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radio control

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FEATURES

PRODUCT REPORTS

DEPARTMENTS

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Executive Editor	Patricia Crews
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THIS MONTHS COVER

This months cover is of lovely Miss Kathy Shelton holding a beautifully covered Airtronics Olympic. Ektachrome transparency by Ed Okie.

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FROM THE SHOP

DON DEWEY

● The Southern Alameda County Radio Controlers are, again this year, sponsoring one of the seasons best Stand-Off Scale contests. The ACRC would like to invite you to attend and join in the two day festivities, to be held at Willow Avenue, Newark, California, Southeast of the San Francisco Bay area on June 22-23.

This is an AMA event with sanction #159 and will be flown to AMA Sport Scale Rules with this exception: .60 engine size restriction is waived and an .80 may be used while twins can total 1.25 cubic inch displacement. Categories include World War I (1903-1918); World War II (1919-1946); Racing; Sport (includes all other aircraft not included in other areas). The entry fee is $5.00 for the first entry and $3.00 per additional entry. Color schemes and plan view are required for all entries. Trophies will be awarded in 1st place categories while merchandise and ribbons will be given for 2nd and 3rd place categories. AMA and FCC licenses are required. Pilot briefing will be 8:00 A.M. Saturday, June 22, 1974, with static judging beginning at 8:30 A.M. of the same date. Flying begins at 10:00 A.M. on Saturday and 8:00 A.M. on Sunday June 23rd. Available motels are the Fremont Inn and the Fremont Frontier in Fremont, California. For further information, contact Contest Director Richard J. Franco, 4868 Mauna Loa Park Drive, Fremont, California 94538. Telephone (415) 657-6888.

* * * * *

July 6th and 7th are the dates of the Second Annual National Multiwing R/C Championships to be held at the crossroads of the nation - - - the "Biplane Capitol of the World" - - - Omaha, Nebraska.

Last year, a minor revolution was started by introducing Biplane competition in the country as well as introducing "free-style" to pattern, and multiwing aircraft to fairly compete in sports scale and not be snowed under by retracts, flaps, and the mechanical gadgetry of the more modern monoplanes. And, perhaps most important, this event put back a little fun in RC competition and took off a little pressure and introduced a format that appeals to both contest and Sunday fliers.

The National Multiwing R/C Championships are aiming at an award list in excess of $1,500.00 consisting of trophies, engines, plus biplane and triplane kits. A new aerodrome will be available for this years AMA sanctioned (.60) National Multiwing Event and is considered to be one of the most beautiful in the country. They have the support of four sponsoring R/C clubs from two states with a combined membership of over 250.

In other words, the Second Annual National Multiwing R/C Championships have the ability and manpower to produce a superb meet - - - they did it last year - - - and they're going to do it this year and in years to come.

* * * * *

The Boeing Management Association announced that its fifth annual Model Aeronautics Contest will be held July 13 and 14 at Boeing's sprawling Space Center, Kent, Washington. Jim Thompson has, for the second year, been named General Chairman.

Again, $1,750 in scholarships, as well as the trophies, are being offered as prizes by the Boeing Management Association, sponsor of the contest.

This contest is sanctioned by the Academy of Model Aeronautics and the National Association of Rocketry, and is open to any person under eighteen years of age. Overall, there are eighteen events in three categories. These categories and events are:

FREE FLIGHT

1/2 Gas; Unlimited Rubber; Hand Launch Glider; Cargo; Towline Glider; Helicopter.

CONTROL LINE

Speed (record Ratio); Control Line Scale Racing; Stunt (Precision Aerobatics); Combined Navy Carrier (Record Ratio); Combat; Slow Combat.

SPECIALTY

Indoor Hand Launch Glider; Indoor Easy "B"; Rocket, Parachute Duration

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Two VK Nieuports and a DR-1 ready to show their capabilities at the 1974 National Multiwing RC Championships.

CUNNINGHAM ON R/C

BY CHUCK CUNNINGHAM

An indispensable shop tool - - - The Stanley Utility knife.

● Before we get into this months foray into the problems of getting a good foundation in the sport of radio control building and flying, I would like to mention a few of the new items with which I have been working.

The first has to be one of the very best tools that I have used for building models. It is a Stanley Utility Knife, and can be purchased for $1.95 at most hardware shops as well as at all Montgomery Ward stores. Its intended use is in construction, such as for cutting sheet rock, or any other board surface. The blade is razor sharp, but so strong that it is almost impossible to break it or to even dull it. I have used the same blade for slicing long strips of balsa, cutting out 1/16" plywood, and then trimmed overhanging plastic covering films. Try that on your average razor blade, or on two or three blades! The Stanley blades are replaceable when they finally get dull and the extras can be stored in the handle. The primary blade even retracts back into the handle to keep your youngsters (or yourself) from getting injured. All in all, it is great, and for the hobbyist has the added attraction that you can use it for around-the-house construction projects. I like it so well that I bought two of them, one to keep in my general tool box, and the other to keep with my model work.

*

About a month and a half ago I received a kit from the Pierce Aero Company of their new standard size glider, the Pierce Arrow. I told Ed Slobod that I would build the kit and then report my findings to you. Well, this little bird ranks right up there with the Stanley Utility Knife – it's great! The plans are well drawn, the wood in the kit is good and well selected, and the pre-cut parts fit very well. Only a little sanding is required on the wing ribs, but, basically, the entire aircraft goes together with a minimum of trouble. It can be built very rapidly and, when completed, makes a very attractive sailplane with a wingspan of 76-1/4" and 500 square inches of wing area. It is a very light aircraft and suitable for either a brick or small two channel radio. The performance of this sailplane is truly outstanding and, if you elect to build one, you will have many happy hours of flying ahead of you. The price tag of $29.95 is right in line with the going price for this size aircraft. You can fly it in the standard condition by using a Hi-Start or by simply pitching it off of a cliff for slope soaring. If you prefer, you can mount a Cox .049 on the nose in place of the nose block and fly it around the school yard, a sight that will drive the dyed-in-the-wool soaring pilot right up a tree!

This is an aircraft that you will be proud of, and one that you will enjoy. Congratulations, Ed, you've put together a winner!

*

A couple of weeks ago I received a letter from Len Purdy of Lanier Industries taking me to task for not giving full consideration to the plastic almost-ready-to-fly aircraft for the beginner. Len, you're right, I haven't been giving this type of aircraft their full merit and consideration, and I apologize. The plastics fill in a needed void for the newcomer to R/C with no modeling experience or for the experienced flier with not enough time to construct a balsa aircraft. I have "built" and flown at least four or five plastics in years past, and all of them were good flying aircraft. A lot has been written about customizing a plastic to give it the owners own personal touch, so I won't go into that again, but it is true that the plastics offer an excellent way to get started with a proven aircraft.

*

The next thing that I would like to comment on is the new line of Logictrol radios by EK Products. The line for 1974 continues the fine tradition built up over many years of serving the modeling public, and two new additions to this years offering are really a must for the sport flier, whether he is a newcomer to R/C or if he is an old hand looking for another rig to purchase. The two new offerings from Bob Elliot are a "Brick-plus-Two" and a "Super Brick." The "Brick-plus-Two" is a regular brick with the capacity of two extra servos rather than the standard one. This means that the modeler can purchase his new brick with just two channels and then, when his pocket book can stand the strain, he can get full house capacity with the simple idea of just buying two more servos. No transmitter alterations or mods are required and there's nothing to buy but two servos. And, these can be added one at a time.

The "Super Brick" is just that. It is just a little longer than the standard "Little Red Brick" but comes with three servos buried in the brick with a connector for a fourth servo. You can start life with this brick with three channels already in your aircraft and, then, as you become a more skilled pilot and want to move up to more advanced flying, you add the fourth servo. An ingenious adapter simply plugs into a pigtail hanging from the servo to change the rudder servo in the brick from the right stick to the left stick when you add ailerons and the aileron servo. Another bit of clever engineering is a built-in direction change for the throttle servo when the brick is moved from a high wing aircraft to a low wing aircraft. If you think about it, you will see that when you turn a brick upside down to put in a low wing aircraft, the throttle servo will then be on the wrong side for the throttle arm on an upright engine but, with the built-in adapter, you hook to the correct side of the engine no matter what the position. I predict that more and more fliers will take advantage of the economy and versatility of the "Brick-plus-Two" and the "Super Brick"

*

A couple of months ago I mentioned that I was currently flying a Jasco "Floater" soaring aircraft but I failed to mention the great education that can be obtained just by studying the plans for this aircraft. This has to be one of the most complete sets of plans that I have ever seen, and the information is not limited to construction, but also covers flying tips, plus giving the outline of several of the more popular soaring airfoils. It's great reading. I don't know if you can purchase the plans separately or not, but if you get the chance, latch on to a set.

*

Spring is breaking out as I am writing this column and all over the country modelers are turning to thoughts of getting back to the flying field, and trying out the Winter's construction projects. Here in the Southwest the flying season never really stops - - - it just goes underground for a few cold or windy days, but even so lots of fliers take a

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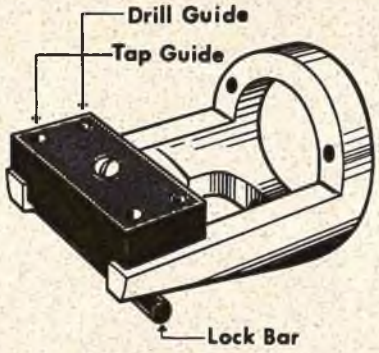
engine clinic

By Clarence Lee

● This month we have another new product to bring to your attention from Prather Products. The new product is an engine template drill jig. Prather Products has been advertising the drill jig in their ads for several months now but I am sure many of you are unaware of its existence due to the fact that many readers seem to ignore the ads in the magazine. Every month I get several letters from modelers wanting to know who imports the Super Tigres; where can parts for the H.P.'s be obtained; when is K & B coming out with the new Schnuerle .40, etc., etc. And, yet, these manufacturers run large ads every month. So, it is quite obvious that many of you skip past the ads and miss many of the new products available. This, in turn, is the reason for my trying to bring some of these new products that have long been needed to your attention. The Prather drill jig is certainly one of these items. To my knowledge this is the first true drill jig to be offered for drilling motor mount holes. Metal templates have been available for locating the holes and some time back a fellow offered a service of installing drill jig bushings in an old crankcase to be used, in turn, for drilling motor mount holes, but you had to supply the old crankcase which many fellows did not have. A new crankcase could naturally be purchased but the cost of a new case, plus the modification charge for installing the drill jig bushings, kept many fellows from going this method. Then, too, with no advertising, a few modelers were aware of this service.

The Prather drill jig is a steel block with pre-drilled guide holes that clamp to your motor mounts. One end of the block contains the holes for the tap drill and the other end contains the holes for the threading tap itself. In operation you clamp the drill jig to your motor mounts and drill the first two holes. The drill jig is then reversed and the tap guide holes used for threading the holes. Screws are then put through the tap guide holes and screwed to your motor mounts. The other end of the drill jig is then used for final drilling of the remaining two holes and, in turn, tapping. This makes for a dead true mounting pattern for the engine eliminating the need to drill the mounting holes in your engine oversize, egg the holes, etc. When using wood motor mounts with blind nuts



you can get away with a little misalignment due to the bolt hole being oversize for the blind nut to begin with. However, when using one of the aluminum radial motor mounts there is no lee-way for error. If the holes are not correctly located you have no other choice than to rework the holes in your engine. I get many of these "reworked" hole jobs in every month during the normal course of repairs. Some are real beauts. Holes big enough to use a 1/4" bolt. Oversize holes such as this do not give the mounting screw a good seat and it, in turn, keeps coming loose. Then the lousy screws are blamed, the no good engine for vibrating so much, etc. Modelers seem to have a great reluctance to put any blame on their own goofs.

The Prather drill jigs sell for $4.98 and are available for all of the more popular engines. This is a life time tool that can be used to drill thousands of holes and will pay for itself many times over. It is a must for the pylon fliers. With the popular mounts running $8.00 – $15.00 there is great sorrow if a hole is drilled wrong and the engine does not fit. I have shed a few tears over the years myself. The Prather drill jig pays for itself the first time it keeps you from goofing one of the expensive pylon motor mounts.

* * * *

Our first letter this month is typical of many I receive in that the writer has a problem with which he wants help but does not give any of the necessary information for me to have something to go on. I am naturally withholding the writer's name to avoid any embarrassment but I am running the letter to give you an idea of what I am up against.

Dear Mr. Lee,

I recently purchased an O.S. Max .30 and installed it in a Falcon 56. After a proper break-in and a lot of frustration I could not get the engine to idle correctly. The engine will idle with the clip connected to the glow plug but when disconnected the the engine dies out. I have adjusted the needle valve and air screw but still get no results. Also the spray is located in the correct place (the hole in spray bar). I would appreciate any advice you could give me to help get my engine to idle.

The things missing here are the type of fuel being used and type of glow plug. The writer's problem is more than likely due to a cold fuel – most likely home brew or a non-idle bar glow plug. So the first thing to do here would be to install either a K & B or Fox idle bar glow plug. If the writer is using a home brew fuel he should try one of the medium nitro range com-

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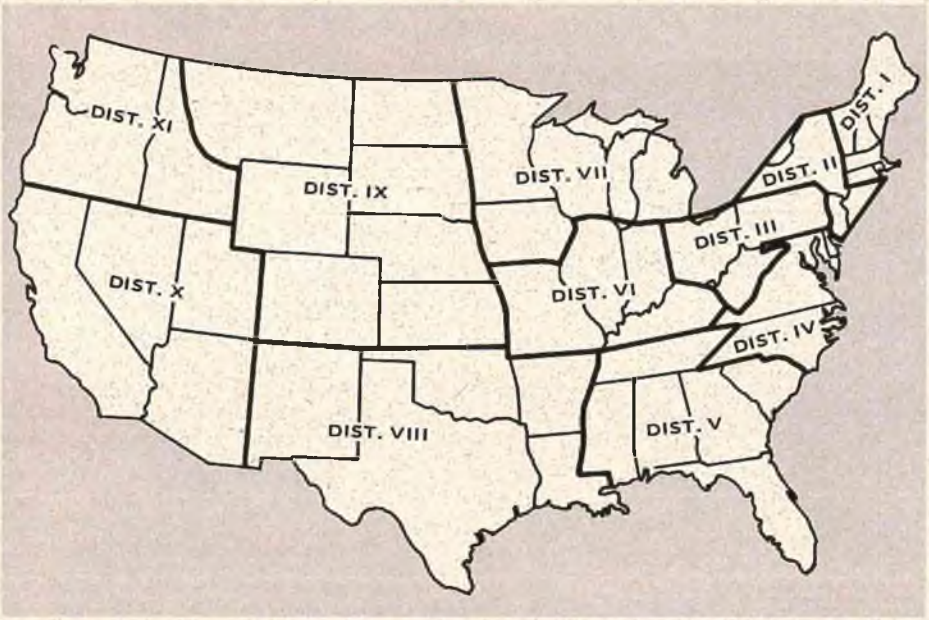
SOARING

BY JIM SIMPSON



● Well here it is 1974 and still mid-Winter for most of the USA at the time of this writing but by the time you read this it will finally be spring and hopefully you will be ready to fly those brand new sailplanes you've worked so hard on all Winter. To make things easy for you I'm going to start this column with a quick review of the national organizations available to you, the Soaring enthusiast. Then we will move on to products and from there to whatever you dictate.

First off there is the AMA R/C Soaring Advisory Committee (commonly called SAC) which is constituted of individuals appointed by the respective AMA Vice Presidents. The SAC members are responsible to AMA President, John Worth, through the Vice Presidents on all R/C Soaring matters. Therefore, they are your "man in government." Find your representative in the list below and write him a postcard with you name and address on it so he knows you're there and where to contact you. In other words stand up and be counted.

SOARING ADVISORY COUNCIL

I: Richard Jansson, 6 pine Street, Wellesley Hills, Mass. 02181.

II: (unavailable at this time).

III: Fred Collins, 29 Steward Ave., Pittsburgh, Penn. 15227.

IV: Carl Maroney, 3107 McComas Ave., Kensington, Maryland 20795.

V: James Davidson, 8013 Craigmont Rd., S.W. Huntsville, Alabama.

VI: Neil Liptak, 325 O'Neal Street, Joliet, Illinois 60436.

VII: (unavailable at this time).

VIII: Dale Nutter, 2498 E. 49th, Tulsa, Oklahoma 74105.

IX: Jim Simpson, 2736 Elsworth, Omaha, Nebraska 68123.

X: John Donelson, 16162 Littler Dr., Huntington Beach, California.

XI: (unavailable at this time).

The next national organization available to you is the League of Silent Flight. This well established organization just completed an election and the following news release says it all much better than I can.

PRUSS HEADS NEW
LSF ADMINISTRATION

Santa Clara, California, 31 Jan. 1974 – Dan Pruss, Plainfield, Illinois, has been elected president by the worldwide membership of the League of Silent Flight. Pruss, LSF/060, with other officers of the new Executive Board will serve a two-year term, 1974 and 1975.

Barbara Henon, LSF/250, Pacific Palisades, California, is the new vice president; John Neilson, LSF/240, Chicago, is secretary; Hugh Stock, LSF/134, Saratoga, California was re-elected treasurer. Walt Good, LSF/063, former vice president, will continue to serve as European coordinator.

Don Clark, Election Board chairman, noted an unusually high level of interest in the recent voting. Ballots were received from throughout the United States and from most of the other 13 nations currently represented in the League.

Almost 900 R/C soaring sportsmen have earned lifetime membership status in the organization. Predictions based on growth to date indicate that the Pruss administration will register member number LSF/2000 by the expiration of its term on 31 December 1975.

The League of Silent Flight was founded in 1969 to provide collective identification for the active radio control soaring enthusiasts of the world. Its famous Soaring Accomplishments Program recognizes individual proficiency and achievement through documentation of standard performance criteria.

The LSF is an association of and for individual sportsmen. It is not a club, but rather a program. Participation neither conflicts with, nor requires, club membership. However, many clubs have found that group participation in the LSF can excite new interest and bring new growth.

Membership in the League can only be earned. There are no dues or fees. To become a member, one must first register their intent to participate with the League's Executive Board, and then fulfill the requirements of Level I of the Soaring Accomplishments Program. All serious R/C soaring sportsmen and sportswomen are invited to associate with the League.

Correspondence with the LSF should include at least 25 cents in stamps or coin. For expeditious handling, direct correspondence to The League of Silent Flight, P.O. Box 39068, Chicago, Illinois 60639. The League's permanent address is Box 2606 Mission Station, Santa Clara, California 95051.

Let me just add one comment to this release. Prior to the Toledo Show I chanced to talk with LSF Secretary, John Nielsen and he assured me the LSF membership is 930 and rising. All the people I know who fly R/C Sailplanes assure me they each know at least two people who also fly R/C sailplanes but who are not members of the LSF. Why not? It's free. So Stand up and be counted here too. Let's try to exceed that goal of more than 2000 by the end of 1974 not 1975. You'll find it easy to join, just sign your name to the statement printed with this column and send it along with 25

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DECLARATION OF INTENT

NAME _____

ADDRESS _____

_____

AMA LICENSE # _____

FCC LICENSE # _____

Statement:

I, (_____), 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.

(signed) _____

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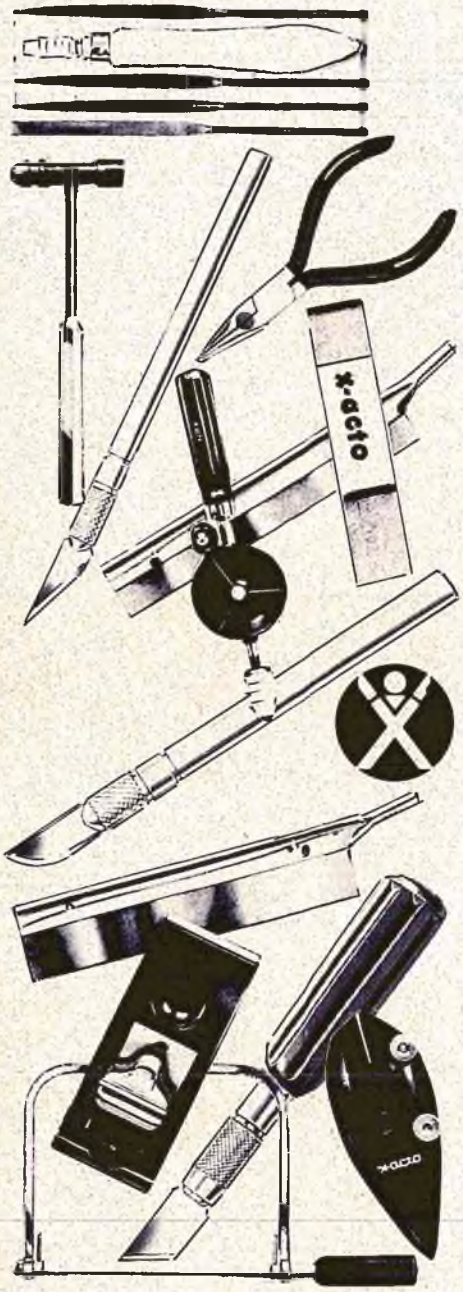

Whether you're just starting out as a hobbyist or you've been a serious craftsman for years, you're sure to own X-ACTO knives and tools. They're precisely-made and precision-balanced to help a hobbyist finish models with a professional touch. X-ACTO... it brings out the perfectionist in you.

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NOTES ON THAT FIRST FLIGHT

BY R. TENEAU

Flying looks easy – until you try it. And when you talk to the guys with the transmitters in their hands it sounds easy. And when they show you how it works – it seems so simple that a slack-jawed three-toed sloth could handle it with enough smarts left over to solve the energy crisis and change several pounds of lead into gold.

In reality, as we all know, flying radio control is a lot like trying to balance a ping pong ball on a wet noodle.

Now I'm not trying to scare anyone out of trying the hobby, but let's put everything in proper perspective.

You've spent weeks painstakingly constructing "the ultimate trainer." You've mastered balsa wood, epoxy, gas tank fittings, servo linkage and a whole batch of other stuff. It's finished and it's gorgeous. More important all the controls work correctly. You checked it out with your personal instructor (the one your wife says might as well move in).

Now you're ready for the "moment of truth." You've made all the right moves. You've arranged to meet the best flyer in your state at the field and he's agreed to be both test pilot and instructor. Everything has been checked out. The radio works. The engine has been broken-in. The time is now.

As you load everything in the car you're filled with a combination of excitement and foreboding. The drive to the field is nerve racking. With your precious cargo aboard, you're conscious of every stop, start, and turn. You might as well be driving an ammo truck behind enemy lines!

You finally arrive and unload. Everyone you've ever seen is there. And they all stop everything and watch as you put the new bird together. As you do, you discover that your fingers have multiplied like rabbits. There must be ten or twenty on each hand.

Your pilot walks over. He was a normal guy only last week. Now he's ten and a half feet tall. Together you range check it, control check it, re-check it. Everything is normal except your nerves.

You try to start the engine but after twenty flips your test pilot leans down and casually connects the lead to the glow plug. You smile weakly feeling like a baboon. With one deft flip he starts the motor. You stand there examining your left toe.

He adjusts the engine, picks up the control box and moves to the flight line. You suddenly feel that your beautiful creation is too precious to actually fly. It should be placed under glass and exibited as an example of modern sculpture.

Your throat feels like wet sandpaper. The test pilot cruelly jams the throttle forward. Wide open. Four hundred thousand dollars worth of model airplane starts to move. You can't help wondering if it will take an operation to remove your heart from your mouth.

Faster and faster. Then lift-off! It's flying! Actually flying! Wait – it's banking to the right. You lean left. Your pilot is right on it. The plane straightens. You straighten. Then a lazy left turn as he climbs out to about two hundred feet. You relax a little as he trims it out.

He's got it tamed. "Look, hands off." He takes his hands off the controls. It keeps on flying! Straight and level. You just stand there and smile nervously. "Let's see what she'll do," says the pilot. "Yeah," you mumble without being heard.

A loop – a roll – an Immelman – you can hardly believe you are the genius who built such a marvel. He brings it by low and you suddenly realize how Orville and Wilbur must have felt.

"You don't have to fly it at full throttle," the pilot says as he chops the power by half. The plane slows down to a walk. "Let me show you how to do a turn," he suggests. You watch . . . straining every memory cell. A little left . . . a little up and a little right to straighten it up. "You try it," he says and hands you the transmitter.

An amazing thing happens. As the transmitter touches your hand . . . the plane speeds up. It's moving at least twice as fast as it was. And you haven't even touched the throttle control. Your instructor grins, "I'll be right here." You move the stick left. A little, you think. The plane zaps over 90 degrees. You feed it a little up. She comes around like a racer. You try some right . . . she straightens out . . . thank goodness. But your hands are shaking. And your knees want to quit

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BY KEN WILLARD

Remember when you were a kid and started racing - - - skates, bikes, and as time went on, cars, boats, and for some of you, even airplanes. But it was getting too expensive - - - - so you tended to stifle the desire to race. Said you really weren't interested but if there was a model that you could race, you would. And did. And that's where the concept for the Hot Dawg came from - - - - a quick and inexpensive to build and maintain Half-A Racer. Let's race - - - -

HOT DAWG

"Race you to the car!"
"Race you to school!"
"Race you home!"
"Race you to Johnnie's!"

Remember when you were a kid? How much fun it was to "race" anywhere, with anybody? And all you had to do was run faster.

When you started racing with equipment – skates, bikes, and as time went on, cars, boats, and for some of you, even airplanes. But it was getting too expensive – and in some cases, too dangerous, so you tended to stifle the desire to race. Said you really weren't interested. But if there was a model that you could race, you would. And did.

But even models have a way of getting too expensive. This, of course, is relative, but not too many modelers can afford the sophisticated equipment used in Formula I R/C racing – and those who can have trouble finding the time to build one.

So, as equipment became available, racing of small R/C models has become entirely practicable. The 1/2A engine puts out all the power you need, and a two channel radio gives you all the control you need.

But how about the time to build?

That's where the Hot Dawg concept came from. It seemed to me that if a racer could be put together in a few hours instead of a few weeks, it would have an extra appeal to the modelers who only have a limited time for building.

After watching a couple of 1/2A races, I noted that those with foam wings seemed to be pretty competitive, and I knew from some experiments that I had made with Ace foam wings that they were strong enough to take the G loads of those pylon turns. So wings would be no problem.

How about the fuselage? For fast building, it should be a slabsider. But they don't look streamlined – even though for 1/2A racing they are fast enough. So, let's compromise - - - make a slabsider, with triangular stock for longerons, then round the corners and fool the fuselage into thinking it's sorta' oval. And, by keeping the lines straight from nose to wing on top, nose to landing gear on the bottom, then straight back from the wing and the landing gear to the tail, but at a different angle, you don't notice the break in the lines, and a pleasing appearance results. Since the lines are straight, though, it's easy to glue the triangular stock to the sides without resorting to a lot of pins to hold things in place.

Sheet balsa for the tail surfaces. Can't be simpler.

A Kraft or Tatone mount for the 1/2A engine, bolted on the front; Hallco landing gear with Veco wheels; plenty of room for whatever radio you prefer. Finish with your favorite material. About ten hours work, and – Hot Dawg!

For what they are worth, here are a few thoughts on the design concept for the aerodynamic viewpoint rather than the structural aspect.

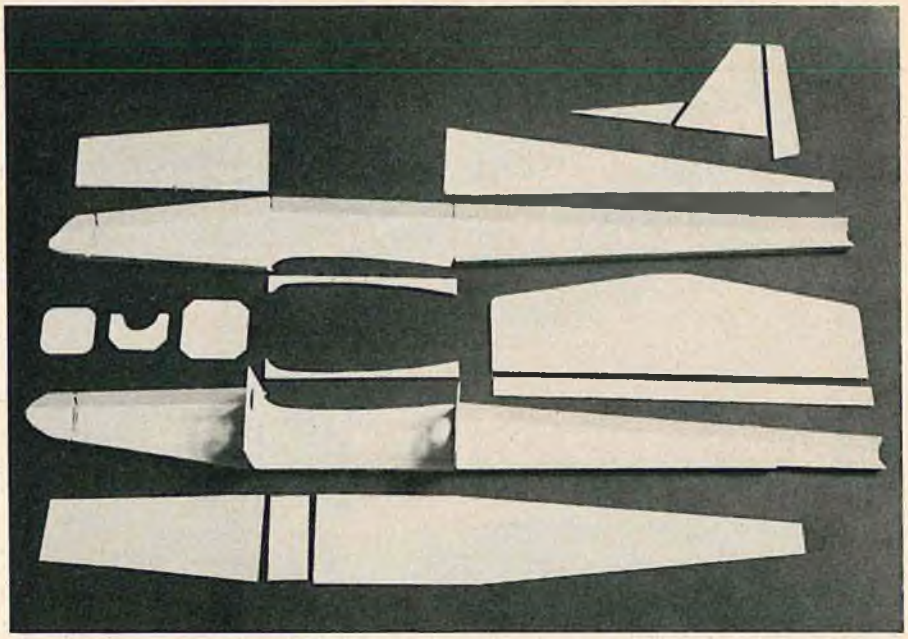
First, the long nose comes from comments I've heard experienced racers make to the effect that the long nose seems to help a racer "groove" on the course.

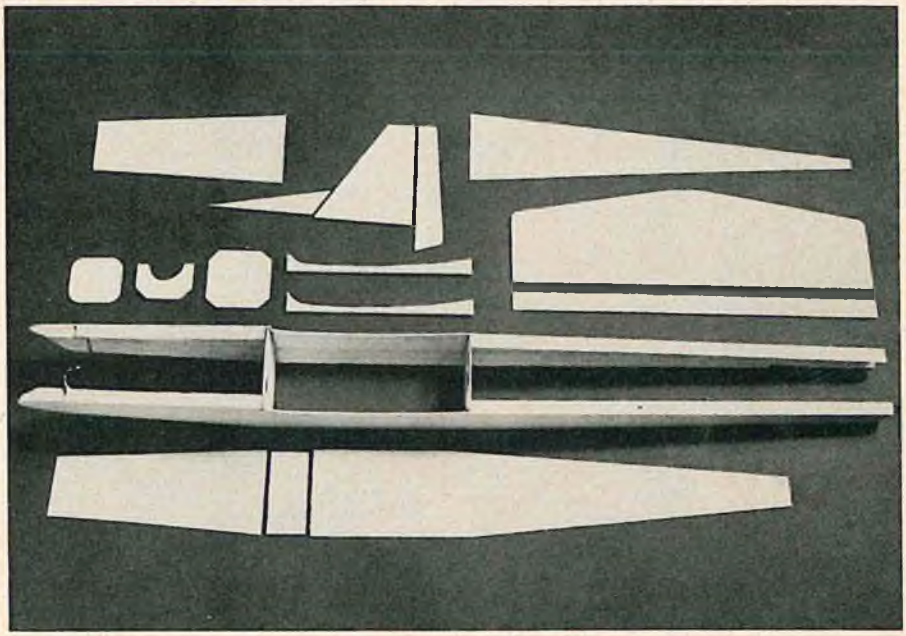
Second, the location of the stab on the bottom of the fuselage is something I've been doing for many years. Long ago I found out with a design called "Breathless" that if I put the stab on the bottom, it was hard to stall and very hard to spin, compared to a design which was identical except for having the stab on top of the fuselage. This tendency was very noticeable when rudder action was full throw or neutral, rather than proportional as we have now. So, maybe it isn't really important any more. But for smooth turns I still like it.

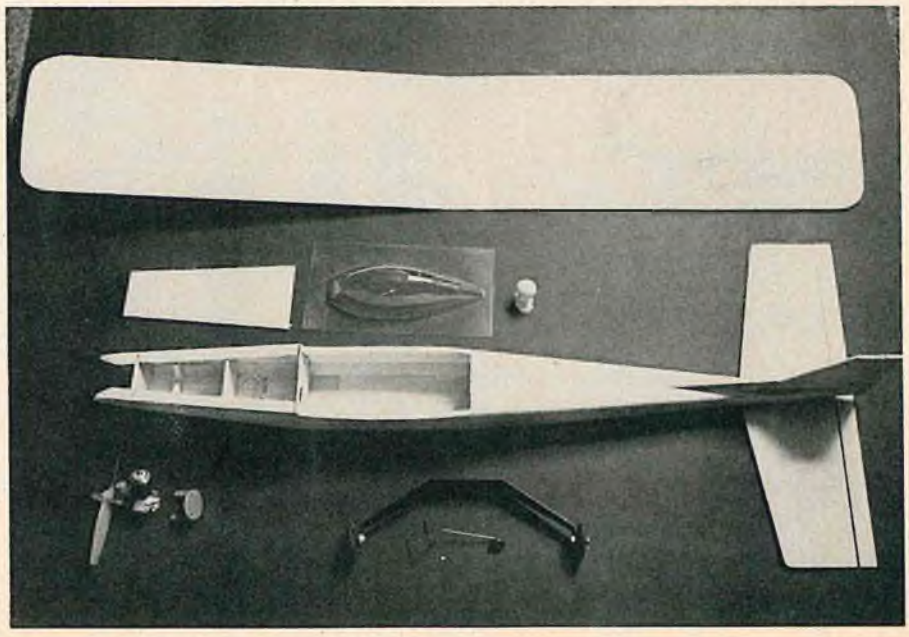
Third, the unusually high tail wheel strut makes the model sit on the ground more nearly level, and helps to keep the take-offs from getting "squirrely."

Fourth, using rudder and elevator control, with dihedral to induce the bank, is a combination of structural and aerodynamic factors. Structurally, you don't have to figure out an aileron linkage – or repair it after a crash (and there will be crashes). With a proper match of fin area and dihedral, the aerodynamics are such that the turns are just as smooth as ailerons would provide.

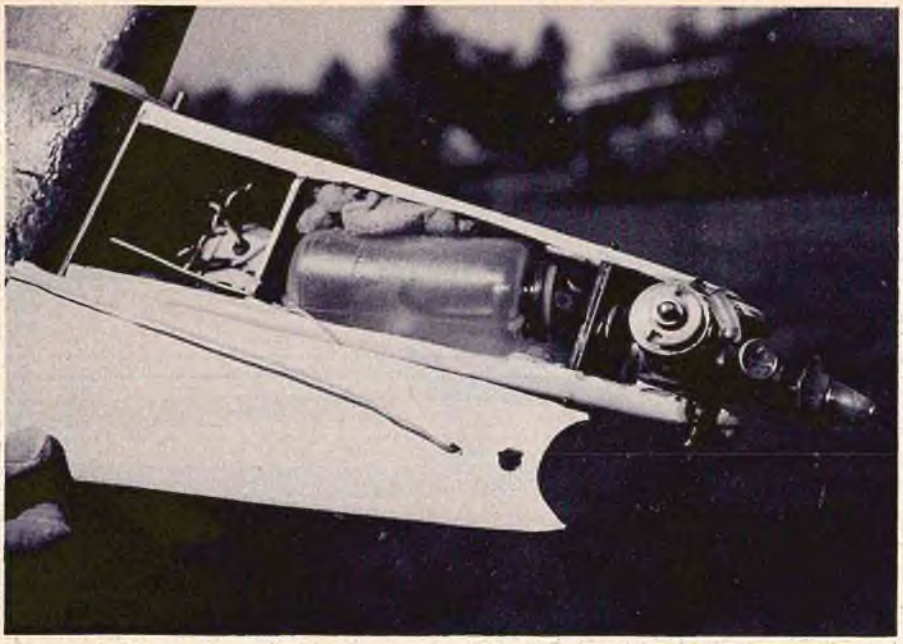
Speaking of dihedral, Paul Runge of Ace is stocking a special set of wings, called the Sunday Wings, which have exactly the right amount of dihedral pre-cut in the tips of each panel. All you need to do is butt join two panels at the center with epoxy and the







Top construction photo shows slots at break points in triangular longerons to accept bulkheads. Middle photo shows 'kit parts' and semi-completed fuselage. Photo at right shows principal parts of entire aircraft.



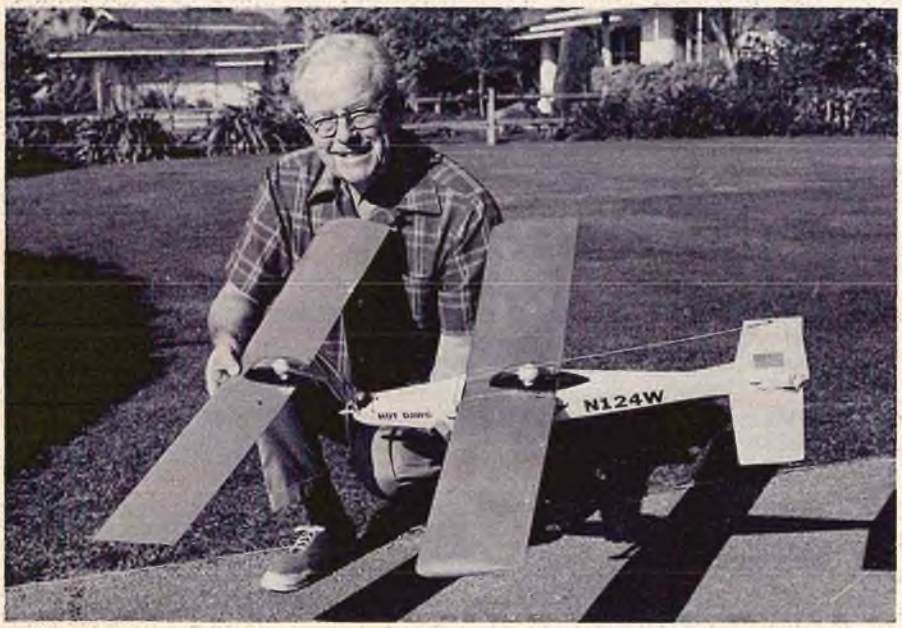


Photo at left shows top front of fuselage including tank and battery compartment. Note cut-outs to accommodate fuel line and needle valve. Antenna comes forward from receiver and doubles back. Center photo shows author with two wings – the extra wing reshaped as described in text. Lower photo shows Chief Sunday Flier with Sunday Racers.

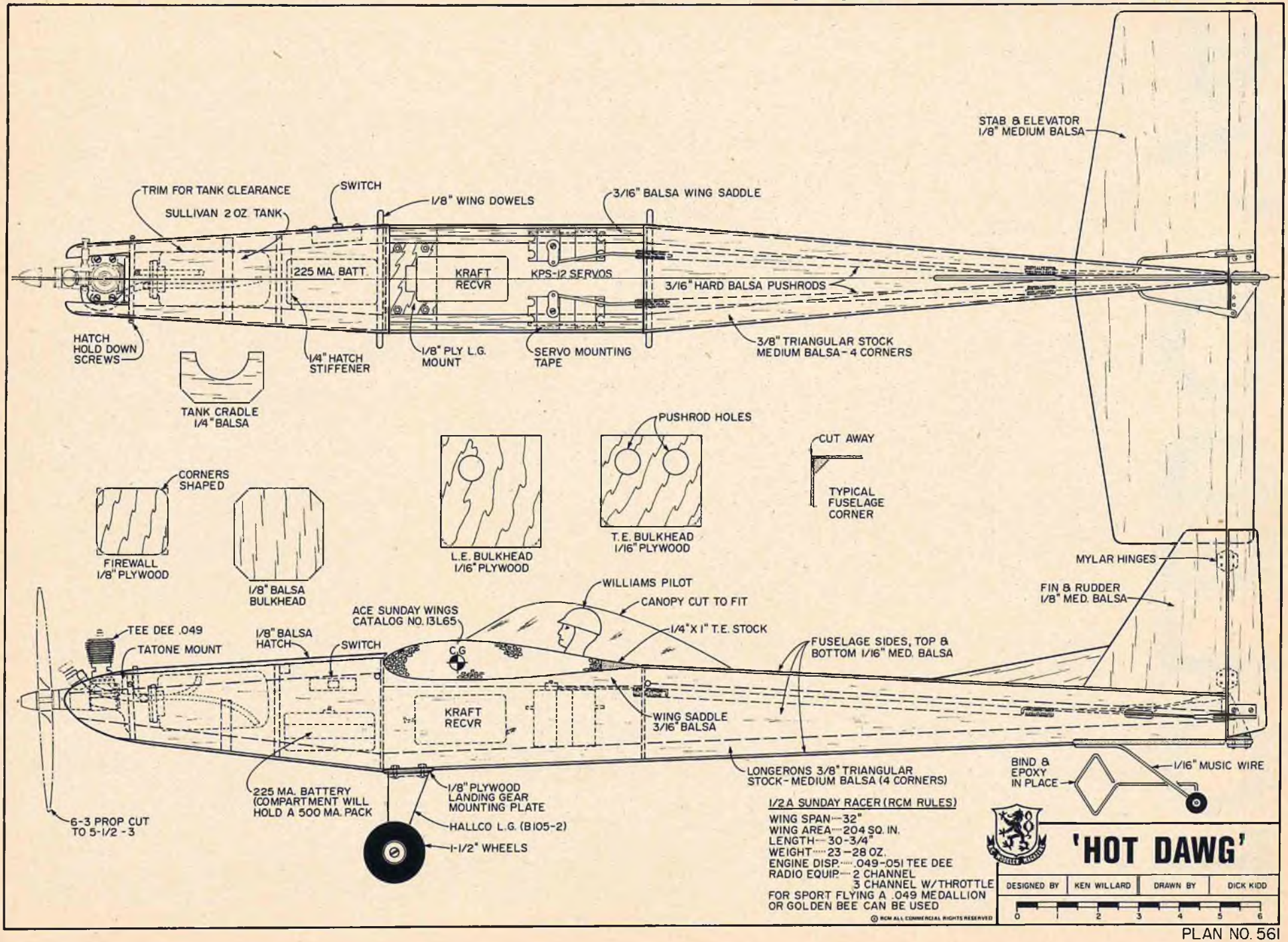
dihedral is pre-set for you. Incidentally, when you do this, you'll find a very slight difference in the airfoil section. When joining the wings, align the bottom curve. This will assure uniform incidence in the wings. The small discrepancy along the top of the airfoil isn't noticeable anyway after the canopy is added. And you must add the canopy. Otherwise the model doesn't meet the specification of 8½ square inches cross section.

