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RC MODELER

THE WORLDS LEADING MAGAZINE FOR RADIO CONTROL ENTHUSIASTS

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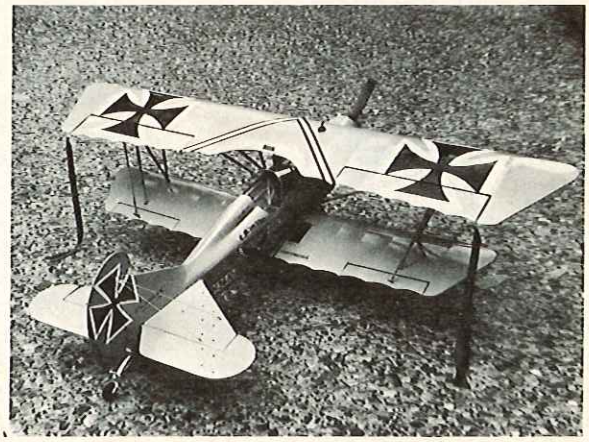

der Jager, an exact scale model of an unusual homebuilt biplane.
See page 18.

THIS MONTH'S COVER

Linda Neal, Miss RCM, poses with the newest kit offering from Model Dynamics, The Shrike. This .30 to .40 powered ship is not only unique in design, but purely spectacular in flight.

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SEPT. 1972

FROM THE SHOP

DON DEWEY

Did you know that model sailplanes may have a heritage that goes back 2,000 years to their origin. Dr. Kalil Messiha has found a model sailplane made during the fourth or third century B.C. With its reverse dihedral wing it has a certain similarity to the American Lockheed Hercules transport aircraft. The model, which has lost its tailplane, has a wingspan of 18 centimeters and is made of sycamore. The following article, reprinted from the London Times, was submitted to R/C Modeler Magazine by Anthony Pitt, of Warwickshire, England, and was authored by Michael Frenchman:

Did the ancient Egyptians learn to fly? At least one person thinks so. He is Dr. Khalil Messiha, who has rediscovered a model glider or sailplane dating from the fourth or third century BC. The glider which is made of sycamore wood, looks remarkably futuristic and bears a close resemblance to the American Hercules transport aircraft which has a distinctive reverse dihedral wing.

Dr. Messiha, who has made a study of bird figures, came across the glider model in 1969 when he was looking through a box of bird models in one of the Cairo Museum's storerooms.

"I was looking for odd things when I found this particular model. It was very like some of the scale model planes which I used to make 20 years ago," he said. Most bird figures that have been found are often half human, half bird. But this one was very different.

"It was in a box of relics found at Saqqara in 1898. The model is of a high-wing monoplane and weighs 39gms. The aerofoil-shaped wing is in one piece with a span of 18cm and a greatest thickness of 8mm over the fuselage. Seen from the front the wing tips droop slightly. The fuselage is heart shaped in section and assumes a compressed elipse towards the tail.

"It is the tail that is really the most interesting thing which distinguishes this model from all others that have been discovered," Dr. Messiha said. At the end of the fuselage is a vertical fin. According to Dr. Messiha there is no known bird that sports a fin 'rudder,' certainly not in Egypt. No bird can produce such a contortion at the rear of its body to assume anything that looks like the model. Furthermore there is a groove under the fin for a tailplane which is missing.

All other bird models have usually been expensively decorated and have fittings for legs, or marks to suggest that such attachments once existed. This model has no legs and only very slight traces of a painted eye on one side of the nose and two faint reddish lines under the wing and around the fuselage. Dr. Messiha says that a lot of work and skill went into the production of the model to produce the very fine aerofoil shape in the wing. Many attempts must have been made before perfection was achieved.

He is convinced that the find is a scale model of a full-sized flying machine of some kind. He has spent many hours making a replica of the model, which, when fitted with a tailplane of the correct proportions, will actually fly or glide when thrown into the air.

His brother, Mr. Geurguis Messiha, who is a flight engineer, commented that the aerofoil shape of the body would lessen the drag effect, a fact that has been discovered only comparatively recently after many years of aeronautical engineering research.

Although the model seems at first sight something of an anti-climax because of its size, there is no doubt that it does bear a striking resemblance to a man-made machine of some kind. Dr. Messiha points out that the ancient Egyptian engineers always made models of comtemporary things, from their funeral boats to war chariots. All these existed, and the full-scale versions have been found, so why not a scale model of some kind of glider?

The Cairo Museum is at least taking the whole thing seriously enough to stage a special "aeroplane" exhibition. The diminutive model is shown

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THE TREND TOWARD MUFFLERS

Mufflers are most certainly *here* and in. In fact, 1972 is the first year that the AMA rules call for mufflers in competition (unless adequate prior notice is given). The vast majority of clubs in the Northeast and West now require mufflers on all of their members' planes out of necessity . . . fields are getting harder and harder to find all the time.

The secret to using mufflers is finding a good one that will provide adequate quieting without creating a substantial power loss or engine overheating.

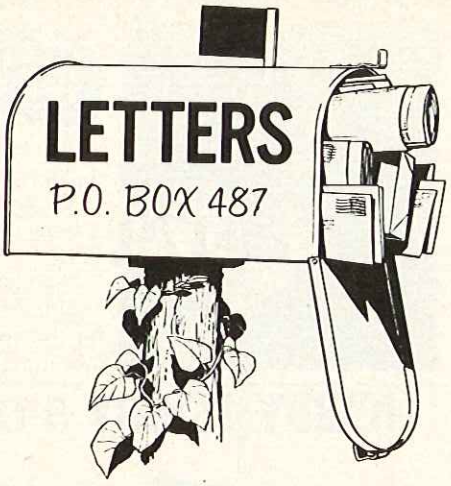
Positive Engine Attachment

The MRC-Kavan muffler fills the bill. It is supplied with a removable nose cone that allows the installation of two separate, interchangeable "front-ends" — a venturi front end for an absolute minimum power loss and lots of quieting and a solid "expansion chamber" front end for the very maximum in quieting. What's more, the MRC-Kavan muffler is cast with lots of cooling fins to dissipate muffler heat that would be otherwise transmitted back to the engine causing loss of power. There are a number of other unique design features built into the MRC-Kavan muffler that go a long way towards making it the ideal type to use. This new MRC-Kavan muffler is available with a large selection of inexpensive standard adapters that allow you to switch the muffler from engine to engine, plane to plane, in seconds. One muffler and a few adapters are all you'll ever need for efficient engine quieting.

There's no doubt you'll be using a muffler on that screaming .60 or other large engine soon. Make sure that the muffler you use is the best. A quote from Clarence Lee in RCM finishes our story. "To sum up our findings of the Kavan muffler, with the venturi disc insert installed, we would have to rate this as one of the top mufflers we have tested . . . with the solid disc insert installed the Kavan muffler would be about equal with the best expansion chamber mufflers we have tested in the past."

Available at local hobby dealers—$11.50

Model Rectifier Corporation
2500 Woodbridge Avenue
Edison, New Jersey 08817



MORE ON NOISE POLLUTION

Dear Don,

I am an engineer employed at the Noise and Vibrations Laboratory of GM Proving Grounds, Milford Michigan. I have just read your comments concerning noise in the May issue of RCM. You could not be more correct about what you are saying. Noise pollution is a serious problem and government regulation is in the works. We at our lab are putting enormous amounts of money and effort into reducing the passby noise of our cars and trucks. There is a great concern all over GM about this problem.

I am personally concerned for our sport. It is most enjoyable to me and I don't want to see it slide into oblivion over noise pollution. Effective mufflers will be designed. Let's hope it's soon to avoid government intervention. I am also doing something about this problem. Enclosed is a copy of a letter I wrote to Clarence Lee explaining what I plan to contribute. You should find it interesting as it is concerned with model engine noise.

Thanks again for a well-written article. I hope it opens up some eyes especially those of engine manufacturers.

Sincerely,
James E. Stocke
Ann Arbor, Michigan

Dear Don,

I just got the RCM and am compelled to write to you over your viewpoint – I agree 100% or more, if possible. We have been in the U.S.A. for nearly 5 years, and I have been promoting the use of mufflers all over my area. In Great Britain they became mandatory several years before we emigrated, so I knew how little effect they had on the power output/flight characteristics of my models.

My club – Signal Seekers – fly in the middle of a housing area and have an all muffler rule which met quite a lot of opposition when we proposed it 2 years ago – but we are still flying there, and the objectors soon "grew up" and realized that the $10.00 hanging onto the engine in the shape of a muffler really has been worthwhile. I must say that we now get more visitors who stay and watch the action, and noisy engines really show up with black looks from other fliers.

I hope the engine manufacturers really get the message – and then a lean run won't cook the motor as bad.

I would like to add a tip to muffler users – clean them out periodically, as you really get them caked up through the long flight times we now fly.

Glad to hear Formula I will be muffled! As a contest board member it seems I get this news out of the blue. Also, the Pattern schedule article has been my view too – so the RC contest board is really thinking of the problems.

Cheers,
Peter T. Waters
Livonia, Michigan

MIDGET PYLON RACING

Dear Sir:

I think it is a real help to the majority of RC'ers that you gave such a boost to 1/2A Midget and 1/4 Midget Pylon Racing. But where are the 1/2A Midget Races held? I have yet to find advance information of this racing.

Also, I wonder why you passed over what I think might be the best racing of all for sport fliers. This is .10 size racers with about 250 sq. in. wings and throttle control. The 1/4 Midget class is already going to hell with the supermen moving in from Formula I and II and blowing the amateurs off the field. Maybe .10 Midgets would be the next step for the not-so-quick majority.

Ronald Shean
Paramount, California

A TURN OF THE COIN

Dear Sir,

Many things have been said lately about safety in flying around full-size aircraft. Maybe it is our turn to say something about the way full-size

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TAKE A LOOK AT THIS

Chuck Gill Models, P.O. Box 404, Martinsville, New Jersey 08836, has produced a line of the finest frequency flags we have seen to date. Consisting of a triangular shaped flag of one or two colors, depending on the frequency band selected, the flags are sturdily made and stitched and utilize two strong elastic bands for fastening to your transmitter antenna. Priced at $1.50 per flag, they have been Tested, and are Approved and Recommended by R/C Modeler Magazine.

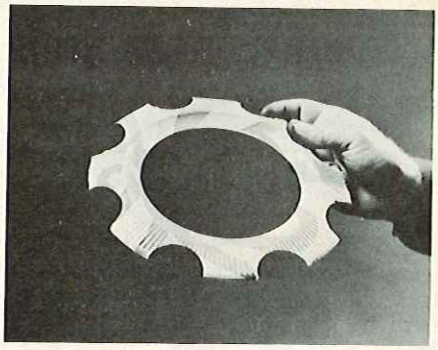
*

Kraft Systems, Inc., 450 W. California Avenue, Vista, California 92083, have produced a new molded mounting block for their Multicon Retractable Nose Gear. This is a molded plastic box designed to house the nosegear in the Multicon Landing Gear set. It is also available separately at a list price of $1.98. Also available is a new landing gear amplifier which permits switching with a standard four channel set. This unit will enable the owners of any 1967 or later Kraft or PCS four channel proportional system to operate the Multicon Retracts by simply plugging this amplifier into the motor control channel of the receiver. The motor control servo is then plugged into the amplifier, as are the retract gear units. The operation of the retracts is quite simple inasmuch as the throttle trim lever controls the position of the landing gear. To retract the landing gears, the throttle control stick must first be in the full "high" or open position. Retraction occurs when the throttle control trim lever is moved to the "high" position. To extend the landing gears, the throttle control stick must be in the full "low" or closed position. Extension occurs when the throttle control lever is put into the "low" position. Once the retracts are in either the extended or retracted configuration, with the trim lever in its proper position, the throttle control stick can be worked through its full range without affecting the position of the retracts. To further enhance the versatility of this small and lightweight amplifier, it can also be operated from any 5 or 6 channel 1967 or later Kraft, PCS, or Heathkit radio by plugging the amplifier into the appropriate auxiliary channel. In either mode of operation with a four channel or six channel radio, no extra batteries are required for the operation of the retracts other than the standard airborne pack. Price of the complete retractable landing gear system wired with the LG-51 amplifier is $109.95. The LG-51 amplifier only is priced at $39.95. Connectors supplied will mate with Kraft Series 70 or later radio unless specified otherwise.

*

Dremel Manufacturing Company, 4915 21st Street, Racine, Wisconsin, has a new electric engraver carton which highlights the power tool manufacturer's burglary prevention program, "Project Theft-Guard" where participants utilize an electric engraver to inscribe valuables with a driver's license number. Enclosed in the carton along with the engraver, are two "Project Theft-Guard" stickers that, when affixed to the front and back doors, tell potential burglars that everything inside has been permanently marked for fast identification and quick recovery by law enforcement authorities. The carton has a hanger that enables it to be hung on pegboard. This is an outstanding item that could be effectively used by RC'ers to protect their valuable radio control equipment.

The Absolutely Incredible Flying Thing Co. (a division of Mason-Renshaw Industries) 6315 E. Coast Highway, Carpinteria, California 93013, herewith announces a world-wide contest aimed at (1) uncovering the flight secrets of the Frisbee (trademark of Wham-O), the Whiz-Ring (trademark of North Pacific) and the Sling-A-Ring (trademark of Vercal) and (2) improving the design of this unique class of



flying things.

As designers and manufacturers of model airplanes, they are ashamed and embarrassed at their inability to explain the gliding and hovering characteristics of these highly popular flat circular throw toys. They are interested in improving the design of the existing models and developing THE PERFECT MODEL which will fly further and stay up longer than any competitive design.

Mason Renshaw is stymied, however, by their lack of understanding of the principles involved. The following questions occur to them and they're frankly confused as to how to develop the answers.

1) Do these things develop lift because of their forward speed?

2) Do these things develop lift because of their rotational speed?

3) Is their stability due to aerodynamic equilibrium, a gyroscopic effect, or both?

4) How important is the airfoil? Is there a theoretically optimum airfoil?

5) Is it best to have the weight at the edge or in the center?

6) Is a hole in the center better or worse?

7) Shall they scallop the edges or leave them straight?

This internal development program has led to the construction of a number of scallop edged models with large center holes made from paper picnic plates and to the interesting conclusion that the tendency to dive to the right or left can be controlled by trimming of the outer and inner edges. Turning the outer edge down causes the model to dive to the right while turning it up causes it to dive to the left. The opposite effect is generated by turning the inside edge up or down.

This contest is open to everyone and will run until November 1, 1972. Mason-Renshaw will (1) give a first prize of $100.00 to the person submitting the best explanation of the flight of these throw toys, and (2) give

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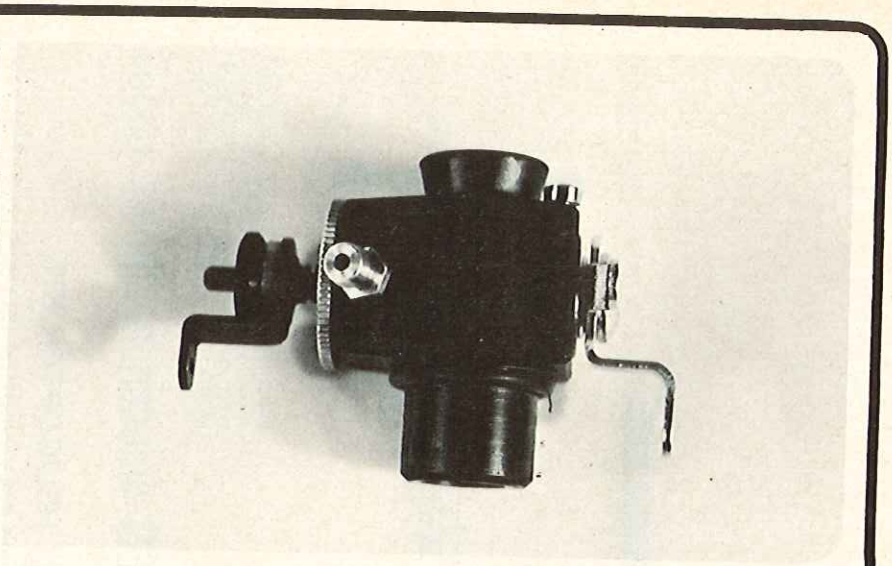
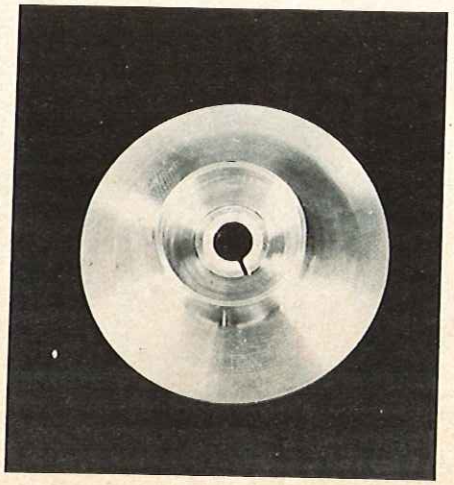
engine clinic

By Clarence Lee



This month we have two new products of interest to bring to your attention. Quite often smaller items such as these will appear on the market but, due to the fact they are not accompanied with full page advertising in the model magazines, etc., many modelers are never aware of their presence. I receive several letters every month from readers wanting to know why some manufacturer has never made such and such an item available and, in many cases, such an item has been available for years. So when useful products come along we try to bring them to your attention.

Our first item is a mixture control unit for the Perry carburetor that allows you to adjust the fuel mixture while flying. An extra servo and channel on your radio is naturally required to operate the control unit. How many times have you taken off a little on the lean side and wished you had a means of richening up the engine. This is especially true for your contest fliers. Those of you using the Perry carburetor on your engines can now do so. The unit, itself, is the ultimate in simplicity and will fit any of the Perry carburetors using the black adjusting needle. First models of the Perry carburetor used a 2-56 screw with a small knurled aluminum head. The mixture control cannot be used on these models. The mixture control unit is composed of two pieces. The first is a regular adjusting needle the same as the one presently used on the carburetor, but with a saw tooth knurl on the back side of the adjusting disc. The second part is a small servo arm with a matching knurled face which slips over the adjusting needle. This unit then screws into the carburetor the same as the standard needle. A movement of the arm richens or leans the mixture. The mixture can be set manually by turning the adjusting disc the same as with the standard needle; the knurled faces making a ratchet that lets the needle 'click,' being spring loaded by the regular tension spring. The mixture control needle is available through any hobby shop handling the Perry carburetor line.



Our second product this month is a line of machined aluminum back plates for the Veco spinner. This is not a new product having been on the market now for close to a year. As those of you who have used the Veco spinners know, the back plate that accompanies the spinner is die cast and does not always run as true as might be desirable. Also, they are easily distorted when tightening the propeller. John Garabidian, who heads the J.G. Model Company, markets such a line of machined back plates. They come in 1¾", 2", and 2½" sizes and are made for specific engines. The model for the Super Tigre has the dust cover machined as part of the back plate, comes with the split collet, and replaces the regular Super Tigre prop drive unit. A similar model for the Testor's McCoy .35 and .40 also has the prop washer as part of the back plate and replaces the regular prop washer. This is an excellent idea as it assures better spinner alignment. A true running spinner means less vibration and better performance from your engine. Price of each back plate is $4.49 and may be obtained from your local hobby shop or ordered direct from J.G. Model Co., 909 N. 3rd St., Montebello, California 90640.

Dear Mr. Lee:

We follow your column with much interest every month and we thought that you might be able to help settle a minor argument with our local club. R/C flying is just coming into its own in this town since we initiated a reliable source of supply and, we hope, information. We do the best we can with limited knowledge to get the novice off to a good start, however, we still have our share of those who insist on running 11–8's on .40's, along with other "questionable" practices.

To get back to our problem, the local club voted in a muffler rule, which we support, but we object to a prohibition on break-in flying minus the muffler. Although some bench running is necessary for initial adjustment and parts rating, it is not practical to run an engine for extended periods so close to the ground because of the dust and dirt which can be sucked into it.

Due to the abundance of open space here, we do not have a noise problem, but the muffler rule gets us

ENGINE CLINIC

ready for contests in other cities that do. We feel that allowing ten, ten minute flights before use of the muffler is not unreasonable since we are breaking in a new engine every week. This initial break-in period will give the engine a fighting chance to do what it was designed for and prevent otherwise good customers from complaining that the engines we recommend are gutless on the top end.

We would appreciate any comments you would care to make.

Thank You
Karl Schaefer
Missoula, Montana

Karl, although it is not always possible in some flying locations, it would be desirable to break an engine in without a muffler. New engines run hotter to begin with. Using a muffler only causes the engine to run even hotter than normal. A new engine has to be run rich and a rich running engine with the increased heat from a muffler will varnish and carbon-up considerably faster than if run without a muffler. During the break-in period the parts have to wear in and, in the case of a ringed engine, the ring or rings seat. If the rings become glazed or varnished during the break-in they may never seat properly. A muffler only contributes to this problem. So, if possible, it is always better to break an engine in without the muffler. Ten, ten minute flights would certainly be a start in the right direction. However, in the case of a .60 size engine, this amounts to under a gallon of fuel and I recommend that you run at least a gallon of fuel through a .60 before installing a muffler.

Dear Mr. Lee:

My new Webra .61 has a crooked piston baffle, that is the "fence" on top of the piston is noticeably wider on one side than on the other. To my way of thinking, this error in manufacturing will lead to assymetric fuel distribution and loss of power. I would appreciate your comment on this.

Are ni-cad starting batteries @ 1.2 volts adequate in cold weather to heat up our glow plugs? I noticed that Duke Fox recommends 1.5 volts only. I wonder if my cold weather starts could be improved with 1.5 volts.

John Agee
Shaw AFB, So. Carolina

Your piston baffle, being a little wider at one end than the other, should not effect the performance of the engine in any way. This is not a critical dimension in the engine. However, do make sure that the baffle does not touch any part of the head. This would be pretty hard to do with your Webra .61 as there is considerable clearance for the baffle.

Duke's recommendation of 1.5 volts pertains to maximum voltage. Do not use 2 volts. 1.2 is fine. If in doubt, just check the glow of the plug. You want it bright orange – not dull red.

Dear Clarence,

I have a McCoy .19 R/C motor with which I have had no success at obtaining a good idle. It runs smoothly and powerfully at full throttle. When throttled down it runs for about 10 seconds and then stops. If the throttle is opened before the above occurs it speeds up roughly, coughing and smoking, and then stops. At any intermediate speeds it runs for awhile and then stops without any warning – almost as though someone had switched off the glow plug!

The motor is well run-in, being about twelve months old. I use about 5% nitro in my fuel, a 9-4 prop and an idle bar glow plug.

As you probably know there is no air bleed adjustment on the McCoy .19 carb and the spray bar rotates with the throttle barrel. Should the hole in the spray bar point directly down the carb throat at full throttle or at the idle or somewhere in-between? Should the exhaust baffle completely close the exhaust at the idle position? Am I hoping for too much in wanting a motor of only .19 cu. in. to idle reliably?

Yours faithfully
John M. Smith
Natal, South Africa

The old type McCoy carburetor left a lot to be desired in the idle department, John, and you would do better to install a Perry, as the later McCoy's use, or a Kavan. Both of these can be adjusted for tank position, and variances in installation that effect idle. As for your old carburetor, the hole in the spray bar should be straight down in relation to the venturi at full throttle, and the exhaust baffle should completely close with the carburetor in the idle position. As your carburetor seems to be loading up you can cure this by notching the top edge of the barrel slightly with a jewelers file. This will lean the idle mixture. Be sure to remove the carburetor from the engine when you do the filing. You can get a fairly reliable idle from a .19, however, they are not going to tick over or be as tolerant as a .60. One drop of fuel that would not particularly effect a .60 is considerably larger to a .19 and could flood it out. Also, your .19's run cooler than the .60's, making it harder to keep the glow plug hot. For this reason you need a higher nitro content fuel. Fuels such as Cox blue can, K & B 500, and Duke's that are in the 12% – 15% range will work the best in your .19. 5% nitro is a pretty cold fuel for a .19 and probably the cause of a lot of your problem.

Dear Mr. Lee,

I am building a Top Flite P-51B. It will be powered by a Webra .61 Blackhead. I would like to use a scale-like 4 bladed prop. What diameter and pitch would you suggest starting at? The plane will be somewhere around 8 lbs. with retracts, flaps, and all.

Thank you for your help.

Sincerely,
Joseph Klein
Williamsfield, Illinois

Forget the four blade prop, Joe. Four blades means that you would be doubling the load on the engine and it could not swing it. If you reduced the diameter and pitch to the point where the engine could swing it, the prop would not be large enough to pull the airplane, i.e. something in the neighborhood of a 9 or 10-6. I admit a four bladed prop would look great for scale effect, but better stick with an 11-8 if you expect the airplane to fly properly.

Dear Mr. Lee,

I have an O.S. Max H40P which, when breaking it in, I followed the instructions to the letter. After the break-in period the engine held rpm without sagging and there were no indications of over heating. The fuel I used was Dukes (plenty of lubrication) fuel. After about 10 flights or so, a friend of mine was starting the engine and heard a clicking noise as it was being flicked over. When I checked, it felt as though the connecting rod was loose. Upon disassembly I found the

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SUNDAY FLIER

KEN WILLARD

Growing pains. Long green growing pains. Air space growing pains. Frequency growing pains. Flying site growing pains. Equipment, accessories, materials, methods, events; you name it, and there's growing pains.

Like the LSF (League of Silent Flight). The League, conceived a couple of years ago as a means of affording an individual a Soaring Accomplishments Program whereby he could measure his ability not only against man, but against nature as well – and without, hopefully, hurting either one by unwanted noise, air pollution, or any of the other great causes of the environmentalists. So what happens? It has become so popular that something has to be done to preserve it.

As of this writing, there are over 300 members in LSF. I said members – not aspirants. Remember, you can't buy a membership; you have to earn it. The record shows that roughly one out of four aspirants, so far, has reached Level I. And letters from aspirants are coming in, I am told, at the rate of about twenty to twenty-five a week! Now that's a lot of correspondence. And when you add all of the processing correspondence for the fellows who are achieving additional levels, the load becomes pretty staggering for an unpaid staff of two.

The Bylaws of the LSF provide for no dues; expenses are paid out of donations and whatever incomes accrue from the LSF Soaring Tournament after expenses are paid. So the LSF has what I would call "long green" growing pains.

