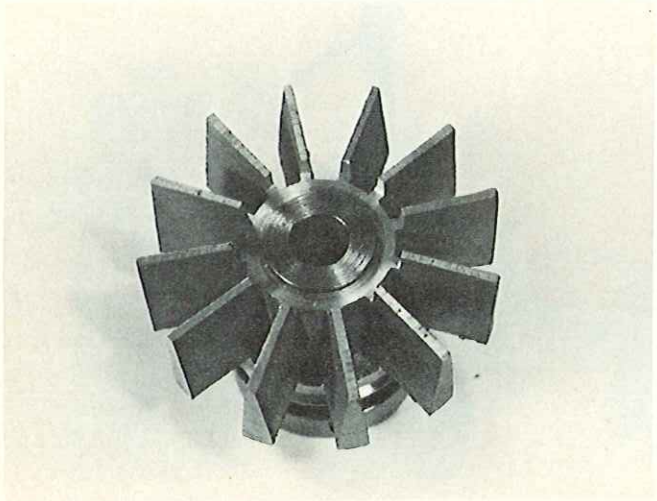
A close-up of the German Veco .61 muffler with pressure nipple removed, the top half sawed off above the hex nut and the hole filled with silver solder.



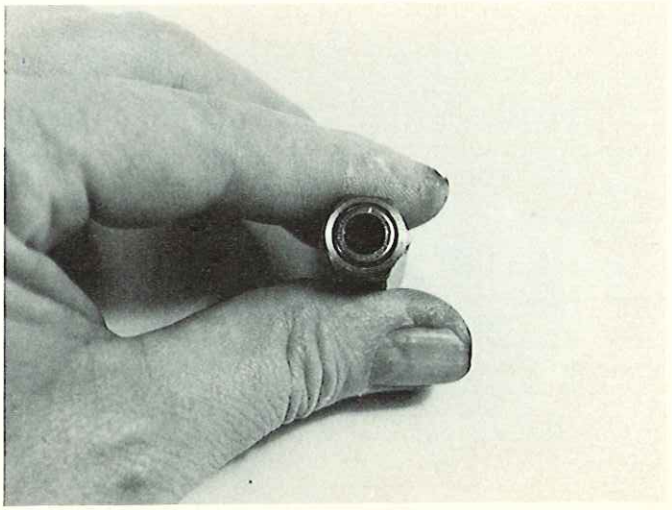
The drive washer assembly has been removed by heating the engine in an oven for approximately 20 to 30 minutes and then gently tapping the drive washer assembly loose with a piece of brass tubing.



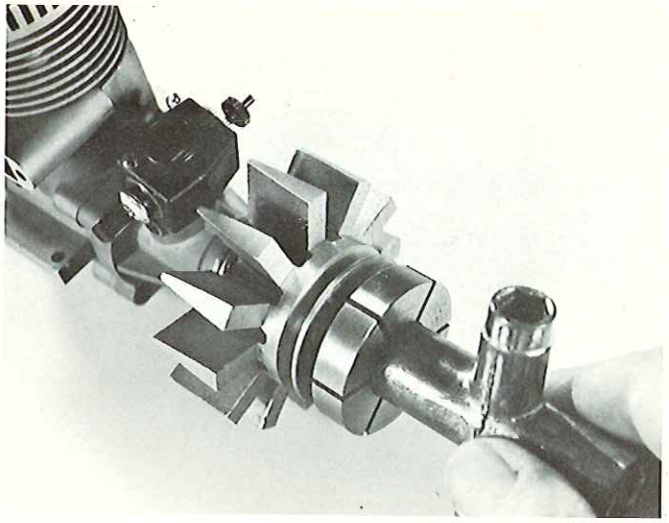
In this photo, the split ring from the Bell Huey Cobra helicopter kit is being installed on the drive shaft of the engine prior to installing the clutch and fan assembly.



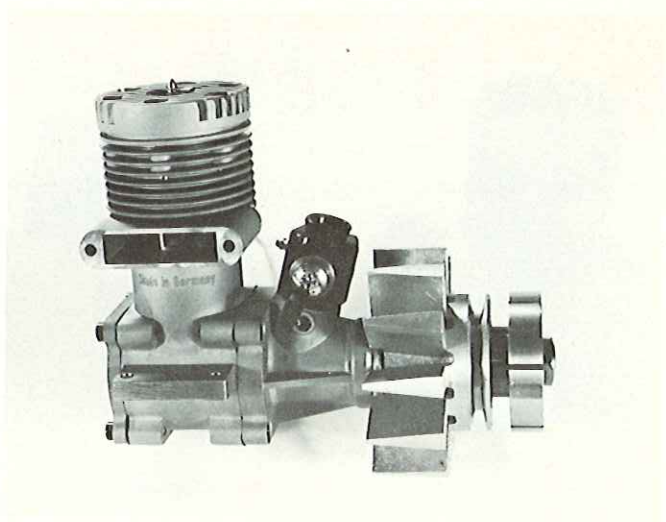
A close-up view of the clutch and fan assembly. Carefully remove any flashing from the fan blades with a fine file before installing on the Veco .61.



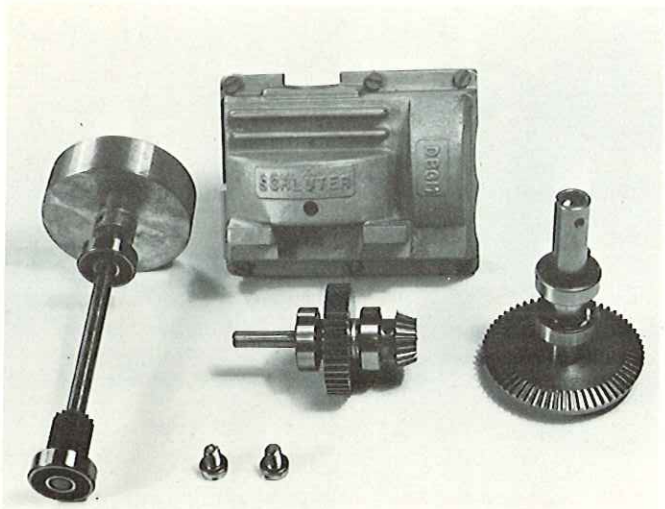
A close-up of the ball bearings in the end of the retaining nut which holds the clutch and fan assembly to the crank shaft of the engine. The ball bearing end should face towards the transmission.



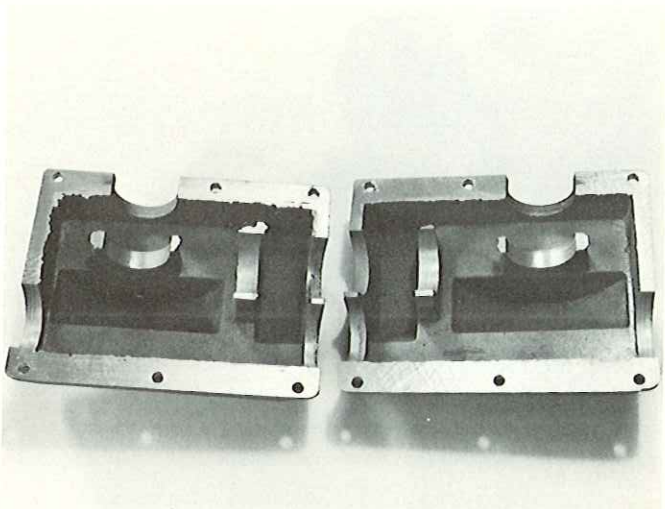
The fan, and spring clutch is fastened to the crank shaft by tightening the coupler with a standard four way glow plug wrench.



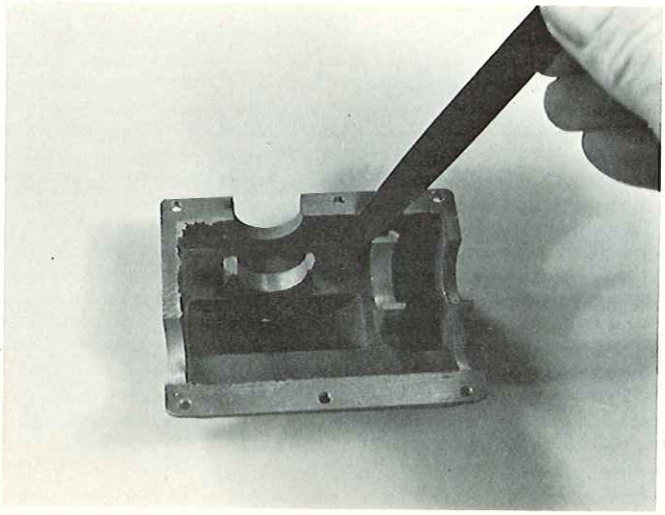
Here's a view of the German Veco .61 engine with the fan, starting pulley, and spring clutch securely fastened in place.



The components of the main transmission consisting of the gears, clutch housing and shaft, and case halves.

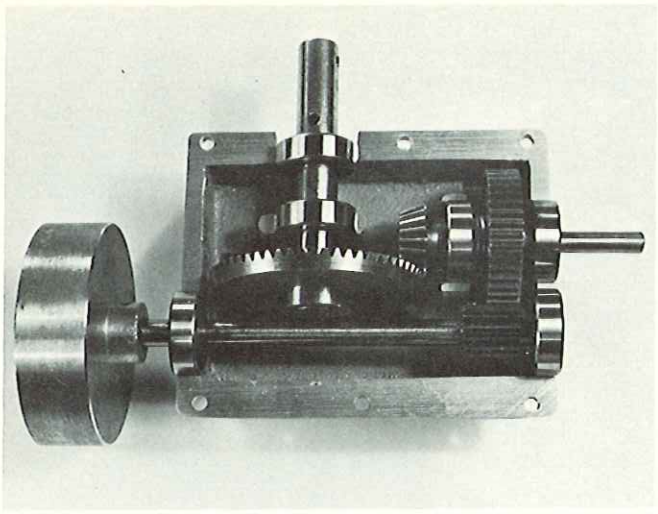


The two transmission case halves, showing the interior of the transmission case. The flashing shown in the pictures must be removed.

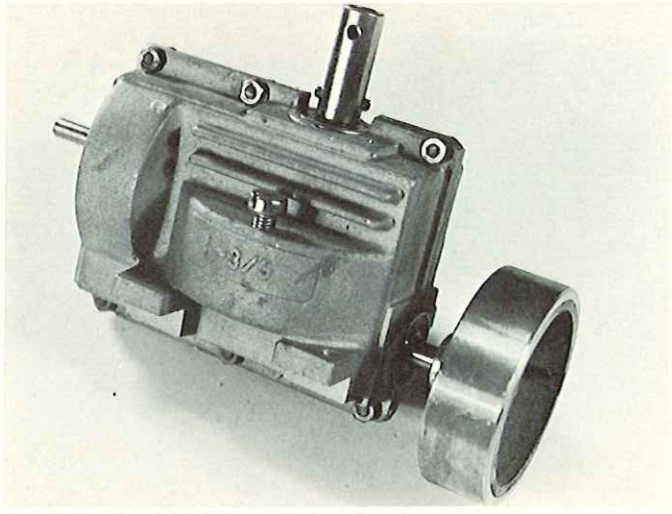


The flashing is carefully removed using a fine file being careful not to scratch or mar the bearing seats.

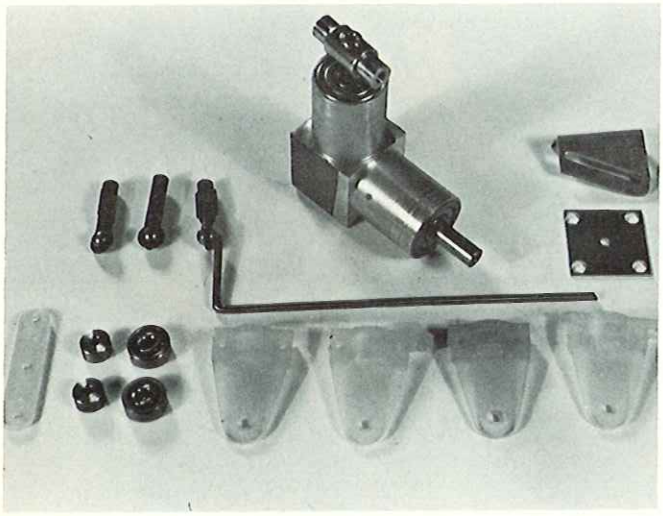
Stabilit Express epoxy is used on the bearing seats to secure the sealed ball bearings in place. This material sets up in approximately 10 minutes.



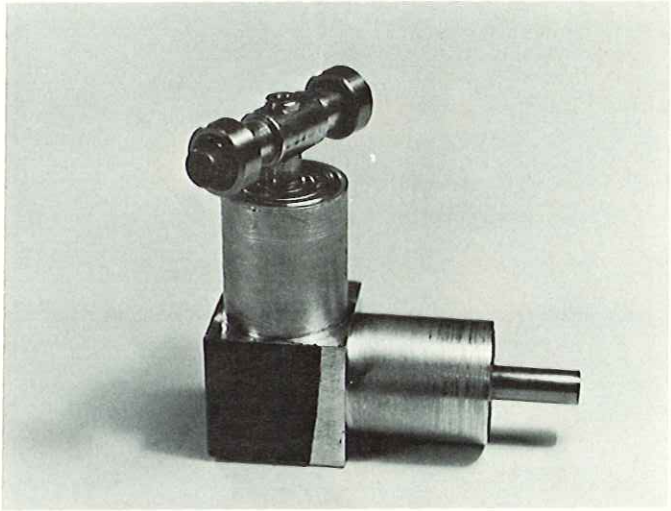
All of the sealed bearings have been epoxied in place in the bearings seats on the lower transmission case half.



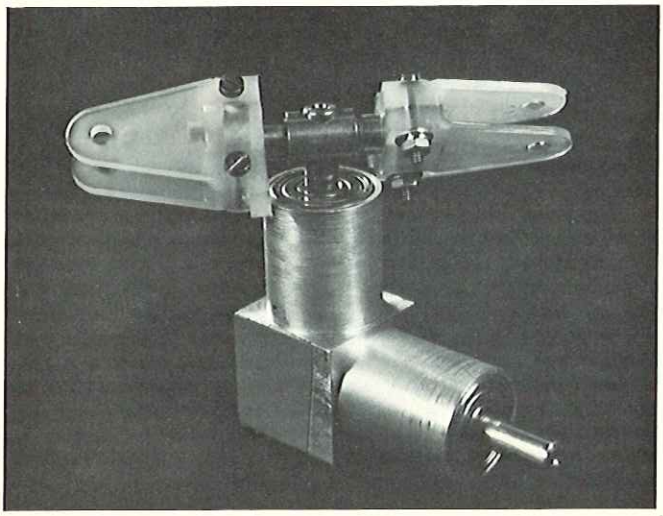
The mating case half is then glued to the other side using Stabilit Express and tightening down with the six metric nuts and bolts. This completes the main transmission assembly.



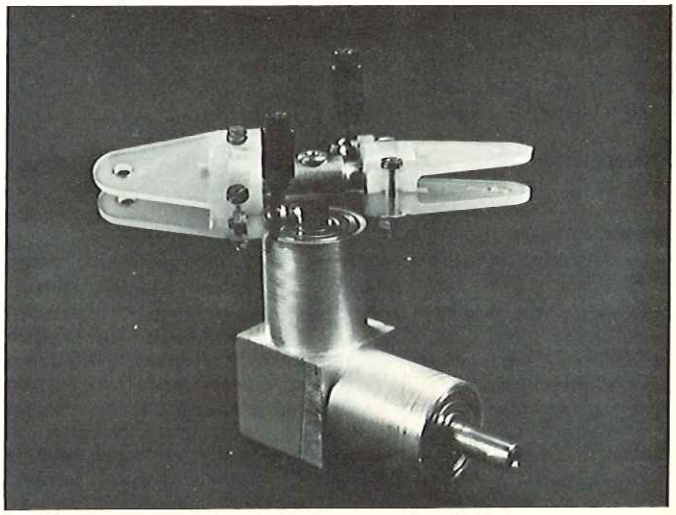
A photo of the components of the tail rotor transmission. The rotor blades are shown in the foreground and the slotted pitch plate in the upper right portion of the photo.



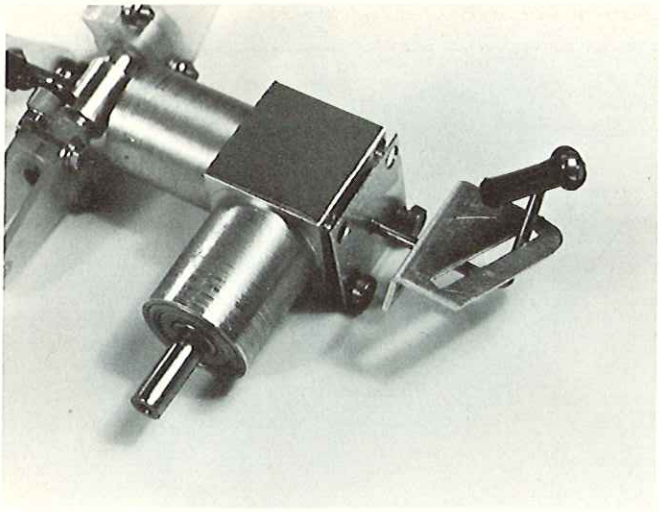
The basic tail rotor gear box with ball bearings in place on the rotor head. Tape around the base of the transmission is a grease seal.



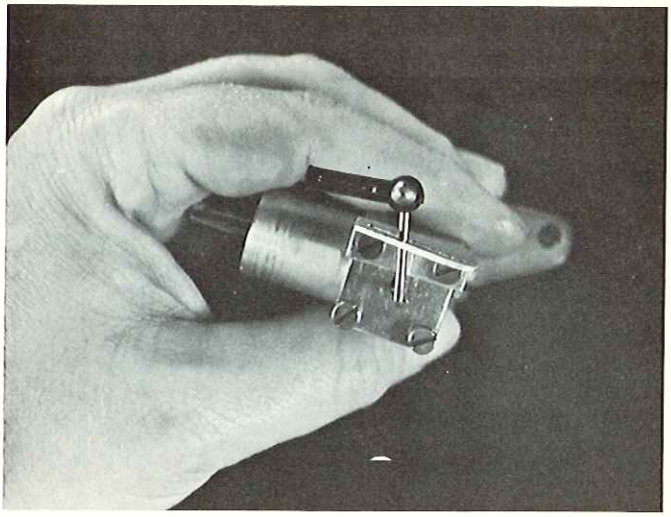
The tail rotor transmission assembly with the ball bearings and blade holders in place.



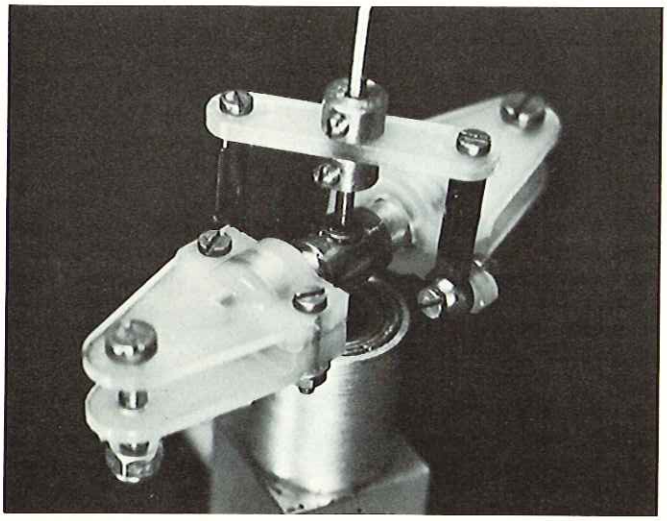
The addition of the Kavan ball and socket fittings.



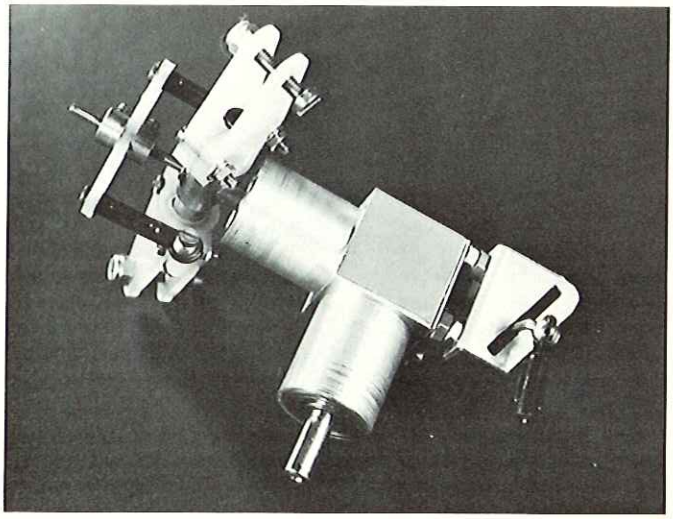
The base plate is temporarily mounted in place and the slotted pitch plate installed with the driven shaft and right angle arm passing through the pitch plate.



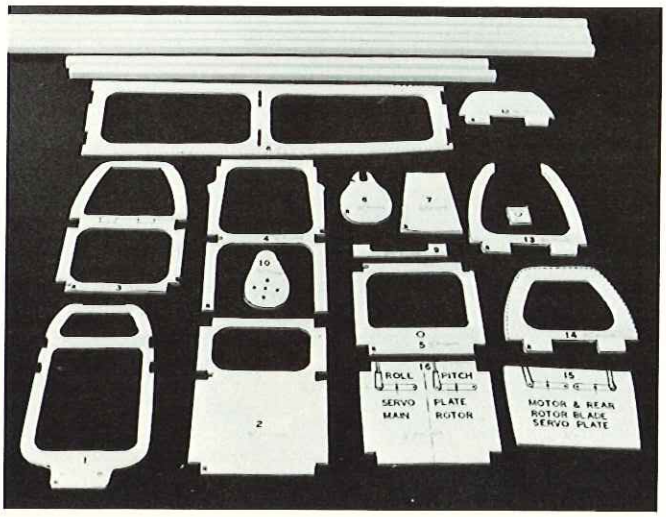
An end view of the control arm for the rotor blade pitch adjustment. There must be complete freedom of movement from one end of the slotted pitch plate to the other.



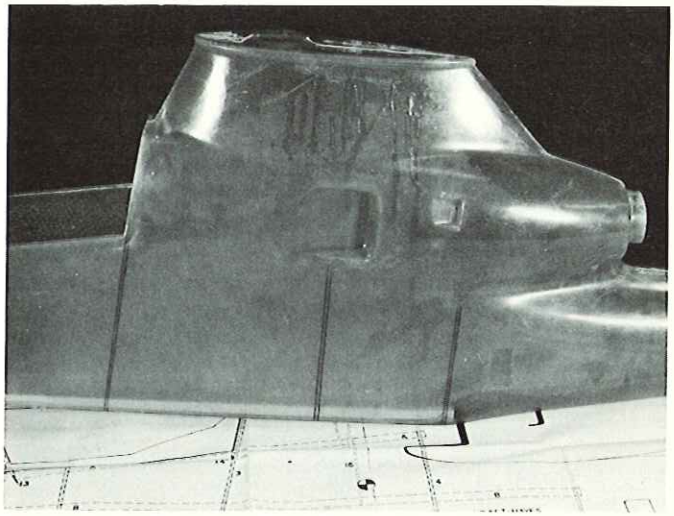
A top view of the completed tail rotor assembly showing a close-up of the blade and pitch rocker assembly.



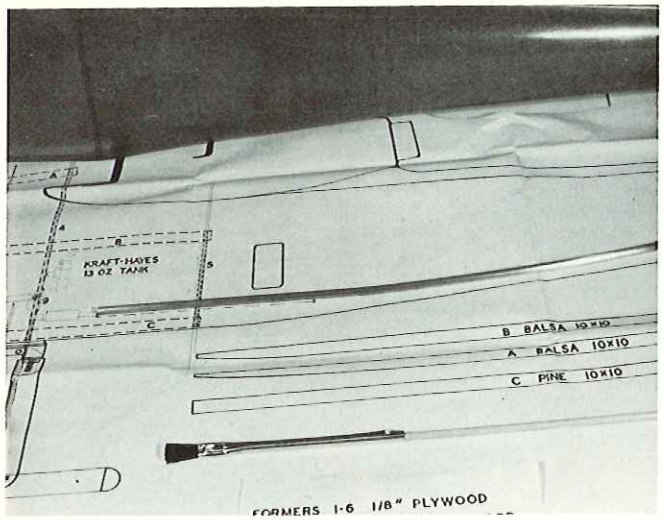
The completed tail rotor transmission. Notice the double nuts and bolts between the base plate and the slotted pitch plate used to simulate the thickness of former #10 and the fiberglass fuselage side.



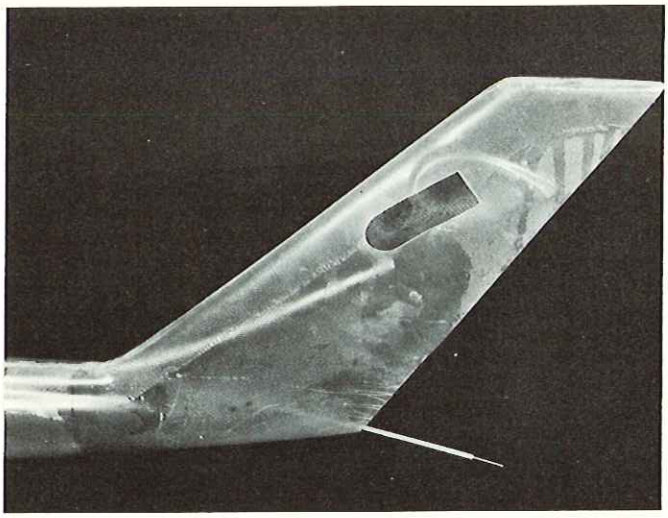
All of the plywood formers, and balsa and spruce stringers cut to shape.



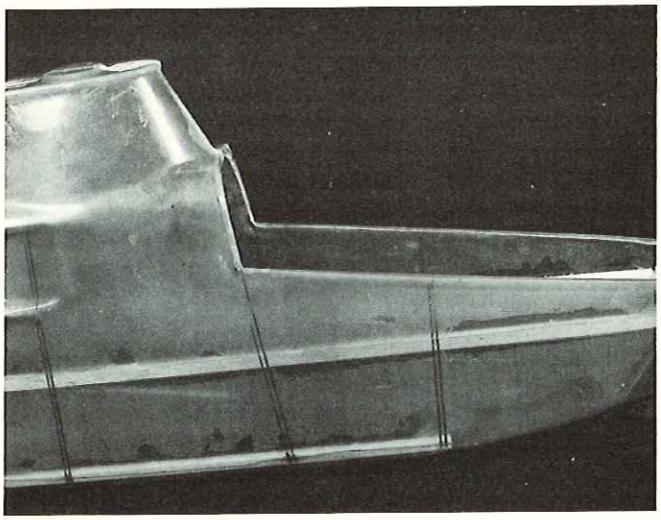
The position of the formers are marked on the side of the fiberglass fuselage using a grease pencil.



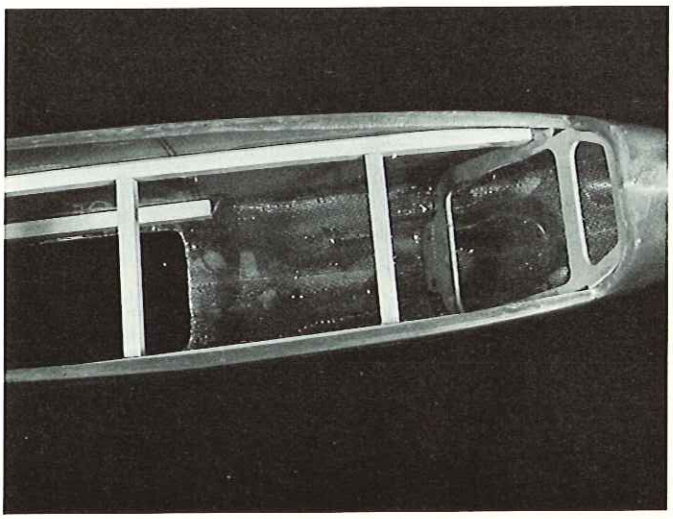
In the center of the photo the brass tubing for the tail rotor transmission drive shaft has been bent to plan form. In the foreground a 10 cent acid brush has been crimped to a length of dowel for use in resining inside the fuselage.



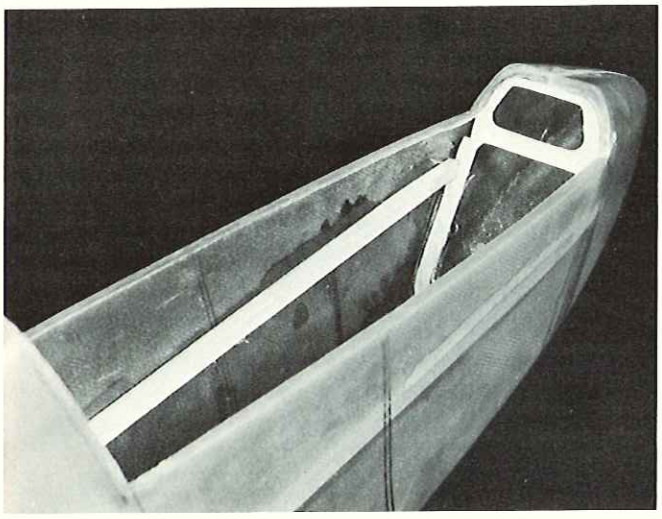
The cutout for the tail rotor transmission has been made in the vertical pylon of the fuselage. Note the tail rotor pitch cable and tubing temporarily extending out the rear of the vertical fin.



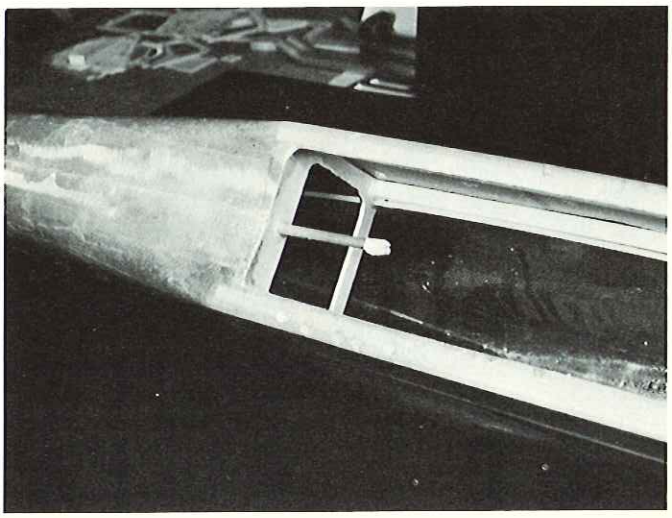
After sanding to final shape, the stringers are installed in the fuselage with resin. Make sure the bottom spruce stringers are firmly in place since this will hold the entire transmission and engine assembly.



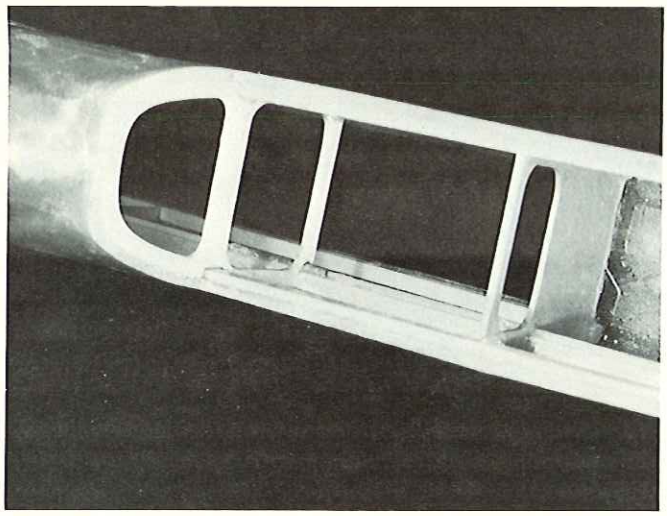
In this photo looking into the cockpit area of the fuselage, balsa spacers are used to hold the stringers firmly in place until the resin has dried.