Another nice thing about the Ace Sunday Wing sets. For $6.50 you get two sets of wings for the Hot Dawg. Ask for Catalog No. 13L65.

I made some interesting tests with these wings. In my first race with the Hot Dawg, it was apparent that the model was slower than some of the specially designed bombs. That bothered me. So, I put together another wing, but this time I used a razor plane and reshaped the wing airfoil – being careful to maintain the required 7/8" thickness, but sharpening the leading edge curvature. Then I covered the wing with Solarfilm,, which doesn't have to be heated quite as hot as MonoKote for shrinking.

With this specially built wing – which took several hours to make – I went out with my friend Bob Andris to make some comparative speed tests. He has an audio tack that reads rpms in the air. The results? At 19,500 rpm there was no difference in the speeds attained by substituting the streamlined and glossy wing! However, on one run, the engine sagged to 18,000, and the speed dropped eight mph. Now I knew why my Hot Dawg looked slow its first time out - - - because at that time I had an engine which only turned 17,000. Conclusion? Within reasonable aerodynamic streamline design, optimizing the re-

to page 119



1/2 A SUNDAY RACER (RCM RULES)

WING SPAN---32"
WING AREA---204 SQ. IN.
LENGTH---30-3/4"
WEIGHT---23-28 OZ.
ENGINE DISP.---.049-051 TEE DEE
RADIO EQUIP.---2 CHANNEL
3 CHANNEL W/THROTTLE
FOR SPORT FLYING A .049 MEDALLION OR GOLDEN BEE CAN BE USED

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'HOT DAWG'

DESIGNED BY	KEN WILLARD	DRAWN BY	DICK KIDD

0 1 2 3 4 5 6

PLAN NO. 561

TOLEDO '74

BY BERNIE MURPHY

Photos by Bernie Murphy & Jim Simpson

Almost everyone associated with the radio control hobby must be aware of the "Toledo Show." Those few who aren't, probably have just joined the RC ranks, and are more concerned with learning the techniques of building and flying.

Each year, for the past twenty years, the "Toledo Show," or more properly the Toledo Radio Control Conference, has provided a meeting place for interested RC'ers. From a rather meager beginning, in the Detroit Golf Club in 1955, as a joint meeting between the Toledo Weak Signals and the Detroit RC Club, the Toledo RC Conference has grown to be the largest gathering of RC'ers in the world.

The continual growth of the "Conference" necessitated changes in both location and format. Its address can be traced from the original Detroit Golf Club, to a Detroit funeral home! Then to the Trailby Log Cabin. It was at the Log Cabin, that the name Toledo Radio Control Conference was adopted. The Conference moved on, occupying the Miracle Ballroom, then the Sunnydale Golf Clubhouse; each time moving to keep pace with the ever increasing numbers attending, now reaching an almost unbelievable attendance. Realizing the possibilities in being able to reach a large group of interested RC'ers at one time, five or six manufacturers attended, obviously bringing along their latest products and ideas. Another move, this time to the Champion Spark Plug hangar, at the Toledo Airport. After a brief two year stay, the Conference was once again moved in 1965; this time, to the present site at the Lucas County Recreation Center. With each move came more manufacturers, higher attendance and, of course, more work for the Weak Signals members.

Along with the moves and growth, there has been a slow but steady change in the theme of the "Conference." Originally conceived as a conference, where RC'ers would meet to discuss their hobby, show off their latest creation, listen to invited "experts" explain the workings of the then complex control systems, and hopefully solve a few of the inherent problems. Through the years the Weak Signals have attempted to preserve this idea, though, with the sophisticated equipment currently available, there are few problems left to discuss. There is, however, plenty of opportunity to display that latest project and, hopefully, win a treasured trophy. There are also unlimited opportunites to meet others who share your interests. The Trading Post, which is probably the largest in the world, offers a chance to buy or sell almost anything associated with the hobby. Many of the items which have not been sold on Saturday, find their way into the Saturday evening auction along with many other goodies brought for the occasion, and many happy RC'ers return home with a newly acquired treasure.

To this, the manufacturers have added a Trade Show atmosphere. Over one hundred and ten RC oriented outfits displayed their latest wares at this year's Conference. Some displays included prototype equipment or kits, shown here for the first time in order to sample the potential buyers reaction. Here the manufacturer has an opportunity to see first hand whether his new offering will succeed or fail, before investing a large sum of money in production. Often a widespread acceptance will promote quicker production, or a larger run. It is for this reason that most new products are first shown at Toledo.

The Toledo Conference, where manufacturers exhibit new products, sample potential buyers reactions, and where the hobbyist has a chance to express his feelings, pro or con, on any product. Truly, the greatest RC Show on Earth.

On the other side, the RC hobbyist has a chance to express his feelings, pro or con, on any product. The industry representatives are most receptive to questions and opinions. There is no place in the world where you can talk to so many of the people who make up the RC industry under a single roof. If you would name ten industry names, it is probable that at least nine were present at Toledo, and each with time to listen to YOU!

A weekend spent at the Toledo Conference is a busy one. Just trying to see and absorb a small portion is a huge task. To simply spend ten mintues at each display would require about twenty hours! Add this to the time spent in the Trading Post, Auction, the flight demonstrations being held outside, or just a bull session with an old friend and you have a full and total weekend.

Our picture story is not intended to show all that is promised, nor is it designed to picture each and every participant – it is merely a sampling of "Toledo," and an invitation to YOU to plan ahead toward next year's Conference, the largest and possibly the most important event on any RC'ers calendar.

The Toledo Weak Signals Club, through their sponsorship of the Conference, continues to make an enormous contribution toward the furtherance and promotion of the RC hobby. Certainly everyone with an interest in RC owes a debt of gratitude to the members of the Weak Signals Club. Since the Conference is a group effort, we hesitate to single out individuals. We would, however, especially like to extend our congratulations and thanks to the Conference Directors, Don Belote and Bob Hisey for a magnificent, smoothly run RC happening.

The models entered in competition were once again outstanding, and to all of the winners, our congratulations. A special well done is hereby extended to Jack Perry, of the Weak Signals, whose Dazzler version of a Mach I won the RCM Trophy for "Best of Show."

Success has again crept up on the Toledo Conference, and once more in 1975 it will be moving. Plans are already underway to stage next years Conference in the Toledo Sports Arena. This will mean a minimum of 50% more space. In addition, a change of date is being carefully considered in an effort to eliminate some of the hazards created by February weather in the area. As soon as all plans are firm, RCM will publish the information.

In any event, the Toledo Conference WILL be held (between February and April); it WILL be bigger than ever, and we WILL be there! We'd like to see YOU there too! Remember, it's the Greatest (RC) Show on Earth! □

ımona Schultz's outstanding P6E, completely finished with ɔnoKote. Unbelievable!

Larry DePaolis' immaculately detailed Winnie Mae.

ɔhn Werne's superbly detailed, award winning Du-Bro Hughes ɔ0.

Westcoast Product's beautiful F4 Phantom kit. New company from California.

ot new idea from Ace R/C - - - tiny .049 versions of the big ones!

Giant scale Piper Cub from Span Aero Products - - - - a real crowd pleaser.

A top line of sailplanes for sport or competition displayed by Airtronics.

Conference Chairman, Bob Hisey, congratulates Ramona Schul on first place award.

Latest from Big Frank is Midwest Product's Cardinal Squire.

John Werne with 1st place trophy for Hughes 300, best helicopt of show.

John Werne took 2nd with a Kavan Jet Ranger, also entered this beautiful Graupner Bell 212!

Windspiel Models attractive scale sailplane display.

ew Gazelle Aerospatiale, a Schlueter helicopter with collective itch.

Soarcraft's selection of sailplanes including the Centurion II.

Outstanding MRC-Kalt Bell 212 with working access door and collective pitch.

Sharon Silberhorn with Pat Crews and Bob Hisey, presents RCM Best Of Show to Jack Perry.

New Mustang from Southern RC Products - - - Beautiful!

Royal Electronic's 1974 line of proportional systems.

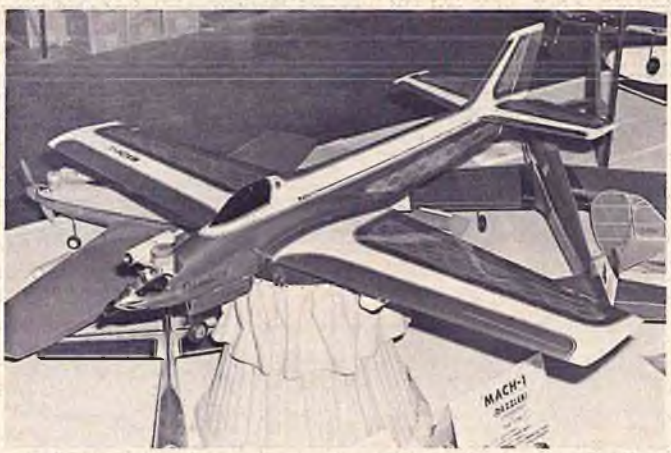
Fliteglas Model's F-51 Mustang.

The RCM Best Of Show Award.

The only Cherokee larger is built by Piper!

House of Balsa's quality kit line.

Dave Platt's phenomenal scale kits.



Jack Perry's Mach I 'Dazzler' – Best of Show.

Astro-Flight's electric Fournier RF-4.

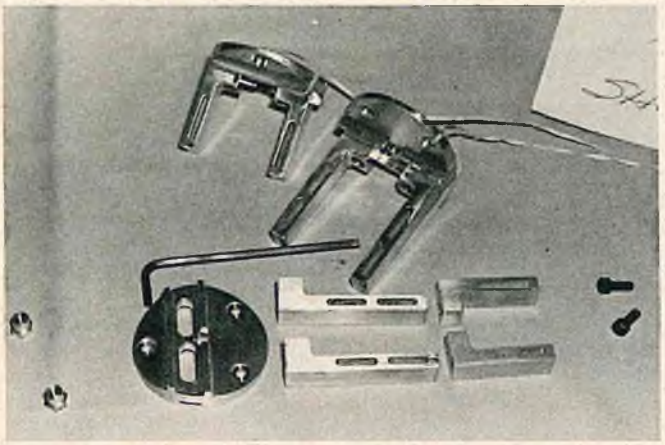
WW I pilots from Bill Miller's Studios.

This could be fashionable soon!

Futaba's digital proportional line.

Hobby Lobby's real quickie!

Heathkit - - -or did you guess?



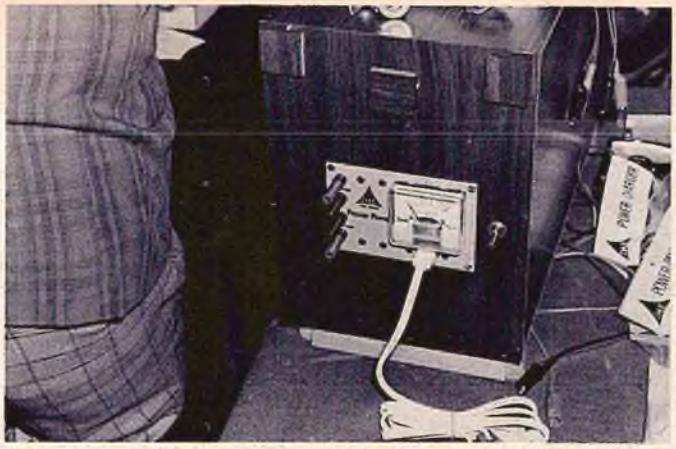
Adjustable Edson mount from Nelson Model Products.

Imported Rowan Boelkow chopper.

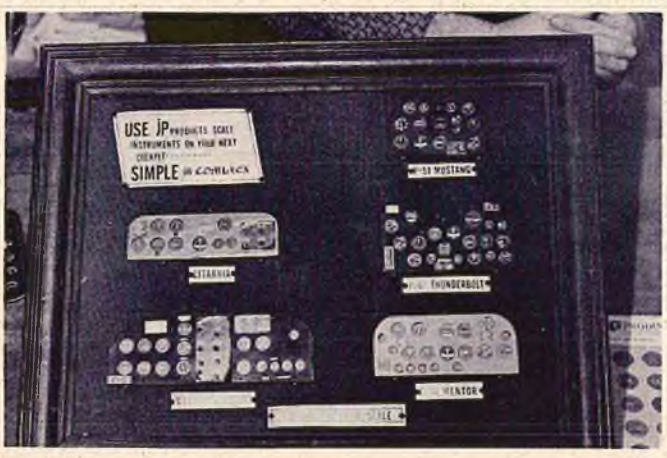
Ducted Phantom - - - - - ?

Indy Flite's expendable field caddy.

Nick Ziroli's Stearman from L.I. Hobbycrafts.



D A Enterprises complete power panel.



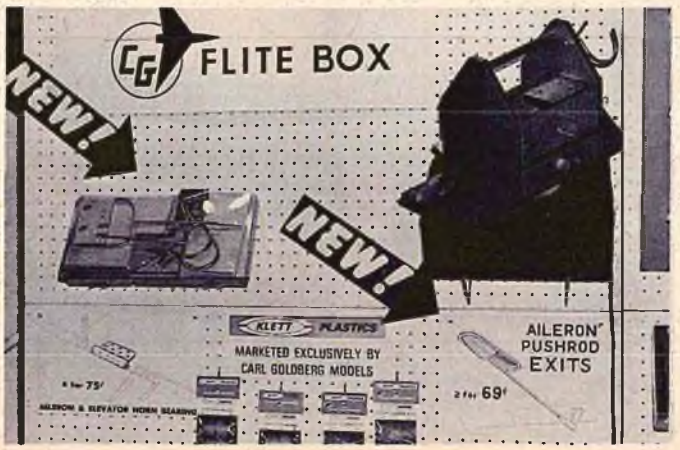
JP Products display of their instrument dials.

Prather Product's new RC Landsailer.

Jim Fosgate and Dick Penrod at Pro-Line exhibit.

Flyin' high over Reuther's Hobby World.

Top Flite's Stand-Off Scale P-47 Thunderbolt.



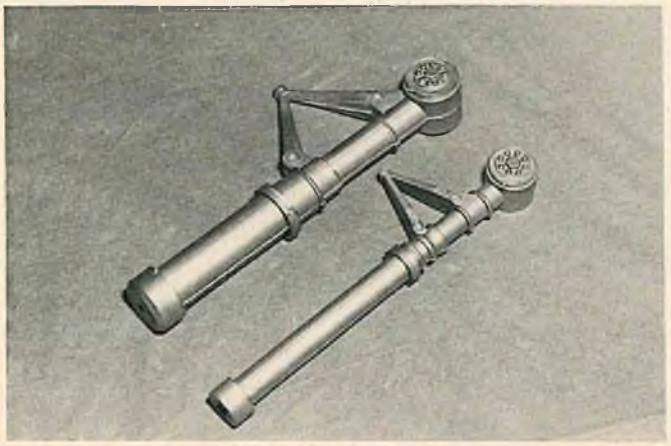
Carl Goldberg's display with new field box.

Bucker Jungmeister from Mini Flite.

Airborne Associates' exotic foam and fiberglass kits.

Newly kitted Strikemaster by Midwest Products.

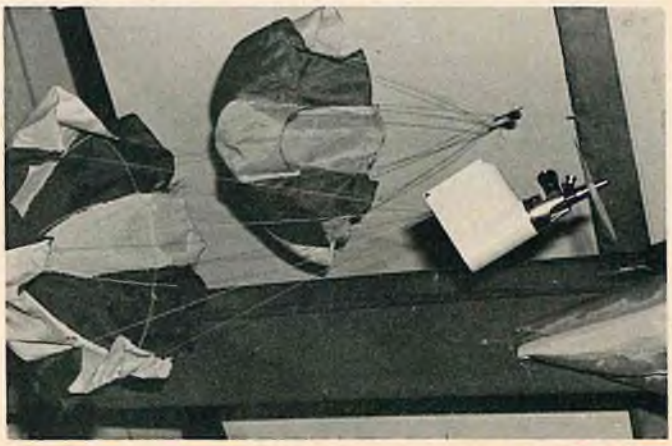
Hobby Shack's display of merchandise lines.



Robart's answer to covering up skinny legs.

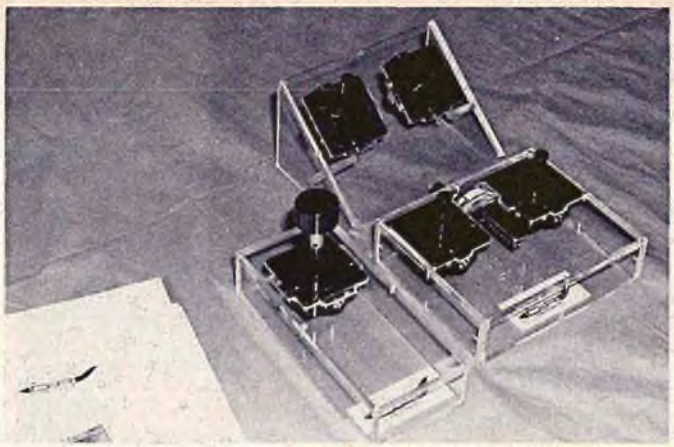
Sterling Model's new sport ship - - - - Gazarlator!

The K & S variety store!

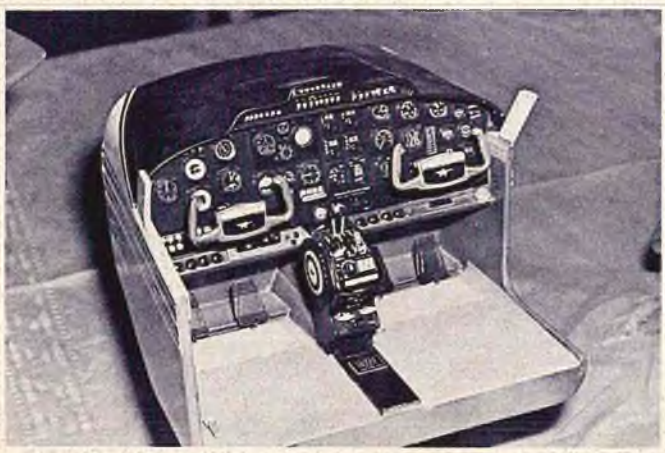


Perl-Pod – the latest in Hi-Starts!

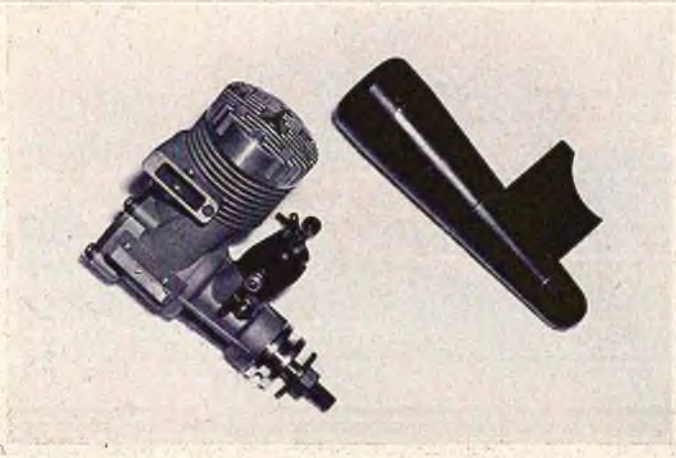
Thermal sensor for the serious soarer.



Control sticks from D & R – precision!

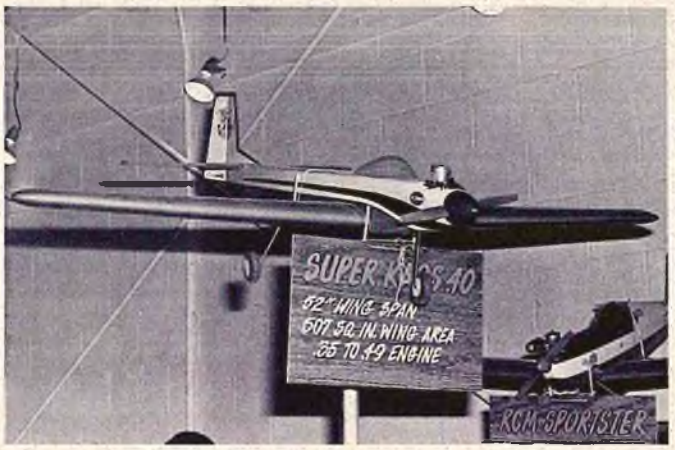


Aristo-Craft's mock-up scale cockpit. Wow!



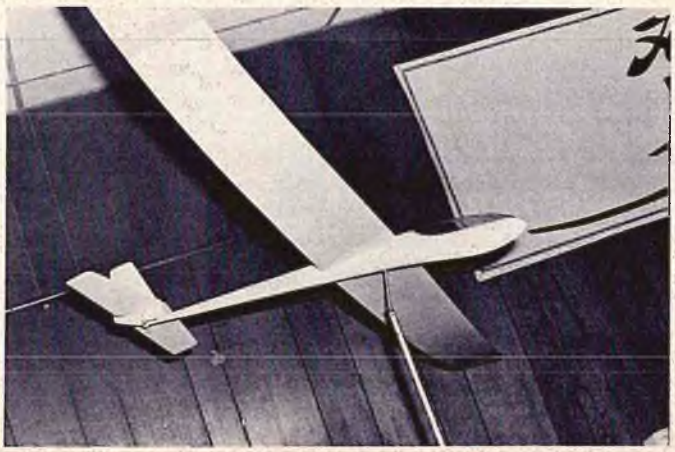
Kraft's new .60 prototype looks good.

World Engine's import the Sanwa system.



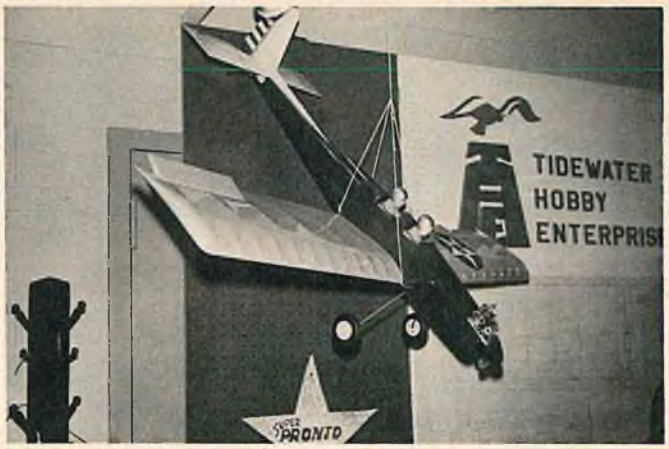
Bridl Enterprises' Super Kaos, Jr.

Franz Kavan and new .19 powered Alouette.

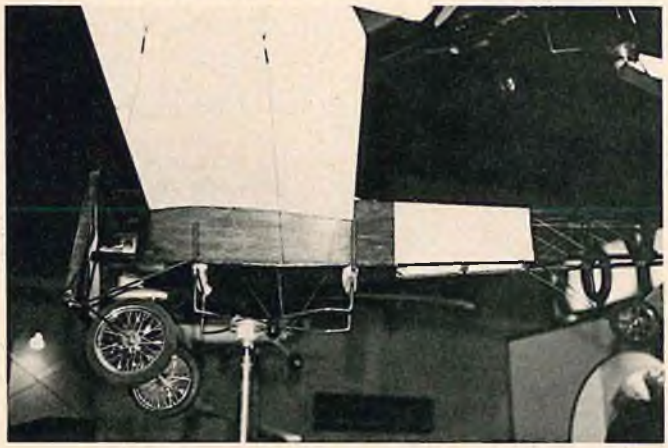


The Hobie Hawk – one of the hits of the show.

The ever-popular EK-logictrol exhibit.

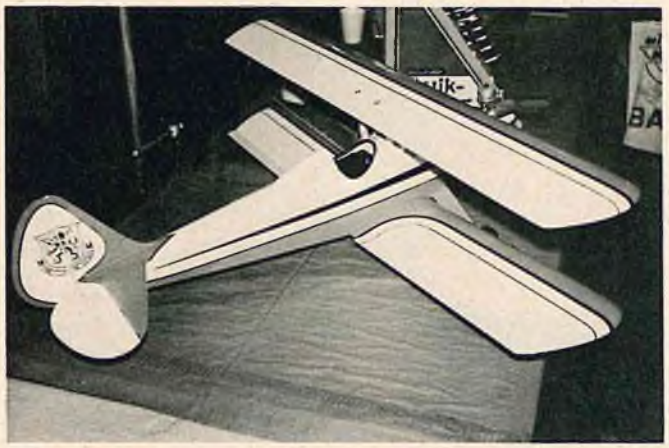


Tidewater Hobby Enterprises' Super Pronto.



Royal Products' magnificent new Bleriot kit.

How's this for realism?



Don Dewey's new .19 to .25 Mini-Wayfarer.

Jerry Nelson's Pitts for the NSPA.

Scale Skymaster – it's going to be popular.

John Simone, Jr.'s Kavan Bell Jet Ranger.

Part 1 of 2 Parts

BY BEN STRASSER, JOE BRIDI, AND DON DEWEY

Another reliable, good flying 60 becomes a reliable, good flying 40. An aerodynamic design that makes for slow, stable flying when you want it but, will loop, roll, spin, fly inverted, or . . . . The 40 size offers more economical flying, more convenient storage, and easier transportation to and from the flying field.

What goes into the design is only part of the story. What you make out of it is the other part. To get a good flying ship the parts must be cut and assembled correctly, accurately, and with care. Begin with a flat building board. When you glue a part in place, make sure it is properly aligned – and stays that way while the glue dries. Use pins, spring loaded clothespins, clamps, masking tape, elastic bands, spring loaded paper clamps, weights, blocks, or whatever you have handy that will do the job. When you use other than epoxy glues, double-double glue all of the joints. Put glue on both surfaces to be joined, wait a few minutes for the glue to soak in, apply a bit more glue, as necessary, and join the surfaces. When you use epoxy apply it to both surfaces before you join them.

When it comes to adhesives we recommend you use aliphatic resin glue, specially formulated for use in modeling work. In using this or any other glue, spread it thin. Except in some special cases, building glue up around the glue joint doesn't help at all. As a matter of fact, a blob of glue around a joint may actually keep the glue from drying properly and give you a weaker glue joint! Use a glue stick or rag to remove excess glue. It helps keep the plane a bit lighter, too!

The sequence we'll follow begins by putting the stabilizer together and installing the pine insert into the elevator and rudder. Then you'll work on the fuselage, which is built upside down on your building board. First the top block or fuselage top is built, then the sides and bottom are installed. Finally, the cabin front and read blocks and sides are glued in place and the rudder and elevator are hinged. Note that the nosegear is mounted on the engine mount – in holes drilled for that purpose.

With the fuselage completed, the wing halves are built, ideally on a wing jig to insure warp-free construction. The wing halves are joined, the center section is sheeted, and the center is glassed. Finally, the ailerons are finished and installed and you're ready for the final alignment. Finish it, install your radio equipment, check out the operation of the surfaces and have fun. Now that was easy, wasn't it? (See picture #1)

Time to get to work.

[ ] Your first job is to read through the entire construction procedure. That way you'll know where you're going before you get there. As you glance through it you'll notice that we put a box in front of each step. Check 'em off as you go. The check marks also make it easier for you to find your place as you read about the next step, do the work, read, do the work, and so on.

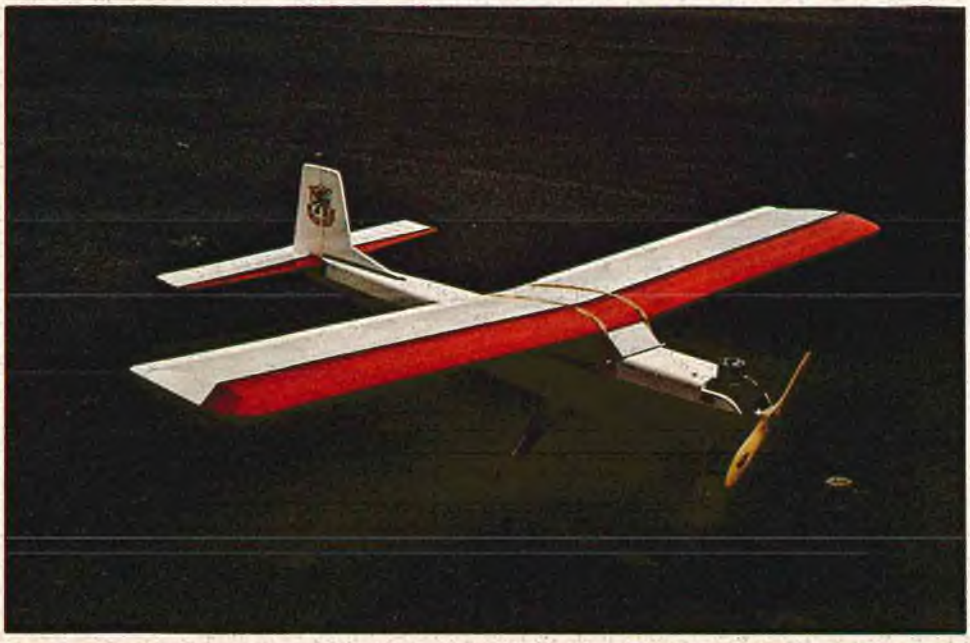
THE RUDDER, FIN, AND DORSAL FIN

[ ] Cut out the 1/4" sheet balsa RUDDER and PINE INSERT. (See picture #2)

[ ] Double glue and install the pine insert into the notch in the rudder. Do not glue the fin to the dorsal fin yet. They will be glued together later as they are glued in place on the fuselage.

THE STABILIZER AND ELEVATOR

The stabilizer (or more properly called the horizontal stabilizer) is the piece that sticks out of the tail of the fuselage sometimes incorrectly referred to as the elevator. The stab is permanently fixed to the plane and doesn't move up and down. The elevator is the part that moves up and down to make the plane climb and dive. (See picture #3) [ ] Cut out the 1/4" balsa sheet ELEVATOR and the PINE INSERT. [ ] Put glue on both the notched area in the elevator and the pine insert. [ ] After the glue has had some time to sink into the wood,



push the pine insert into the notch. [ ] Wipe off the excess glue and set it aside to dry. (It's a lot easier to wipe off the excess glue now than after it dries!) When you hinge the elevator later, remember that the pine insert is on the hinge line side.

[ ] Cut out the FRONT AND REAR 1/4" balsa sheet STABILIZER SECTIONS. [ ] Lay them on your building board to find which edge of the rear stabilizer sections best mates to the front section. [ ] Push the front and rear stab sections tightly together and put a piece of masking tape over the length of the joint. [ ] With some waxed paper or plastic kitchen wrap larger than the size of the stab on your building board, turn the stab over, fold the masking tape hinged joint open and apply glue to both edges to be glued. [ ] After you've given the glue some time to penetrate into the wood and have added additional glue, as necessary, fold the glue joint closed. [ ] Pin the stab down on your building board and remove the excess glue.

The horizontal stabilizer is finished, ready to glue to the top block at the right time.

THE FUSELAGE

[ ] Cut out the 3/16" sheet balsa top block, the 1/4" plywood bulkhead #1, the 3/16" sheet balsa bulkhead #2 and #3, and the 1/2" sheet balsa hatch.

[ ] Draw a centerline down the center of the fuselage top block, the bottom of the stabilizer and the top hatch, and vertically down the back of bulkheads #1, #2, and #3. [ ] Pin the fuselage top block down on your building board. (See picture #4) [ ] Add the 1/4" x 3/8" BALSA STRINGERS. The stringers should not go all of the way to the back of the top block. Line them up with the front end of the top block as you install them. Double glue and pin them in place. Wipe off any excess glue.

[ ] Locate the stabilizer by butting it up against the stringers. The stabilizer should extend beyond the end of the top block as shown. (See picture #5) Double glue the top block and stabilizer. Be sure to glue the leading edge of the stabilizer to the end of the stringers as well. For correct alignment the centerline down the center of the stabilizer should line up with the centerline of the top block. Put a couple of pins into the stabilizer/top block to hold it in place. Then double check the alignment before the glue sets up. Tie a long piece of string or thread to a T pin or straight pin. Stick the pin into the front of the fuselage top block right on the centerline. Use the string to make sure the distance is the same to both rear corners of the stabilizer. Adjust the alignment accordingly and leave it to dry.

[ ] Finish up the top block by adding the 3/16" x 1/4" x 3" CROSS BRACING between the two stringers at the front end of the top block. [ ] Cut the other 3/16" x 1/4" x 2" top block CROSS BRACING. Lay it across the top block inside the stringers near the front cross brace and slowly slide it down toward the rear of the top block. Mark the location where the cross bracing fits snugly between the stringers. That's where it should be located. Double glue it and pin it down to dry.

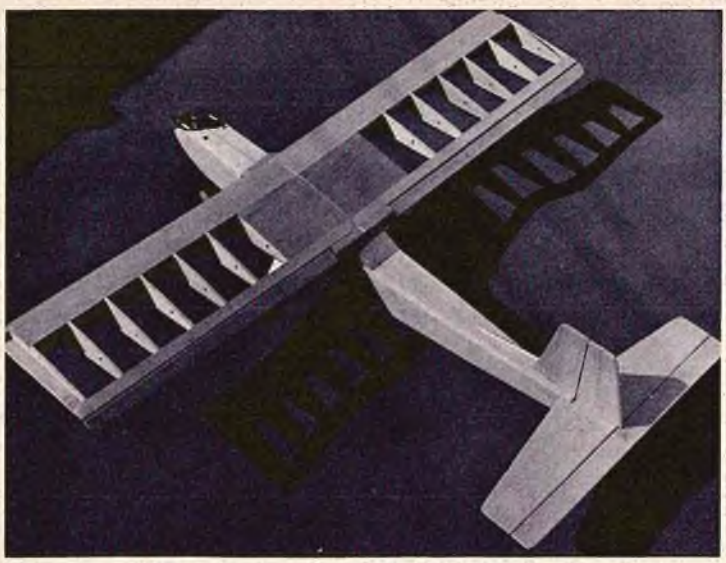
[ ] Finally, glue BULKHEAD #3 on to the top of the front cross brace, even with the front end of the top block and centered between the sides. (See picture #6) The centerline on the back of the bulkhead should line up with the centerline on the top block.

Use a square to assure the bulkhead will be at 90° to the top block and pin it in place.

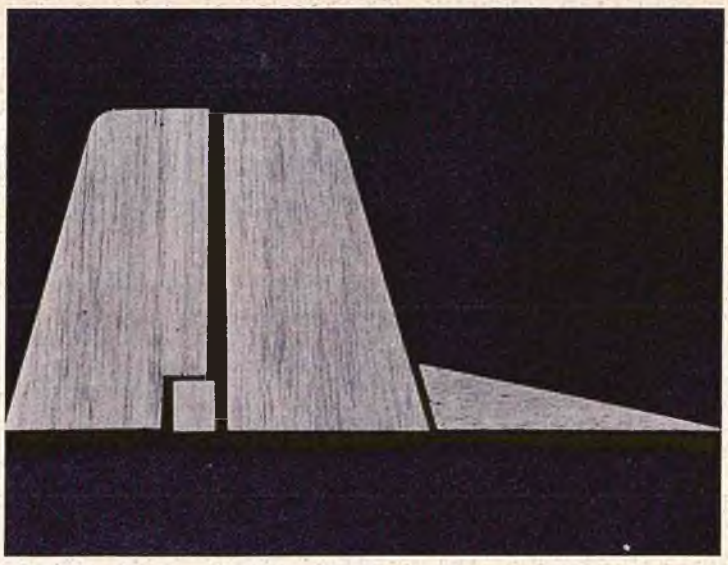
BUILDING THE FUSELAGE SIDES

Now to prepare the 1/8" sheet balsa fuselage sides (See picture #7).

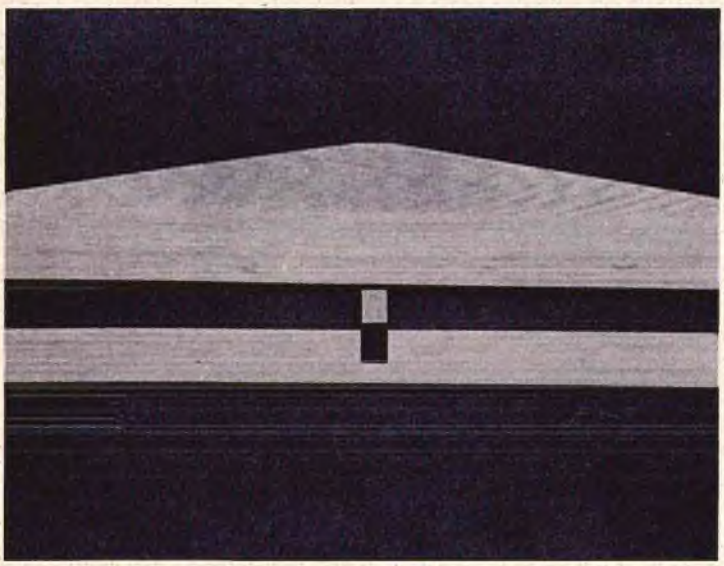
[ ] Cut them out as shown on the plans. Lay one side on top of the other to assure they are the same. If the sides are not exactly the same, remember that the crucial part is the straight side that serves to properly align the wing and elevator. Use a straight-edge



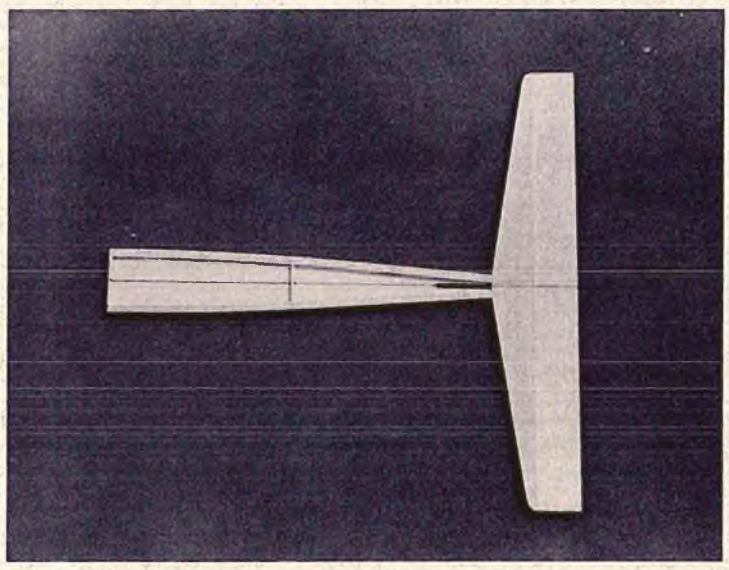
(1) The completed airframe, ready for finishing.



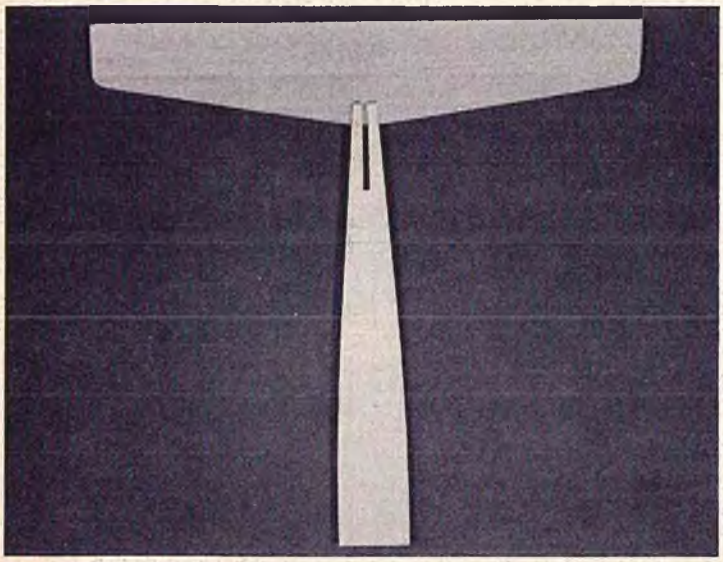
(2) The rudder, fin, and dorsal fin.



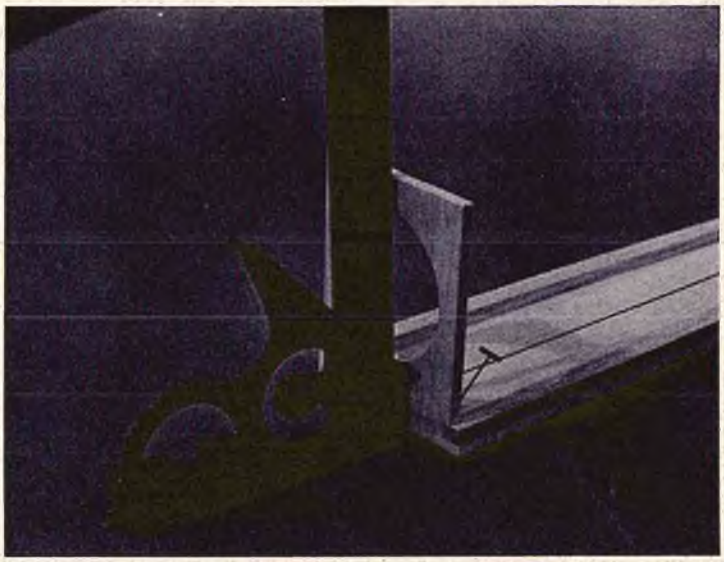
(3) The horizontal stabilizer and elevator parts.