To help ease those pains, the South Bay Soaring Society, in the Santa Clara Valley area south of San Francisco, where the LSF was spawned, has taken a significant step. At each of their monthly contests, where the entry fee is two dollars, they have added a fifty cent charge per entrant (except juniors) which is set aside for the LSF. This makes sense; the contests are used by the members to fulfill the contest requirements of the higher levels of LSF, and this nominal fee helps defray the LSF expenses for processing. It isn't much per individual, but the average contest draws about thirty contestants, and that's fifteen dollars for the LSF. Multiply that by twelve for the year, and that's $180.00 for the LSF just from one affiliated club.

If each of the affiliated clubs of LSF were to do likewise, it certainly would go a long way toward solving the growing pains of the LSF without the necessity of changing the Bylaws to provide for dues as well as qualifying flights.

And what about the guy in outer Mogandiland who reaches Level I but hasn't anyone near enough to get together a club of five members? Well, that's a problem – but if he wants to assess himself of fifty cents every time he makes a flight of some duration – say twenty-five minutes – and send it to the LSF, it will be just as gratefully received as any other "contest" amount.

The LSF, and its Soaring Accomplishments Program, is unique. In my opinion, it's worth keeping in its unique format. I'd like to see all clubs institute a program like the South Bay Soaring Society has done to help the LSF solve its "long green" problem without losing its individuality.

And what about air space growing pains? You've all heard or read about the crowded airspace over New York when a powered model, apparently out of range of the transmitter of the owner, for one reason or another, was sighted alongside an airliner, creating an incident which was blown up all out of proportion by the newspapers, and which has necessitated an intensive effort on the part of the AMA to reach some agreement with the FAA regarding a proposed safe flying program.

It brings to mind a time, some thirty-five years ago (yes, I said thirty-five!) when I was working as a meteorolgist and assistant flight superintendent for American Airlines in Chicago. One day, a NOTAM (Notice to Airmen) was posted on the flight information board. Roughly, it read, "All aircraft flying in or out of Detroit Municipal Airport be on the look-out for model aircraft in the vicinity of Willow Run. National Model Championships are in progress. Models may be sighted to altitudes of 15,000 ft." (At that time, air traffic on the airlines flew at around 8000 feet.) Somehow or other, that never made headlines. Yet the situation was essentially identical – the possibility of midair collision. Only the crowded sky was pretty localized. Nowadays, with more air traffic and more models, the air around an airport can get pretty full. But, if you know the traffic is there, and you fly on a "see and be seen" basis, like they did thirty-five years ago, it should be manageable.

The proposal to fly model aircraft at altitudes of 400 feet or less, except for special record trials, may be all right for power models, but sailplanes need more freedom than that in order to perform. To take care of this, the proposal to notify an airport tower when you plan to fly a sailplane within a five mile radius of the airport doesn't seem unreasonable to me. You're flying VFR (visual flight rules) and I don't know about you, but when my sailplane gets up around a thousand feet and I see a full sized job anywhere near it, I get the hell out of the way! Sure, I'm concerned about the safety of the people in the plane – and I'm also concerned about the safety of that equipment up there, so there's two good reasons to be careful.

Just to keep the record straight, I recently notified the control tower of San Jose Airport that we were flying sailplanes at three fields, each of which is within five miles of the airport, although just barely. The chief controller was very interested, and asked why I called. I told him we wanted them to know of the air traffic – that it was radio controlled under VFR conditions – so it wouldn't come as a surprise to any pilot coming into the control zone of the airport. He asked if there had been any incidents, and I told him no, but that this was just to help prevent any from occurring. He thanked me for calling. I don't think we'll have any problem with sharing the airspace, although the possibility always exists that some publicity seeking individual may create a problem.

And then there are the frequency problems. I saw recently where someone sent in a plea to AMA for more frequencies, and I'm sure a continuing effort is underway to open the door. But if you've ever seen the frequency spectrum, then you know that we're almost at the point of trying to "put two pounds in a one pound bag." Saw a modeler – electronics genius type – recently who had built his own matched transmitter and receiver. He was flying on purple and white, which was the frequency I have. We were on the slope, and he could have stayed up all day, the way the wind was blowing.

I finally asked him when he planned to come down, since we were on the same frequency.

"No problem," he said. "I'll come down and change."

And he did. And when he did, I noted that he had six frequency flags. He had built a unit that could be switched to any one of six of the approved frequencies!

How he did it, I don't know, but I have always been under the impression that two frequencies, on adjacent channels, was all that could be accomodated. Maybe that's all that can be accomodated at a price the average modeler can afford, but it certainly was a great advantage for him. There was always a vacant frequency to which he could switch, depending on who was flying. It certainly would be great for slope racing; several times I've been in the position of not being able to fly against another modeler because we were on the same frequency. Somehow, frequency crowding will get solved. Not by me – I have trouble, sometimes, just turning the receiver on and off . . . but the Krafts, the Elliots, and the Cannons should figure it out one of these days.

And then there are the flying site growing pains. You've all been up against that – at least those of you who live in an urban area. Powered models get kicked out because of noise. Sailplanes get crowded out because the field, which is open to all recreation, gets filled up with dogs, softball teams, soccer or whatever. We even were asked to leave a field because a Little League baseball game was going on at the adjacent diamond. I'm not exactly sure what happened; some opined that an outfielder got fascinated watching a sailplane and dropped a fly ball. And if you've ever had anything to do with a Little Leaguer's mother, you can imagine the rest!

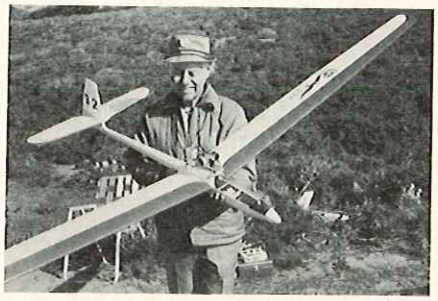
As for the growing pains resulting from the increase in equipment, accessories, materials, Don Dewey pretty well covered that in the "From The Shop" column in the July issue of RCM. It was interesting to note, in the same issue, the tabulation by Chuck Cunningham on the preferences of modelers; balsa and plywood still seem to be the favorite material. Plastic models, which had a strong upsurge, still intrigue a lot of modelers, but I've noticed that many modelers return to wood after a short fling with plastics. One material that's hanging right in there in popularity is fiberglass. Although expensive, it's molding ability and strength makes a lot of modelers willing to shell out the extra dough.

And talk about contests! If you wanted to, you could spend every weekend at one, and without having to travel halfway across the continent, either. Trying to schedule a contest so it doesn't conflict with another one that you would also like to attend just about requires a computer these days.

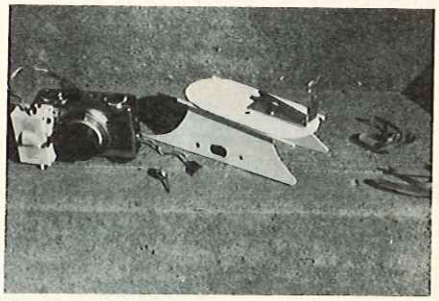
Finally, there's the growing size of the models – particularly sailplanes. Eight to twelve feet spans are the rule rather than the exception. I was interested to see some evidence of a reversal in the trend in powered models, according to the Cunningham survey. Up until now, it seemed like you just weren't with it unless you had a .60 powered job. Some of you will remember that I championed the small models for a number of years – and still do, when it comes to power jobs. For awhile, I also tried to foster interest in sailplanes with less than six foot wingspans, but it was a lost cause right from the start. To do any really serious R/C soaring, you have to go to the larger size, since the thermals don't really blossom until you are above 500 feet, and the little sailplanes start to go out of sight when you go higher than that. The Top Sailer, which I've been developing for Top Flite, has a nominal wing span of ten feet, which can be varied by using different wing tip panels. Even with that span, as I keep trying to achieve the elusive two hour thermal flight for LSF Level 5, the Top Sailer frequently is a mere speck in the sky.

There's one aspect regarding size that may require serious consideration very soon, and that is the fact that many "models" now flying are no longer models in the eyes of the Federation Aeronautique Internationale (FAI). The FAI limits models to eleven pounds, or a maximum wing loading of 24 oz./sq. ft., or fifteen square feet of wing area (including stab) in the three categories. Many of our present aircraft exceed these limits. In a feasibility demonstration, the Lockheed California Company flew one of my Wavemaster amphibians at an all up-weight of just under twenty pounds, with a wing loading around 40 oz./sq. ft. It was no longer a model; it was a RPV (remote piloted vehicle). I'll tell you more about that in a future article; how it carried a TV camera, with real time transmission so it could be (and was) flown by the pilot just watching a TV screen. And there's a lot more of that type of experimenting going on. What we're getting into more and more is the fact that we're flying unmanned, remote controlled aircraft – not model airplanes – and as such, it is virtually inevitable that arrangements for shared airspace will have to be worked out.

At one time or another, every modeler thinks about installing a camera on his model and taking aerial shots. George Steiner, up in Sacramento, did just that, but with his sailplane. He mounted a RICOH f35mm/f2.8 lens on his Graupner Cirrus, actuated the shutter with a KPS9 servo, and the film advanced in the camera automatically by a spring motor. The installation added 20 oz. – and a lot of drag – but I saw it perform and was intrigued by the idea. The photos show the installation, and I've included some of the aerial shots, as well. Shot No. 1 shows Stan Powell



holding George's model with the camera mounted sideways. The camera can be rotated. Photo No. 2 shows the



camera, servo, and the camera mounting base, the sides of which fit between the wing root and the fuselage and are held in place by the dihedral wires. Photo No. 3 shows you what we look like, down at the winch, as the glider is towed aloft. The fourth shot shows what a contest group looks like to a glider coming in for a landing.

George's set-up may be crude in comparison to some, but you have to

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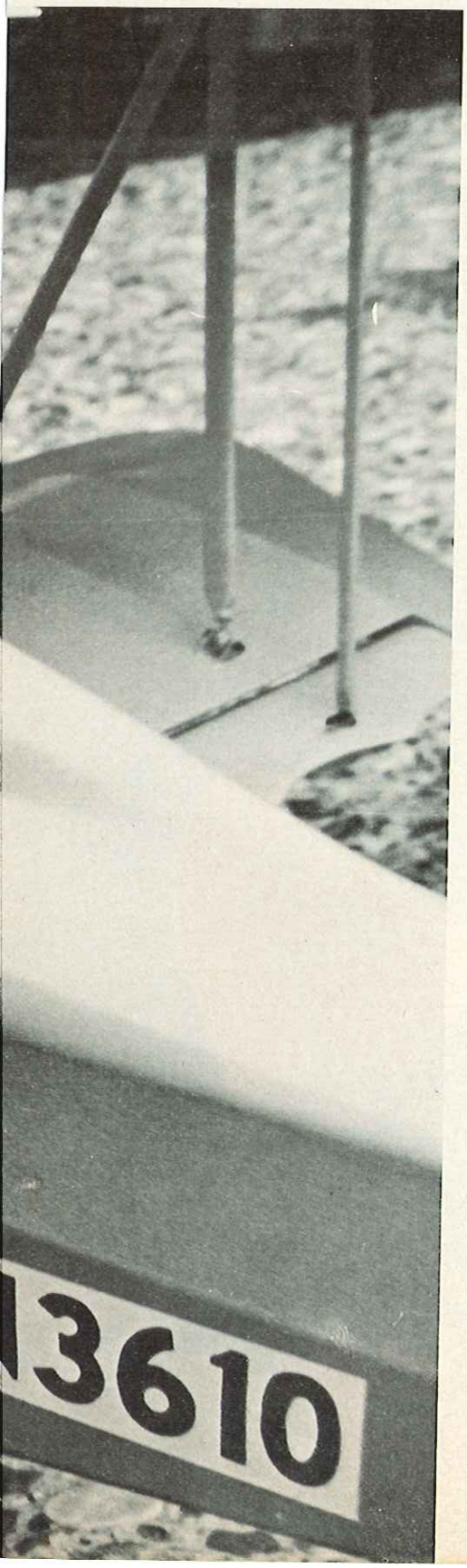
der JAGER


pilot
Marshall 'von' White
E.M. 'von White
Flying Eagles
experimental

BY BRUCE R. LUND



Finding a subject suitable for scale modeling is about as difficult as building the model. I know that all of you have some particular model you would like to build but will it make a good flying aircraft? Most of my favorites were either too complex to build, contained too much delicate detail, impossible to authenticate, or just not airworthy. After examining my favorites I decided to be analytical in my choice of a model. For the coming National Scale competition, I would set my requirements down on paper and then build the plane that fit them the closest - - - even if it wasn't one of my favorites. The requirements went something like this.

1. A plane that hadn't been recently modeled.
2. Single engine.
3. Colorful paint job for eye appeal.
4. Long enough nose moment for easy balancing.
5. Simple construction.
6. Very little detail with no flying wires.
7. Plans and photos readily available for authentication.
8. Sensible wing loading.
9. Large tail area.
10. Cowled engine but with adequate cooling.

Finding a plane that met these requirements seemed almost impossible. After searching through my magazine library, I had just about given up when the mailman delivered the March, 1970 copy of Sport Flying Magazine. On the cover was der Jager, a new homebuilt. It looked more like a model airplane than a real one. The color photographs inside whet my appetite even further.

Here was a colorful biplane with no wing wires, a long nose moment and, above all, a large tail. Detailed plans were also available from the designer, Marshall White. I looked through many more magazines but kept coming back to der Jager. Finally, I couldn't stand it any longer and ordered a set of plans for the full sized airplane. Once they arrived I hibernated into my shop with them and, about a week later, came up for air. I now had a set of plans for my National entry. It was large, but not too large. I had decided on a scale of 3" to the foot. My reasoning was that it would be easier to build ¼ size and allow plenty of room for the engine, and radio gear as well as making detailing easier. The wing worked out to a span of only 60", 990 square inches in area. Not bad if I could keep the total weight down.

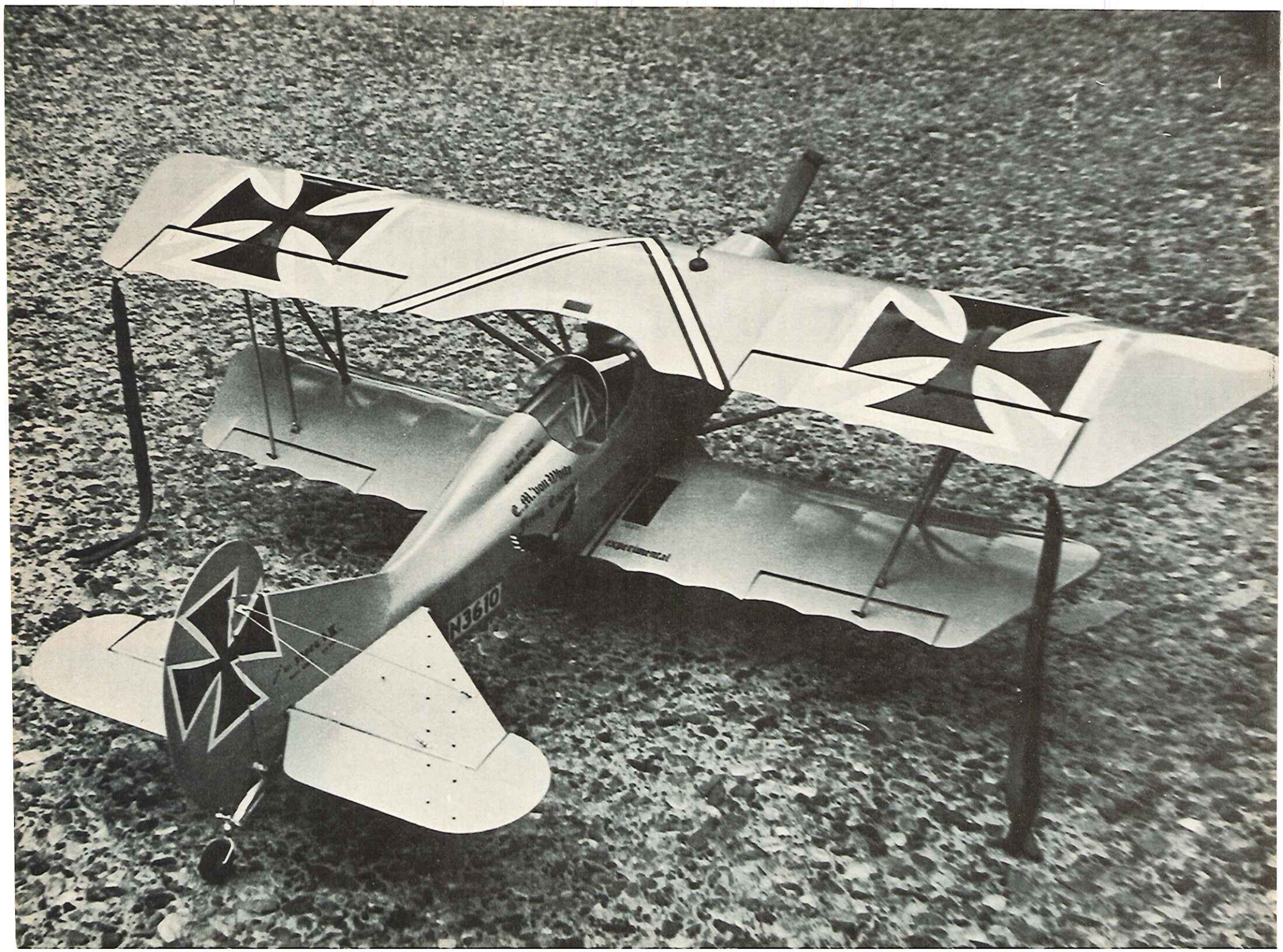
The real plane is constructed very much like a model, and why not, since Marshall White has built and flown many models. He even competed in the 1938 through 1940 Nationals. This plane was constructed so much like a model that I succumbed to the urge to duplicate the structure rather than follow normal modeling techniques. The steel fuselage longerons could be made of dowels and even the scalloped trailing edge of the wing could be easily duplicated. This construction should be good for extra points, particularly in the cockpit.

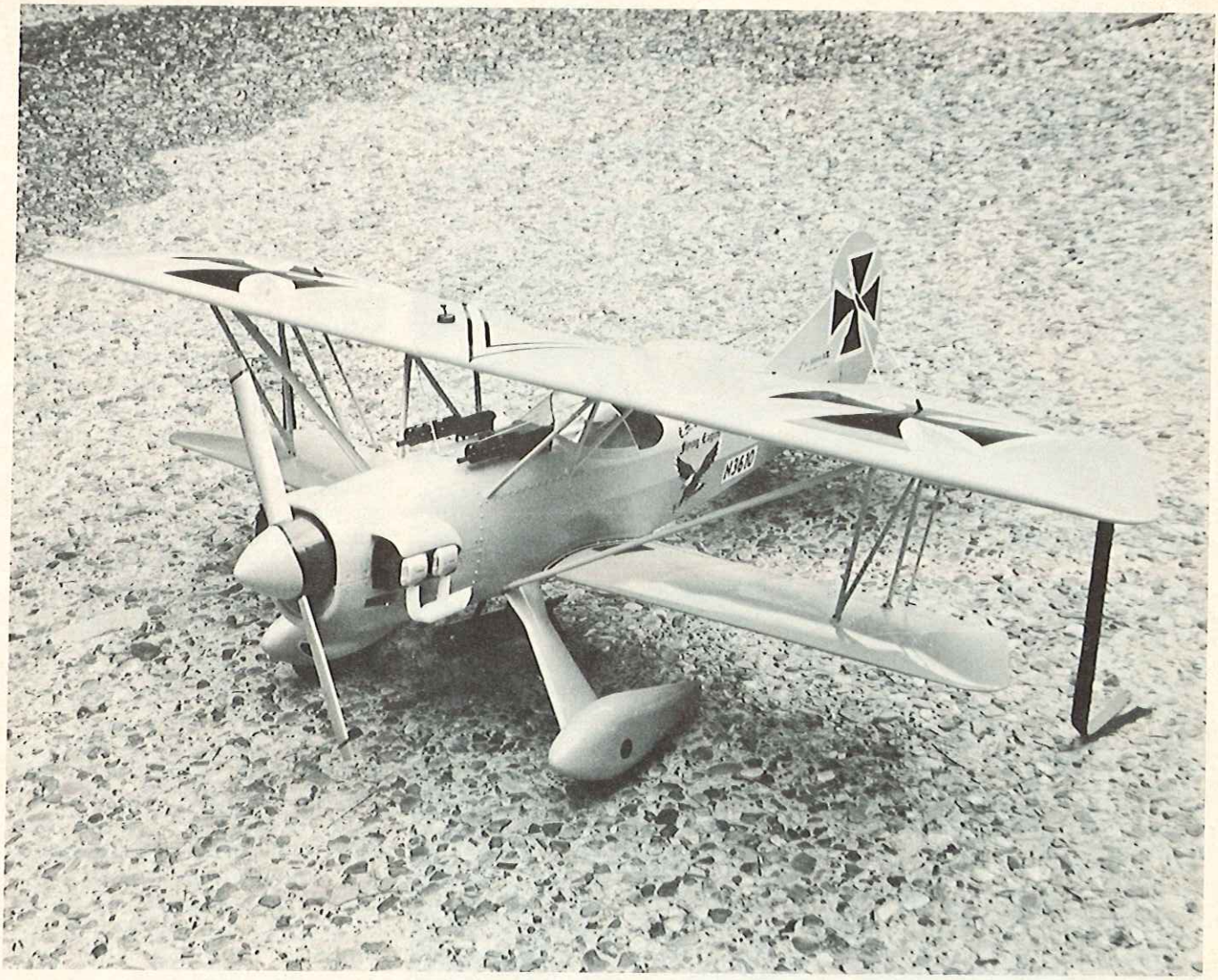
When you look into my cockpit you see it just like the real one. Tubular stringers, fabric sides, and a ¼ size instrument panel. The wings and tail were more or less conventional but the fuselage was going to take considerable thought. I was afraid that the tubular framework of the fuselage might be too flimsy. Just to see if it was feasible I started building the framework. By the time I glued the two sides to the firewall I knew I had it made since it was much stronger than conventional sheet balsa sides. Now the sawdust really began to fly.

Many hours or, should I say, months later, it was almost finished. The paint job was completed two weeks before the Nationals. I planned to give it a test hop the week before leaving for Chicago. Just my luck it rained and rained and rained. Finally, late Friday afternoon, the weather broke just before sundown. der Jager lifted off the runway. The lift-off was beautiful, altitude was obtained, and the first turn was entered. Then it happened; the prop and spinner came off and the engine went wild. I cut the throttle and tried to turn back to the runway without getting down wind. Stretching the glide resulted in lost flying speed; it didn't stall but the sink rate was about to get out of hand. The runway was out of reach now so I tried to stall it into the tall grass along side.

When the grass quit swaying der Jager was lying on its back. There was no structural damage done and, in fact, the bomb was the only victim. I knew that the plane would fly so Chicago was still in sight. The bomb was repaired in Cairo, Illinois, the next evening and painted in the Chicago motel room the evening before der Jager was turned in for scale judging.

My first official flight was almost a repeat of the test hop, only this time it was an over-lean engine that began to


N3610



sag during climb out. This time the tall grass only bent the landing gear back a little. The second flight was much better. In addition to the prescribed maneuvers, der Jager did three loops, three barrel rolls, and a stall turn. Not bad for its first real flight. Everything was fine but it wanted to climb very badly. About half down stick was required for level flight. This was due to the 3½ degree incidence in the top wing. (The real airplane had the same problem.) Marshall has now taken the incidence out of the top wing and I would suggest that anyone building the model to do the same. I have been able to get by by flying slower and using plenty of down trim. der Jager placed ninth at the 1971 Nationals. Not bad for my first attempt at scale. der Jager has proven to be a capable flyer and is very strong. Constuction is not easy and should only be attempted by the most qualified builders.

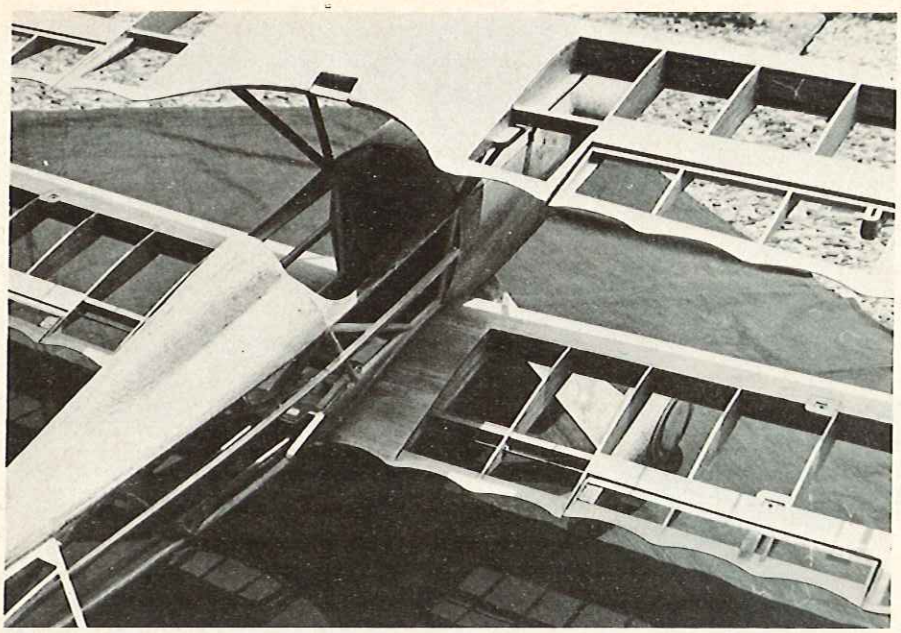
FUSELAGE CONSTRUCTION

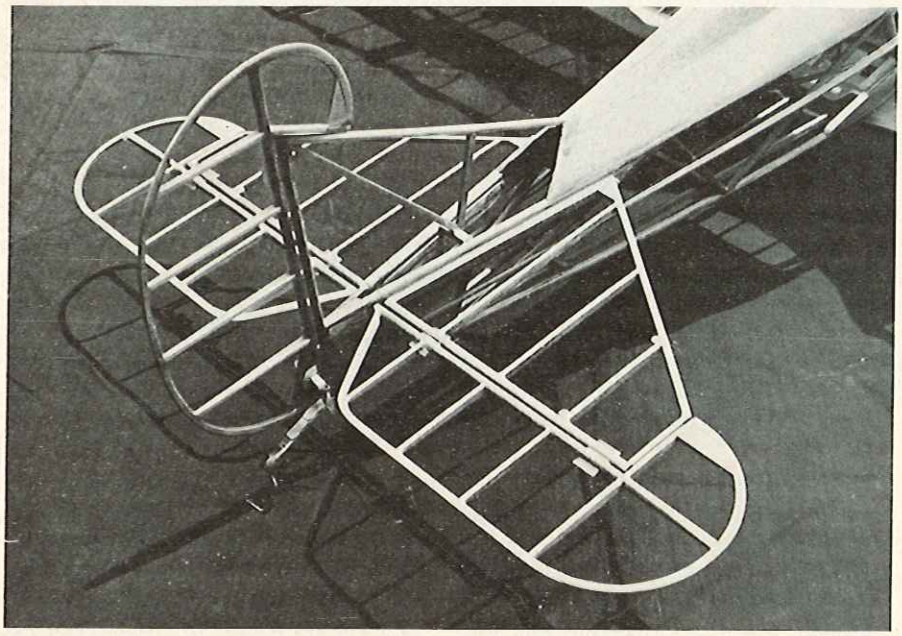
Build two sides using ¼" birch dowel. Fit every joint very carefully. Use a small rat-tail file on the ends of each cross piece for a perfect fit. Be sure to omit the tail post, it will be part of the vertical fin. A good grade epoxy glue is used to hold everything together. When the two sides are finished, insert the longerons into the ¼" plywood firewall F-2. Install the top and bottom cross members and landing gear mount using epoxy. Watch your alignment. I placed the plans on the edge of my building board so the firewall hangs over and the top longerons are on the plans.