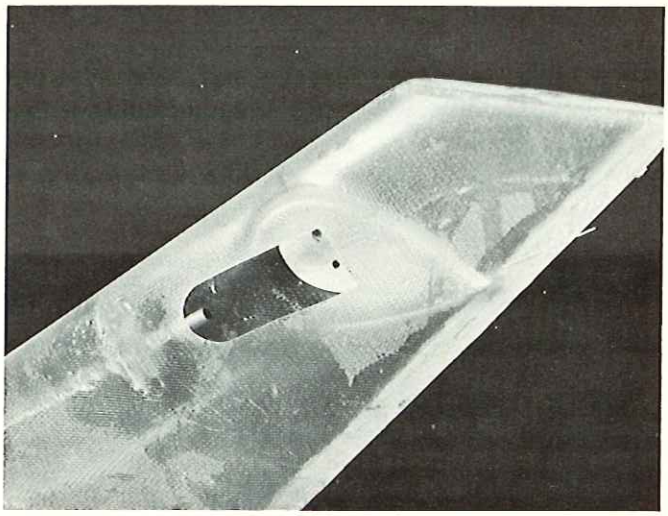
The interior view of the balsa side stringer and the front plywood former.



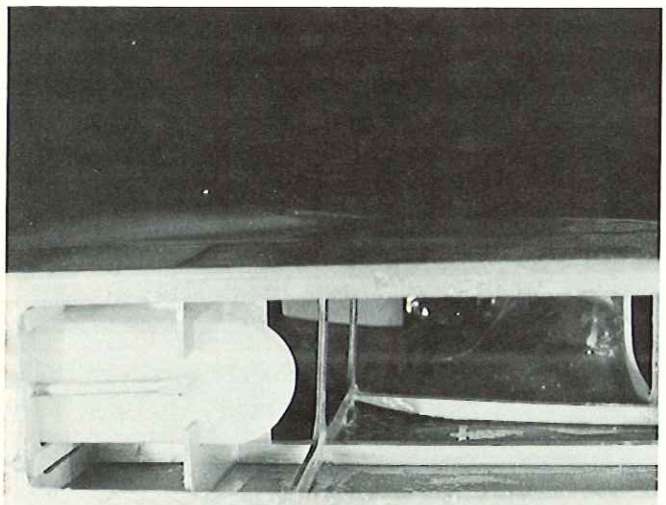
A view of the tail rotor and drive shaft housing extending through the plywood bulkhead. Tape is wrapped around the end to prevent epoxy from running inside.



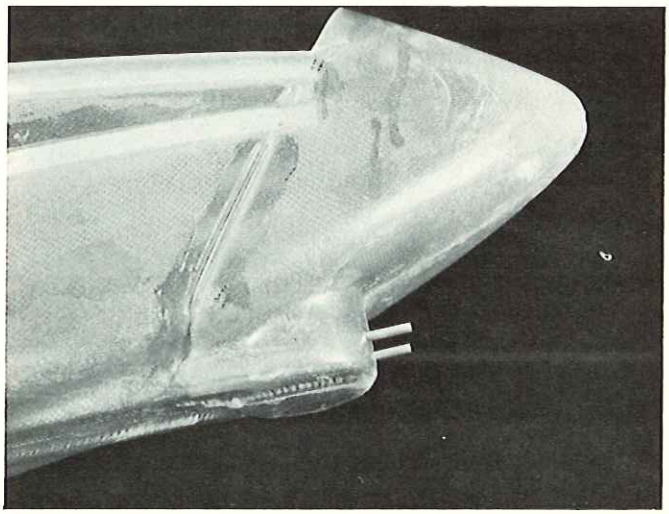
A view into the cockpit area showing all internal formers and stringers firmly resined in placed.



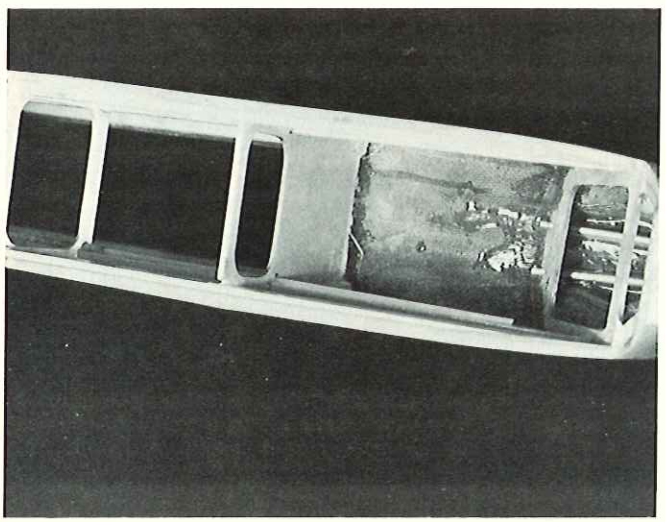
Former #10 has been installed with resin in the pocket in the vertical fin on which the tail rotor transmission will be mounted. Note the tail rotor drive shaft tubing located in line with where the tail rotor drive shaft will be positioned.



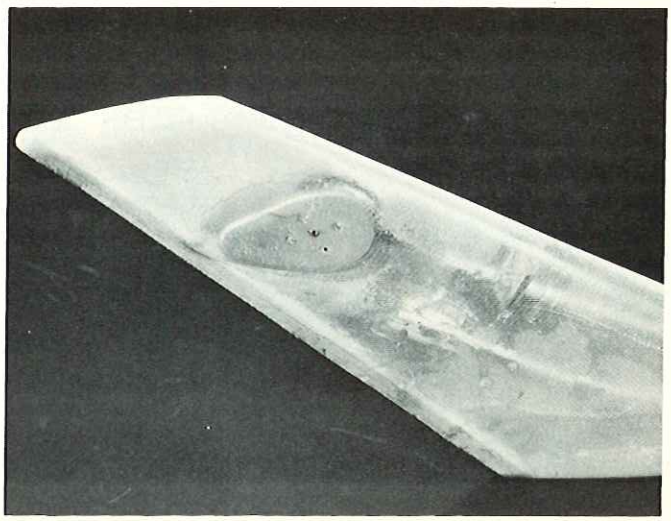
A view into the bottom of the engine and transmission compartment showing the placement of the Kraft-Hayes fuel tank with its supporting braces.



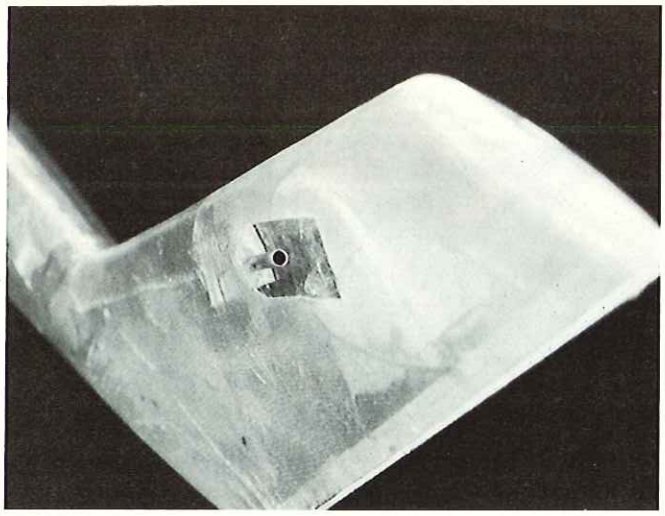
The brass tubing in the gun turret are for use with the training landing gear and also simulate the guns on the full scale Bell Huey Cobra AG-1.



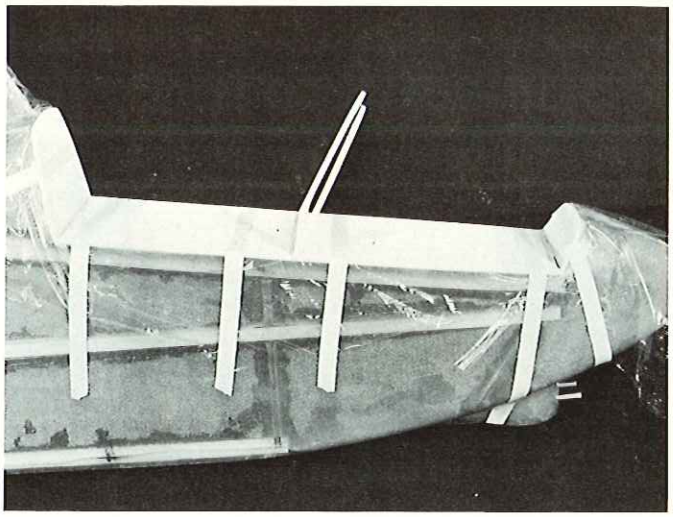
An inside view of the nose section showing the brass tubing for the training gear extending through the bulkhead and being firmly resined in place with balsa support blocks in fiberglass cloth.



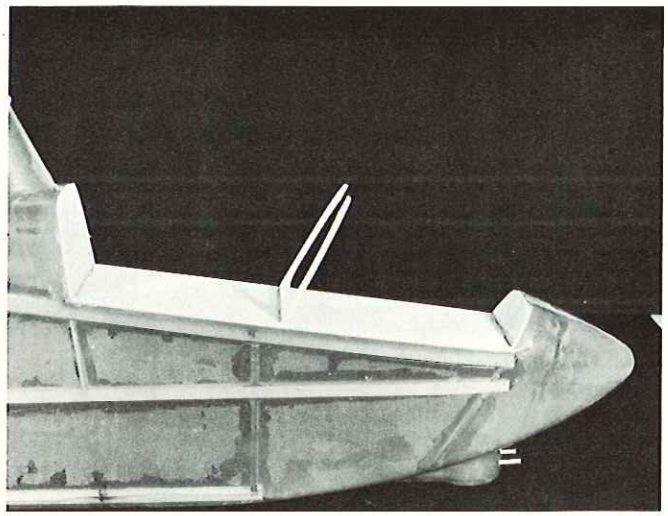
A view of the vertical fin opposite the cutout for the tail rotor transmission. Four holes are drilled through the fiberglass side and former #10 for mounting the tail rotor transmission. The slotted pitch plate is on the exterior of the vertical fin on this side.



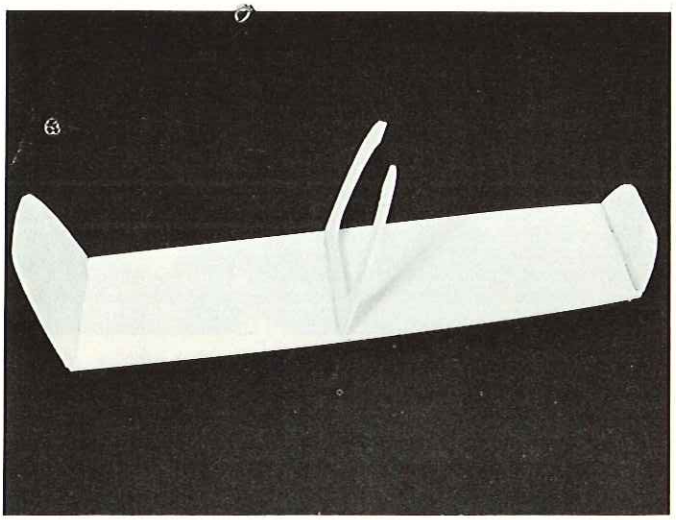
A close-in shot of former #11 firmly mounted in place with the tail rotor drive shaft housing properly centered for alignment with the tail rotor transmission shaft.



The cockpit on our prototype was made of three 1/8" plywood formers and a plywood canopy floor. Saran Wrap is used between the cockpit and the fuselage and the entire assembly taped in place until the Titebond or epoxy dries.



After drying, the Saran Wrap is removed and the cockpit formers and base sanded to final shape, approximately 1mm undersize from the fuselage to allow for the thickness of the canopy.



The completed cockpit ready for the installation of the canopy.

drive transmission gear sub assembly, the tail rotor drive transmission gear sub assembly, and the clutch drive shaft sub assembly bearing to the bearing seats in the transmission housing shells. It will also be used to join the two halves of the transmission case together in order to provide an oil tight seal between the sub assembly bearings and their housings and between the transmission case halves themselves. After filing off the rough burrs on the transmission housing case halves, and before cleaning with acetone, lightly run the mating halves of the transmission case shells over a piece of 400 wet-or-dry sandpaper, used dry, to insure a good fit between these two half shells. The sandpaper should be held down on a hard flat surface and the transmission housing half shells drawn lightly across the paper several times.

The next step is to take the lower transmission case half (marked with the numbers 1/39) and mount it in a small vise. Now take the main rotor drive shaft (02.04) and the beveled gear shaft (02.10) and trial fit them into position as shown in the photograph. Take a cotton swab and, once again, clean the two bearings on both of these shafts with acetone as well as the bearing gear seats on which they will be mounted. Next, take your Stabilit Express and, using the small measuring spoon accompanying the Stabilit kit, put one level spoon of powder into the number 1 plastic hole in the epoxy kit and then fill that cup with the glue from the tube. Mix thoroughly until it becomes a yellow/grey mixture. Now, using a toothpick, place your mixed epoxy inside the bearing edges on all surfaces of the transmission case where the bearings from the main rotor drive shaft and the beveled gear shaft will come in contact.

Install both shafts, making sure the edge of the beveled gear (02.09) matches exactly with the edge of the large beveled gear, driven, (02.05) with a close fit. There will be some slight overflow of the epoxy around the bearings – this is desirable – do not attempt to clean it up. Allow the assembly to set for 30 minutes, and remember that the mesh of the gears is more important than any dripping, or running epoxy. You may find it necessary to hold the top bearing of the main rotor drive shaft to the lower half of the transmission case until the Stabilit Express dries since this large gear assembly will have a tendency to tilt down into the transmission housing due to the weight of the large main gear. You can use a small lamp bulb or a hair dryer to fire off the epoxy more quickly, if you so desire.

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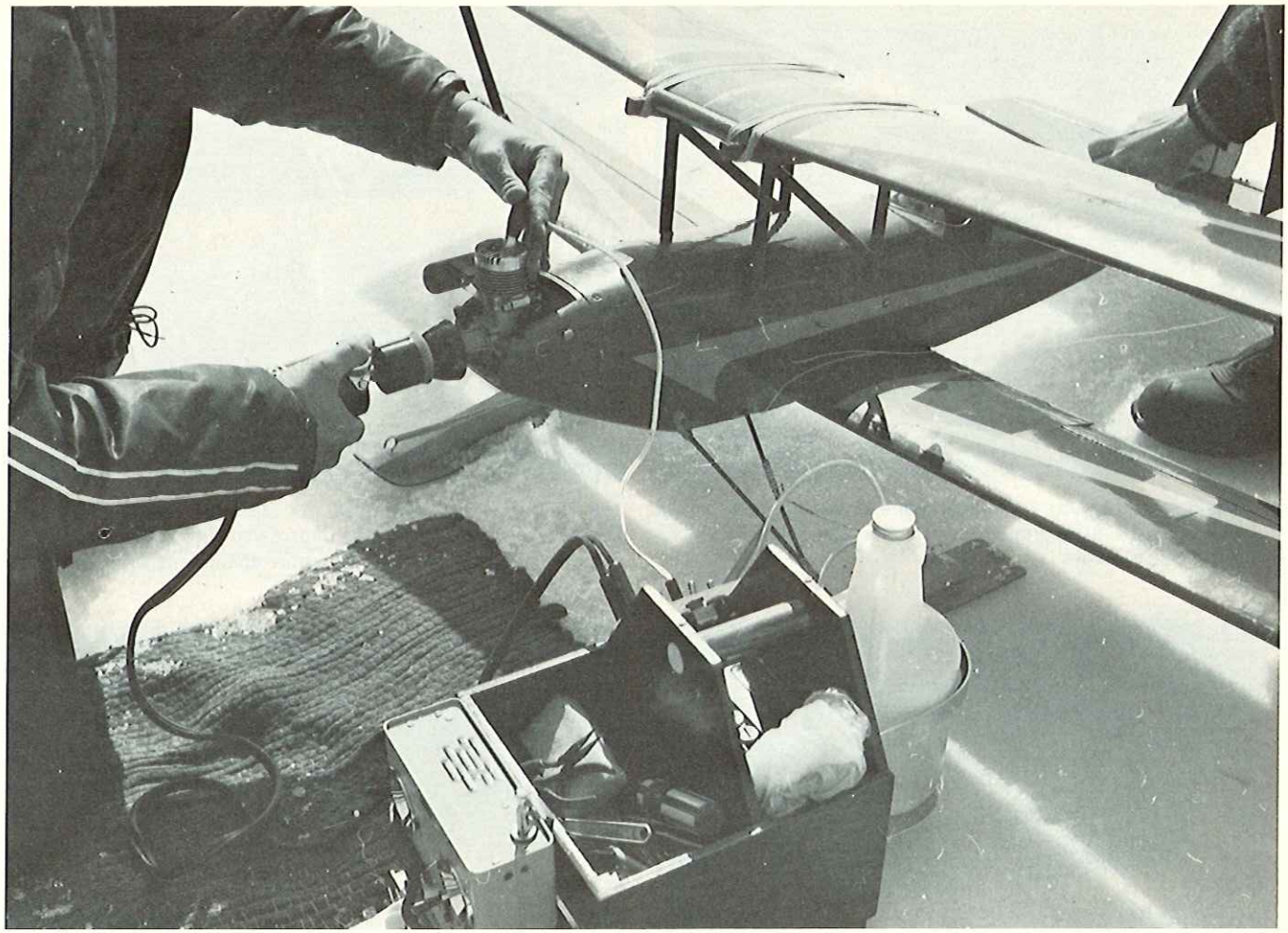


The RCM 'One Tripper' is a complete field box that provides everything you need at the field for your aircraft.

YOU CAN BUILD THE RCM ONE TRIPPER

BY ANDRE BELANGER

IF YOU WANT TO FLY FIRST CLASS, AN RCM ONE TRIPPER IS THE TICKET. THE FIRST REALLY COMPLETE FIELD BOX.

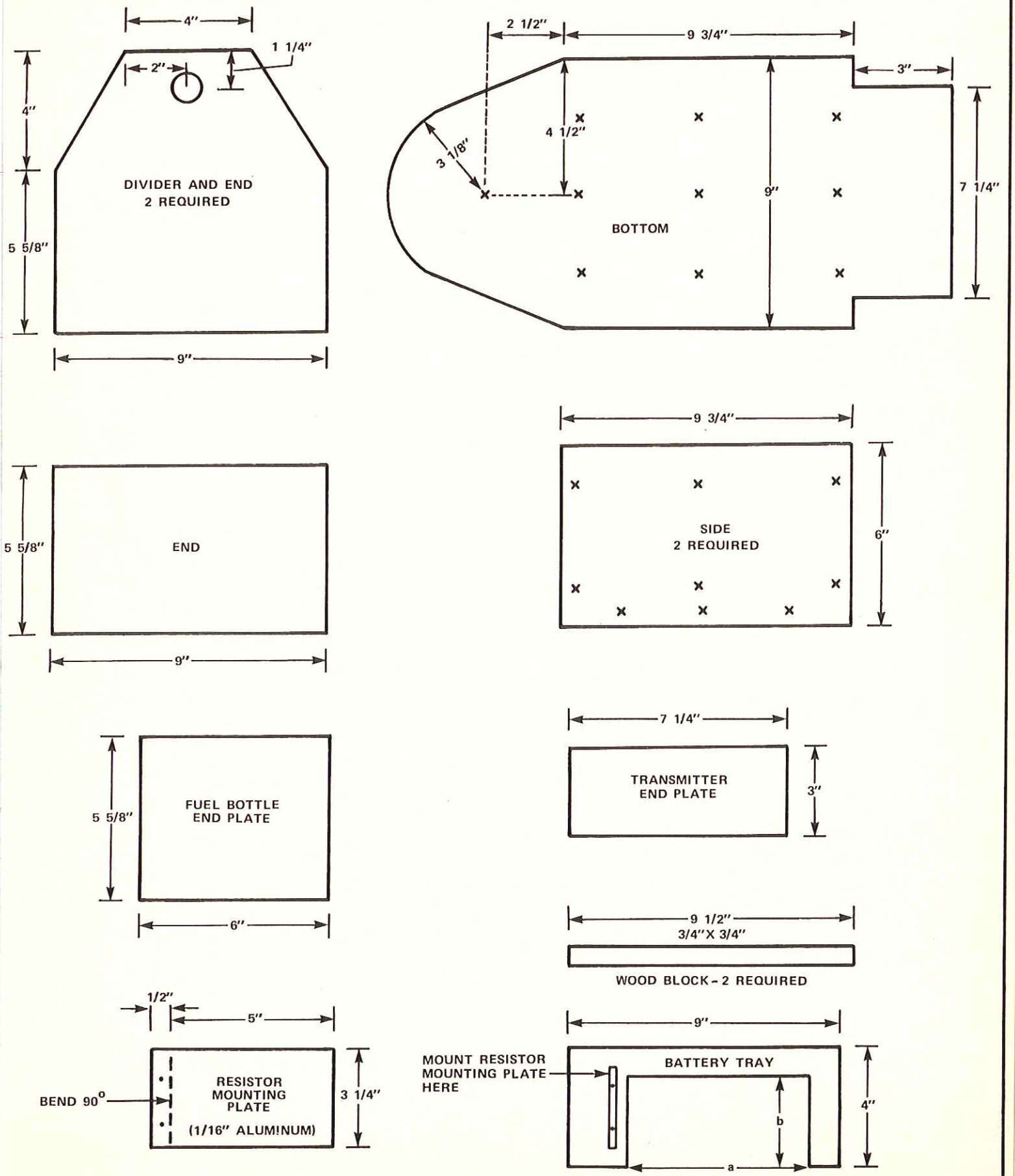
Peace of mind on the flying field contributes greatly to flying ability. If all your equipment is working perfectly, most of your worries can be left at work or at home and all you have to do is fly, fly, fly!

The One Tripper, if properly built, was designed to operate completely problem-free. It is so convenient that you barely notice it beside you, ready to do what you ask it, without demanding a thing from you except knowledge on how to operate it and a little respect for its components.

The reason it's called the One Tripper is because, with it in one hand and your plane in the other, you can walk from your car to the flight line without having to make one or two more trips for things such as beer, blondes, or screwdrivers. I've always said that one good field box at the flight line is worth two shopping bags in the car.

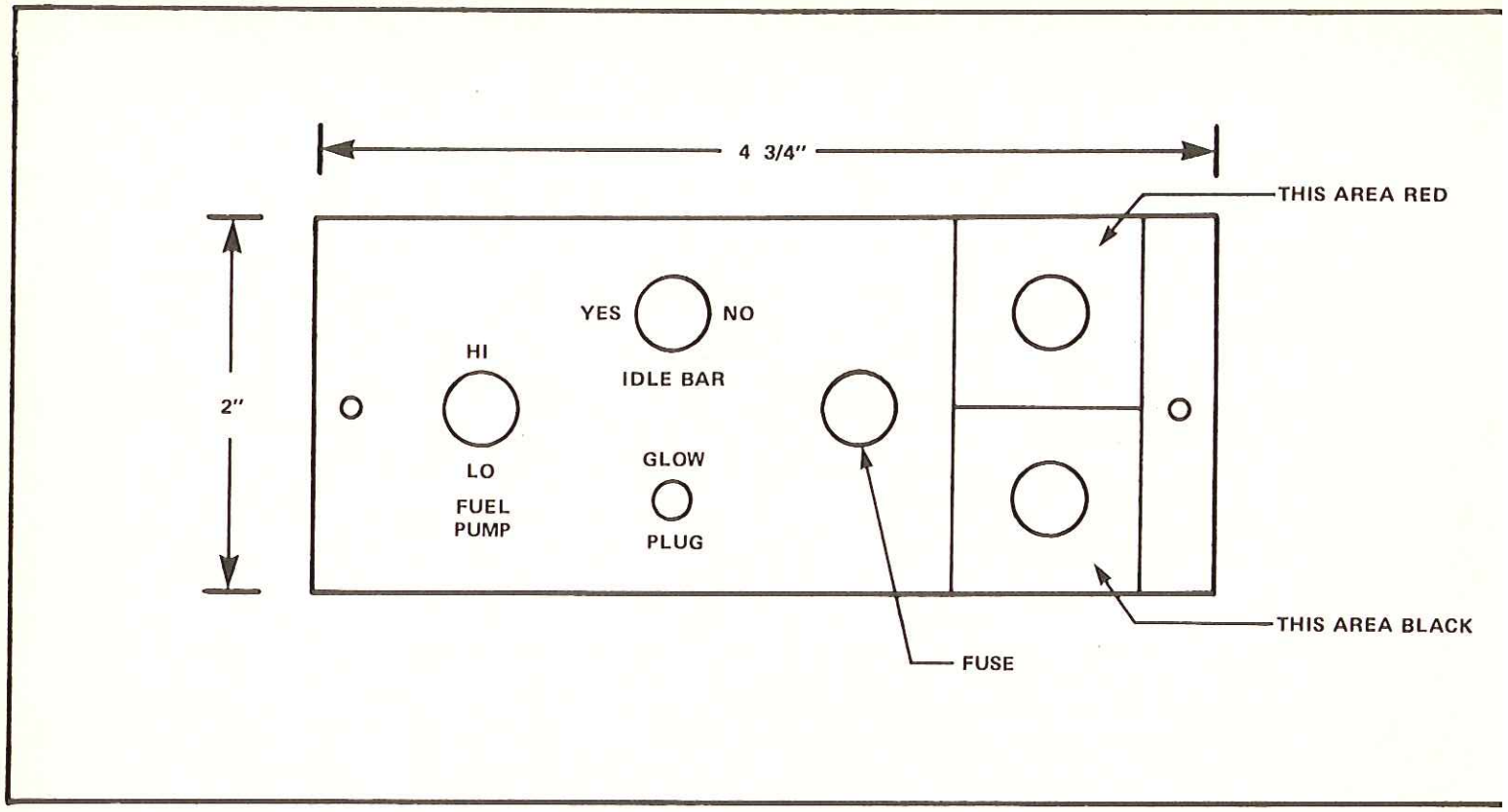
The One Tripper came about from a design passed on from Canadian RC pattern champion Warren Hitchcox. I don't know where Warren got it from but it seemed to me to be a liitle beauty that just needed a few touches here and there. The touches turned into a major design project with field testing throughout the Winter indicating that the One Tripper is foolproof. Last Fall, one of our club members, using a similar field box, spilled fuel on a hot resistor and, in the ensuing fire, burned his hand. The One Tripper electronic panel completely precludes any danger of fire. Those big 50-watt resistors run as cool as a North Canadian trout stream.

So far, four of us in my club, the Derry Flyers, have One Trippers. More are coming. It's a funny thing but, whenever any RC flyers see the One Tripper, they stand around making admiring noises, sometimes sounding

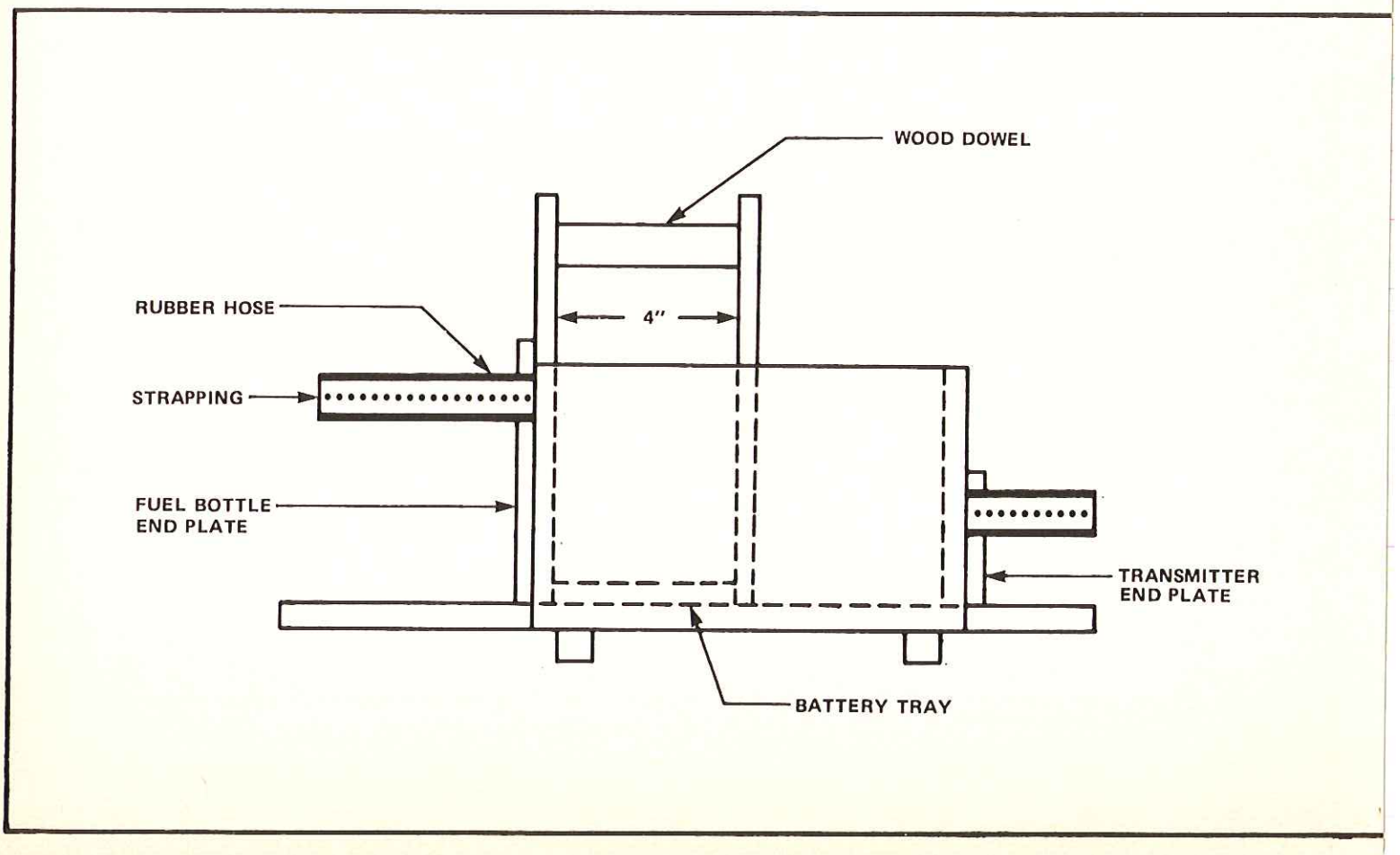


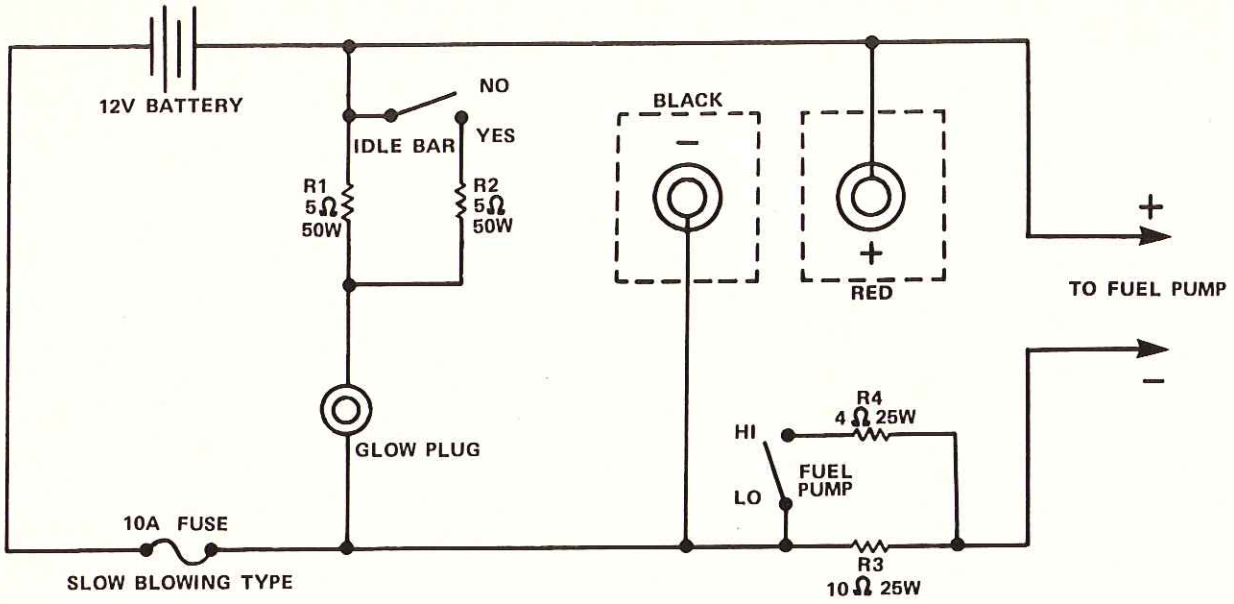
DIMENSIONS "a" AND "b" ARE DETERMINED BY BATTERY SIZE

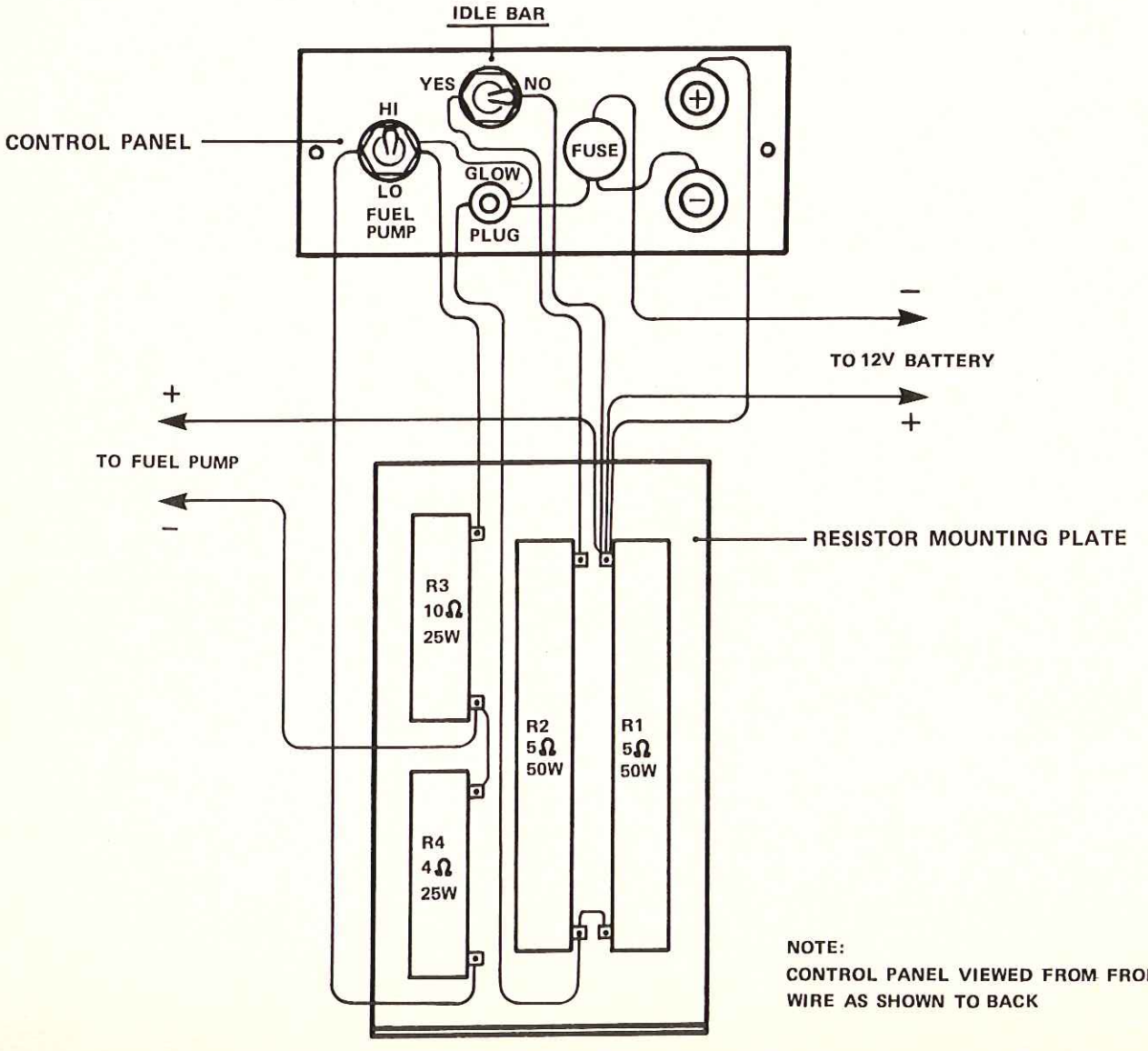
NOTE: BUILDING MATERIAL IS 3/8" PLYWOOD UNLESS OTHERWISE SPECIFIED.