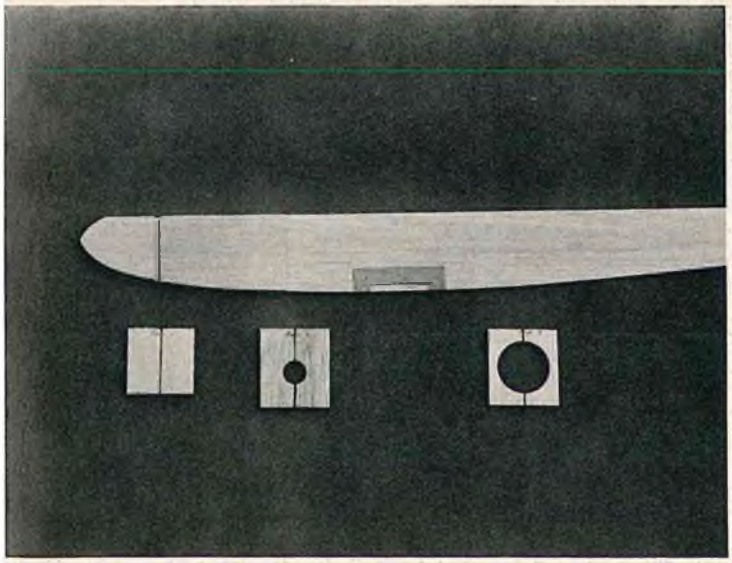
(4) The assembled top block ready for installation of bulkhead No. 3.



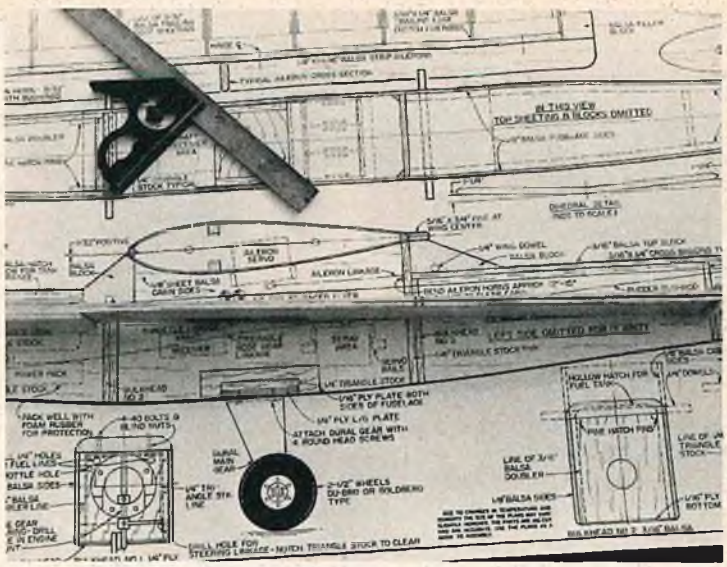
(5) Top view of top block showing stabilizer overlap.



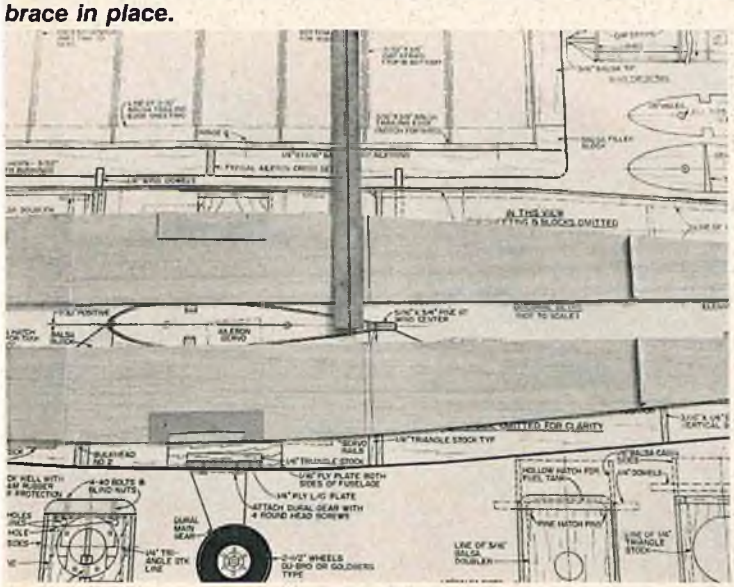
(6) Installing bulkhead No. 3 on to the top block.



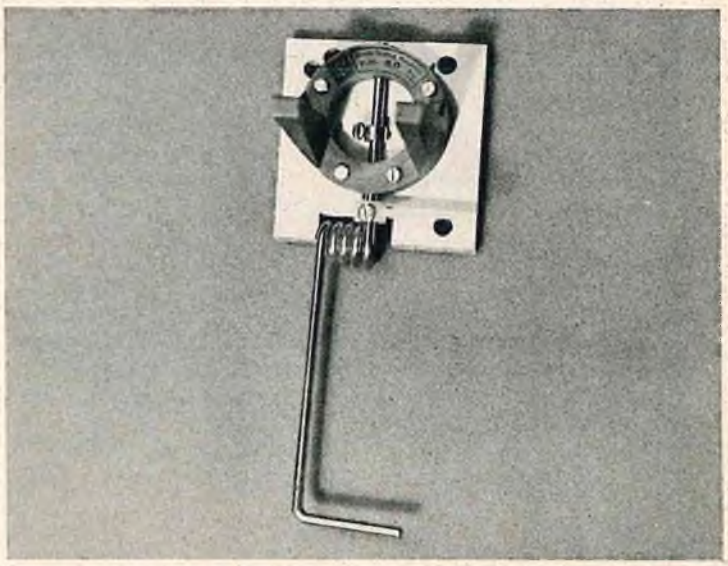
(7) The fuselage side with the engine compartment doubler, fuel tank compartment doubler, main gear brace plate, and vertical brace in place.



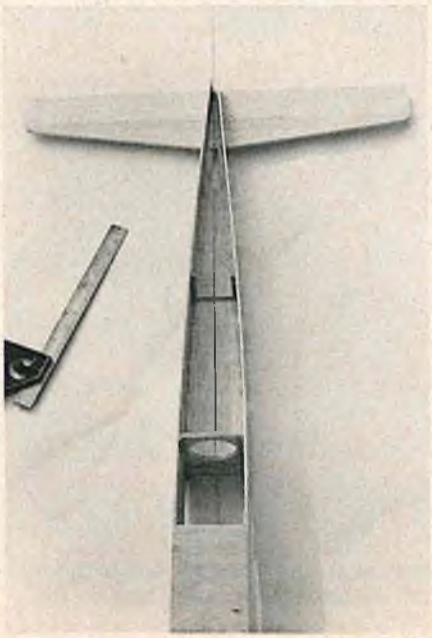
(8) Marking the location of bulkhead No. 3 on the fuselage side.

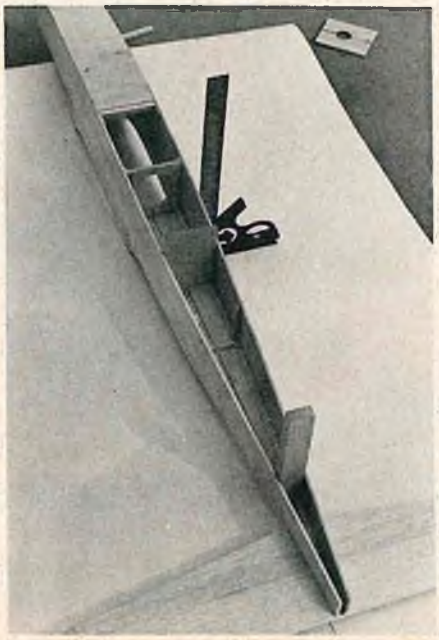


(9) Another view of bulkhead locations.



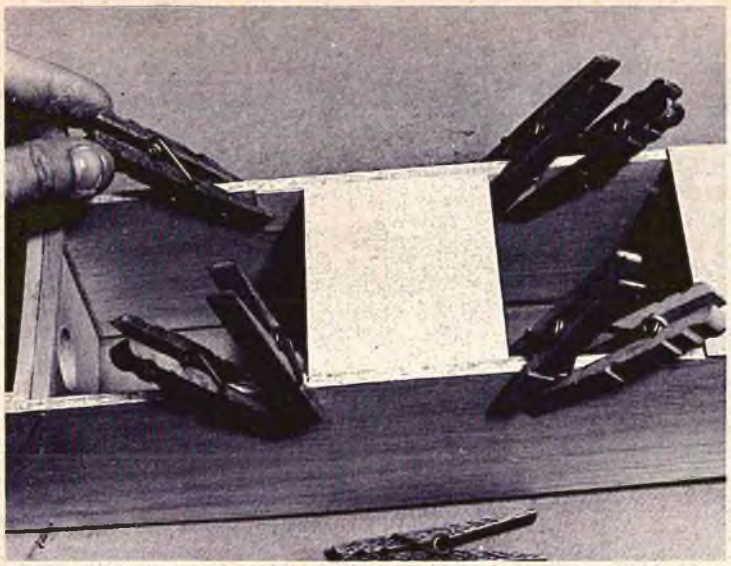
(10) The completed bulkhead No. 1 with the engine mount and nosegear.



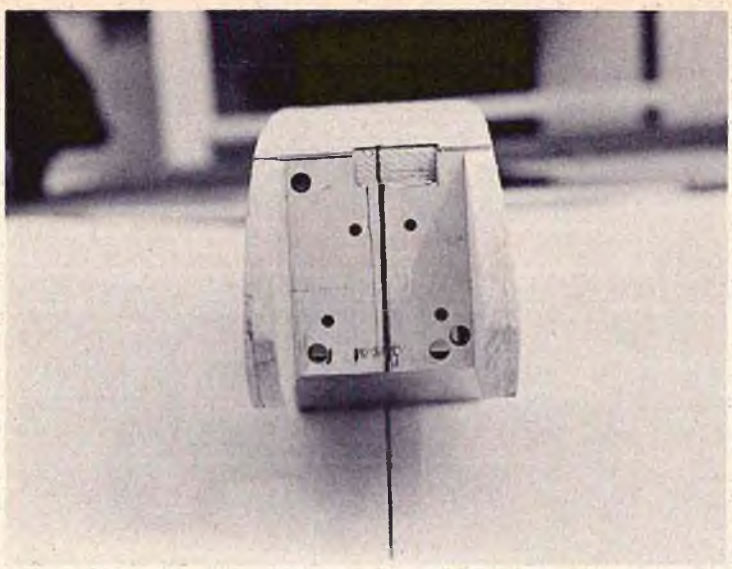


(11) FAR LEFT: The fuselage sides, top block, and stabilizer assembly.

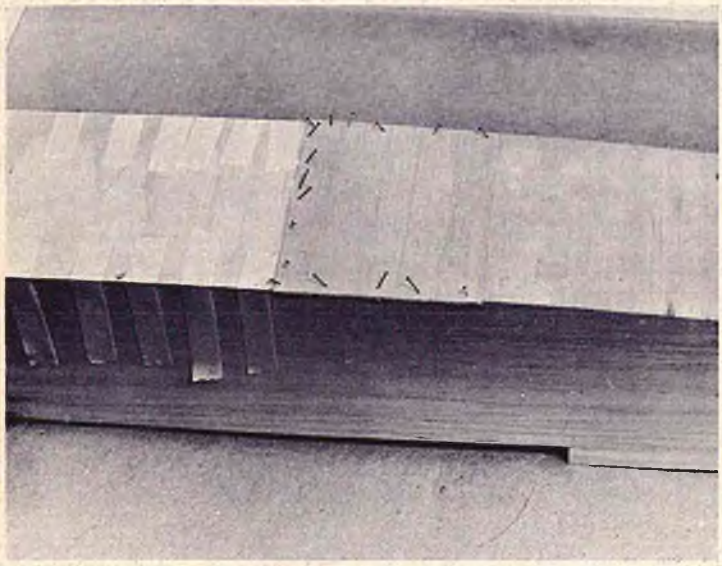
(12) LEFT: Aligning the fuselage sides with the top block.



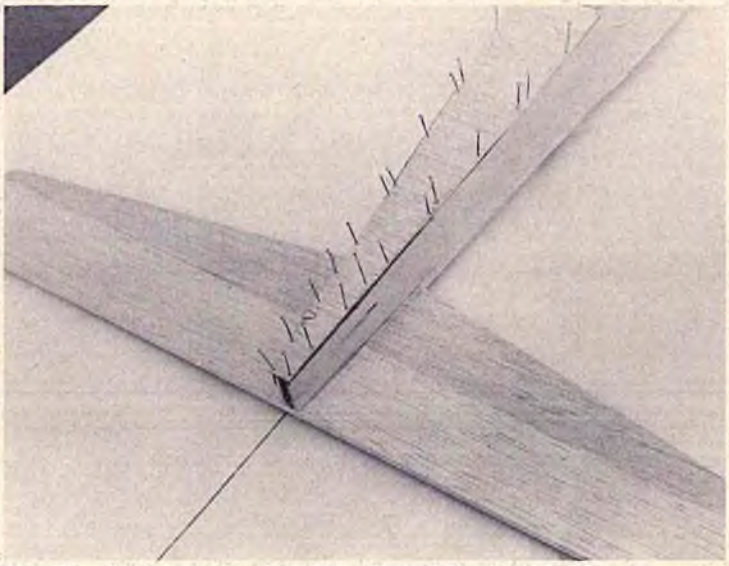
(13) Installing the main gear brace plate and the landing gear plate.



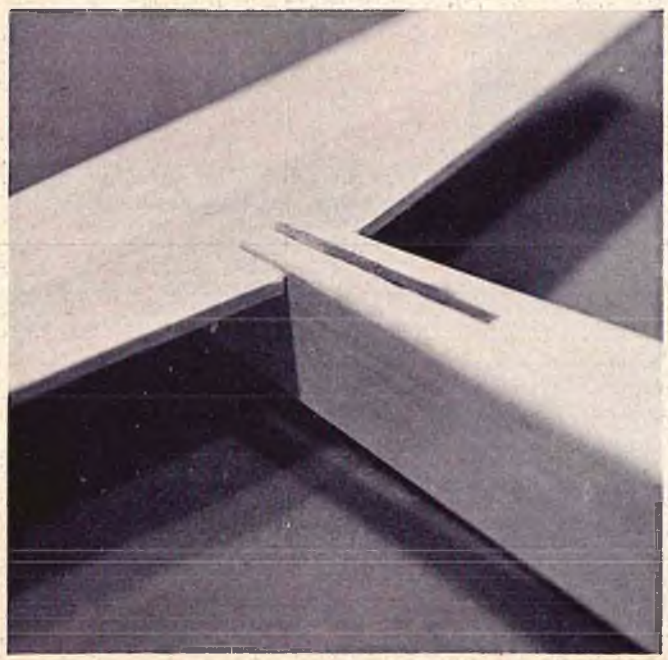
(14) Sheeting the fuselage bottom. Note the notch cut in the fuel tank compartment bottom at bulkhead No. 1.

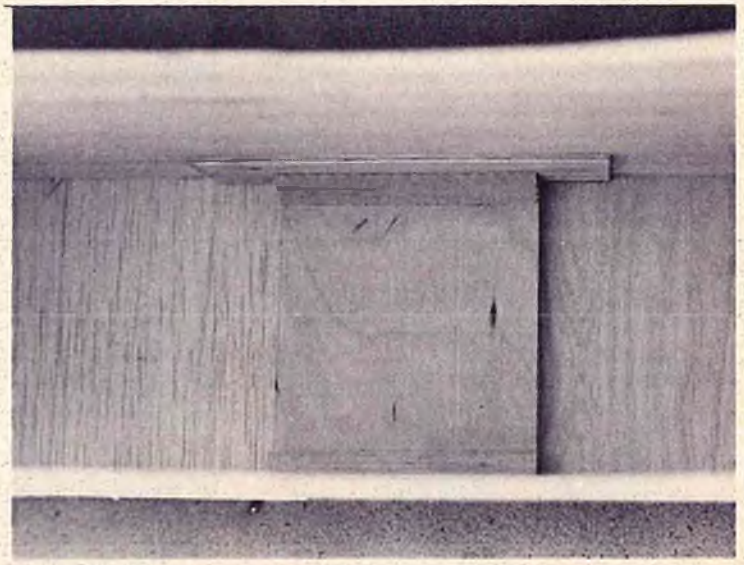


(15) Installing the plywood fuel tank compartment bottom sheeting and balsa fuselage bottom sheeting.



(16) Fuselage bottom sheeting pinned in place to dry.





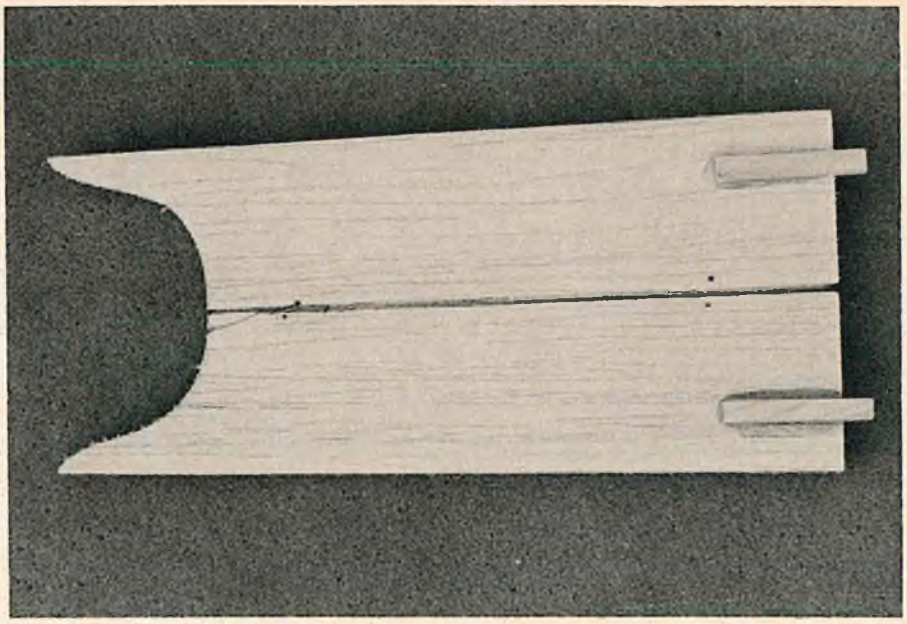
(17) LEFT: The rear of the top block sanded to shape before the fin is installed. (18) ABOVE: Installing the triangular stock.

to determine which side is straight and match the other side to it.

Some measuring and marking to do. [ ] Using the top block, measure the distance from the back of the stabilizer to the middle cross brace and to bulkhead #3 already installed. [ ] Using both 1/8" sheet balsa FUSELAGE SIDES, working along the straight edge, measure and mark the distance from the tail end to the location of the middle cross brace – which is called a vertical brace on the fuselage sides – and bulkhead #3. [ ] Use a carpenter's square along the straight edge of the fuselage sides to draw guidelines for installing the vertical braces and for locating bulkhead #3. (See pictures #8 and #9)

[ ] Pin down both fuselage sides on your building board with the straight edges toward each other – at least 2" apart. That will assure you build a right and left fuselage side. The spacing between them will give you room to remove excess glue that will squeeze out from under the doublers when you install them. [ ] Cut out both 3/16" FUEL TANK COMPARTMENT DOUBLERS you'll need. Cut it out carefully because it is used to locate the bulkheads. Lay the doubler on the front of the fuselage sides and move them back and forth until you find the location at which they fit properly. Don't glue them yet until you check out the location further. Just pin them in place. Use a carpenter's square to make certain you have them oriented so the bulkheads will be at 90° to the fuselage straight edge. [ ] Measure the distance from the tail of the fuselage to the rear of the fuel tank compartment doubler on both of the fuselage sides and make sure they are the same. [ ] When it all looks OK and you have marked the fuselage side for the proper location of the doublers, remove the doublers, double glue them and pin them in place. It will take only a thin coat of the aliphatic resin glue on both pieces to do a good job. [ ] Remove all of the excess glue that squeezes out when you pin the doublers down in place – including the front and back, bottom and top. Any unwanted beads of glue can keep the bulkheads from seating properly later on.

[ ] Cut out the 3/16" sheet balsa ENGINE COMPARTMENT DOUBLER and double glue it and the area of the fuselage side in front of the fuel tank compartment doubler on both fuselage sides. Using bulkhead #1 as a spacer-guide, put the side of bulkhead #1 that will be fitted to the fuselage side in place in front of the fuel tank compartment doubler. Put the engine compartment doubler in place so it fits tightly up against bulkhead #1 and pin it in place.



(19) The completed hatch ready for hollowing out.

[ ] Remove bulkhead #1 and wipe off any glue you may have gotten on it. [ ] Remove all excess glue from around the engine compartment doubler – especially from the fuselage side where bulkhead #1 will be installed.

[ ] You already have marked the location of the 3/16" x 1/4" x 2-3/8" fuselage side VERTICAL BRACES on each fuselage side. Double glue them and pin them in place. Be sure they are aligned even with the fuselage straight side. [ ] Finally, mark the location of the plywood main gear brace plates by measuring 3-2/16" from the rear of the fuel tank compartment doubler. Make the mark on the fuselage straight edge on both fuselage sides. Do not glue the main gear brace plywood plate in at this time, however, It will be easier to glue in place later when a clamp or wooden clothespins can be used to hold it in place while it's drying.

The fuselage sides are now ready to assemble into a unit.

PREPARING BULKHEADS #1 and #2

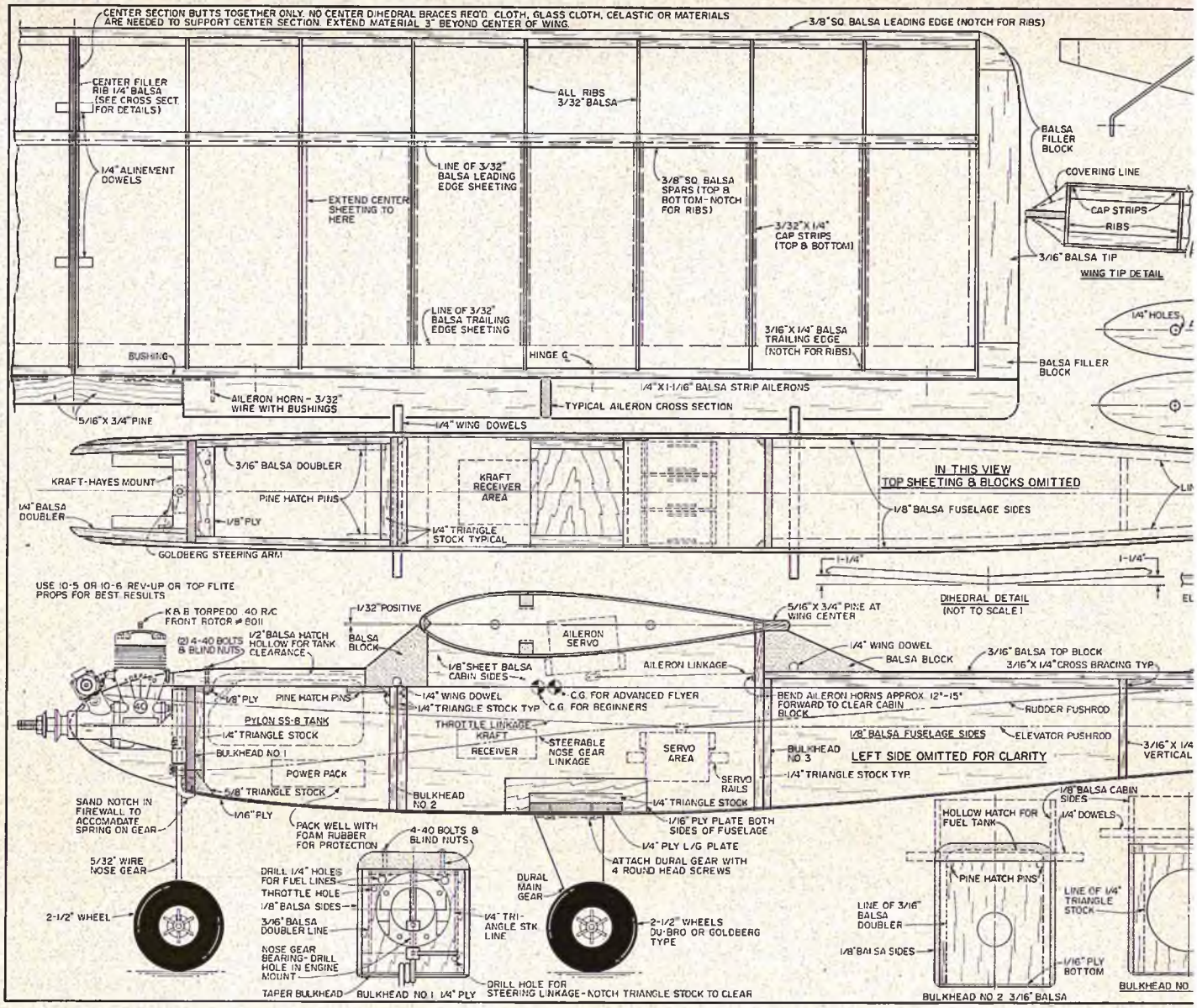
While the glue is drying on the fuselage sides and the top block, assemble the 1/4" plywood BULKHEAD #1 (the firewall) as pictured. (See picture #10) [ ] Mark the top front side. (You should already have a centerline drawn vertically down the back of this bulkhead.) [ ] Drill two holes in the engine mount for the nosegear strut as pictured. [ ] Install the KRAFT-HAYES ENGINE MOUNT. [ ] While holding your engine in place on the engine mount, mark the location of the throttle linkage hole you want to drill into the bulkhead. Put the engine away for now. [ ] Using your fuel tank as a guide, mark the location of the fuel tank vent and feed lines on the bulkhead. [ ] Install the STEERING ARM onto the top of the NOSEGEAR. Check the plans to make certain you know which is the front and rear of the nosegear. Looking at the nosegear from the front, the steering arm screw should face away from the bulkhead and the arm should be on the right side. Turn the steering arm over, as necessary, to get it that way. [ ] Slide the nosegear up into the holes drilled for it in the engine mount. Mark the area of the bulkhead to be filed or cut away to make room for the spring.

[ ] Remove the engine mount from the bulkhead. [ ] Drill all of the holes you marked. [ ] Cut the nosegear spring notch into the bottom of the bulkhead as marked.

[ ] Once the notch is cut into the bulkhead, use a couple of screws to mount the engine mount in place again. Install the nosegear with steering arm mounted in place on it. [ ] Mark and drill the hole for the nosegear steering arm linkage. Remember, looking at the front of the bulkhead, the steering arm should be on the right side. And, the hole for the nosegear linkage should be above or below the steering arm and even with the inside hole. (The steering arm will later be cut off at the outside hole so it will fit inside of the fuselage.) In this way the nosegear steering linkage can be bent up or down into the hole in the steering arm.

[ ] Drill the holes for the throttle and nosegear linkage from 3/16" balsa sheet for BULKHEAD #2. Both bulkheads are then ready for installation.

FULL SIZE PLANS AVAILABLE — SEE PAGE 126



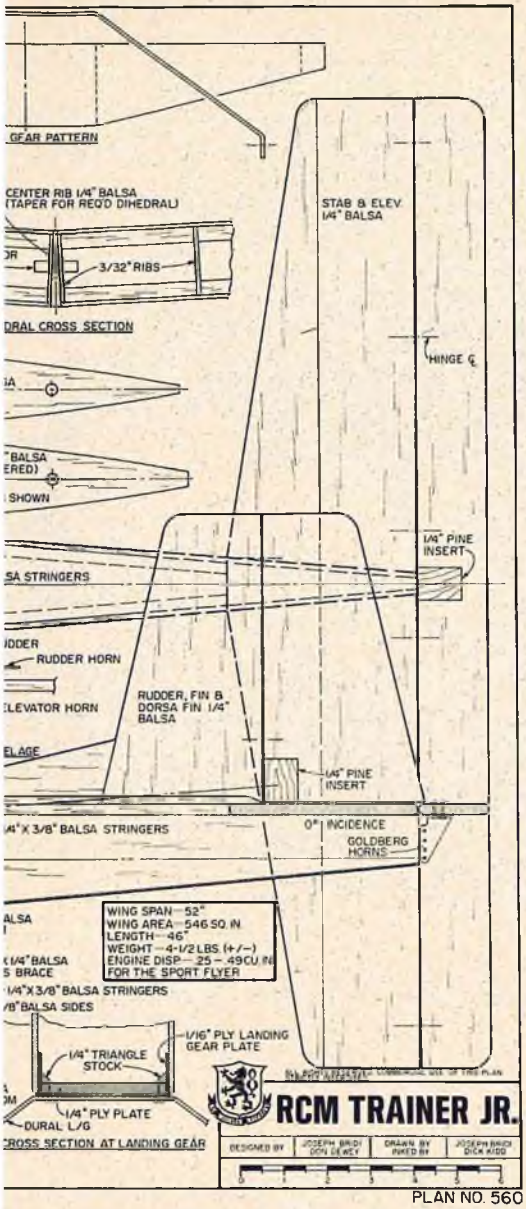
ASSEMBLING THE FUSELAGE SIDE AND TOP BLOCK

It is extremely important that the fuselage be built straight if you are to have a good flying plane. To insure a straight fuselage, follow the next building sequence carefully. (See picture #11)

[ ] Remove your plans from the building board and turn them upside down — so you have the unprinted side up. Use a soft pencil or brush pen to draw a straight line across the plans that is longer than the length of the fuselage. Tack some waxed paper or plastic kitchen wrap over the plans to protect them. [ ] Pin the top block down on one straight line so it lines up with it. It should be pinned down on the right side of the straight line.

[ ] Lay both fuselage sides on top of each other with the insides together — so the outsides are on the outside! Carefully align them and put a couple of pins through the nose and middle sections to keep them in that position. [ ] Because the elevator pushrod exits through a space left between the rear of the fuselage sides, the sides must not be glued together at the rear. Put a piece of 3/8" scrap balsa between the fuselage sides at the tail. Be sure this piece is shorter than the width of the fuselage sides so it won't get glued in place by mistake. Spread the fuselage sides at the tail and insert the 3/8" scrap spacer. Pin the spacer in place and either clamp the tail section together or put some masking tape or an elastic band around it so it won't come apart when you install the bulkheads #1 and #2. [ ] Remove the pins you used to hold the front of the fuselage sides together while you inserted the spacer in the tail. Spread the two sides apart and double glue and install BULKHEAD #2 so it butts up against the rear of the fuel tank compartment doubler. If you use 5-minute epoxy to give bulkheads #1 and #2 in place you won't have to wait a few hours before you continue. [ ] Wrap masking tape around the fuselage to hold the bulkhead firmly in place, but don't use any pins yet. Wipe off any excess glue. [ ] Double glue Bulkhead #1 and install it in the slot between the engine compartment doubler and the fuel tank compartment doubler. Either clamp the fuselage sides to the bulkhead or use masking tape to hold the fuselage sides firmly to the bulkhead to insure a good, solid glue joint. [ ] Put the fuselage sides/bulkheads assembly onto your building board with the straight edge side (top of the fuselage) down. Check and realign the fuselage sides as necessary so both sides rest flat on the building board and are 90° to it. Add pins into bulkhead #2 as necessary. Let this assembly dry. [ ] Remove the masking tape.

[ ] Put glue on the fuselage sides from bulkhead #3 to the rear. Also, put glue on the inside of the fuselage sides where it mates with bulkhead #3. Put glue onto the sides of bulkhead #3, down the top of the balsa stringers on the top block, and, down



PLAN NO. 560

the stabilizer. [ ] Put the fuselage sides/bulkheads assembly in place onto the top block. (See picture #12) Make certain the sides are aligned with the sides of the top block. Pin the sides in place as necessary. Use balsa scraps as spacers inside the fuselage to hold the sides apart as necessary. Also make sure the rear of the fuselage is centered on the elevator centerline. Get out your square and check to make sure the sides are 90° to the building board. Block, pin, or tape the fuselage sides in place, as necessary. Wipe off excess glue both inside and outside the fuselage sides.

[ ] Slide the hatch under the front of the fuselage in its approximate location. Align it with the straight line you drew on the back of the plans earlier. As a result the hatch should be in line with the top block. Put a piece of kitchen wrap or waxed paper over the hatch so it won't get glued to the fuselage sides by mistake, and pin it down in place. [ ] Align the centerline on the back of bulkhead #1 with the centerline on the bottom of the hatch and align the fuselage sides with the sides of the top hatch. [ ] Pin the fuselage sides to the top hatch to keep them in place as you install the bottom sheeting and landing gear plate.

[ ] Cut out the two 1/16" MAIN GEAR BRACE PLYWOOD PLATES. These are then glued to the inside of the fuselage and support the 1/4" plywood landing gear plate. (See picture #13) [ ] Double glue and install the two main gear brace plywood plates at the mark you made on the fuselage sides earlier. Use wooden spring loaded clothespins or clamps to hold the brace plates in place. Before the glue sets up [ ] cut out and install the 1/4" x 2-9/16" x 3-1/16" PLYWOOD LANDING GEAR PLATE between the fuselage sides so it rests in the slot provided in the brace plates. Neither the main gear brace plywood plates or the plywood landing gear plate should extend above the fuselage sides.

[ ] Lay the 1/16" PLYWOOD SHEET FUEL TANK COMPARTMENT BOTTOM on the fuselage so it runs from the front of bulkhead #1 to within 1/4" of the rear of the 1/4" plywood landing gear plate. (The balsa sheeting for the remainder fuselage bottom must overlap the landing gear plate by 1/4") Cut the plywood sheet to the proper length and cut out the notch for the nosegear strut spring. (See picture #14) [ ] Double glue it in place. Use masking tape to hold it while the glue sets up. Wipe off excess glue. (See picture #15) [ ] Sheet the remainder of the fuselage bottom with the 1/16" BALSA SHEETING, applying pieces of balsa so the grain runs from side to side for added strength. The first piece of balsa sheeting should overlap the 1/4" plywood landing gear plate and should butt up against the 1/16" plywood sheet fuel tank compartment bottom. After you get the first piece of balsa sheet in place, remove the pins from the top block and continue sheeting the remainder of the bottom of the fuselage. Pin the balsa in place as you work. (See picture #16) Wipe off excess glue. To make the job easier you may want to rough cut the balsa sheeting to size, then sand it to size after the glue has dried.

At this point the fuselage sides, bulkheads, top block, stabilizer, and bottom sheeting should all be glued in place.

Now you're going to install the front and rear cabin blocks and the 1/8" balsa sheet cabin sides (wing saddles). [ ] Install the CABIN REAR BLOCK so it butts up to the front end of the fuselage top block. [ ] Cut out and install the CABIN SIDES so they fit squarely up to the cabin rear block. Wipe off the excess glue – both inside and outside of the fuselage. [ ] Install the CABIN FRONT BLOCK so it mates squarely with the front end of the cabin sides.

[ ] Sand the back of the top block to shape before the fin is installed. It's easier that way. (See picture #17) [ ] Add the 1/4" sheet balsa FIN. Check it out with a square. The fin should be at 90° to the surface of the stabilizer. [ ] Add the 1/4" sheet balsa DORSAL FIN.

[ ] Add the 5/8" TRIANGLE BALSA STOCK at the bottom rear of bulkhead #1. [ ] Add the 1/4" TRIANGLE BALSA STOCK from the top to the bottom of the fuselage sides behind bulkhead #1, behind bulkhead #2, and in front of bulkhead #3. [ ] Add the 1/4" TRIANGLE BALSA STOCK along the corners of the 1/4" plywood landing gear plate and the 1/16" plywood landing gear plate brace. (See picture #18)

[ ] Cut out and install the 1/8" x 2-3/8" x 1/2" PLYWOOD FRONT HATCH HOLD DOWN PLATE behind bulkhead #1 as shown on the plans. [ ] Place the hatch over the fuel tank compartment and mark the location of the PINE HATCH PINS. They should be located just inside the fuselage sides on the hatch so the back of the hatch won't move from side to side. (See picture #19) Glue them in place and wipe off the excess glue. [ ] Hollow out the underside of the hatch as shown on the plans so the fuel tank will be properly located.

[ ] Using the 1/8" plywood front hatch hold-down plate as a guide, make a light pencil mark at the center of the plate on the side of the fuselage. You'll use this mark to locate the screw holes for the hatch hold-down screws. [ ] Lay the hatch in place. Using the hold-down plate center marks you made on the side of the fuselage as a reference, draw a light line across the HATCH to indicate the centerline of the hatch hold-down plate below. Mark the location of the 2 hatch hold-down screw holes approximately 3/4" in from each fuselage side. [ ] With the hatch in place, stick a pin through the hatch to mark the screw holes on the hatch hold-down plate below. [ ] Remove the hatch and check to make sure the pin marks are properly located on the hatch hold-down plate. If all is OK, [ ] drill the holes for the 4-40 HATCH HOLD-DOWN SCREWS through the hatch. [ ] Drill the holes for the BLIND NUTS through the hatch hold-down plate. [ ] Install the blind nuts so they come up from the bottom of the hatch hold-down

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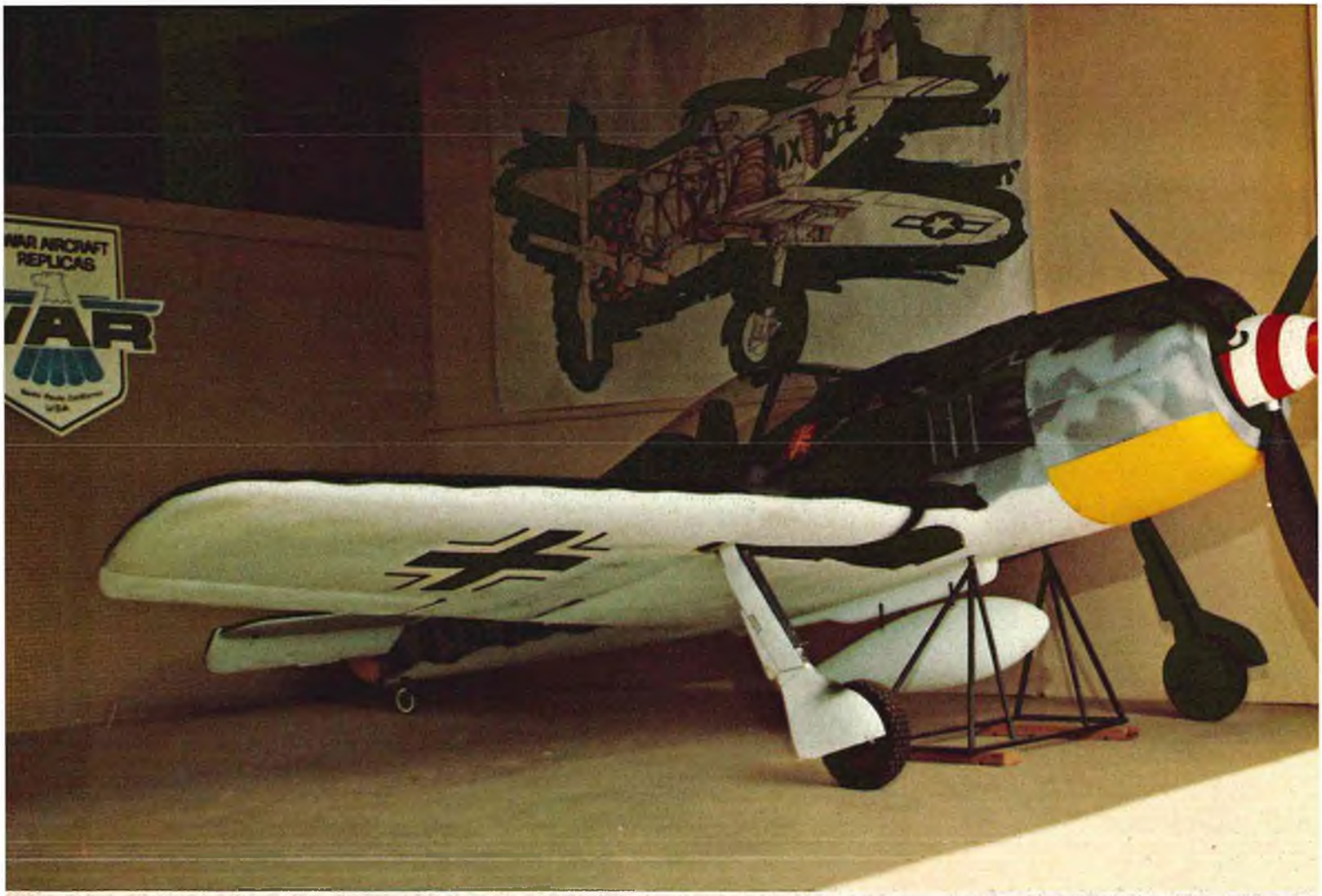


Focke-Wulf 190 mock-up by War Aircraft Replicas to prove design features and dimensions prior to building prototype. Sketch of company's forthcoming P-47 Thunderbolt on wall in background.

RCM VISITS WAR AIRCRAFT REPLICAS

BY DICK TICHENOR

Continuing RCM's policy of bringing to its readers activities of interest that have a direct relationship to RC modeling, we flew to Santa Paula, California, to visit War Aircraft Replicas. Their projects can supercharge the imagination of any modeler who ever daydreamed of boring holes in the sky, especially if he is also a Walter Mitty type World War II fighter pilot hero!