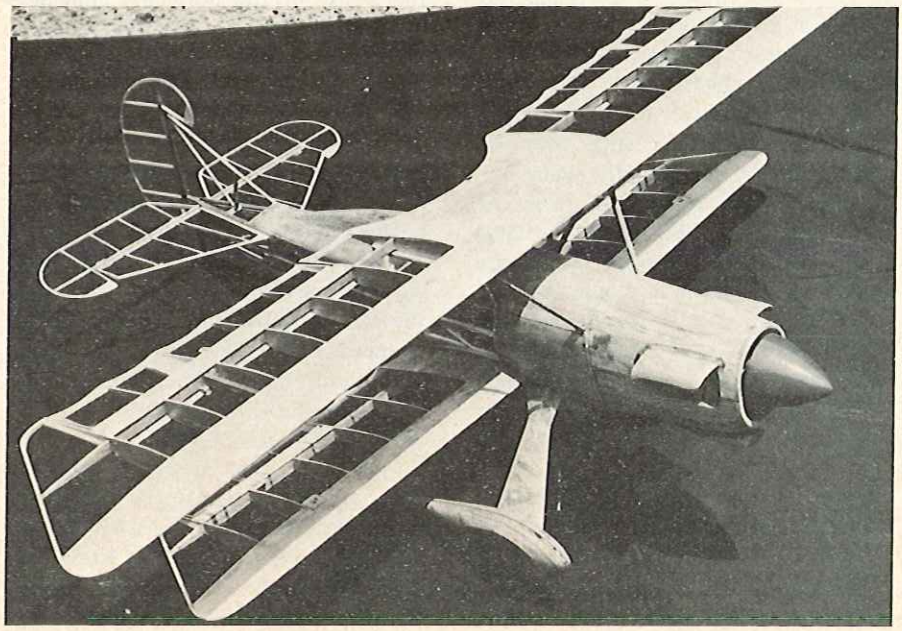
Remove the framework from the board and install F-3 and F-7. Carve the turtle deck from soft balsa and hollow out. Install it along with the 1/16" plywood F-4 and F-4A. The bottom 1/8" x 1/4" stringers and the 1/8" plywood tail wheel mounting are next. Now install the 1/8" music wire cabin struts on F-2 and F-3. Be sure that F-8 is in place on the wire before securing them in place. F-8 is wrapped with fine wire and epoxy cement. It is advisable to have the top wing complete for use in aligning the two F-8's at this time. Plank with 1/8" x 3/8" balsa between F-2 and F-3. Cut and fit into place the 1/16" plywood sides between F-2 and F-3. Add the 1/8" x 1/4" stringer to each side. The hardwood engine mounts F-5 and F-9 are next. Cut a block balsa to the shape of the nose and glue into place. Now add the ¼" plywood F-1. Sand to shape and cut as necessary for lower cowl removal. I placed plywood all around the cowl. This will give you a good sharp corner when you are applying your finish. 1/32" plywood is cut to shape and placed around the cockpit. This is a good time to install the two NyRods for the rudder and elevator pushrods. Route them under the side longerons at each side of the cockpit. The 1/16" plywood cockpit floor will, essentially, complete the construction of the fuselage.

TAIL CONSTRUCTION

The tail is constructed in a more or less conventional manner, except for material. Due to its lightweight construction, spruce and plywood are used extensively. It is so flimsy that the tail flying wires were designed to







be functional and not just for looks. The spar at the hinge line is ¼" birch dowel. The ribs are 1/8" x 1/4" spruce with each end cut to fit the dowel. The 1/16" music wire at the tip of the stabilizer is most important since, without it, the fabric tension will pull the stabilizer ends out of shape. The rudder and fin are made in a similar manner. As soon as the fin is completed it should be added to the fuselage.

LANDING GEAR CONSTRUCTION

Bend 3/16" music wire to shape. The "L" shaped piece shown on the plans was not included in the original model. I think it is necessary, though, and I am modifying my plane to include it. The gear is just too long for one piece of wire to be stiff enough. Cut the 1/16" plywood center core and balsa pieces. Epoxy them together and sand to shape. The wheel pants are epoxied to the strut fairings. This seems to work well enough. 3½" wheels are installed with the pants as there is no way to add them later. Cover them with masking tape.

The tail wheel spring is made from leaf rake tangs. This is usually a good grade of spring steel. The pivot is a piece of 3/32" brass tubing with plastic steel around it. The tailwheel is a 2" wheel cut down to 1½". This gives it a square cross section more like real planes use. The steering springs are obtainable from most auto parts stores. This system really works. No wonder full size planes use them.

WING CONSTRUCTION

Nothing new here. Construction is tried and true, very similar to Sterling's Stearman. ¼" x ¾" and ¼" x ½" main spars, 3/32" balsa ribs, 1/16" sheet balsa leading edge sheeting and a 1/8" x 3/4" trailing edge. Slip the ribs on the spars. Block the spars up ½" and glue the ribs in place. Add the trailing edge and leading edge. The tips can also be installed at this point. Now mark and cut the ribs for the ¼" balsa aileron spars. Glue the spars in place and, when dry, remove the wing from your table. Sand the leading edge and sheet the top and bottom as required. Cut the trailing edge and remove the ailerons. Install the necessary blocking for the "N" strut connections. Bellcranks for the aileron controls can be installed in the lower wing. (The original model used torque rods. This proved to be unacceptable and bellcranks are going to be added.) The scallops in the trailing edge can now be cut and sanded.

One place that deserves mention is

the strut attachment points. I have made it as close to scale as possible. Secure a scrap of 1/8" plywood just under the 1/16" sheeting at each attachment point with a blind 4-40 nut. Cut a hole through the sheeting which will expose the plywood. After the wings have been covered and clear doped cut the covering away to expose the plywood again. Install the aluminum strut attachment pieces. Hold them in place with a flathead screw and epoxy glue. Add a little sealer over the screw head and you have it. Be sure to secure the plywood well as the N-strut will actually be load carrying members and not just for appearance.

The "N" struts are cut from 3/16" plywood. 1/8" brass tubing is glued to each end with some brass shim stock wrapped over it. The lower rear strut is made from heavy electrical wire bent around the brass tubing. The cabin struts are laminated with a 1/8" balsa core front and back of the 1/8" wire. 1/32" plywood sides are added and then sanded to a streamlined shape.

FINISH AND DETAILS

The model is covered with S.P.L. "Shrinktite." This is a heat shrink dacron just like the real der Jager used. It is painted with butyrate dope and has a high gloss finish. The overall color, goldenrod yellow, can best be described as a school bus yellow. The maltese crosses are black on white except for those on the bottom wing which are red on white.

Lettering on the fuselage side is deca-dry old english #2848-L, 2848-C and 2824-CL.

I have been asked many times about the rib stitching; no secret, just use a long needle and thread. I do this after applying the first two coats of clear dope. After stitching, I dope a 3/8" wide piece of covering material over the stitches. This will represent pinking tape as used on full size aircraft. It should have zig-zag edges but this is very difficult to accomplish with any degree of success. After the 3/8" strips are doped in place, proceed with your normal finishing techniques. Just be very careful when sanding the stitches.

The Lycoming engine is made from .060 aluminum discs glued to a ¾" wood dowel. The dowel is supported from F-5. Valve covers are 1/16" plywood and balsa. The exhaust manifolds are laminated plywood carved to shape. Machine guns are made from balsa and steel beer cans. Flying wires

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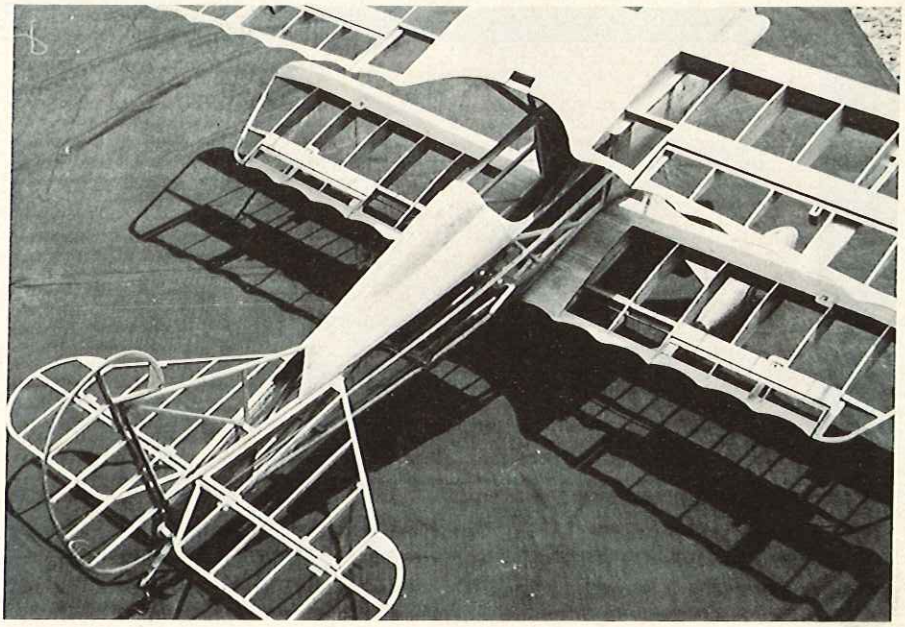
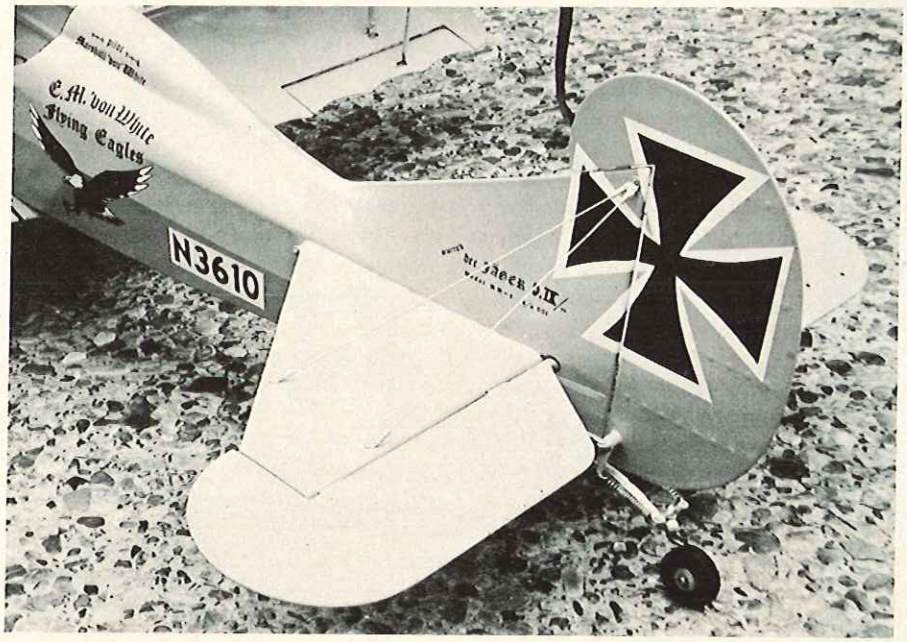
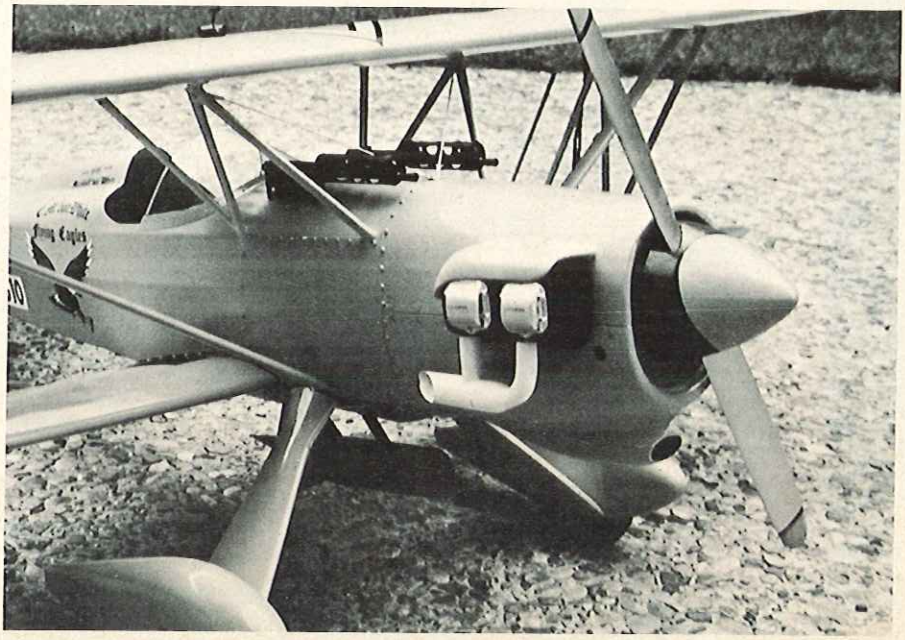
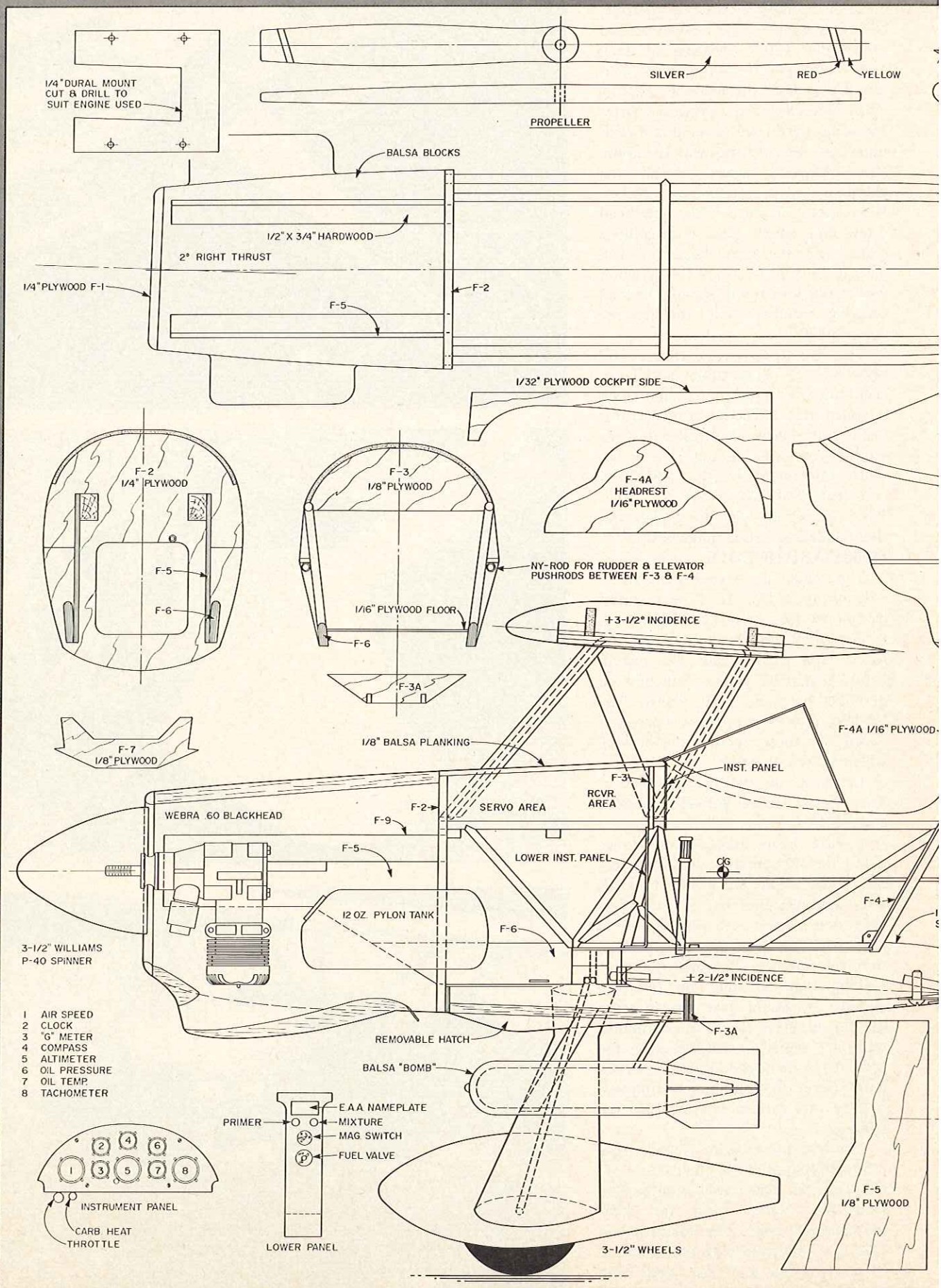







1/4" DURAL MOUNT CUT & DRILL TO SUIT ENGINE USED
SILVER
RED
YELLOW
PROPELLER
BALSA BLOCKS
1/2" X 3/4" HARDWOOD
2° RIGHT THRUST
1/4" PLYWOOD F-1
F-2
F-5
1/32" PLYWOOD COCKPIT SIDE
F-2
1/4" PLYWOOD
F-3
1/8" PLYWOOD
F-4A
HEADREST
1/16" PLYWOOD
F-5
F-6
NY-ROD FOR RUDDER & ELEVATOR PUSHRODS BETWEEN F-3 & F-4
1/16" PLYWOOD FLOOR
F-6
F-3A
+3-1/2° INCIDENCE
F-7
1/8" PLYWOOD
1/8" BALSA PLANKING
F-4A 1/16" PLYWOOD
INST. PANEL
F-3
RCVR. AREA
F-2
SERVO AREA
WEBRA .60 BLACKHEAD
F-9
F-5
LOWER INST. PANEL
CG
F-4
12 OZ. PYLON TANK
F-6
3-1/2" WILLIAMS P-40 SPINNER
+2-1/2° INCIDENCE
1 AIR SPEED
2 CLOCK
3 "G" METER
4 COMPASS
5 ALTIMETER
6 OIL PRESSURE
7 OIL TEMP.
8 TACHOMETER
REMOVABLE HATCH
F-3A
BALSA "BOMB"
PRIMER
E.A.A. NAMEPLATE
MIXTURE
MAG SWITCH
FUEL VALVE
INSTRUMENT PANEL
CARB. HEAT
THROTTLE
LOWER PANEL
3-1/2" WHEELS
F-5
1/8" PLYWOOD