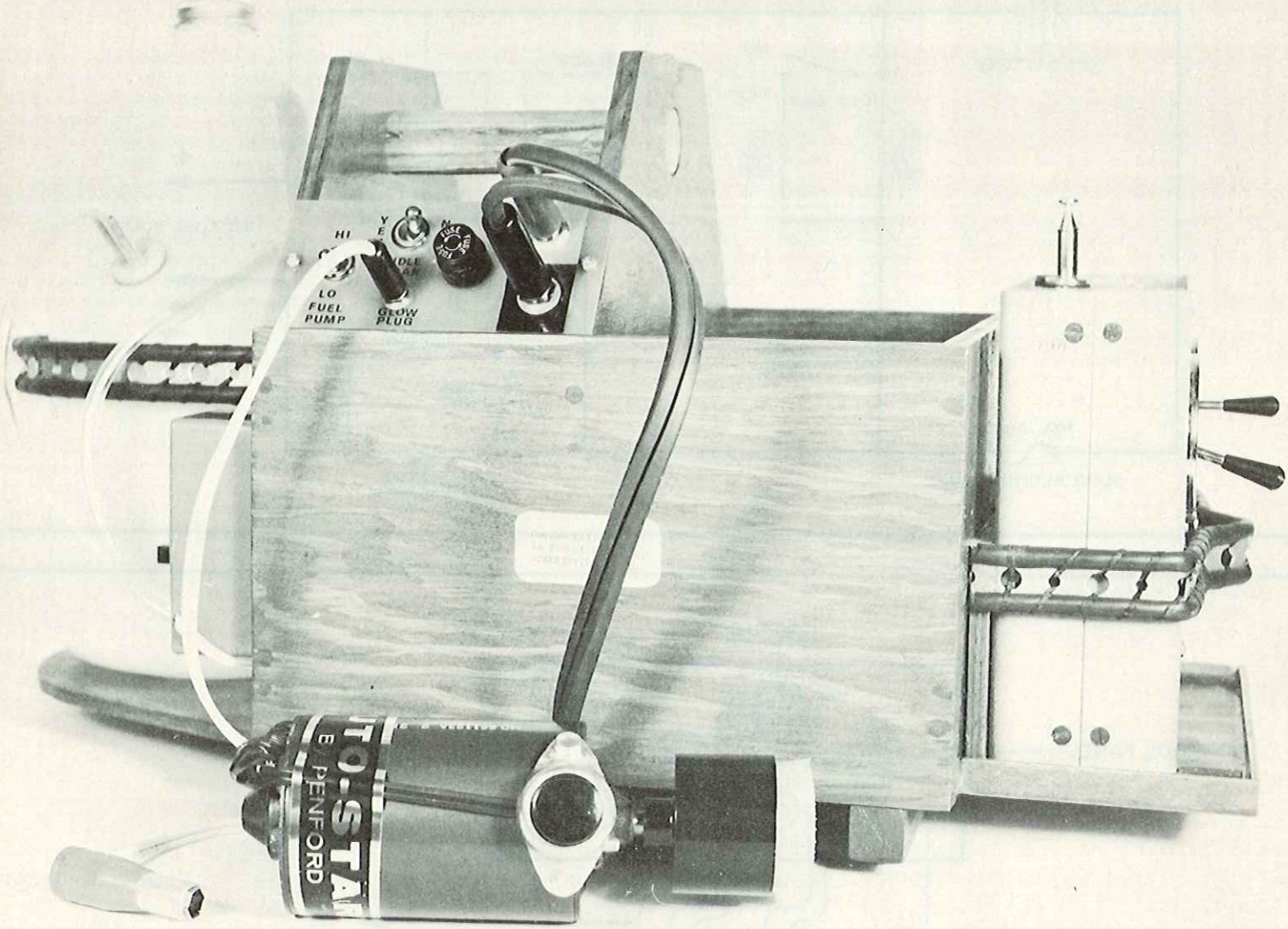
CONTROL PANEL
(ACTUAL SIZE)







NOTE:
CONTROL PANEL VIEWED FROM FRONT,
WIRE AS SHOWN TO BACK



The completed RCM 'One Tripper' Field Box. Everything you need: Fuel tank and pump, glow plug and electric starter power supply, transmitter caddy, and plenty of room for field tools.

like four Ross twins being broken in a hundred yards away!

But enough of this well-founded enthusiasm and on with the construction tips. But before that I just want to reassure anyone contemplating building a One Tripper that all components in it are readily available over the counter at your local hardware, electric supply and lumber store.

Here's to trouble-and-worry-free flying and only one trip to the car.

CONSTRUCTION

(1) Cut out the box parts from 3/8" plywood. (For best results use a bench saw with a plywood blade.) Assemble entire box with ¾" finishing nails, first by nailing sides to ends and bottom to sides and end. Position the divider into the box and secure with nails. The box is now held together with nails.

(2) Use screws to secure the wood blocks to the underside of the box. Reinforce the box with wood screws as follows: Drill holes for the screws, ream out to countersink the screw heads and then fit the screws. Use wood filler to cover the screw heads, nails, and any wood blemishes. Allow to dry and sand the box with fine sandpaper. If you wish, the box can be stained to contrast the wood grain. Brush or spray the box with polyurethane varnish.

(3) Next, cut and shape a piece of strapping to hold the fuel bottle to the box. Use the fuel bottle end plate to support the strapping and fasten to the box with nuts, washers, and bolts. Repeat the above assembly for the transmitter bracket. (Note: The hump in the transmitter bracket is to allow you to turn your transmitter on and off without having to remove it).

(4) Cut suitable lengths of car window washer hosing, split the tubing end-to-end and apply to the upper and lower edges of the strapping. Use nylon thread or string to lace the

tubing to the strapping.

(5) Drill holes on the resistor mounting plate and mount the resistors with the hardware provided with the resistors. Cut a fiberglass, bakelite, or plexiglass control panel 4¾" x 2" (do not use metal as it may be a shock hazard). Drill holes into the control panel to accomodate the jacks, switches, and fuse. Use Letraset to identify the control panel functions and then apply a coat of polyurethane varnish over the entire panel. Let dry. Apply red MonoKote to the control panel positive starter output and black MonoKote to the negative starter output.

(6) Install the control panel hardware. Use 18 gauge or heavier wire to connect the resistors, switches, jacks, and fuse as per the diagram. Cut two 1-foot lengths of battery lead-in wire and label the leads positive (+) and negative (-). Solder the battery lugs to the battery leads and connect as per the diagram. Bolt the resistor mounting plate to the battery tray.

(7) Identify the fuel pump wires, red (+), black (-), and cut off the alligator clips. Fit the fuel pump to the box (see manufacturer's instructions) and pass the pump wires into the box through a hole drilled under the pump. Tie a knot in the fuel pump wires just where the wires enter the box and solder the wires to appropriate resistors.

(8) Slide the resistor mounting plate and battery tray assembly into the battery compartment. Use screws to fasten the control panel to the box. Place the battery into the battery tray. Note: The battery has an overflow vent line. Cut a short length of Gold-N-Rod outer tubing, drill a hole through the battery tray and box, fit the tube to the vent line and pass the tube through the hole in the box. Connect the battery lead-in wires to the battery. Fit the carrying handle into the box and fasten with screws. To protect the transmitter from scratches apply wing mounting tape to the transmitter bracket.

(9) Cut a hole into the fuel bottle, as close as possible to the bottle neck and install Sullivan tank fittings. (Note: Two tubes are required; one for fueling and one for a vent). Place the bottle into the box mounting bracket and install the fuel lines. When the fuel bottle is not in use, connect the fill tube to the vent line.

(10) Remove the electric starter motor red clip and solder the red phono plug. Do the same by removing the black clip and replacing with the black phono plug. Solder the glow plug cable to the small phono lug. Install 10 amp. slow-blowing fuse.

HOW TO USE THE ONE TRIPPER

Fill the fuel bottle with fuel no higher than the vent. Connect your electric starter motor cables to the control panel, red plug to red jack and black plug to black jack. Connect the glow plug cable to the control panel and position the glow plug switch, IDLE BAR YES/NO to the appropriate plug position. Connect the fuel pump fill line to the aircraft fuel tank and fuel up by activating the pump switch to IN (switch located on the fuel pump). The fuel HI/LO switch located on the control panel provides fast or slow-fueling. If the aircraft fuel tank is to be emptied, simply position the fuel pump switch to OUT.

Next, connect your glow plug connector to the glow plug, apply your electric starter motor to the propeller, start up, throttle the engine, and be ready to fly.

There is enough room in the One Tripper for all items necessary for a day's flying – electric starter motor, props, tools, etc., not to mention beer, blondes, and screwdrivers. Now, the recipe for screwdrivers . . . take a little Vodka and orange juice and give some to the blonde. □

PARTS LIST

RESISTORS (Wire-Wound Fixed)

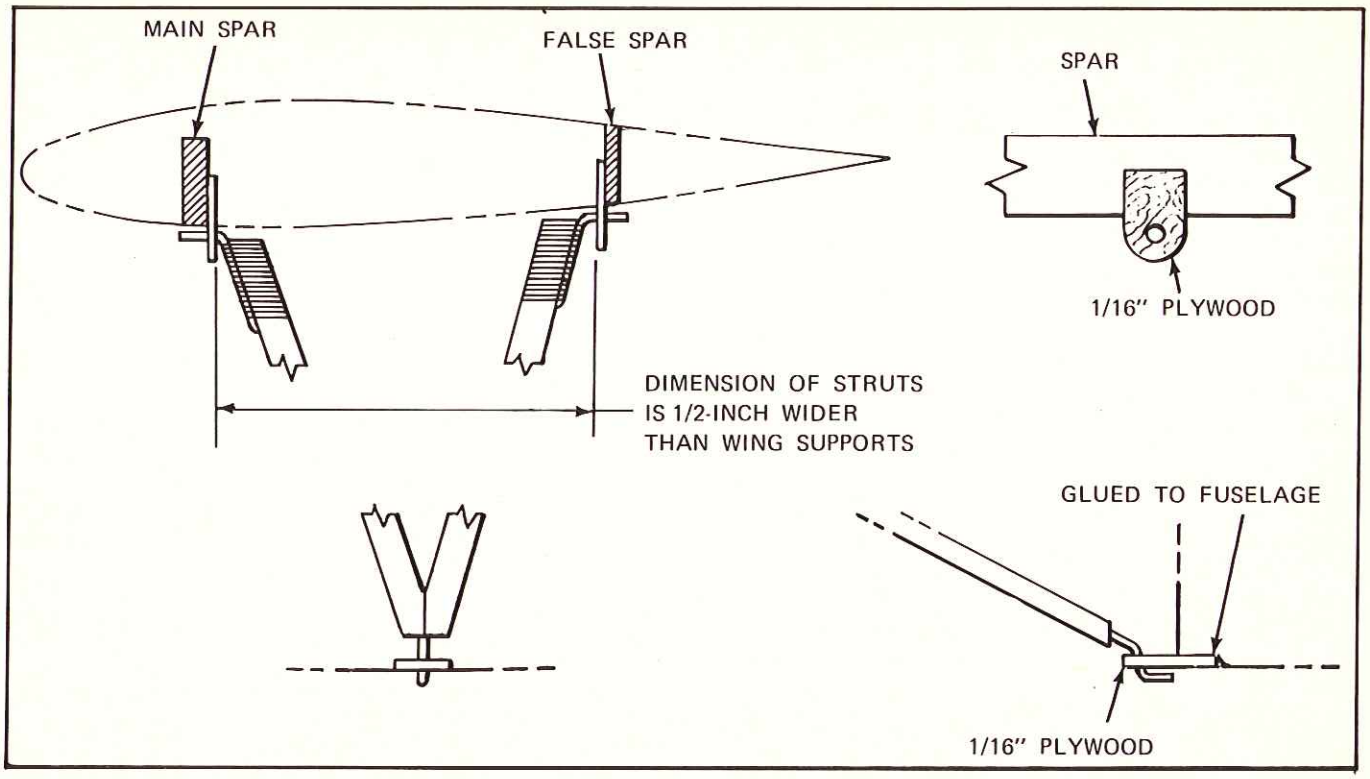
Quantity	Value	Watts	Part Number
1	5 ohms	50	R1
1	5 ohms	50	R2
1	10 ohms	25	R3
1	4 ohms	25	R4

HARDWARE

Quantity	Nomenclature
1	Fuse holder panel mounted (for ¼" x 1" fuse)
2	Switch SPST (15 amps., 125V)
1	Fuse 10 amp. (dual-element slow-blowing type)
2	Standard ¼" phone jacks (2 conductor type)
2	Standard ¼" phone plugs, black/red (2 conductor type)
1	Miniature jack (2 conductor type)
1	Miniature plug (2 conductor type)
1	12 volt motorcycle battery (5½" high by 5½" long by 3½" deep, typical)
1	Fuel pump (Sonic-Tronics "Nifty")
5 ft.	18 gauge wire (or heavier), covered, stranded
1	Fuel bottle adapter (Sullivan, Kavan)
1	80 oz. plastic bottle (Heinz vinegar bottle)
	3/8" Plywood (see detailed diagram)
	Fiberglass or plexiglass or bakelite for Control Panel (see detailed diagram)
	6" x 3¼" Aluminum for resistor mounting plate (see detail diagram)

MISCELLANEOUS

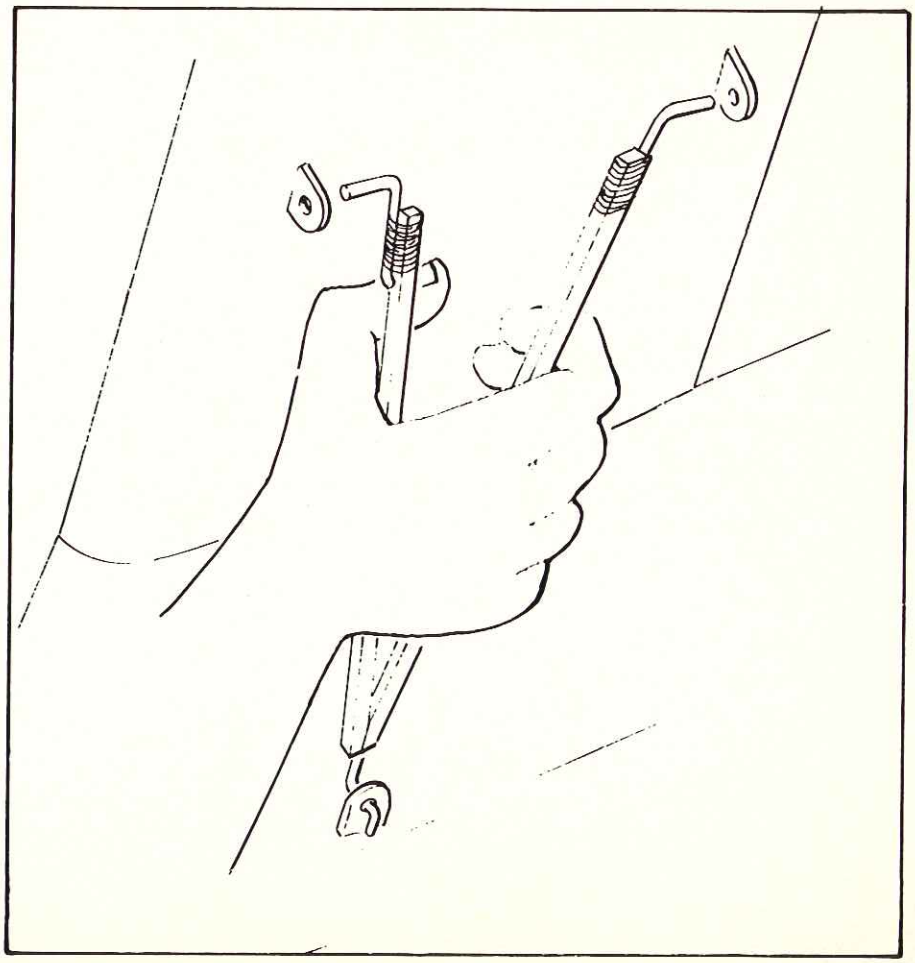
Screws – wood, flathead ¾" x 4" – Box Construction
Screws – wood, roundhead 1" x 6" – Handle and Control Panel
Strapping – (type used to support plumbing pipes)
Nuts, bolts and washers
Window washer hosing – 6 feet
Wing mounting tape
Nylon thread
Battery lugs (2 required)
Wooden dowel (broom handle)
Letraset



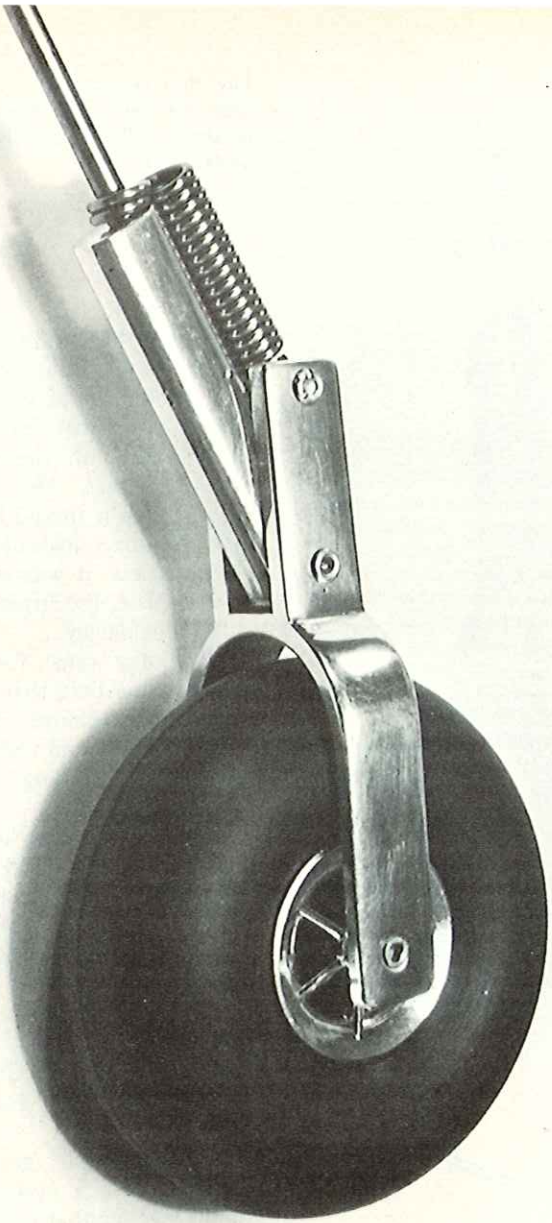
EASY WING STRUTS

BY
HAL SHEMELIA

The simple wing strut installation presented here, has been flown on a Tri-Pacer and has proven structurally sound during all flights and landings. The drawing should be all that is required to apply this quick installation on any machine which uses wing struts, thus eliminating complex attachments and lengthly field set-up time.



The drawing at the right shows the simple 'spring loaded' wing struts. This easy method of installation gets you into the air fast.



birth of a LANDING GEAR

BY RAY HANISCO

In 1938 I was first exposed to model airplane building by purchasing a model biplane with ten cents I had saved. It was a beautiful kit with its tiny tube of glue, printed sheets of balsa, bamboo paper, and a set of plans that seemed far beyond my comprehension. Being a determined kid that would not let this beat him, I struggled with it until it was complete. It was not the most beautiful job, but it was enough to give me the "fever," and from that time on, I have been "hooked." I suppose I will be until the end.

Since then, model airplanes have become really sophisticated in most areas of construction. Unfortunately, some areas have been left as being "good enough". For example, at times I felt that some Archaeolgist would uncover a landing gear in one of the TELLS that is exactly the same as being used today.

For that reason, I wrote this article, and to introduce you to what I consider an advancement long awaited . . .

Here is how it happened.

There, on a very early Spring afternoon stood a Design Engineer – an R/C stick jockey who was completely disgusted with what the Winter had done to a beautifully rolled and mowed field. The earth, during the past Winter, had heaved in an attempt to reject the grass and stones as the human body attempts to reject transplants. Our field had more curves and bumps that the proverbial "strip show."

The engineer (me), (I), (party of the first part) after some difficulty, had lined up and proceeded with an attempt to smoothly take his brand new R/C bird off into that wild blue yonder. There she goes – Bump, she's airborne, Bang, nope she's down, etc., etc., etc., etc., and, finally, she did break ground.

With beads of perspiration, uncommon on such a cool day, I was finally filled with the exhilaration that occurs each time I fly. It was great being on the sticks again, feeling as free as the wind.

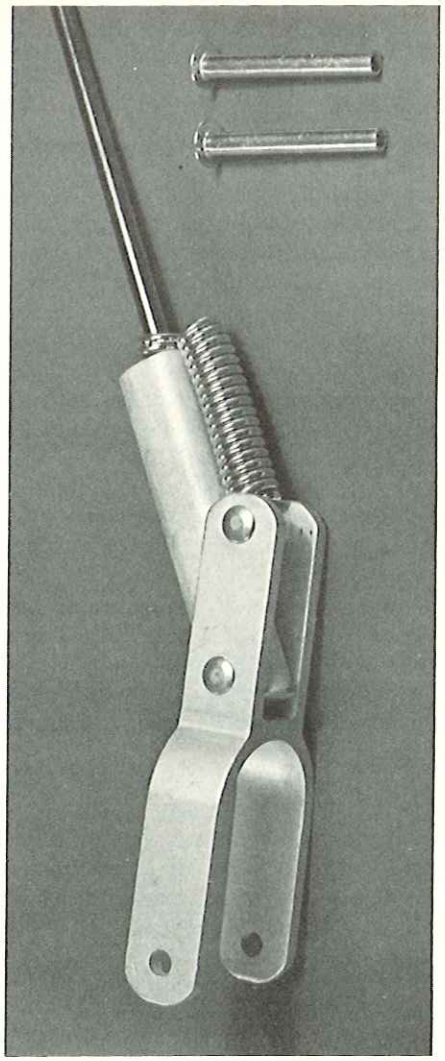
With almost no trim necessary she flew hands off, straight as an arrow. Finally, fuel time was running short, so I started with the landing procedures. Suddenly, panic struck – there was my brand new shiny bird, built with precision, on its final, when I remembered **why** those beads of perspiration were on my brow. That new bird had to land in this rough field, and would be akin to a tree being attacked by a chain saw! The landing was great until the first grass clump reached up and slammed one wheel, then the other through the underside of the wings. The nose caught an uppercut and the prop attempted to roughen the field to an even greater extent!

Looking at the wounded bird and the damage that occurred, I made the statement, "Why doesn't someone design a landing gear that can take a field like this?" Imagine, a guy that works in Research and Develooment making such a stupid statement. Soooooo . . . a dream of lending a helping hand to all of the guys in this wonderful tranquilizing hobby started to be envisioned.

After a bit of study on what occurs when an airplane is accellerating and decellerating on a rough field, a gear design started to "gel."

One of the biggest problems is the torsion spring nose gear being overflexed and taking a permanent set. To replace a prop on each rough landing can be expensive and nauseating.

The first design objective was to



The new landing gear takes many shapes, from the unpolished heavy spring nose gear on the far left to the polished, single leg unit on the right.

eliminate this condition, then make an indestructible unit with slight caster for good ground handling characteristics. After weeks of board work, and a few days on the milling machine there it was. My new-born child looked like it should be a cradle for a 105 Howitzer instead of a nose gear. Nevertheless, it was mounted and, to my surprise, the airplane required very little rebalancing.

The day came for initial testing. Back to the field that was in the same condition as before. The grass clumps, bared stones, and rocks were showing their fangs waiting to dine on the revised bird.

With the airplane lined up, I poured on the horses, and lo and behold, the nose gear rode those clumps as an expert skiing on a beginners slope!

I used this combination for quite a few flights, until one day, I got "hit" on a low pass. The nose of the airplane pointed due China, and was completely wiped out. Guess what? That grand old nose gear suffered no damage.

Although this gear was designed primarily for a nose gear application and I, feeling that I was sub-consciously rating the gear too highly, asked Bob McArdle, one of the members of the Keystone R/C Club to mount a nose gear, and a similar set of gear for mains, on his 'Contender.' I asked him to just cut off the lower portion of the standard gear wire and slip these on. This he did. Then, out to the field again. This time a really spectacular thing happened. The takeoff run exhibited so little transfer of shock to the airplane that it looked as if it was rolling down a paved runway. Bob is an avid RC'er and gave the gear a good workout. An expression was coined that made my efforts seem well worthwhile – "Boy, that landing gear sure takes the grass out of the grass runways."

A few weeks later, I wanted to try the gear on my "Aerobat," a tail dragger. Mounting them on the "Aerobat" was as simple as it was on the "Contender."

In my exhuberance to get more

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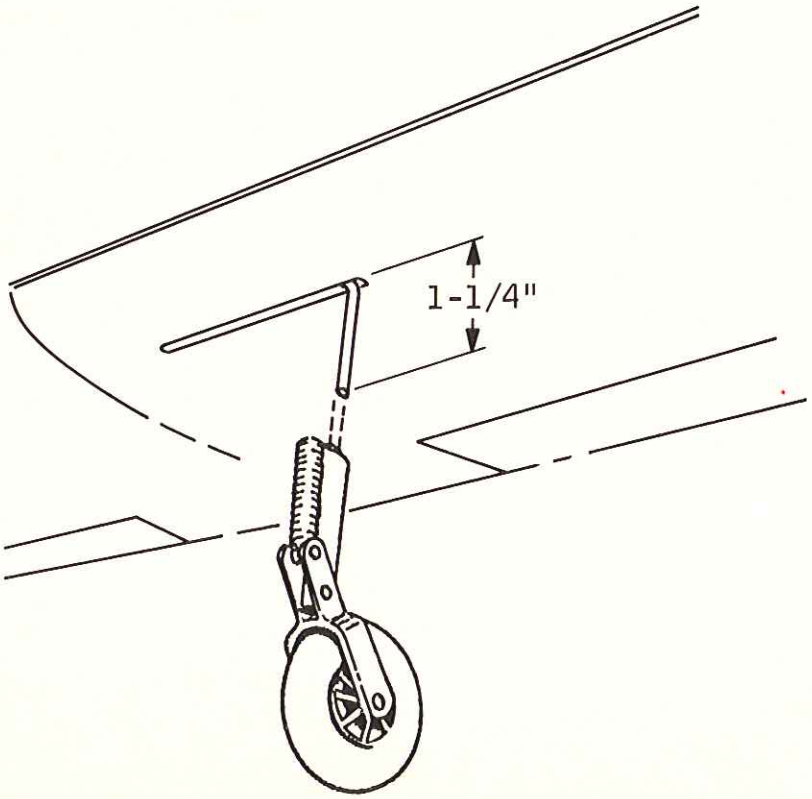
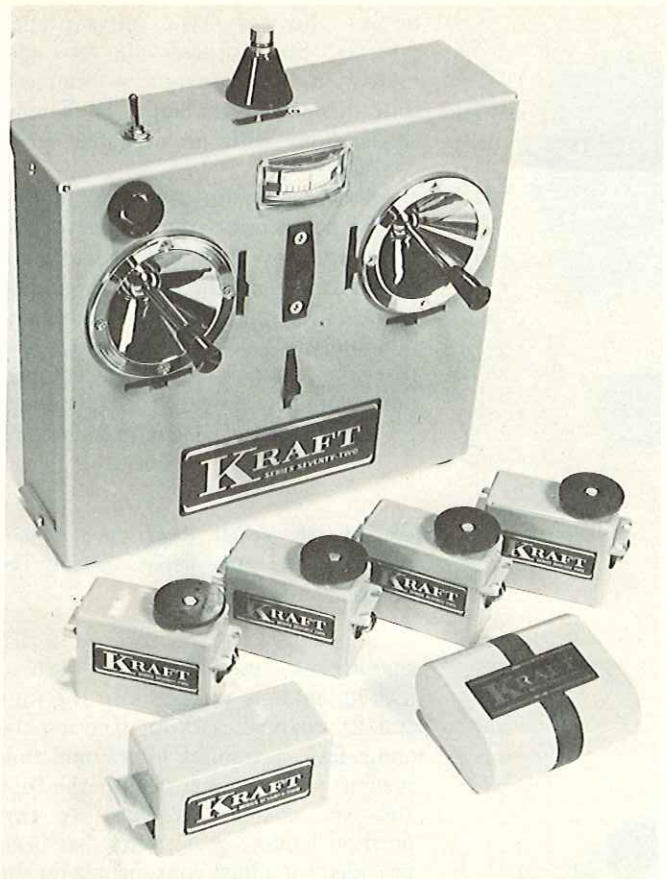


Mounting of gear as mains requires cutting off the standard gear wire to a 1¼" length projection.



The Kraft Series Seventy-Two proportional system. A six channel, Mode II transmitter shown.