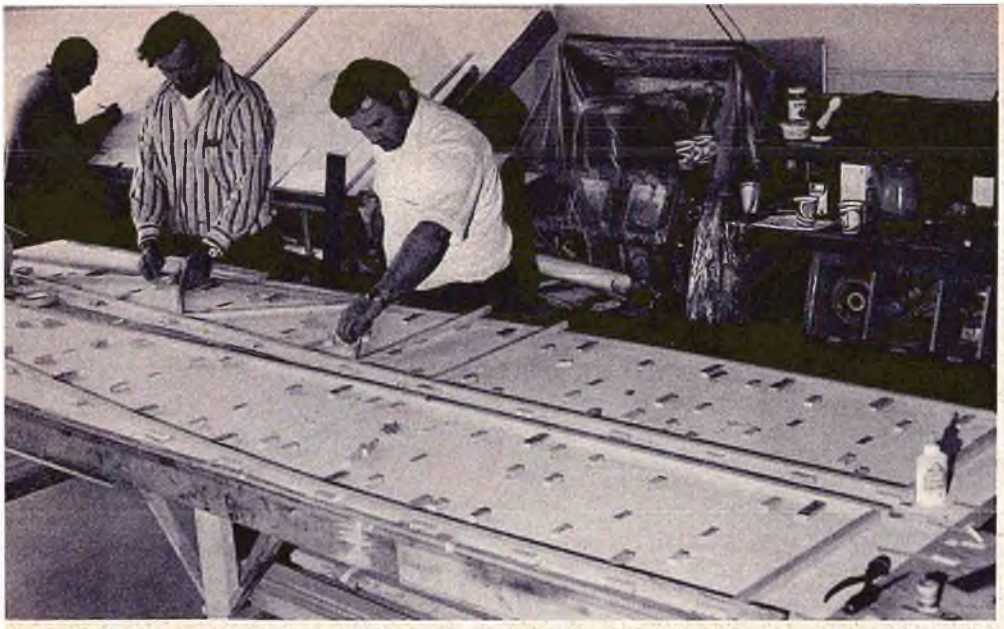
War Aircraft Replicas is a company approximately a year old whose business is producing kits for half size World War II fighter aircraft for the home builder. Their first kit is the Focke-Wulf 190, chosen for its clean, classic lines and aerodynamic proportions. Its popular appeal in aviation, historical and model building circles was also a major influence.

Jim Kern and Ken Thoms started this project following a close association of many years. Both are aeronautical engineers, pilots, and they were the team who designed the midget racer Jonathan Livingston Seagull. Jim and Ken discovered that another aeronautical engineer, Warren Eberspacher, was engaged in a similar effort and the three joined forced to become the principals of War Aircraft Replicas.

OK, there are plenty of home-builder airplane kits around; what's that got to do with RC? Just look at the materials and construction techniques these guys are using — right out of RC! As examples, load carrying structures of wood, polyurethane foam for shape and epoxy resin coated cloth for covering and finish. The main difference is that they are doing it a bit larger.

Military aircraft inspires a tremendous fascination within many pilots but the military ships are both scarce and beyond the financial means of most people. Attempts to modify existing airframes to resemble military aircraft have been less than satisfactory and scaled down reproductions


KT

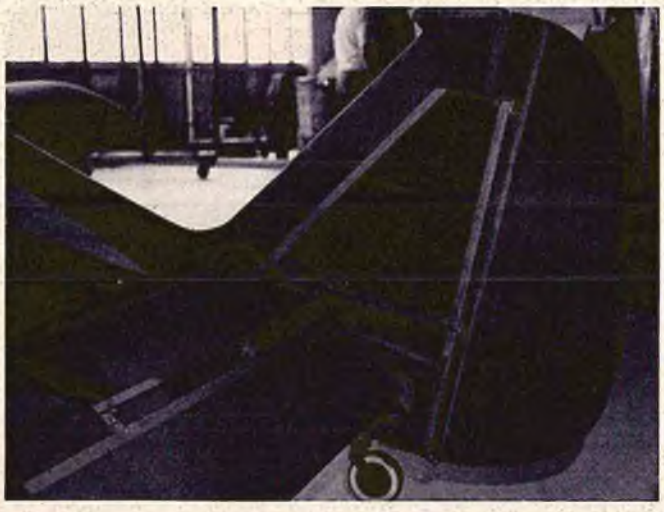


The fuselage structure starts with four longerons held together with upright members - - - just like modelers build them!

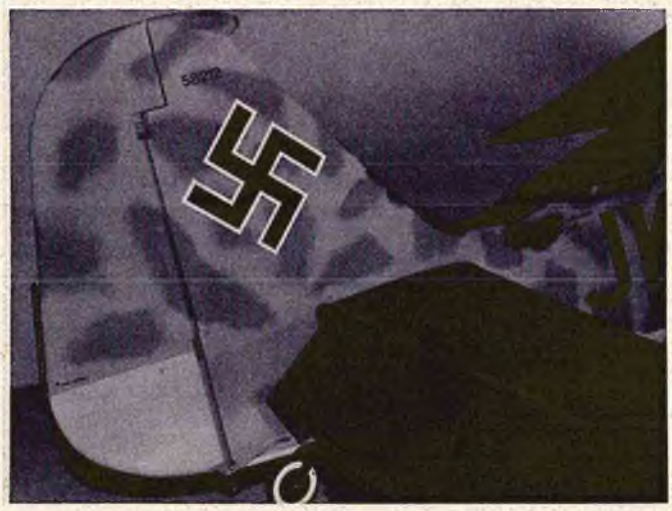
Basic flight instruments and radio take care of the FW 190's needs.

Typical skull session by WAR's principals Warren Eberspacher, Jim Kern and Ken Thoms.

Ken Thoms saws spruce fuselage frame members – an operation familiar to model builders.



Uncovered side of tail surfaces shows the wooden structure and foam filler blocks.

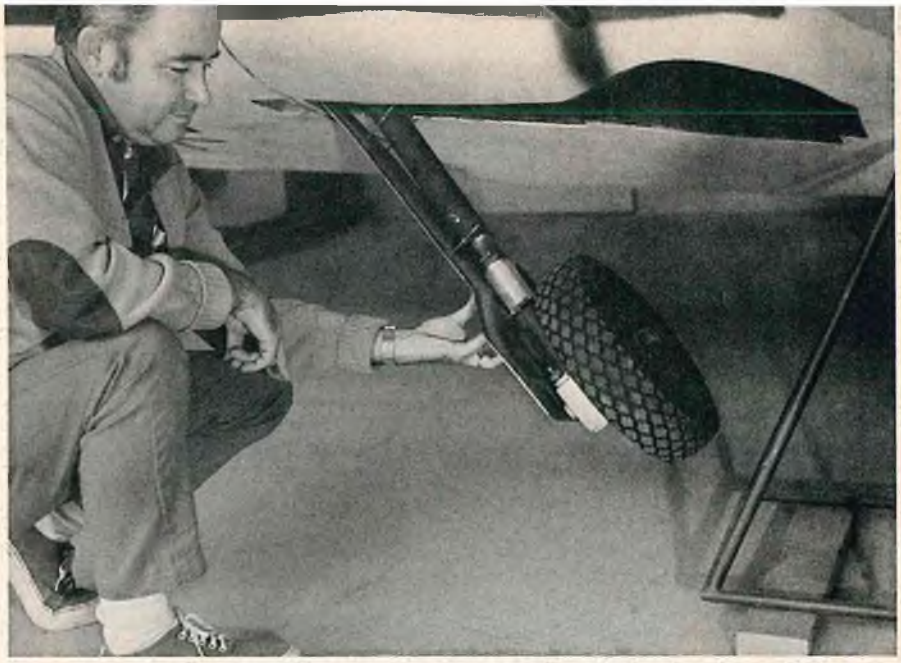


Finished tail group gives no clue as to its structure. Modeling on a large scale!

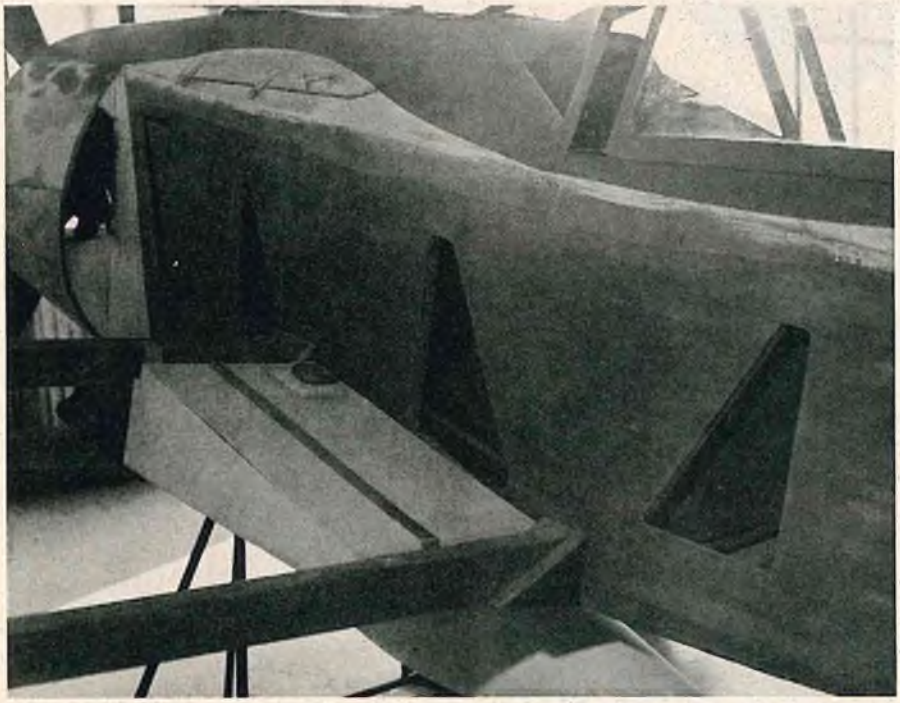
usually involve construction methods not available to the average home builder. Gluing together a wood airframe, carving and sanding foam blocks and applying cloth covering with epoxy resin is being done by model builders every day.

The engine selected for the replicas is the large bore Volkswagen, already flight proven in numerous light planes. The VW is attractive due to its cost, fuel economy, ease of maintainance, parts availability, and light weight. A reduction unit turns the prop around 2600-2700 rpm. A 3 blade ground adjustable pitch propeller adds to the realism and efficiency.

The landing gear is retractable with the mechanism either manually or electrically operated. The 7 foot wide gear tread maintains the characteristic FW-190 inward cant. Among the decorative details are dummy guns, drop tank and simulated access panels. The bird is finished in authentic camouflage colors and trimmed with specific squadron markings.

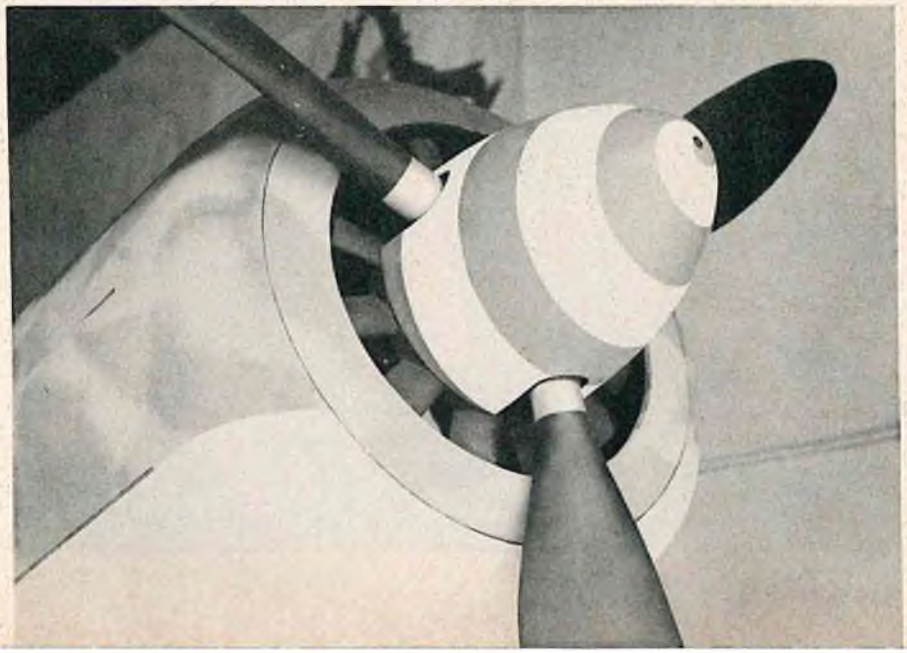


Warren Eberspacher demonstrates the retractable landing gear. Retract mechanism was removed at time of photos for final machining design.



Fuselage framework is reinforced with plywood side panel covering. Fuel tanks are located between wing spars on each side.

Scale FW 190 engine blower cools the Volkswagen engine.



In half-size, the War Aircraft Replicas FW-190 is 16½ feet long, with a 20 foot span, will cruise at an estimated 135 mph, be aerobatic (+6 G's at full gross weight), and have a 4-5 hour endurance. It will accommodate a husky 6'4" pilot with a backpack parachute. Empty weight is 450 lbs.

The FW-190 replica takes top priority in the War Aircraft Replica shop among the first 4 designs with the Mitsubishi A6M Zeke (Zero) coming second. These will be followed in order by the P-47 Thunderbolt and the F4U Corsair. The Corsair comes last because of the involved engineering

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The Heathkit three heat soldering iron.

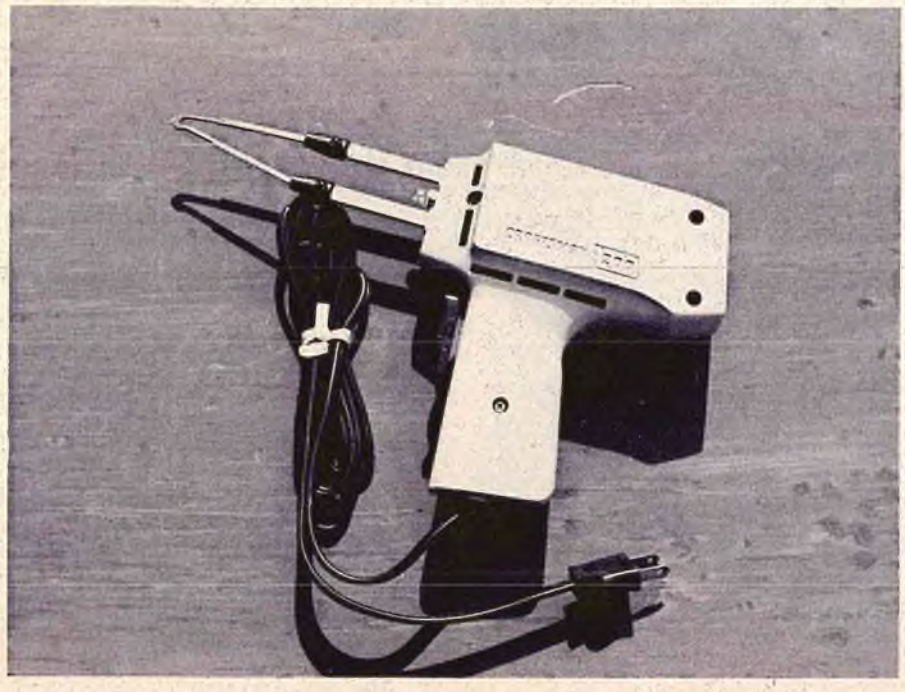
SOLDERING

TECHNIQUES FOR MODEL BUILDERS

BY TOM CONE & BEN STRASSER

Part 1 of 2 Parts

Sears trigger operated soldering gun, 150-230 watt.



● Several months ago, when Tom was giving a fellow modeler a helping hand down at the local flying field, the fellow's plane suddenly went into a 30° dive. Tom grabbed the transmitter and pulled up elevator. Nothing! He cut the power and waited – for the crash.

When the dust settled only the landing gear and the bottom of the fuselage were damaged. In examining the plane to find the cause, Tom found that the "soldered" elevator horn was only held in place on the torque rod with resin. And that didn't work too well! The workmanship on the plane looked great, so why check out all of the solder joints?

More recently, when the resident flight instructor again responded to a new pilot's call for help in trying to start a balky engine, Tom noticed that one aileron had drooped. And no one wants a droopy aileron. When the wing was pulled off to check it out, the "soldered" coupling had separated. Lucky day. It didn't hold long enough to get into the air.

Like most guys in the hobby, Tom hates to see a crash because of a simple mistake – like a poor soldering job. His motto is, "Keep the mistakes complicated. Don't let a little thing like a solder joint do you in."

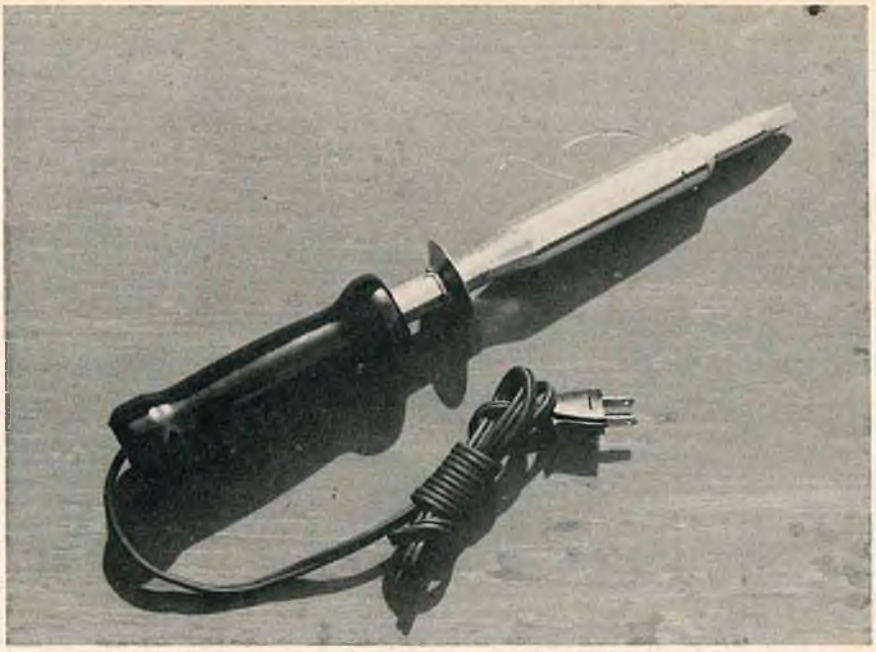
So what is there to solder besides an occasional elevator horn or some aileron linkage? Well, your ship may use a landing gear built up of several pieces of piano wire soldered together. Some guys solder a washer on the inboard side of their landing gear axle instead of using a wheel collar – especially when the axle isn't long enough for a wheel collar on both sides of the wheel. The RCM wheel brakes call for brass tubing to be soldered to the struts of your main landing gear. Or you may use some brass tubing to extend the axle of your landing gear.

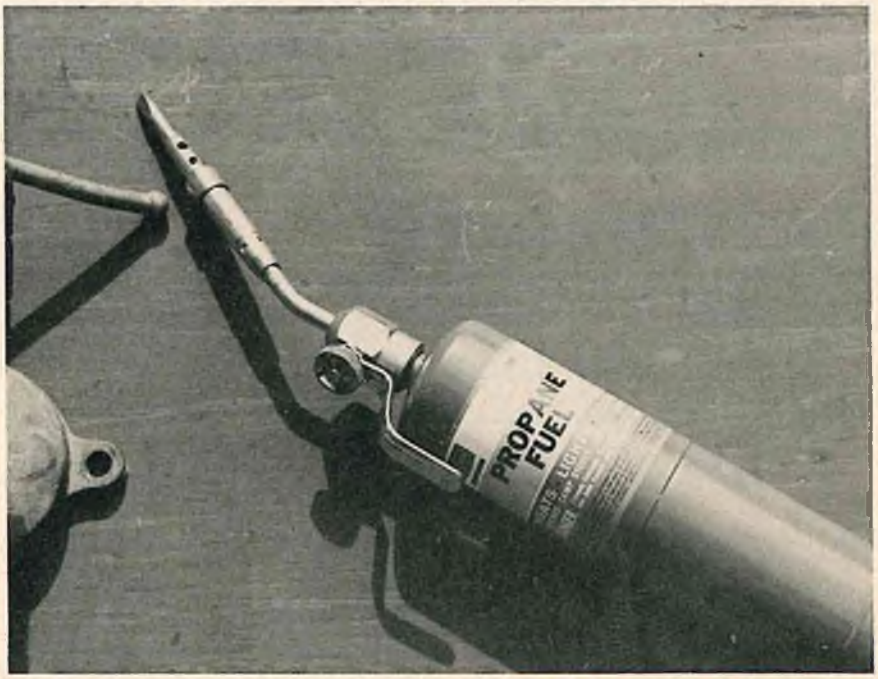
The cabanes for many bipes are built up with several pieces of piano wire soldered together. While it's not very critical if the landing gear soldering job fails – just a few scratches, nicks, or dents, a few loosened joints in the cabane may cause the whole wing alignment or wing incidence to go out of kilter and you may be out of a plane for awhile!

Some set-ups make it necessary to solder piano wire together for rudder or elevator pushrods or for aileron linkage. Needless to say, if that soldering goes . . . Or, you may need to solder some stranded cable for throttle or nosegear linkage. And some guys build up their own metal fuel tanks.

What's to solder? Lots! And there's no reason for a failure due to poor soldering techniques. Anyone can do a good job with the right equipment and

TOP: Sears 200 watt electric soldering iron. CENTER: Sears propane torch with soldering tip. BOTTOM: Miscellaneous soldering materials including Sal Ammoniac, 50-50 solder wire, No. 22 gauge tinned copper wire, soldering paste, tinner's fluid, soldering fluid, clothespin clip, metal glue brush, and stainless steel brush.





the "know how" to go about it. In this, and the article which follows, we're going to square off on those two aspects of "other-than electrical soldering." This part will deal with the equipment and materials you'll need to do the job, and Part II will get to some soldering techniques so you will be able to do a job you can count on. Like the man says, "So you can keep your mistakes complicated."

There's a saying in the sheet metal trade. "The quickest way to go to hell is to try to solder with a cold iron." Translated to our hobby it becomes, "The quickest way to make a kit out of your plane is to use a low wattage iron and rosin core solder to do some other-than electrical work on your plane." Sure, some guys have been using a low wattage iron for years with no problems. And hopefully their luck – or skill, will hold out for them. Others of us aren't as fortunate, though. We need everything working for us.

As you read through the discussion of the equipment and materials that follow, you'll note that we've listed a source and price for each of the units. While there certainly are many makes of soldering irons available, we used Sears as a primary source because their products are available either in the stores or through their catalogue service. Where we've found something special that isn't available at Sears, like the Heathkit 3-heat soldering iron, we've listed that source too.

SOLDERING IRONS

When it comes to a soldering iron, you can go one of four ways; a soldering gun, an electric soldering iron, a 3-heat soldering iron, and, a propane torch with a soldering tip. Each unit has its advantages and disadvantages. However, because the major function of a soldering iron is to get the material you're soldering hot enough to make the solder flow, one thing all of the units we recommend have in common is that they get enough heat to do the job. And they're all priced within a couple of dollars of each other.

First there's the TRIGGER OPERATED SOLDERING GUN. It looks like a space gun with a light bulb

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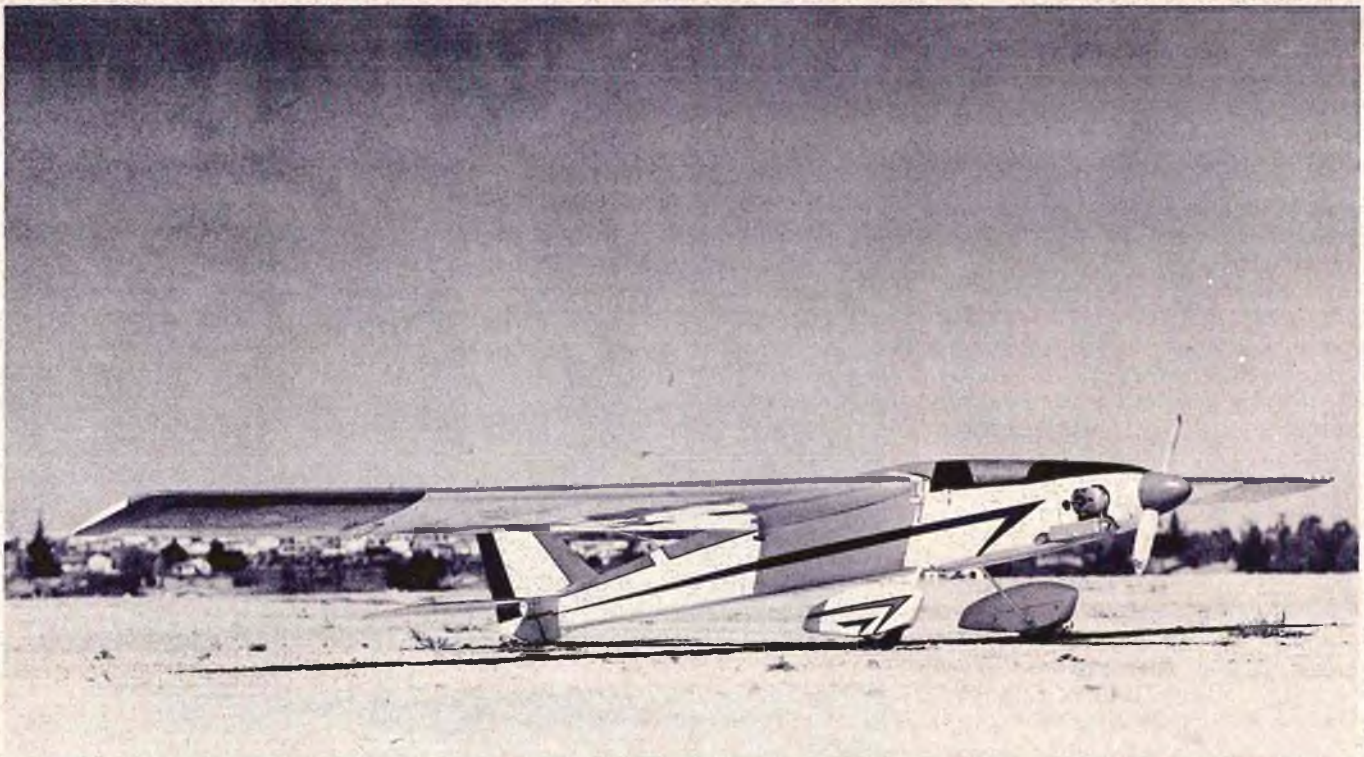


Bushwacker, complete with wooden muffler, ready for another test hop. If a runway is not available the landing gear will slip out of the fuselage and the plane is then hand launched. The pilot can either land it in the grass and "whack" a bush or catch it as it glides in dead stick.

RCM PRESENTS THE

BY ROD AND MARK SMITH
PHOTOS BY JIM HALDY

WOODEN MUFFLER

A plywood muffler? You won't believe it until you try it!

A Wooden Muffler?

Why Not? As the exhaust gasses expand after leaving the engine, the temperature and pressure drop to the point where 1/16" plywood, protected by aluminum foil and held together with 5-minute epoxy, can confine these gasses and muffle the sound of the engine.

Mark's Model's has been testing such a muffler for the past year and plan to include a plywood, die-cut, muffler in their new kit of a plane called the Bushwacker. When this plane was first introduced at the 1973 Model and Craft Show at Anaheim, California, people remarked at how quiet the engine was, while none of the thousands who witnessed these demonstration flights realized that the screaming Schneurle K & B .15's were muffled by 25 cents worth of plywood, epoxy and aluminum foil. Later many people stopped by the booth and commented on how quiet the engine ran.

Since that time the muffler was used a couple of times a week during normal test flying. After approximately 30 hours of flight time one end of the muffler was cut off with an X-Acto knife and the interior was examined for deterioration. The epoxy was colored red, or dark brown, but the joints were structurally sound. The aluminum exhaust tube was not loose. In fact, there was no discernible damage due to temperature or fuel. A new muffler was then built (big deal – 10 minutes) to be sure that the first didn't work from just pure luck.

This muffler is still under test. There have been no scientific, sound level tests conducted, but as long as the neighbors don't hear the engine, who needs sound tests. Our fellow club members, Palomar Fliers, say that during low, high speed, passes the plane sounds like a sewing machine!

So let's look at some of the advantages of a wooden muffler:

Cost:

1/16" plywood, epoxy, aluminum foil, and a dab of G.E. silicone rubber.

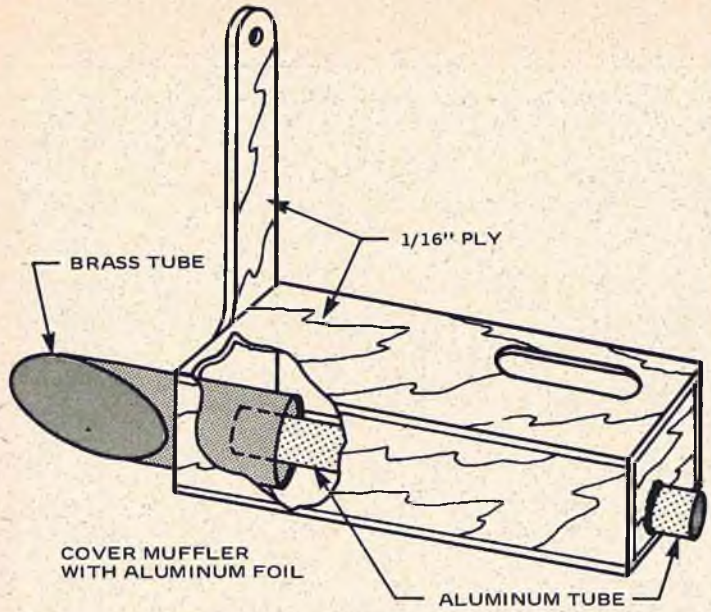
Size:

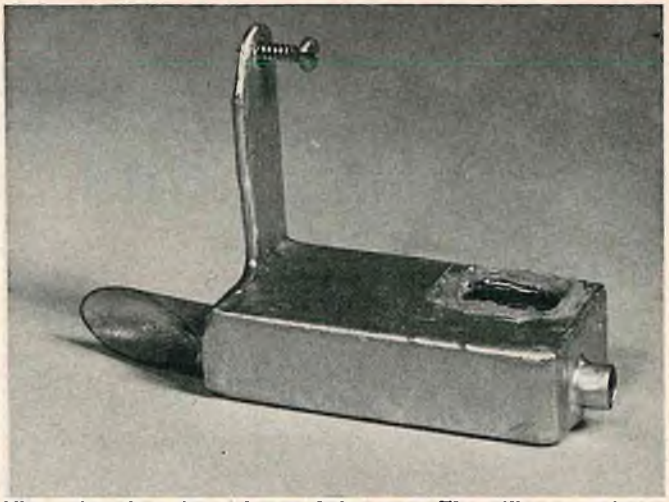
Suit yourself, just don't get carried away and make it so small that the exhaust gasses have no place in which to expand.

Shape:

This is beautiful – how about a double wall cowling? Or, a double wall fuselage side? We can now experiment with volume, baffle layout, exhaust orifice area, internal venturi, airfoil shapes – there are thousands of things that need investigation in muffler design. With plywood, these experiments can be conducted by modelers with only a small investment in time and money. This is how we, the modeling fraternity, will finally get the "ultimate" muffler. After the "smoke" has cleared, and the best design is agreed upon, we can, if we want, adapt the design to metal.

Are you starting to become convinced? Let's look at some other aspects:





View showing the exhaust inlet port. The silicone rubber serves as a gasket between the muffler and the engine. The exhaust outlet tube is a short piece of brass tube that was flattened to an oval cross section, cut at an angle, and epoxied in place. The tube extends into the muffler 1/2".

Weight:

Less than metal mufflers in most cases. More important than weight is the effect of weight or mass – inertia. The wooden muffler is not mounted on the engine. It is mounted to the airframe and the muffler presses against the exhaust port. Silicone rubber, available in a tube at the local hardware, is used to form a seal between the engine and the muffler. Any inertia loads due to vibration or hard landings (crashes) are not transmitted to the engine and thus to the mounts. Another bonus is that any engine can be custom fitted with a wooden muffler and the cylinder distorting, muffler mounting clamp is eliminated.

Appearance:

The Bushwacker muffler is a simple box but the scale modeler can now muffle his engine with any shape he desires and even use scale exhaust stacks. Why not?

Pressure Tap:

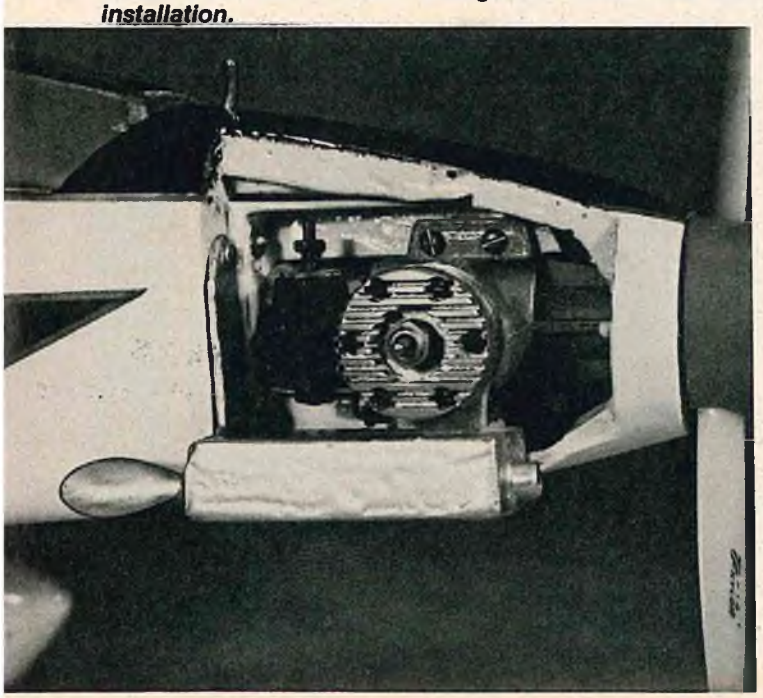
Simply drill a hole and epoxy in an aluminum or brass tube wherever you want it.

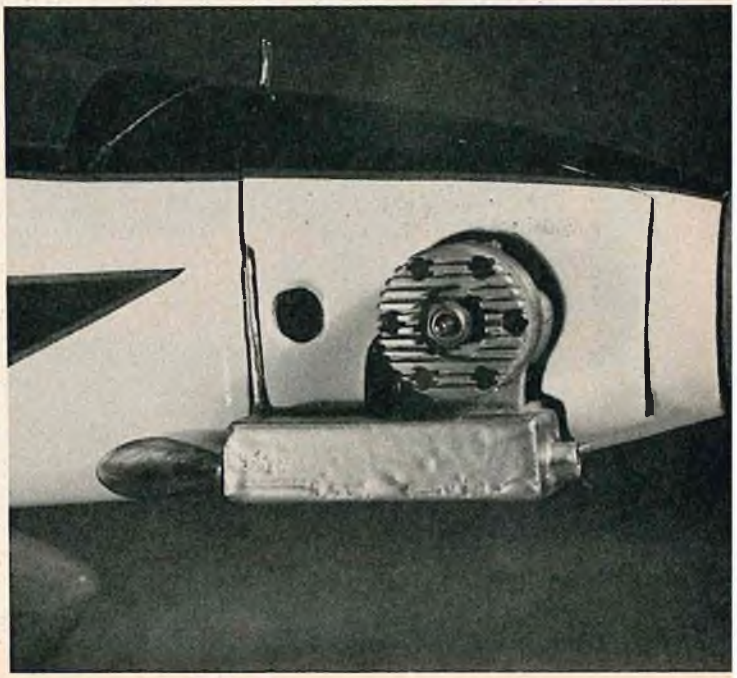
STOP!! Don't throw out that metal muffler! There is a lot of testing to do before we are sure that we don't need metal. We would not dare use the wooden muffler at a major contest where a sudden failure would result in a loss of flight points. Maybe a light coating of fiberglass on the outside will be needed on larger mufflers.

So, let's get more people working on muffler design. By now most modelers, in congested areas, realize that mufflers are here to stay. Mark's Models has confined their tests to only a small muffler for the .15 or .19 engine, and there is still lots of work to be done with other size engines. Will the same material work as well on a big .60? If not, can a piece of tin can stock be used as a heat sink? Will a thin wall muffler pulse, or expand, thus tending to dampen the pressure pulses from the engine.

Use your imagination and let's get a good, inexpensive muffler that will silence the protests against modeling.

Cowl removed to show mounting of muffler to the airframe and mating with engine. Aluminum tube protruding from the front of the muffler is an experiment to see if ram air from the slip stream will assist in scavenging exhaust gases from the muffler. The tube extends through the muffler and ends inside the exhaust tube. Photo at right shows completed installation.





NATE RAMBO'S

RUNWAY SWEEPER

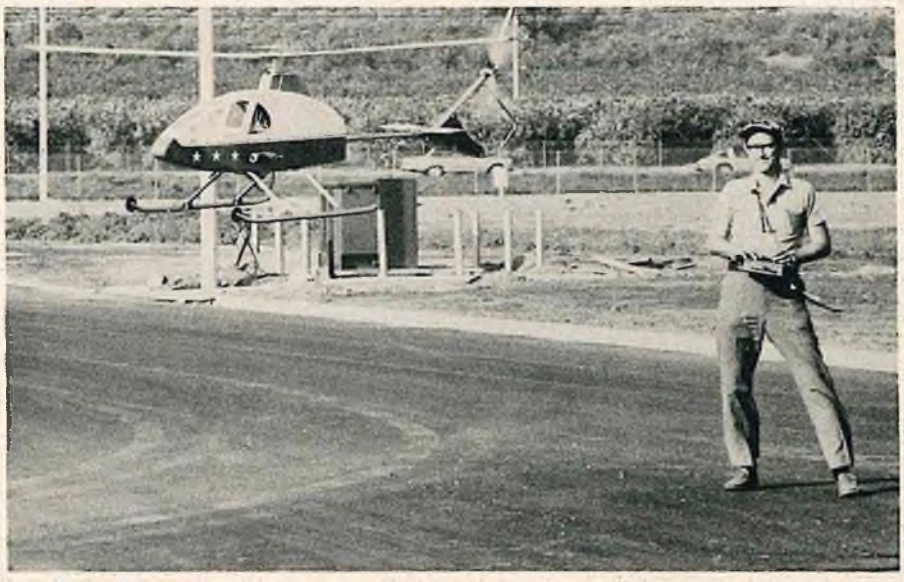
A recognized West Coast flyer provides not only a helicopter construction article but also a broad base of information concerning helicopter modeling. The author's philosophy and approach to designing and building model helicopters will be of value to all those interested in pursuing this aspect of our hobby.

I have always felt that the RC helicopter modeler should approach his hobby just like any other RC modeler approaches his. By this I mean a person should be able to create or build a helicopter airframe in a similar manner to that used by the fixed wing flyer. Certainly, some new tools and materials and techniques should join the old razor blade and glue. But the joy of creating a beautiful model should remain unchanged. The modeler should be able to create and build his own airframe because that's what modeling is all about. The average helicopter modeler should not have to be a machinist; he should merely procure and use a set of helicopter machinery just as any other modeler procures and uses an engine, radio system, or retract landing gear mechanism.

With the above philosophy in mind, I have designed and built a series of original helicopters. The design presented here is the Runway Sweeper (RS for short). I hope that what is provided in the form of drawings and text is viewed as more than just a construction article. It is my intent to stimulate modelers' thinking and perhaps to inspire new helicopter modelers to this approach. In doing so, they will develop new designs and utilize new materials while applying some good old fashioned modeling expertise to this new branch of our hobby.

Before I go into the details of R S, let's talk about helicopter machinery (i.e., the clutch, transmission, rotor head, rear gear box and other esoteric paraphernalia peculiar to a rotary wing monster). There are three basic ways to acquire this very specialized hardware. The first and hardest way is to build it, possibly using John Burkham or Gene Rock's drawings. That method is pretty time-consuming and becomes a "thing unto itself." To me, the method is unacceptable. Another way is to go hog wild and buy a complete helicopter kit. In this case, all you have to do is follow the manufacturer's instructions, fly the complete machine for a period of time, and allow the ancient rules of aeromodeling to leave you with the machinery sans airframe. Here the cost seems pretty steep. But for those who have neither the incentive to build the machinery nor the pile of cash to buy a complete kit, there is one other method. Find a person who has bought one of the many complete helicopter kits on the market and after a crash or two is willing to dispose of what is left, namely the mechanics. The latter method happens to be the one I used to procure not one but two sets of mechanical components at very

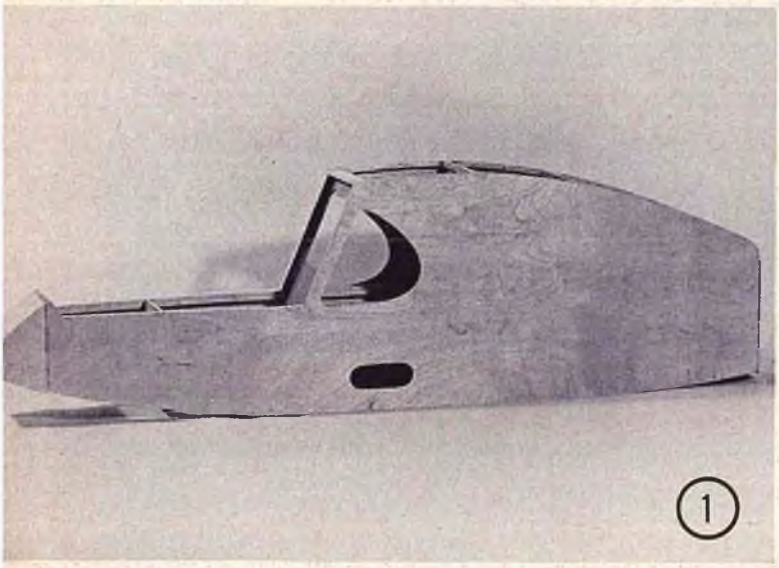
Author's helicopter hovering gracefully. Note lamp posts along road used as flying site.