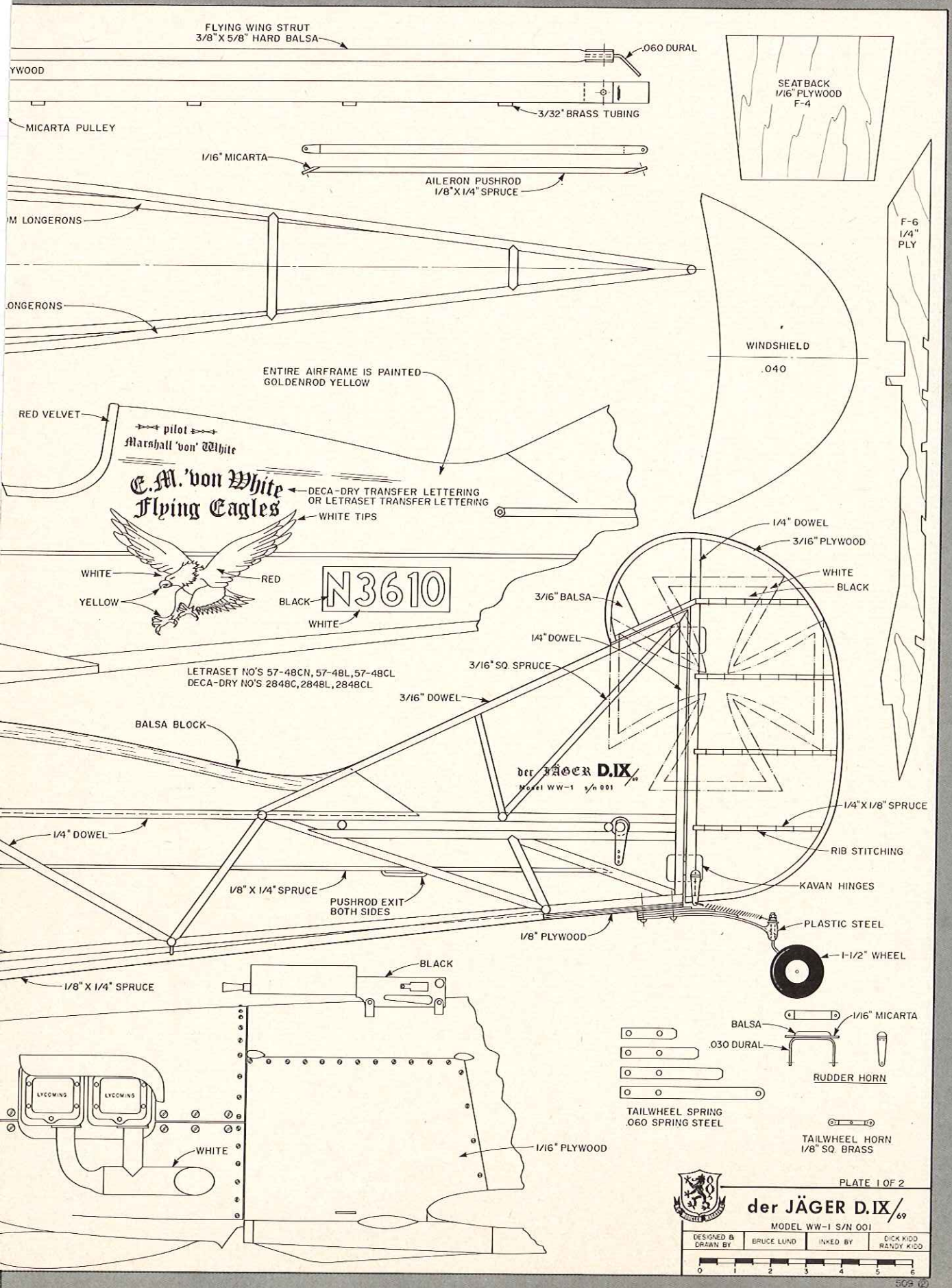


PLATE 1 OF 2

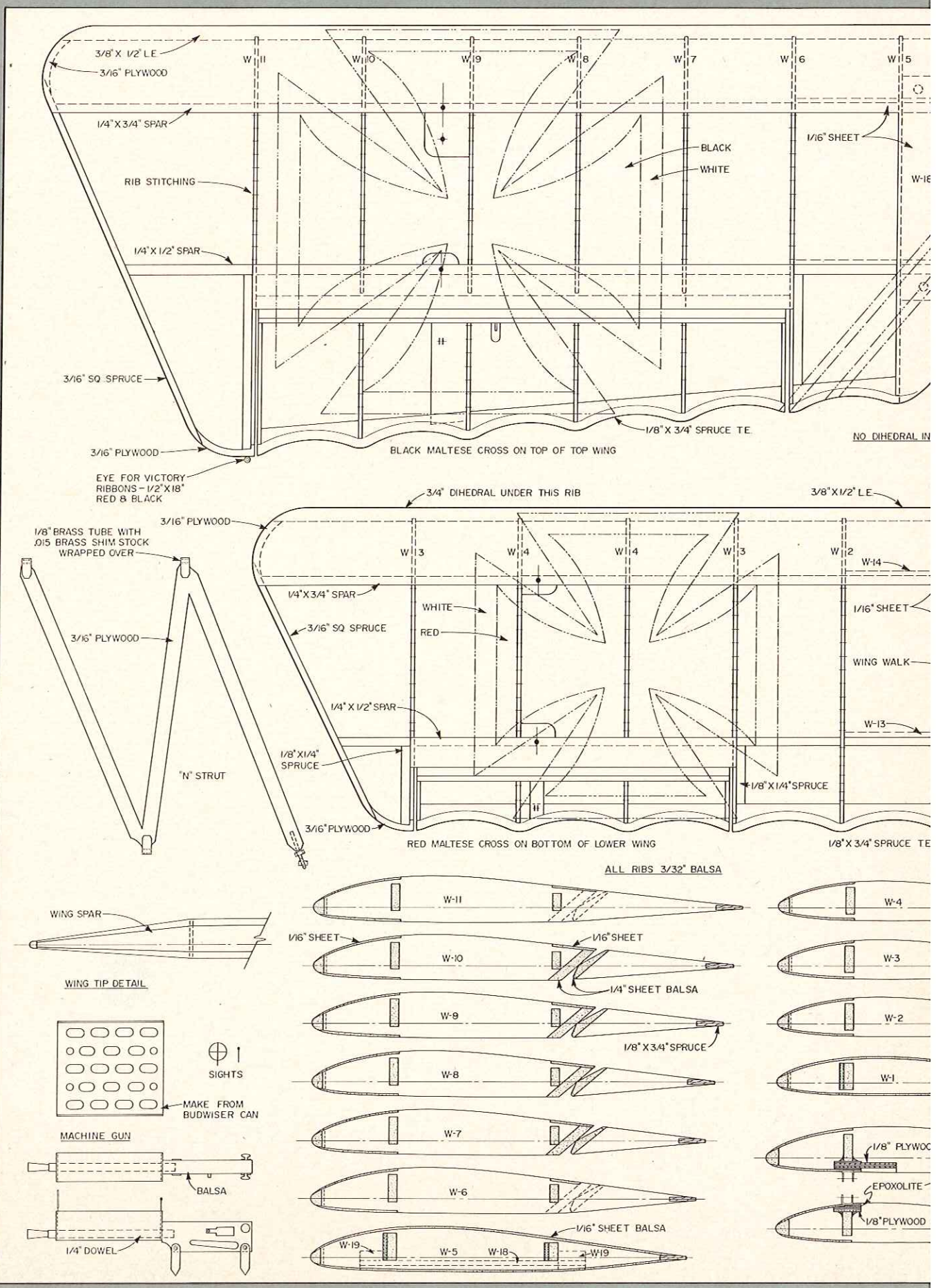
der JÄGER D.IX/69

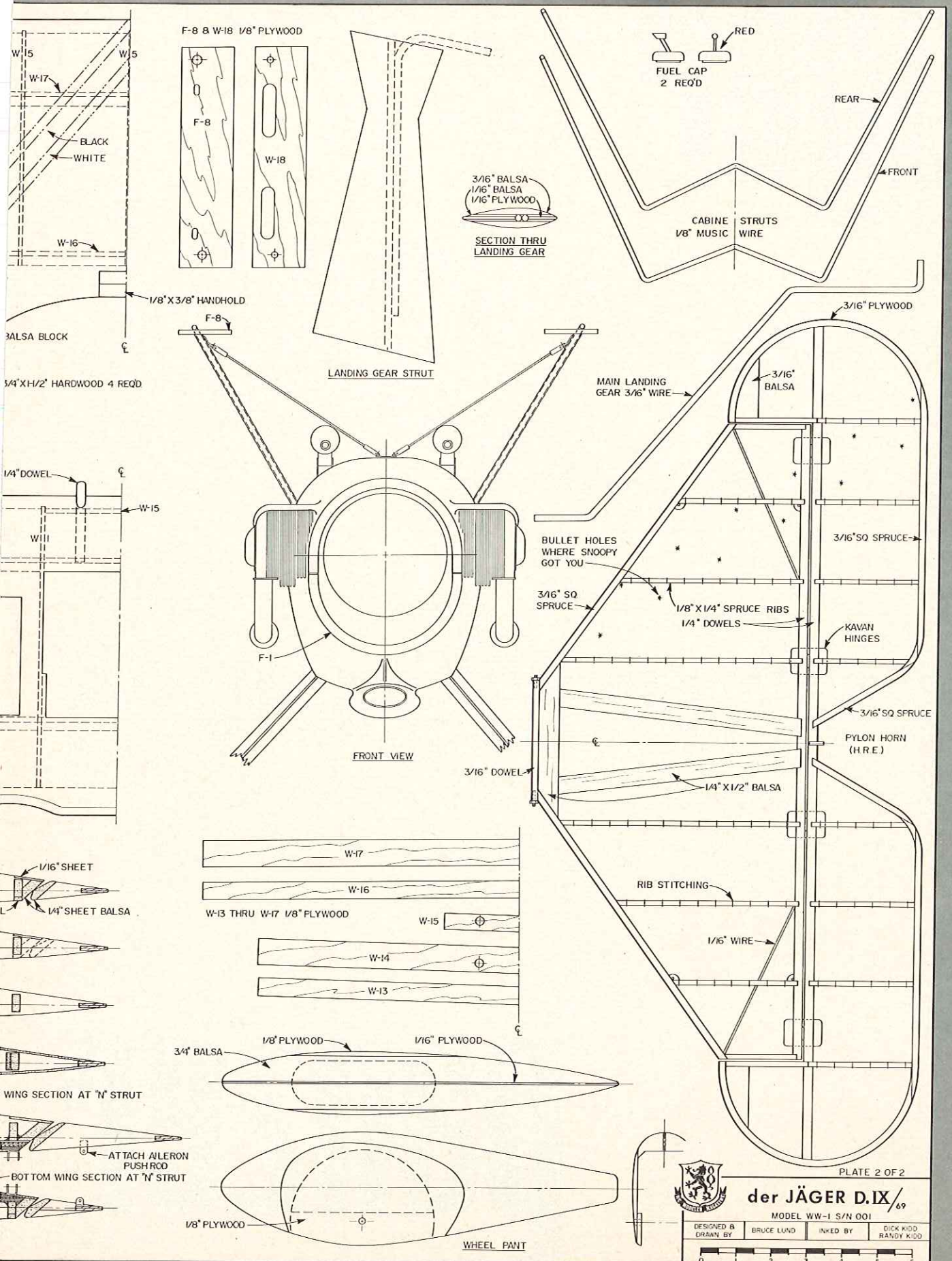
MODEL WW-1 S/N 001

DESIGNED & DRAWN BY	BRUCE LUND	INKED BY	DICK KIDD RANDY KIDD

0 1 2 3 4 5 6

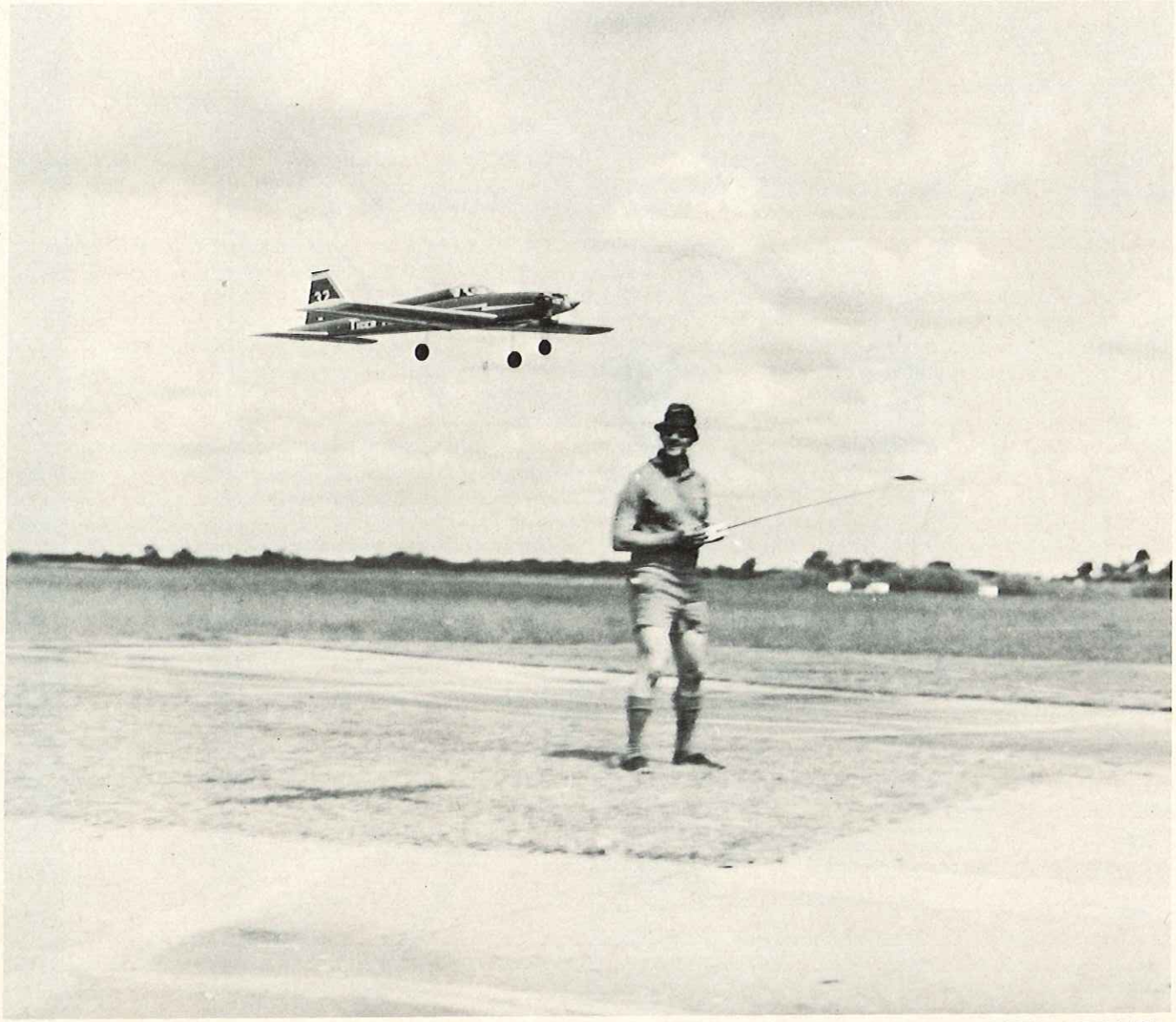
509 ②


3/8" X 1/2" L.E.
3/16" PLYWOOD
1/4" X 3/4" SPAR
RIB STITCHING
1/4" X 1/2" SPAR
3/16" SQ. SPRUCE
3/16" PLYWOOD
EYE FOR VICTORY RIBBONS - 1/2" X 18" RED & BLACK
W-11
W-10
W-9
W-8
W-7
W-6
W-5
BLACK
WHITE
1/16" SHEET
1/8" X 3/4" SPRUCE T.E.
BLACK MALTESE CROSS ON TOP OF TOP WING
NO DIHEDRAL IN
3/4" DIHEDRAL UNDER THIS RIB
3/8" X 1/2" L.E.
1/8" BRASS TUBE WITH .015 BRASS SHIM STOCK WRAPPED OVER
3/16" PLYWOOD
"N" STRUT
W-13
W-14
1/4" X 3/4" SPAR
3/16" SQ. SPRUCE
WHITE
RED
1/4" X 1/2" SPAR
1/8" X 1/4" SPRUCE
WING WALK
1/16" SHEET
1/8" X 1/4" SPRUCE
3/16" PLYWOOD
RED MALTESE CROSS ON BOTTOM OF LOWER WING
1/8" X 3/4" SPRUCE T.E.
WING SPAR
WING TIP DETAIL
SIGHTS
MAKE FROM BUDWISER CAN
MACHINE GUN
BALSA
1/4" DOWEL
ALL RIBS 3/32" BALSA
W-11
1/16" SHEET
W-10
1/16" SHEET
1/4" SHEET BALSA
W-9
1/8" X 3/4" SPRUCE
W-8
W-7
W-6
1/16" SHEET BALSA
W-19
W-5
W-18
W-19
W-4
W-3
W-2
W-1
1/8" PLYWOOD
EPOXOLITE
1/8" PLYWOOD


W-15
W-15
W-17
BLACK
WHITE
W-16
BALSA BLOCK
1/8"X3/8" HANDHOLD
3/4"XH/2" HARDWOOD 4 REQ'D
F-8 & W-18 1/8" PLYWOOD
F-8
W-18
LANDING GEAR STRUT
3/16" BALSA
1/16" BALSA
1/16" PLYWOOD
SECTION THRU LANDING GEAR
RED
FUEL CAP
2 REQ'D
REAR
FRONT
CABINE STRUTS
1/8" MUSIC WIRE
F-8
F-1
FRONT VIEW
3/16" PLYWOOD
MAIN LANDING GEAR 3/16" WIRE
3/16" BALSA
3/16"SQ SPRUCE
BULLET HOLES WHERE SNOOPY GOT YOU
3/16" SQ SPRUCE
1/8"X1/4" SPRUCE RIBS
1/4" DOWELS
KAVAN HINGES
3/16"SQ SPRUCE
PYLON HORN (H.R.E)
3/16" DOWEL
1/4"X1/2" BALSA
RIB STITCHING
1/16" WIRE
1/4" DOWEL
W-15
W-11
1/16" SHEET
1/4" SHEET BALSA
W-17
W-16
W-13 THRU W-17 1/8" PLYWOOD
W-15
W-14
W-13
WING SECTION AT "N" STRUT
3/4" BALSA
1/8" PLYWOOD
1/16" PLYWOOD
ATTACH AILERON PUSH ROD
BOTTOM WING SECTION AT "N" STRUT
1/8" PLYWOOD
WHEEL PANT
PLATE 2 OF 2
der JÄGER D.IX/69
MODEL WW-I S/N 001
DESIGNED & DRAWN BY
BRUCE LUND
INKED BY
DICK KIDD
RANDY KIDD
0 1 2 3 4 5 6
509

tiger

BY RICH BRAND



panzer

INTRODUCTION

The "Tiger Panzer" is a highly aerobatic model designed primarily for F.A.I. pattern flying. I have no doubt that the design is suitable for the AMA Pattern, as the model is quite capable of performing flick maneuvres. However, this does not distract from its docile characteristics.

The fuselage shape is derived from the well-known Northrop F5 strike reconnaissance fighter. Being semi-scale, therefore, the model looks very attractive whilst flying, and can be painted in a variety of military colours.

The model, itself, is an updated version of my "UDI Panzer," which I flew at the 6th World Championships in 1967. The prototype "Tiger Panzer" first flew in 1969 and was fitted with retracts. This necessitated positioning the nosegear retract to one side of the fuselage so that an oblong 8 oz. fuel bottle could be placed alongside. All subsequent models have been fitted with fixed undercarriage.

The "Tiger Panzer," in my opinion, can be flown by both novice and expert alike, and is a joy to fly. The construction is relatively simple and should present no problems. I sincerely hope you decide to build the "Tiger Panzer."

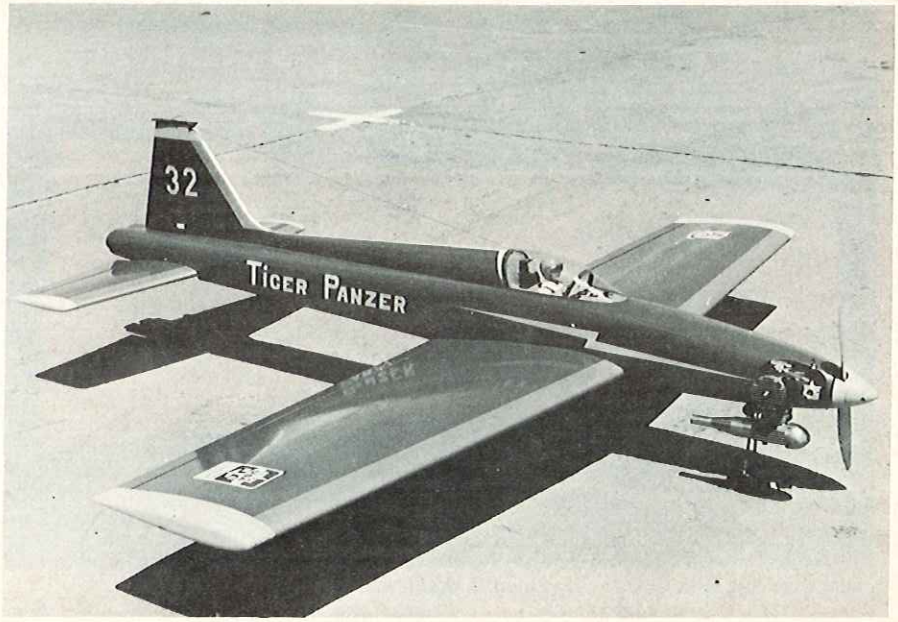
CONSTRUCTION

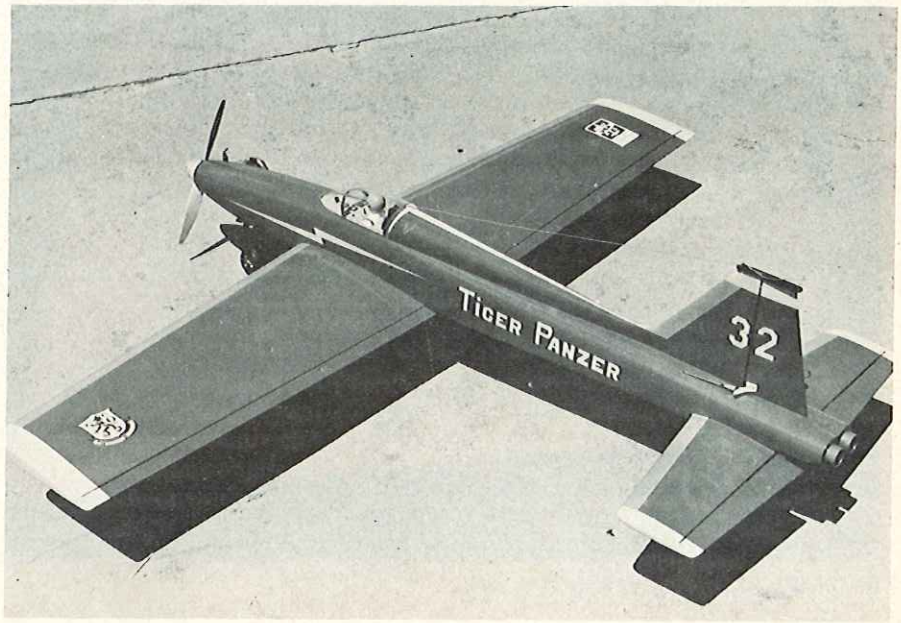
WING:

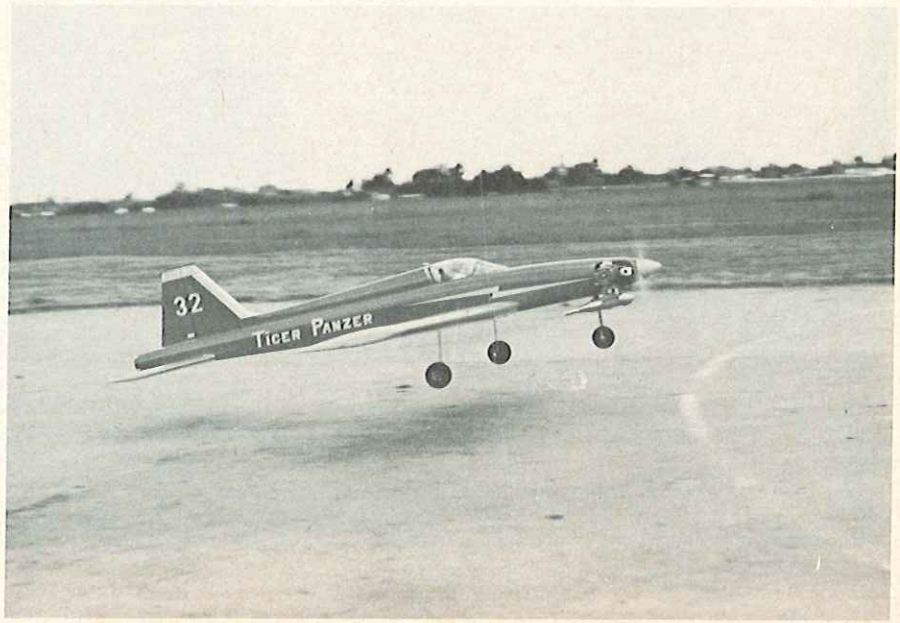
Start by building the wing. After cutting out the foam cores glue the rear spar in place. Next, epoxy glue the undercarriage mounts in position.

The wing is now ready for sheeting. Cover the cores with one piece of 1/16" prepared balsa sheeting. Apply contact adhesive to both sheeting and foam cores with a sponge to prevent excess glue weight. Use Titebond glue on areas where wood meets wood. The method used by myself when covering cores is as follows:

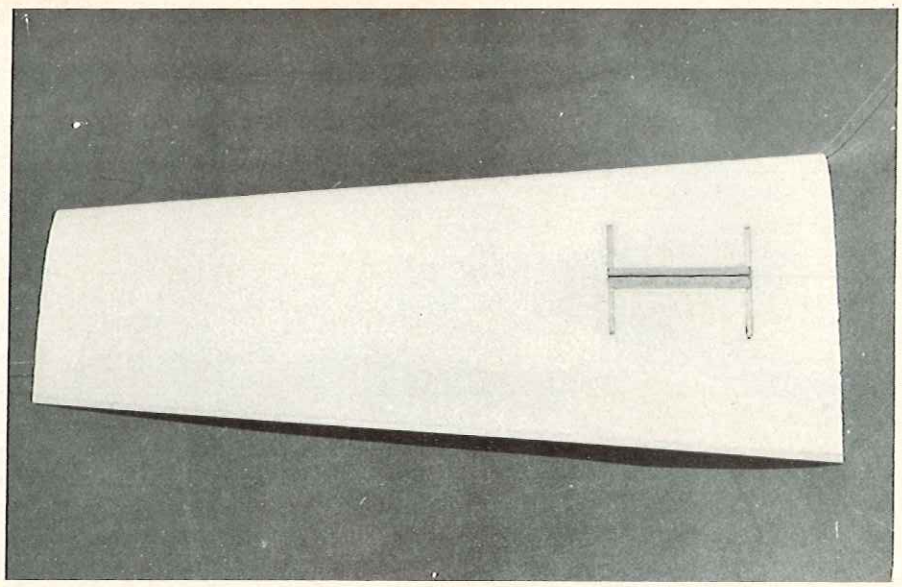
Wet the leading edge portion of the sheeting with ammonia. Make the initial contact between the foam core and sheeting at right angles. Now, slowly roll the core until one side of the wing is covered. Trim the sheeting at the rear spar. Now, roll the core over to make contact on the other



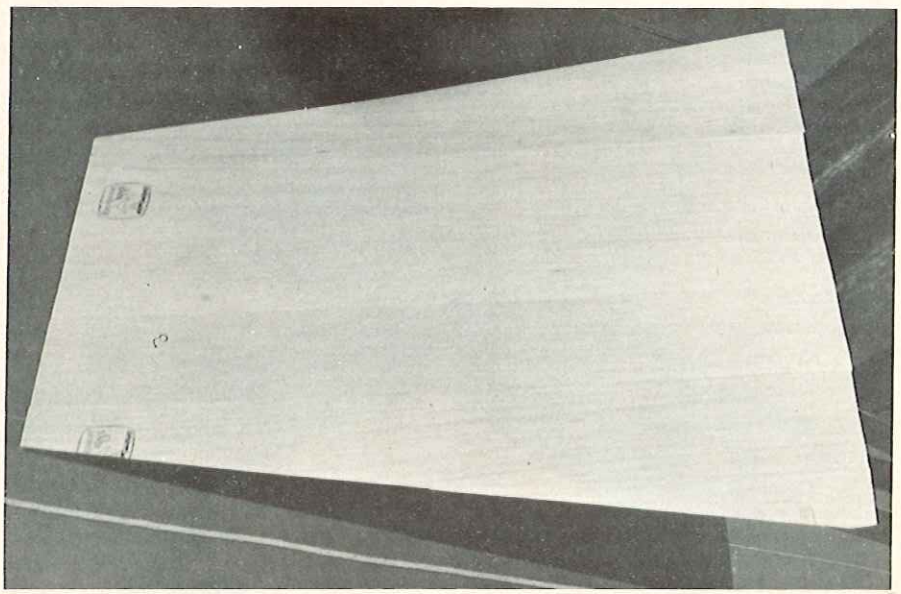




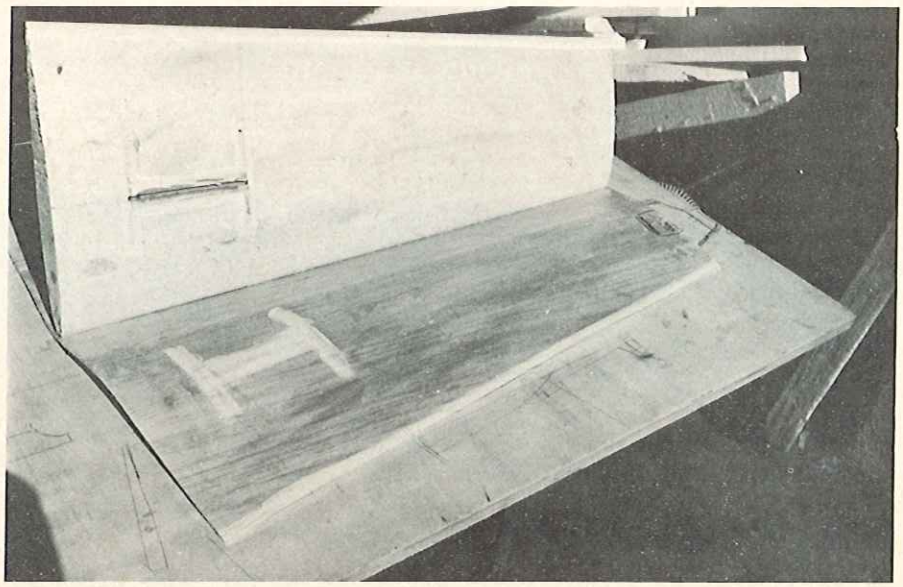
Prototype #3 of the Tiger Panzer is painted dark blue with yellow and silver trim ala Blue Angels. Author Rich Brand, of the Rhodesian Air Force, is a world renowned F.A.I. competition flyer and his Tiger Panzer is one of the finest high performance pattern ships in existence today.



Foam wing core with landing gear mount in position.



One piece balsa sheeting for foam wing core.



Both foam and sheeting coated with contact adhesive.

side. Trim the sheeting at the rear spar, and use pins to ensure that no warps develop while drying. Allow the wet leading edge to dry with the wing standing upright. Failure to do this, i.e. allowing the wing to dry lying flat on the table, could result in a leading edge warp. At this stage the two wing halves can be lightly sanded and trimmed. The cutouts to accept servo and dihedral braces can now be made using the balsa sheeting as templates. Carefully sand each wing root to obtain the correct dihedral as indicated on the plan. Glue the two halves together and insert the oversize dihedral braces with epoxy glue. Ensure perfect alignment at this stage by viewing the wing from the rear. Fill the bottom of the servo cutout with 3/16" sheeting. Next shape the ailerons from a straight 3/8" sheet to the desired section. You will find a small razor plane a useful tool for this job. Make up the wing tips from 3/8" balsa and glue to the wing. Epoxy glue the plywood Camloc support in position and fibreglass the entire centre section. Epoxy glue the aileron control horns in position. Fix the locating dowel in position. Finish the wing by applying two coats of baby powder and dope. Cover with lightweight tissue and continue applying thin coats of baby powder and dope sanding between coats until the surface is prepared for spraying. The ailerons are finished the easy-does-it method.