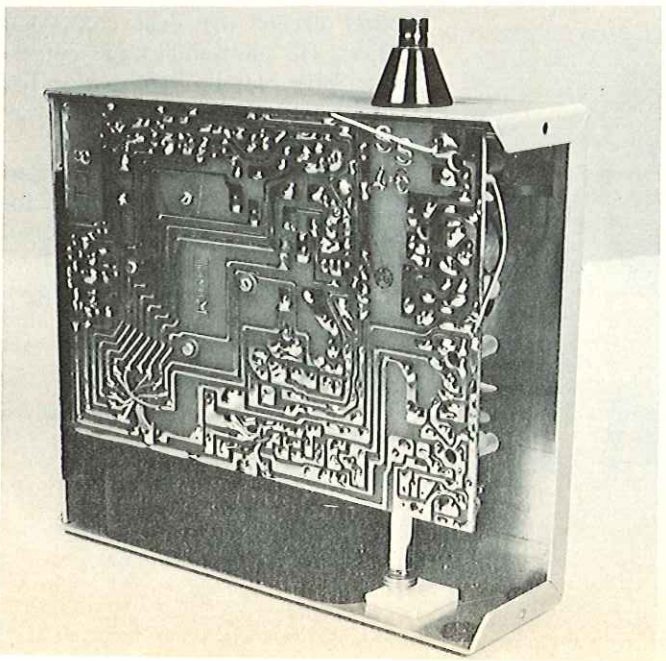
The popular six-channel, single stick version of the Kraft Series Seventy-Two system.

RCM PRODUCT REPORT

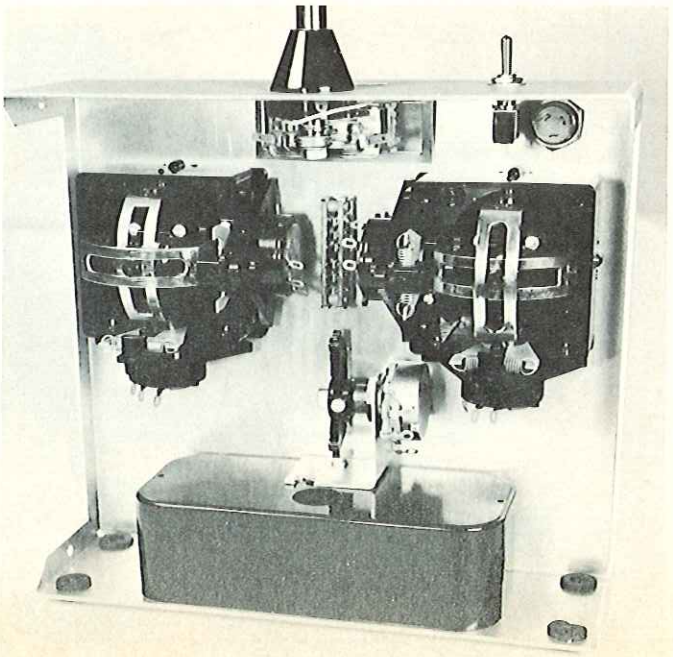
KRAFT SERIES SEVENTY-TWO

Kraft Systems, Inc., 450 W. California Ave., Vista, California 92083, is, unquestionably, the largest producer of proportional radio control systems in the world today. With an enviable reputation for engineering design, production quality, and outstanding service, we were interested to see what this manufacturer had to offer in their

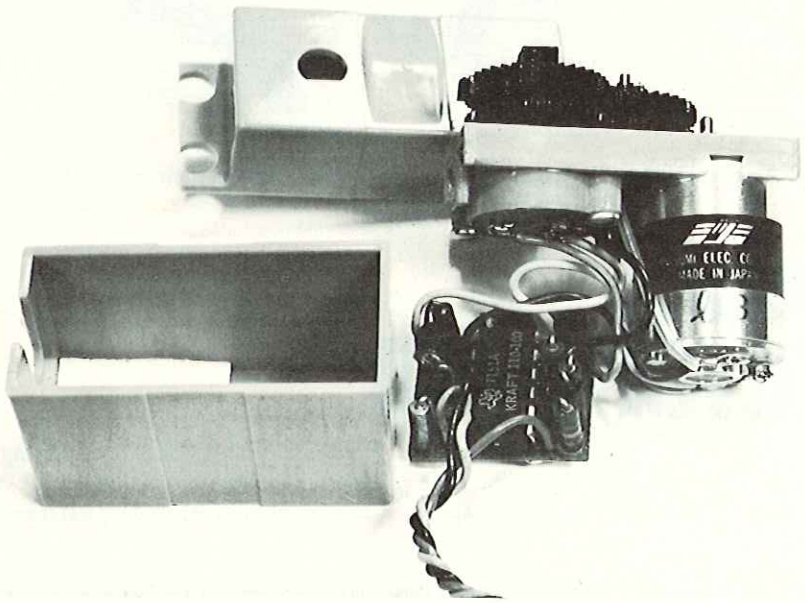
Note clean printed circuit board design, excellent workmanship. Antenna retracts completely into transmitter case.



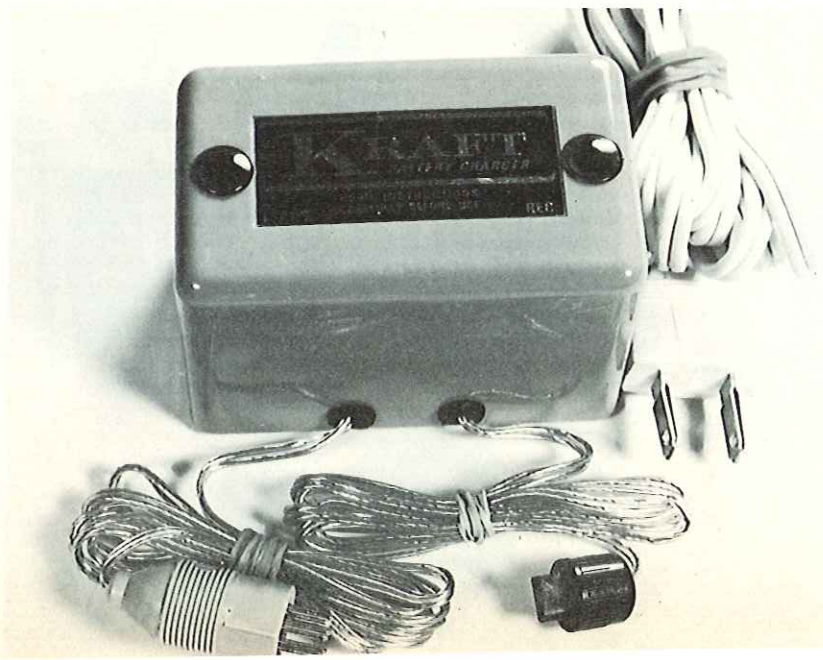
Mechanical assemblies shown here on the two stick transmitter. PC Board and wiring have been removed for clarity.



Two of the several Kraft servo options available with the Series Seventy-Two systems.



The servo case has been removed to show the new Kraft servo amplifier integrated circuit.



The Kraft battery charger is a fast rate unit allowing a full charge in four hours.

Series Seventy-Two proportional systems. For purposes of test and evaluation, we ordered a complete four channel system and a six channel single stick with all available servo configurations.

Here is a summary of the features of the new Kraft Series Seventy-Two. First, the very compact transmitters are carefully designed for proper balance, insuring better control and minimum fatigue. The precision control sticks have a specially developed potentiometer providing an accuracy of better than 1/2% with improved smoothness and feel. A positive locking antenna retracts into the four and six channel cases for convenience and safety. A training interconnection system is also standard with the four and six channel systems. A two position landing gear switch has been provided for added convenience on the six channel transmitters for use with retractable landing gear.

On the new Series Seventy-Two receivers, the exclusive dual conversion receiver option will perform reliably in areas where standard type receivers will not, making this one of the most advanced receivers available for radio control usage. Remote electronic frequency switching is optional on all models except the dual conversion receiver. The unitized block receptacle in the Series Seventy-Two receiver has a positive locking tab preventing accidental plug disconnection.

A custom integrated circuit has been designed by Kraft Systems for their Series Seventy-Two digital servo. This IC "chip" includes 57 transistors, 63 resistors, 5 diodes, and 2 capacitors, all housed in an integrated package to produce centering and tracking accuracy better than 1/2%,

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SOARING

WITH DON DEWEY

A discussion of the A.M.E. E-Clipper takes place after RCM's test flights. Bill Anderson, at left rear, pursues less verbal activities.

SULA SOARS

by Socorro Serrano

Until two years ago the only glider I had seen was in a "One Step Beyond" episode set in pre-war Germany. Then I fell in love and entered the world of X-Actos, wood shaving, servos, Hi-Starts, and sunsets. I also learned about a very special animal, the R/C sailplane enthusiast. I was very impressed with the type of man that took to the slope or the open field in pursuit of an updraft or thermal. Here was an *Individual* in total communion with nature. He could appreciate a job well done and admire skill and ability in a fellow human being, irrespective of any economic or ethnic differences between them.

As my involvement grew, a distressing possibility occurred to me. Because of the very nature of the Art and the Individual, sailplane flying might be doomed to extinction. You see, the sailplane flyer is an invisible man to the general public. He does not destroy, waste, or protest. Even when he is personally pushed aside by private enterprise or public utilities, the sailplane flyer simply packs up and looks for another site. It is his very survival that is threatened by the influx of Made-by-Mattel track homes and the thoughtless waste of our natural resources and public lands.

It was because of this very real feeling of self-preservation that Milton and I found ourselves hurtling down the Harbor Freeway in Los Angeles, one Tuesday evening three months ago. We were going to support our friends in their dream. That evening, the Soaring Union of Los Angeles was born. I went to the meeting to cheer our friends' efforts and left with the title of Assistant Contest Director. (Quite possibly the first female CD?)

Fortunately, Mardell Tubbs is the SULA Contest Director. Under his guidance, and with the help of a few "unsolicited suggestions" from the Man-in-My-Life on how a contest should be run, I survived our first monthly contest and even found myself enjoying it. By the time the March contest began to take shape, I had collected enough 'unsolicited suggestions' from fellow SULA members to realize that I would never master the fine art of contest directing to the satisfaction of every participant. But that didn't faze me one bit. After all, ignorance is bliss!

CD Tubbs and I announced that our next contest was set for Sunday, March 11, at Domiquez College. It would be a Pylon Contest with spot landings. We could have five minutes within which to complete as many laps as possible and one minute to land. Mardell was beautiful! He had thought of everything! Then someone, bent on destroying my newly acquired CD confidence (that same Man-in-My-Life), began to ask questions: "What time will the contest start? How far will the pylons be placed from one another? How will the contest be scored?" With the coolness that comes only with vast years of executive experience, I took care of all questions and objections with a well-timed, "Mardell, would you like to answer that?"

Nineteen daring and undaunted men accepted Mardell's challenge. As the entrants turned in their scores, it was evident that it would be a very close contest. Of the first nine entrants, three were tied with the highest points for the round – 400 points each. Then Willie Richards stepped up to the Hi-Start, launched his Cirrus and started thermal hunting. Eight laps later, he brought his ship in to the 50 point landing area, and turned in a total of 850 points for his first round. At that point, eighteen computers readjusted strategy and checked weather conditions. At least that's what I thought, upon hearing, "When you're hot, you're hot," directed at Willie.

With his usual aplomb, Willie (who was No. 16 in the lineup) spent his time retrieving Hi-Starts, timing other contestants, and generally making himself helpful. Early in the second round both Milt Swan and Pat Seale pulled out of the pack with flights of 1000 points each. But Willie was not ruffled. He is not a loud or showy person. When his turn came up, he set his Cirrus free once again, and let it go on to score another 800 points with a 50 point spot landing. With that, Willie became high point man of the day with 1700 points. Milt Swan came in second with a total of 1350. (Milt had also placed second in the February contest. Always a bridesmaid . . . .) Close on Milt's heels was Dom Scrooc, followed by Pat Seale and Derek Moran.

The unusually large and orderly spectator crowd witnessed not only several fine demonstrations of thermal hunting, but also a few spectacular, and unplanned, crash landings. But in spite of a few mishaps, it was a fun-filled day.

These monthly contests are an integral part of the SULA concept. SULA feels that through regular competition among frineds a flyer's skill grows and skill in controlling his ship grows, so does his pleasure in soaring. SULA was organized as an aid in the development of sailplane flyers. In addition to that goal, or in pursuit of it, SULA hopes to make soaring a more visible art to the general public in order to have the cooperation of the public in keeping sites open and making new ones available.

The younger members of our organization, in particular, Peter and Paul Parszik, are fine examples of the calibre of person that is attracted to and involved in glider flying. These young men perform under the pressure of competition with commendable skill and confidence. They, like most "Invisible Men," are gentlemen in every sense of the word.

The soaring world is not limited to gentlemen. In the near future, SULA will have ladies competing in the monthly contests. It is also quite feasible that at our annual trophy banquet, one of our ladies may win an award for having shown the most improvement over the past year. After all, we ladies are starting from ground 0!

Life with SULA – and that Man-in-My-Life – is very exciting for a city girl. There are contests, meetings, and Sunday fun-flys to look forward to, with the accompanying picnics, hikes, and sunburn (or windburn, depending on the site). I'll be looking forward to sharing my experiences with you, if those Invisible Men and Their Flying Machines hold still long enough!

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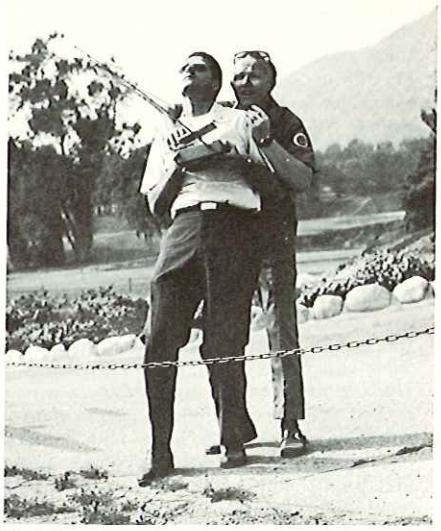
In a letter from Dan Pruss, Contest Director for the Third Annual R/C Soaring Nationals, he informs us that this largest of all soaring events will be held on July 23-25 at Miller Meadow, Chicago, the site of last year's Soaring Nationals. Judging from the inquiries and replies from across the U.S., it



Mad Magazine Magnate Mauls Modeler! Don Dewey, right, attempts to teach John Pothier, left, how to crash a sailplane. Photo by Dick Jansson, a transient hippie from Wellesley Hills, Massachusetts, who cluttered up the skies with a Kurwi 68 before being banned as an unnatural hazard to navigation.

is already apparent that this year's contest will again be national in representation and not merely in name. For further information, contact Dan Pruss, Box 49D, Plainfield, Illinois 60544.

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The Flying Sparks of Elmira, N.Y., invite you to the Harris Hill Open R/C Soaring Contest on September 30 – October 1, 1972. There will be prizes for Flight Endurance, Spot Landing, Building Skills, Design Originality, and Sportsmanship. Prizes will include rides in a full sized Schweizer sailplane. Plan now to attend the Harris Hill Open and launch into the updrafts of the 900' Harris Hill glider site. Camping is available within walking distance to the contest, so plan on bringing the family. They will enjoy seeing the National Soaring Museum located at the site. Hotel headquarters are located at the Howard Johnson Motel, Horseheads, N.Y. 14845. For additional information, contact George Fuller, RD No. 2, Beaver Dams, New York 14812.

CAMERA FOR SAILPLANES

An excellent camera is made by Estes Industries, designed for model rockets, and is readily adapted to radio controlled sailplanes. Merely remove the canopy or nose hatch from the sailplane and strap the Camroc Camera in place with masking tape. The shutter is tripped by means of a line running from the shutter to a wire protruding through a hole in the fuselage which, in turn, is connected to a servo. The camera and servo are easily removable in order to revert back to conventional soaring once again. The camera is inexpensive ($5.00) and so streamlined that it does not drastically effect the flying of the sailplane. This idea was submitted by David P. Anderson, of Minneapolis, Minnesota.

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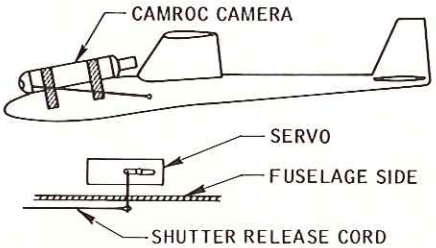

COMBINED CAN WINCH AND FIELD BOX

L. MacArthur, of Omaha, Nebraska, submitted this sketch of a modification he made to the RCM Can Winch. As originally designed, a 3 lb. coffee can was used which contained the Hi-Start rubber inside with the line wound on the outside. This modification consists of cutting another 3 lb. coffee can in half and soldering the cut end to the bottom of the full length can. Both ends are open and are covered with the removable plastic coffee can lids. The "half-can" soldered to the original Can Winch is used to hold your emergency repair kit, Hi-Start spike, extra chute, tow hooks, "S" hooks, additional nose weights, and anything else that you may need at the field.

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TUBE RINGER

Dr. Emery L. Wayman, of Portland, Oregon, has been using a tube ringer which is available from Gill Mechanical Company, P.O. Box 5529, Eugene, Oregon 97405. This device, priced at $3.95, allows you to get every drop of expensive epoxy glue out of the tubes. Also, on cold days, when the glue doesn't flow very easily, the tube ringer will get it out without any difficulty. Dr. Wayman mentions that it will more than pay for itself in glue that it gets out of tubes that would otherwise be stuck there and subsequently be thrown away.

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SAILPLANES AND ACCESSORIES

The Dart sailplane from JP Models, 26557 Mazur Drive, Palos Verdes Peninsula, California 90274, is a 100" span sailplane with a unique rugged "folded" plywood fuselage with a fiberglass nose which has been fully assembled and finished in white epoxy as a part of the kit. Priced at $44.95, the Dart kit includes complete hardware, a hand painted pilot, shaped tail surfaces, decals, complete instructions, a large R/C compartment, and a carton in which the wing can be stored. The wing, by the way, now includes spruce spars on top and bottom with full span shear webs for a true D-tube construction. The wing area of the Dart is 675 square inches with a root chord of 8¼" and a tip chord of 5¼". The stabilizer area is 103 square inches with a fin area of 51 square inches. The airfoil used is a flat bottomed Eppler 387 and the wing has an aspect ratio of 14.8:1. The weight of the Dart, less radio, is 32 oz. and the wing loading with an 8 oz. radio is 8.5 oz. per square foot. The kit is exceptionally well made and is quite unique due to its completely finished and pre-painted fuselage. All that is necessary is to build the wings, the empennage, and install your radio equipment. The Dart has proven to be a good and stable flier both on the slope and in flat-land thermals, launched from a Hi-Start or electric winch. RCM has Tested, Approved and Recommends the Dart sailplane from JP Models.

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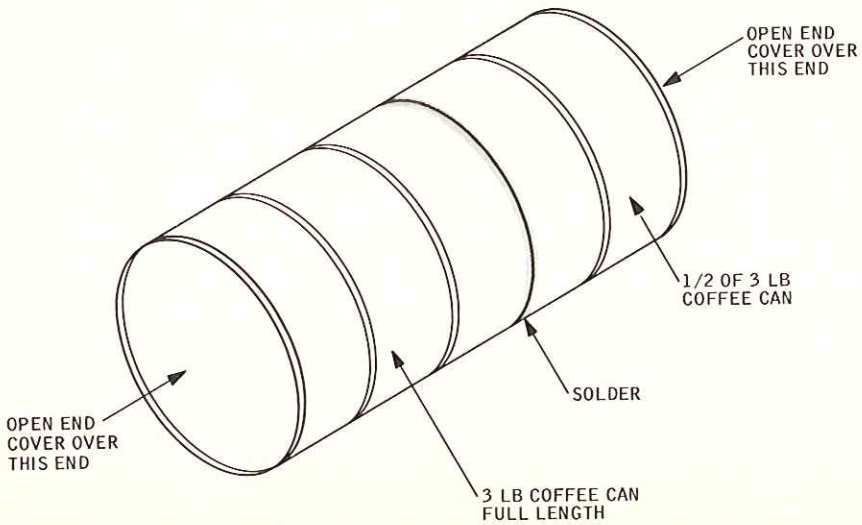
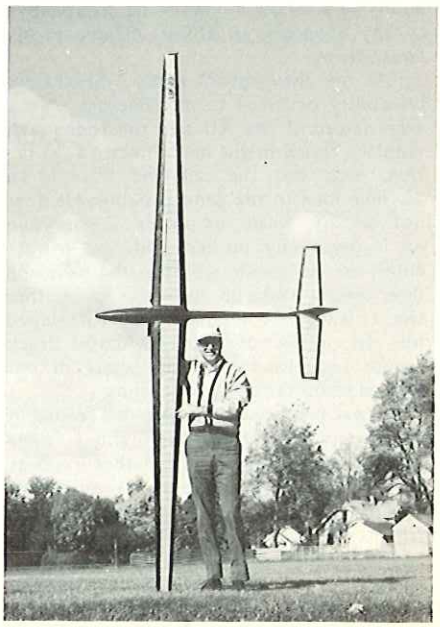
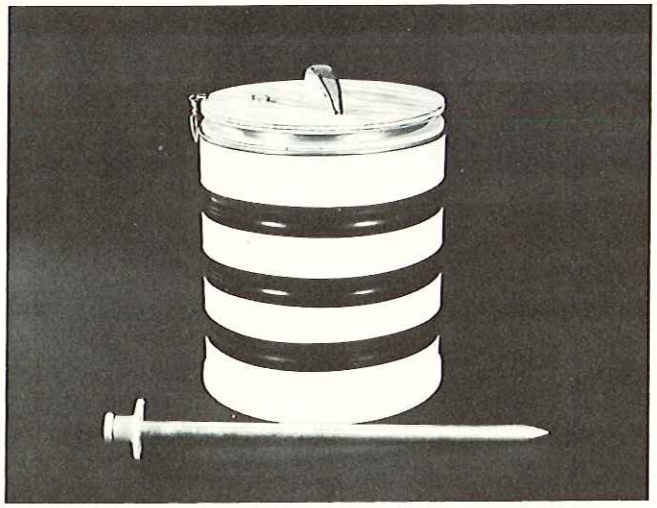
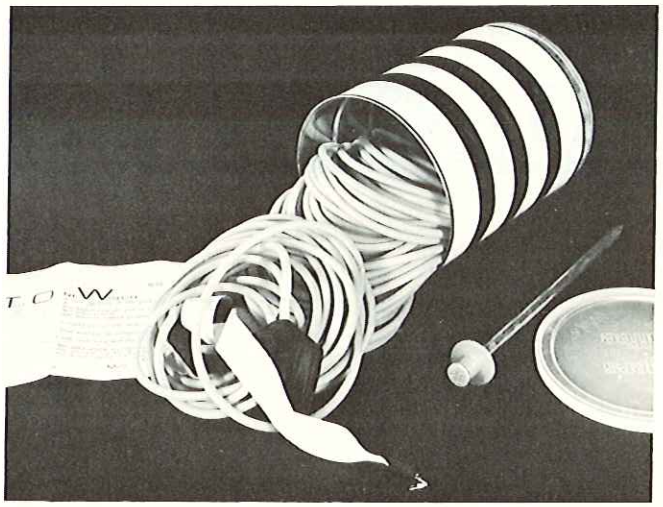
Fliteglas Models, P.O. Box 98851, Des Moines, Washington 98188, is now offering the "Miskeet" in a semi-kit form for $39.95. There are four sheets of plans that show both wing panels so that both can be built at the same time. The Miskeet has a 1008 square inch wing area and a loading of 8.5







The Omni Winch, a new hi-start from M & S Limited includes everything you need for one-man launches. Reel contains 300' of monofilament line.



Inside the Omni Winch is 100' of hi-start rubber, locating streamers, and all necessary hardware. Priced at $19.95 direct.

oz. per square foot. A properly trimmed 4 lb. ship will fly over 100 yards with a hand toss. Stall characteristics are good with stalls coming at quite a high angle of attack, even at lowest speeds. The ship has a 150 inch span and a 22:1 aspect ratio with a NACA 6412 airfoil. The model is offered in a semi-kit form (no wood) with a fiberglass fuselage, fiberglass canopy, plans and instructions. Approx. $9.00 worth of balsa wood is required to build the wing, stabilizer, and rudder.

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Model Plan Service, P.O. Box 824, Tustin, California 92680, is offering all 7 back issues of the previously published Zephyr with a full size sailplane plan in each for a total of $15.00. Building instructions and scale data with photos of the sailplane are included in each Zephyr. This is an extremely good buy on this formerly published magazine since the single copy price was $4.00 each and all seven back issues with full sized plans are now available for $15.00 from Model Plan Service.

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The Omni Winch is a new Hi-Start available from M & S Limited, P.O. Box 39745, Los Angeles, California 90039. Priced at $19.95, the Omni winch includes the metal can storage with 100' of Hi-Start rubber inside and a storage reel and carrying handle permanently mounted to the outside of the can with 300' of monofilament line and all necessary attaching hardware. To use the Omni winch, select a spot approximately 550' upwind of the sailplane launch area as a stake location. Place the red topped metal stake that comes with the Omni winch through the black ring at the end of the elastic tubing and drive the stake 6" into the ground. Now, lay your tubing out in a straight line leading toward the sailplane launch area. Attach the chromed swivel snap through the small eye of the brass ring at the end of the elastic tubing. Un-reel the launch line as you continue walking in a straight line towards the sailplane launch area. The Omni winch assembly is now 400' long and ready to be energized. Energize the system by stretching the Omni winch approximately 80 paces (150'). This is a good tension for the average 2½ lb., 6-8' sailplane. Stretch additional paces for larger, and fewer paces for smaller, sailplanes.

The Omni winch from M & S Limited has been Tested, Approved and is Recommended by RCM.

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INTERNATS DATA

The following is a listing of basic data of the models used at the Soaring Internats at Doylestown, Pennsylvania, in September of last year. The weight and wing loading figures are from the processing data and ballast was added during actual competition.

Name	Country	Model	Wing Span (inches)	Total Area (incl. tail)	Weight lb. oz.	Wing Load
Pimenoff	Finland	Cumulus 2800	111	890	3 7	8.9
Dyer	G.B.	Albatross	122	1098	3 1	7.0
Heithecker	U.S.A.	Snoopy	124	1042	3 4	7.2
Nielsen	U.S.A.	Phoenix 130	129	1146	4 0	8.0
Carlsen	U.S.A.	Plain 1	120	1115	3 14	8.0
Dallimer	G.B.	Thermal Hunter	142	1548	3 14	5.8
Matsui	Japan		100	765	1 14	5.6
Hortzitz	Germany	Windspiel	112	974	3 10	8.7
O'Hara	Ireland	Much-Ado-1	94	967	2 13	6.7
Oki	Japan		100	765	1 15	5.8
Hirasawa	Japan		98	865	2 8	6.7
Blair	Ireland	Kookie	104	835	2 12	7.6

From the March 1972 issue of Radio Control Models and Electronics, published in England, comes details of a releasable tow hook. A separate servo is used to operate the release lever of the tow hook described in the illustration. Very little load is placed on the servo and the unit can also be operated by a linkage to the down elevator side of your servo. The folded plate is mild steel and the swinging hook is made from stainless steel. The unit is secured to the model with four screws through the floor of the fuselage into a 1/8" plywood plate.

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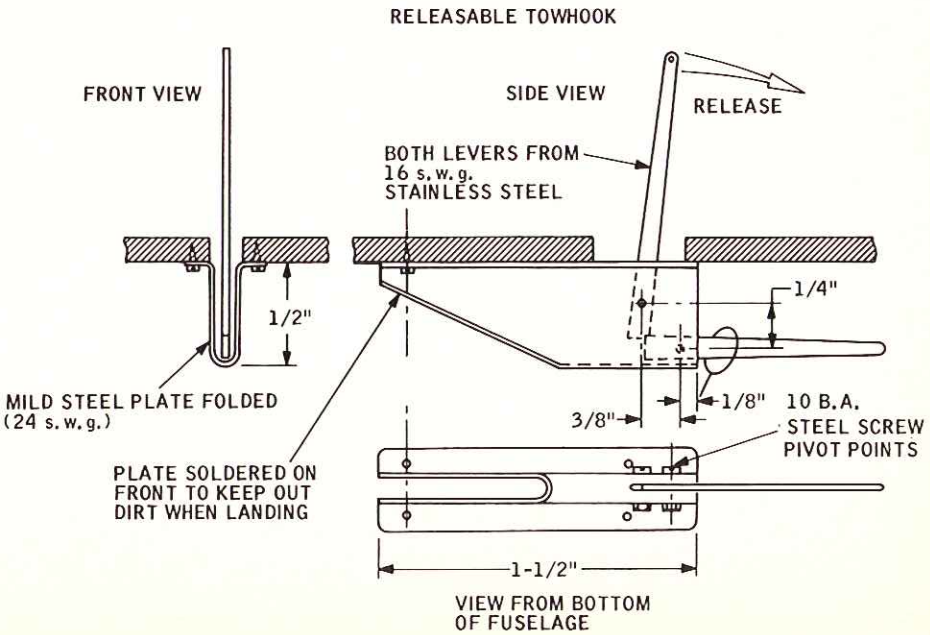
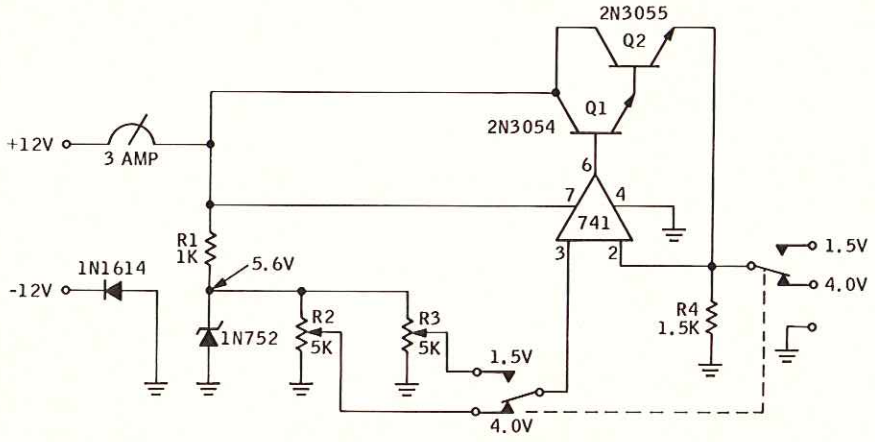


FOR WHAT IT'S WORTH



ALL RESISTORS - 1/4 WATT

The well equipped RC flyer usually has an electric starter and an electric fuel pump. This means he also lugs three separate power supplies to the flying site, not to mention having to keep them "pumped up" all the time. Reducing the battery requirement down to a 12 volt power supply was accomplished by building a regulated dual voltage power supply. This system delivers 1.3 volts measured at the glo-plug, using 3-foot leads, and up to 5 volts for fuel pump operation.

The 741 differential amplifier (Fairchild) is the heart of this system. Pin 3 receives a reference from R-2 (or R-3) and compares this voltage with that at pin 2 (output terminal). When the voltage differs, Q-1 and Q-2 are turned on to regulate that voltage to match the reference value. Present capacity is about 5 amps and should handle 2 glo-plugs simultaneously. However, the 3 amp circuit protector must be upgraded to a 5 amp device before attempting a 2 glo-plug operation. Current capacity can be increased by adding 2N3055's in parallel, as required. This system has been in use for many weeks and has proven to be well worth the time and effort required to put one together. This idea was submitted by Charles Palermo.

Small dents, scratches and depressions in balsa wood surfaces caused by clip clothespins or bumping against a work bench can be removed. By simply applying a drop of water to the damaged portion and dry heating with an iron, the steam will expand the compressed wood fibers and return them to their original condition. This hint saves time that would be spent for filling and sanding the defective surfaces. It is suggested that you experiment with some scraps of balsa and you'll be surprised at the size of the dents and depressions that can be removed. This idea was submitted by Jim Irvine, of Marion, Iowa.

Tom Seager, of Crystal Lake, Illinois, has seen several suggestions for keeping the glow plug lit or using an external jack for engine starting. However, as he mentioned, he's never seen a satisfactory method of attaching the wire to the glow plug. Tom's idea is to use a Du-Bro wheel collar. First, grind the chrome plating off of the collar where you will solder a wire to it. Next, run a 3/32" drill through the 3/32" collar. This exposes the brass on the inside for a better electrical contact. The small set screw is used to hold the collar to the top of the plug. The other end is simply grounded to the mounting bolts.

Bob Lane, of Anchorage, Alaska, mentions that he spars his foam built-up wings with lightweight brass or aluminum tubing. These spars are extremely strong and are almost indestructible in a crash, as well as eliminating flexing during maneuvers.

And here are several ideas from Ben Strasser of Northridge, California.