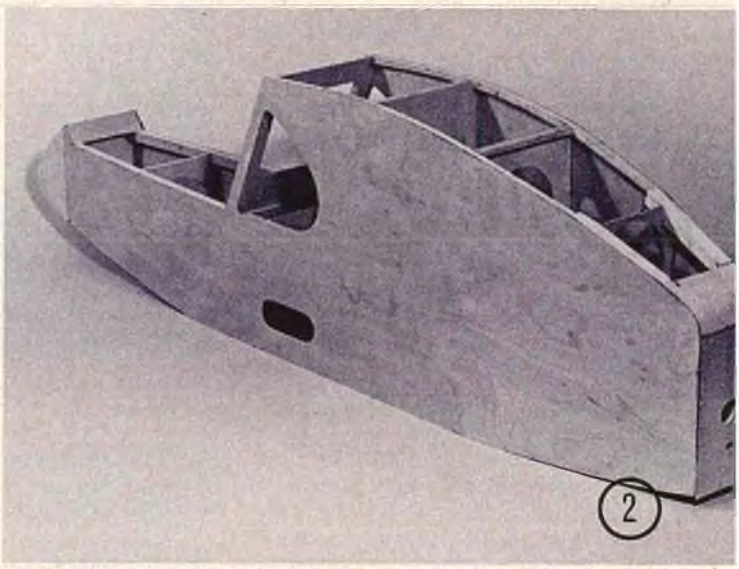


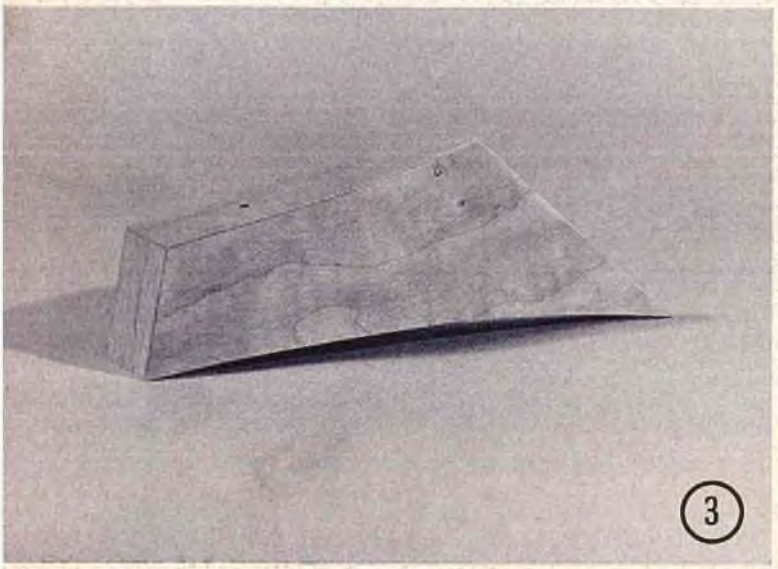
Nate flying his chopper from a confined space on a road - - - easy if wind conditions require.

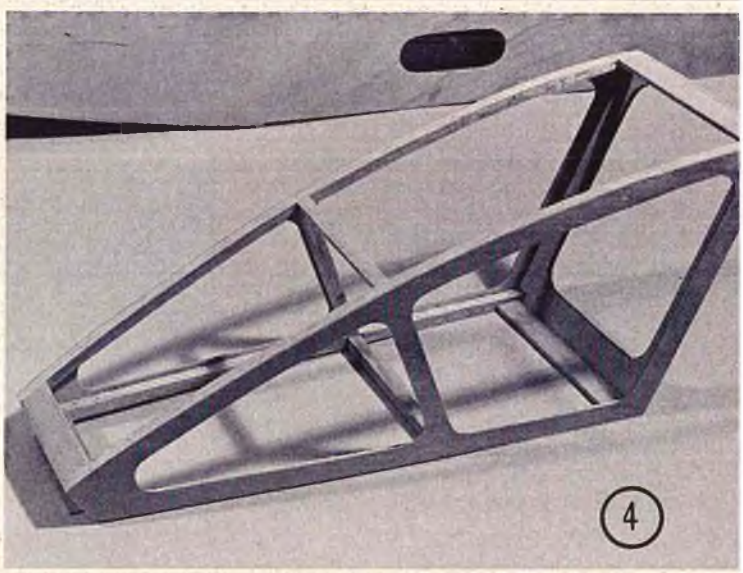
John Minassian makes a low pass with his RS. Ship was built one week and flown the next!

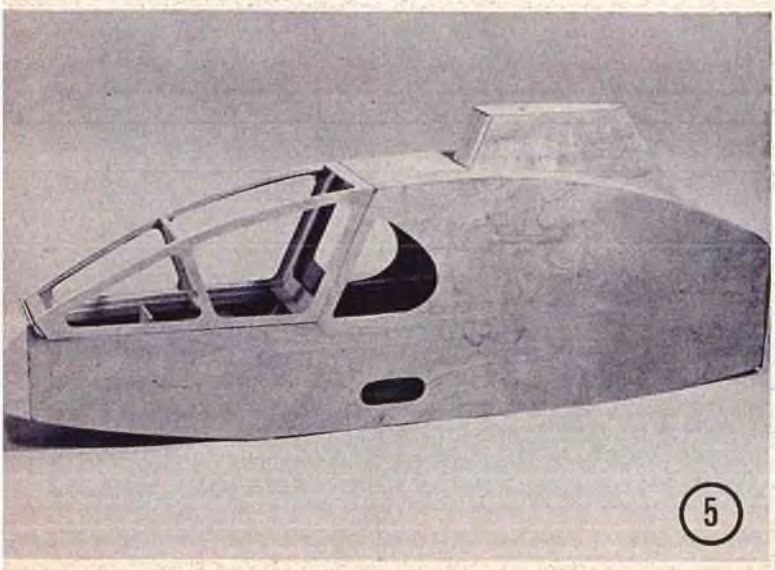
(1) Basic fuselage box, less top and bottom skin. (2) Another view of basic fuselage showing former and stringer locations. (3) Mast tower ready for installation on fuselage. (4) The canopy frame using optional 1/32" ply sides, eliminating twisting. (5) The completed fuselage, ready for attachment of tail boom. (6) Brass drive shaft housing fitted through slot in aluminum tail boom, before bending boom.

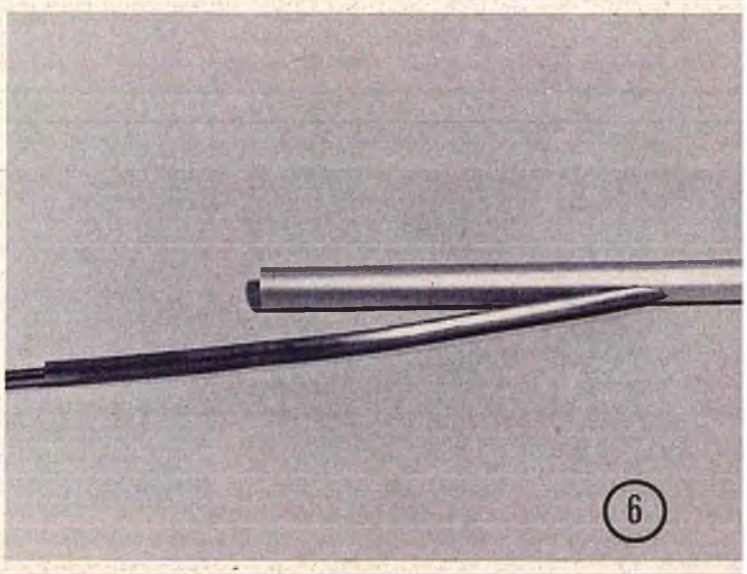




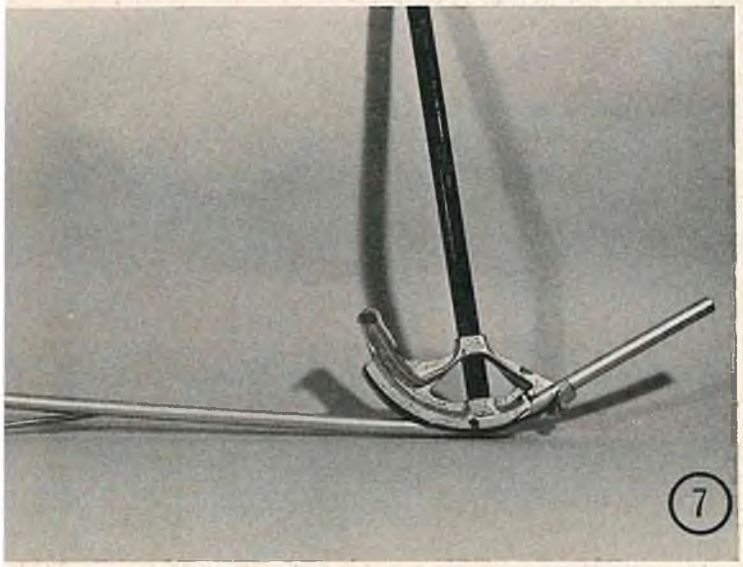


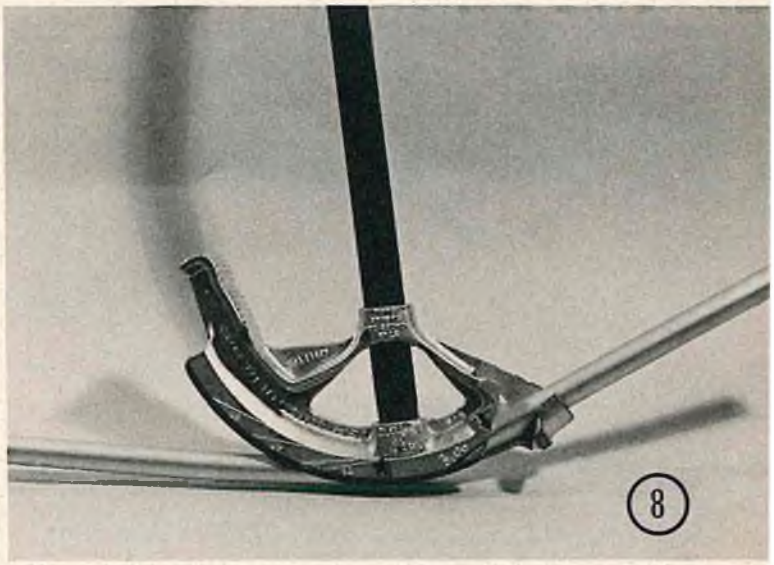


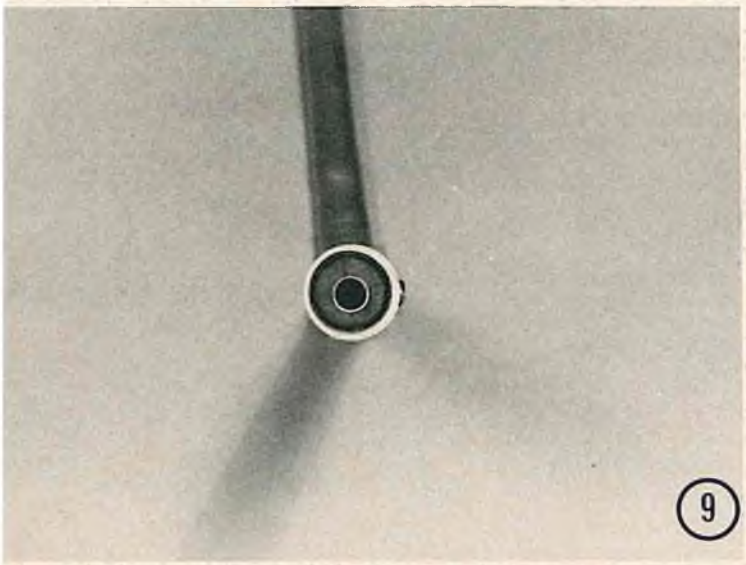


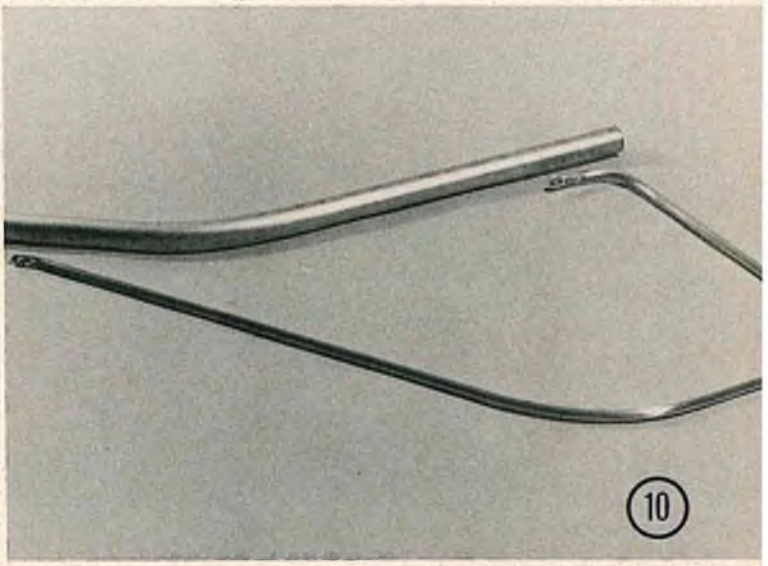


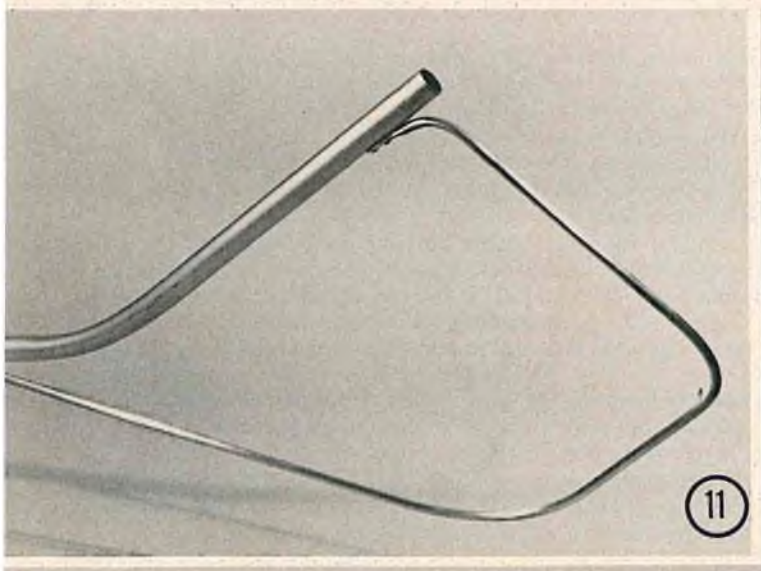
(7) With drive tube in place, both boom and drive tube are bent to conform to plans. (8) 3/4" conduit benders are available at most hardware stores - - - some even rent them. (9) On the RCM prototype, we added a wooden plug to center brass drive tube. (10) 1/4" aluminum fin and skid frame, ready to install. (11) Fin-skid frame in place. End of tail boom has been shortened to accept a tube adapter to fit our Schuco-Hegi gearbox. (12) Tail boom and drive shaft assembled into fuselage. Bottom rear skin can now be added.

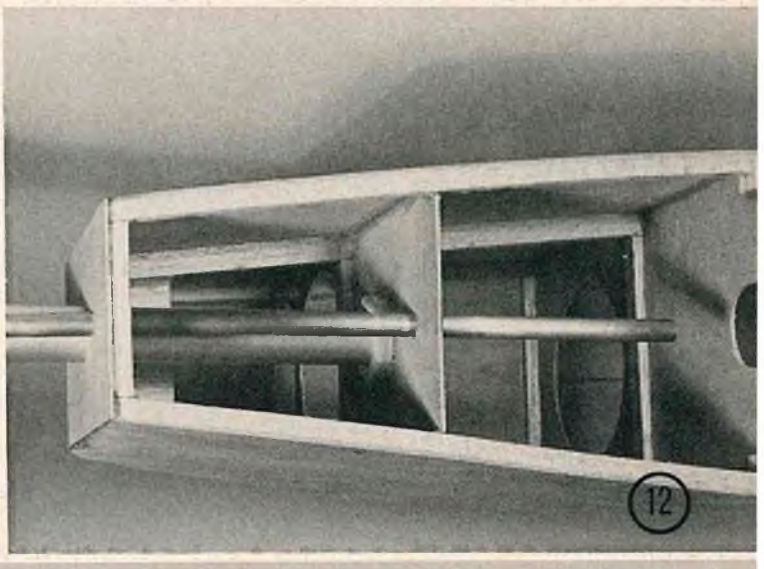


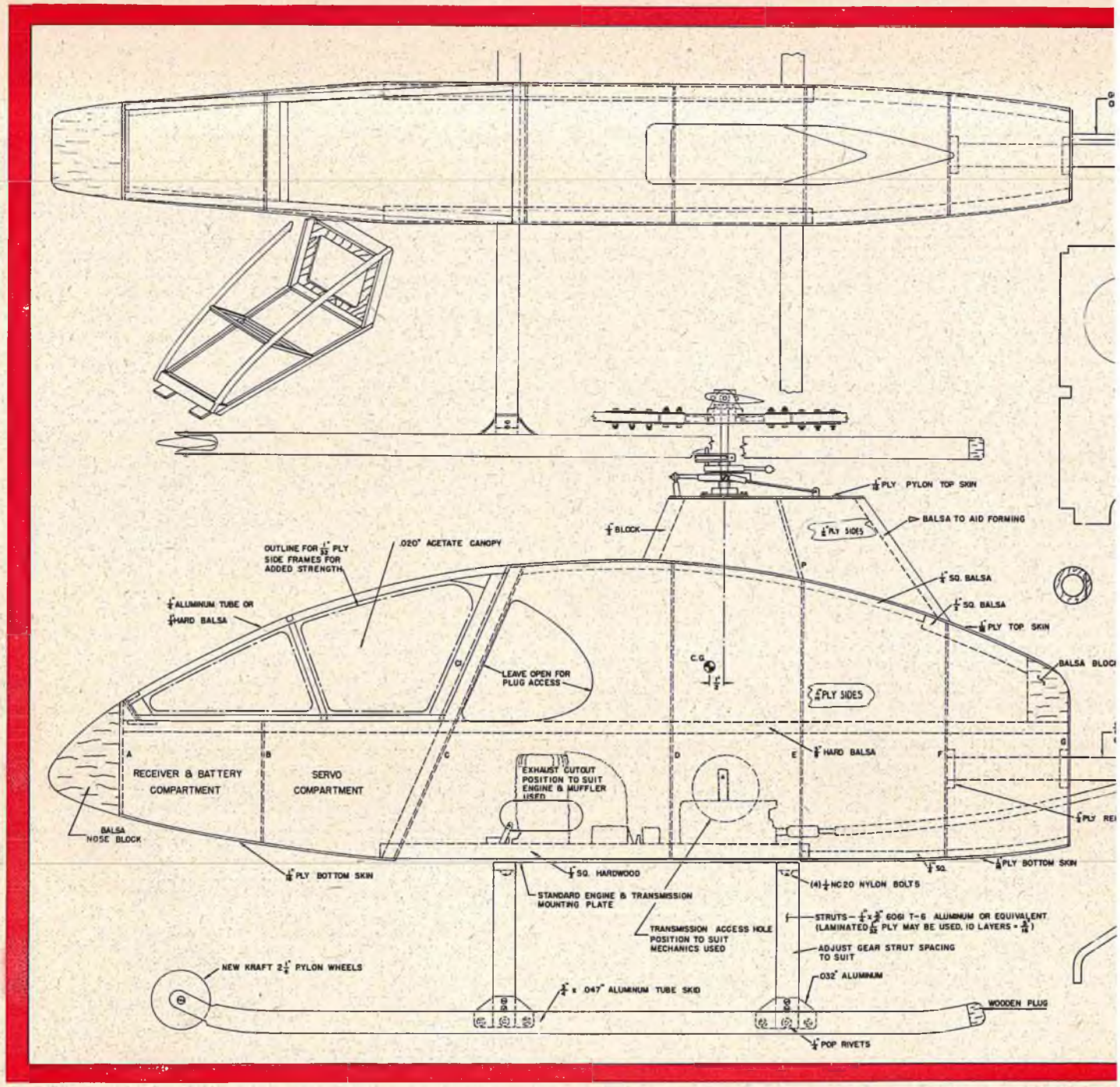












low cost. One of these sets was used in R S. It is possible that the reader might use my technique to obtain a set of mechanics to build R S or some other helicopter design.

Let's now say a little about design ideas and how the R S design was formulated. My first concern was that which is weighed by all other modelers about to embark on a new project. The question was with regard to scale versus non-scale. A lot of factors come into view here. In this case, the machine was to be an advanced trainer. My thought was to make it as quickly and cheaply as possible. Furthermore, the machine had to be easily repaired (old "crash" Nate, they call me). Therefore, I decided on a non-scale design.

The next main design question was size. Any model helicopter must be designed for a specific set of mechanics. R S designed around those which came from an old Schluter Huey Cobra kit (basically the same as sold today in the Shuco-Hegi Huey Cobra). Those mechanics use a .60 to .80 size engine and establish the following:

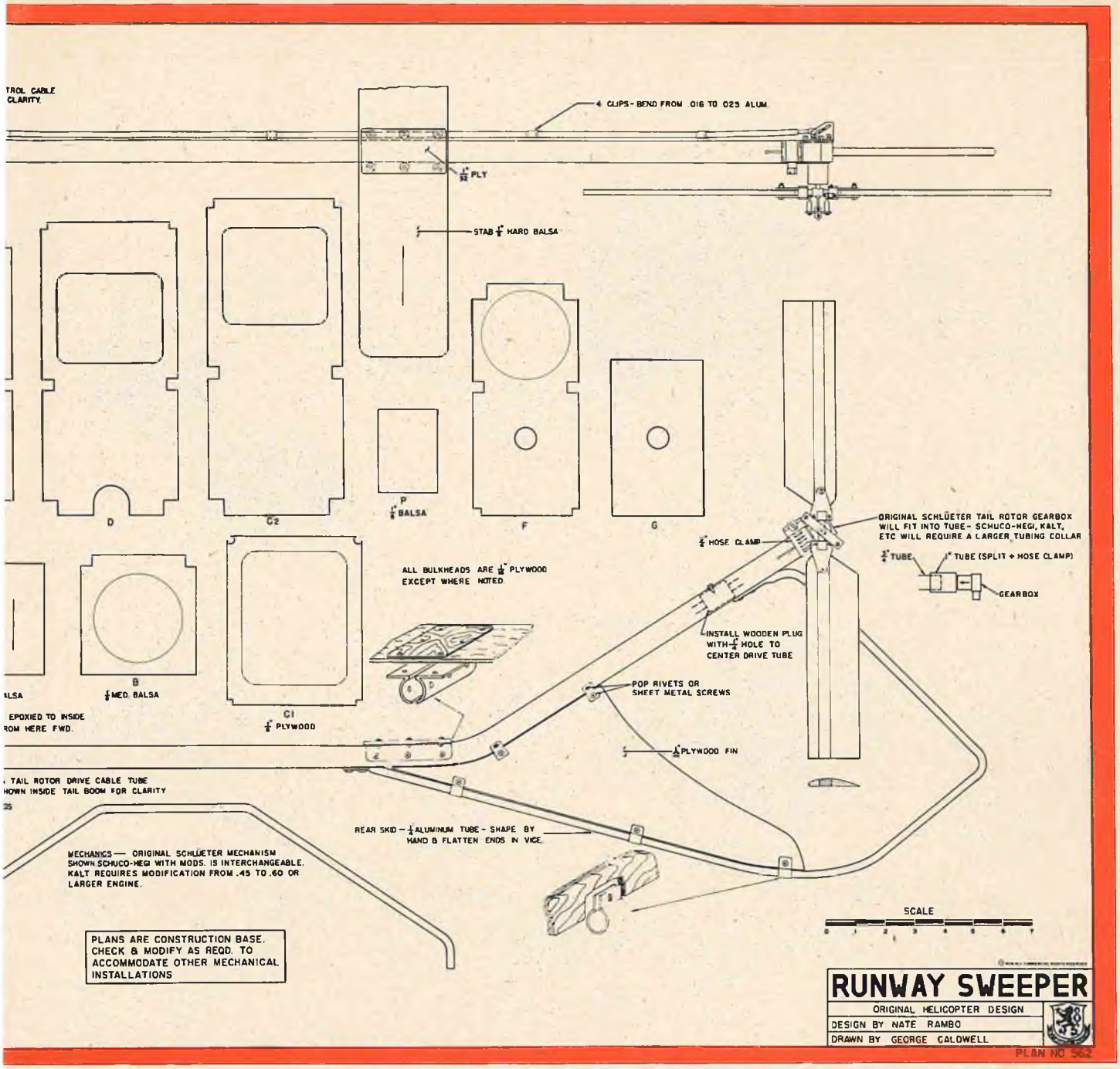
Main Rotor Diameter – 58 to 63 inches.

Tail Rotor Diameter – 14 to 16 inches.

These factors dictated the basic size of the R S design particularly with regard to tail length. Nose length was primarily a matter of being able to keep the Center of Gravity far enough forward. If a set of different mechanics were utilized, the size of R S would merely have been changed accordingly. For instance, a four-fifths size R S works out beautifully for the Kalt mechanism.

The design of the undercarriage shown on the plans is a compromise. Its size is somewhere between a very large training gear necessary for the new student and a small one suitable only for the experts. It is a skid type gear rather than wheel type because I thought wheels would roll when not desired. The two small wheels placed high on the forward end of the skids are for two purposes. The first is to permit high speed rolling take-offs. The second is to permit lifting the model by the tail boom and wheeling it around instead of carrying it.

The easy building and repairability



angle led me to design the R S with an aluminum tail boom. It is easy to make and particularly easy to replace after damage occurs because of engine failure, colliding with a street lamp, losing a tail rotor, shearing a drive pin, pilot error, etc., etc. (Naturally, I categorically deny ever personally making a pilot error!) After tail boom replacement, the ship can often look like new instead of showing repair scars like wood fuselages show.

The R S tail boom was designed low with an upward sweep at the back in order to get plenty of rotor clearance without having to put mechanical flapping restrictors on the rotor head. The upward sweep puts the tail rotor high to prevent rolling moment from the rotor side force and provides good ground clearance without a high landing gear. This helps prevent roll-overs.

The easy building philosophy led me to design the main pod on the R S like a box. All modelers know that there is nothing easier to design or build than a box-type fuselage. So I elected to use this simplest of methods. Actually, the entire helicopter is very simple as is attested by the fact that my good friend John Minassian built and flew his R S within a period of a week.

While establishing the basic R S design ideas, I kept constant attention to using easy-to-procure materials. Going back to the aluminum tail boom, a piece of 3/4-inch diameter by .047 wall thickness Reynold's soft aluminum tube was selected. This is readily available at any hardware store and is soft enough to permit bending with an electrician's pipe bender. The 1/4" diameter brass tail rotor drive tube must be in place prior to bending this boom. Thinner wall tubing (.035) is acceptable but must be cut and spliced rather than bent. When slotted at the back end, the 3/4" boom will conveniently hold the Schluter tail rotor gear box. For the Schuco-Hegi or Kalt mechanism, see details on plans. An automobile hose clamp tightens the gear box in place. If the original drive shaft is in poor shape, a piece of large (truck) speedometer flexible drive cable is acceptable if the 1/4" brass tube is bent with a large radius.

It is of note that a three foot

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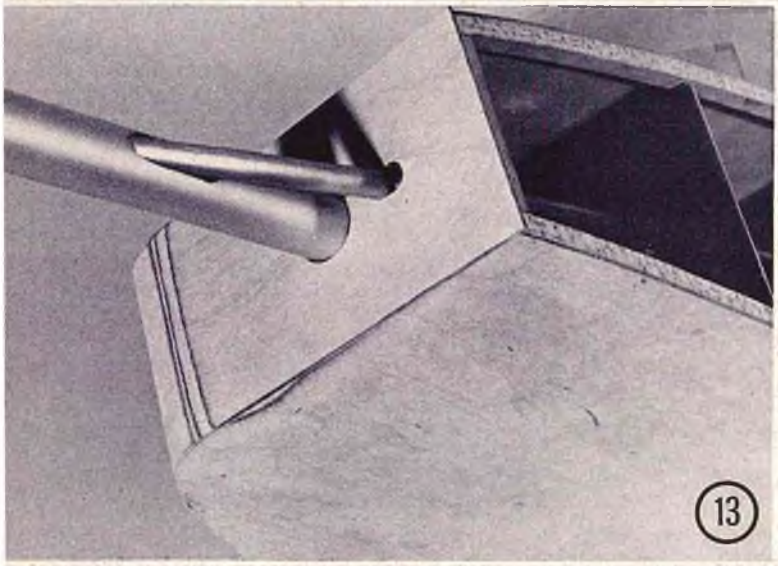
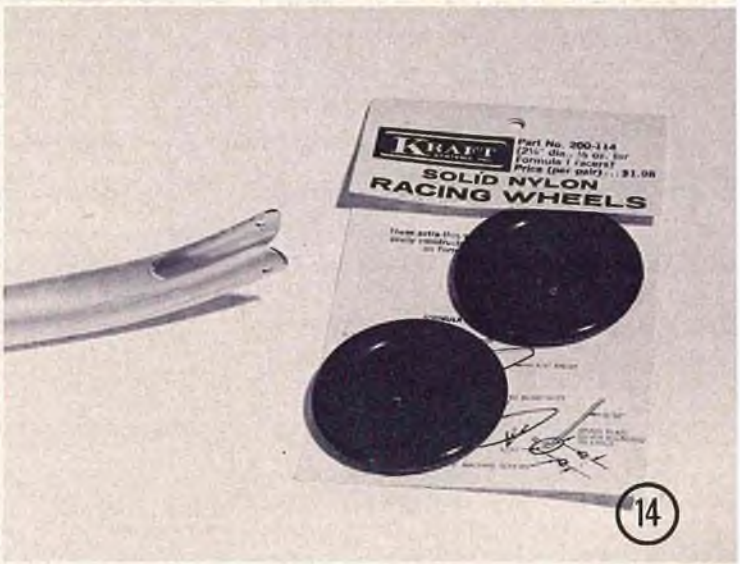
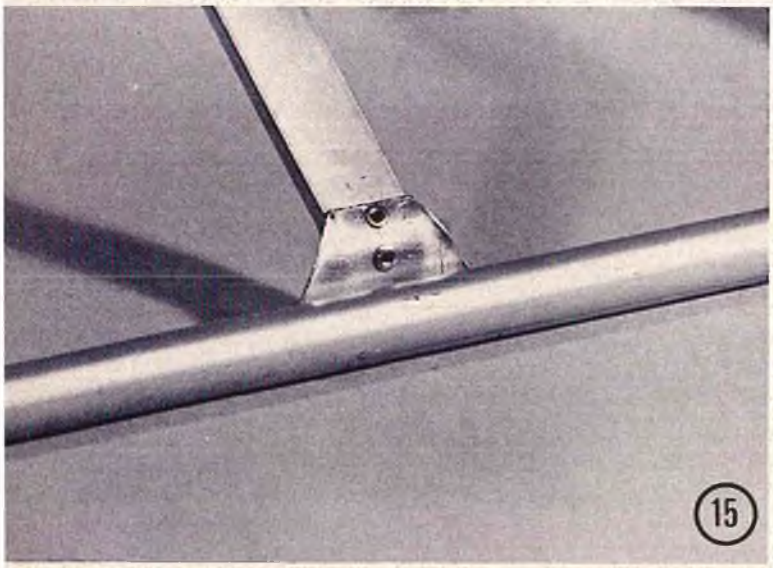
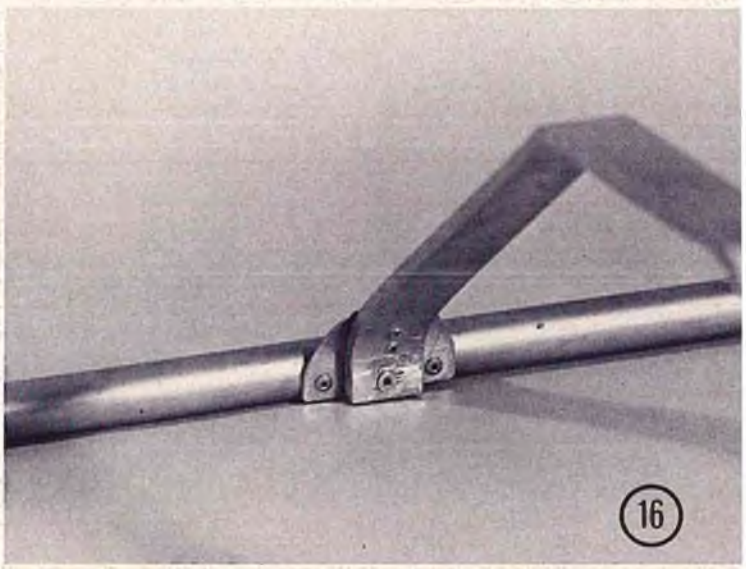
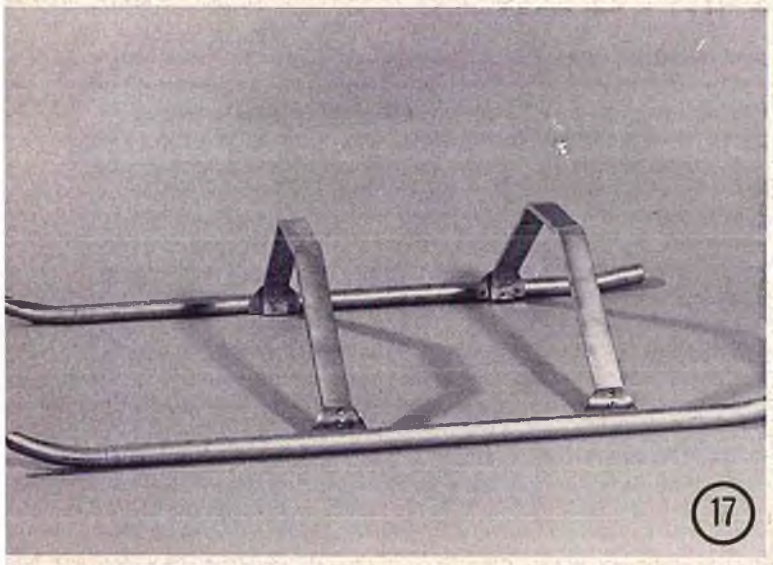
(13) Another view of tail boom and drive shaft assembled into fuselage. (14) New Kraft racing wheels used in slots in front of skids. (15) Aluminum struts and patch plates pop riveted to skids. (16) Another view of skid-strut attach points. (17) The completed landing gear. (18) Alternate gear construction using laminated 1/32" plywood arch struts with wrap-around clamps on to skids.

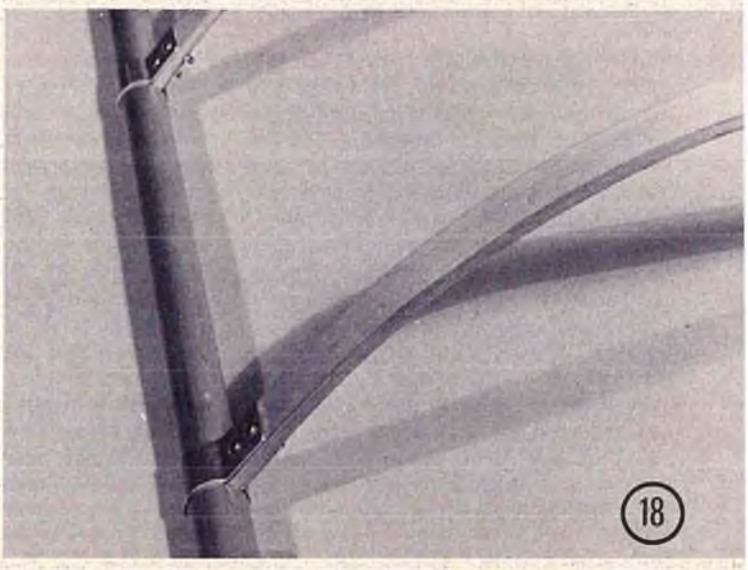




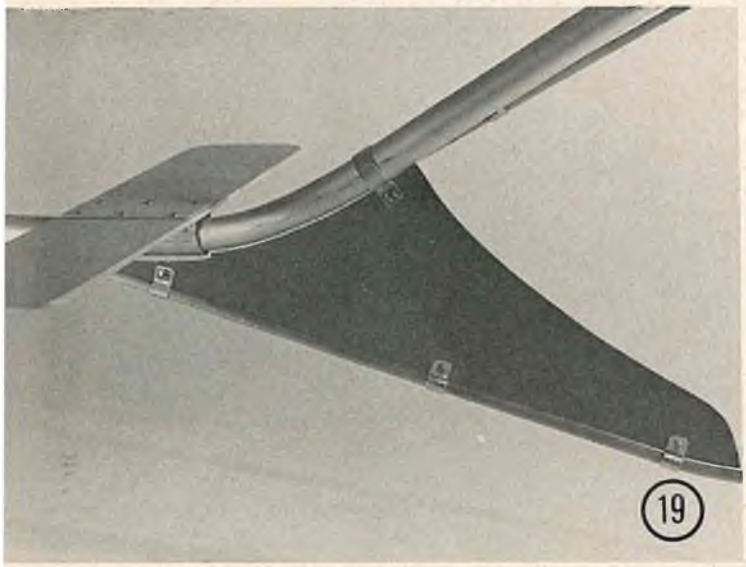


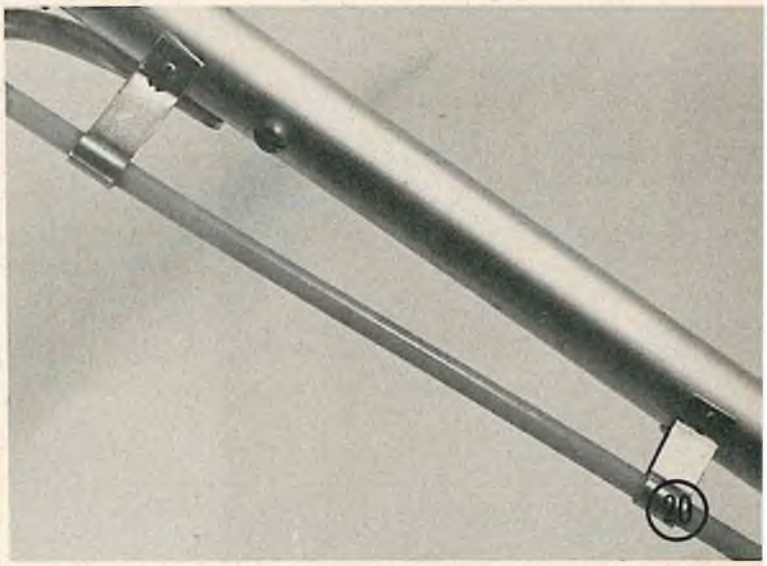


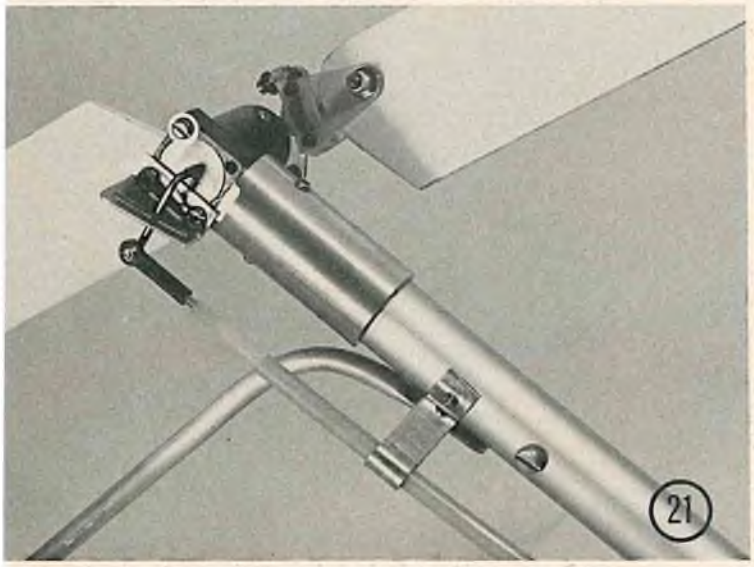


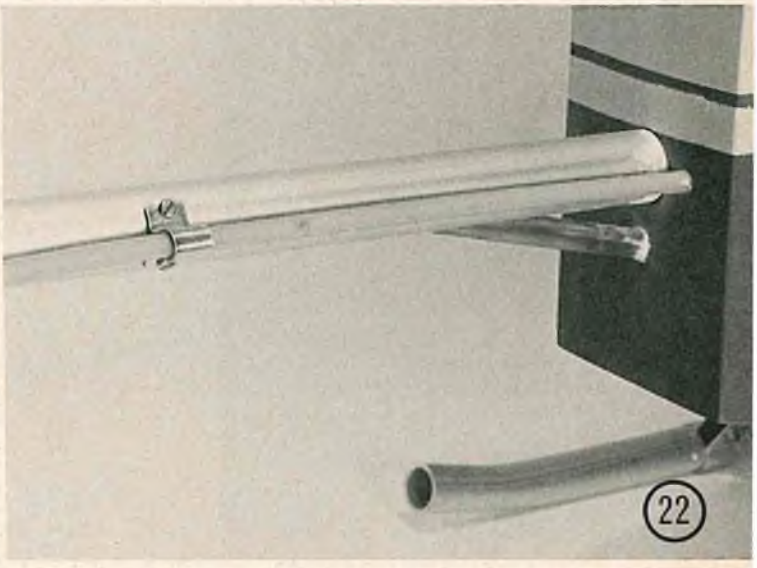


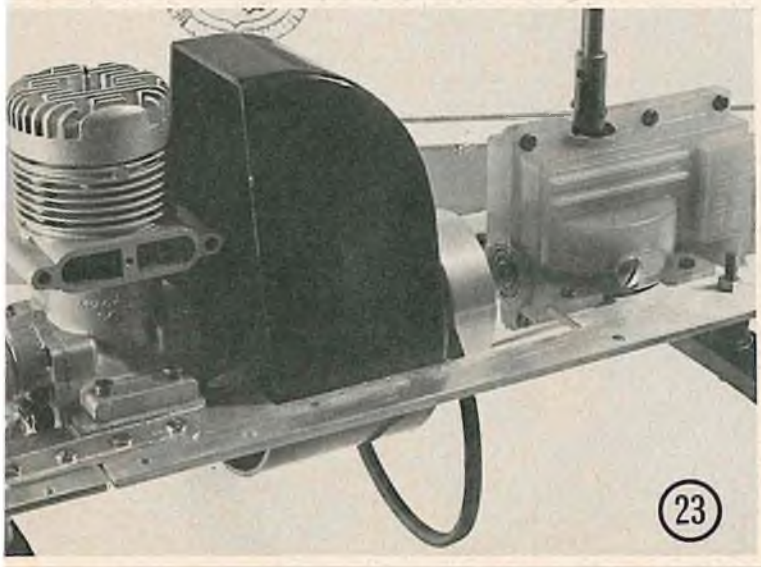
(19) Thin aluminum straps used to attach ply stab and fin. (20) Aluminum posts fabricated to support tail rotor control tube. We used sheet metal screws instead of pop rivets for convenience. (21) Tail rotor installed. We machined the aluminum adapter sleeve for a force fit on boom. A piece of standard tube could have been split lengthwise and used with hose clamp. (22) Boom, drive shaft, and tail rotor control rod as they exit fuselage. (23) Mechanical drive train – Hegi with S.T. .71 - - - ready to be mounted in RS. Short adapter plate behind engine was necessary to adapt gear strut spacing to Hegi mechanics. (24) Tank can be mounted inside, but it is easily visible here. Transmission can be seen through access hole to allow checking of fluid level.