FUSELAGE:

First draw the basic fuselage outline on one sheet, which is then taped and pinned to the other sheet. Next, cut out the fuselage sides with a jigsaw, thus ensuring two perfectly matched sides. Glue the triangular fillet strips in place and pin the fuselage doublers in position. I use contact adhesive for the doublers. Now pin one fuselage side onto a straight building board. No fuselage jig at all is required, as the plan will show. Glue bulkheads F2, F3, F4, and F5, in position. F2 should have been previously prepared and blind nuts fitted for nosewheel block and engine mount. When dry, glue on the other side of the fuselage, ensuring that it runs parallel from front to back. Do not forget to glue the triangular reinforcing fillets to F2 and F4. At this stage all top and bottom sheeting can be fitted, and F6 glued in place. When dry, remove the fuselage from the building board. Fill the engine compartment with scrap balsa and cut out to accept the engine

mount and engine. With the engine bolted in position, glue F1 in place. The wing can now be attached and Camlocs can be fitted. The turtle deck can be made out of foam covered with 1/16" balsa or, if preferred, can be carved from balsa block.

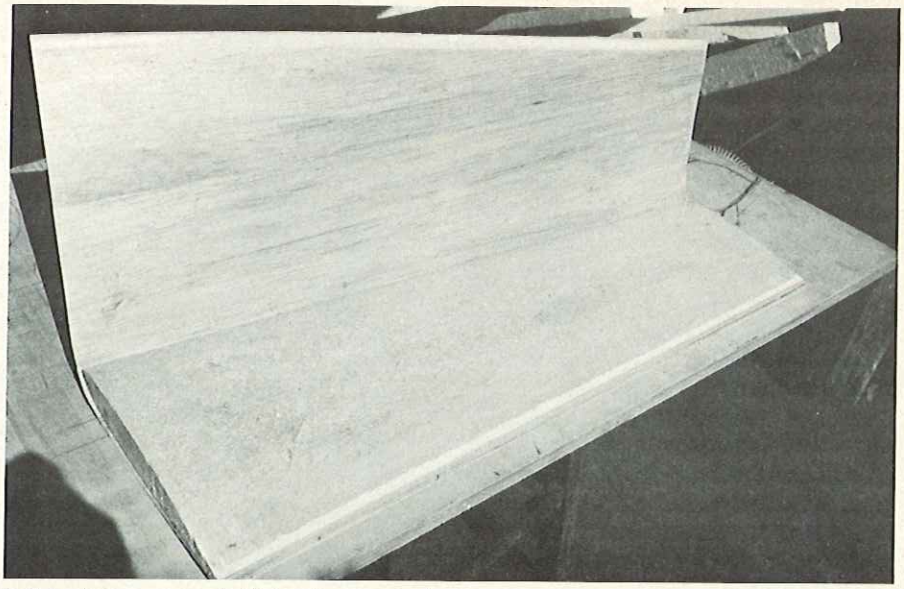
At this stage temporarily glue the 1/8" ply canopy support in place, and pin the turtle deck to the top deck. The windscreen can be made out of acetate sheeting using the basic windscreen pattern as a guide. Next, cut the Du-Bro canopy to fit. With windscreen, canopy, and turtle deck held in place with pins, draw the outline of these on the fuselage top deck. The cutout to accept the tail fin can also be made. Now the entire fuselage can be shaped using a balsa plane and sanding block. Be sure not to transgress the outline already marked. When shaping of the fuselage is complete two coats of baby powder and dope are applied. Cover both the fuselage and turtle deck with silk and continue with thin coats of baby powder and dope, sanding between coats until the surface is ready for colour spraying. At this stage the canopy floor can be painted, instrument, pilot, and ejector seat, fitted. Glue turtle deck in place and then fix the canopy to the fuselage with epoxy glue. Mask off the canopy and fillet with Hobbypoxy Stuff.

TAILPLANE AND ELEVATOR:

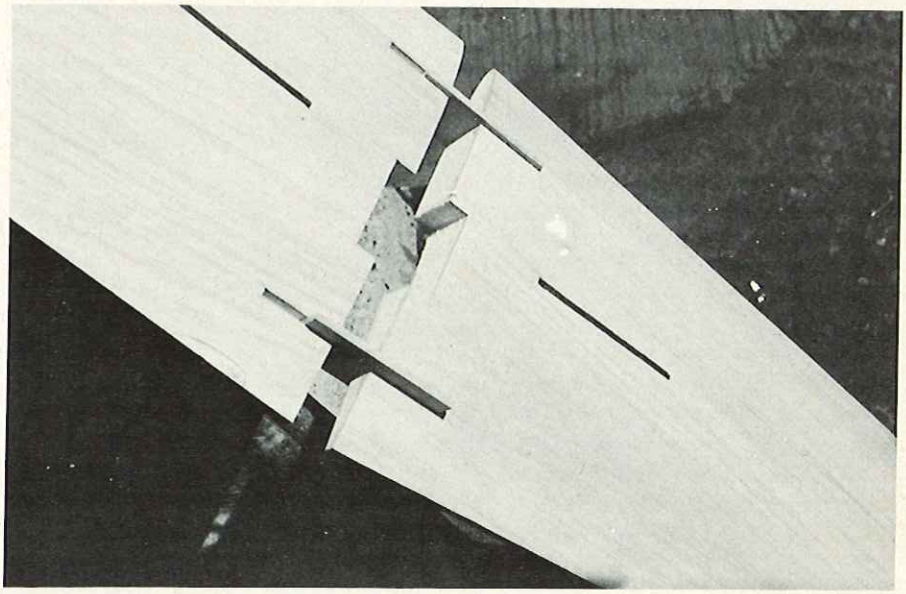
Cut the two halves out of foam. The rear cut line may be lined up with the edge of the foam block. Mark the front cut line on the foam cores and cut off using a sharp modeling knife. Glue the leading edge (oversize) and the trailing edge to the cores. Shape the trailing edge to the foam contour. Cover the two halves with 1/16" sheet using contact adhesive and Titebond, where applicable. Glue the two halves together with epoxy glue and insert the 3/16" balsa braces as shown. Strengthen the centre section with fibreglass cloth. Now shape the elevator from 3/8" balsa and tack glue onto the tailplane. Cut the tips from 3/8" balsa and glue in place. Shape and sand the entire unit and cut away the elevator when complete. The tailplane is given two coats of baby powder and dope. Cover the lightweight tissue and apply thin coats of baby powder and dope sanding between until the surface is ready for colour spraying. The elevator is finished the easy-does-it method.

FIN AND RUDDER:

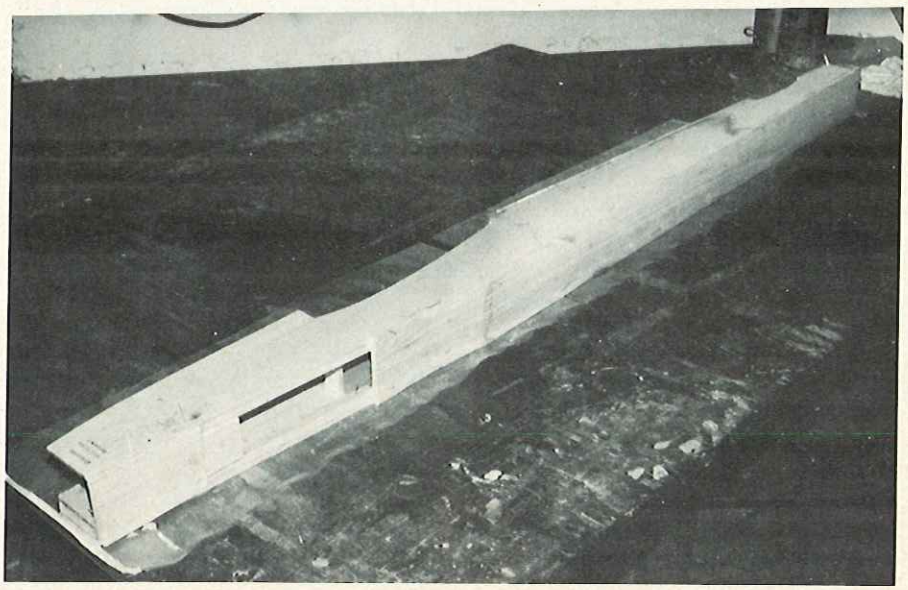
This is fairly straightforward as the plan will indicate. The tailplane and



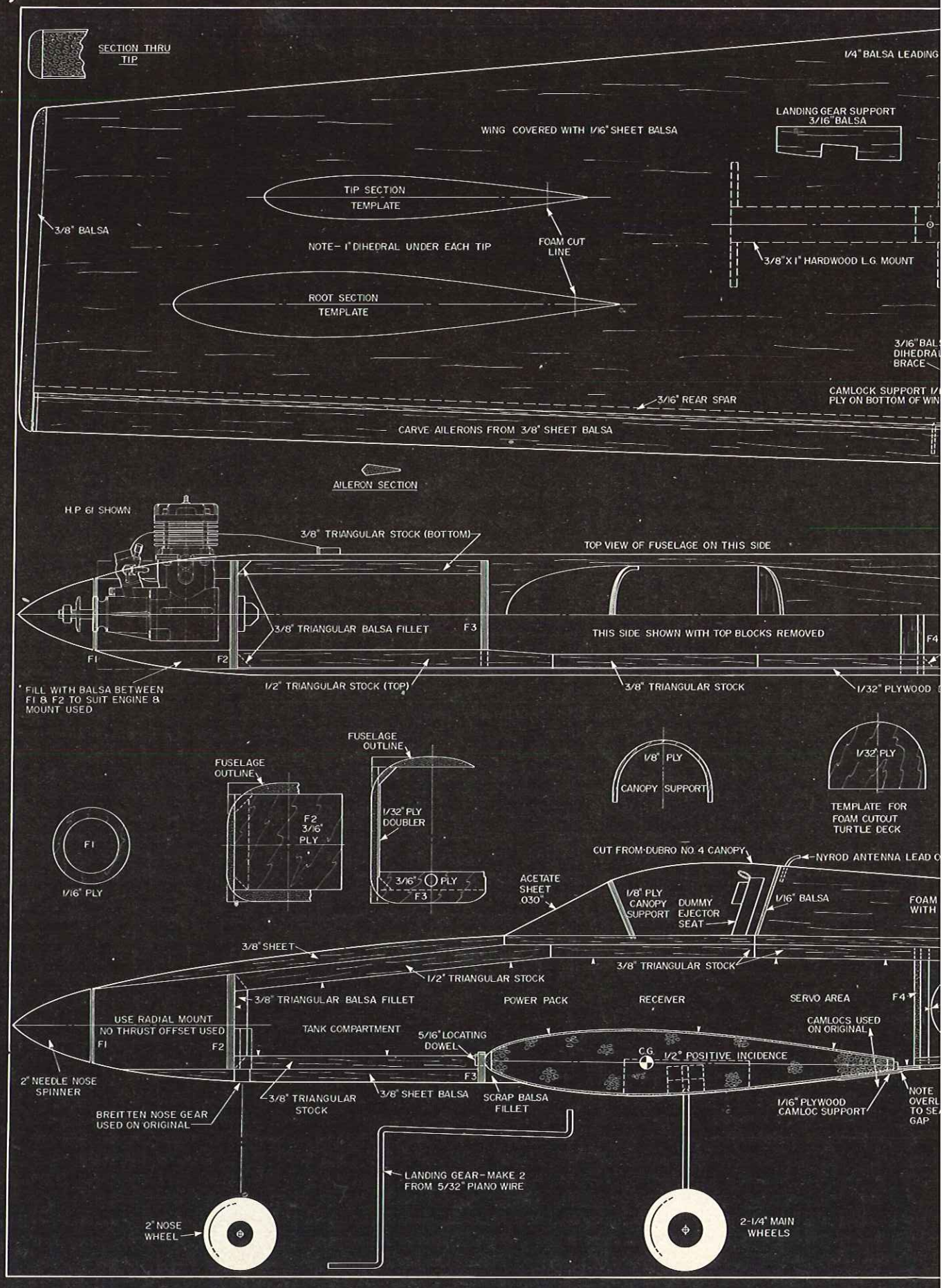
In this photo, one panel side has been covered.



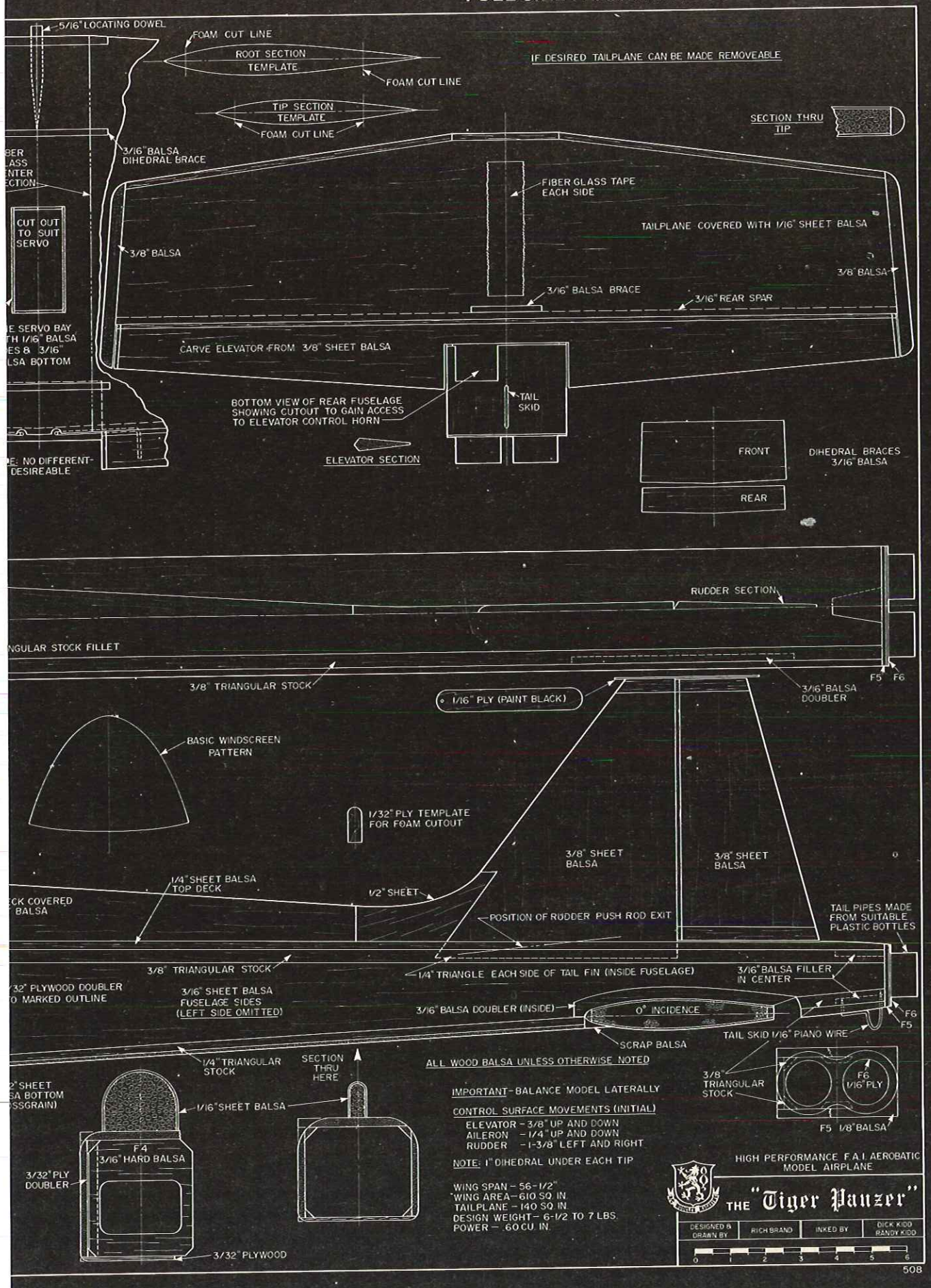
View of wing showing servo cutout and oversize balsa dihedral braces.

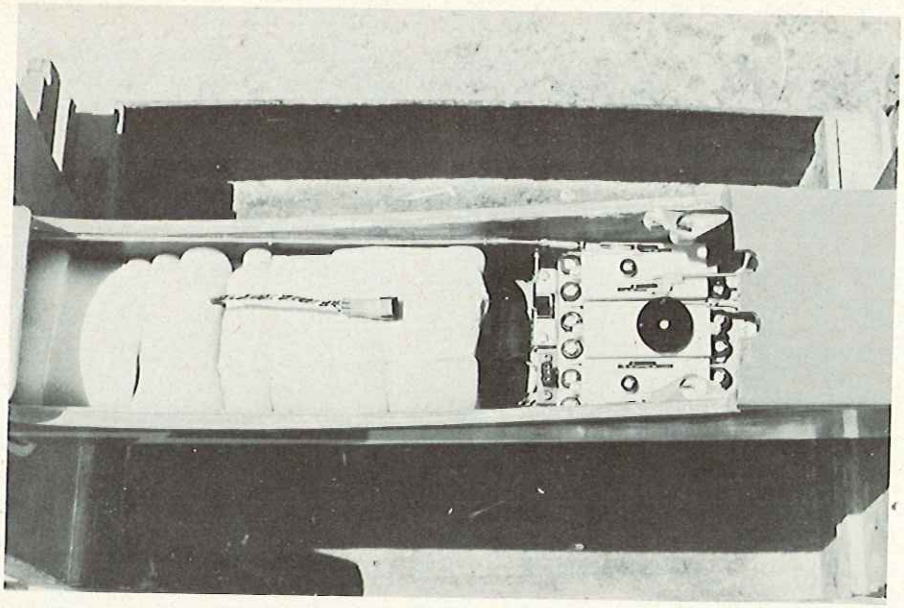


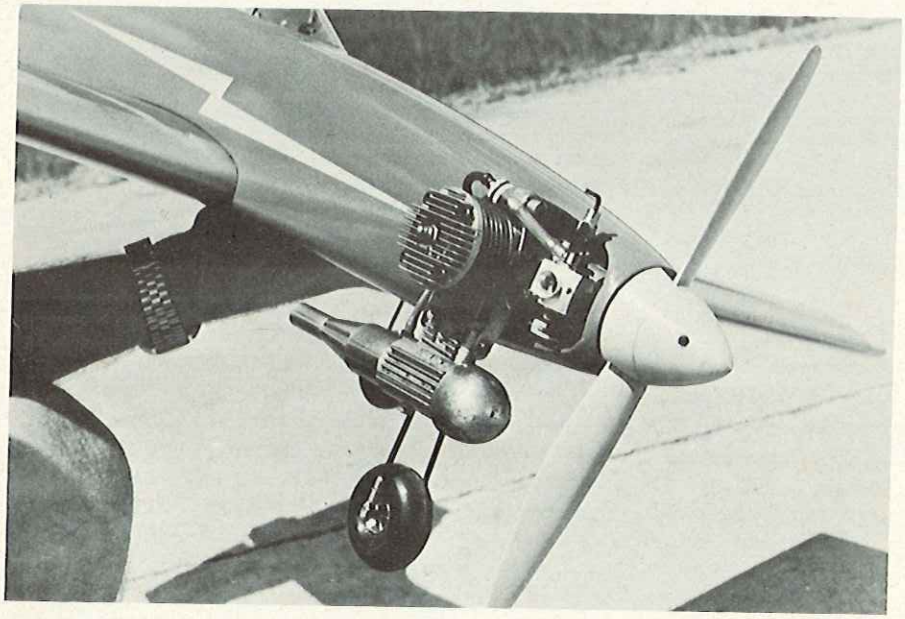
Fuselage is built on its side. This particular prototype used conventional motor bearers.

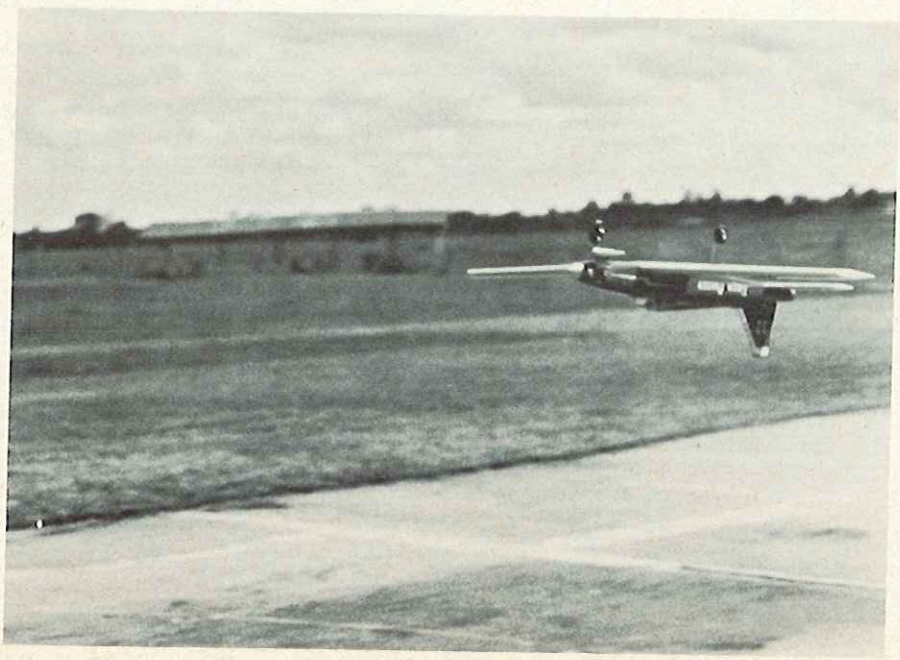

SECTION THRU TIP
1/4" BALSA LEADING
WING COVERED WITH 1/16" SHEET BALSA
LANDING GEAR SUPPORT 3/16" BALSA
TIP SECTION TEMPLATE
3/8" BALSA
NOTE- 1" DIHEDRAL UNDER EACH TIP
FOAM CUT LINE
3/8" X 1" HARDWOOD L.G. MOUNT
ROOT SECTION TEMPLATE
3/16" BAL DIHEDRA BRACE
CAMLOCK SUPPORT 1/ PLY ON BOTTOM OF WIN
3/16" REAR SPAR
CARVE AILERONS FROM 3/8" SHEET BALSA
AILERON SECTION
H.P. 61 SHOWN
3/8" TRIANGULAR STOCK (BOTTOM)
TOP VIEW OF FUSELAGE ON THIS SIDE
3/8" TRIANGULAR BALSA FILLET
F3
THIS SIDE SHOWN WITH TOP BLOCKS REMOVED
F4
F1
F2
* FILL WITH BALSA BETWEEN F1 & F2 TO SUIT ENGINE & MOUNT USED
1/2" TRIANGULAR STOCK (TOP)
3/8" TRIANGULAR STOCK
1/32" PLYWOOD
FUSELAGE OUTLINE
FUSELAGE OUTLINE
F2 3/16" PLY
1/32" PLY DOUBLER
3/16" PLY
F3
F1
1/16" PLY
1/8" PLY CANOPY SUPPORT
1/32" PLY
TEMPLATE FOR FOAM CUTOUT TURTLE DECK
CUT FROM DUBRO NO. 4 CANOPY
NYROD ANTENNA LEAD
ACETATE SHEET .030"
1/8" PLY CANOPY SUPPORT
DUMMY EJECTOR SEAT
1/16" BALSA
FOAM WITH
3/8" SHEET
1/2" TRIANGULAR STOCK
3/8" TRIANGULAR STOCK
3/8" TRIANGULAR BALSA FILLET
POWER PACK
RECEIVER
SERVO AREA
F4
USE RADIAL MOUNT NO THRUST OFFSET USED
F1
F2
TANK COMPARTMENT
5/16" LOCATING DOWEL
CG
1/2° POSITIVE INCIDENCE
CAMLOCS USED ON ORIGINAL
F3
2" NEEDLE NOSE SPINNER
BREITTEN NOSE GEAR USED ON ORIGINAL
3/8" TRIANGULAR STOCK
3/8" SHEET BALSA
SCRAP BALSA FILLET
1/16" PLYWOOD CAMLOC SUPPORT
NOTE OVERL TO SE GAP
LANDING GEAR- MAKE 2 FROM 5/32" PIANO WIRE
2" NOSE WHEEL
2-1/4" MAIN WHEELS

FULL SIZE PLANS AVAILABLE – SEE PAGE 110









elevator are shaped as a unit before cutting away the rudder. Both fin and rudder are finished using the easy-does-it method.

FINAL ASSEMBLY

When all components are ready for spraying, final assembly can take place. With the wing in position, trial fit the tailplane and check alignment. When aligned, epoxy in place or, if preferred, this can be made removable. Attach the fin to the fuselage in a similar manner. Use Hobbypoxy Stuff to fillet the tailplane and fin, as required. Be careful not to sand through the silk. At this stage the ailerons, elevators, and rudder may be fitted. I use 5-Minute Epoxy on the hinges to speed things up. Once completed, carefully check the entire airframe for any dents or irregularities. If any, fill with Hobbypoxy Stuff then give the model two final coats of clear dope. You are now ready to colour spray the model. I will not cover this procedure as the paints available in Rhodesia, differ somewhat from those available elsewhere. I prefer to fit in the equipment once the model has been colour sprayed. I will not detail the radio equipment installation as this will vary accordingly.

FLYING

Set up the control movements and C.G. as indicated on the plan. The weight of the model can be up to 7½ lbs. or possibly more. The "Tiger Panzer" is very easy to fly and has no vicious characteristics whatsoever. Once the roll rate has been adjusted to your requirement set the elevator movement. This is determined by increasing the elevator up-movement until a spin is easily achieved. The rudder should be adjusted to your requirement. All-in-all, the "Tiger Panzer" is a delight to fly, and should give any modeller hours of enjoyment. If you have any problems, whatsoever, please feel free to write to me at Private Bag, 7722 Causeway, Rhodesia, South Africa.

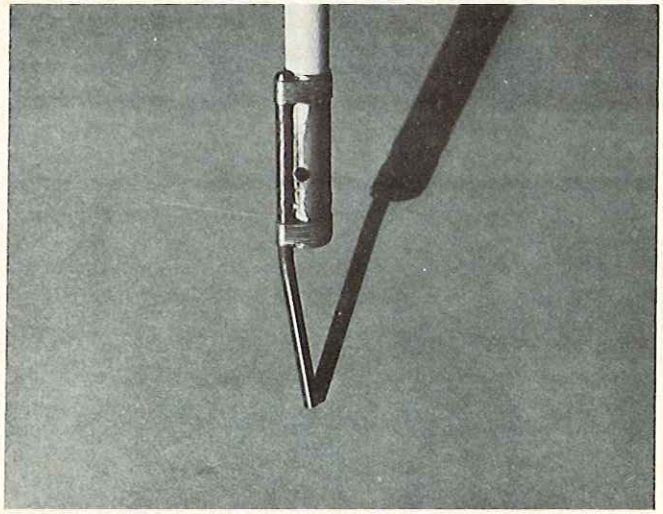
Good building and happy flying. □

TOP, LEFT: View of radio equipment installed in fuselage. CENTER, LEFT: H.P. .61 with Kavan carburetor and muffler used on prototype #3. LEFT: Rich Brand makes a low inverted pass with the Tiger Panzer.