When installing hinges with epoxy or silicone seal, it's wise to get some Vaseline into and on to the hinge pivot point – to keep from gluing it in place. Right? But it seems to take forever to get the Vaseline in place, wiping it on with a screwdriver or other such tool. Ready? Here's one for you. Put some Vaseline in the cap from the Vaseline jar and heat it a bit. (I put my Solarfilm iron into the vise so the shoe is upside down and flat. I then put the cap on to the shoe of the hot iron. It takes about a minute to melt.) When the Vaseline is a liquid I use a small brush and paint it on to the pivot point of the hinge. First one side, then the other. As soon as the Vaseline gets on the hinge it turns back to the usual consistency. And the brush can be cleaned with methyl alcohol.

And now another one:

I usually mix my epoxy in the cap from a bottle, coffee can lid, or . . . When the epoxy is mixed and I'm holding the part to be glued in one hand and digging the epoxy out with a screwdriver in the other hand, the darn capful of epoxy will stick to the screwdriver. Or, I'll have to push the cap of epoxy all over the top of my work bench. And now, the handy hint: I just put a ½" of double stick tape on the bottom of the cap full of glue and stick it on the top of my work bench. Or, if I want to move it around as I work, I stick it on the top of a full fuel can, a can of paint thinner, etc. Then it stays where I want it.

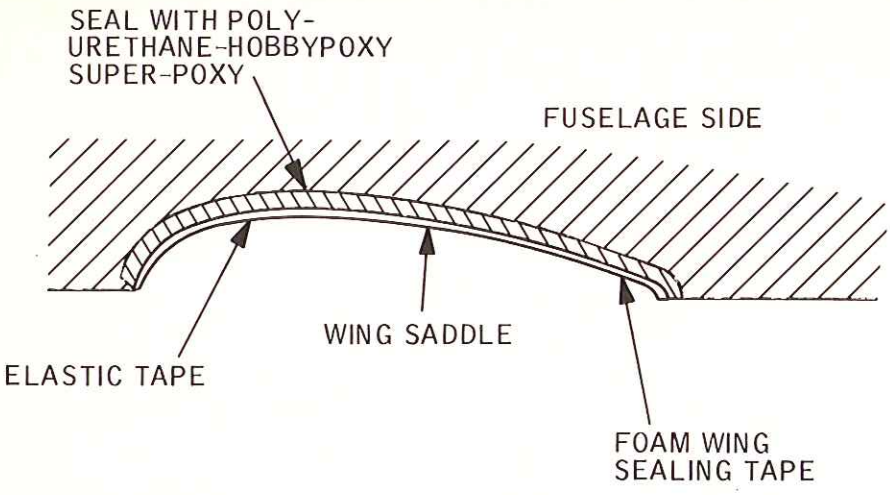
And now another one:

Does everyone but me know that methyl ethyl keytone – available from the local hardware store – works beautifully as a solvent for the Francis Products Building and Surfacing Resin? Now each batch of resin doesn't also cost me a brush. And the brush comes out clean enough to use on the next paint job!

One more:

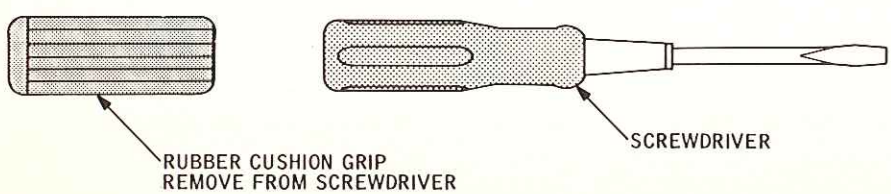
The local typewriter repair shop is a source for small springs – needed for rigging the wheel brakes suggested in RCM to assure the brake comes back to a position free of the wheels and for other such things.

On many sport aircraft that do not have elaborate wing fillets and saddles, a sticky backed foam tape is used to seal the wing and fuselage joint. A

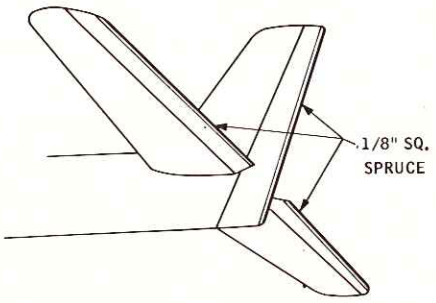


major problem with this arrangement is that the foam tape becomes fuel soaked in time and loses its adhesive qualities. When it is replaced with new tape, usually the fuselage sides are soaked, too, and the new tape won't hold in place. One way to solve this problem is suggested by Stuart Gwin, of Boise, Idaho. Stu's idea is to purchase a roll of Scotch Elastic Tape from your local stationery or art supply store. This tape will closely match MonoKote and most basic paint colors. If not, black or white tape can be used and works satisfactorily. Seal the wing saddle in the fuselage with this tape before it has become fuel soaked. The edges of the tape can be sealed with polyurethane varnish or clear Hobbypoxy or K & B Superpoxy which will make them completely fuel proof. After the foam tape becomes fuel soaked it can be pulled off, the wing saddle cleaned thoroughly and new tape put down with no further problems.

The rubber cushion grips which come on screwdriver handles are an excellent source of free "chicken sticks." The grips may be easily removed and the screwdriver still usable. By checking the sizes you can find one which is just the right fit for your "starting finger." These seem to be less prone to splitting than the commercially available guards. This idea was submitted by Dr. Richard Forbes, of State College, Mississippi.



If you are tired of all those unsightly nicks in the balsa trailing edges of your rudder and elevator from banging into benches, car doors, etc., try this idea from Bud Haight, of Edmonton, Alberta, Canada. During construction, Bud cements 1/8" square spruce to the trailing edges and rounds off the balsa-spruce combination with a razor plane. The rounded trailing edge looks better than a knife edge and the spruce won't nick as easily.



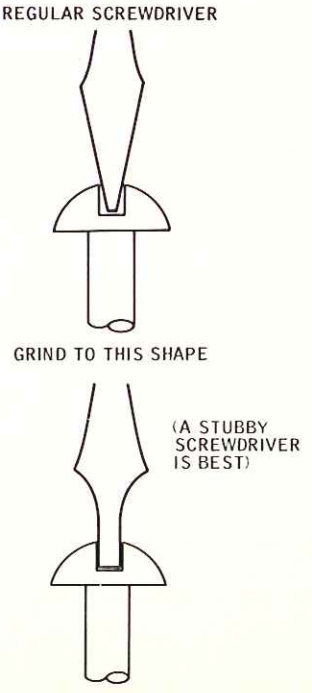
Roger Claude, of Tucson, Arizona, mentions that most of us don't use pins much anymore, but there are times when Roger's "zig-zag" pin will be most useful. Make up a dozen according to the sketch and see for yourself.

"ZIG-ZAG PIN"

Compound curves at the stabilizer-fin-fuselage joints can be covered with Super MonoKote or Solarfilm without denting or marring the surface by using the following method submitted by Dr. R.G. Mokadam of Chicago, Illinois. First, lay a strip of Super MonoKote on the joint. Next, set your iron to high heat, such as linen, and stand it in a vertical position. Take a piece of clean and dry cloth and fold its corners into a small ball or short stump and press this against the hot sole plate of the iron. When the cloth ball gets sufficiently hot, transfer it immediately to the Super MonoKote layed on the joint and press down well. One or two tries will indicate if the cloth ball is warm enough. Repeat the process until the joint is completely covered. Although a bit slow, this method produces a very smooth cover joint. Switch the iron to low heat and allow it to cool before it is used in the normal manner.

For the new Quarter and 1/2A midget racers, Sig bubble canopies in the 4" to 7" range make excellent cheek cowls. They are inexpensive, save weight and time and can be finished with a coat of Testor's Spray Pla Enamel on the inside. This idea was submitted by Ted Stoeckel of Miami, Florida.

If you've been plagued by your screwdriver slipping out of the nylon wing hold down bolts and poking holes in your wings, try this idea from A. Philipczak, of Reading, Pennsylvania. The sketch is self-explanatory.



BIRTH OF A LANDING GEAR

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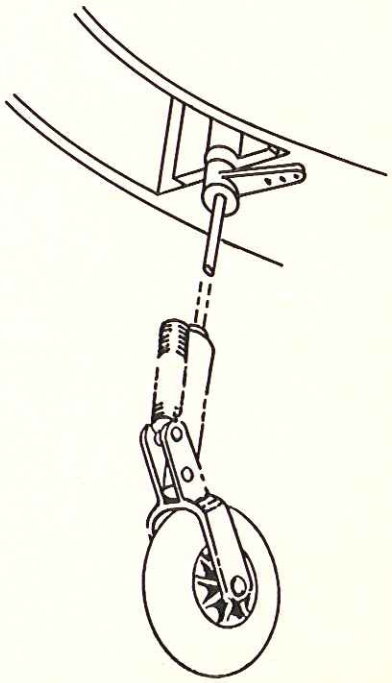
time on the gear, I overlooked one thing: The "Aerobat" is a tail dragger, and with the built-in caster on the gear, I found the airplane rolled-out too quickly, the propeller making funny designs in the runway. Compensation was made by bending the gear wire forward so that she would roll out properly.

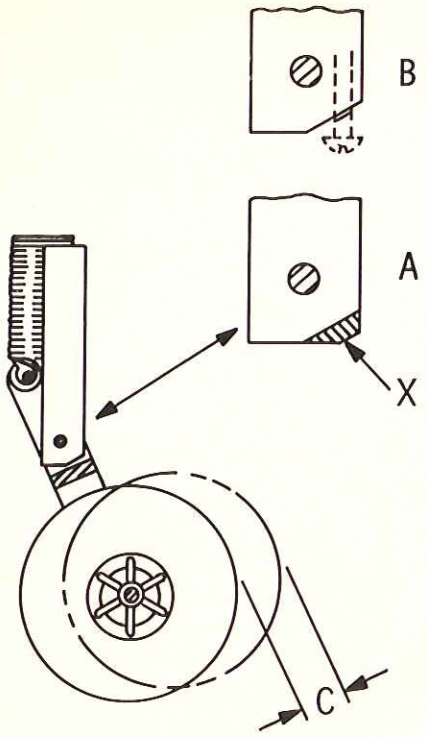
Now let's look at the effects of a standard wire main gear as opposed to the new gear.

The standard wire gear is constructed so that the horizontal portion, mounted in the wing gear blocks, acts as a torsion member, while the vertical member acts as a cantilevered flexible beam. In use, the vertical member flexes to absorb the lighter loads until they reach a point in excess of the torsional resistance, at which time the horizontal beam reacts. If we watch the vertical member in action, we will see that it bends much the same as a bow when the string is drawn. Conversly, when the pressure is released it will snap back beyond its static position. Multiply this action several times a second and you will see an uncontrolled sinusoidal wave develop in the vertical member. Now, compound this with a torsional load in the vertical member caused by the wheel being displaced to one side and an outboard deflection, and we have a conglomeration of motions that are totally destructive.

In designing the new gear, I wanted to make it so that the majority of the RC'ers may take advantage of it without having to make any major alterations to their craft. Therefore the strut was made to accept the most widely used diameter landing gear wire. Just about all of the standard main



Mounting as a nose gear requires only the use of a straight piece of music wire.



The above drawing shows the landing gear with one side of the yoke removed. To adjust for amount of deflection "C" file off rear bottom of strut. This is shown in enlarged view "A" at location "X". File carefully, so that when desired amount of deflection is reached, the inner portion of the yoke will stop on the bottom of the strut. Enlarged view "B" of strut, shows rear of strut tapped for a #5-40 screw as a "fix" for those who lean too heavily on the file and overcut. File screw off to suit. Recommended deflection "C": Nose Gear ½", Main Gear 5/8".

gear wire extending from the wings can be clipped off and will accept the strut. Two setscrews are in the strut to lock the gear into place. The use of a few drops of Loctite, or a good epoxy placed in the strut mounting hole, will provide an excellent fit between the wire and the strut. The yoke is made to accept a range of wheel sizes.

When using the gear for nose wheel application, it is only necessary to use a straight piece of music wire — no torsion spring.

Shall we look at the effects of this new gear? Forward motion on the ground allows the gear to increase caster. The more the acceleration, the greater the caster. Clumps, stones, bumps, etc., are absorbed in the caster action. Large bumps force the caster action to the rear stop provided by the strut, at which time the horizontal torsional member in the wing block takes over, allowing further shock absorbing characteristics. The short radius from the yoke pivot point to the contact point of the wheel to the ground makes for almost pure ground hugging characteristics. The wheel being mounted directly on-center eliminates the torsional load on the vertical member. And, a big plus is that the castering gives excellent tracking. The yoke is prevented from swinging forward past its static

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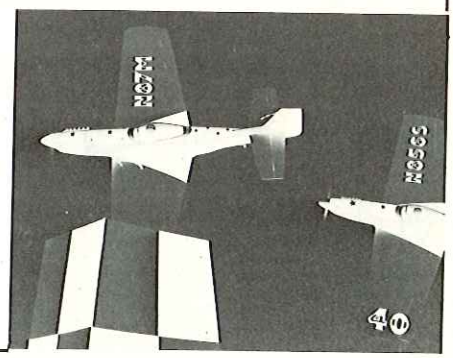
TURN!

RCM RACING REPORT

by dick tichenor



RCM takes pleasure in presenting this Race Procedure Guide which will be included in the 1973 AMA Rule Book and is applicable to conducting any R/C Pylon race.

This excellent and comprehensive guide was compiled by the NMPRA Race Procedure Committee: Chuck Smith, Chairman; Jack Fabbri, Bror Faber, Jim Jensen, Sonny Meyers, Howard Nupen, Mel Santmeyers, Glen Spickler and Bob Upton.

CONTEST PROCEDURE GUIDE FOR R/C PYLON RACING

The operation of an R/C Pylon contest requires more organization and manpower than any other R/C event. The R/C Pylon Contest Director, therefore, must assume a greater amount of responsibility to assure a successful meet. The intent of this handbook is to define these responsibilities and to standardize the contest procedures used throughout the nation. It should be used as a supplement to the AMA Rule Book.

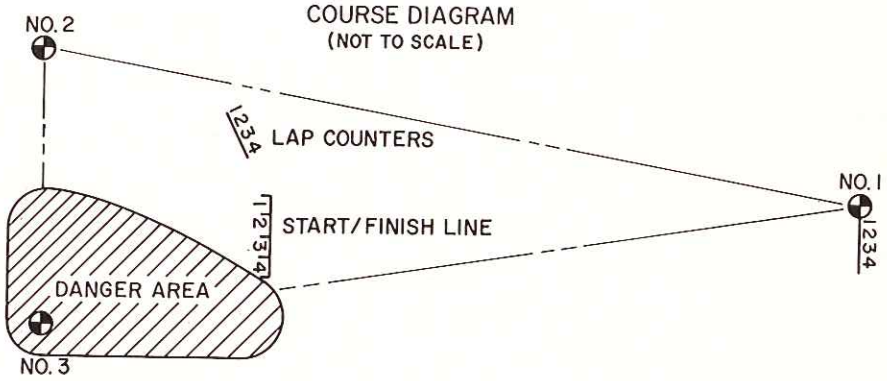
Except for the mandatory safety requirements, the procedures stated in this book are written as a guide. Though these procedures are strongly recommended, it is realized that conditions or locale may require deviation.

SAFETY

Safety is the No. 1 concern for all R/C Pylon Contest Directors. The following is a list of safety procedures which must be used in the operation of a contest. Violation of these procedures may result in cancellation of all NMPRA Championship Points that contestants would have earned in such a contest:

1. The pit and spectator areas must be outside the minimum distances stated in the AMA Rule Book.
2. A protective barrier must be at the No. 1 pylon for the flagmen to stand behind. The barrier should be at least 4' high and made of at least ½" plywood or its equivalent.
3. No workers (except the No. 3 Pylon Judge) or contestants must be in the Danger Area near the No. 3 pylon (see Fig. 1).
4. The Ready Area for the heat that is after the one already flying should not be out on the course between the No. 2 and No. 3 pylons; however, if circumstances make it necessary for this procedure to be violated in order for a sufficient number of heats to be flown, a protective barrier must be provided for the contestants on the ready line between the No. 2 and No. 3 pylons.

FIG. NO. 1
COURSE DIAGRAM
(NOT TO SCALE)



The following safety procedures are strongly recommended:

1. Hard hats for the starter, Flight Recorder, all lap counters and the No. 2 and No. 3 pylon judges.
2. Protective barriers for the No. 2 and No. 3 pylon judges.
3. A minimum number of people should be out on the course. The CD or the Starter should chase anyone out of the flying area who they feel does not belong.

Safety, of course, is an item that can't wait for rules or paperwork. During the course of a racing event, an unforseen situation may arise that requires immediate controls. The Contest Director, therefore, has the authority to initiate any procedure which he feels is necessary to eliminate a dangerous situation.

The following procedures describe the operation of a Formual I contest. Any modification necessary for Formula II or FAI Pylon will be noted later:

RACE PREPARATION

All announcements and pre-entry forms for an R/C Pylon contest should tell of any local deviation from normal race procedure. Pre-entry is recommended since it simplifies registration procedures; however, pre-entry need not be required.

The course should be laid out according to the AMA Rule Book. All mandatory safety procedures must be incorporated into the layout. The pylons should be highly visible and approximately 20' high, but not under 15' high. The landing area should be set up outside the course, preferably on the side of the course opposite the pit area. Landings should not be made between the No. 2 and No. 3 pylons. A public address system is strongly recommended for the pit and spectator areas.

REGISTRATION

Pre-entry information should include pilot's name, address, AMA and FCC license numbers, NMPRA number (optional), type and color of aircraft, make of engine and radio frequency. Cards with this information should be made before the contest for all pre-entries (see Fig. 2). These cards may be used in all post-contest reports.

The Registration Desk should be manned by two or more persons, depending on the expected number of entries. All contestants must register at this desk and must show their current AMA and FCC licenses, pay the entry fee (if not paid with pre-entry) and confirm that their information cards are correct. All contestants not pre-entered must also fill out information cards.

HANDICAP SCALE JUDGING

The object of Formula I R/C Pylon Racing is to race miniature aircraft that look like specific full-scale Formula I aircraft. Since this is a semi-scale event and not a pure scale event, the purpose of the scale judging is to insure that models entered in the event will be realistic and of high quality. The contestant is responsible for

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JOHNNY SPEED
NAME

67
CODE NUMBER

4321 MAIN ST.
ADDRESS

72.40
FREQUENCY

LOS ANGELES, CALIF.
CITY STATE

654321
AMA LICENSE

KAX 1234
FCC LICENSE

51X
NMPRA NO.

SNARK
NO. 1 AIRCRAFT

RED & WHITE
NO. 1 COLOR

S&B
ENGINE

MISS LOVE
NO. 2 AIRCRAFT

BLUE & WHITE
NO. 2 COLOR

S&B
ENGINE

Fig 2: Information Card

N.M.P.R.A.

CODE NO.	START	NAME	FINISH PLACE 1	2	3	4	O	TIME
1	1	ED A.			X			2:05:2
8	2	CARL F.					X	N.T.
22	3	GLADYS C.		X				1:43:4
15	4	HOWARD Q.	X					1:43:2

HEAT NO.: 1 ROUND NO.: 1

Fig. 5: Heat Card

FIG. NO. 3
CONTESTANT CODE LIST

CODE	NAME	HANDICAP	FREQUENCY
	GROUP 1		
1	Ed. A	4	26.995
2	Charlie S.	5	26.995
3	Bill D.	13	27.045
4	George V.	22	27.045
5	Tom I.	24	27.045
6	Stan R.	9	27.145
7	Jack J.	14	27.145
	GROUP 2		
8	Carl F.	15	72.08
9	Bob R.	18	72.08
10	Sam D.	12	72.08
11	Willie P.	10	72.08
12	Hue H.	1	72.08
13	Mike R.	17/16	72.96
14	Dave J.	20	72.96
	GROUP 3		
15	Howard Q.	30	72.24
16	John P.	27	72.24
17	Ike M.	2	72.24
18	Bartolomue G.	8	72.24
19	Fred F.	11	75.64
20	Tony T.	7/6	75.64
21			
	GROUP 4		
22	Gladys C.	19/21	72.40
23	Dan W.	23	72.40
24	Paul J.	28	72.40
25	Roy R.	3	53.10
26	Jack F.	31/29	53.20
27	Tonto	26/25	53.30
28	NOTE: This is very necessary — do it all!		

FIGURE NO. 4
ROUND/HEAT LIST

ROUND 1

HEAT		HANDICAP
1	1 Ed A.	1
	8 Carl F.	15
	15 Howard Q.	30
	22 Gladys C.	19
2	2 Charlie S.	5
	9 Bob R.	18
	16 John P.	27
	23 Dan W.	23
3	3 Bill D.	7
	10 Sam D.	12
	17 Ike M.	2
	24 Paul J.	28
4	4 George V.	22
	11 Willie P.	10
	18 Bartholomue G.	8
	25 Roy R.	3
5	5 Tom I.	24
	12 Hue H.	4
	19 Fred F.	11
	26 Jack F.	31
6	6 Stan R.	9
	13 Mike R.	17
	20 Tony T.	13
	27 Tonto	26
7	7 Jack J.	14
	14 Dave J.	20

NOTE: The 2-plane heat advantage will distribute itself into varying 3-plane heats as the event goes on.

NOTE also that Jack F. (by frequency) could be put into heat 7 and make two 3-plane heats.

TURN!

from page 58

supplying three-view drawings and/or photographic proof that the plane he has entered resembles a full-sized Formula I racing aircraft.

Scale judging should be done by two or more impartial officials. All aircraft, with the contestants' names, and three-view drawings or photos attached, should be lined up after registration. Contestants must signify which aircraft is their back-up ship. If there are a large number of aircraft, the judges should begin by tentatively dividing the aircraft into three or four rows, based on average, good and excellent workmanship and realism. Any model that, in the judges opinion, does not resemble the aircraft shown in the three-views should not be allowed to participate in the event. The CD should make the final decision on this matter.

When judging workmanship, the officials should inspect the quality of the construction and finish. They should check such things as whether joints used in construction show through the finish and whether all fillets blend smoothly into the fuselage and wing. The finish should be smooth and the texture of the material underneath should not show through. A two or three color paint scheme should generally be judged above an aircraft of a solid color; however, below average workmanship on a three color aircraft should be judged below a solid color aircraft of good workmanship. It should not be necessary to have a super hand rubbed finish for an aircraft to be considered excellent by the judges.

When judging realism, the officials should consider such things as cockpit detail (instruments and headrest) and whether the aircraft has a pilot. Duplication of full size construction methods (rivets, corrigated control surfaces, fuselage stringers, etc.) should also be considered when judging realism but should not be given much importance. If a plane is judged with wheel pants, the aircraft must be flown with them on unless the CD determines that rough field conditions make their removal necessary.

Exposed engine heads should be downgraded; however, exaggerated bumps in the cowling which cover an engine that otherwise would be exposed should also be downgraded if the bumps extend beyond the scale outline of the top or side views.

After roughly ranking the aircraft to their degree of workmanship and realism, the judges should just consider scale outline. They should not go so far, however, as to measure the accuracy of the outline with a ruler and slide rule. Scale outline should be used as the deciding factor between aircraft of equivalent workmanship and realism. The judges should have a list of contestant names and then rank the aircraft according to the AMA Rule Book.

PILOTS AND CALLERS BRIEFING

The Contest Director, and the Starter, should brief all contestants before the racing is begun. The following is an outline of points that should be mentioned:

1. Stress that all contestants should keep safety in their minds at all times.
2. Explain any deviation from established contest procedure that will be used at the contest.

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position by a stop on the front of the upper yoke.

After reducing the overall weight of the gear, more testing continued until, finally, the local stick jockeys threatened to have me "tarred and feathered" if I did not make them a set.

It was then that Matty Sullivan and I got together to discuss the possibilities of preventing my tar and feathering. Matty is a cautious guy who has the model builder at heart. He wants to explore all of the possibilities in order to produce a quality product.

In meeting after meeting we discussed the geometry, alloys, machining, specifications, drawings, etc., until, finally, he said, "O.K., it looks good — now let's tear the design apart."

At that time, I thought he had flipped, but in doing this, it was refined into the purest of designs and was really in a presentable state. We had resolved that the gear could be used in all applications, except "fuselage" mounted gear.

The R.C.W.C. was coming up, so Matty asked me to make a display with retracts. It was to have the standard torsion type, and the new gear to display the lack of vibration that occurs on raising and lowering the new gear, as opposed to the standard gear. This was done, and even a blind person could see the effects with his ears. When the standard gear was lowered and locked, it was accompanied by the "twang" one normally expects to hear from this type of arrangement. And, as was predetermined, the new gear "clunked" into position like a 707's.

I called on another club member, Roger Eeckhout, to mount a set of gear on his "Trainermaster." They worked out so well, and Roger, being a master at the art of building, offered to allow us to use his bird in the exhibit.

While working in tabulating at the R.C.W.C., I decided to visit the exhibition area on my break. It was then that my eyes almost "popped." There was Matty about to pounce upon the "Trainermaster" like a lioness upon her prey. Grabbing the cowl and turtledeck, he attempted to drive the airplane through the display counter. I expected to see a pile of balsa laying in a heap, but on the contrary, the gear and plane took all of the punishment Matty could give it. I am sure the exhibit visitors were as impressed as I. This was shown by

their anxiousness in attempting to buy the set of gear mounted on the "Trainermaster."

We had shown the gear in its almost raw state, except for a few minutes of sanding and buffing.

It was after the meet that I got out my trusty files and attempted to customize the gear into as many variations as possible. When I completed the twelfth variation, I finally realized it would take a month of Sundays to do all of the ones that were in mind. After all, you guys would probably prefer to do your own customizing, anyhow. So, why steal your fire?

For a point of interest – if you would like to have a gear that looks great for mains in semi-scale, try this:

Remove the outer portion of the wheel yokes and mount your wheels on cantilevered axles. For more realism, taper the remaining yoke portion and drill two or three lightening holes of decreasing size from top to bottom. I am sure it will earn you some extra points. I believe this variation is strong enough for actual operation, but for safety sake, be cautious and don't overdo your trimming.

I am not on the retract kick – so far – but the problems facing this group are not unknown to me. So many have cussed the torsion spring wire design because, if flexed beyond its elastic limit during takeoff, the gear would not enter the wheel wells and would hang up. At times damaged servos or retract units are the result. The use of the new gear, with or without the torsion spring, reduces these occurrences to where they are negligible. Let's face it, the more we reduce the chance of failure of any component, the more pleasure we can extract from our hobby.

The new gear is now in production at Sullivan Products, and by now are probably on the hobby shop shelves.

Girls, we did not forget you, because with a little work these gear can be made to look as frilly as you like, and as individual as you are.

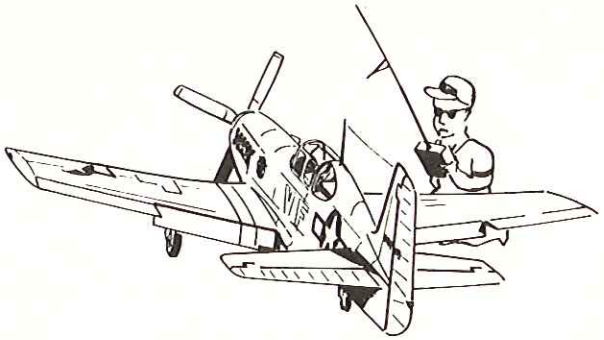
You modelers are the corner stones of one of the greatest hobbies ever given to man. I want to pass it on to my children and their children.

With this gear I feel I am contributing to the advancement of this hobby.

Pass it on.

Peace. ☐

by DAVE PLATT



SCALE IN HAND...

In last December's column we attempted to give a few pointers to the would-be RC Scale contestant regarding choice of subject. Unhappily, this column showed that all is not well with our present AMA competition system, and we concluded with the "sad observation" that changes will be necessary for RC Scale to survive and prosper.

With the acceptance of the Stand-off Scale class into the AMA structure, it would seem an appropriate time to re-examine the AMA RC Scale class, expose the problems and, where possible, suggest solutions. Obviously, anyone who has flown competitively in an event for several years can take a strictly personal view and criticize a set of rules from an individual standpoint. In this analysis, we are going to make an honest attempt to avoid such criticism. It is not, and never has been, any secret that this columnist is attracted to WW II-type scale model, but our primary and far greater love is Scale – all kinds, period.

Our philosophy is, that it takes all kinds of models to make a scale event exciting, and the only thing we can think of that would be as flat as the present rows of insipid and characterless aerial nonenties would be rows of any one type of model – including WW II.

Following December's column we received a number of comments from readers. Let's take a look at these; even if our postscript remarks show disagreement with some of the views expressed, we, nonetheless are grateful to all who troubled to respond.

Dear Dave:

I meant to respond to your RCM article on the ridiculousness of the scale contest rules as now written. I don't consider them just bad – the rules are insulting. As though they are written by some academic boob who had to codify the point system no matter how bad the result.

We need people like you, and other similarly experienced individuals, to make scale judging sensible. I'm no expert, but I'm sure that many fine planes could be built with a few (even significant) scale deviations. Who cares? Judging should be based on an accumulation of virtues including revising scale to make a project feasible. Judgement of the final winner (if anyone can veer be best) should take all matters into consideration and, of course, simplistic planes would have a difficult time placing high. Scale as prescribed by present day criteria is O.K., but so dull and inept as to not be worth considering.

I, for one, would not walk across the street to see a perfect "nothing." There are so many points to be considered I wouldn't attempt to even venture an opinion, but it is hoped that all influence will be exerted to

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A.M.A. RADIO CONTROL SCALE

NAME _____ A.M.A. _____

ADDRESS _____

_____

SUBJECT _____ SCALE _____

STATIC

NOTE: ALL MARKS OUT OF 10

No.	ITEM	MARK	K	SCORE
1	PROP, SPINNER		2	
2	ENGINE, COWL		3	
3	FUSELAGE		6	
4	COCKPIT (EXT)		2	
5	COCKPIT (INT)		4	
6	WING (S)		5	
7	LANDING GEAR		3	
8	WHEELS		2	
9	TAIL GROUP		5	
10	FINISH		4	
11	COLOR		5	
12	MARKINGS		3	
13	PRESENTATION		2	
14	EQUALIZER		5	

CHECK:

_____

_____

_____

_____

FLYING

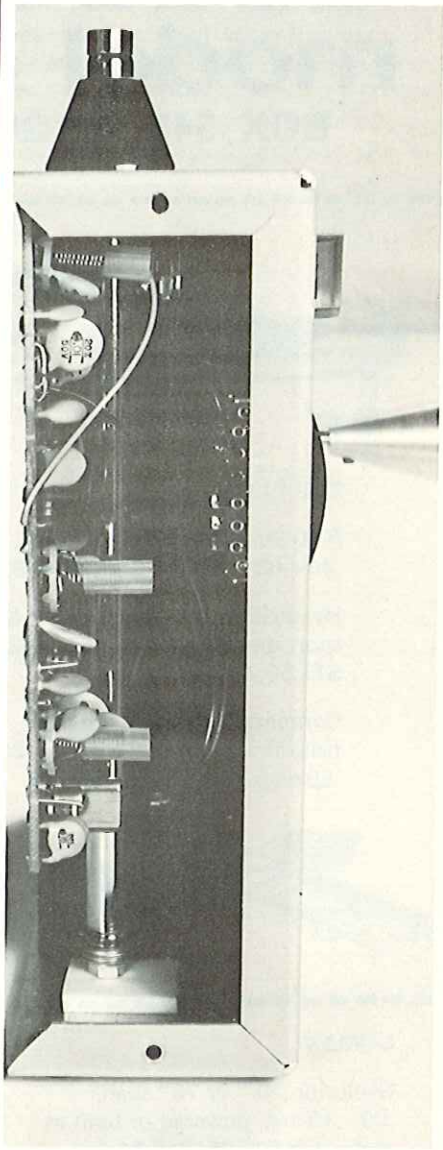
No.	ITEM	FLIGHT 1 MARK	FLIGHT 1 K	FLIGHT 1 SCORE	FLIGHT 2 MARK	FLIGHT 2 K	FLIGHT 2 SCORE	FLIGHT 3 MARK	FLIGHT 3 K	FLIGHT 3 SCORE
1	TAXI, TAKEOFF		6							
2	FIG 8		4							
3	FLYPAST		4							
4	WRITE IN OPTIONS									
5										
6										
7										
8										
9	TRAFFIC PATTERN		4							
10	LANDING, TAXI		8							
11	REALISM IN FLT		3							

STATIC	+	BEST FLIGHT	=	TOTAL	POSITION

FLIGHT OPTIONS: MAXIMUM OF FIVE AT CONTESTANT'S CHOICE. OPTIONS MUST BE TYPICAL OF SUBJECT AIRCRAFT.
K-FACTORS: RETRACT GEAR, TOUCH AND GO, MULTI-ENGINES (ANY NUMBER) K = 6. ALL MECHANICAL OPTIONS (CROP SPRAY, FLAPS, ETC) K = 5. ALL MANEUVER OPTIONS K = 4.