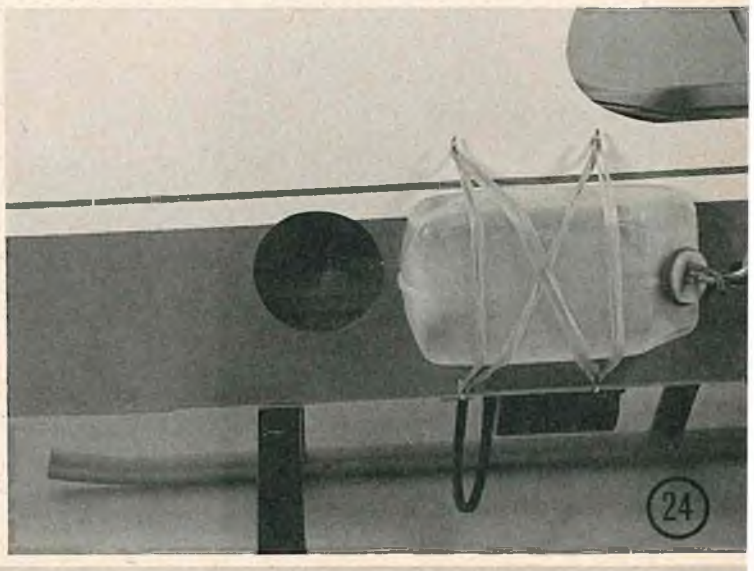




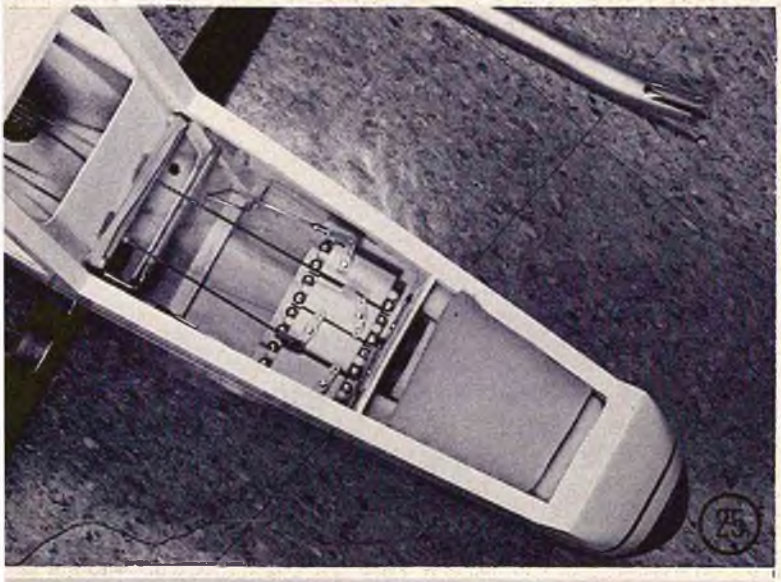


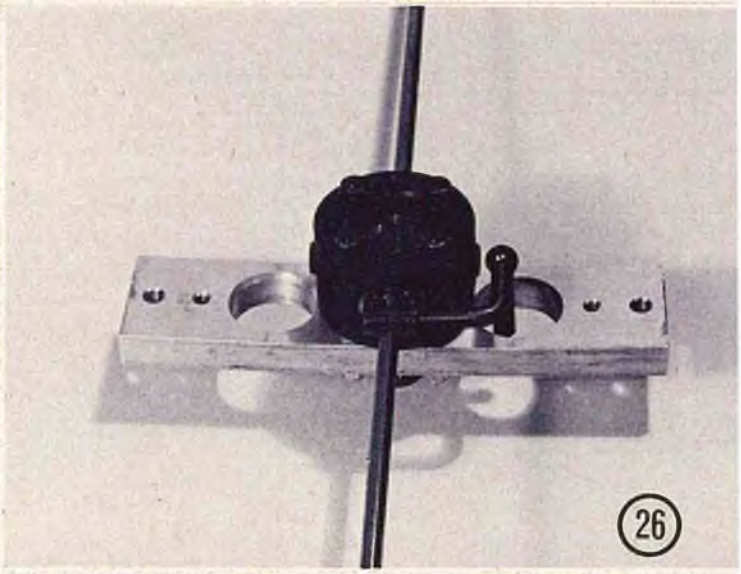


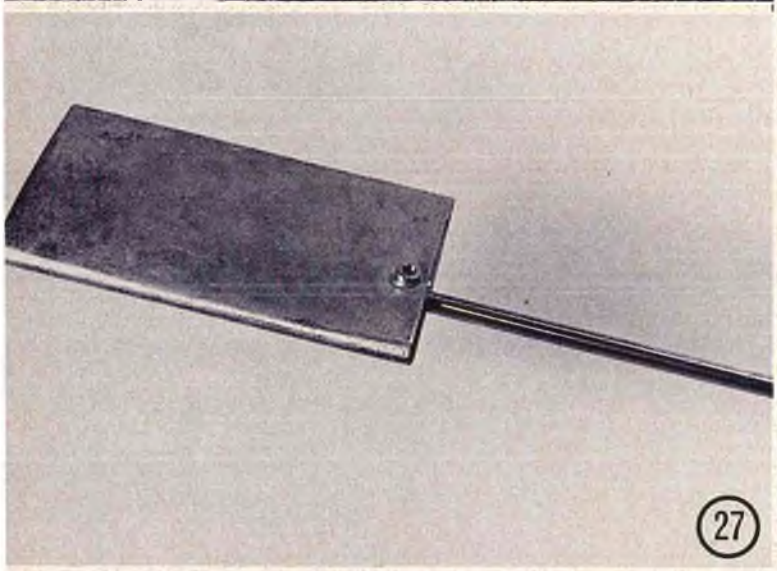


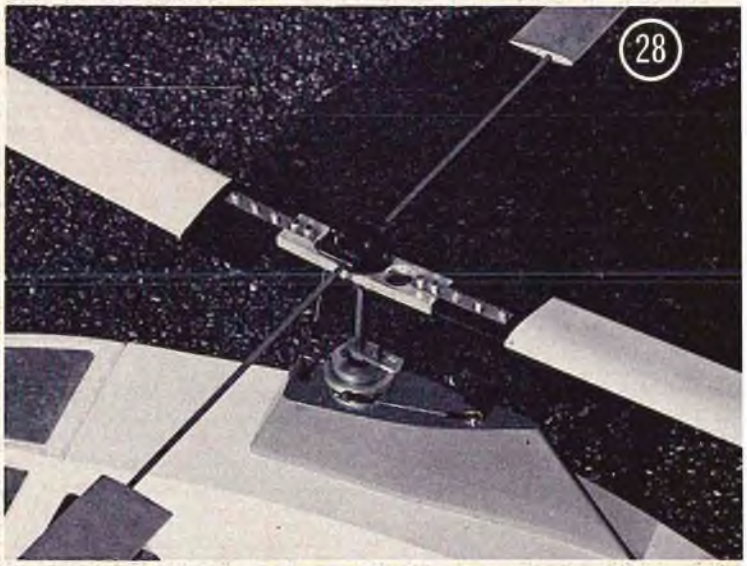


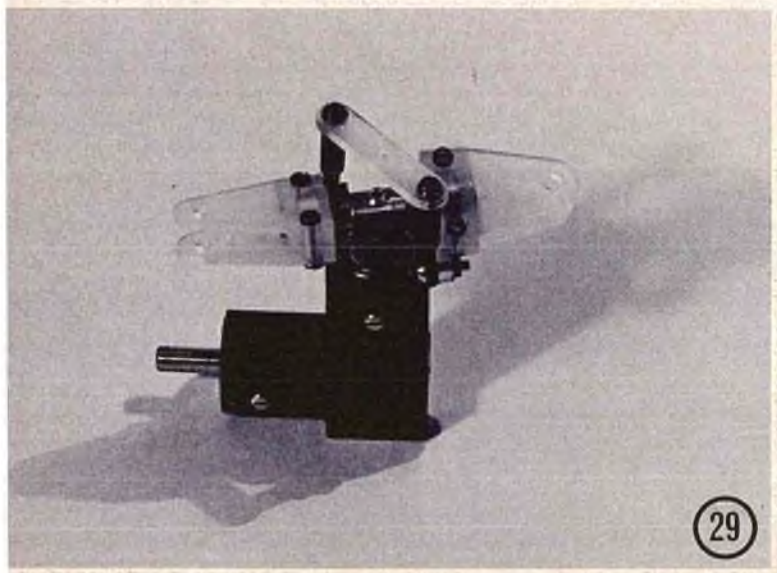
(25) Radio installation. Four World Engines S5A servos fit neatly side-by-side. The two center servos drive bellcranks to cyclic controls. Receiver and battery foam packed in front compartments. (26) View of Schuco-Hegi rotor head assembly. (27) Close-up of Schuco-Hegi paddle bar and flybar installation. (28) Completed head for Runway Sweeper. (29) Schuco-Hegi tail rotor gear box assembly. (30) Completed tail rotor mechanism. Schuco-Hegi components available from Model Helicopters, Tustin, California.

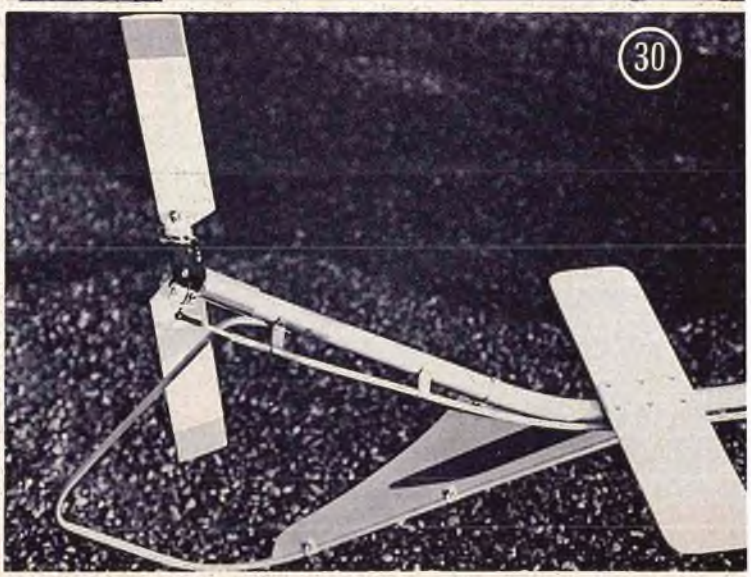












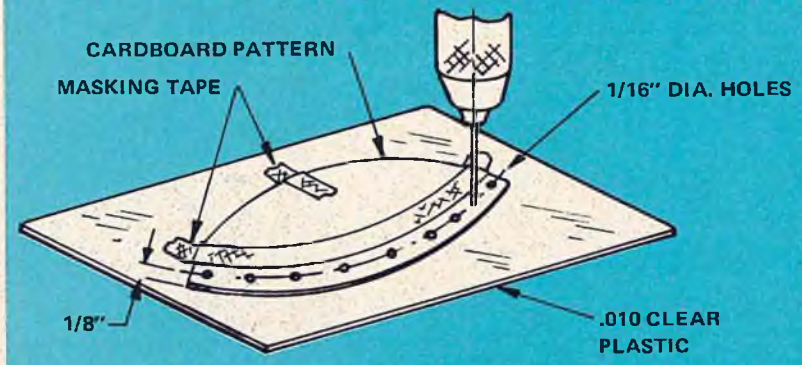
Here's how to make WINDSHIELDS

BY JERRY SMITH

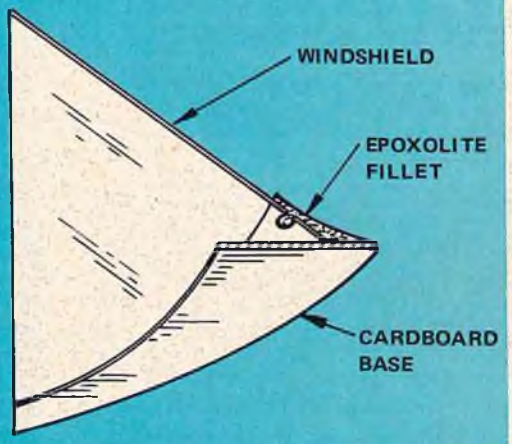
YOUR FAVORITE OPEN-COCKPIT BIPE IS SITTING ON THE WORKBENCH ALMOST COMPLETE, THAT IS, EXCEPT FOR THE WINDSHIELD. OH HOW I HATE TO FOOL WITH A WINDSHIELD YOU SAY TO YOURSELF. SIMPLY BECAUSE YOU HAVE HAD A BAD EXPERIENCE IN THE PAST IN TRYING TO BUILD ONE OR, PERHAPS YOU JUST PLAIN DON'T KNOW HOW. OK, READ ON, SOMEONE IS GOING TO SHOW YOU HOW.

THE BASIC CONCEPTS OF THIS WINDSHIELD ARE: TO PROVIDE AN EASY BUILDING CONSTRUCTION METHOD, EASE OF ATTACHMENT TO THE AIRCRAFT, AND A COMPLETE ASSEMBLY THAT CAN BE FINISHED AND ATTACHED TO THE AIRCRAFT AS A SEPARATE ITEM.

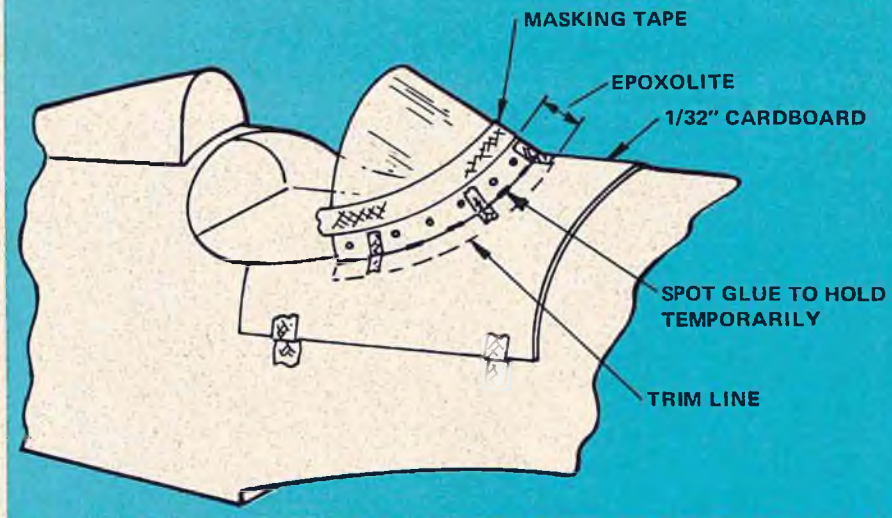
THE MAIN FEATURE OF THIS BUILDING METHOD IS THE ROW OF SMALL HOLES ALONG THE BOTTOM EDGE OF THE WINDSHIELD. IN FORMING THE BONDING FILLET WITH SIG EPOXOLITE, SOME OF THE MATERIAL IS FORCED THROUGH THE HOLES FORMING SMALL NODES ON THE FAR SIDE. THESE RETAIN THE WINDSHIELD TO THE MOUNTING BASE MOST EFFECTIVELY. THIS IS A SURE-FIRE BUILDING METHOD AND THE END PRODUCT IS ABSOLUTELY FANTASTIC!



DEVELOP WINDSHIELD PATTERN ON STIFF PAPER. TAPE PATTERN DOWN ON .010 CLEAR PLASTIC. DRILL 1/16" DIA. HOLES (APPROX. 3/16" APART) EQUALLY SPACED AND IN LINE ACROSS THE BOTTOM AS SHOWN. NOW CUT OUT WINDSHIELD.



CROSS SECTION OF WINDSHIELD ASSEMBLY



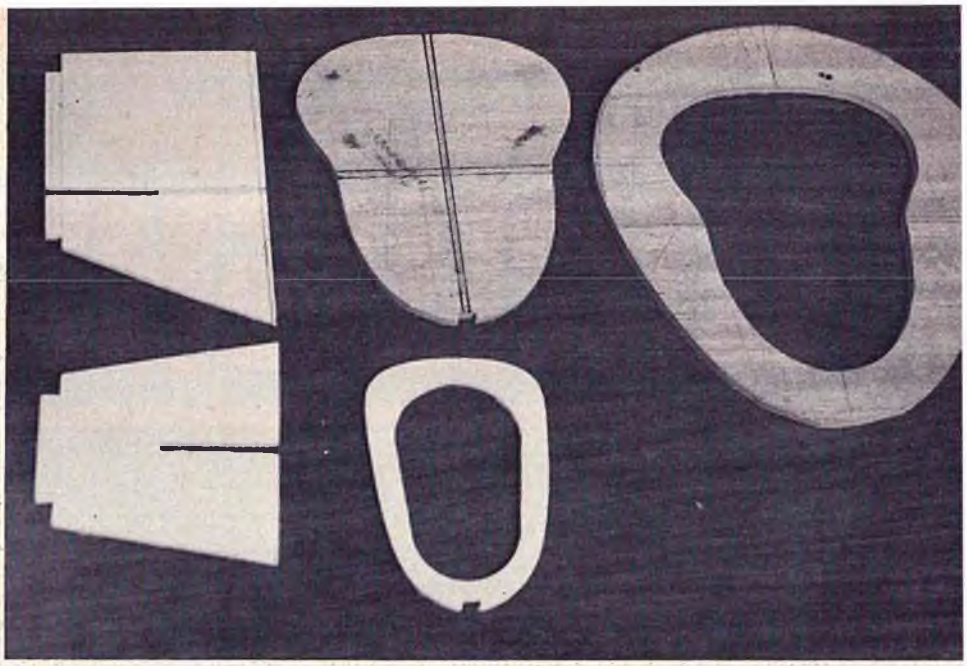
ON 1/32" CARDBOARD TRACE AND CUTOUT FORWARD CONFIGURATION OF COCKPIT. TAPE SECURELY TO FUSELAGE. LOCATE WINDSHIELD AND HOLD TEMPORARILY WITH TAPE. NOW SPOT GLUE. WHEN CURED, REMOVE HOLDING TAPE AND APPLY A SMOOTH FILLET OF EPOXOLITE TO JOINT. ALLOW TO CURE OVERNIGHT. TRIM OFF EXCESS CARDBOARD AND CAREFULLY REMOVE TAPE NEXT TO FILLET. FINAL TRIM MOUNT-FLANGE AND LIGHTLY SAND TO SHAPE.

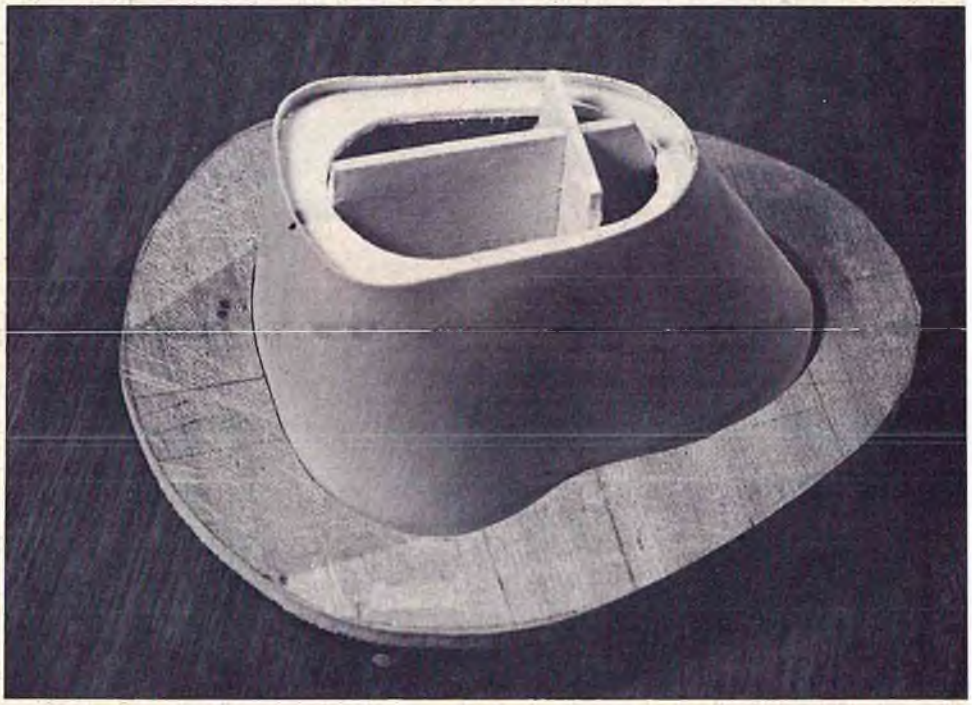
FOR ADDED DEATAIL — PAINT FLAT BLACK INSIDE AND ADD GLUE DROPS FOR RIVETS

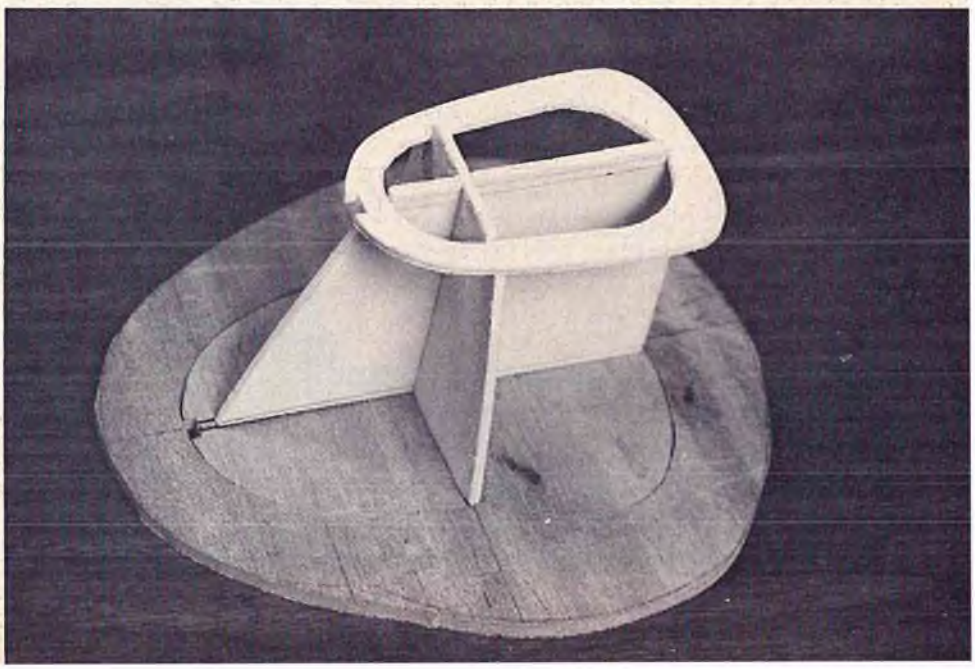
FINISHED WINDSHIELD WILL SPREAD SLIGHTLY FROM ORIGINAL CONFIGURATION. IT IS EXTREMELY FLEXIBLE AND WILL RETURN TO ORIGINAL SHAPE WHEN BONDED TO THE FUSELAGE.

ANOTHER WAY TO MAKE A COWL

PHOTOS AND TEXT BY
DICK TICHENOR



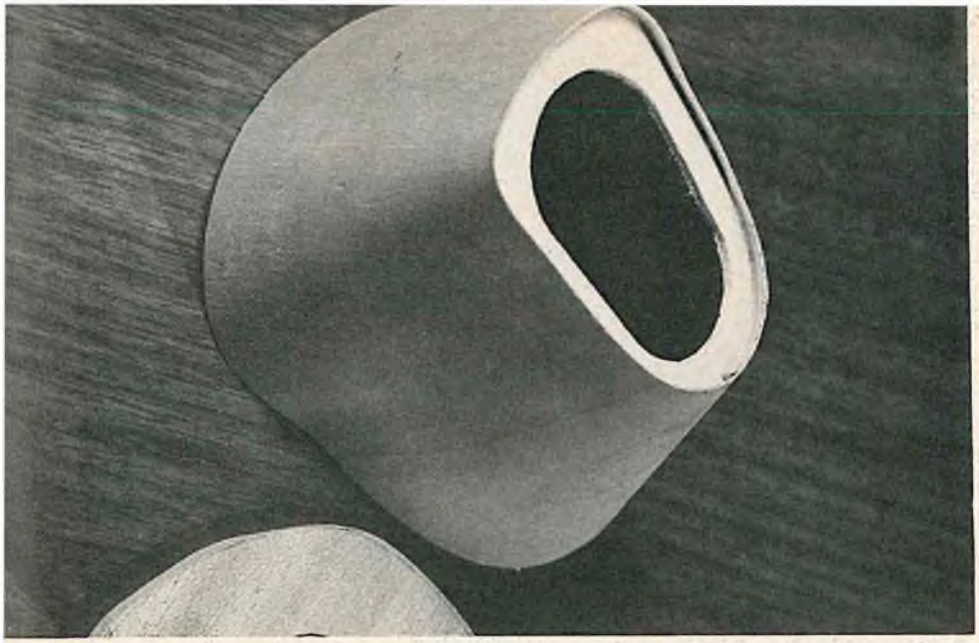


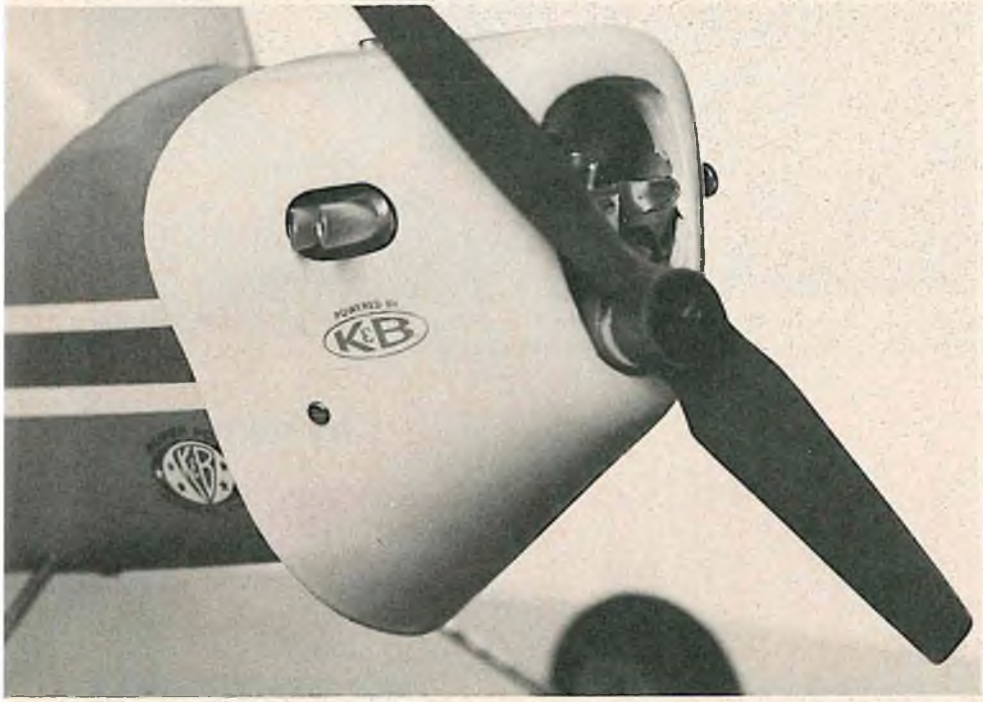


Our Fearless Leader liked the cowling building technique that we used on the forthcoming "RCM Senior Citizen" old folks type aeroplane and asked for a how-to-do-it article. Sometimes you get tired of seeing an engine sticking out in the breeze and want to hide it. That's dandy if you can do the things necessary to make it practical. You must consider cooling, accessibility, light weight and easy construction. This particular cowling meets those requirements and I have since built cowlings for several other models using the same technique.

From your plans you need a cross section of the cowling at the nose and another at the forward side of the firewall. From 1/8" plywood, cut a former for the nose section. From 1/4" plywood, (any cheap plywood will do), lay out the cross section at the firewall. Draw a ring about an inch outside that. On each side of the vertical centerline at the firewall. Draw a ring about an inch outside that, on each side of the vertical centerline at the bottom, drill 2 holes, 1/8" diameter, to be used for inserting a Dremel or coping saw blade. Saw out the former and leave the ring intact.

A vertical and a horizontal spacer can be layed out to hold the formers in their proper locations. Notch the front end of the spacers to slip inside the nose former. Use aliphatic resin or epoxy to secure the spacers to the 1/4" ply former.





Here's an easy way to make a cowling in only a few minutes time. Don't try it on compound curves – just on simple cowl shapes. The step-by-step photos are self-explanatory.

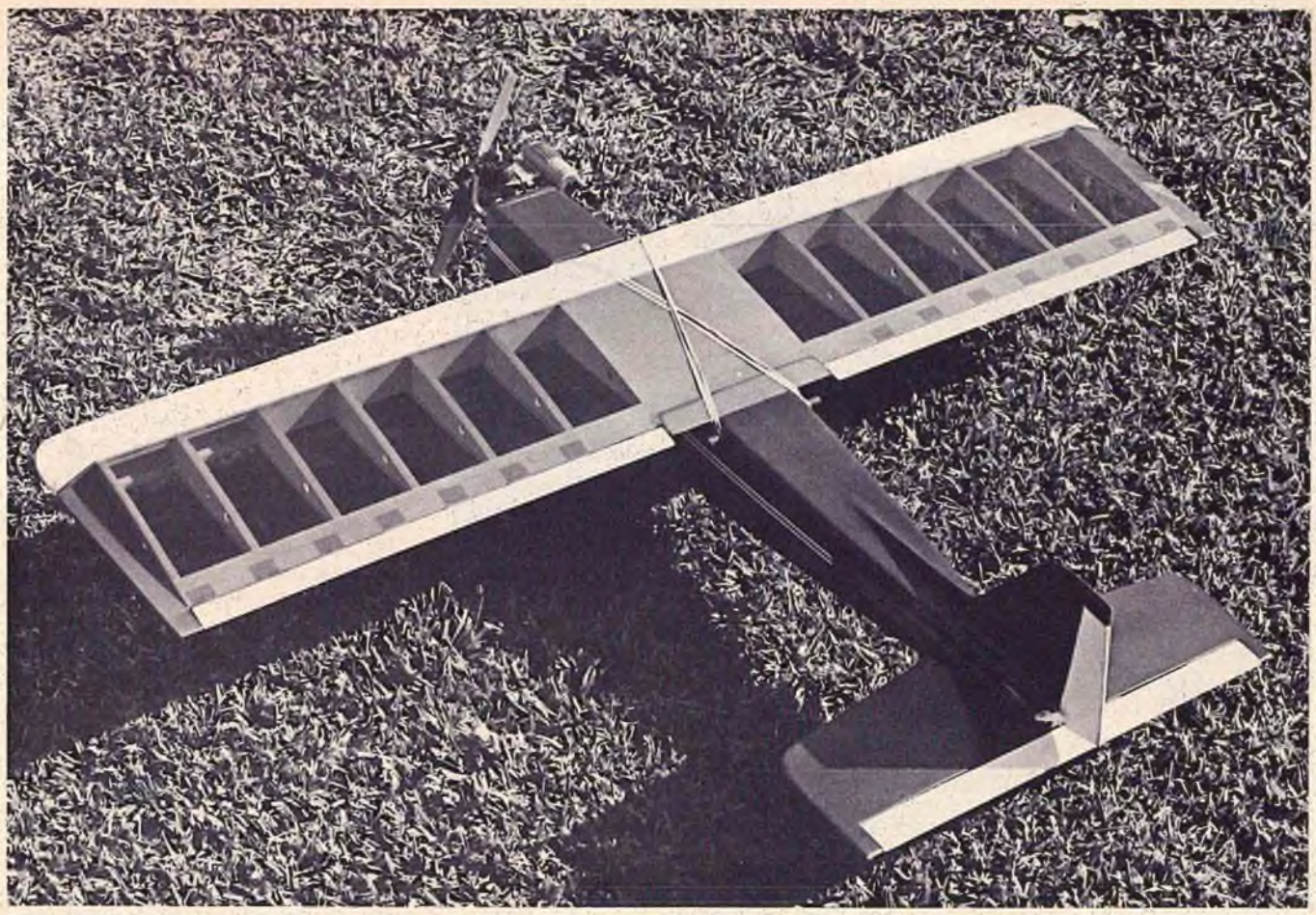
On the Senior Citizen, a length of 1/4" square spruce was notched to fit the notches on the bottom centerline of the formers which served as a splice plate for joining the skin. A piece of heavy paper is wrapped around this fixture and trimmed a little bit oversize (1/8" to 3/16" trim) front and rear. The wrap around skin of 1/32" plywood was cut to size from the paper pattern. Be sure the grain is running fore and aft. Wet the plywood (just stick it under the water faucet) and it can be easily bent right around the fixture.

Spread aliphatic resin on the edge of the nose former and the bottom splice plate, wrap the plywood skin around and push the ring from the aft former down as far as needed to hold the skin tightly around the former. Spring-type clothespins can be used to hold the skin in position around the nose former. Lots of rubber bands are helpful to hold the shape between the formers. Check to see that everything is lined up the way you want it and is held snuggly in place. Let it dry thoroughly, overnight or longer, and remove the holding gadgets.

Now you can trim the skin flush with the nose former and glue on balsa blocks of the proper thickness to get the desired nose shape. After sanding the balsa nose to shape, we used a Dremel grinder to hollow out the inside. We used #2 sheet metal screws through the cowl and into pine blocks epoxied to the firewall for attachment to the aeroplane. With the cowl screwed in place we marked the aft edge for final trim. Relief notches were cut as needed to clear the throttle linkage and fuel line. Holes were cut for the needle valve, exhaust stacks and glow plug access.

When you have all the desired fits and clearances, a couple of coats of sanding resin and gingerly applied sandpaper will have the cowl ready for primer and paint.

Our description is, as we said, for the RCM Senior Citizen. Unfortunately this method will not work on cowlings with compound curves but you will be surprised how many applications of "wrap-around skins" are used on full size aircraft. Radial engines used them regularly. That 1/32" plywood is good stuff and we recommend it! □



The 2-Bits is an excellent general sport ship or Quarter Midget trainer. RCM's prototype covered in metallic red, transparent red, and white Solarfilm with DJ's Multi-Stripe trim. O.S. Max .15, RS Systems radio.

RCM TESTS THE

by don dewey

MODELS WEST 2-BITS

● The 2 Bits was originally designed as a Quarter Midget Trainer that would be quick and easy to build and is kitted by Models West, P.O. Box 2257, Phoenix, Arizona 85002. However, powered by a K & B .15 engine or new Taipan Schneurle .15, this machine has proved to be competitively fast and stable. When powered by a standard .15 engine, such as an O.S. Max, it remains very stable enabling it to be a fun sport plane.

The 2 Bits was tested on a standard Quarter Midget Pylon course and, flying at an altitude of approximately 30 feet, using knife edge turns with full up elevator, there was no snap tendencies or loss of altitude. The wing is a flat construction, no dihedral and designed strong enough for Solarfilm

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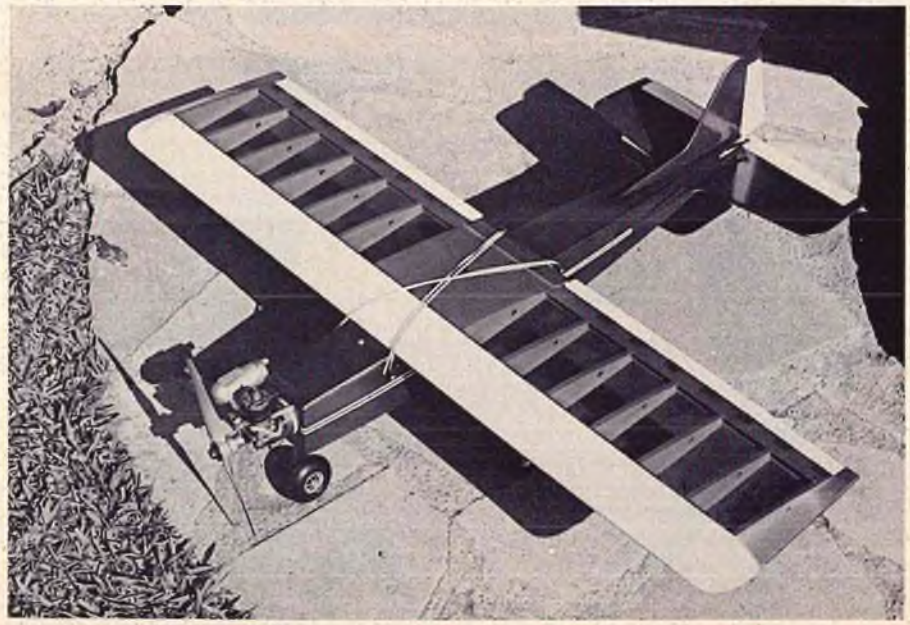

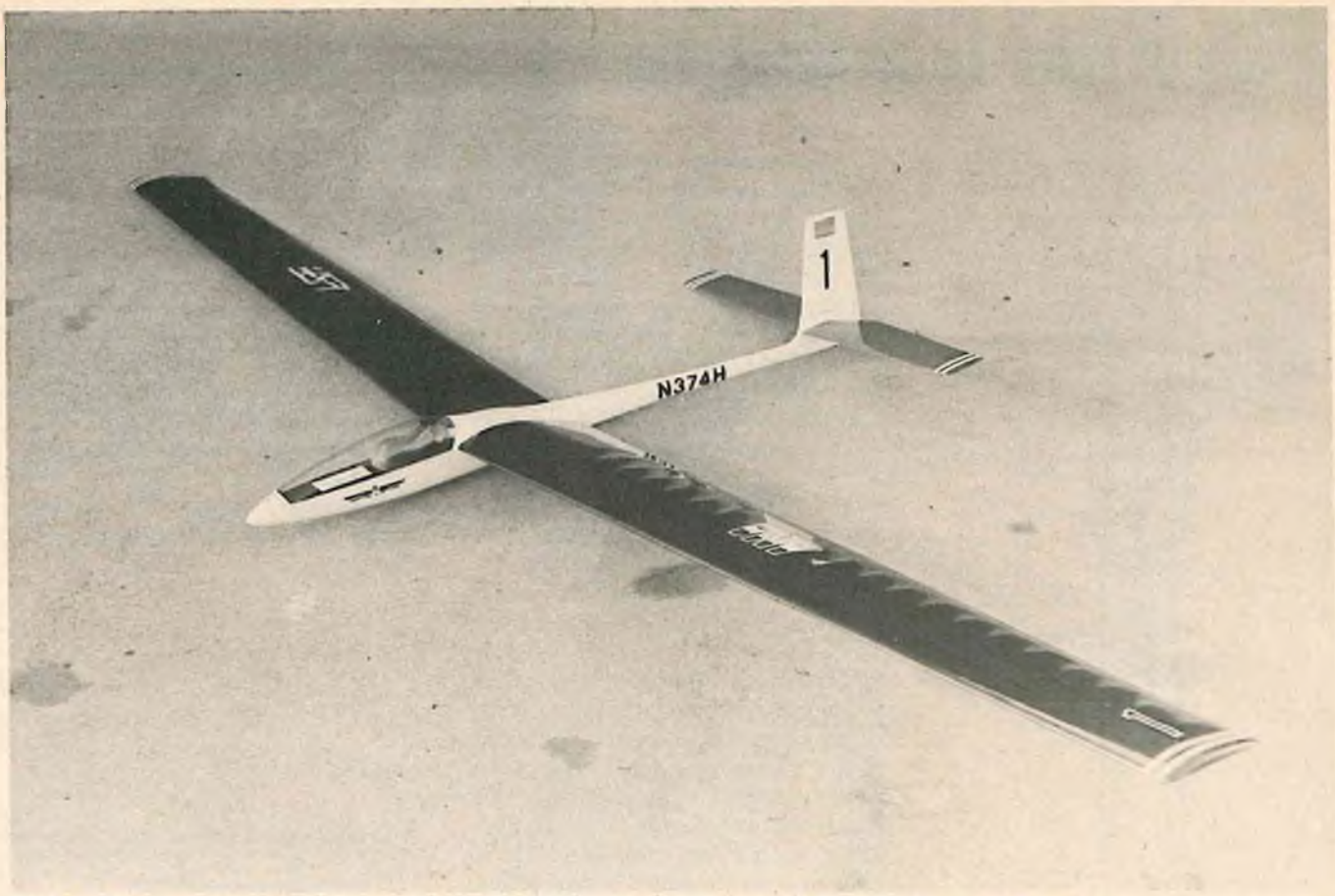

The Gull, resplendent is red, blue and white finish. Get a magnifying glass and look at that pilot!