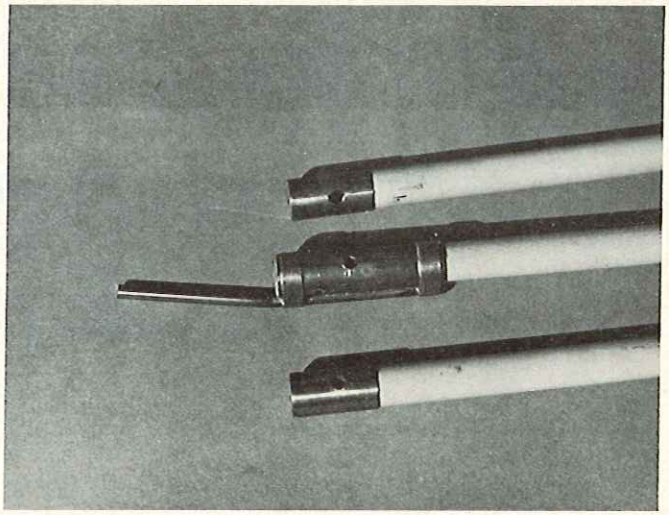
building the BELL HUEY COBRA r/c helicopter

PART III

PHOTOS AND TEXT BY BERNIE MURPHY
LEAD PHOTO OF BELL HUEY COBRA
R/C HELICOPTER
BY JERRY BEASLEY



End of main landing gear leg with brass sleeve installed. Axle securely bound and soldered to the sleeve before assembly.



Wheel end of the three legs with brass sleeves installed.

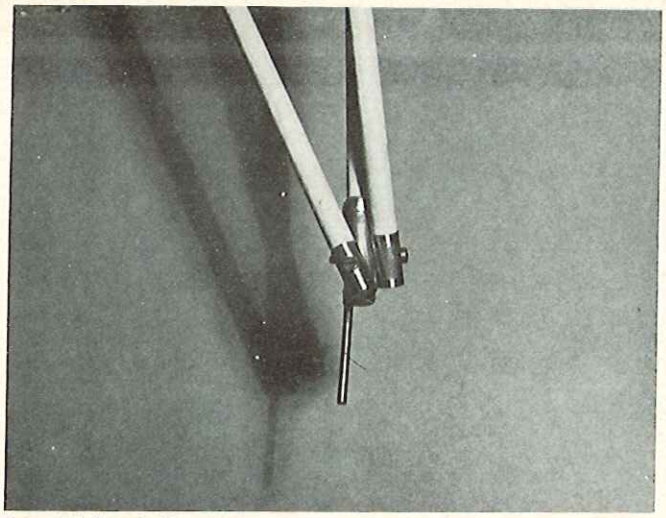
If you have been building along with us, you should have a nearly completed Huey Cobra. During the last two segments, we have taken you through the complete construction steps. In this, the final chapter, we shall endeavor to show you how to properly adjust and balance the various segments of your machine, construct the simple training landing gear, and survive those initial flights.

Since the landing gear is the only item remaining to be constructed, let's begin there. We had recommended that you obtain six #10 fiberglass arrow shafts, and epoxy doweling inside of them. This sounds simple enough, but due to the sizes involved, may have caused some difficulty. The inner diameter of the #10 shaft is about .290", or about twenty thousandths (.020") smaller than a 5/16" dowel. It is also about forty thousandths (.040") larger than a ¼" dowel. If you have lots of time to spare, you could use a file, sandpaper, spoke shave, trained termites, or what have you to cut down a 5/16" dowel to fit. An easier approach would be to use a ¼" dowel, filling the space with epoxy; however, for maximum strength, the dowel should be centered in the fiberglass shaft, and the void should be filled with epoxy. We used the following system, which proved not only easy, but provided maximum strength (proven in actual landings – crunch!). A piece of .020" diameter wire was taped to one end of a ¼" dowel, with the wire laying along the dowel. This wire was then spirally wrapped around the dowel, with about 2" between spirals, and again taped to the dowel at the end of the wrap. The .020" wire spiralling around the dowel makes the outside diameter of the wire a nice fit inside the fiberglass shafting, and holds the dowel centered within the shaft. If the tape was applied carefully, it too, will slide inside the shaft. Mix up about 1 ounce of Hobbypoxy II (No 5 minute stuff, here!) and work some into one end of the fiberglass shaft. Then insert one of the dowels about ¼". Liberally coat the dowel with the epoxy for six to eight inches, and gradually work the dowel into the shaft. The trick here is to maintain a sizable puddle of epoxy in front of the dowel, and another puddle of epoxy where the dowel enters the shaft. If these puddles are adequate, no air can enter the shaft, and as the dowel is inserted, it will act as a piston, sucking the epoxy in with it. Follow this procedure until you have six filled fiberglass shafts.

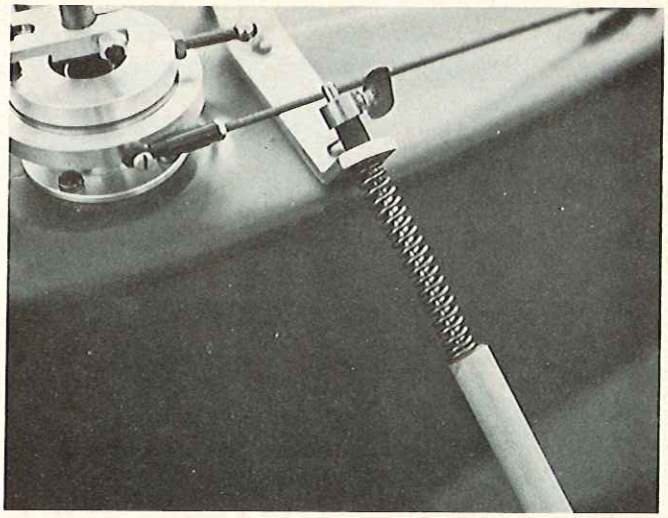
While the epoxy cures, cut two (2) pieces of 3/8" O.D. brass tubing 1½" long, and ten (10) pieces, ¾" long. Set the ¾" pieces aside for the time being. Now cut two pieces of 5/32" diameter music wire 2-7/8" long for the axles. Carefully bind an axle to each of the 1½" brass tubes, with the axle flush with one end of the tube, using soft copper wire and binding securely at each end of the tube. Now solder the wire binding, and tube together, using plenty of solder.

Once the epoxy in the shafts has set, cut the shafts to length, making two each 23¼", 25-5/8", and 27½". Carefully sand or file one end of each 23¼" shaft until the brass tube with the axle can be forced on, with the end of the tubing flush with the end of the shaft (axle extending beyond the shaft). Sand or file the other end of the 23¼" shafts, and both ends of the 25-5/8" and 27½" shafts until a ¾" length of tubing can be forced on each. The tubings can be epoxied in place, although it is not necessary. The 23¼" shafts will have two .116" diameter holes drilled in the axle end, at right angles to each other, and positioned so as to miss the axle. The first hole is 3/8" from the end (vertical) and the second is 5/8" from the end (horizontal). At the other end, a 5/32" hole is drilled ½" from the end and parallel with the first hole in the other end (vertical). The 25-5/8" shafts each are drilled .116" diameter, 3/8" from one end, and 5/32" diameter, ½" from the other, with both holes in line. The 27½" shafts should have a .116 diameter hole drilled 3/8" from one end only. The other end is drilled .116" diameter directly down the center of the inner dowel, about 1½" deep. Roughen one end of a 4" piece of .116" diameter drill rod and epoxy into the hole. This rod will fit into the gear support bracket bolted on the top of the pylon. Assemble the gear shafts together as shown, making a right and left side. The 23¼" shaft attaches to the rear shock, the 25-5/8" attaches to the front shock, and the 27½" goes to the pylon, with a stiff spring installed between the shaft and the pylon bracket. A standard wheel collar acts as a keeper on these shafts. We have found it advisable to add a ¼" piece of black fuel tubing (Du-Bro type) as a bumper between the collar

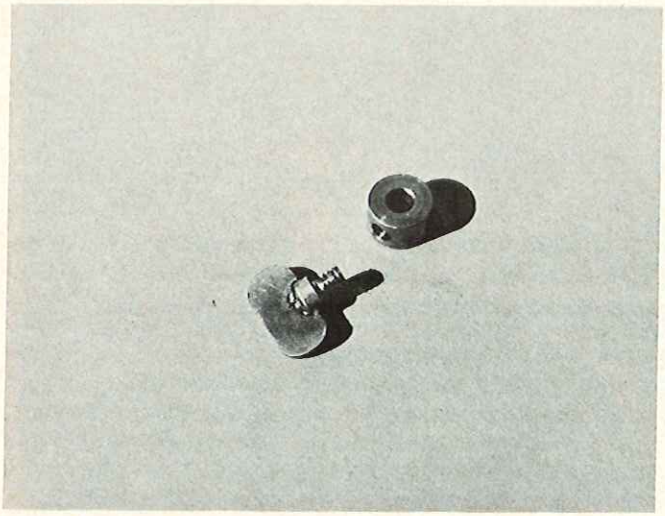
text to page 84



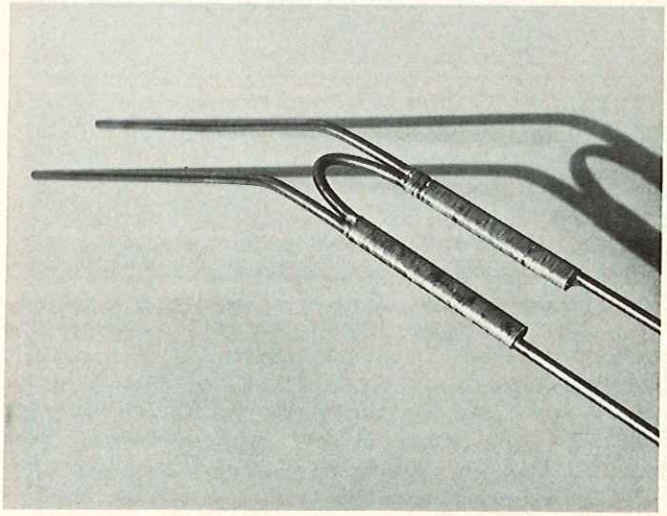
Assembled end of training gear; bolting in this manner allows legs to be folded flat when not in use.



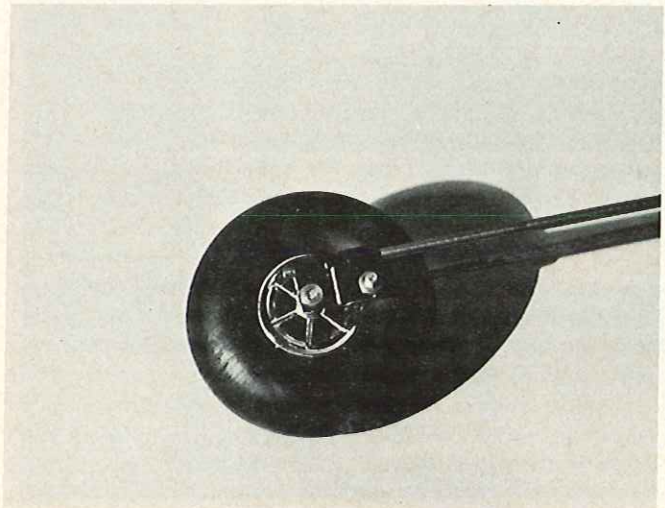
Upper end of pylon leg showing spring shock absorber, tubing return bumper and collar.



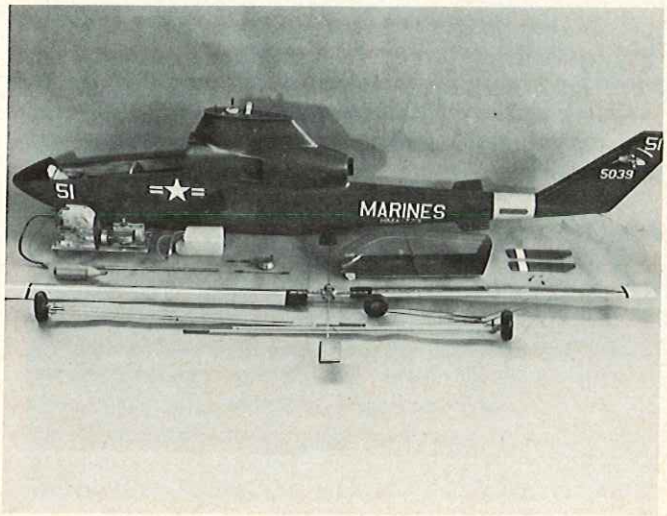
Handy "wing" soldered to standard 4-40 screw aids assembly.



Upper end of nosegear – bound "U" helps resist twisting.

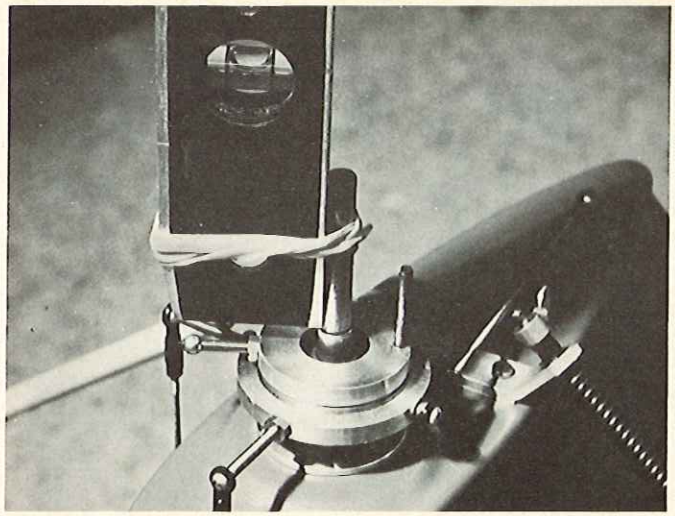


Simple clamp fittings hold nose wheel, forward screw also serves as axle.

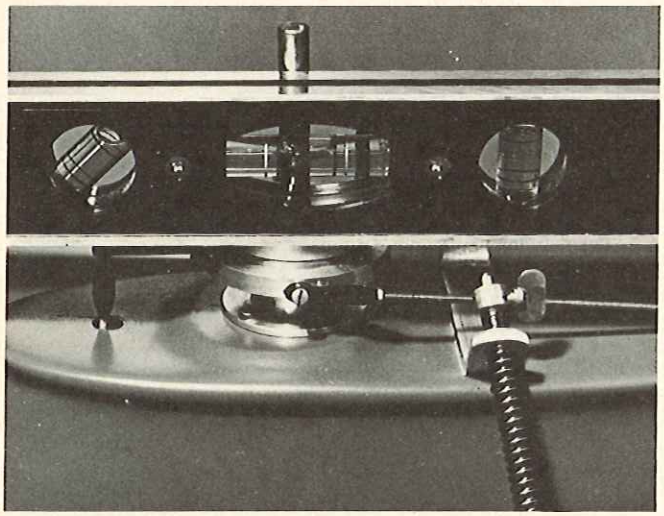


Completed sub-assemblies ready for final assembly.

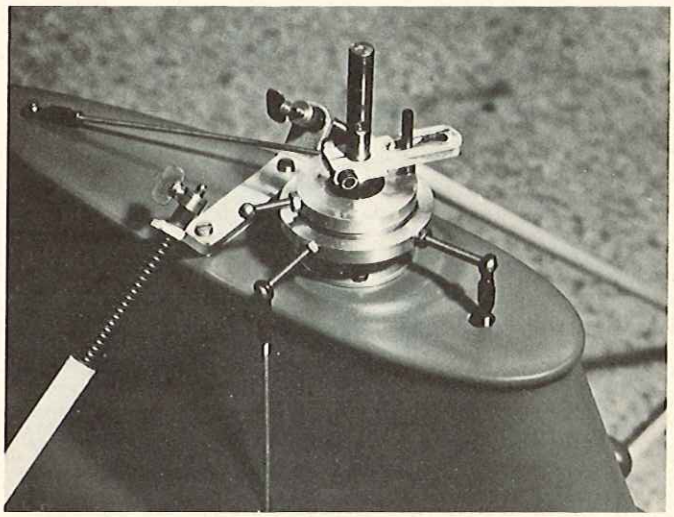
Tail rotor gear box with drive shaft coupler installed.



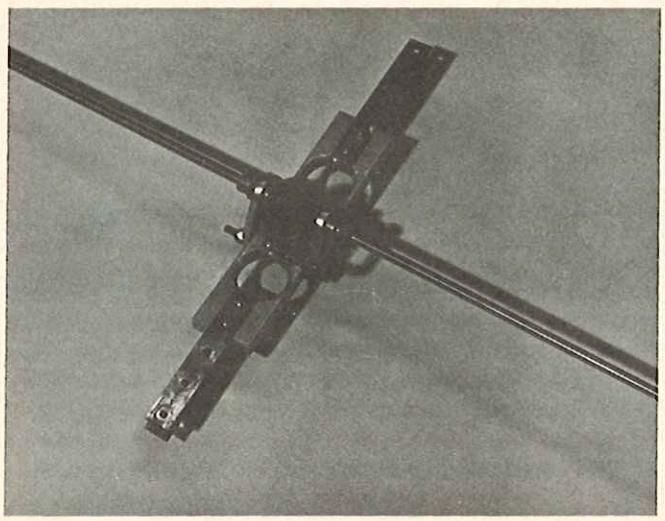
Fuselage blocked up until main rotor shaft is vertical (check as rotated).



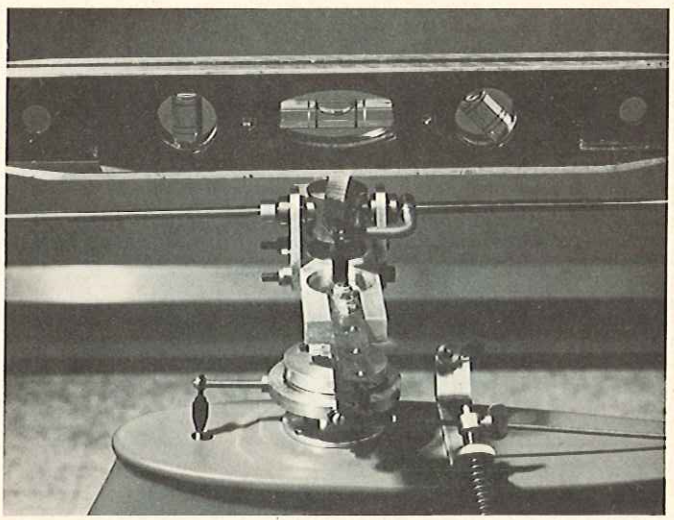
Pushrods adjusted until swash plate is level on all axis.



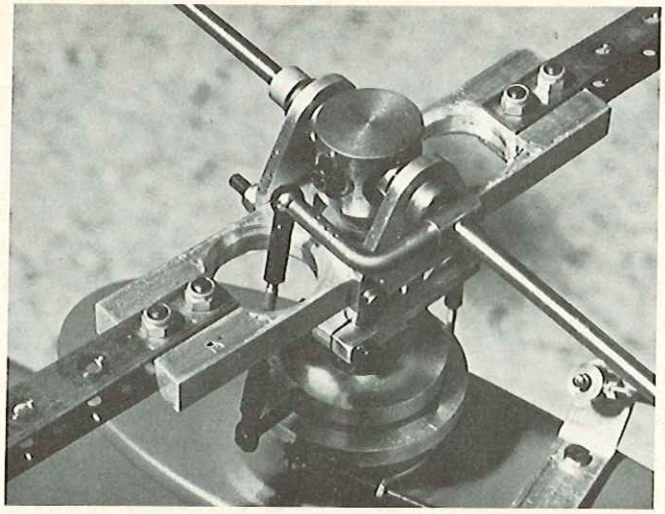
Swash plate driver installed.



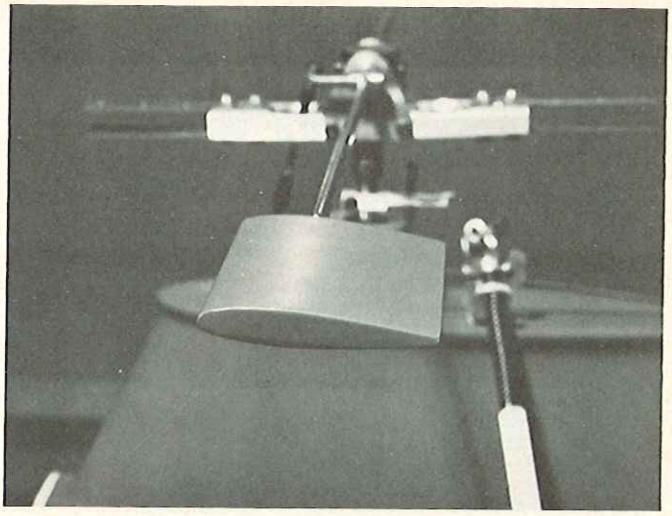
Main rotor head ready to be installed on the main rotor shaft.



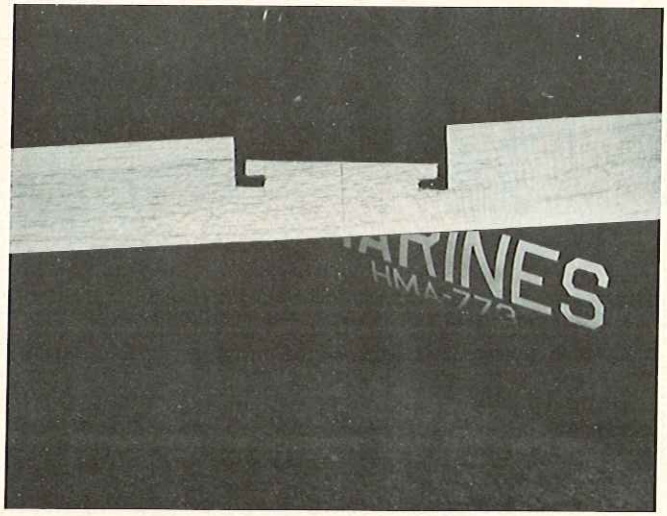
Stabilizer bar adjusted to hang level.



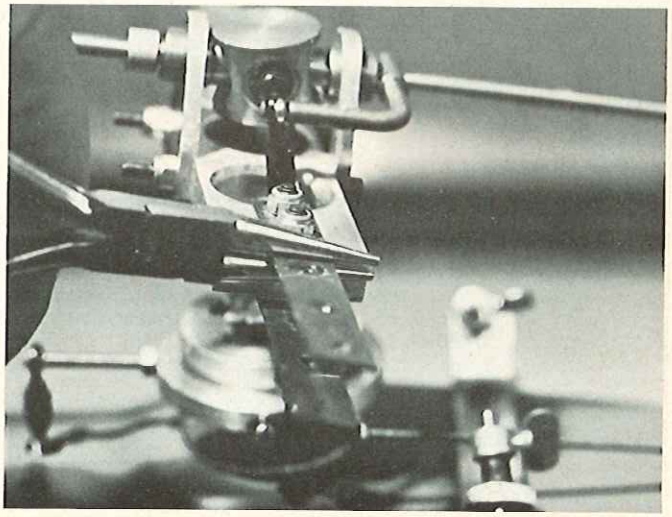
Steering control rod added between swash plate and steering control arm.



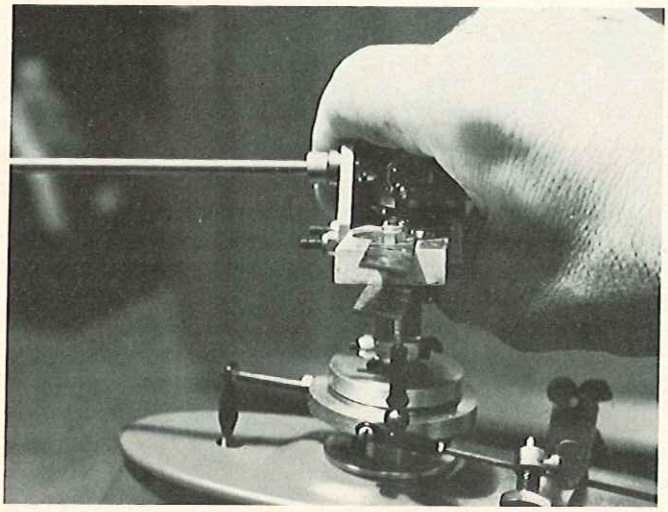
Stabilizer blades adjusted to 0° (check with level).



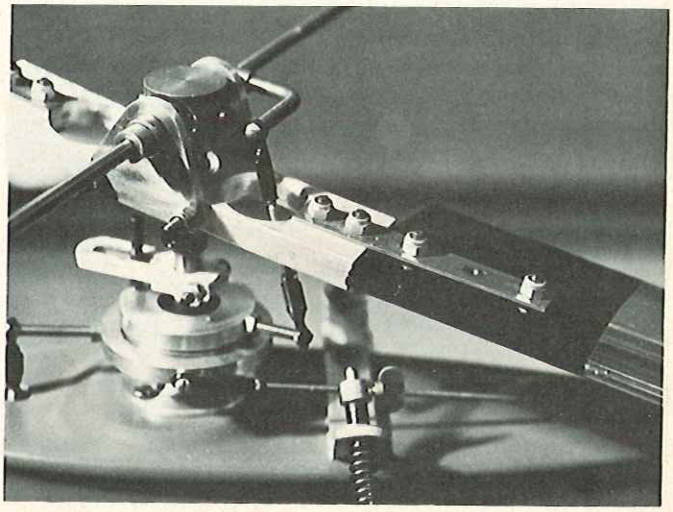
Carefully cut balsa alignment gauge.