KRAFT SERIES SEVENTY-TWO

from page 50



The antennas on the 4 and 6 channel models retract into the transmitter for convenience. The retracted antenna is also disconnected to eliminate interference to other systems.

virtually zero drift with changes in temperature and voltage, uniform duty cycle, and excellent damping characteristics. The single ended 3-wire servo system will continue to operate when one battery is dead or shorted, the latter being very unlikely with the new battery cells being used on the Seventy-Two systems.

The batteries used on this year's sytems are specially designed, heavy duty, vibration resistant batteries designed to virtually eliminate battery problems. The versatile dual output transformer-isolated battery charger, charges receiver and transmitter batteries

independently and the convenient fast-charge battery system allows you to fully charge the transmitter and airborne batteries in less than four hours. In addition, a remote charging jack is incorporated in the switch harness to permit convenient battery charging without the necessity of removing wings or hatches. Now, let's take a look at the features of the individual components of the Kraft Series Seventy-Two proportional system.

TRANSMITTERS

The Kraft Series Seventy-Two transmitters are quite compact and feature a near perfect balance and feel. The hands position naturally and comfortably over the controls promoting maximum guidance accuracy with minimum fatigue. Featuring the custom quality of Kraft-Hayes control sticks, the transmitters are available in either two stick or single stick configurations. These controls have chrome-plated, hand-lapped actuating bails with a centerless ground chrome-plated ball for exceptional smoothness and long life. Mechanical trim controls for the four primary functions are conveniently located, easily operated, and do not affect control stick position.

The antennas on the four and six channel models retract into the transmitter case for convenience during transportation. The retracted antenna is also disconnected so that interference to other systems is virtually eliminated should the switch be left on accidentally. In the up position, the antenna is securely locked and repeated use will not affect its mechanical integrity.

All transmitters, except the KP-2B and KP-2S, feature a heavy-duty shock and vibration resistant rechargeable battery pack. These packs incorporate a fast charge feature enabling complete recharging in less than four hours.

The transmitter cases are formed from heavy-gauge long wearing vinyl-covered aluminum. The electronic components are conservatively rated for reliability and long life. The RF output is extremely high combined with very low harmonic radiation. Four channel sets may be factory converted to six channels when, and if, desired.

All four and six channel transmitters incorporate a training system originated by Kraft Systems. This gives the beginner a chance to learn without the usual discouragement and expensive crashes. For training purposes, two transmitters are connected together with a cable, which, in turn, is plugged into the same receptacle used for battery charging. Transmitters need not be on the same frequency and may be four or six channels, and the system is interchangeable between Mode II and single stick configurations. During operation, the instructor retains control until he pushes a button transferring control to the student "slave" transmitter. As long as the instructor holds down the transfer control button, the student has full control. If the student gets into trouble, the instructor releases the button and assumes control, preventing an accident. The trainer interconnecting cable is not supplied with systems but is available as a separate option.

Six channel transmitters include one switch selected channel and one proportional auxiliary channel. The switched channel is most often used for retractable landing gear which requires a positive up and down control. The proportional

RC MANUFACTURING

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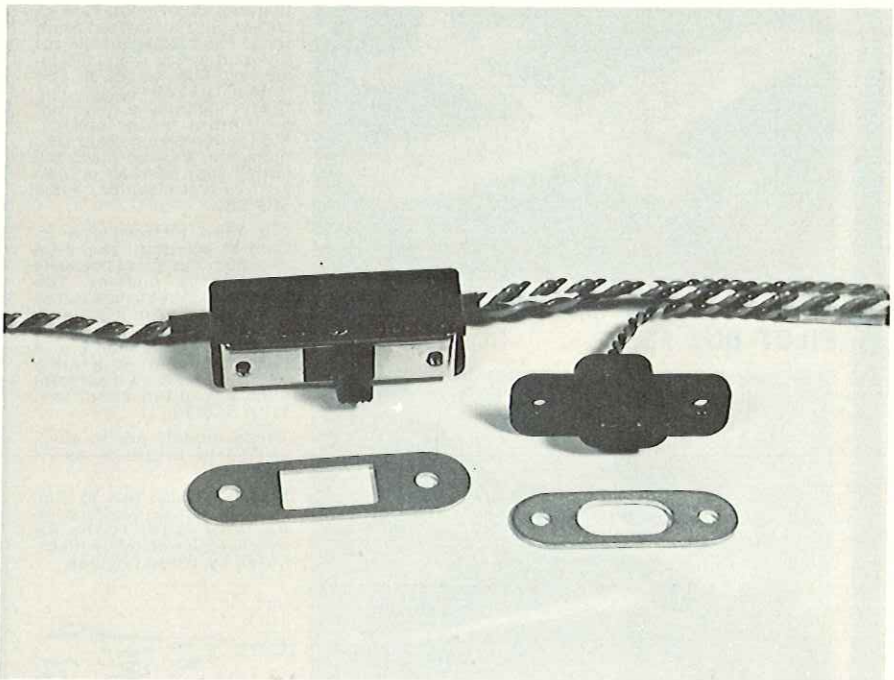
TESTED, APPROVED AND RECOMMENDED BY RCM



Close-up view of the Kraft Series Seventy-Two switch harness. On-off switch at left, nickel cadmium battery pack charging receptacle at right.

auxiliary control is used for any other function as desired.

The transmitter modulation is a pulse position type 1.4 ms pulse spacing at control neutral. The pulse time stability is ∓ 1% 0-140 degrees F and over the useful operating voltage of the power pack. The KP-2B and KP-2S use a 9 volt dry battery (Eveready 276 or equivalent). All other transmitters use a 9.6 volt 550 MAH high reliability nickel cadmium battery pack.

The RF input power of the transmitter is 825 mw while the output power is 500 mw. The approximate current drain is 100 ma and the operating temperature range is from 0-150 degrees F. Transmitter size of the four and six channel transmitter is 6¾" x 6" x 2" while the two channel systems measure 5-3/8" x 5¾" x 2¼" and the three channel systems measure 5-3/8" x 5¾" x 2". The weight, including the antenna of the two channel systems with dry battery is 2 lbs. while the three to six channel systems weigh from 1 lb., 12 oz. to 2 lbs., 4 oz.

RECEIVER

The standard three, four, and six channel receivers are the same size. The optional dual conversion receiver is of similar shape with a slightly larger size. The "cube" shape of the Series Seventy-Two receivers is the most adaptable to various installations. The unitized plug system offers light weight, improved reliability, and greater convenience by eliminating the bulky wiring harness. Servo plugs are securely held in place by a locking tab, but will pull loose without damage in the event of a crash. A jumper cable is provided for aileron hookup for ease in removing the wing. Additional jumper cables may be ordered if servos are to be installed a great distance from the receiver.

The connector block and connectors are designed and built by Kraft's subsidiary, the Multicon Corporation, and have been specifically developed for the demanding requirements of radio control use. The sockets are gold plated beryllium copper, crimp connected to machine cut and stripped wire.

R/C MODELER MAGAZINE'S

MODEL OF THE MONTH CONTEST

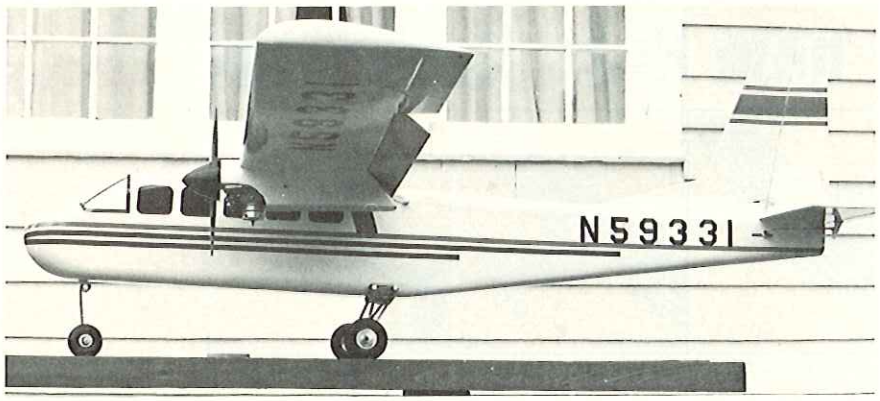
This program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month R/C Modeler Magazine will award a Dremel Model 261 Moto-Tool Kit featuring the Model 260 Moto-Tool. On alternate months the first place will receive a Dremel Model 572 Moto-Shop. The second and third place winners each month will each receive a one year subscription to R/C Modeler Magazine or, if they are a subscriber, an extension of their current subscription.

See the December 1971 issue of R/C Modeler Magazine for complete contest rules.

MAY WINNERS

1ST PLACE: C.J. Viosca, 3450 Salisbury Drive, Dallas Texas 75229. Piper J-3 from a Sig Mfg. Co. kit. MRC F-700 Radio, O.S. Max H40P engine. Weight 6½ lbs. Totally scale.



2ND PLACE: Thomas M. Acciavatti, 38 Patterson Street, Weymouth, Massachusetts 02189. Original design, semi-scale 'Britten-Norman Islander.' Two Super Tigre 23's, Micro Avionics radio. 72" span, 8½ lbs.

3RD PLACE: Leon E. Tedeschi, 1000 N.W. 5th St., Boca Raton, Florida 33432. Scratch-built scale Elfe S-3 sailplane from magazine 3-views. Fiberglass fuselage from own mold. 118" span, 98 oz. weight. MRC F-713 radio.

A plastic plug body extends over the wiring insulation preventing stress at the junction between the pin and the wire. Not only is this wiring method inherently more reliable than soldered connection, it also ensures uniform quality.

Although virtually standard for all quality VHF receivers, the dual conversion design has not heretofore been used for radio control because of its increased complexity and more difficult design. However, certain areas of the country have interference problems on specific frequencies, or band of frequencies, that seriously limited the sport of radio control. Since this interference problem is increasing, the Series Seventy-Two KPR-6D has been developed by Kraft Systems to help solve this problem. It will work in many areas where standard receivers will not function. It has no "image" frequency as do all other radio control receivers. In addition, harmonic and other spurious responses have been eliminated. The KPR-6D is available matched with the three, four, or six channel systems, replacing the standard receiver at extra cost. However, this receiver is available only in the six channel version.

The receiver has an IF Frequency of 455 KHz and a current drain on the four channel model of 11 ma. The usable sensitivity (0.5 V detected) is 1.5 to 2 uv. Selectivity is 3 db down at 3 KHz. The image rejection is −2 db. The spurious and harmonic rejection is −50 db minimum. Series clipper and pulse integration provides high immunity to shot and ignition noise. The operating temperature range of the receiver is 0-150 degrees F. The semi-conductors used in the receiver consist of 5 bipolar silicon transistors, and 2 silicon diodes. The semiconductors used in the six channel logic consist of 17 bipolar silicon transistors and 6 silicon diodes.

The KPR-6D dual conversion receiver has a first conversion of 10.7 MHz and a second conversion of 455 KHz. The current drain (no signal) is 12 ma maximum and with signal is 15 ma maximum. The usable sensitivity (0.5 V detected) is 1.5 to 2 uv. A 3 stage high "Q" preselector is used for superior harmonic and image rejection. The latter is greater than −60 db. The harmonic rejection is greater than −90 db. Other spurious response rejection is greater than −80 db. Selectivity is 3 db down at 3 KHz. Series clipper and pulse integration provides high immunity to shot and ignition noise. Again, as with the standard receiver, the operating temperature is 0-150 degrees F. The semi-conductor used in the receiver consists of 2 dual gate metal oxide semiconductor field effect transistors, 5 junction field effect transistors, 3 bipolar silicon transistors, and 2 silicon diodes. The semiconductors in the six channel Logic consist of 17 bipolar silicon transistors and 6 silicon diodes.

The weight of the receivers vary from 1.8 oz. for the KPR-4B and the KPR-3B to 2.6 oz. for the KPR-6D. The Kraft two channel systems containing the servos in a common housing with the receiver weigh approximately 5 oz.

SERVOS

All Kraft servos, except those used in the KP-2B and KP-2S use an integrated circuit amplifier designed by Kraft Systems. This is the result of over 3 years development and consists of 57 transistors, 5 diodes, 63

resistors, and 2 capacitors, housed in the IC package to produce centering and tracking accuracy better than 1/2%, virtually zero drift with changes in temperature and voltage, uniform duty cycle in both directions, smoothness, and excellent damping characteristics. Additionally, the design incorporates a bridge type output which means that the servo motor operates on the full battery voltage and that only three wires are required for operation. This also permits system operation even though one battery cell may be dead or shorted.

Five different servos are available to suit a variety of applications. Each servo is electronically interchangeable and feature the same full throw, instant response, accuracy, and high power which have long made Kraft servos an industry standard. To accomodate the greater power available from the new servo amplifier, the servo mechanics in the KPS-10, KPS-11, and KPS-12 have been strengthened.

The KPS-9 servo has a weight of 2.2 oz. with a static thrust of over 4.0 lbs. with a 10 ohm motor. The transit time is 0.5 seconds for .625" of linear travel. The available outputs are 1 rotary wheel or rotary arm, and 2 linear racks.

The KPS-10 servo has a weight of 1.8 oz. with a static thrust of over 5.5 lbs. with a 10 ohm motor and a transit time of 0.5 seconds for 100 degrees of rotary travel. The available outputs are 1 rotary wheel or rotary arm.

The KPS-12 servo is the smallest, and lightest digital proportional servo in use today. Despite its small size, it features the same full throw, high power and performance of the other Kraft servos. Its ruggedness makes it suitable for miniature and heavy duty applications. With a weight of 1.2 oz., the KPS-12 servo has a static thrust of over 4.5 lbs. with a miniature 12 ohm motor. Again, the transit time is 0.5 seconds for 100 degrees rotary travel. The available outputs are 1 rotary wheel or a rotary arm.

The KPS-11 servo is a new standard servo which combines the versatility of rotary and dual linear outputs with small size and rugged mechanical design. The weight of the KPS-11 is 1.9 oz. with a static thrust of over 5.5 lbs. with a 10 ohm motor. The transit time is 0.5 seconds for .625" of linear travel. The available outputs are 1 rotary wheel or rotary arm and 2 linear racks.

The KPS-11A servo is the same as the KPS-11 except that the rack outputs are not furnished and the resulting production economies are reflected in a lower price. The weight of the KPS-11A servo is 1.7 oz. with a static thrust of over 5 lbs. with a 10 ohm motor. Transit time is 0.5 seconds for 100 degrees of rotary travel. The available ouputs are 1 rotary wheel or rotary arm only.

All separate servos feature ∓0.25% positioning accuracy and virtually zero drift from 0 degrees to 160 degrees F. The servos used in the KPR-2B two channel systems feature ∓0.5% positioning accuracy and ∓2% maximum drift from 0 degrees to 160 degrees F.

All Series Seventy-Two integrated circuit servos are compatible with Series Seventy-One sets but not earlier models. All earlier (1967 and later with proper plugs) are compatible with the 1972 receivers. However, 1972 servos and earlier Kraft servos

cannot be interchanged.

Specifically designed servo mounting trays are available for each Kraft servo type and are recommended for convenience and increased reliability. Applicable servo trays are included with the four and six channel systems.

RECEIVER BATTERY PACKS AND CHARGER

The reliability of the pencell type rechargeable batteries previously used, particularly under vibration, has been very poor. In fact, batteries have been a major cause of failures in all radio control systems. Fortunately, a new type cell has been designed specifically to withstand high vibration and shock. This cell also has superior seal design, increased capacity, and generally improved performance. It should eliminate battery problems. For 1972, Kraft Systems has discontinued all previous battery pack configurations and now offer two packs, both utilizing this new heavy-duty cell. The standard pack is the 500 MAH KB-4E. Because of many requests for an increased capacity pack for applications such as long duration sailplanes and complex stunt and scale aircraft, Kraft also now offers their 1000 MAH KB-4F. Both packs are of the fast charge type and can be fully charged in less than 4 hours.

The versatile dual output battery charger is transformer-isolated for safety. The transmitter and receiver battery packs may be charged simultaneously or independently and the charge rate can be easily altered if required. The charger is standard with all models except the two channel systems.

The 550 MAH fast charge battery measures 2.25" x 1.89" x 1.0" and weighs 4.6 oz. The KB-4F 1000 MAH fast charge battery pack measures 1.89" x 1.89" x 1.8" and weighs 7.1 oz.

FINDINGS

All of the foregoing has been general descriptive information to familiarize you with the Kraft Series Seventy-Two proportional systems. Our summary will be brief. We have used Kraft proportional systems at RCM since they were first introduced. We could not even begin to estimate the hundreds of hours that have been logged on those systems. During those hours, we have never experienced a radio failure. This is not meant to imply that a Kraft proportional system will never fail — it just means that ours never have. Over the years they have evidenced a reliability factor that would be hard to beat. We have two Kraft Series Seventy-One proportional systems continuously in use and felt that they were second to none in reliability, performance, or the versatility of each of the features that are built into them. We felt that it would be hard to improve on the Kraft Series Seventy-One. Yet, upon completion of our testing and evaluation, we find that the Kraft Series Seventy-Two proportional systems offer some exceptional new features as summarized in our opening paragraphs that are destined to make this proportional system a sales leader in 1972. The only drawback that we could find in the entire system was that it does have a higher current consumption than its predecessors, due, perhaps, in part to the new IC "chip" in the servos and the voltage regulator circuit. However, the servos, themselves, offer a fantastic amount of power and a precision and accuracy which is truly phenomenal. We have found the Kraft Seventy-Two proportional system to equal or exceed all of the manufacturers specifications and claims for it and were impressed enough with the system's performance to purchase a new one for our own use at RCM after returning the systems loaned to us for test and evaluation.

We can say no more than to state that the Kraft Series Seventy-Two proportional system has been thoroughly Tested, and is Approved and Recommended by R/C Modeler Magazine. □

SCALE IN HAND

from page 66

reward and encourage outstanding workmanship, ingenuity, detail, imagination, and even documentation of scale accuracy, but all with common sense at the foundation. Give us second-rate scale buffs something to look at in wonderment.

Many thanks for expressing, with prestige, what many modelers, like myself, have felt about present day scale contests.

Best regards,
Bob Bell
Aurora, Indiana

COMMENT: The only point where we'd differ with Bob is that simplistic models

League of Silent Flight

LEAGUE OF
SILENT FLIGHT
P.O. Box 2606
Mission Station
Santa Clara,
California 95051

By Le Gray

Perhaps you are curious about the LSF . . . the League of Silent Flight. Many people are these days, because the LSF is attracting the attention of R/C sailplane fliers throughout the world. Recent press coverage has given many details, but other points may also be of interest.

The LSF is an association of people who have a common interest . . . R/C soaring. It is designed for the individual . . . it is a "program" . . . it is not a club. Participation in the LSF neither conflicts with nor requires club membership. In fact, many clubs find that group participation in the LSF program can excite new areas of interest and be the basis of new growth.

The League of Silent Flight Soaring Accomplishments Program provides a realistic challenge to the serious R/C soaring enthusiast through a series of meaningful standards of flying proficiency . . . goals that can be attained at most local flying sites. Membership in the League can only be earned . . . by personal, documented performance. Membership cannot be "bought" . . . there are no membership dues or fees.

To become a member, an R/C sportsman must fulfill the requirements of Level I of the LSF Soaring Accomplishments Program; a 5 minute thermal soaring flight; a 15 minute slope soaring flight or a second 5 minute thermal flight, and five spot landings within 3 meters (9.84 feet) of a target point.

Advanced levels in the Soaring Accomplishment Program are progressively more difficult. Level V, for example, requires a 2 hour thermal flight, an 8 hour slope flight, a 10 km (6.21 miles) goal and return flight, as well as considerable contest success.

Only members . . . sportsmen who have achieved Level I or higher . . . are privileged to display the LSF insignia. The LSF emblem on a jacket or sailplane is a symbol of proven performance . . . it has been earned . . . and is displayed with pride anywhere in the R/C soaring world.

The LSF is growing – fast – but the "grass roots" concept, the personal challenge for the independent sportsman, will be maintained, because that is the League of Silent Flight.

Serious sportsmen are invited to associate with the LSF by submitting the following to the Executive Board: (a) name; (b) mailing address; (c) FAI organization affiliate and license or membership number; (d) radio operator's license number; and (e) a statement similar to the following:

> "I, (the undersigned), support the philosophies, concepts and criteria set forth in the Bylaws of THE LEAGUE OF SILENT FLIGHT and give notice herewith of intention to attain Level I of the LSF Soaring Accomplishments Program, and by so doing, earn full recognition and privilege of membership."

All correspondence to the LSF should include at least **16** cents in stamps for return postage. Correspondence should be addressed to The League of Silent Flight, P.O. Box 2606, Mission Station, Santa Clara, California 95052, USA.

should not, in our judgement, have a more difficult time placing high. We'd like to see a system where any subject could win.

Dear Dave:

I would like to offer my congratulations on a well written column in the December issue. I do hope it leaves some folk with food for thought. The last comment heard about the Nats was that the reason WW II did not win was because they could not fly. Looking at the static scores in RCM it is all to obvious that it was impossible. I still intend to keep on my losing ways with WW II but knowing you cannot win does take most of the fun out of building, or at least competing.

Yours,
Bud Nosen,
Two Harbors, Minnesota

COMMENT: Just a reminder that Bud is a regular RC Scale competitor, flying a P-47 in '70 and a Skyriader in '71.

Dear Dave,

I agree with you that competition R/C is a dying event unless something is done! I, for one, don't want to see a Nat's or even a small local scale contest dominated by "Volksplanes." These super-simples might win contests per the present rules – but they certainly don't draw the crowds or the super-scale dream.

It is my opinion that the judges set the trend – but, of course, they are bound to abide by the present rules system. I still find it hard to believe that the Scale Committee rejected the "Complexity Factors" proposal – could it be that no one wants the job of putting specific planes in their respective category?

In my opinion we are overdue for a complete scale rules change – especially in the flying department.

Really do enjoy your column each month, only wish it was more often. When Dewey published his questionaire (1971 Reader Interest Survey) and your column was not listed, I promptly put "Scale in Hand" as a write-in – Number 1!!

Julian Garrett

Dear Dave:

Your recent article on selection of scale subjects was an eye-opener. I've always been attracted by the WW I and even pre-WW I types – the wood and wire wonders. Why bother if a 1/5 size Volksplane is going to skunk everyone? A favorite of mine in the "classic" variety of scale subjects is the 1929 Curtiss Robin.

Keep up the good work and better luck at the next Nat's than you had with the 109 – seems like you've had more than your share and someone's gotta' stop Maxey!

D.M. Orr
Houston, Texas

COMMENT: Why? Maxey's doing fine, thanks!

Dear Mr. Platt:

I thoroughly enjoyed and agreed with your piece in the December RCM. It has long been a true fact that, if one wanted to really score in scale, one should do two things. First, build a real plane out of ¼" plywood and 1" x 1" pine, put a big one lunger on it, and get the lightest fellow in town to fly it around the field once so that it is, by FAA standards, an airplane (the class and category we need not bother

with). Then, build a true model of same (should take no more than 30 minutes or so), document it, and put the largest engine on it so that you can tear through the flight phase. You are guaranteed to place high.

Now, I have seen Max's Ryan, and I don't think that there is any doubt in anyone's mind that this plane is a champion. But, what you point out about building simple models for scale is all too true, and the loser is the entire fellowship of model builders. The craft built entirely for performance are much the same; they are judged not by how they look so much as what they do in the sky under the builder's control. That is all fine and good. I am sure you have appreciated a well executed pattern as all of us have. But scale is another matter. One of the attractions is well executed variety. Further, I agree with you that with the present rules we are forcing this part of the sport into terrible dullness.

I agree with you that some changes are in order so that we may put more of a spark of life back into our scale events.

Sincerely yours,
William H. Foley
Columbus, Ohio

COMMENT: Mr. Foley made suggestions to help things out – too long to print here – but the thinking was similar to our later remarks.

Dear Dave:

I was interested and somewhat surprised at your recent article in the December issue of R/C Modeler. There is no question that scale in the United States needs a complexity factor to equalize the present bias in judging. Further, I certainly would agree with your statement that competition scale modeling is dying. In the New England area over the last few years there has been a rapid decrease in the entrants in most of the scale contests, at a time when the number of good scale kits and accurate scale accessory equipment is abundantly available.

My surprise is at your statement that a WW II aircraft under the present rules could not possibly win against simpler aircraft. To my knowledge your Douglas Dauntless is the only aircraft to ever obtain maximum static points in a national competition. Obviously it was a model of great complexity and did not win only because of flying difficulties. Further, Fred Nosen's P-47 took second a year ago with a World War II aircraft with great complexity, and a large number of scale functions. I present these two examples as arguments that WW II aircraft can obtain high scale static points in scale competition.

I am sure you are aware that in this year's British Nat's, an airplane (Rollaston Condor) won though it had a low complexity factor, so that even when a complexity factor is used, as in England, a simple model still has some advantage. I don't argue your basic point that complexity factor is necessary if scale is to prosper in the United States. I do, however, differ with the arguments you put forward to support this thesis. Your own models are evidence that complexity and accuracy can be judged properly in competition. The British experience proves that a complexity factor does not assure that a more complex airplane will win. I am writing, however, principally to support your thesis since your editorials seem to be the only force in scale

today that is trying to solve our competition problems and bring about a higher degree of scale interest and development.

Sincerely,
Alan R. Spievack, M.D.
Brookline, Massachuttes

COMMENT: The judging of our SBD several years ago was undoubtedly over-enthusiastic. Scale standards have improved so dramatically since 1968 that could not happen today. Indeed, unless such a model were built of metal and riveted together (as the real one was) it could not compete with the homebuilt-type subject made of wood and glue (as the real one is).

As to the results of the British Nats, these only prove that when every model entered is a simple subject, then a simple subject will win, complexity factor or not.

Mr. Platt:

I was interested in your comments in the December issue of RCM. Being an incipient RC modeler, i.e., I haven't got the money to begin fully yet, I have nonetheless become quite an avid reader of the aforementioned journal, once I get past the "toys" on the cover. Even though I haven't started yet, I have determined that of all types of flying, scale is the category that interests me the most. Since I am interested in scale modeling, your comments on the present state of the art were most depressing.

For a so-called classification of modeling to be labeled "scale," when in fact it is heavily weighted against those aircraft which offer the most promise for scale reproduction, and yet benefit those models which require substantially less work and overall effort, is an error that should not have developed. Since the problem does exist, this is a moot point. However, certain solutions must be found. The first, of course, might be a re-defining of the rules involved. I know absolutely nothing of the organization responsible for the present set of rules, but pressure must be applied to those within the rule formulating organization to bring about some form of re-definition of the scale modeling rules.

As for your eight criteria for succeeding in scale modeling, as it now exists, they're frightening! To have to win, the ideal aircraft would be something like the Agwagon – fixed wing, monoplane, fixed landing gear, little detail, etc. But, as I'm sure you're aware, Agwagons, or Cessna 150's are not the most fascinating or detailed of airplanes. Could you suggest ways in which the more complex aircraft have a change through a rules change! I ask this for purely selfish reasons: I plan to build multi-engined WW II or modern prop engined aircraft, not exactly the most likely to win under the present set of rules.

I must add, however, that I think that the last suggestion concerning the documentation of the aircraft is excellent, and should be required of ALL scale modelers.

Last point: You might have ended the column with suggestions for reorganization, rather than your "sad observation." Perhaps this may appear in the future. I would sincerely dislike seeing a sport die as I am about to enter it, as I, like you, tend to build what I want to build, not that which may win according to other standards. So, how about some direction?

Cordially yours,
Geoffrey D. Lowe
Chicago, Illinois

Dear Dave:

I presume from your article that a possible major reason for this "dying" is the built-in discouragement to compete which you clearly explain in your article. A modeler is discouraged from competing by the scoring unless he happens to be interested in building a Spinks, the model that has the "built-in" advantage.

I have just recently become interested in RC Scale flying, but I'd like to build a Spitfire or Helldiver. I would be angry if this choice of plane, per se, will put me at a disadvantage in competition.

Each contestant should really put his heart and soul into whatever scale model he favored most and know that his choice of model, per se, would not automatically jeopardize his chance of competing successfully against other entrants. This would expand the competition to modelers interested in any and every type of scale plane.

Bill McConochie
Dayton, Ohio

There were a lot more letters, but by now you're getting the drift of all this. What is clear is that the modeler wants rules which will enable him to follow his heart in choosing his subject. Of course, there's nothing right now to stop him – but it takes a good deal of the frosting off the cake to know that you are entering an event, but remain unable to compete in it.

So, in any analysis of the AMA RC Scale event we must list "restriction of choice" as problem No. 1. There is no easy solution to

this problem; achieving the balance we want will require sweeping changes both to the "static" judging section and the "flying" section, since both are presently favoring one type of model, as our December column demonstrated.

Because of this, it has become apparent that the "complexity factor" solution (whereby more complicated subjects qualify for a graduated bonus added to their static points) alone, will not resolve the difficulty. For awhile, we thought it would, and indeed, signed our name to such a proposition before the AMA Scale Contest Board meeting last July. The Board turned the proposal down, making it twice in two years they had done so.

Before anyone goes off half-cocked at this seeming indifference to our plight, let us hastily add that deeper reflection has, in our judgement, shown the Board to have been right. Why, will become clear as we develop our argument.

The second large-scale problem we have is that the rules call for multiplication of the static points (max. 450) by the flight marks (max 55). Why is this an unfair system?

Consider this situation: Competitor A has a perfect model, static-wise, and, on the field gets maximum flight marks, less 1. Competitor B drops the same one point but from his static score. Who wins?

Competitor A — 450 x 54 = 24,300 points. Competitor B — 449 x 55 = 24,695 points.

What these figures prove is that the man whose model flew best won by a tidy margin — yet both men dropped one point. Therefore the multiplication method, which has been called "a mathematical system for finding the wrong winner" has made a mockery of dedicated static judges' painstaking efforts, when one point spontaneously given during flying effectively cancels nine extra points given another model in carefully-considered static marking. We would most strenuously argue that the only fair system would be to make flying and static possible marks as equal as practicable, and add the two for the result. This one change, by itself, would help a good deal toward making a fairer contest, free of claimed over-emphasis on "flying" or "building."

The last major problem, and one that need never have arisen at all, was hinted at in our previous paragraph. This is that, at the Nationals, anyway, the poor old Scale Director, who has spent countless hours selecting the best possible static judges from men of the highest qualifications for so important an event, must, after the static judging is done, see his and these judges efforts literally thrown in a raffle-bag because the flying judges are a motley assortment of either non-modelers or, at best, pattern RC flyers, whose ideas of scale flight performance are as curious as their inexperience in such matters would lead us to expect.

It isn't in the rules that this should be so. We would like to see the Scale Director empowered to choose all of his judges, static and flying. A simple enough organizational change, but a tremendously significant one to the health of RC Scale.

We have thus named three key features of the system which, in our estimation, are responsible for RC Scale being in such a sick state. This means that even if one of these was left as is, in any projected shake-up, it is going to continue to provide serious problems; or, to put it another way, we consider that attendance to all three would be the minimum corrective treatment.

The system of scoring the model on the ground, and in flight, appears to be reasonable enough, though we could find small improvements here — these would mostly be concerned with trying to ease the organization somewhat. For some examples:

(a) It has for so long been a feature of static scoring that a model is marked separately for "fidelity" and then "craftsmanship" that it probably hasn't occurred to anyone to query the logic of this method. We'd like to see a one-column system where a model is marked only for fidelity. Our view is that craftsmanship which is out of line with what it should be (too poor or too good) constitutes a fidelity error and can be so marked. This one-column system would ease the judges task noticeably, and give equally logical results.

(b) We'd also prefer a system whereby the entrant can choose a fixed number of options regardless of whether they be "mechanical" or "manuevers" or a mixture of both. The present rule (24.7.1) is, to be candid, a helluva' mess which strains organizations and competitors both.

(c) In order to help out the builders of ultra-slow models, we believe that the flight time requirement (8 minutes) could be extended somewhat, or for very little cost, abolished altogether. Anyone who ever fought a stiff wind with a large Fokker DVII (hi, Bill!) and tried to get his pattern completed in time to get his landing points would appreciate a relaxation of this rule.

After all, the contest isn't a race; in its own way the 8 minute rule is another discriminatory one, against any subject likely to be slow.

(d) The compulsory flight maneuvers Straight Flight, Procedure Turn, and Straight Return are a waste of everyone's time – the Standoff Scale rules substituted the Flypast for these and the AMA Scale class could do likewise to everyone's benefit (especially the spectators and in-flight photo buffs!)