RCM TESTS THE

by gil horstman

T&h GULL

● Have you ever wanted to do something but for one reason or another never got around to it?

Well, this sailplane is such a project. Gliders, much like sailboats, had been of some interest to me, but not enough to actually get started. That is, until Fathers Day when my family provided me with a Gull kit.

Well-wishers had suggested that the Gull was a little "hot" for a beginner, and after flying it I'd say they were right. The soaring novice should start with something less competitive but, if

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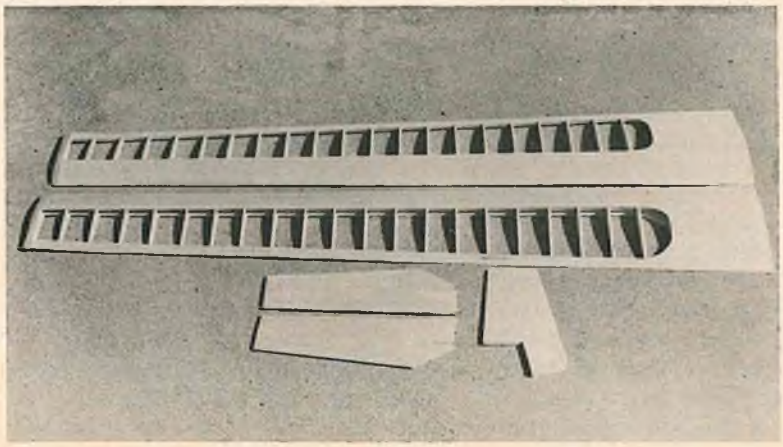
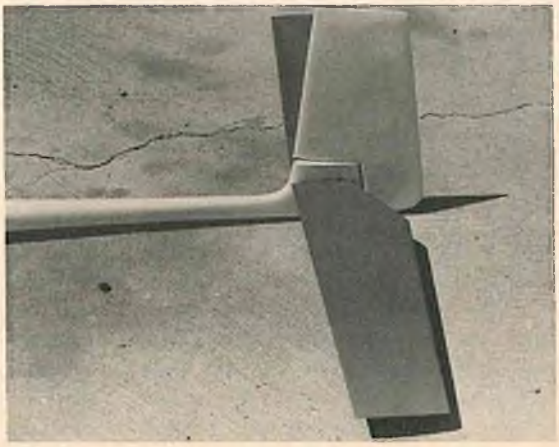
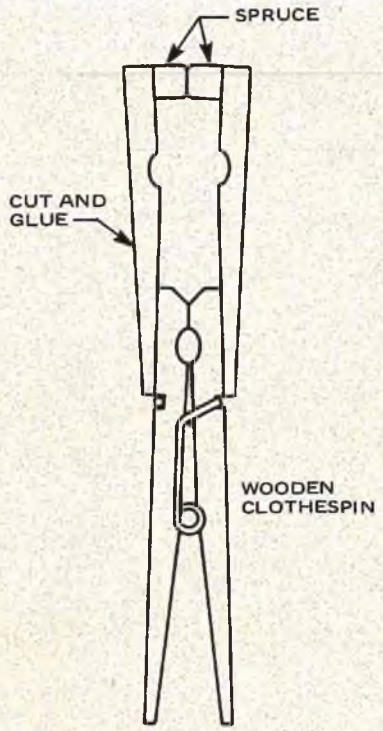
All of the wing and empennage parts, ready for sanding.



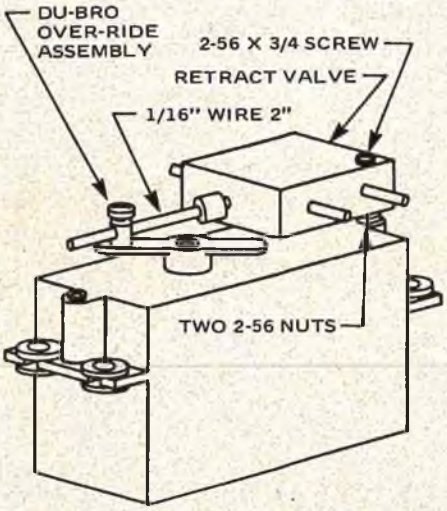
The all flying vertical fin gives more than ample control response.



FOR WHAT IT'S WORTH



There is an excellent clamp suggested by Wallace Looney of Portland, Oregon. It is made of two clothespins glued together with a little piece of spruce to act as a clamping surface. You can make twenty-five of them for about 69 cents and you'll find them an invaluable building aid.



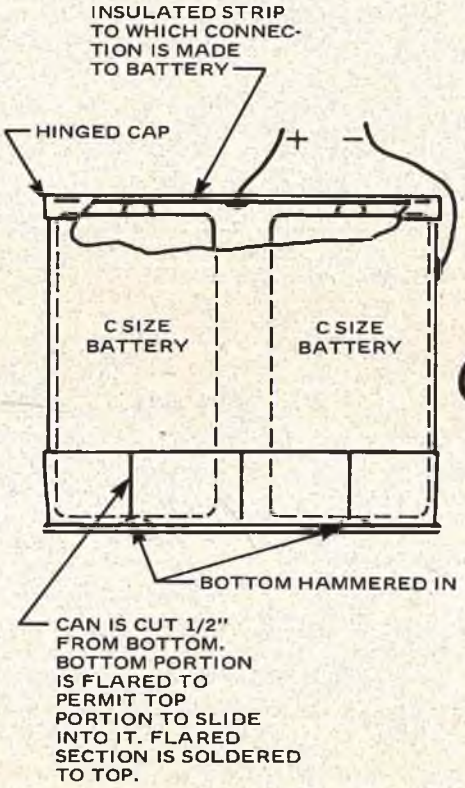
One way of mounting a Rom-Air Retract Valve on a Heathkit miiature servo is to take a 2-5/6 x 3/4" screw; put the screw through the retract valve, put two nuts on the screw, then jam them together, so that the valve will rotate on the screw. Screw the screw in place of one of the top hold-down screws. The servo has to be non-linear with the arm type using a Du-Bro throttle over-ride assembly in the innermost hole. Use 1/16" wire, 2" long through the valve with the Du-Bro collar. Adjust the collars to take care of any over travel of the servo. The valve will now rotate and align itself with servo arms at all times. This idea was submitted by L.R. Lewis of Charlottesville, Virginia.

Ernest L. DeBardeleden of Orlando, Florida, mentions that a friend of his used to produce foam wings for the foam wing trade. The contact cement that he used in building his foam wings was called Best Test White Rubber Paper Cement. This paper cement is produced by Union Rubber and Asbestos Company and can be obtained at art supply stores or some office equipment and supply shops. This paper cement goes for about $5.50 a gallon and can be joined as soon as it dries or you can wait a longer period of time. Ernest mentions that he had coated two pieces of foam and balsa and waited twenty-four hours before joining. Still, it held just as it was supposed to hold. In addition, Ernest stored one of his wings in an area that was flooded wherein he found a wing half floating in the water. The bond between the balsa and the foam was still good and after drying the wing out it was as good as new, proving that moisture can't hurt this particular type of contact cement.

If you're looking for a good way to help keep things tidy inside a crowded fuselage, instead of stuffing all of the plugs and associated wires in loosely, try securing a length of servo tape to the side of the fuselage and then stick the plugs to the side out of the way of pushrods, etc. This also helps guard against the connectors vibrating loose in flight. The sketch by Chris McLain of Visalia, California, is self-explanatory.

Paul Trimarchi of Hurst, Texas, uses a tire pump needle intended for pumping up footballs and basketballs as a glue nozzle. Paul found that this screws right on to a tube of Ambroid. All that is necessary is to saw off the tip so glue comes out the end. It makes perfect glue fillets around ribs, formers, etc. Just stick a pin in it to keep it from drying out when you finish construction for the evening.

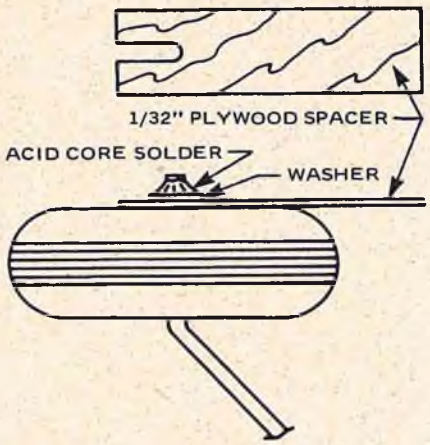
Richard David of Fort Hood, Texas, suggests a method for keeping your oily thumb from slipping around on your transmitter sticks. This entails removing the factory installed tips and installing some Rocket City Kraft replacement stick tips. Use a small amount of Silicone sealant to hold them securely in place. These tips have a concave center and serrated edges which give you a positive grip, oily or not.



An ordinary small size Band Aid box can be converted into an effective battery box for size C batteries. By using two size C nickel cadmiums in parallel, you get the hottest of hot charge to a glow plug. The bottom of the box is hammered in a little to make good contact with the bottom of the battery. The top is well insulated and the leads that make connection with the center post of the battery and wire (+). The (–) connection is soldered directly to the outside of the box. By paralleling the two batteries (still 1.25 volts but double amperage) a glow plug will look like a Roman

FOR WHAT IT'S WORTH

candle about to go off and the charge lasts several weeks. This idea was submitted by John G. Wright of Paris, Texas.

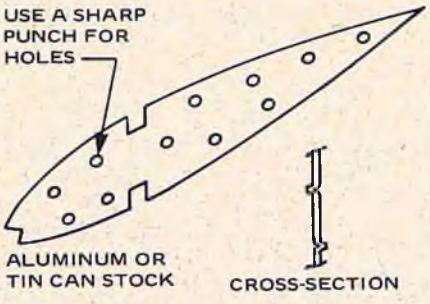


If you're looking for a quick way to solder keepers on your landing gear, try this idea from Bryce Petersen of Charleston, West Virginia. Prepare a 1/32" plywood spacer with a cut-out the size of your landing gear wire. Rest it against the tire to hold the washer in position for soldering. Using acid core solder, flow the solder on the washer until a puddle surrounds the washer and wire. Remove the spacer and clean the joint with a mild solution of baking soda. Acid core solder will flow quick enough to keep the wire from melting the wheel hub.

If you want to make your own clear plastic canopies, here is a method suggested by Don Williams as printed in the MAPA "Vector." Carve and sand a mold from a balsa block and mount on a pedestal about 6" high so you will have working room. Cut a hole in 1/4" thick plywood the shape of the bottom of the mold, but 1/4" larger all around. Purchase some acetate plastic sheet from your favorite hobby shop no thicker than .040". With experience, you will be able to determine the thickness you will need for different sizes of canopies. Tack the acetate to the plywood plate using small scrap strips of plywood for a firm hold. Take all this stuff to your kitchen range and hold the plywood plate with the acetate 12" to 15" above a hot burner with the plastic facing down. When the plastic appears wet and begins to sag, quickly press it down over your balsa mold 'til the plate is about 1/2" below the bottom of the mold. Try to apply even pressure, then let cool, remove the balsa mold and trim off the excess plastic.

John Novak of Chester, West Virginia, mentions that he has been using Scotch Brand Super Strength Adhesive for applying windows and windshields on his aircraft with great success. As a matter of fact, he used this adhesive for the windows and windshield on an old timer, Buccaneer Standard a year ago and, to this date, there has been no problems with the windows coming loose. This is one problem that has plagued modelers for some time and this material seems to solve the problem.

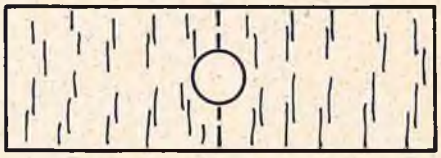
William Close, Jr., of Deming, New Mexico, mentions that he has a lot of bottles of Aero Gloss dope of different colors left over from time to time. Like everyone else, Bill doesn't have too much paint left in some of them, but now and then he will need to use a small quantity and, after they have been in storage for some time, the lid simply won't come off. Bill's solution is to turn the bottle upside down and brush some dope thinner around the threaded area of the lid and the bottle. Let it set for a second and the lid will come off easily.

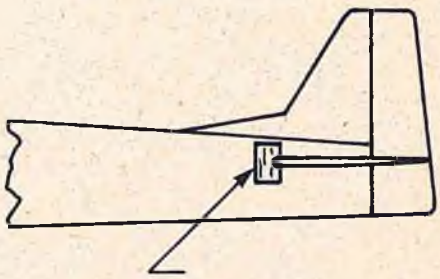


Everyone has their own special way of cutting out duplicate pieces, such as wing ribs, but here is an easy method suggested by Richard J. Franco of Fremont, California. First, take a sheet of any light metal that can be cut easily, such as light aluminum or tin can stock. Cut out an exact template to be used as a cutting guide. Now, here is the secret: Take a sharp tool and punch holes in the template - - - scattering the holes over the entire template. The holes leave a burr on the opposite side. These burrs grip the balsa when cutting and prevent the template from slipping. Dick mentions that he punches holes on both sides so the template may be used on either side so that, by proper placement, you may conserve balsa sheet stock.

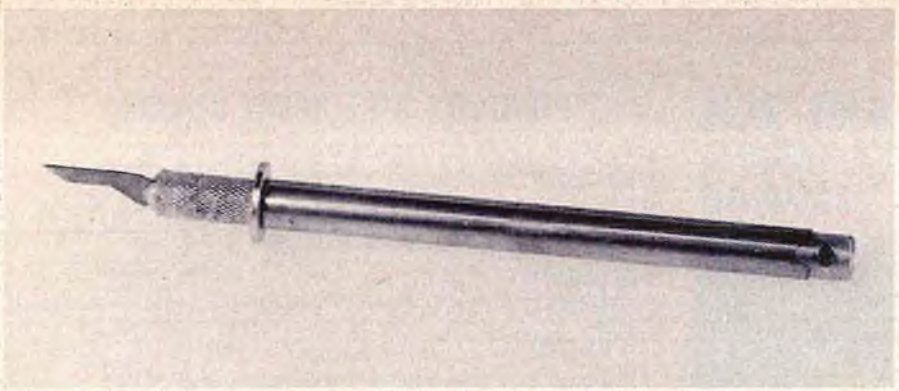
Ed Betancourt of San Diego, California, suggests tapping the throttle arm of your engine to receive a 2-56 screw. Place a 2-56 screw through the connector, such as a Missing Link, and screw it into the throttle arm. The hard to put on and easy to drop nut is thereby eliminated. This is particularly handy around Quarter Midgets and cowled engines.

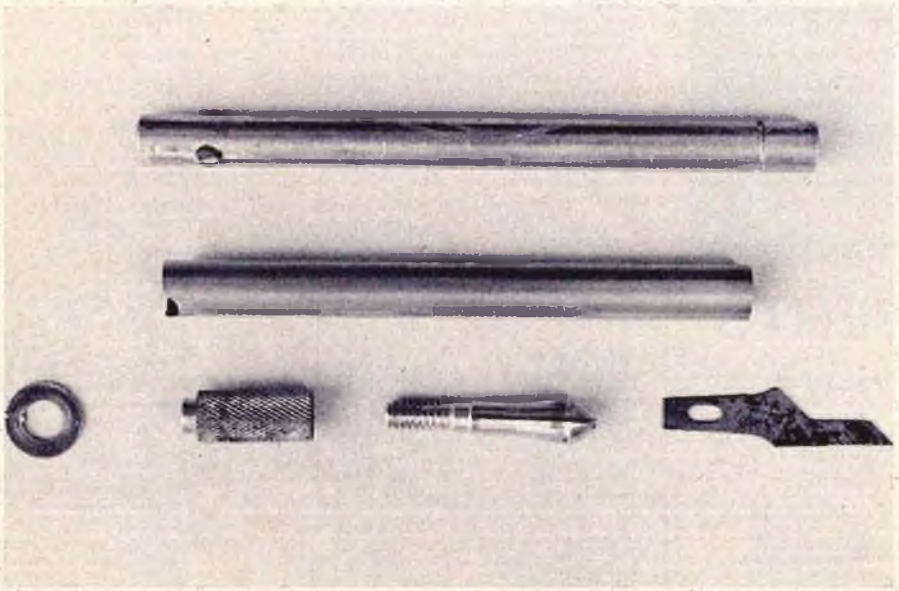
Byron Blakeslee of Littleton, Colorado, suggests this idea for transferring a pattern to wood or other material. First, copy the design on tracing paper. Next, place a plain white sheet behind the tracing and make a Zerox copy. The third step is to place the Zerox copy face down on the wood or cloth and rub the back of the copy with a cloth dampened with lacquer thinner. Finally, remove the Zerox copy and you will find the pattern lines will have transferred as a reverse image.

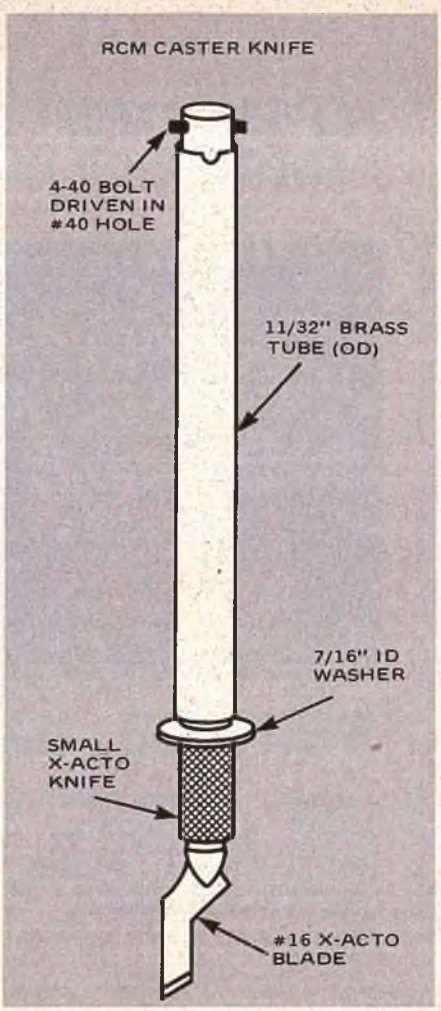




William G. Mitch of Merrillville, Indiana, writes that he was having trouble getting masking tape around the leading edge of the stabilizer next to the fuselage. As a solution, he took a piece of masking tape and punched a hole in it with a hard punch (ticket punch). He then cut the tape in half and used each half for the stabilizer as shown in the sketch. □







IT WILL TAKE ABOUT TEN MINUTES TO BUILD THE

RCM CASTER KNIFE

WHICH WILL AUTOMATICALLY ALIGN ITSELF WITH THE DIRECTION YOU MOVE YOUR HAND AND CUTS IN THAT DIRECTION.

BY WILL D. MITCHELL

A knife cuts only in the direction its blade is pointed. So, as we modelers carefully cut out ribs, we must continuously twist the knife to conform to the direction of cut. This makes intricate cuts even more frustrating.

This little knife is particularly handy with difficult shapes, for the blade casters as you cut. It automatically aligns itself with the direction you move your hand, and cuts that direction. Construction time - - - 10 minutes.

Obtain a small size X-Acto knife, some 11/32" brass tubing, a 7/16" ID washer, and a 4-40 bolt.

Drill a hole with a #40 drill about 1/4" from the end of the handle – the end furthest from the blade.

Insert the washer between the knurled and smooth parts of the handle.

Cut a 3¾" length of 11/32" brass tubing, and slip it over the smooth end of the handle. There should be about 1/8" between the edge of the tubing and the center of the hole.

Use a small hammer, a soft surface, and a bit of care, to drive a 4-40 bolt into the hole. It should drive about like a nail into oak. Drive until the end just protrudes from the other side, about 1/16". Cut off the slotted end so it protrudes about the same.

Mark the brass tubing where it touches the bolt, and file two notches into the tubing. Requires disassembly, of course.

Deburr everything, and thoroughly clean out all the filings. Reassemble the knife with a touch of oil, and you're done.

When cutting, this knife swivels nicely to follow your hand. To change blades, slide the tubing back to fit its notches into the bolt, and twist.

An X-Acto #16 blade is offset just enough for good castering action. Many other blades are also good. Take the tubing off, and the knife is just as it used to be. □

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ENGINE CLINIC

from page 10

mercials fuels: Duke's, K & B 500, etc. If the problem still persists it could be due to a high tank position (again nothing mentioned) which, in turn, causes the engine to load up at idle. The loading up or richness being beyond the range of the air bleed screw.

So the point is, gang, when you send in a letter, give me a few specifics to go on. Fuel used, make of glow plug, tank position and size. Fellows still try to use 12 ounce tanks to get longer runs with the smaller displacement engines, and they just can't handle the volume.

Dear Mr. Lee:

Looking through the back issues of R/C Modeler, I cannot find information as to why the Schnuerle porting is so much better than the standard porting of our older engines. Could you diagram how this is supposed to work to such an advantage. Does the Schnuerle porting make it harder to start or hurt the idle?

Sincerely,
George Willy
Beecher, Illinois

Schnuerle type porting definitely has the advantage over the older loop type of scavaging used in the past. In my opinion there are two main reasons for this. First, with Schnuerle type porting the baffle on the piston can be eliminated. The baffle sitting on top of the piston works like a fence and, in turn, effects the combustion pattern. Sometimes only moving the baffle fifteen thousandths one way or another, or raising or lowering it this amount can add or take 500-1000 rpm from the engine. This, in turn, proves that the baffle has considerable effect on the combustion pattern and power of the engine. By eliminating the baffle, better combustion can be achieved. Second, the Schneurle type porting with a boost port allows the fuel to enter the cylinder from three points. The two main transfer ports are directed towards the rear of the cylinder. The incoming fuel charge converges with the flow from the boost port which directs the incoming charge upward. This results in better fuel distribution in the cylinder and more fuel actually getting into the cylinder. The more fuel you can get in, the more spent exhaust gas that is forced out – which means better scavaging. Schnuerle porting does not effect the starting characteristics of an engine. Schnuerle port engines are just as easy to start as the older loop port. Schnuerle type porting does cause an engine to run considerably cooler and this, in turn, can effect the idle. However, this also can be compensated for with compression ratio, cooling fin

area, etc., so that the Schnuerle's can be made to idle every bit as well as the older loop type engines.

Dear Mr. Lee:

I purchased an OS Max .40 RC four months ago to put in my UO-4 "Special" (a plane of my own design). Due to an unavoidable crash I found it necessary to clean the engine. I used Sig Airplane and Engine Cleaner to clean it then I used light oil on the engine and reassembled it. I put it in my UO-5 "Special" which was just completed. When I tried to start it at the field it would not go. After twenty minutes or so it started. I flew the plane at full throttle but it did not have the speed the sister ship (UO-4 "Special") had, it also sounded like I had a muffler on it. I have not been able to figure what is wrong with it. It is not leaking in compression. Could you please advise me. I used a toothbrush and Sig Airplane Cleaner to clean the burnt castor oil between the fins of the engine. This keeps your engine looking like new.

Yours Truly,
James Dayte
Halifax, Nova Scotia, Canada

Jim, due to the hard starting, lack of power and muffled sound of the engine, I would guess that you installed the cylinder liner backwards. The bypass port is now the exhaust and vice versa. Reverse the liner and I am sure you will cure the trouble.

Dear Mr. Lee:

I am having trouble keeping my Fox Eagle .60 running very long. For some unknown reason it will run beautifully for 3 to 5 minutes then quit cold. I've tried different mixture settings, changed tanks, fuel lines, etc., but the problem still prevails. I'm running it in an "Antic" seaplane and until just recently it would go through the complete tank of fuel before stopping.

It appears as if the problem is with the engine and not the fuel system but if you have any suggestions I'd appreciate knowing what they are.

Yours very truly,
Richard Owens, Jr.
Port Angeles, Washington

If your Fox Eagle runs beautifully for 3-5 minutes and then suddenly quits it can only be caused by one thing – lack of fuel. There is nothing within the engine itself that can cause this. As long as you supply them with fuel they are going to run. You must have a hole in your fuel feed line, or obstruction of some sort. Possibly your tank is too low but this would cause a gradual leaning out rather than stopping abruptly. Be sure to make sure that something is not obstructing the air vent to the tank. If this is squeezed off by installing a hatch block, etc., the engine will run a few minutes and then die. Unknowingly, something has changed in your fuel system.

Dear Clarence:

I recently acquired one of Dewey's dream planes, an old Bipe the HoBo. It was completely finished and ready for covering. The trouble was it was set up for the old K & B .45. Rather than cut and change

to page 121

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'Course, the kaban strut and cabling doesn't hurt any. To say nothing about the incredibly detailed Camouflage Coverite, which is an exact replica of German W.W. I lozenge pattern in orange, purple, olive and blue-black.

There are lots of kits you can do this to. Here's a partial list: Carl Goldberg's Falcon, Sterling's Fledgling, Andrews Aircraft's Aeromaster, Texas Model's Big Daddy, J&J Industries J-Craft, Jack Stafford's Weekender, VK Model's Corben Super-Ace, Mini-Flite's Bucker Jungmeister, Hartman Fiberglass' Little Toot, Tidewater's Pronto and Sig's Aerobipe.

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SHOWCASE '74

from page 80

sheet and block balsa to complete. If you are capable of building and flying a Quarter Midget then you have all the horns you need. These two aircraft designs are just as you saw them in R/C Modeler Magazine and in American Aircraft Modeler. They are designer approved and exclusive at Custom Control. Retail orders postpaid east of the Mississippi and dealer inquiries are invited. □

GULL REVIEW

from page 61

you are a soaring pilot already, this one will be your challenge since the aircraft is surely capable of top competitive performance. I'm not a sailplane expert so I can't discuss all the technical reasons why it flies — — — all I can tell you is that it can hold it's own.

The kit consists of hand cut balsa and plywood parts with sheeting included to complete the construction; all needed hardware is provided along with a canopy and, best of all, a beautiful fiberglass fuselage. The plans and instructions are brief but completely adequate.

The wing is the only built-up construction in the kit and no moderately experienced modeler should have any trouble with the familiar "D"-tube style construction. The stabilators and rudder are 3/8" sheet, carved and sanded to shape, then lightened by the ole' "lightening hole trick." (I borrowed a 1-1/4" hole saw to do mine.) After all the construction is completed you can start the covering process. The use of MonoKote or Solarfilm, etc., has been touted as being the way to go, but up 'til now I had not tried any of these super products. My Gull has Super MonoKote on the rudder and Solarfilm on the stabilators and wings.

to page 86

Wing Area .....301 square inches
Flying Weight .....2½ — 3 lbs.
Engine 15

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GULL REVIEW

from page 84

I am pleased with the ease of application and, as a time trade-off, I am pleased with the result. I sure have been missing a lot of flying because of old methods of covering a model! I certainly wish I could encourage other "hold-outs" to try these new products — — they are GREAT! With some practice even the most critical modeler will be satisfied with the results. I use a Kraft 3 channel radio with KPS-12 servos. The model completed and ready to fly weighs 31 ounces. The designer says to keep it light for best performance so don't be putting in all those extra bits of "beef".

My first flying session rewarded me with 4 spot landings toward my LSF Level I. I also had several 3 minute + flights in still air. The next time out I was able to get a 10:45 thermal flight

to page 88

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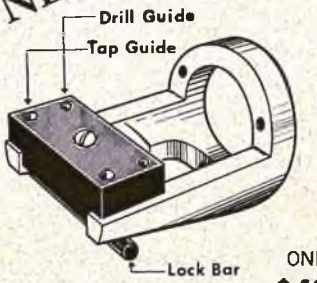

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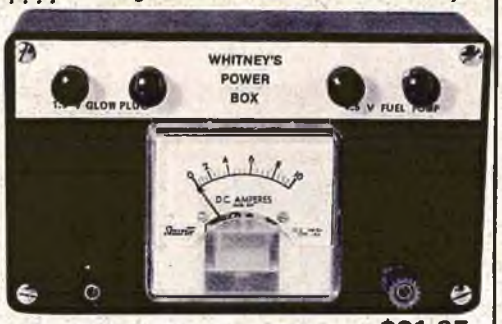

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GULL REVIEW

from page 86

and my last required spot. Those of you who think LSF Level I is easy should try it. Those 9'+ landings are different from the total lack-luster power flying that most of us have engaged in. Now to Level II and the 4'+ spots! (It's going to take more than 3 flying sessions to achieve that.)

It's always amazing to me to see how my interests change. I feel sorry for the individuals who are limiting their scope in the R/C hobby to one particular area. It's a ball to venture out. I have had more **fun** with simple airplanes – – – more than with any other "super duper world beater" pattern ship, scale, or racing model. All those events have their place and interested participants, but if you want to really enjoy a challenge try a sailplane. Only 2 channels are required and some of the goofiest looking planes show up and fly. Besides, have you ever heard of losing a soaring site because of noise!

To date I have now entered four contests with 2 First places and 2 Fifth places. All I need for Level II is two more contests. I feel that a Gull Glider is a fine competition aircraft as well as a pleasure for just plain sport soaring. Manufactured by T & H Enterprises, 7025 N. Stevens, Spokane, Washington 99208, the Gull has a wingspan of 99 inches with a total wing area of 642 square inches. Flying weight is 32 ounces for a wing loading of 7 ozs./sq. ft.

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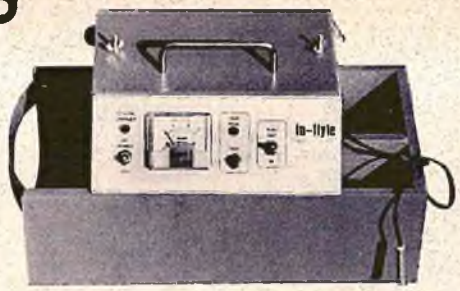

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from page 60

covering such as used on the RCM prototype. The symmetrical wing section, while quite thick by racing standards, enables the aircraft to be slowed down considerably as well as flown through the various pattern maneuvers including excellent inverted flight. The kit is designed to fly with tricycle gear or a tail dragger with an extra main gear block provided in the kit. In order to move the main gear forward, only the nosegear need be removed. Servos shown on the plan in the kit are Kraft KPS-12's although there is ample room provided for larger servos if desired. In the RCM prototype we used a 1973 RS Systems radio with their small DR2 servos.

The kit by Models West is quite precise with respect to the accuracy of the parts prefabrication and the selection of balsa wood in our particular kit was excellent. A great deal of attention has obviously been given to a precise fitting of parts and to streamlining features such as the extra long fairings on the stabilizer-to-fuselage

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TWO-BITS

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junction. This is a small aircraft with a wing that employs no dihedral and, for this reason, would not be considered a beginners aircraft. It is sensitive to control response and will go exactly where you aim it and nowhere else. If you're looking for a small aircraft for general fun flying or for breaking in that new racing engine, we would suggest the 2 Bits by Models West Incorporated. You'll like the very complete plans, the jig built pre-assembled fuselage, and the high degree of prefabrication contained in this kit. At its price of $26.95 plus $1.00 for postage, it's quite a bargain. Tested, Approved, and Recommended by RCM. □

RUNWAY SWEEPER

from page 53

section of 1/4" diameter thin wall brass tubing is required for the tail rotor drive tube. My local hobby shop had three foot sections in stock (distributed by A & L Distributors). A suitable substitute can be made from 3 one foot sections. They should be spliced together using pieces of the next size bigger tubing for reinforcement sleeves at the solder joints.

I selected some 1/4" by .035 aluminum tubing (6061-T6) at the local aluminum shop for a fin frame. It is not difficult to bend, flatten, drill, and pop rivet a piece of this in place as shown. On the subject of pop rivets, a study of the plans will reveal their use at many points. I suggest that any modeler desiring to scratch-build helicopter airframes to buy a pop rivet tool and a generous supply of assorted rivets. They are always handy around the house, too.

The skids and landing gear are made of 6061-T6 aluminum. The only reason for this is that the metal is commonly available and is relatively tough. Unfortunately, the latter characteristic makes the material difficult to form. Therefore, if 5052H34 or some better aluminum is available, I suggest it be used.

The thin wheels shown on the plans probably won't be available unless you have a junk box that dates circa 1947. The thickness of most wheels available today will dictate placement on the outside of the skids instead of placement as shown.

The fuselage box and most of the formers are 1/16" plywood. I bought two 12 by 48 inch pieces at the local hobby shop at a cost of four dollars each. This is pretty cheap considering the cost of balsa these days. There is no splicing. The plywood cuts with a saw and sands beautifully. The round holes were all cut with a cheap hole saw. All joints were made with Devcon epoxy glue, this being one of the few epoxy glues which are compatible with sanding resin. Two external and internal coats of K & B Superpoxy or Francis polyester sanding resin prepares the plywood for finish. Here I used Superpoxy, two coats of primer and one coat of each color. You just can't say enough good things about K & B Superpoxy, particularly if it's put on plywood which provides a rough, mar-resistant base.

Be sure to keep the weight down as much as possible when building R S or any other helicopter. Through the complete designing and building cycle, one must think about how to save weight. An empty weight of 11¼ to 12¼ pounds is about right for R S.

Building and attaching the main rotor blades is the next item. Forget about buying expensive rotor blade kits. I use a ramin wood leading edge and pre-shaped balsa wood trailing

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RUNWAY SWEEPER

from page 92

edge. Ramin wood is a beautiful clear grain wood available at most cabinet shops. For five dollars you should be able to get enough for eight or ten sets of blades. Included in the price will be the cost of cutting the ramin to your rectangular cross-section specifications which should be the same as those originally used with the mechanism. The ramin can then be easily contoured to airfoil shape with a block plane provided a few holding strips are first nailed near the edge of your workbench to hold the wood while planing. I use 5-Minute Devcon Epoxy to glue the leading and trailing edges together. Final shaping and sanding can then be accomplished. A good grade of shelf paper makes an excellent cover. No other finishing is required.

Some of us have found that if the main rotor blade chord is reduced slightly from that originally called out,

to page 98

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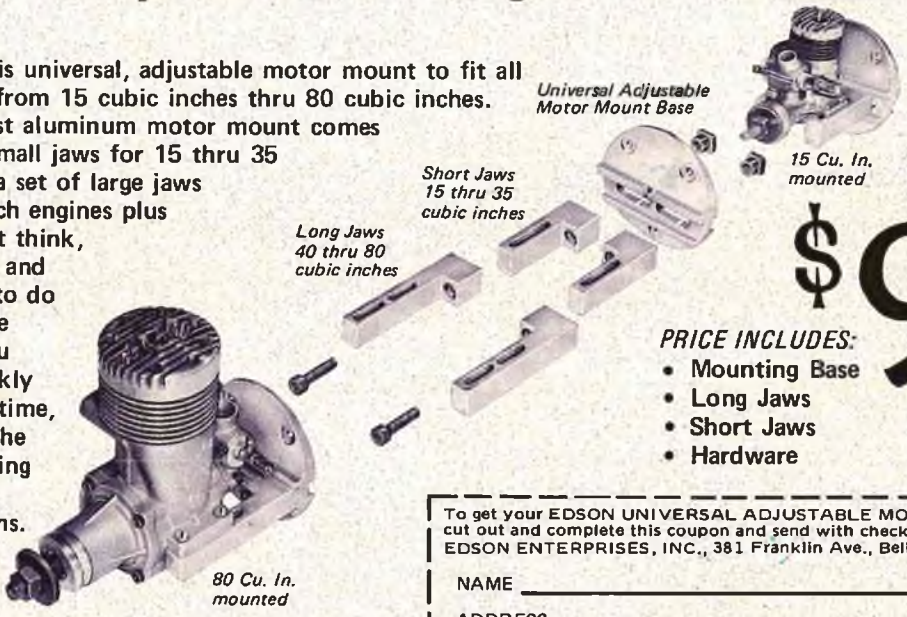

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RUNWAY SWEEPER

from page 96

the machine may fly better. The main reason for this is that the rotor must turn faster to develop the same lift. This permits the engine to turn higher rpm's where greater horsepower (i.e. faster rotor acceleration) can be obtained by going to full throttle. The best thing to do is try different size blades to find the best size.

With regard to blade attachment, I firmly recommend using a single bolt attachment on R S or any other "chopper." Instead of bolting the blade straps to the teeter-totter plate with two #4 bolts, use one #10 hex head bolt and lock nut. This permits the blade to pivot rather than breaking in a crash or roll-over. Believe me, this attachment method saves rotor blades and a lot of frustration.

Before installing my mechanism in the R S, I replaced the cloth/rubber starting V-belt with a glass reinforced plastic belt. These wear forever and

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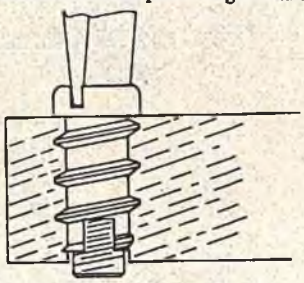

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RCM'S prototype RS uses Du-Bro muffler.

RUNWAY SWEEPER

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I've never broken one. They are obtainable at the local vacuum cleaner repair shop. I suggest a Japanese Bando No. 412 or similar belt. Never use a starter with a plastic pulley. It will wear and result in belt grabbing.

The main power package installation in R S is quite simple; it must be quite simple in any helicopter. (Future repeated removal may become necessary.) Eight 4-40 screws hold it in place. Most of the fuselage bottom is open to facilitate installation and maintenance. Be sure that the main power package can be rapidly connected and disconnected from the throttle servo, fuel tank, and both drive shafts. Note that one access hole is positioned so that the transmission-to-main rotor shaft bolt is accessible for disassembly. Also, external access to add oil to the transmission is possible through the same hole. There is nothing more exasperating than having to pull a whole power package just to check or add transmission oil!

Be sure to get some Zip Grip or similar adhesive. Put this on all nuts, bolts, and set screws in the mechanism. This is a marvelous material which has prevented many crashes by keeping all the parts tight.

Flatten the servo paddle shaft where the control arm screw seats. This is the most critical control attachment on the machine. Also, replace all foreign ball clevis plastic parts with Rocket City "Missing Link" plastics.

Author's RS with home-built collective pitch head.

The American-made plastic fitting is superior in design and more secure in flight.

Both John Minassian's and my R S used external fuel tanks installed near the Center of Gravity. I am not proud of the appearance and have since moved the tank inside. Regardless of where the tank is installed, I suggest some method of visually sighting fuel level. Most flyers also add a timer on their transmitter to warn them of low fuel level.

The original R S control installation had a large number of control rods in the cabin. These were primarily to control a home-made collective pitch rotor head. That home-made device was full of problems which ultimately caused me to remove it and all the extra control rods. My only comment here is for those who insist on having collective pitch to reassess their position with complexity, crash damage, and adjustment in mind.

Model helicopters should balance just ahead of the main rotor mast. Each helicopter is slightly different depending on horizontal stabilizer size and other factors. About 3/8" forward of the mast was correct for R S. This results in zero fore-and-aft swash plate trim while hovering because it offsets the rotor downwash effect on the stabilizer.

I suggest using K & B 500 fuel in R S. The fuel provides good power, burns cleanly, and its residue is easy to remove. If, when starting and test spinning R S, there is any hint of improper engine performance, don't fly. I found that if I, for instance, ignore the signs of a bad glow plug, I am asking for a crash. The glow plug is an insipient problem in the power system which loves to produce cold running engines and power failures during descent when the throttle is back.

The R S should weigh about 12½ to 13 pounds with its fuel tank full. If the machine acts underpowered and won't lift off in dead calm air at this weight, look for friction in the tail rotor drive or mis-adjusted main rotor blade pitch. Also check for clutch slip

John Minassian's RS makes a low speed pass around the camera.

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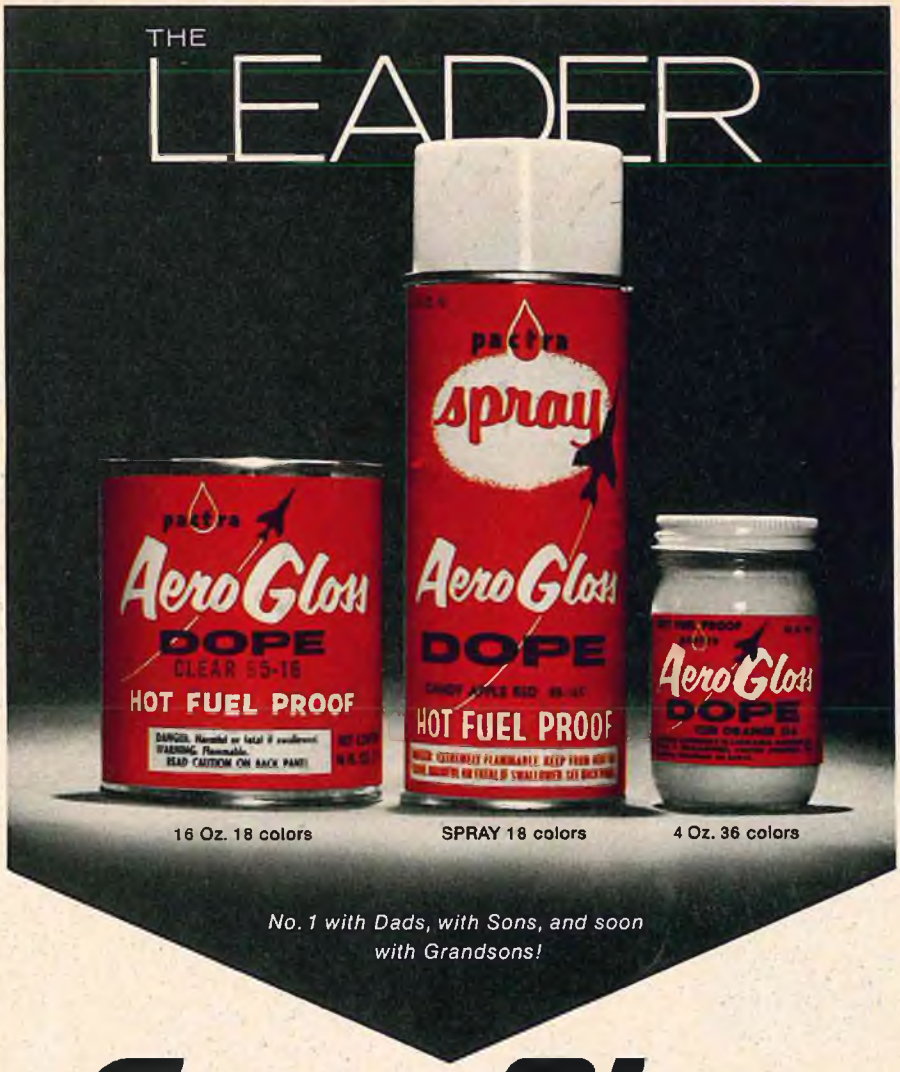

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RUNWAY SWEEPER

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by putting belt grip liquid in the clutch.