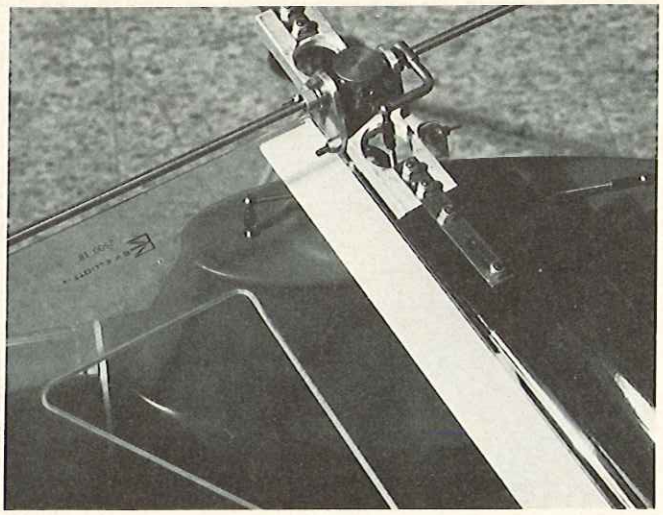
Needlenose pliers used to twist blade holders close to proper angle.



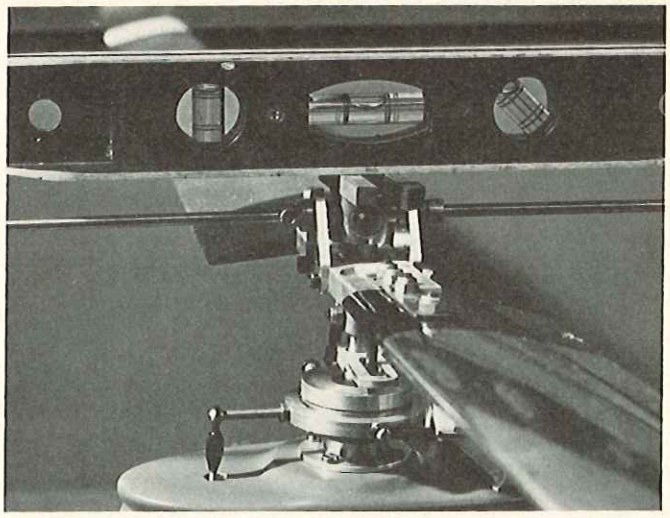
Blade holders ready to accept rotor blades.



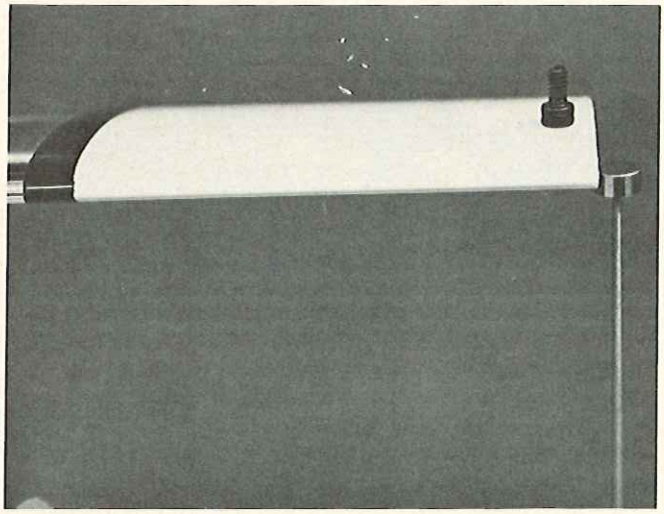
Rotor blade installed – center screw omitted to allow for final adjustment.



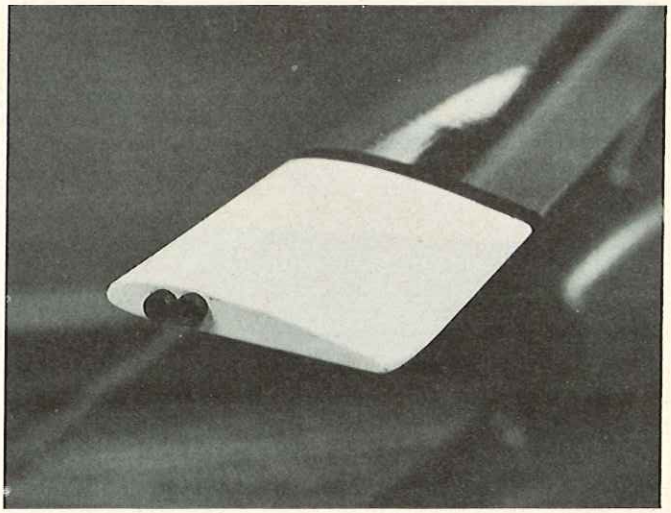
Blade adjusted square to stabilizer bar and securely tightened.



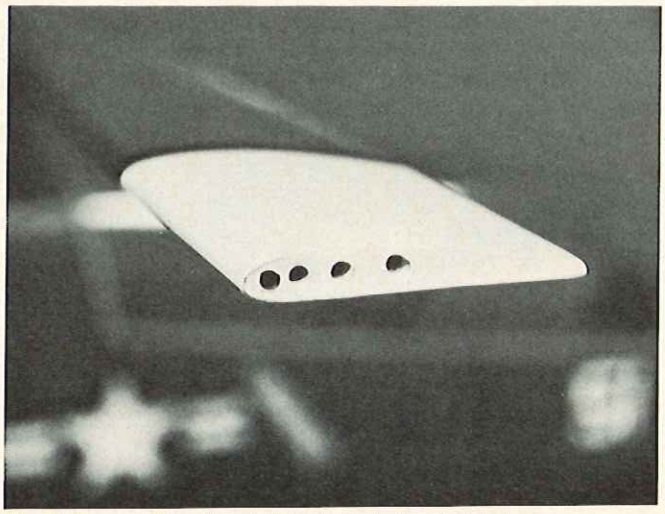
Other blade adjusted until stabilizer bar is again level, then tightened.



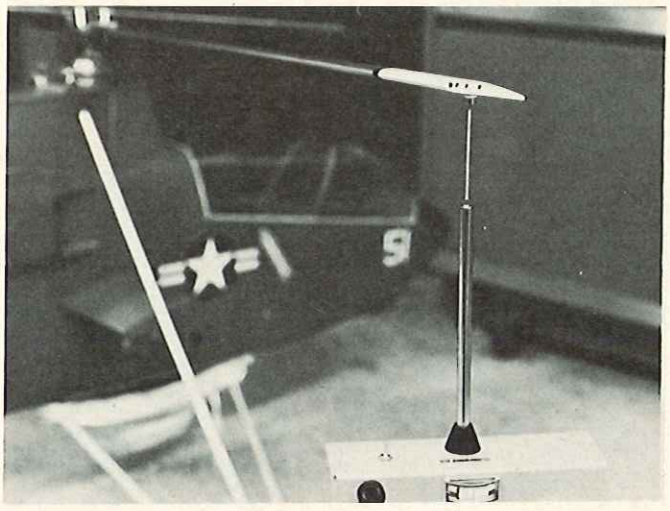
Screws set on tip of light blade as required to achieve balance.



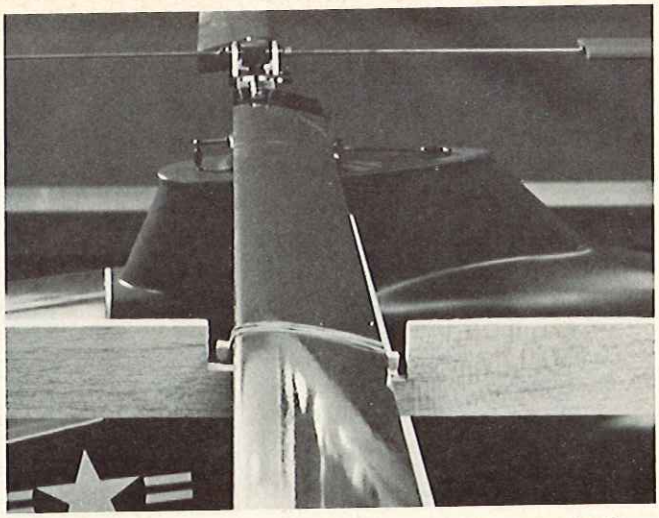
Screws threaded and epoxied into ash portion of tip.



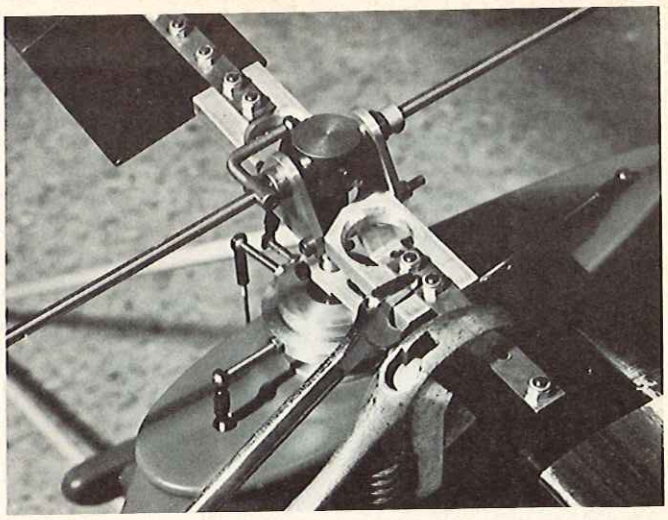
Fine balance achieved by drilling holes in heavier blade tip.



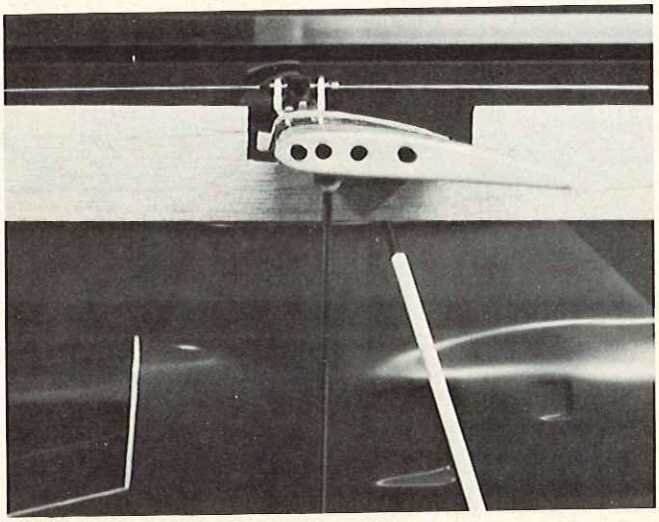
Transmitter antenna makes a handy height gauge.



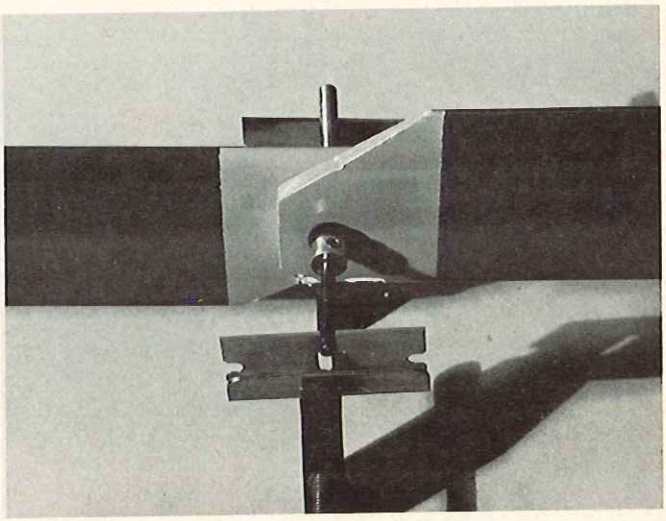
Alignment gauge held to underside of rotor blade by rubber band.



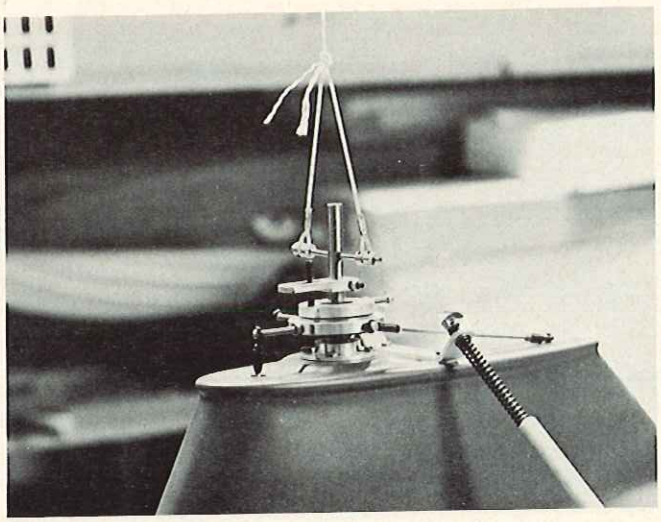
Adjustable wrench used to carefully twist blade to correct incidence.



When properly set, top of gauge is parallel to stabilizer bar.

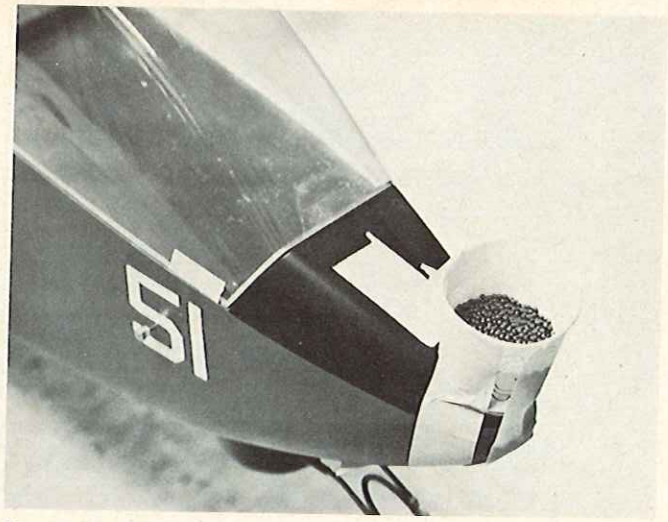


Rear rotor blades carefully balanced before installation.

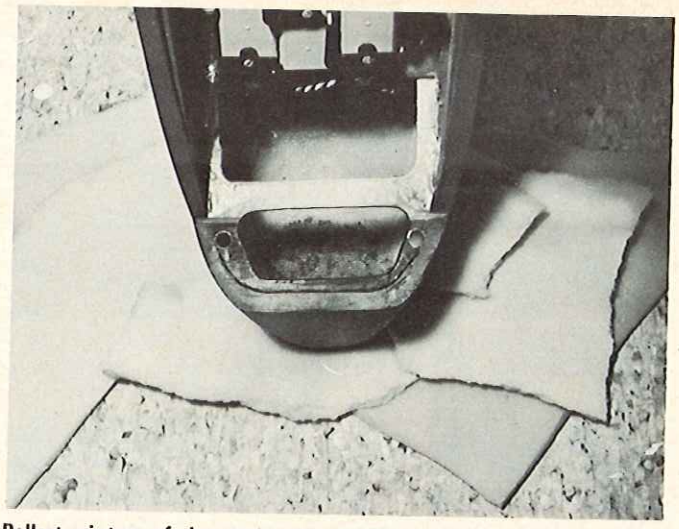


Rod through main rotor mounting hole for balancing.

Assembled 'copter suspended from ceiling rafters.



Paper cup taped to nose allows addition of ballast as needed.



Ballast mixture of shot and resin poured into nose and covered with fiberglass cloth.

Test run – if all balancing was done carefully, the Cobra will sit calmly with all blades rotating. (Note: Running inside or in a restricted area is not recommended!)

Bernie Murphy ready for first test "hop" in street in front of his home.

Many gallons of fuel have now been run through the Cobra. A whole new technique in learning to fly a chopper.

Close-up of the Cobra lifting off. Training gear is removed after you are thoroughly proficient at flying.

TECHNIQUES OF COVERING AND FINISHING WITH SOLARFILM

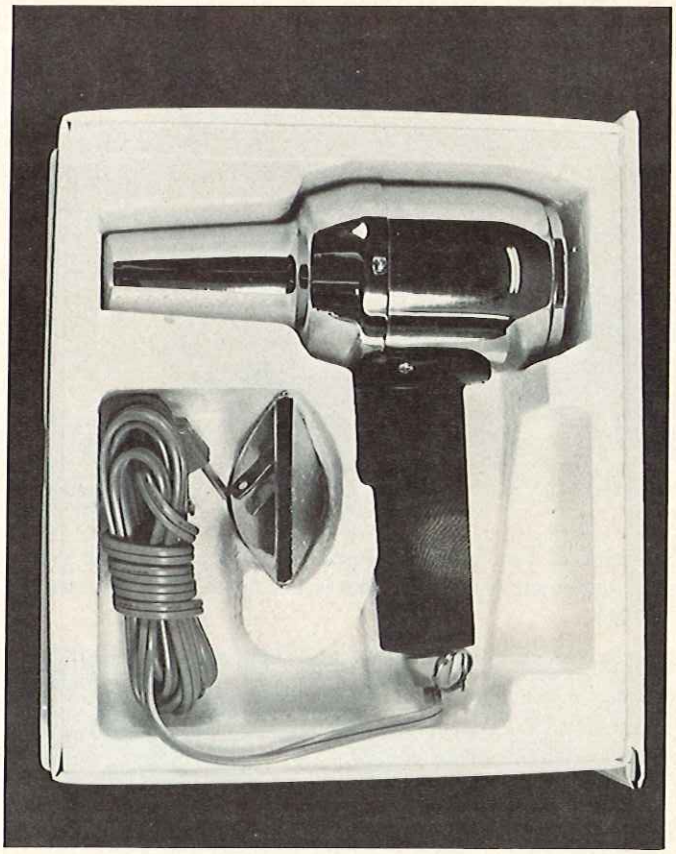


Photo at right shows the AME Heat Gun. The AME and the Polytherm Heat Guns are specifically designed and recommended for use with heat shrinkable covering materials. The step-by-step photos show the use of a heavy duty industrial type gun due to the fact that the AME and Polytherm units were not available at the time the photos were taken.

The introduction of the English manufactured Solarfilm, distributed in the United States by the Pactra Corporation, 6725 Sunset Blvd., Hollywood, California 90028, has virtually revolutionized the finishing of model aircraft. Basically, this is a plastic film with an adhesive back where the color of the material is contained in the adhesive. With virtually every opaque, transparent, and metallic color available from Solarfilm, you can obtain a professional looking finish in a fraction of the time that it would normally take to finish by one of the more conventional methods such as dope, epoxy, or acrylic lacquer. All of the tedious work of sealing, doping, sanding, and polishing, is eliminated while giving you a strong light weight model that is fuel proof, moisture proof, stain proof, and easy to maintain and repair.

One of the outstanding advantages of Solarfilm is that it is extremely light, since the total weight difference between a bare structure and a finished and trimmed airplane, such as a standard .60 size multi, is only 4-4½ oz. The initial outlay for material is somewhat expensive, but not so when compared to the amount of dope, sanding sealer, color coats, and miscellaneous material necessary to finish a model in the conventional method. Solarfilm stands up extremely well under various weather conditions and is quite easy to work with once you understand and have practiced the techniques.

Solarfilm is substantially more flexible than competitive materials of the same type and is, therefore, easier to work around compound curves. It is also extremely puncture resistant for this type of material and has more of a tendency to "give" rather than to rupture or tear.

First of all, no dope, primer or sealer of any kind is used on the surfaces of your model. When you apply Solarfilm, using heat, air gets trapped underneath. If the surfaces underneath are sealed with any type of material, this air cannot escape and you will end up with a bad job, little adherence of the material, and any dope that you have applied will blister with heat. Solarfilm, due to the lesser amount of heat required for adherence, can be applied over a doped surface, but it is entirely unnecessary. What is necessary, is that all surfaces to be covered have been sanded as smooth as you can possibly obtain them. In other words, progressing from coarse to fine sandpaper, sand the model as smooth as you can, filling all cracks, dings, and gouges, before you begin to apply the Solarfilm covering. Before you begin to apply the material to each section of the model, make sure that you have gone over the entire surface several times with a tack rag in order to eliminate all sanding residue and dust particles. If you do not do a thorough job at this point, the dust particles and sanding residue will be trapped between the surface of the model and the thin Solarfilm covering and will stand out like a sore thumb on your finished model. Since you have eliminated a lot of elbow grease necessary in the application of dope and sanding sealer on a conventional finish, take a little extra time at this point to do a good job of surface preparation before beginning the actual application of the material.

The tools that you will need for applying Solarfilm are a heat gun, such as the Polytherm or AME heat guns, that put out approximately 300 – 400 degrees of heat, and a Sealectric electric iron available through most hobby shops, for the application of this material. The latter is a small tacking iron which is used in photography to seal photographic prints to cardboard backing frames as well as in butcher shops to heat seal meat packages. The best shoe that we have discovered for the use, with the Sealectric iron is the new Super Shoe from Robart Mfg.,

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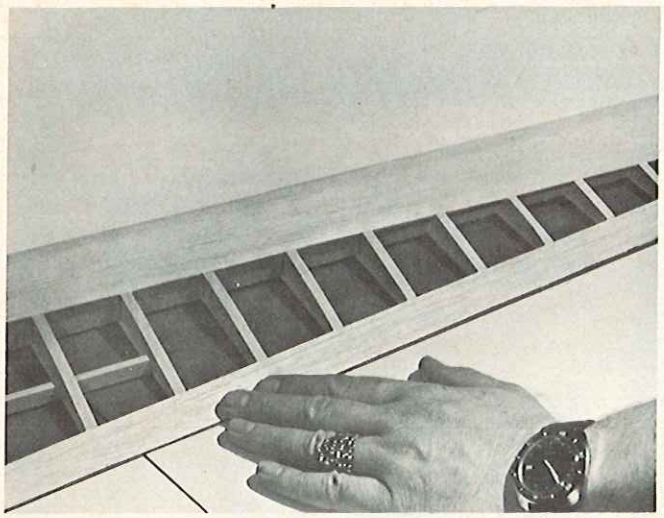
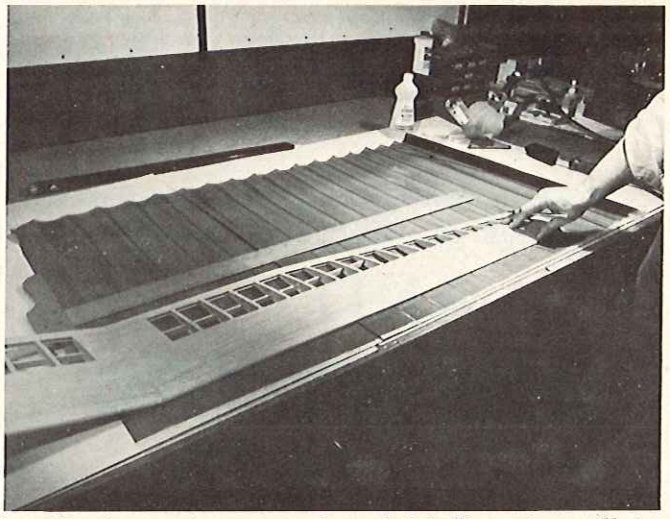
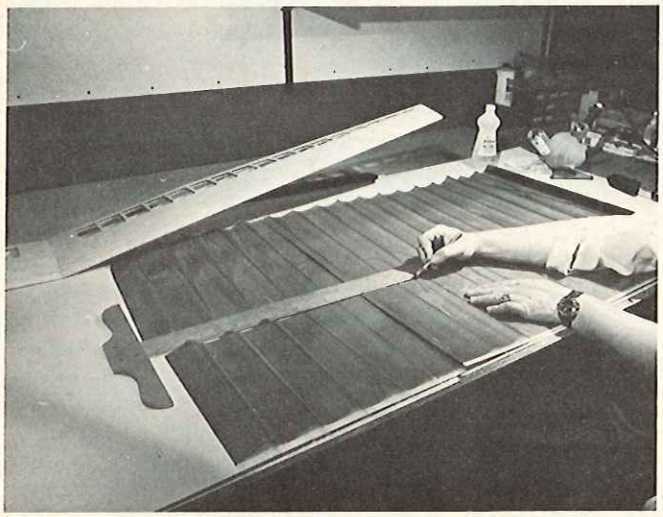


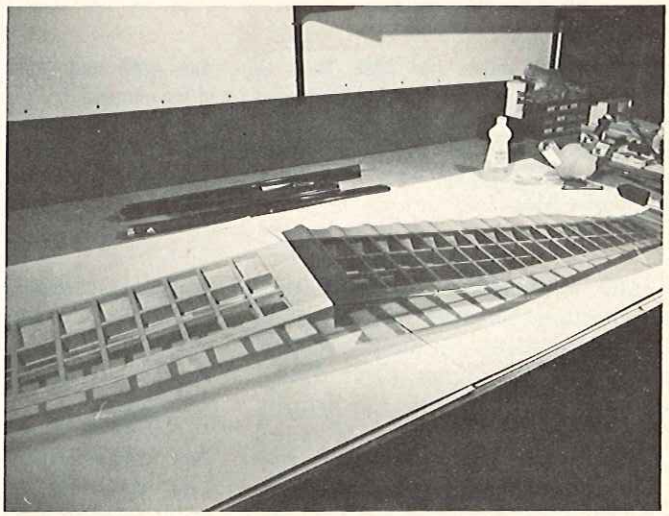
Before covering your model with Solarfilm, be certain that the framework of your model is sanded absolutely smooth and then dusted thoroughly with a tack cloth just before the covering material is applied.



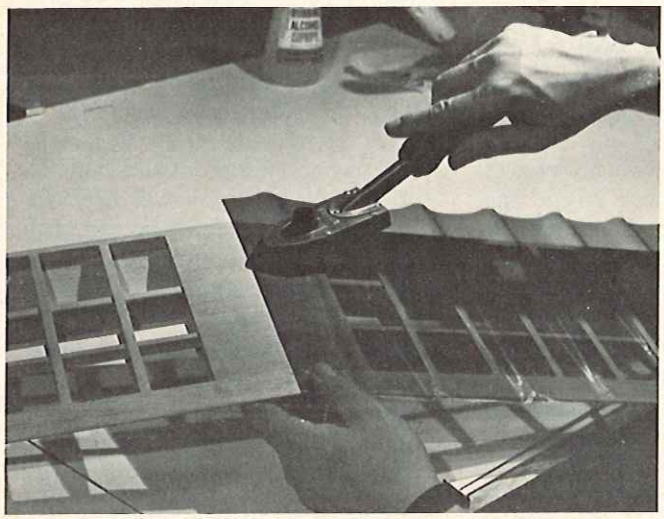
Lay the wing panel out on a sheet of Solarfilm and cut off the amount needed allowing sufficient overlap all the way around the wing panel. The bottom of both wing panels are covered first.