* * * * *

Any critical analysis of a contest procedure should include suggested remedies, or that analysis becomes destructive and hurtful to the event rather than helpful. Keeping in mind that it is anyone's privilege to disagree with a published viewpoint, we have included here a score-card for the AMA RC Scale event as we would like to see it develop. This system has taken considerable time to evolve, and we have subjected it to the most rigorous testing. We have, for example, worked out just how some one dozen widely different subjects, each well executed, would compare. Our results show no apparent bias toward any one type of ship. The more complex subjects have been kept on a par by purposely rewarding the options typical of such models with slightly higher marks. Also, for the first time, we have included a "Realism" marking in the flight scoring, enabling the judges to reward, say, the slow, steady flight of a WW I model, while marking down such a model which flew like a supersonic rocket.

Well, what now? For starters, it is definitely not our hope or aim that the system be revised at this time. This may sound strange. However, the truth is that the suggestions and ideas contained here are unproven. For too long we have seen successive attempts to fine-tune the rules when they weren't even in the right waveband. As a generalization, we'd like to see any rule-change proposal backed up with practical data gathered in actual field-condition tests.

Our need at this time is to get this data. If deficiencies exist they will show up and can be corrected before it is too late. What we are suggesting is that clubs who presently run AMA RC Scale events give the new system a try. Are you listening, you fellows in Dayton, St. Louis, and Chicago? If there is any club that is willing to try to help RC Scale, write to this column. We'll provide the complete system and a card you can copy, life size, like the one we've printed here.

Then we'd like to get, in return, a brief report on how the event went, with special emphasis on any problems and suggested corrections. When, and only when, we can say, "Look – we have a better system and can prove it," . . . . we'll be able to make official proposals. Our feeling is that, even if not perfect (what is?) the new system will be instantly far better than the present one, for competitors and organizers alike.

* * * * *

Mailing address for Scale in Hand: 104 Talcott Ct., Bolingbrook, Illinois 60439. □

TURN!

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3. Decide whether or not contestants can fly without their wheel pants due to rough field conditions.
4. Point out where the back-up, ready and transmitter impound areas are located.
5. Designate an area for engine testing where the noise will not interfere with communication within the pit and spectator areas.
6. Explain every situation that can lead to disqualification of a contestant from a heat or the contest.
7. Instruct the callers to stay with a pilot while he lands his aircraft so that he may tell the pilot of any obstructions that are in his landing path.
8. If a starting clock is not used, the Starter should explain the method he will use to designate the amount of time a contestant has left to start his engine.
9. Point out any hazards that the flying field has which may affect the contestants while flying.

TRANSMITTER IMPOUND AREA

A Transmitter Impound Area should be provided near the Ready Area where all contestants must impound their transmitters between heats. A contestant not doing so may be disqualified from the contest. The Transmitter Impound should be manned by someone who will confirm that all transmitters are off and all antennas are removed, when possible.

RACE SET-UP

The purpose of this section is to serve as a guide toward organizing aircraft, frequencies and handicaps in such a manner as to arrive at a reasonably equitable series of heat races for contest participants.

The methods of selecting and recording can be tailored to suit individual preferences and forms. The important thing is to be sure that frequency groups do not conflict and that there is a list of groups readily available and easily interpreted throughout the event.

The following are the definitions of some of the items used during race set-up:

CONTESTANT CODE LIST – That list which matches each contestant with a code number (all heats are set up with numbers because they are easier to work with than names).

RACE CODING LIST – That list on which each heat of each round is first recorded using the code numbers.

ROUND/HEAT LIST – That list upon which the contestants and their starting orders for each heat of each round are recorded. This list is prepared from information on the Race Coding List and the Contestant Code List and is used for preparing Heat Cards.

HEAT CARD – That document upon which each contestant in a heat and his starting position and code number are recorded. One card is required for each heat

of each round.

SCORE BOARD – Blackboard, prepared chart, or whatever, that is used to record the running score of each contestant in each round. Times should also be recorded here.

"EXCEDRIN" – Self-explanatory, for use by whoever does this job.

While the aircraft are being handicapped, the contestants' information cards should be divided into their respective frequencies. The total number of contestants is then divided by four. This result is the ideal number of contestants in each of four frequency groups for 4-plane races. If this happens to come up a whole number, water will probably run uphill that day. So, assuming that there are 26 entries, each group must be adjusted to whole numbers, such as:

Group 1	Group 2	Group 3	Group 4
7 cards	7 cards	6 cards	6 cards

If the frequencies work out, this will produce six 4-plane heats and one 2-plane heat in the first round.

Assume the stack of frequencies look like this:

Frequency	No. of Cards
26.995	2
27.045	3
27.145	2
72.080	5
72.240	4
72.400	3
72.960	2
75.640	2
53.100	1
53.200	1
53.300	1

The cards could be arranged as follows:

Group 1	Group 2
26.995 (2)	72.08 (5)
27.045 (3)	72.96 (2)
27.145 (2)	
Total 7	7
Group 3	**Group 4**
72.24 (4)	72.40 (3)
75.64 (2)	53.10 (1)
	53.20 (1)
	53.30 (1)
Total 6	6

Of course, if four groups simply can't be worked out, the total number of contestants should be divided by three to make three groups. This way, only 3-plane heats would be flown.

It is clear that the next higher whole number above 26 that four will divide into is 28. The Contestant Code List is therefore begun by writing down a column of the numbers 1 to 28. Match the contestant names to the information cards in Group One and enter them to the right of numbers 1 through 7, Group Two to the right of 8 through 14, Group Three to the right of 15 through 20 (21 is left blank) and Group Four to the right of 22 through 27 (28 is left blank). These Code Numbers should also be added to each contestant's information card.

A carbon copy of this Contestant Code List should be given to the Handicap Scale Judges. They should record the handicap position of each contestant on this list. These handicap numbers should then be transferred to the right of the names on the Contestant Code List. Where applicable, the handicap position of a contestant's back-up aircraft should also be written down. The frequency of each contestant should be written down to the right of the contestant's handicap numbers (see fig. 3).

The Code Numbers must then be divided into individual heats. To begin with, write down four columns of numbers, 1-7, 8-14, 15-21 and 22-28 as follows:

1	8	15	22
2	9	16	23
3	10	17	24
4	11	18	25

5	12	19	26
6	13	20	27
7	14	21	28

This is Round 1. Each row (1, 8, 15, 22) constitutes a heat. Using the Contestant Code List, match the names and handicap positions to the Code Numbers on the Round/Heat List (see fig. 4) and then on the Heat Cards (see fig. 5).

The Information Cards should then be filed in the order of their Code Numbers. If there is a Public Address Announcer, these cards should be given to him for each heat.

For Round 2, move column 2 up one row, column 3 up two rows and column 4 up three rows as follows:

Round No. 1 (ref)

1	8	15	22
2	9	16	23
3	10	17	24
4	11	18	25
5	12	19	26
6	13	20	27
7	14	21	28

Round No. 2

1	9	17	25
2	10	18	26
3	11	19	27
4	12	20	28
5	13	21	22
6	14	15	23
7	8	16	24

Match and record them on the Round/Heat List and Heat Cards as in Round 1 and then juggle the numbers the same way for Rounds 3 and 4. For example:

Round 1

1	8	15	22
2	9	16	23
3	10	17	24
4	11	18	25
5	12	19	26
6	13	20	27
7	14	21	28

Round 2

1	9	17	25
2	10	18	26
3	11	19	27
4	12	20	28
5	13	21	22
6	14	15	23
7	8	16	24

Round 3

1	10	19	28
2	11	20	22
3	12	21	23
4	13	15	24
5	14	16	25
6	8	17	26
7	9	18	27

Round 4

1	11	21	24
2	12	15	25
3	13	16	26
4	14	17	27
5	8	18	28
6	9	19	22
7	10	20	23

Carry on through Round 6. After Round 6, contestants will begin repeating heats with contestants whom they have previously raced. There is no way to avoid this, so this is a good time to start reshuffling codes and groups to fill in for the attrition (it's also a good time for that Martini).

Contestants should be listed on the Score Board in the order of their Code Numbers. Results from the Heat Cards should be recorded on the Score Board as soon as it is received and then filed away for future use (anti-protest medicine).

Some hints and pit falls:

1. Invariably, there will be a contestant who is scheduled for the last heat of one round and the first heat of the next round. If it is not the last round coming up, just switch rounds. If it is the last round coming up, switch the heats around. Rounds should not be posted more than one ahead so that contestants will not know when these changes are

made.

2. Sooner or later, two contestants will be on the starting line with the same frequency. This is one reason for the Contestant Code List. Find them on the list and compare frequencies to what they put on their Information Cards. 99 out of 100 times one of them wrote down the wrong frequency. If you hit the 100th time, you'd better run well.
3. The starter's decision is final! Record what he sends and direct all assasins to the CD.

THE READY AREA

In addition to aircraft on the starting line, aircraft should be called to a Back-up and Ready Line in front of the Registration Desk. The Ready Line should not be out on the course between the No. 2 and No. 3 pylons. (See Safety section).

THE PIT BOSS

The Pit Boss should get the heat cards from the Registration Desk and call the contestants for each heat to the Back-up Line over the PA system. A contestant will be called again when his heat moves to the Ready Line and it is then the responsibility of the contestant to be in the Ready Line by the time his heat moves to the Starting Line.

On the Back-up Line, the Pit Boss should inform each contestant of his starting position. When a heat moves to the Starting Line, the Pit Boss should see that the Heat Cards get to the Starting Line in the correct sequence. Either the Pit Boss, or some other contest official, should notify the Starter, either through an intercom or by waving a black flag, when an aircraft flies over the pit or spectator area.

THE FLIGHT RECORDER

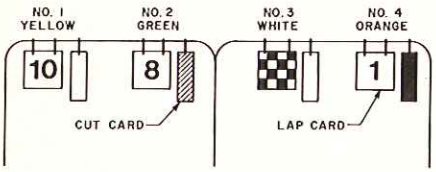
The Flight Recorder will have the Heat Cards for each heat on the Starting Line. He will confirm that the contestants are in the correct starting order. It is recommended that the Flight Recorder have a watch to time the first place finisher. Near the end of a race, he should help the Starter ascertain the order of finish. As the aircraft cross the Finish Line, the Flight Recorder should write down on the Heat Card the position in which each contestant finishes. The Flight Recorder should then record the times of each contestant from the Lap Counter's stop watches. The Heat Card is then sent back to the Registration Desk. There, the positions should then be converted to points. First place should receive 4 points, second 3, third 2, fourth 1 and no finish 0. The points and the times are then recorded on the Score Board and announced over the PA system.

THE STARTER

The Starter should have a stop watch, a green and checkered flag and a hard hat. The Starter is the head official of the flight line and is expected to be fully backed up by the CD in all of his decisions. The Starter should stand to the left of the Starting Line, closest to the No. 1 aircraft.

When all of the aircraft are lined up from left to right on the Starting Line for a heat, the Starter should have each contestant, starting with the No. 1 position, hold up his aircraft above his head for identification with the appropriate flagmen at the No. 1 pylon. The top, bottom and sides of the aircraft should be shown. When all planes are identified, the starter should remind the contestants to turn on their radio systems and then announce the beginning of the starting period. If there is not a starting clock, a system should by established where by the Starter will notify the contestants of the amount of time that is left (such as waving the flag over his head and below his waist at preset time intervals). If all engines are started before the end of the starting period, the Starter should check with each pilot to confirm that he is ready for his plane to be released and then flag the aircraft off at one second intervals. The Starter should start his stop watch as he drops the first flag. If one or more contestants should have difficulty starting their engines, the Starter should then flag off the first aircraft when the starting period has elapsed, whether the pilots who were having difficulty are ready or not. Each aircraft must be released when its flag is dropped, i.e., the No. 1 aircraft is released when the flag is dropped the first time, the No. 2 aircraft is released when it is dropped the second time, etc. This means that if the No. 2 aircraft, for example, does not get its engine started, the No. 3 aircraft must still wait for the flag to be dropped for the third time before being released. If an aircraft is released before it receives its flag, the contestant is disqualified in that heat. An aircraft must be released in less than one second after receiving the flag or it will be disqualified (except for the situation when a previously released aircraft obstructs the

FIG. NO. 6
LAP COUNTER'S CARDS



take-off path of another aircraft).

If an aircraft is damaged during a heat and continues flying, the Starter may disqualify the contestant if, in his opinion, the aircraft has sustained enough damage to make flying unsafe. If the Starter plans to enforce this recommendation, all contestants must be notified of such possible action at the pilot's briefing. In this situation, a contestant must land his aircraft immediately after notification or face automatic disqualification from the contest. If a contestant is disqualified for unsafe flying, or receives two cuts during a heat, he must pull out of the race immediately after being personally notified or face automatic disqualification of his next heat. A disqualified pilot should not land his aircraft until the remaining aircraft in the heat have finished racing. A disqualified aircraft should be flown at a higher altitude out of the way of the other aircraft; however, if a pilot is experiencing radio problems, he must land immediately. The Starter has sole authority to disqualify a contestant for unsafe flying and his decision is final.

The Starter should flag each aircraft as it crosses the finish line on its last lap. The starter should stop his watch when the last aircraft lands. He can then use this time to determine if an aircraft has been in the air longer than the six minute maximum. The Starter may disqualify any contestant who lands his aircraft between the No. 2 and No. 3 pylons.

In the situation where a pilot cuts either the No. 2 or No. 3 pylon on his last lap and still receives the flag, the pilot must fly another lap before he is officially considered to have finished the race. If a cut on the last lap is a pilot's second cut in the heat, he is still disqualified even if he receives the checkered flag.

In the case of a "photo finish" at the end of a race, the Starter, assisted by the Flight Recorder, is the sole judge of which aircraft finished in front.

If there is a disagreement between the pilots and officials concerning the results of a race, the matter should be settled immediately on the flight line by the Starter. If a pilot feels that a mistake in lap counting has caused him to place lower than he should have, the official results can be changed only if a lap counter freely admits making a mistake or if all pilots in the heat agree that the results should be changed. If one or more pilots disagree, the matter should be dropped without further discussion.

If there is a foul-up at the No. 1 pylon, such as a Flagman flagging the wrong aircraft or, when a light system is used, a malfunction in a light, the contestant has the option of requesting that he be re-scheduled into a heat later in the same round or, if that is not possible, two heats in the next round. A heat should not be reflown unless (1) there is a complete breakdown of the flagging or the lights at the No. 1 pylon (2) there are only two contestants in the heat (3) the heat is a fly-off or (4) the heat is in the last round and re-scheduling is impossible.

LAP COUNTERS

The Contest Directors should select his most experienced workers as Lap Counters. They should each be equipped with stop watches and hard hats. It has been found that the use of cards is the most reliable and easy to manage system to count laps. Each lap counter should have cards numbered from one to ten plus a checkered card to signify that the heat is over. The cards should be of the color corresponding to their position. It is recommended that the No. 1 position be yellow, No. 2 green, No. 3 white and No. 4 orange. Each card should be slightly smaller than the previous card. For example, card No. 6 should be slightly smaller than card No. 5. This helps insure that only one card at a time will be flipped over. The Lap Counters should be positioned so that the cards are visible to the contestants.

Each heat should begin with all the No. 1 cards showing. The Lap Counters should look at their aircraft carefully on the Starting Line to insure recognition throughout

the heat. They should constantly keep their eyes on their aircraft during a heat.

When a Lap Counter is informed that his aircraft has cut a pylon, he should not flip over a card for that lap. Instead, he should flip over the cut card (see fig. 6). There should be three cut cards. One card should be white and should be the card that is showing at the beginning of a race since it signifies no cuts. The second card should be red and signifies one cut. The third card should be black and signifies two cuts. When a Lap Counter is informed that his aircraft has two cuts, he should leave his position and personally inform his pilot's caller that they have two cuts and must pull out of the race.

To simplify the identification of contestants during a race, the pilot's caller should wear some type of color identification (arm bands, ribbons, etc.) that would correspond to their starting position. There should be three sets of these markers so that contestants can receive them while on the Back-up Line. This way, time will not be lost when contestants exchange the markers.

The Lap Counters should start their watches when the Starter drops the flag for their starting position. When an aircraft is on its last lap, the Lap Counter should point at it so that the Starter knows which aircraft is about to finish. Lap Counters should stop their watches when the Starter drops the checkered flag for their aircraft. Due to the lack of reliability in watches, they may aid in determining the finishing order but should not be the determining factor.

The duties of the Head Lap Counter may be combined with that of the Flight Recorder if not enough help is available. There should be an intercom set up between the Head Lap Counter and the No. 1 Pylon Judge. If possible, there should also be a communications system set up between the Head Lap Counter and the No. 2 and No. 3 Pylon Judges and the Registration Desk.

Before each heat, the Head Lap Counter should write down the color of the aircraft in each starting position. When the No. 2 or No. 3 judges call in a cut, they should identify the color of the plane that cut the pylon. For example, the pylon judge should say that "the white and red aircraft just cut the No. 2 pylon." The Head Lap Counter would then see what the starting position of the aircraft is and then notify the appropriate Lap Counter. When the No. 1 Pylon Judge calls in a cut, he should identify the aircraft by its starting position.

The Head Lap Counter must inform the Lap Counters of every cut that occurs during a heat. He should check that each Lap Counter follows the correct procedures throughout a race.

NO. 1 PYLON JUDGE & FLAGMEN

The No. 1 Pylon Judge should be a responsible, adult worker. He should have communication with the Head Lap Counter and should relay all cuts called by the Flagmen. Both the judge and the Flagmen should be in immediate agreement on a cut, with the No. 1 Pylon Judge being the final authority.

It is the general consensus among contestants and officials that the use of flags at the No. 1 pylon is preferred to the use of lights. It is therefore recommended that each of the four Flagman have a flag corresponding to his position, i.e., the No. 1 Flagman should have a yellow flag, the No.

2 Flagman a green flag, the No. 3 Flagman a white flag and the No. 4 Flagman an orange flag.

The No. 1 Flagman should be closest to the pylon. When the aircraft are identified, each Flagman should wave his flag over his head when his plane is held up to acknowledge that he recognizes the craft. If more than one plane in a heat is painted the same color, the Head Lap Counter should describe the aircraft in detail to the No. 1 Pylon Judge, who should relay the information to the appropriate Flagman.

The Flagmen must watch their aircraft at all times during a heat. Before a heat is started, each Flagman should have his flag raised over his head. Each Flagman should drop his flag smartly as his aircraft draws even with the No. 1 pylon. The No. 1 Pylon Judge should check that each Flagman is not standing in front of or behind the pylon and that the Flagmen are not dropping their flags too early or too late. The Flagmen should have their flags raised every lap at least by the time their aircraft round the No. 3 pylon.

When an aircraft does not fly around the No. 1 pylon, the Flagman should repeatedly wave his flag over his head and yell out his number to the Pylon Judge. Decisions on cuts must be made immediately. If there is doubt about whether an aircraft cut a pylon, a cut should not be called.

NO. 2 & NO. 3 PYLON JUDGES

The No. 2 and No. 3 Pylon Judges should be equipped with hard hats, Freon-powered air horns and, if possible, intercoms to the Head Lap Counter. The Pylon Judges should blow their air horns immediately after an aircraft flies inside either the No. 2 or the No. 3 pylon. If two aircraft fly inside a pylon simultaneously, the air horn should be blown twice. The Pylon Judges should then tell the Head Lap Counter which aircraft has cut.

PUBLIC ADDRESS ANNOUNCER

When the number of spectators warrant it, there should be a PA Announcer. He should be carefully picked to be both entertaining and informative to the contestants and spectators. He should use the contestant's Information Cards to the fullest extent when describing a race. When a heat is over, he should announce the official result, then refile the Information Cards and get the cards for the next heat.

* * *

When all the rounds are completed, the points earned by each contestant should be totaled on the Score Board. If two or more contestants have an equal number of total points, there should be a fly-off if frequency and time permit. Ties should otherwise be broken by a contestant's fastest time. The Contest Director should have either the top three or top five finishers checked for legality according to the AMA Rule Book. The awards should then be handed out.

In addition to fulfilling the requirements of an AMA sanction, the Contest Director must send the results of the contest to the Vice President of the NMPRA District in which the contest was held. The results should include the name, NMPRA number and the place of every official contestant. A contestant is considered official when he has attempted to make at least one flight. The CD should break all ties all the way down to last place for this report.

FORMULA II

All the previously described contest procedures also apply to Formula II, except for the determination of contestant starting positions. In Formula II there is no handicap scale judging. The Pit Boss should have each contestant draw a number (either 1, 2, 3, or 4) that will be their starting position in that heat. The Pit Boss should then transfer this information to the Heat Cards.

FAI PYLON

The same method of determining starting position as Formula II should be used for FAI Pylon. In addition, two workers should man a refueling station near the Back-up Area. There should be two fuel pumps for the FAI fuel which must be supplied by the contest management. Every contestant must refuel his aircraft from these pumps before he enters the Back-up Area. To prevent any rule bending, aircraft should not be allowed to return to the pit area after the refueling operation. All FAI regulations in the AMA Rule Book apply to this event. □

BELL HUEY COBRA

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Do not touch the assembly until you are sure the Stabilit has set up. This can be determined by checking the unused portion in the mixing cup in the Stabilit kit. When it is completely dry you can pop out the unused epoxy in the cup by applying pressure from beneath the plastic case.

Once the Stabilit epoxy has dried, add the clutch drive shaft (02.22) to the transmission case with Express. Make sure that the large gear on the beveled gear shaft meshes properly with the gear on the clutch drive shaft and does not hit the protruding head of the expansion pin that holds the gear to the clutch drive shaft.

When the clutch drive shaft assembly has thoroughly dried, the space between the bearings and the transmission case is completely filled with Stabilit Express to insure a good seal. First, however, it is necessary to scrape off the excess epoxy that has built up on the pillars that surround the bearings as well as any other surface of the case that is to be mated to the other housing half. Use a #11 X-Acto blade and carefully scrape off any unwanted build-up of epoxy. Blow out any epoxy residue that has dropped down into the case halves and then mix up a small amount of Stabilit Express, this time, using the number 2 mixing cup in the Stabilit kit. With a toothpick and the black spatula that comes with the Stabilit kit, place a generous amount of epoxy all around the outside of the case halves as well as any other place where the two halves meet. Quickly bolt together the transmission case halves with the six metric nuts and bolts and set aside to cure. Although the instructions accompanying our prototype Huey Cobra specified filling the transmission case with 35cc of Hypoid SAE 90 oil at this time, we elected to set the transmission aside and proceed with the balance of the mechanical

sub assemblies and the airframe construction before so doing. Later, when the transmission is filled with oil, and if you discover that you have an oil leak, the transmission case can be reopened by removing the screws and then warming the transmission case with a heat gun. Then repeat the steps for sealing the transmission case halves with Stabilit Express after cleaning up the softened epoxy with acetone or lacquer thinner.

TAIL ROTOR AND GEAR BOX ASSEMBLY: GROUP 4

Study carefully the illustrated parts catalog sheet for Group 4 after unpackaging the tail rotor and gear box assembly. Take the tail rotor transmission and check quite carefully to make sure that there are no screws, nuts, or small washers inside the transmission or jammed behind the gears. If there are, remove them and set them aside. Next, put a small amount of high speed bearing grease inside in order to provide adequate lubrication for the gear box. Do not fill the box with the grease. The high speed bearing grease is in a small capped plastic container accompanying your kit. Next, take the smaller of the two Allen wrenches, and check to make sure that the tail rotor hub (04.07) is secured firmly on the driven shaft (04.20). Next, screw the two open 3 x 10 millimeter ball bearings (04.11) to each end of the tail rotor hub using an Allen head screw (04.10) to secure each one. Again, tighten firmly with the Allen wrench. Next, add the nylon blade holders (2 of each kind) (04.09 and 04.14) with the four mounting screws and brass nuts (04.03 and 04.05). We added a small 2-56 washer and lock washer on the bottom side of this assembly to be sure that the nylon blade holders remained firmly in place. You will see that each nylon blade assembly consists of two halves with a molded-in recessed housing to fit over the ball bearings. Next, attach a Missing Link (04.04) on the inside of each protruding nub of the nylon blade holder. This is followed by installing the nylon pitch plate (04.02) to the tail rotor assembly by means of two screws (04.03), each screwing down through the top of the nylon pitch plate into the threaded portion of the Missing Links. The Missing Links, incidentally, were installed to the nubs of the nylon blade holders with 2-56 lock washers under the brass nuts.

Now, take the gear box and fasten the aluminum base plate (04.27) to it. We did this by mixing up a small amount of Stabilit Express and putting four small dabs of this epoxy material on each of the four sides of the plate and, after centering the plate over the screw holes on the tail rotor pylon, allowed the epoxy to set up. Next, take the slotted pitch plate (04.29) and feed the blade pitch shaft (04.28) with the right angle bend and the Missing Link attached to the end through the slot and then through the hole in the base plate and through the pylon. As the blade pitch shaft comes out the top of the tail rotor hub, and before it passes through the nylon pitch blade, slip a brass collar with set screw (04.01) on the shaft and then continue feeding the shaft up through the pitch plate. Do not tighten this collar at this time. Now, "borrowing" four M3 nuts from the kit, install the slotted pitch plate to the base plate using the M3 nuts as "spacers" to approximate the thickness of the fiberglass airframe plus the plywood plate that will later be installed inside the tail pylon and on which the tail rotor and gear box assembly will be mounted. Make sure that there are no rough burrs on the slot in the slotted pitch plate. If there are, remove them carefully with a small file being careful not to enlarge the width of the slot. Once the screws are tightened down in the base of the pylon and the slotted pitch plate is mounted in place, install another brass collar with set screw (04.01) on top of the shaft above the nylon pitch plate. Move both collars up until they are in contact with the nylon pitch plate and, using a very small jewelers screwdriver,

tighten the set screws on the brass collars. Now, put a drop of oil on the blade pitch shaft just above the tail rotor hub and work the entire assembly by hand to eliminate any binds. It is absolutely essential that the entire pitch control mechanism work smoothly and that the blade pitch shaft, driven by the Missing Link through the slotted pitch plate, move from one extreme to the other without any binding. Finally, set this assembly aside until it is time for installation on the airframe.

At this point we will proceed to the installation of the formers and longerons in the fiberglass airframe since the main and tail rotor drive (Group 3), the swash plate assembly (Group 5), and the main rotor assembly (Group 6) will be assembled as part of the airframe construction. This, then, completes the basic mechanical sub assemblies.

AIRFRAME CONSTRUCTION

The next phase of construction of your Bell Huey Cobra helicopter will be the construction of the airframe – that is the construction and installation of the internal bulkheads and longerons and the cut outs in the fiberglass fuselage for the installation of the mechanical sub assemblies. Before starting this phase of construction, it is absolutely essential that you obtain a ruler with millimeter measurements. (A multi-purpose tool with a metric scale is available from RCM for $1.50). On the plans, and in the text, you will find constant reference to measurements in millimeters, thus a ruler with millimeter divisions is a necessity in building your Huey Cobra.

The first step is to cut out the four balsa longerons and the two pine longerons as shown on the plans. A table saw will be required for this operation since the six longerons are all 10mm x 10mm square by the length shown on the plans. 10mm, by the way, is slightly larger than 3/8". Select a good grade of pine for the two "C" longerons and good hard balsa stock for the "A" and "B" longerons.

There are 16 plywood formers that make up the internal structure of the Huey Cobra. Formers 1-6 and formers 15 and 16 are cut from 1/8" plywood while formers 7-14 are cut from 3/32" plywood. Those with some drafting knowledge will note that the formers appear to be roughly drawn on the plans – this is simply due to the fact that there will be internal variations in each fiberglass fuselage due to the amount of resin used, internal bubbles in the cloth, etc. Thus, these formers are approximate size only and each will be a trial and fit application as they are installed. Formers shown on the plans with dashed instead of solid lines are to be cut slightly oversize since the greatest degree of variation will occur with these formers. The best method for cutting out these formers without cutting up your plans is to simply turn the plans over, face down, on top of a sheet of black Contact shelf paper. The paper backing of the shelf paper should be face up and toward the plans. Next, insert a sheet of carbon paper between the bulkheads and the backing sheet of the shelf paper and carefully trace the outline of the bulkhead viewed from the back of the plan sheet. When this transfer has occurred, carefully cut out the templates you have made on the black shelf paper, remove the backing sheet and press the templates down onto your sheet of plywood. You will find that the black shelf paper makes an excellent former template without the necessity for cutting up your plans or using a messy rubber or spray cement in order to adhere your templates to the plywood. You will also find that, when cutting the templates on your Dremel Jig Saw, that you will have a nice clean edge around the template with no fraying of the edges as you would have in cutting around a paper template.

Next, use a grease pencil and mark the exact locations of the formers on each side of the fuselage exterior. The formers will shortly be glued into place with polyester laminating resin which you can obtain at a local marine supply or hardware store. *Do not* use epoxy resin since it is not compatible with the polyester resin used to lay up your Huey Cobra fuselage. Titebond Aliphatic glue or epoxy glue can be used at the joints where the plywood formers meet the spruce and balsa longerons. When former No. 2 is installed be sure to seal completely around its edge so that fuel and exhaust residue cannot seep into the radio compartment. Seal two or three times, as necessary, in order to completely seal around the edge of this former. If a former has large gaps between it and the fuselage, mix up an ounce or two of your polyester resin and stir in a couple of teaspoonfuls of phenolic micro-balloons filler, available from Prather Products, 1660 Ravenna Ave., Wilmington, California 90744. These micro-balloons will add virtually no weight but

becomes a very strong filler and converts your resin into a dark brown paste which will fill these gaps.

Before installing any of the longerons or formers, it will first be necessary to bend the brass tubing for the tail rotor drive shaft (03-12) to the contour shown on the side view of the plan. This is easily bent by hand, making sure that you don't exert too much strength on it and crimp the tubing. Simply make sure that both ends of the tubing line up over the side view of the plans with their respective couplers – that is, that one end is in a direct line with the coupler from the transmission while the other is in a direct line with the coupler from the tail rotor transmission. After completing the forming of the tubing to the desired shape, lightly sand the entire tubing with #400 sandpaper to roughen up the exterior surface.

At this point, the instructions accompanying the Huey Cobra recommended gluing the tubing to tail former # 6 with Stabilit express epoxy and then inserting into the fuselage. We found, however, that our template for former #6, as drawn on the plans, was quite a bit more narrow than the inside width of the fuselage and somewhat taller than required. Thus, it would be extremely difficult to trial fit this former with the tubing in place. We found an easy method to somewhat simplify the installation of this former. First, cut the former from 1/8" plywood to the exact shape of the template as shown on the plans. Next, drill a ¼" hole just below the center of the former and take a 3' length of ¼" dowel and press fit it into former #6. Now, carefully insert the former back into the tail reaching in through the cockpit area. Push it in as far as it will go without wedging it and then go back and look at the former through the open part of the vertical fin. You will see where it will be necessary to either remake the former larger, or alternately, trim it down to the shape required. This is best done with a Dremel Moto Tool and small drum sander attachment. Keep removing the dowel and the former until such time as the former will slip back into the position as outlined by your grease pencil marks on the exterior of the fuselage. It took us 9 or 10 fittings to obtain a proper fit of former #6 which is located at the junction of the vertical fin where it meets the fuselage. When we finally had it as close as possible and in position, the dowel was left in place until after this former was secured to the fuselage with polyester resin. The easiest way to accomplish this is to attach a 10 cent acid brush, obtainable at almost any hardware store, to a length of 1/8" dowel. These acid brushes are simply a hollow piece of tubing with a brush crimped into the end. A piece of tubing is inserted into the hollow handle and the metal crimped onto the dowel with a pair of pliers. Now, mix up an ounce of polyester resin with about 10 drops of hardener (most all polyester hardeners are methyl ethyl ketone peroxide in dimethyl phthalate). Quickly add a couple of spoonfulls of phenolic microballoons to your resin and catalyst and stir thoroughly. At the rate of 10 drops per ounce, this resin will start to gel in approximately 10-15 minutes and set up hard in 30-40 minutes. Take your brush attached to the length of dowel and, reaching in through the slot in the rear of the vertical fin, brush the resin-filler mix all around the rear of former #6. By standing the fuselage on its nose, this filler will form a nice lightweight fillet around the former and, wherever there is a gap between the former and the fuselage side, it will fill the gap completely. After about 45 minutes you can reach in through the cockpit and remove the length of dowel that was pressed into former #6.

The next step is to make a cutout in the vertical fin (or rear pylon), for the rear rotor transmission gear box. Trace the pattern from the plans onto black Contact shelf paper and be sure to locate this cutout exactly as shown on the plans. Using a Dremel Moto-Tool, carefully remove the fiberglass using a carborundum disc cutter. When you have removed the fiberglass, sand the edges of the cutout with an emery board and follow with #400 wet-or-dry paper, used dry. The tail rotor mechanism will be installed later.