This article is not the proper place to diverge deeply into flying techniques. But for the beginner who does not know the fundamentals of helicopter flying, I can suggest only two basic things when training with R S. First, use an even wider landing gear than shown on the plans. Also, don't translate until hovering is completely mastered. As far as hover training is concerned, I find tethers of little value. I never was able to learn to hover on tethers because they unduly interferred with or upset the machine. The best day to practice is when there is a 5-10 mph wind. This helps stabilize the machine and hovering is much easier than in calm air.

If the R S tail rotor pitch is adjusted for hovering trim, the machine will try to yaw right in forward flight. This is due to "unloading" of the main rotor which requires less torque to sustain rpm's. Bending the lower fin to give left yaw in forward flight will greatly help to circumvent this characteristic. Some designers build this feature into their helicopters, others just apply yaw correction. Adequate tail rotor pitch control will also help fight this problem if manual control compensation is preferred.

If the modeler has used one of the rigid Cardon-type rotor heads, such as come in the Schuco-Hegi kit, the R S will tend to roll right in forward flight. This is due to the advancing blade having more lift than the retreating blade. The only way to avoid this is to modify the head to provide teeter-totter flapping. If the modeler is a beginner, the rotor head should not be modified until he can hover with the rigid-type head.

But enough! Whether you are a mere mortal or one who has mastered these "infuriated palm trees," go forth! Build an R S or create your own design.

But above all, put real modeling into this specialty area of our hobby!

SOLDERING TECHNIQUES

from page 45

sticking out by the barrel. While this unit is available in 50, 100 – 140, and 150 – 230 watts, we strongly recommend the 150 – 230 watt unit. Neither the 50 or the 100 – 140 watt units we've tried put out enough heat for all of the kinds of jobs you may want to do. For example, using a 100 – 140 watt unit we recently tried to solder a bracket to a wheel axle. The bracket had to be soldered to the axle while the axle was mounted in a dural aluminum landing gear. But the aluminum absorbed the heat from the axle so well we couldn't get the solder to flow. A 230 watt soldering gun did the job easily.

The soldering gun is on when you're soldering and off when you aren't. While it takes about 15-20 seconds to heat up, it's handy in the hand and easy to work with. The small size of the tip makes it possible to get into tight spots and the little headlight helps. The only word of caution we've heard about is that there is a pos-

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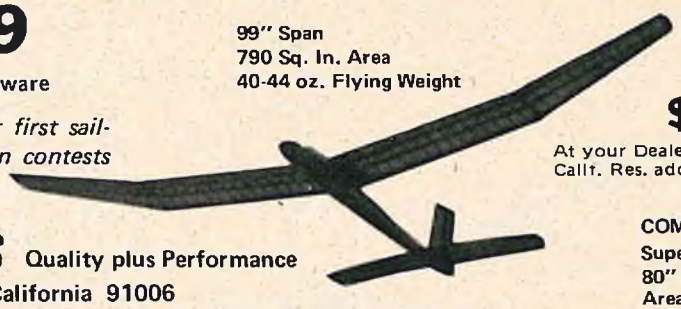

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sibility that the AC coil in the body of the gun might demagnetize the permanent magnets in your servo motor if you get the body of the soldering iron too close. To play safe just don't get the body of the gun within an inch or so of your servos and you have no worries. Sears two-heat 150 – 230 watt soldering gun sells for $9.50 in their Power and Hand Tool Catalogue. #9HT-52851

Rather than the soldering gun, some guys (and gals – Ed.) prefer to use an ELECTRIC SOLDERING IRON. To get enough heat to do all of your jobs the unit should be 200 watts. While the little pencil irons many of us have are ideal for some soldering, for electrical soldering and, for your hot knife, most of them don't put out enough heat for a good landing gear or cabane soldering job. A particular advantage of the 200 watt soldering iron is that once it's plugged in and hot, it's ready to go when you want it; no waiting. Sears 200 watt electrical soldering iron sells for $10.50 in their Power and Hand Tool Catalogue. #9HT-53832

Another unit you should know about is the Heathkit Model GH-17A THREE-HEAT SOLDERING IRON. The iron is wired to a separate transformer unit that takes only a few hours to assemble. The transformer has an ON/OFF pilot light and three heat settings. While we could find no indication of the wattage of the various settings, at a high setting we were quickly able to easily flow solder on a landing gear that was mounted in a vise 1/2" away from the soldering work. We guess it must be at or about the 200 watt setting. It sure puts out the heat to do the job.

With the small tip and lightweight soldering unit it's particularly easy to work with. An advantage of this one is that you can turn it down to the low setting between soldering jobs to extend the life of the tip. Then, boost it back to high a few seconds or so before you're ready to use it again. The size of the tip and low heat setting also make this unit useful for electronic soldering. Though somewhat less than ideal, the unit also has a tip adaptor to get into very tight spots when working on other jobs such as printed circuit boards. About the only disadvantages we can report about this unit are that it costs a couple of dollars more and takes a couple of hours to assemble. The Heathkit Model GH-17A Three Heat Electric Soldering Iron sells for $15.95.

And then there's the SOLDERING TIP ATTACHMENT FOR A PROPANE TORCH. While this unit is bulky to handle, hard to get into tight spots, and, there's the danger of setting your plane on fire if you leave the flame going while you solder something inside or near your plane. I sure moved fast when my plane started to go! Now there's a scorched area inside my fuselage as a testimony to my ignorance at the time. You can really get a lot of heat to the job with this one. And it can be used for field repairs.

Actually, torching your plane doesn't have to be a concern though. Because of the mass of the tip you can get it hot, turn off the flame, and get to your soldering. It will hold enough heat to do most of the jobs you'll want to do. Sears propane torch kit sells for $12.50 in their Power and Hand Tools Catalogue. #9HT-54285.If you already have a torch but need a tip, they are sold separately.

While we've mentioned using a propane torch with a soldering tip to do your soldering, we haven't discussed soldering with the torch flame. We don't recommend it except for some unique jobs. It's too hard to control the heat. Too much of the piece you're soldering gets hot. You get one end of the job soldered and the solder runs off when you try to solder the

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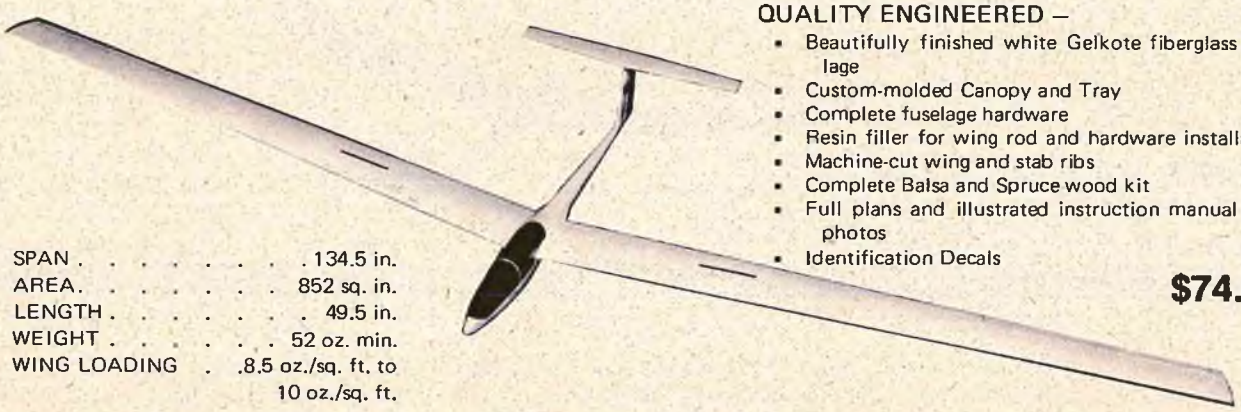

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other end. Another difficulty is that it's easy to get the surfaces too hot and the solder won't stick no matter what you do. It's so much easier with the soldering tip, why work at it the hard way?

Miscellaneous Soldering Materials

You'll need SOLDER. (Brilliant, huh?) The news is that you won't be using any rosin core or acid core solder for this work. Put the rosin core solder aside for electrical jobs. The rosin doesn't help clean the surfaces to be soldered so the solder will bond to them. While you do need acid for other-than electrical soldering, acid core solder doesn't have anywhere near enough acid to do the job. But before you decide you can use your acid core solder if you use it with soldering acid, check the tin/lead ratio. Some acid core solders are 40% tin and 60% lead. Some are 30/70. What you want is solder that is 50% tin and 50% lead. The more tin in the solder, the better the bond and the stronger it is. When you go out to buy some, look for solder wire – sometimes referred to as soft solder. As we've mentioned, the percentage of tin and lead varies with different solders. You want 50/50. Sears carries a one pound spool of solder wire (without acid or a rosin core) in their Power and Hand Tools Catalogue for $2.95.

You'll also need some SOLDERING ACID or tinning acid. It cleans the metal you're soldering – including any oxides that may have built up on the surface – so the solder will bond to it. You will use soldering acid in soldering tin, lead, zinc, brass, steel, and stainless steel.

Soldering acid is nothing more than cut acid, killed acid, or chloride of zinc. It's also known as stainless steel soldering acid or tinner's fluid. You can mix up your own brew by getting some small pieces of galvanized iron and putting them into some muriatic acid. Let the stuff "boil" for a few minutes and you have your own stock.

Soldering acid is available as a liquid in the Sears Power and Hand Tools Catalogue as soldering fluid at 59 cents. #9HT-8073. It's also available as soldering paste at 49 cents. #9HT-80751. We recommend the soldering fluid because it does a better job of getting into those tight spots. A couple of brands of soldering acid we've found in local hardware stores are Allen's Tinner's Acid or Dunton's Tinner's Fluid.

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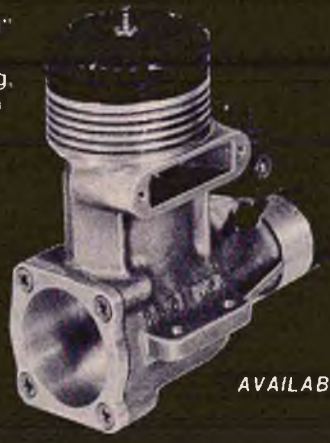

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SOLDERING TECHNIQUES

from page 108

To apply the soldering acid you can use a swab or one of those inexpensive METAL HANDLED GLUE BRUSHES we use in building planes. Cut the bristles down to about 3/8 of an inch and you're ready to go. Be sure to rinse it out in water when you're through with it, it will last longer that way. If you're going to be doing any soldering with galvalized iron use the strong stuff to clean that. Use muriatic acid.

To tin your soldering iron you'll need a block of SAL AMMONIAC. Rubbing the tip of the hot soldering iron on the sal ammonica cleans it so the solder will stick. It's in the Sears Power and Hand Tools Catalogue at 39 cents. #9HT-8071.

Frequently during your soldering work you will want to be able to wipe off the hot tip of your soldering iron. A dampened inexpensive KITCHEN SPONGE laying on your work bench works very well. As long as the sponge is damp the iron won't burn it — but it will sure wipe off any excess solder or dirt build up.

Another handy thing to have around the work bench is a #15 STAINLESS STEEL BRUSH. It's like a wooden handled toothbrush with stainless steel bristles. This jobby is sure handy to brush excess solder off of something you're soldering or to brush off the tip of a hot iron. The brush we use is available from the Gordon Brush Manufacturing Company, 1018 S. Santa Fe Street, Los Angeles, Calif. 90021. They're 80 cents each plus 20 cents for handling. In two dozen lots they are 80 cents each post paid. Anyone need twenty-three stainless steel toothbrushes?

You may also want to spend a few cents at the local supermarket to buy a pack of spring loaded WOODEN CLOTHESPINS. In general, they make inexpensive and handy clamps for some model work, including soldering. If you epoxy half of an ice cream stick to one leg and file a shallow notch on the inside of one of the clothespin halves just below the rope notch, you have a neat clamp to hold your piano wire or other parts while you solder. Mount the ice cream stick leg in your vise and you're ready to go.

If you're going to be connecting piano wire for landing gear, cabanes, or linkage, you'll also need some WRAPPING WIRE. Wrapping wire is single strand uninsulated wire available in electronic stores. We've used #22 and #24 gauge tinned copper wire

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SOLDERING TECHNIQUES

from page 110

called Wire Cable Cord. You can also use #22 or #24 gauge steel wire if you have any of that around. In buying this wire be sure you get uninsulated wire. Some wire that looks uninsulated may be coated with a clear thin coat of an insulating material. If you get that stuff you'll have to rub it down with some sandpaper before the solder will hold. Or, if you have a small job to do you can pull the insulation off of some stranded electrical wire you have around the house. Wind off a strand to the length you need.

And, finally, if you are tired of burning the top of your work bench with your soldering jobs, you may be able to find a scrap of asbestos sheet to solder on at your local builder's supply house. A small piece of aluminum also works well since solder won't stick to it. And the aluminum may be easier to find.

Next month, Part II, Some Soldering Techniques. □

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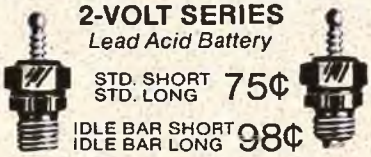

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WAR AIRCRAFT REPLICAS

from page 43

required for the wing center section of the F4U "bent wing" and the 90 degree strut rotation of the retractable landing gear. Several other single seat radial engine fighters are being analyzed for future projects. Serious research and preliminary design analysis is being given the 2 place JU 87 Stuka and SBD Dauntless.

Target date for the first flight of the FW-190 is early May, 1974, with kit availability anticipated around Christmas 1974. Kits are estimated to cost the home builder about $3,500 to $4,000.

An open invitation is extended by the fellows at War Aircraft Replicas to anyone that may drop by the Santa Paula airport to visit their facilities and check out one of the most fascinating projects we, at RCM, have ever seen.

RCM TRAINER 40

from page 39

plate. They can be secured in place by putting a bit of epoxy under the shoulder of each one. Put a large washer on the hatch hold-down screws and with the hatch removed, put the screws directly into the hatch hold-down plate blind nuts and tighten the screws down. That should pull the blind nuts tightly into place. Then remove the screws.

When the hatch is completed it is held in place with the two 4-40 screws – with washers under the screw head. Tighten the screws down until the washer is snug, but not too tight. One too many turns and you'll dent the wood. If you're worried about the screws loosening due to vibration, take the hatch off and squeeze some of the silicone rubber into the screw hole. "Screw" the 4-40 screws into the silicone rubber filled screw holes in the hatch and set the hatch aside overnight. (But don't put the hatch in place or else it may get permanently

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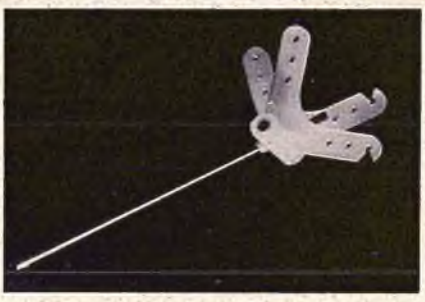

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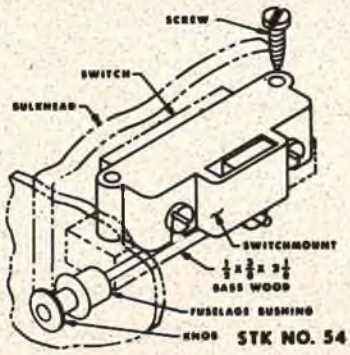

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from page 114

fixed there.) Unscrew the screws the next day and you'll have a dampened screw hole that will resist vibration loosened screws. You can use this same approach with your engine mount screws into bulkhead #1 as well.

Another thing you might do to prevent "denting" the hatch because you've tightened the screws too tight is to build a piece of scrap plywood into the hatch at the location of the screw holes.

FINISHING UP THE FUSELAGE

[ ] Drill the hole for the rudder pushrod exit in the fuselage top block. The hole should be on the right side of the fuselage about even with the front of the fin. Hold the drill at 90° to the top block to start the hole. Then slowly move the handle of the drill toward the rear of the fuselage while you are drilling. Move to the point at which the handle of the drill almost touches the rear of the top block/elevator. Drilling the pushrod exit hole at such an angle helps keep the pushrod as straight from the servo as possible. [ ] Sand the rudder and elevator to shape as shown on the plans. [ ] Mark the location of the hinges on both the stabilizer and elevator and the fin and the rudder. Four hinges should be used on the elevator and three hinges on the rudder. [ ] Drill the hinge holes or cut out the hinge slots – depending on the type of hinge you are using. Some fellows prefer to install the hinged surfaces at this point and finish the plane with the surfaces hinged. Some prefer to finish the plane first, then install the hinged surfaces.

[ ] When you're ready to install the hinges, first use a paper punch to make a hole in the middle of each hinge tongue. The hole will allow the epoxy to flow through the hinge and "pin" it in place. [ ] To prevent the possibility of getting epoxy glue into the hinge pin and gluing it in place, melt some Vaseline and paint it onto the hinge pin area before you apply epoxy and install the hinge. Or, a resin mold release may be used.

[ ] Use an old X-Acto knife blade to get plenty of epoxy glue into the hinge slot. [ ] Also apply some epoxy to both sides of the hinge tongue to be installed. [ ] Insert the hinge into the hinge slot, wiping off any epoxy glue that squeezes out.

[ ] Cut the nosegear steering arm off at the outside hole so it will fit inside the nose of the plane. [ ] Add

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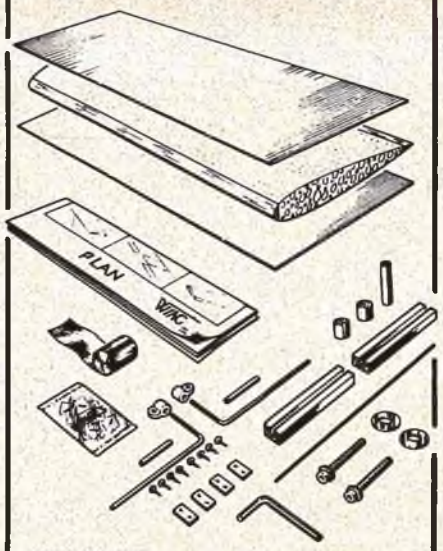
Wing Kits!



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RCM TRAINER 40

from page 116

the NyRod for the throttle and nosegear steering linkage. Note that when the nose wheel is straight, the steering arm should be pushed forward at about a 20° angle to the firewall. Otherwise, it will jam when given a left turn control. If the steering arm slips on the nosegear strut, file a flat spot on the nosegear where the steering arm set screw makes contact with it.

[ ] Cut out the front part of the hatch, as necessary, to fit your engine.

[ ] Coat the inside of the engine compartment, the #1 and front of #2 bulkheads, the inside of the fuel tank compartment, the bottom of the hatch, and the fuel tank vent and feed lines through bulkhead #1 with resin to seal them so fuel or oil won't penetrate into the wood and soften it.

[ ] Drill four holes to mount the dural main landing gear in the 1/4" plywood main landing gear plate and in the dural landing gear.

[ ] When the whole plane has been finished you may want to make a hatch seal to prevent oil residue from seeping into the fuel tank compartment. Use one of the silicone seals available. You only want the silicone seal to stick to the bottom side of the hatch – not to both the hatch and the fuselage, otherwise you won't be able to get the hatch off. With the hatch removed, put a piece of plastic kitchen wrap over the top of the front of the fuselage and up the front of the cabin front block. Make two holes into the plastic wrap for the hatch pins. (Be sure the bottom of the hatch is sealed with resin first.) Get out your silicone seal and put a 1/4" bead down both sides, across the front at the location of bulkhead #1, and, across the back where the hatch mates with the front cabin block. Put the hatch down in place, screw it down, and wipe away the excess silicone seal. Take the hatch off the next day and you have an effective hatch seal. The same technique may be used to make a wing seat seal. The silicone seal should be applied to the wing seat.

[ ] You may install the 1/4" WING ELASTIC DOWELS into the holes provided in the front and rear cabin blocks now, or when you've finished the plane. Some prefer to wait until they've finished the plane so they don't have to try to sand around them.

[ ] Install the rudder and elevator horns onto the pine insert built into those surfaces. When properly installed, the clevis holes in the horns should line up with the surface hinge line.

(continued next month)

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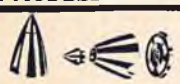

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HOT DAWG

from page 20

finements is of negligible effect compared to another 500 rpm on the engine. So, there's no need to rework the Sunday Wings – just lightly sand them smooth. And to color them, Testors Pla enamel works fine – so long as you spray it on lightly and from about six to eight inches away from the foam surface.

When I say "within reasonable limits" with reference to aerodynamic design refinements, don't misinterpret this to mean refinements aren't worth it. They are – but at the expense of considerable work – like scrapping the foam wing entirely and using a different airfoil with a different chord. Naturally, if you design a wing especially for this racing event, where the rules specify a minimum thickness of 7/8" at the point of maximum depth for the airfoil; if you go to a 7" chord, or even 7¼", you can reduce the relative thickness of the airfoil, and get a faster section. But that's for the dedicated, determined type of racer – not us Sunday Racers.

I have purposely refrained from detailed building instructions; the plans tell you all you need to know to put one together. Jim Georgeson, who took those beautiful photos, built his right off the plans with no problems at all. Except he did have to add some weight to the tail to counter the weight of his big battery pack. I suggest that if you can get one, use a 225 ma pack. You'll save a couple of ounces, at least.

If there is any instruction required, it could be up at the nose. You may have to route out the doublers a bit to accommodate the fuel line so it can make the 90° turn to fit on the spray bar. Also, the needle valve may rub against the top of the fuselage side, and you'll have to cut it away to fit.

For racing, the throw of the rudder should be about 3/16" to either side of neutral; same for the elevator, about 3/16" up and down from neutral. This gives plenty of action, and will prevent the turns from being too violent.

Note that a two ounce tank is used. You don't need that big of a tank to

TRACK 180°

At the Toledo and WRAMS shows, we were often asked to explain the finishing techniques used on our display Tiger Tail and Bobcat models. We used Sherwin Williams Acrylic Enamel, using their Polasol additive, and applied the finish with spray equipment.

The excellent finish is the result of careful preparation. First, the main structure of both models was covered with SKYLOFT—our spun bonded nylon covering material using clear dope. Just follow the instructions included with the SKYLOFT. Be sure to soak the SKYLOFT for 5-10 minutes before applying. Apply epoxy or surfacing resin to seal the rudder, elevators and ailerons.

Once the SKYLOFT is sealed with clear dope, spray on two light coats of general purpose automotive primer, plasticized with FLEX-ALL to prevent cracking. Sand off most of the primer, using 400 paper and don't worry about fuzz; we'll eliminate that in the final stage.

Next, apply one light coat of the acrylic enamel you have chosen for your base color. Let it dry, then sand with 400 wet (there goes the fuzz). Now apply your finish coat of the base color, sand lightly, and trim—sand with 600 paper and rub with a good grade compound.

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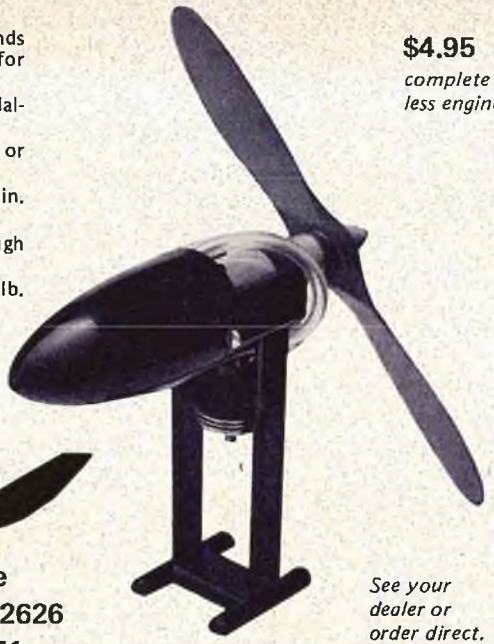

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run the race, but sometimes another racer will have trouble getting started, and you'll be sitting there with your engine running for about a minute. Better to have too much fuel than not enough; nothing is more frustrating than to be leading a race and run out of gas.

Since the tank holds more than it has to for racing, there's a simple way to shut it off. Instead of using a "clunk" in the tank, run the brass tubing to the back of the tank at the bottom. You'll have a steady fuel feed for racing, and when finished, just go up a bit, turn inverted, and fly that way until the fuel in the line runs out. It takes about ten or twelve seconds.

For those of you who would prefer just a sport model for fun flying, the Hot Dawg has enough room in it to accommodate another servo for engine control – even a fourth servo for aileron if you want – but take out the dihedral for aileron control. Personally, for fun flying I think they're unnecessary. Oh – and don't forget to go back to the clunk tank for stunting. And finally, if you want to really tear up the sky, increase the rudder and elevator throw a bit.

The Hot Dawg is a good Sunday sport flyer with a Medallion .049 with engine control, but I'll just bet that after you've flown it a while, you'll get a hot Tee Dee, find a couple of other enthusiasts, set up the 1/2A course as described in the May 1971 RCM, and . . . . . .

"Hot Dawg! Let's race!" □

WRITE!

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THAT FIRST FLIGHT

from page 16

doing their job. You hand your instructor the transmitter. Expertly, he executes a smooth left turn . . . then a second . . . and a third. Again he hands you the transmitter. "This time," he explains, "relax . . . and give it just a **little** left . . . then a **little** up and straighten it up. It's easy." You win this time.

A **little** left . . . a **little** up . . . she does a nice slow easy left turn. A little right. Right back straight and level. Beautiful. You do three left turns in a row. "Try a right turn," the instructor suggests. You suddenly begin to sweat. Then . . . **the motor stops.** It's cardiac arrest time. You slam the transmitter into the instructor's hands. "Guess we ran out of gas," he says laconically and puts the airplane in a smooth long glide ending in the landing pattern. A little flare . . . and a perfect landing. The big one is over. Your first flight is history. Perhaps later the same day you'll take-off . . . or the tough one – land. Perhaps you'll try a loop . . . a roll. You're hooked and you know it. And you don't mind a bit.

And you know one thing that you didn't know before. You know that with a little luck and a lot of help, you're gonna make it! □

SOARING

from page 12

cents worth of stamps to LSF: P.O. Box 39068, Chicago, Illinois 60639. DO IT NOW!

Last but not least there is the East Coast Soaring Society (ECSS). This organization is really mis-named and procedures are in effect now to change the name to one which reflects greater scope. This organization was officially organized in the Fall of 1969 as a result of soaring interests in an eight state eastern seabord area. In the few short years between then and now it has grown to a membership of more than 760 and more than 40 clubs from all across the U.S. are affiliated with it.

The ECSS Board of Directors are shown below:

ECSS BOARD OF DIRECTORS

President – George Durney, 107 Silver Lake Drive, Dover, Delaware 19901 (302-734-4686).

Vice President – Leo Weiss, 89 Red Brook Road, Kings Point, New York 11024 (516-487-7253).

Secretary – Clive Sadler, 46 Oakcrest Drive, Dover, Delaware 19901 (302-697-3718).

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Paul Kelley, RD 1, Box 160, Dover, Delaware 19901 (302-736-1654).

Don Clark, 4202 Brookfield Drive, Kensington, Maryland 20795 (301-946-2834).

Ray Smith, 811 Brantford Avenue, Silver Spring, Maryland 20904. (301-622-0878)

Otto Heithecker, 2129 Parmenter, No. 3, Royal Oak, Michigan 48073 (313-549-8999).

Dan Pruss, Rt. 2, Box 49D, Plainfield, Illinois 60544 (815-436-2649).

The ECSS publishes a monthly journal (edited by Carl Maroney) which is an excellent and timely source of information for the soaring enthusiast who really cares!

In addition to the journal, the ECSS co-sponsors AMA contests across the country which enable the determination of individual season champions. In 1973, Otto Heithecker was the ECSS Grand Champion. The ECSS also conducts a yearly design contest which for the year just past, had over $700.00 worth of prizes. There are also many items available through the ECSS such as the Sailplane Designers Handbook and custom-made jewelery for you or your wife.

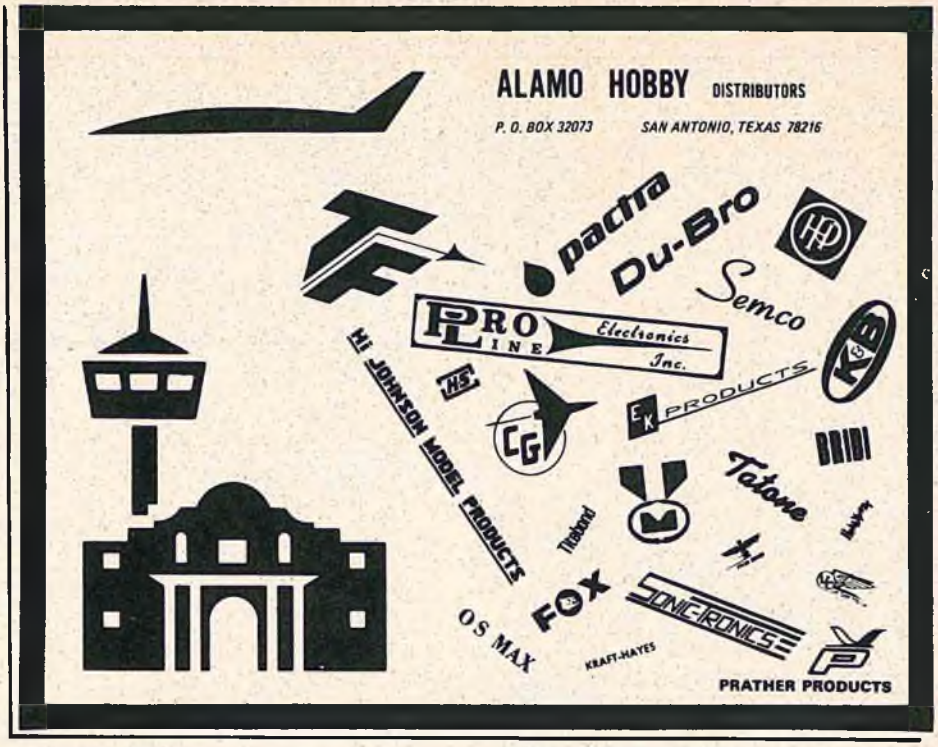
●

The 1974 Soaring Nationals will be hosted by the Silent Order of Aeromodeling by Radio (SOAR). Meet site will be Lewis University; Lockport, Illinois, and the contest will be held on July 22, 23, and 24, 1974. Following the Soaring Nats there will be a one day conference held on 25 July to discuss soaring matters on a national level. This will be an open meeting and all interested soaring enthusiasts are invited to attend.

Only through the efforts of these organizations was it possible to select the United States Soaring Team who are listed below:

Andre Faure (LSF)
Kelly Pike (LSF)
Frank Finney (LSF)
Otto Heithecker (ECSS)
Keith Finkenbiner (ECSS)
Jerry Mrlik (ECSS)
Don Goughnour (ECSS)
Jeff Mrlik (NATS)
Mark Smith (NATS)
Rick Walters (NATS)

This team will represent the U.S. at the 1974 Internats which will be sponsored by AMA. This meet will be held at Lakehurst Naval Air Station, New Jersey, on August 5, 6, 7, 1974 and will be conducted by the ECSS.



In addition to these national organizations there are many regional and local soaring groups also organized for the same goals – to promote and enhance the true enjoyment of R/C Soaring.

If, perchance, you happen to be an R/C soaring enthusiast and are not a member of any of these groups then get with it and join AMA, LSF and ECSS. If there is no local or regional group, start one! Find friends and live a little. R/C soaring is really going to rise with the gas situation like it is so join now and avoid the rush. □

from page 79

throttle linkage and fuel line I went ahead and installed an old KB .45. Using your rule for idling the engine, the engine idled well. The plane didn't roll while idling. Somehow the plane didn't fly like I expected or wanted so I checked the rpm. Using a Top Flite 11/6 prop on Duke's fuel I got 9,500 rpm with the K & B .45. I decided my old Veco .45 was in better shape and might give more rpm. I checked it out. I got right at the same reading – I used a Heath Kit Tach. I know both of these engines have seen their hey day and parts are probably hard to get. However, they both start easy and idle well. Anyhow, my question is, what was their rpm reading when they were new? Does this rpm reading show they are both shot or is it close to what they did when new?

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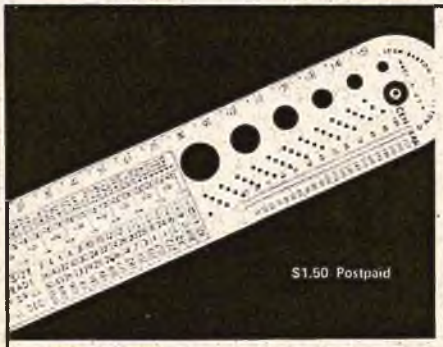

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My Veco .61 Lee custom comes close to 12,000 and my ST .23 on a 9/5 prop comes close to 12,000. So I figure todays engines must turn out close to 12,000. What did these engines do 5 years ago when they were new?

Shall I clean them up, oil 'em and put 'em in a box in my cedar chest and run my Lee .61 or K & B .40?

Many Thanks,
Ernest
Orlando, Florida

Today's engines are putting out quite a bit more power than those we used juat a few years back. Most any of your good .60's will turn an 11/8 in the 11,800 to 12,000 range and some of the new Schnuerle .60's are topping this. Back in the days of the Veco .45 and K & B .45 10,800 to 11,000 with an 11/6 was considered very good. As your engines are well under this you can see that they have seen their better days. Anything under 10,500 is pretty poor with an 11/6 prop. As parts are no longer available for either engine it would be best to retire them.

Dear Clarence:

In regards to your answer to F.G. Fleshner about his OS Max .15, Dec. issue, Engine Clinic.

With my experience in getting newcomers started, and being an instructor for a few years now, the major problem with engines equipped with the Japanese-type carburetor, Enya, O.S., is that the spray bar is not far enough into the carburetor throat to create enough draw; the engines equipped with those carbs, will run perfectly on the bench as the newcomer will tell you, but will not keep going once in the plane.

Of course I agree with you on the tank placement, height, and distance, but in order to create this extra draw the spray bar has to be screwed in at least to reach halfway into the carb opening.

As delivered these engines (carbs) are set up rather on the short side. With the new setting the engine will idle much better after the air bleed hole has been opened to the required gap. The top end will suffer maybe a few hundred revs, but not enough to be noticed by the new flyer, and he will be able to fly in short order. Particularly as new flyers will sometime place their planes in a rather steep climb, this would be true.

I once quoted in the club bulletin, that so and so's DeBolt Champ "was so un-aerodynamic that when in a 60 degree climb it didn't know it was supposed to stall." It is in those attitudes that the extra bit of spray bar in the venturi will save the situtation.

Yours truly,
Ray Gareau
Laval, P.Q.

Thanks Ray, I always appreciate the letters that don't require any brain power on my part. □

CUNNINGHAM ON R/C

from page 6

vacation for some of the Winter months and then flock to the field when the first warm weekend breaks upon us.

This year, as in the past several years, I feel certain that more and

more of us will be turning to smaller powered aircraft and gliders. The Super Kaos, Jr., in the April issue of RCM, looks like a sure winner, and I wish that I had time to build one, as this size is very convenient. RCM even has a convenient semi-kit available for it. The .40 aircraft have really been making it big. The New Era II helped usher in this size several years ago. This year I feel, too, that the .15 and .19 size aircraft will really find a place with the sport fliers. If you have turned up your nose at aircraft of this size, don't - - - they are a lot of fun and can be flown from much smaller areas than can their larger brothers.

Conversely, this year may also be the year of the really large aircraft. There seems to be a strange fever in the land - - - on the one side are the guys wanting to fly smaller and smaller aircraft, while on the other side are guys wanting to fly the really big monsters with eight, nine, and ten foot wingspans. Today, more and more kits are coming out for these giant aircraft. In many cases the same guy that is building and flying a small ship is also building and flying a big one. Seems strange, doesn't it? Wonder what the reason behind this is? In the very early stages of R/C most of the aircraft were seven and eight foot cabin jobs lugging around numerous pounds of radio and batteries. My first exposure to R/C was in early 1942 when a friend of mine flew a seven foot aircraft by radio. An electromagnet yanked the rudder from side to side. The transmitter was ground based, as were all in those days, and all were put together by tinkerers and experimenters. Now, we find a return to the larger, while the radio equipment becomes smaller and smaller.

So, what does the average modeler do if he wants to build either a small model, or a large aircraft of his favorite ship and none exists either in the kit field, or in magazine plans for the size that he wants to build?

Take, for example, the case of the builder who would like to have a .19 size Super Kaos. What does he do? Simple, he gets out a stack of paper, sharpens his pencil, grabs the slide rule or office calculator and sets about scaling down the plans for the regular Kaos, or the Kaos Jr.

Or, if on the other hand he would really like a SUPER Super Kaos, with 8' wing span, then he scales up the plans.

The easiest way to do this is to decide upon how much wing area that you want for the size of aircraft that you desire, and then relate everything to this. For example, say that you want a .19 Kaos, with a wing area of 400 square inches. This is 4/5ths of the Kaos, Jr., but you cannot reduce

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the span by 4/5ths, nor the chord, or you will end up with much less wing area. Rather, you determine that the "Jr." span is 52", the root chord is 11.5", and the tip chord is 8", therefore an average chord of 9.75" (which isn't quite 502 square inches as the plans show, but near enough). This gives you an aspect ratio of 5.33:1 (or, the span is 5.33 times the average chord).

To find the average chord and span that you require, use the formula Span x Chord = Area, or let A be the chord and the span is 5.33A. Then the formula becomes $5.33A^2$ = Area.

Come on, guys, you learned this in the eighth grade. A^2 = Area/5.33 or, in our case, A^2 = 400/5.33, which equals about 75. Take the square root of 75 and you get about 8.65, which is the average chord. The span then is 46", or pretty close to 88% of the former wing span. You can work out the root chord and tip chord in the same manner, by finding the ratio to the average chord. Knowing that the wing span is 88% of the original you can then work on the fuselage to give you the new length, or 37" from the back of the spinner to the rudder post. All of these figures are approximate as I am writing this at home and my trusty calculator is at the office and my do-it-in-the-head-math suffers from some twenty years of button pushing.

Figure out the tail surface area in the same manner as the wing, and there you have a mini-Kaos.

How about the big monster? Well, just quickly, if you decide that you want to have an area of roughly 1000 square inches, then the use of the formula works out to$5.33A^2 - 1000$. and the chord turns out to be 13.7" and the span of 73", which is not really too big until you realize that you have 1000 square inches of wing area! The same math leads us to a scale factor of 140% and gives us a fuselage length of 64" from spinner to rudder post. Give up on that 8 foot Kaos, it would take at least a Honda engine to get it off of the ground!

This has been a very quick trip along the path to changing the scale of your favorite aircraft. I have often had the question asked, "Could I get the plans reduced by photostatic methods, and come up with a scaled down aircraft?" Yes, you could, but only if you figure out what scale ratio you want to work to, in this case it came out to 88% for the small aircraft and 140% for the large aircraft. The determining factor is the wing area. Another is the cost - - - it's expensive!

*

Good luck, and get out and fly, but, remember - - - get started on that next aircraft while you are still flying the current one. □

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FROM THE SHOP

from page 2

Class 1; Rocket, Swift Boost Glide; Radio Control Sailplanes; Design Craftsmanship.

Scholarships which are good in any accredited college in the United States and Canada will be awarded to the top three winners. First place is a $1,000 scholarship. Second and third place scholarships are $500 and $250 respectively. In addition to the scholarships, trophies, and prizes through third place will be awarded. Concurrent with the contest, a "Fly for Fun" event will be held featuring a Frisbee Toss and the building and flying of simple model planes at the site. Throughout the contest, demonstrations will be flown with various types of model airplane featuring some of the best "pilots" in the country. Additionally, the popular BMA Klown Klub will be on hand to add some fun and merriment to the contest.

In making the announcement of the contest dates, Thompson stated, "This contest has the primary objectives of stimulating an interest in the aeronautical field and by rewarding excellence in the designing, building and flying model airplanes and rockets. Many adults of today were building models during their younger years." Thompson said, "A contest of this nature offers an excellent opportunity to bring back those memories."

The contest is open free to the public. It will be held at the Boeing Space Center located a short distance from Seattle. It provides nearly 100 acres of flat grassy land which includes a well manicured runway for radio control models. Control line events, with the exception of Combat, are held on the asphalt parking lot of the Space Center and the indoor events will be held in a nearby school gymnasium. "This contest," stated Thompson, "will provide an excellent weekend of entertainment for the whole family in these days where gasoline shortages loom. It should well fill the family's need for a fun-filled weekend."

Under special hardship cases the Boeing Management Association will, at no charge, provide a home-away-from-home to an individual contestant for the contest weekend.

Prospective contestants may receive further information by writing to: The Boeing Management Association, P.O. Box 3707, Seattle, Washington 98124. Attention: Ted Caputo. Organization 4-1830; Mail Stop 79-65.

* * * * *

See you next month. □

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