Next, cut the 10mm x 10mm pine longerons (C) to the proper length and bevel one edge so that it will fit into the slightly rounded contour at the junction of the side and bottom of the fuselage. Now glue both longerons "C" to the fuselage bottom in their exact location using polyester resin, and holding firmly in place against the side and bottom. Be sure to eliminate all air bubbles in the resin to ensure a tight fit. These two longerons form the main crutch of the helicopter so be sure that you have installed them accurately and firmly. When the resin has set up, you may have a space between the side of the longeron and the interior side of the fuselage. Mix up another

ounce of resin and fill this gap solid. Tilt the fuselage slightly to the side so that it will fill up any gaps that were left between the fuselage side and bottom and the spruce longeron. Do this for both sides of the fuselage. The metal plate that holds the engine, fan, clutch, transmission, and skids mount to these spruce longerons, so they must be firmly secured in place.

The next step is to taper balsa longerons "B" for an exact fit to the inside contour of your fuselage. This, again, is a fit and try procedure. Position former #1 in place and sand to exact size and use former #1 as a guide for locating the exact position of balsa longerons "B". Apply resin to one longeron "B" and secure it in place to the fuselge side. When dry, turn the fuselage over and glue in the other longeron "B" with resin. Now, glue former #1 firmly in place following the same procedure for gluing as for former #5.

At this point, I would like to mention that the most time consuming and frustrating part of the entire assembly of the Bell Huey Cobra Helicopter is the cutting and fitting of the internal bulkheads and longerons. The fit of the bulkheads should be as close as possible, particularly on each end of the motor and transmission compartment, in order to provide a good seal against fuel and exhaust residue getting into the radio compartment and the rest of the fuselage. For this reason, I would like to suggest that you make each bulkhead first out of balsa wood, trial fitting this "dummy" bulkhead until you have an exact fit and then use the balsa dummy as a master template for your permanent plywood bulkhead.

Insert the brass tubing (03-12) which you have previously bent to shape as shown on the side view of the plans through the slot in the vertical fin and the predrilled hole in bulkhead #6 and threaded down through the fuselage into the hole at the base of former #5. Make sure that the tubing is centered down the full length of the aft section of the fuselage and that it protrudes 3" past former #5 into the mid section of the fuselage, Now resin in former #5. When the tubing is properly centered, use some fiberglass cloth and epoxy glue at former #5 in order to permanently secure the brass tubing in place. Reach in through the open slot in the vertical tail and, using your Stabilit Express, spread epoxy at the junction of the brass tubing and former #6. Both ends of the tubing should be wrapped with masking tape to prevent any epoxy or resin from getting into the tubing now or as you go on installing bulkheads and applying resin in the fuselage itself. When you are gluing the brass tubing to bulkhead #6, be sure not to get epoxy into the hole where the flexible tubing for the rear rotor pitch control is to be installed.

Now, install the flexible tubing for the rear rotor pitch control which is indicated by the dotted lines on the plans. Since the tail rotor is continually under stress, we do not recommend the use of Gold'N Rod for this application, but rather use two lengths of Gold'N Rod inner tubing which is joined together in the center of the fuselage by a piece of 5/32" I.D. brass tubing used as a coupler. Later, you will install the rotor pitch control cable, and we recommend obtaining and using Sevenstrand nylon coated cable, .058" diameter which is 135 lb. test fishing line. This material comes in a 30' coil and is available at most major sporting good stores for under $2.00. It is manufactured by Sevenstrand Tackle Manufacturing Co., in Westminster, California. The inner Gold'N Rod (and we used one 4' length from the tail section to the middle of the fuselage and then a short 18" length joined with the brass tubing to bring to the forward section of the fuselage) is epoxied into the predrilled hole in bulkhead #6, then travels down the right hand side of the helicopter fuselage (the right hand side as if you were sitting in the cockpit) and will go through bulkheads numbers 5, 4, 3, and 2 as they are installed, traveling down the side of longeron "B".

Now, add bulkhead #4 and both longerons "A". When these have been installed, insert former #7, a small plywood reinforcement for the training gear bracket, into the upper pylon. Place the fuselage upside down for this operation and use a minimum of resin since this is not a high stress area. Now, add former #10 to the rudder pylon. This plywood bulkhead is carefully located according to the plans and is inserted through the cutout that you made for the tail rotor transmission and glued flat in the "pocket" for it on the inside of the vertical tail across from the cutout for the tail rotor transmission. Now, you can add formers #2 and #3, again using balsa templates until you are assured of a good fit. Any large gaps between the fuselage sides and the bulkheads should be sealed with approximately ½" wide strip of

fiberglass cloth and some resin.

The next operation is the installation of your fuel tank. We strongly recommend the use of a Kraft-Hayes Products 13 oz. polyethylene R/C fuel tank for your Bell Huey Cobra. The aft end of your tank rests in the cutout in bulkhead #5 while support braces must be made for the forward end of the tank. In our RCM prototype, we cut two pieces of 1/8" plywood in an "L" shape to support the tank while not interfering with the brass tubing drive shaft housing. When these were positioned in place and secured with polyester resin, we added a 1/32" plywood plate over the top of the fuel tank area from bulkhead #5 forward to the front end of the tank. The two 1/8" x 1/4" spruce strips were glued in a vertical position on bulkhead #5 to allow for the width of the tank while holding the tank securely in place. Whatever method you use for mounting your fuel tank, remember that the bottom of the tank must not touch the flexible tail rotor shaft coupling but still the tank should be as low as possible in order to reduce fuel siphoning. If your helicopter quits in mid-air for any reason, and you're any distance from the ground, you're going to be picking up a box of pieces! Make sure that your fuel tank is installed properly.

After all the bulkheads, longerons, flexible tubing, and brass transmission shaft housing have been installed, the last step in the preparation of the basic airframe is to reseal all joints using resin to ensure structural integrity by using only enough resin to adequately do the job. Using an over-thick mixture will not only give you a sloppy finish, but will not penetrate into the balsa before it sets up. The area around the engine-transmission particularly needs attention, coating all the longerons with resin as well. We gave a coat of resin to all of the balsa and plywood framework inside the fiberglass fuselage.

Next, cut two pieces of 1/8" I.D. brass tubing approximately 3½" long, and using a #21 drill (.159") drill carefully through the fiberglass gun turret in the lower portion of the fuselage and into the two holes drilled into the bottom of former #1. Apply small pieces of fiberglass cloth and resin inside the fiberglass gun turret and on former #1 to secure these pieces of brass tubing in place. They are not just for appearance sake, but will house the forward nose wheel of your training skids. As an extra added precaution against hard landings during your flight training period, small pieces of balsa wood can be epoxied between the brass tubing and the fiberglass floor of the gun turret to further reduce the load of the 1/8" music wire forward landing gear struts against the brass tubing.

The next step in the airframe construction is to temporarily mount the tail rotor transmission in place. First, loosen the two set screws on the brass collars on the driven shaft of the tail rotor transmission allowing the driven shaft to be removed with the slotted pitch plate. Loosen the four screws holding the slotted pitch plate and transmission base plate in place. If you use small dabs of epoxy to hold the base plate in place, slip a #11 X-Acto blade between the base plate and the gear housing box and remove the base plate. Now, carefully position the tail rotor transmission assembly in place through the cutout on the left side of the fuselage and located on plywood former #10 which has previously been secured into the vertical fin with polyester resin. Once you have the tail rotor positioned so that the shaft lines up with the cutout and so that the brass tubing (03-12) will be in line with it, carefully remove the transmission leaving the base plate in place on former #10 as a template for drilling the mounting holes. Use a pencil to mark the four mounting holes and the driven shaft clearance hole and then drill the five holes with a 3/32" drill. Now, reinstall the driven shaft, slotted pitch plate, and mount the tail rotor with the four screws from outside the right side of the vertical fin, securing the tail rotor transmission assembly firmly in place. The next step is to route the inner Gold'N Rod tubing which will carry the cable from the rear rotor servo to the pitch control arm. Using your grease pencil, line up the location of the slot where the inner Gold'N Rod will exit the vertical fin. Make sure it is perfectly in line with the movement of the pitch control arm. When it has thus been located and drawn on the side of the vertical fin with the grease pencil, the slot should be approximately 1" long and 3/16" wide. Cut the slot by drilling a 1/8" hole at each end of the slot that you have drawn on the side of the vertical fin. Now, using a carborundum cutting disc on your Dremel Moto-Tool, carefully cut away the fiberglass along the lines you have drawn. Then, use an emery board and small round file to true up the slot.

Since the inner Gold'N Rod will not glue directly to the vertical fin with polyester

resin, some method must be used to make sure that it is firmly anchored where it exits the vertical fin. The best method for accomplishing this is far easier to do than it is to describe. First, take the end of the Gold'N Rod and sand it with #80 cabinet paper until it has been roughened. Next, take a #4 nut and thread it onto the Gold'N Rod for about a length of 3-4". When you remove the nut you will have threaded the exterior of the Gold'N Rod. While the resin will not adhere to the Gold'N Rod, it will lodge itself in the threads on the exterior of the cable housing. The next step is to bring the Gold'N Rod through the slot. Now cut a 1" x 1" piece of fiberglass cloth and put it over the top of the Gold'N Rod with both ends of the tape going down through the slot and into the interior of the vertical fin. Apply polyester resin to the cloth where it touches the Nyrod and to the inside of the fuselage inside of the vertical fin, holding the ends of the fiberglass cloth over onto the interior of the fin as if they were tabs. Apply polyester resin to hold them in place and then put another 1" x 1" square piece of fiberglass cloth over these tabs and over the interior of the slot through which the Gold'N Rod passes. When the polyester resin has dried you will find that you will have a firmly anchored tubing exit. All that remains now is to cut off the excess length of Gold'N Rod where it exits the vertical fin.

The next step is to install former #11 which anchors the brass tubing (03-12) directly in line with the shaft of the tail rotor transmission. Make a balsa template for former #11 and shape it until it fits to the inside contour of the vertical fin. When you are satisfied that it will fit tightly, cut your final template out of 1/8" plywood and drill a hole for the brass tubing. Remove the masking tape on the end of the brass tubing and slip former #11 over it, reaching through the cutout for the tail rotor transmission. Now, reinstall the masking tape on the end of the brass tubing. Before securing bulkhead #11 to the interior of the vertical fin, make sure that the brass tubing lines up exactly with the shaft on the tail rotor transmission. Hold in place by any means necessary as it is absolutely imperative that this brass cable be directly in line with the tail rotor shaft, otherwise the transmission drive cable will flex and break prematurely. Mix up a small amount of polyester resin and brush it on the plywood former and the interior of the vertical fin. Place small 1" x 1/2" pieces of fiberglass tape on both sides of the plywood where it meets the fiberglass vertical fin. Weight the bulkhead down in position with as much weight as required to hold it in place until the fiberglass cloth and resin dries, providing a firm and secure bond between former #11 and the two sides of the vertical fin. When this assembly has completely dried, remove any supporting braces and the tape from the end of the brass tubing. Now, mix up a small amount of Stabilit Express and make a fillet of this epoxy material joining the bulkhead to the brass cable. Make sure that your tail rotor assembly moves smoothly and that the pitch control arm moves through the slotted pitch plate from one end to another without binding. When you are certain that the tail rotor transmission drive shaft lines up properly with the brass tubing and that the entire mechanism works smoothly, remove the tail rotor transmission and set it aside until it is permanently installed later on.

Next, we took a length of the 10mm square balsa used for making longerons "A" and "B" and radiused the ends to fit in the slot at the end of the vertical fin. Although the plans show a single piece of balsa inserted into the open end of the vertical fin and then sanded to shape, this would require some filling and fairing out where the fiberglass would overlap the balsa. Thus, we elected to insert a 10mm square strip the full length of the vertical slot, and then butt glue with epoxy a length of 1½" wide by ½" thick medium balsa to the rear of the vertical fin, carving and sanding it to the curved streamlined airfoil shape shown on the plans. This shape serves to unload the tail rotor at high speeds on the full scale Huey Cobra.

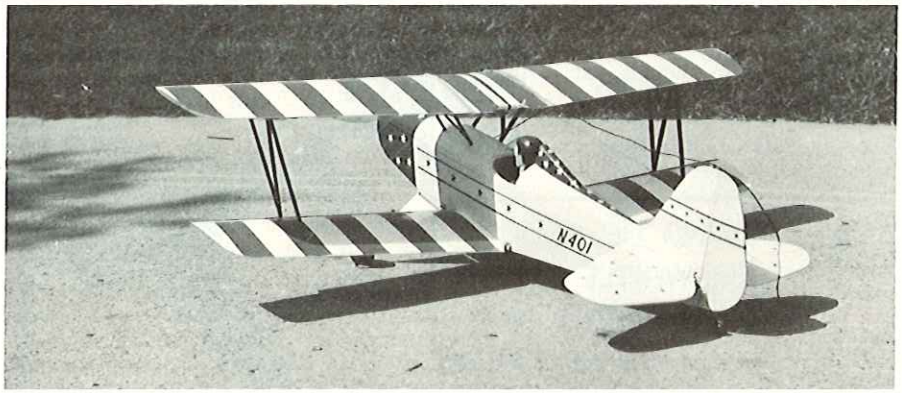
COCKPIT

The assembly of the cockpit is shown on the side view of the plans and consists of the cockpit floor (#8) and cockpit formers numbers 12, 13, and 14. Since we did not intend to make up a full dress cockpit with instruments, pilots, and gun sight for this prototype, we used a solid cockpit floor with no cutouts as well as a solid former #14 (rear cockpit former). A long strip of Saran Wrap was laid over the cockpit area and allowed to come up over the nose and up over the area where the rear canopy former will fit. All of the canopy parts were then sanded to final shape, trimming them

to 1mm smaller than the outside of the fuselage to allow for the thickness of the canopy. Glue the cockpit components together with epoxy and allow to dry thoroughly before removing from the fuselage. If you intend to build up a full dress cockpit, provisions must be made during the cockpit assembly for their inclusion. Revell Inc. makes an authentic Huey Cobra in 1/32 scale with a highly detailed cockpit. By using proportional dividers, it will be easy to scale up the seats, instrument panels, and other cockpit details for your Huey Cobra. We would strongly recommend, however, that you build a simple cockpit until you have learned to fly your helicopter, and then purchase a new canopy and build a full scale cockpit later on. The option, of course, is up to you.

Before going on with the final details of the airframe and its sanding, priming, and painting, we recommend a different sequence of construction than that outlined in the plans accompanying the Huey Cobra. That is, we recommend that you install all of the equipment including the engine, fan and clutch, transmission, main rotor mechanism, and tail rotor assembly so that you can locate and make all necessary cutouts for your muffler, external glow plug connection points, needle valve extension holes, and any other cutout that needs to be made in the fuselage before you begin final sanding and painting. So, at this point we will begin the temporary installation of the motor-transmission, muffler, and main rotor drive assembly before shaping and installing the balsa stabilizer and main "wings."

(CONTINUED NEXT MONTH)



ALL STAR

from page 30

necessary to gouge out the hatch a bit to provide proper clearance. If you choose to mount the engine inverted, this won't be necessary.

The balance point should be located under the top wing, directly over the leading edge of the bottom wing. As I said before, it might be necessary to place the battery pack under the cockpit, in which case adequate protection should be provided for the receiver and servos so that they aren't destroyed by the battery in case of a crash.

Flying:

The performance of this aircraft was pretty well summed up at the beginning of this article, and I only wish to add a few suggestions.

You'll find that this airplane is very stable, smooth, and easy to handle. Its low power and power-off glide is soft and slow, yet good positive control is maintained. This aircraft is particularly well suited for the new breed of two channel systems such as the Ace Digital Commander. Powered with a Max .10 engine and with rudder and elevator control, the All Star will do inside and outside loops, fly inverted, spin, roll and any combination of these with ease, even in the hands of the novice flyer.

If you wish to fly the plane Rudder Only, follow the excellent suggestions contained in the new 1972 Ace Catalog and Manual for proper trimming.

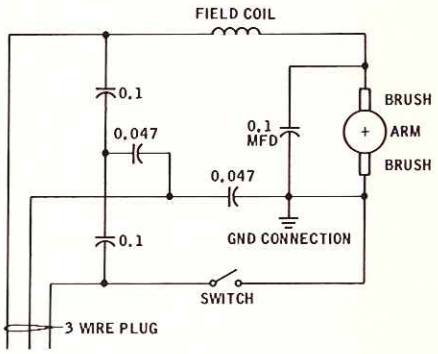
The All Star is a small plane, but don't underestimate its performance. You'll have all the big .60 pattern ship flyers crowding around you after your first flight. □

ceramic size and do not take up too much space. As I say, this will help considerably but it will not knock it out completely. The whole situation rather depends on the condition of the tool and also the systems around it, such as the selectivity of the television sets in use, etc.

I am assuming here that you have a 3-wire grounded cord leading to the tool; however, there is a strong possibility that you don't and this ground wire that you have added is something external. If that is the case, I would suggest that you adapt a 3-wire cord to the tool and terminate these capacitors on the ground connection of the tool which can be anywhere on the rear bearing casting.

I have enclosed a sketch showing the position of these capacitors schematically. I hope this information will be of value to you and if we can be of any further service, please feel free to contact the writer.

Yours very truly,
Dremel Manufacturing Company
R.J. Ganzel
Prof. Eng.



RFI SUPPRESSION CIRCUIT FOR #2 MOTO-TOOL

Now, I haven't any idea how many of the older type Moto-Tools are in use throughout the world, but it must be a pretty sizeable figure, so I'm printing the information for all of you who may be in the same fix. It worked for me, and it should work for you. I think it was very considerate of Mr. Ganzel to take the time to draw the circuit and explain the problem – especially since the newer models don't have the same effect on TV's. In fact, I have one of the Dremel Moto-Saws with the later model motors, and it doesn't bother the TV at all.

While awaiting the reply from Dremel, I had some urgent work to do, so I bought a flexible shaft accessory which works the same as the Moto-Tool, and now I have two. I use the flexible shaft attachment during "prime time" shows – or sometimes when I need the extra power which it provides. Then I use the hand tool (even with the modification, it still isn't quite as interference free as the new permanent magnet model) when I figure the TV shows deserve to be interfered with!

So now I'm a model maker, TV critic, and censor when I feel like it! Not really; the power company says if a customer uses an appliance which bothers the neighbors and they complain, then the power company cuts off the service. So, thanks to Dremel, I can continue to use my shop tool whenever I need it.

Nice people at Dremel. Great friends of the Sunday fliers. □

SUNDAY FLIER

from page 16

Along with this, the addition of a .1 capacitor from each side of the line joining to ground through a .047 mfd capacitor. These capacitors can be had in the small

from page 14

believe that the super powerful .60 engines were making a runaway as the popular favorite. Over 80% said that they like flying .40 and under airplanes, and for a number of reasons. I have long advocated that the best size aircraft/engine combination to use in getting started was the .19 range, and it seems to me that a lot of you are following this line of thinking. Now, with the neat, small radio sets, a return to some of the great .049 kits of ten years ago can take place, equipping them with rudder and elevator for a pretty inexpensive introduction to radio flying. I spent many a happy hour parked out in an open field flying .049 pulse rudder airplanes, and there is no reason why this same aircraft can't be fitted with todays super small proportional radio. Also, I was a lot younger and thinner then and it was much easier to chase the model.

(7) Hand launch or fly from paved fields? This was divided right down the middle. A lot of you are flying from established model flying fields, but a lot are flying from remote sites. Even here, many of you are flying from school grounds where you can take-off rather than having to hand launch. I would say that most flying is done after a take-off from the ground, rather than a pure hand launch.

(8) Silk and dope, or plastic film? Again, a 50% division. Most of the newer builder/fliers are using silk and dope type coverings, but as the time in the hobby grows, a swing to more exotic coverings take place.

(9) Do you paint with dope, enamel, epoxy, or hardware store paint? Almost everyone seems to be experimenting these days, and while most mentioned that they had painted with dope, a majority also said that they had begin to get away from the traditional model paint and to branch out into other types. Only 11% said that they used dope exclusively.

(10) Is your radio set a 1970 model or newer? 75% of those replying are flying fairly new radios. A number also have older model radios in other aircraft, but most modelers, whether beginners or not, tend to constantly upgrade their radio systems. This makes it pretty easy in thinking about new design projects, since the number flying old three pound reed sets are rapidly disappearing. Even the two pound early-day proportional sets are becoming very scarce.

(11) Do you like to fly in contests, pattern and fun fly's, or do you just like to take off, bang around the sky and get back on the ground again? This answer gave me a lot of food for thought. Many letters stated in very clear terms that they felt that they had enough pressure to live with on the job, and that when they went out to enjoy their hobby, they wanted to do just that, enjoy it. They didn't want to have the added pressure of flying in competition. Virtually 100% said that they really just like the thrill of pure flying, without worrying about anything else. Again, this response is somewhat a factor of newness to the art of R/C flying, because, frankly, the challenge of taking home an uncrunched aircraft is quite a bit in itself in the early stages of the sport.

Of course, this is one reason why a lot of you like to fly from remote sites; you want to try and gain a mastery of this sport without a lot of people watching you make mistakes. Also, at a lot of crowded fields, a newcomer is often not made to feel too welcome. This is bad for all of us. Everyone of us had to learn to fly the hard way, and we should all remember this. And, even if you fly by yourself, or with just a few friends, a good idea is to practice something that will make each flight just a little better than the last. Pick out a spot and try to get as close to it as possible on landing. In fact, you may find that just by concentrating on trying to get near a spot on landing will make most of your flying reactions become more automatic, because you aren't worrying about which aileron to give, you are letting your subconscious mind take over. This is the way that you can improve all of your flying and your ultimate enjoyment of this sport.

(12) Home brew fuel or commercial fuel? The commercial fuel is by far the most widely used. Home brew recorded a distant 5% on this survey. Probably more people would give home brew a try if the ingredients were more widely available. It's too bad that fuel has to be so volatile since a pretty good portion of the cost is in the container. Think what the gas bill for your auto would be if you had to buy a new gas tank everytime you pulled into a filling station.

We, as a group, must generate a tremendous amount of 1 gallon cans that are just tossed away. It's too bad that we don't have a "filling station" for models. Or, how about a fuel pump located on a model field?

(13) Balsa or plastic models? This answer was quite definite. 85% indicated that they were not at all interested in plastic models, for a number of reasons, the main one being that they liked the feel of building their own aircraft, and that the balsa model was much more durable than was the plastic. A few said that they might try another plastic, but most said that they preferred conventional construction. Probably some of the feeling running against plastic stems from some of the problems of cracking of the fuselage, and the difficulty of repairing them after a slight altercation with the ground. There isn't any question about plastic being more fragile than the balsa, and a lot begin to show wear from the very beginning. Fixing any kind of plastic is taking a chance, whether it is a model, or some household article. Indy Flight Sales markets a product called "Fix-um" that does a great job of repairing your plastic models, so if you have need of some way to repair them, give this material a try.

The replies to this questionnaire were interesting and informative, and many of you took a lot of time in writing your letters. I would like to thank you for helping out on this survey as well as thanking you for the many kind words you had to say about this column. Over the years I have tried to bring some assistance and information to those new to this great sport.

* * * *

In my last column I told you that I would report on the Quarter Midget Racer Minnow kit from Hobby World. It is a beautiful airplane and a kit that is very well

designed. The kit comes to you with a beautiful fiberglass fuselage and foam wing core. You must provide the balsa for the wing skins and for the tail structures, although the fin is molded in as part of the fuselage. Even so, it really takes very little balsa to finish this model, and it can be built quite rapidly. The firewall is installed in the fuselage, and predrilled for a Tatone mount. The aircraft is designed to use a side mounted engine, with the cylinder head hidden by a removable cheek cowl. The Max .15 engine is so short that it is a bit tough to get it into the cheek cowl unless some provision is made to get the exhaust out of the aircraft. This leads to an exhaust extension, but the Quarter Midget rules state that both the throttle and exhaust baffles must be working. (Something to think about). Ed Hurd from Richardson, Texas, solved this by side mounting the engine in his Minnow, leaving off the cheek cowl on this side and opening up the area around the engine so that it could emit its exhaust without an exhaust extension.

The wing is patterned after the wing of the Stafford Formula I Minnows. The tips are thin with a bit of washout built into them. This is a good flying, easy-to-build racer, and will give you an excellent airplane to fly in Quarter Midget Races. You really can't go wrong by trying one.

As most of you know, this year Quarter Midget racers are really sweeping the skies. Let's keep it a fun event, for fun participation. See you at the races. □

ENGINE CLINIC

from page 12

guessing that your engine may be a liitle tired and the lower pitch will let it turn up. Letting the engine turn up will not hurt it as long as you do not go to extreme. Reducing the load on the engine means it is not working as hard so it runs cooler, etc. However, this doesn't mean going to an 11-6 because the engine would then be running far beyond its horsepower peak, making a lot of noise but not giving the thrust intended.

Dear Mr. Lee,

In a recent issue of your magazine there was an article on how to store your models for the Winter. This article mentioned using Sunbeam Metal Kleen on the head and cooling fins of the motor to clean them.

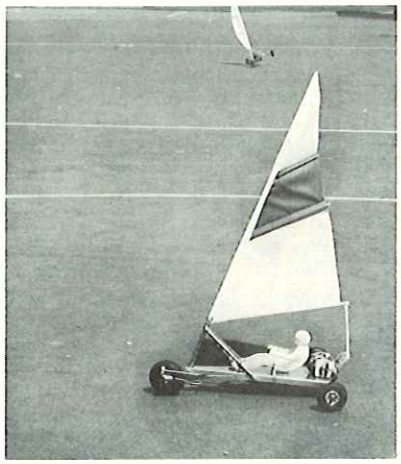
This product did an amazing job removing built-up oil and varnish from the head. Is it safe to use this product on a disassembled engine to clean the varnish from the piston and inside the head?

Sincerely,
Russell Bone
Iowa City, Iowa

The Sunbeam Metal Kleen will not harm the internal parts in any way as long as you flush it off thoroughly with water and apply oil right away. To leave it on metal parts without thorough flushing and oiling can cause a rust film. However, as long as you are going to clean the engine internally it is better to do so with an SOS pad (and water). □

TAKE A LOOK AT THIS

from page 8



available. The kit sells for $19.95 complete. Send check or M.O., or send 25 cents for our catalog "Bugattis to Zeppelins" listing many unusual hobby items that float, or roll, or help you make better models.

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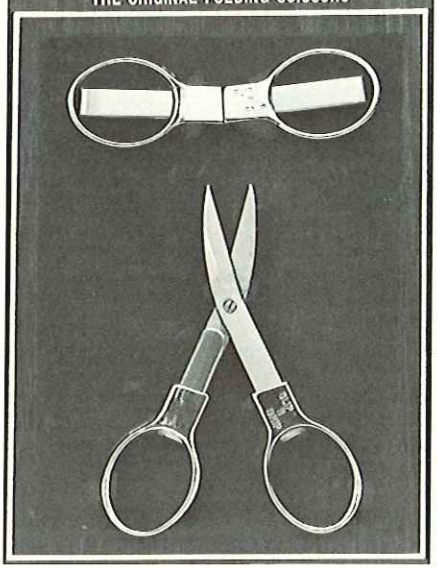

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The Universal Scale Wheel, manufactured by Universal Model Engineering Company, Box 252, Naperville, Illinois 60540, is one of the finest wheels available to the modeler today. Featuring a scale hub and tread detail, the hubs are molded of high strength Lexan® with low rebound thermoplastic rubber tires that remain pliable in all temperatures. Fully assembled in six sizes from 2½" through 3¾" the Universal Wheel comes with spoked and smooth hub cap options. They are compatible with popular mechanical brakes and have variable inflation to suit the weight of the aircraft. Priced from $4.79 to $5.79, the wheels can be easily inflated for heavy scale models by simply disassembling the hub from the tire, inserting a dime sized chip of dry ice into

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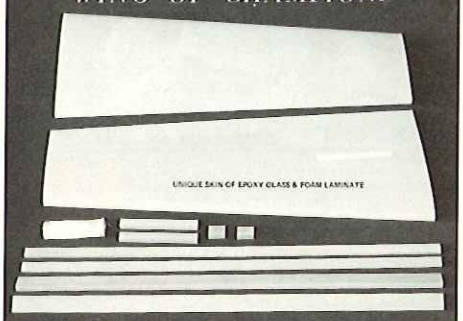

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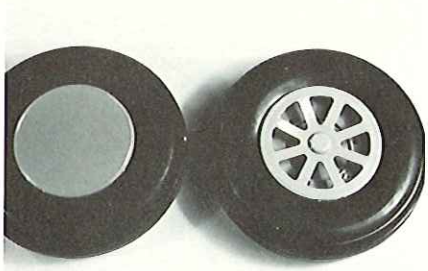

the tire, and then reassembling the hub and tire together. When the dry ice evolves into its gaseous state you have a CO^2 pressurized wheel. These are not only beautiful scale type wheels, but have passed every test that we could put to them for ruggedness and durability. Tested, Approved and Recommended by RCM.

*

The Diane Publishing Company, P.O. Box 2726, Rochester, New York 14626, has released their newest publication, *The National Air Racers in 3-Views 1929 – 1949.* By Charles A. Mendenhall, this book is full of drawings and construction details for all of the famous air racers. Priced at $3.95 postpaid direct from the publisher, we recommend this book as invaluable to anyone interested in scale details of the famous air racers during the 20 year period from 1929 to 1949.

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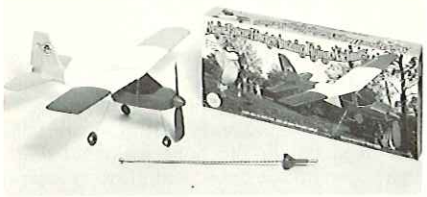
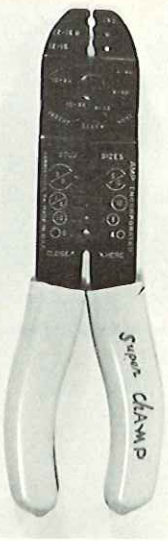


Major Roscoe Hawkes Amazing Outdoor Plane "Arrow Cruiser" is a twenty inch wing span cabin model with fully contoured fuselage from Kenner Products, Division of General Mills Fun Groups, 912 Sycamore Street, Cincinnati, Ohio 45202. Constructed of lightweight plastic foam and high impact plastic, the "Arrow Cruiser" is brightly decorated in red, white and blue. Eight to ten winds with the power injector and the rubber band powered "Arrow Cruiser" can taxi to take-off and is capable of flying well over fifty feet. Maneuverability rather than duration is emphasized. Spectacular loops, rolls, tail slides, and wing-overs are easily achieved. This plane retails in the vicinity of $3.25 and can be flown with a Cox Pee Wee .020 and Ace single channel proportional radio – an ideal way to get your youngster started in R/C.

*

The Brookstone Company, Brookstone Building, Peterborough, New Hampshire 03458, is just about the finest source of precision tools in the United States that would be of interest to the R/C model craftsman. RCM has ordered numerous tools from their extensive catalog and have always received 72 hour service from the date of order. One of the tools that we find particularly useful in the shop is their Terminal Tool which, while designed for the electrician, is excellent for stripping wires



and cuts 4-40, 6-32, 8-32, 10-24, and 10-32 screws clean, without burrs or thread damage. In addition, the unit doubles as a wire cutter. Priced at $5.95, this is only one of thousands of tools available from the Brookstone Company. We urge you to send for their catalog which you will find indispensable in the R/C shop. Service from the Brookstone Company is outstanding and has been Tested, and is Approved and Recommended by R/C Modeler Magazine.

FROM THE SHOP

from page 4

on in order to avoid running around in all directions at once . . .

Sometimes, while comtemplating my navel during a few moments of quiet introspection, I have to fight the temptation to think back to when we pushed a button once for right rudder and twice for left rudder and were thrilled with any flight that didn't terminate in a spiral dive into the ground, or conversely, disappear over the horizon. Of course, I can also remember buying a Model T Ford for $30.00 with money earned working as a box boy in a market . . .

In moments of frustration, when confronted with the complexities of today, we often view the "good old days" with fondness . . . forgetting the repeated frustrations of even trying to get a model to fly with a radio that was subject to interference from a passing bird. We forget, too, the sore and aching arm muscles from cranking that Model T . . .

These are the good old days – let's enjoy them to the fullest by taking advantage of today's technology; by improving our own individual skills so that the man can more closely match the potential of the machine, by participating in whatever facet of this sport that interests us the most.

Me?

I think I'll go out and fly my sailplane, forgetting all about the thermistor-comparator thermal sensor and see if I can simply avoid landing on the top of the same tree I managed to hit twice in a row last month.

One more time . . . . . □