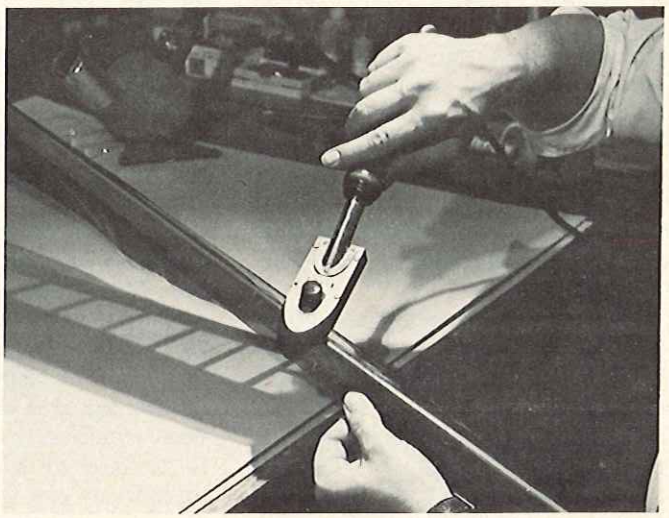
Using a long straightedge and an X-Acto knife, cut away the amount of Solarfilm you plan to use on the wing panel.



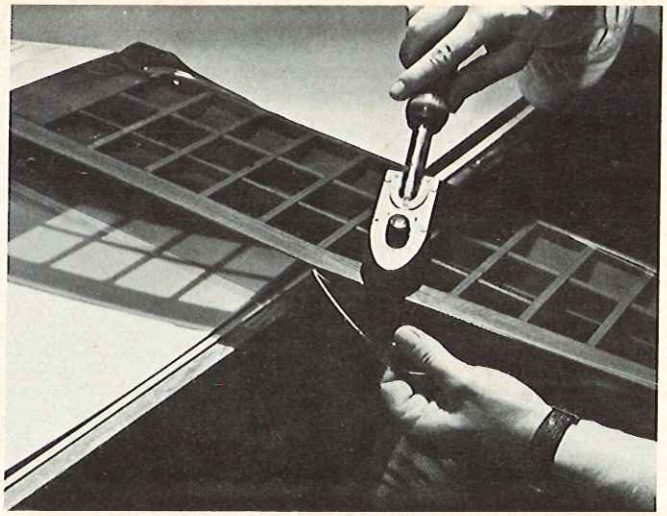
Lay the cut-out piece of Solarfilm over the bottom wing panel and gently smooth out the excess wrinkles with the palm of your hand.



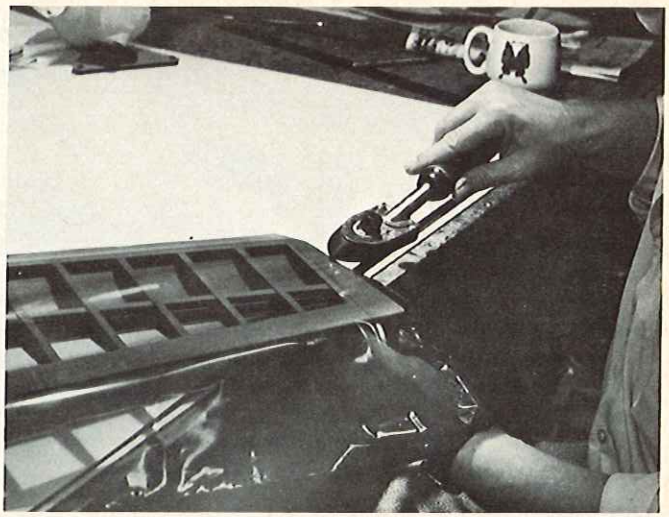
The first step is to seal the root and tip edges with your Sealectric iron.



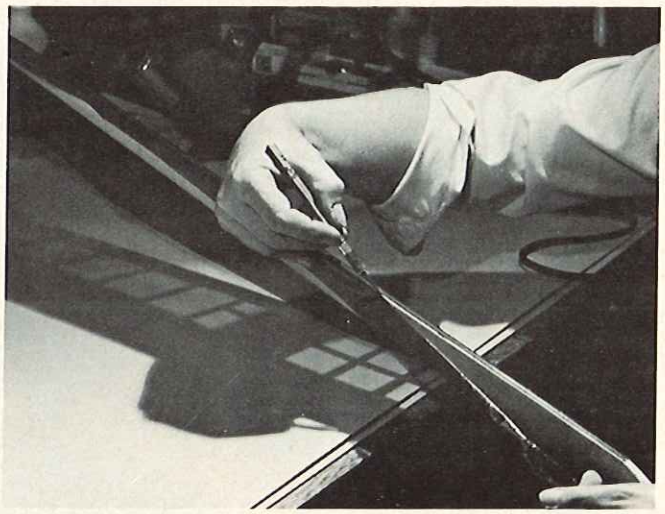
The next step is to seal the leading edge of the wing, pulling the material down as you go to avoid any unsightly wrinkles.



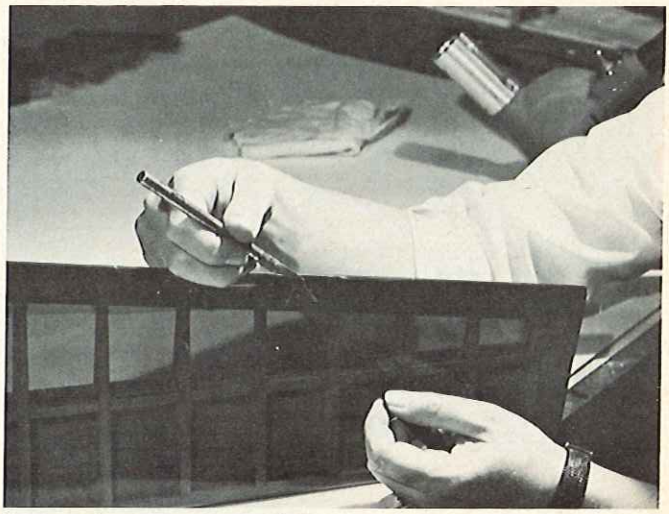
Next, seal the trailing edge of the wing in the same fashion as you did the leading edge, pulling out any large wrinkles as you go, but do not attempt to pull the material drum tight.



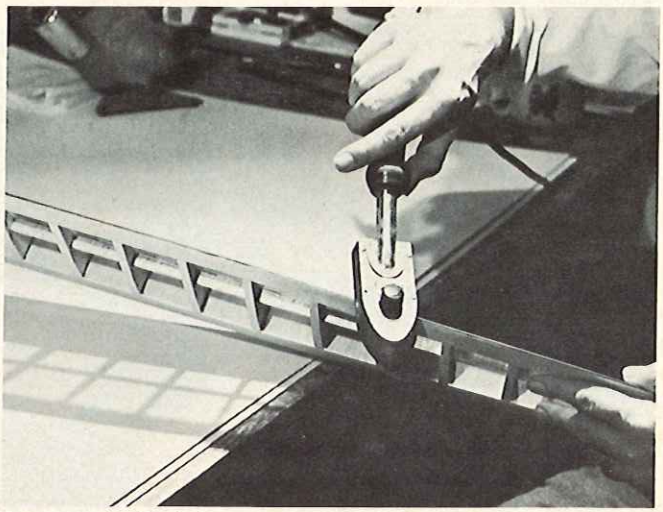
Now, pull the material over the edge of the wing tip and use your Sealectric iron, you will find that it goes around the compound curves quite easily.



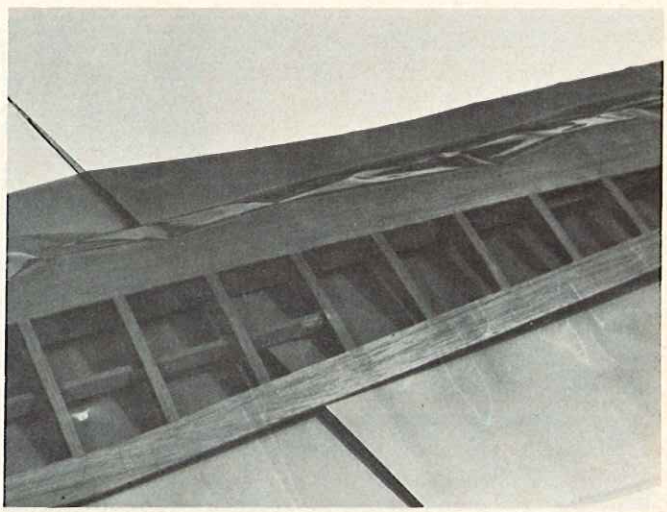
Using your X-Acto knife, trim all the excess material along the leading edge of the wing.



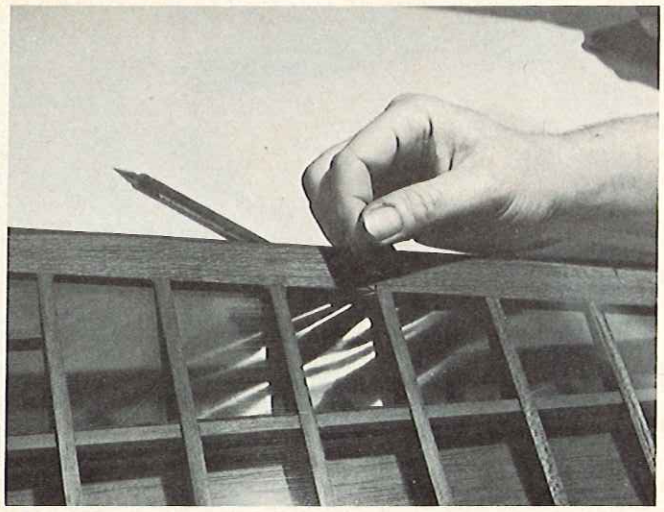
Repeat the same process for the trailing edge, cutting off the over-hanging excess material.



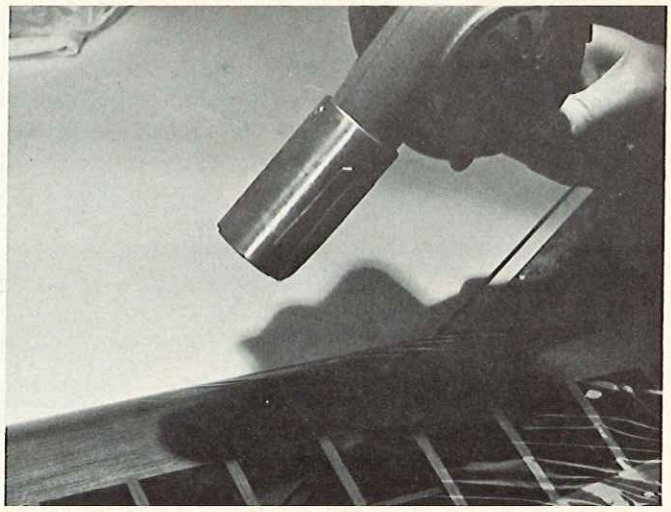
Now, reseal all of the edges around the trailing edge, wing center section, leading edge and tip. Now repeat the entire previous process for the bottom of the opposite wing panel.



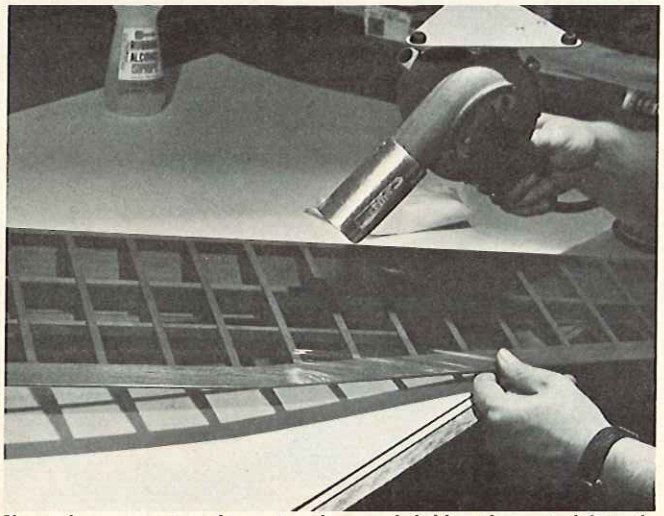
Now cut a piece of material for the top of one wing panel and repeat the entire process for the top of both panels. Be sure to overlap the material at least 1/8" so that it bonds securely to the material on the lower side of the wing.



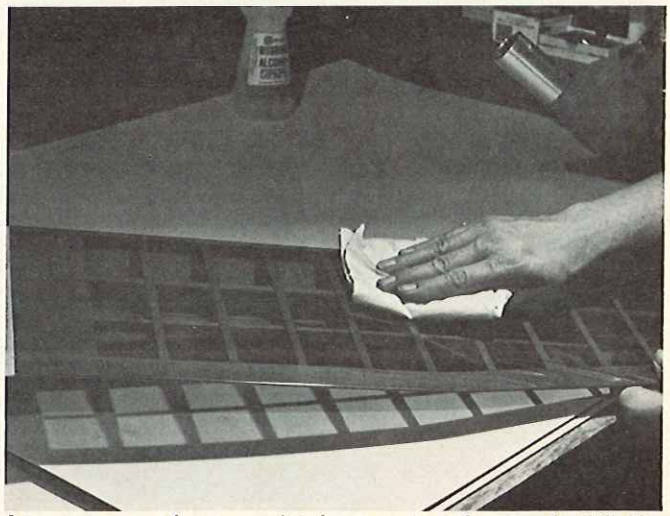
Before heat shrinking the material, take a straight pin and poke a small hole at the junction of each rib in the trailing edge to allow the trapped air inside to escape and prevent bulging the material when it is heat shrunk.



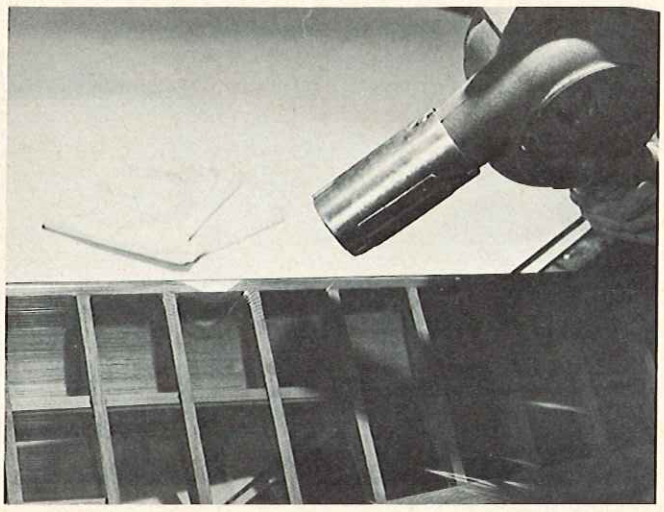
Now, using your heat gun approximately 3" – 4" away from the material, move back and forth across one panel at a time taking out the major wrinkles.



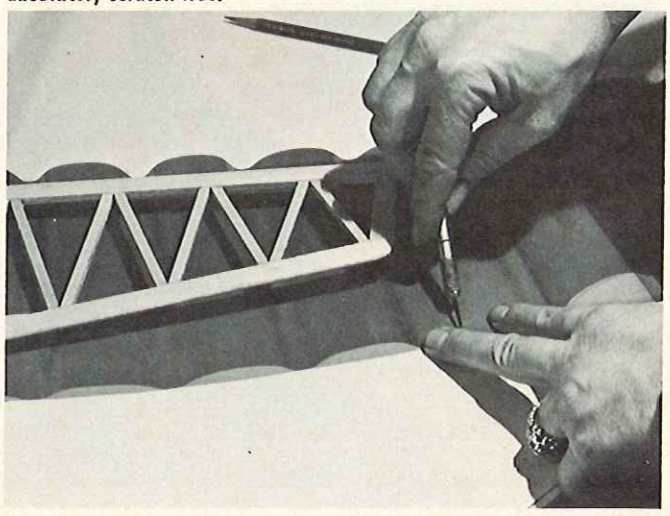
Now, do one or two bays at a time, reshrinking the material to the degree of tautness required.



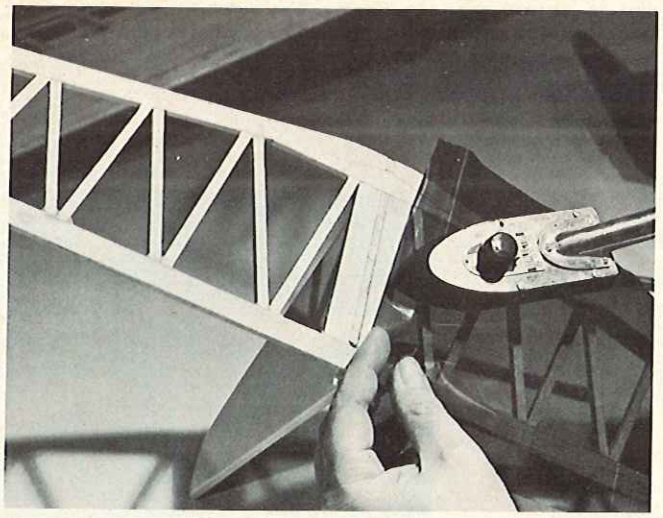
As soon as you have completed one or two bays, and while the Solarfilm is still hot, rub the heated bays with a pad of Kleenex to make sure that the material adheres firmly to the wooden structure underneath. This will give you an excellent covering job that is absolutely scratch-free.



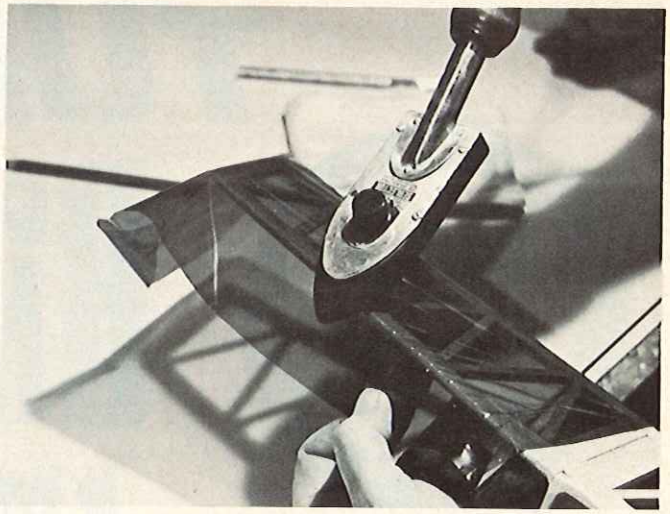
This photo illustrates what can happen if you hold the heat gun too close to the Solarfilm for too long a period of time.



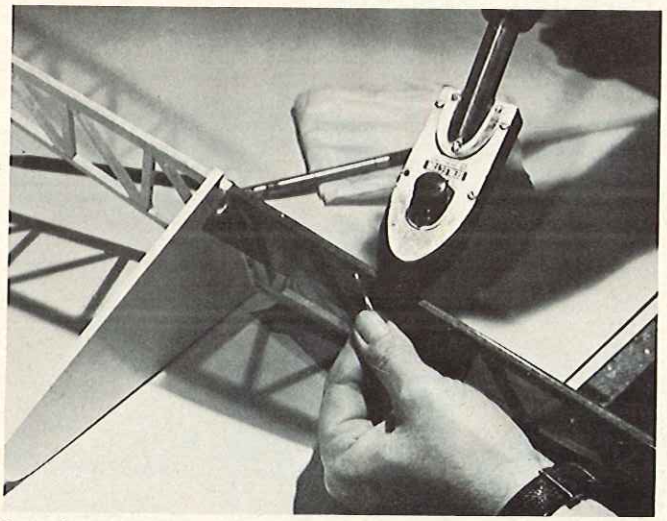
The procedure for covering a stabilizer is basically the same as the wing, cutting an oversized piece for one half of the bottom panel first.



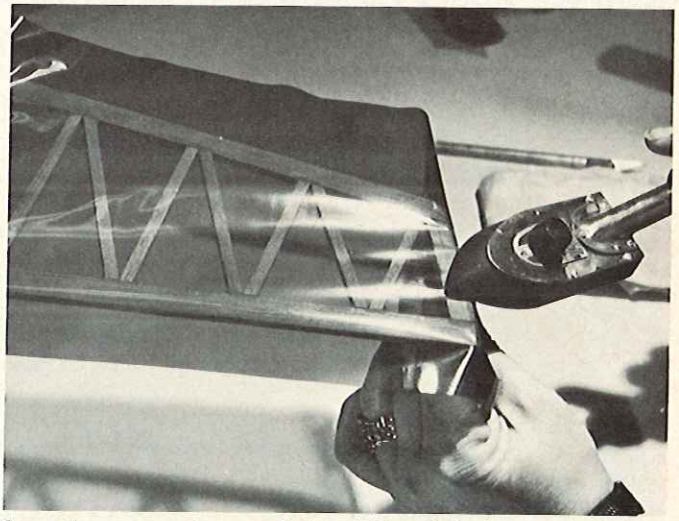
First, seal the material at the center section using your Sealectric iron.



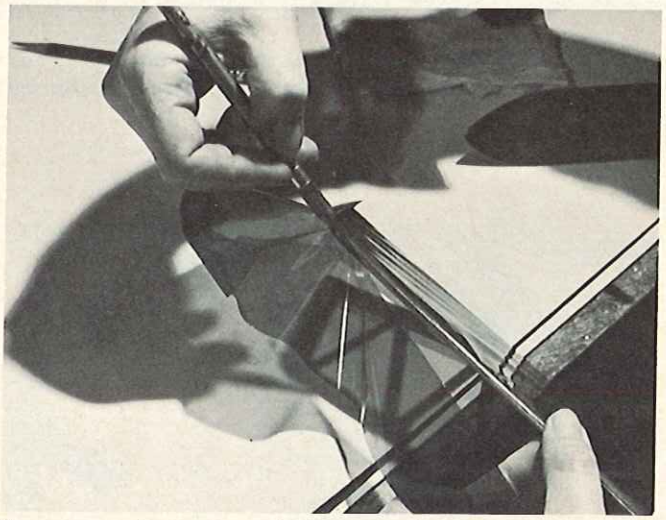
Next, seal the leading and trailing edges pulling out the heavier wrinkles as you go.



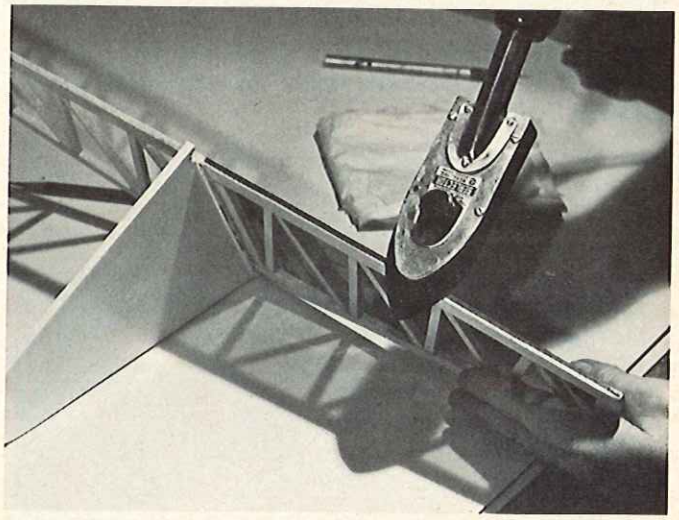
Now, heat the material around the back of the trailing edge of the stabilizer so that you will have a good overlap when the top covering is applied.



Cover the compound curve of the stabilizer tip in the same fashion as you did the wing.



Now remove all excess material from around the leading edge, trailing edge and tip.



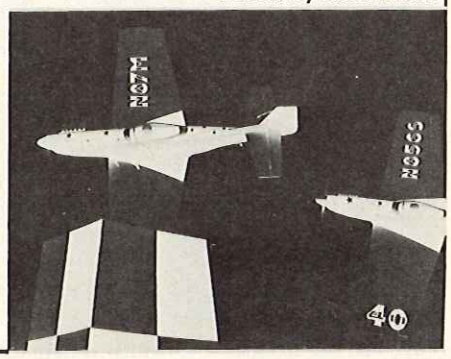
Once again, reseal all of the edges and then proceed with the other half of the stab bottom, followed by each half of the stabilizer top.

TURN!

RCM RACING REPORT

by jerry boyce

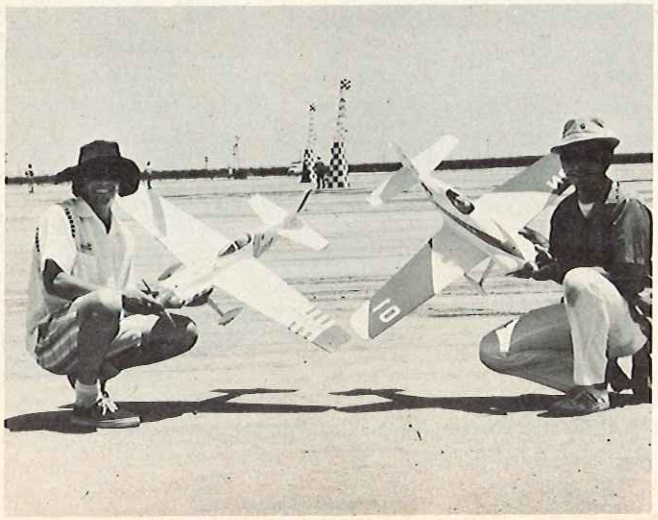
Photos by John Wilson

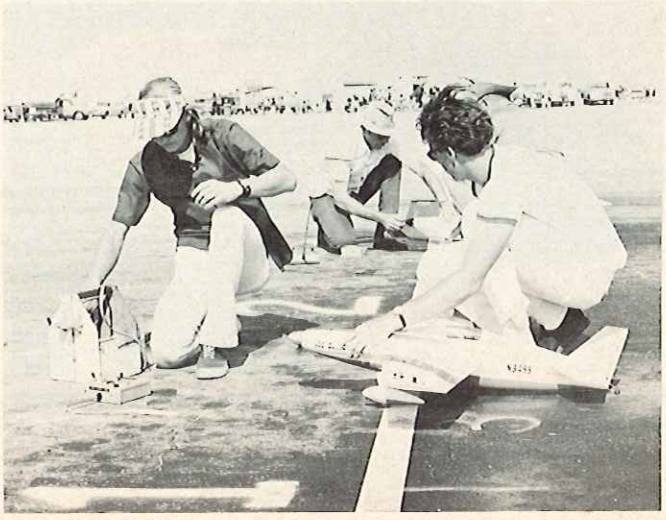


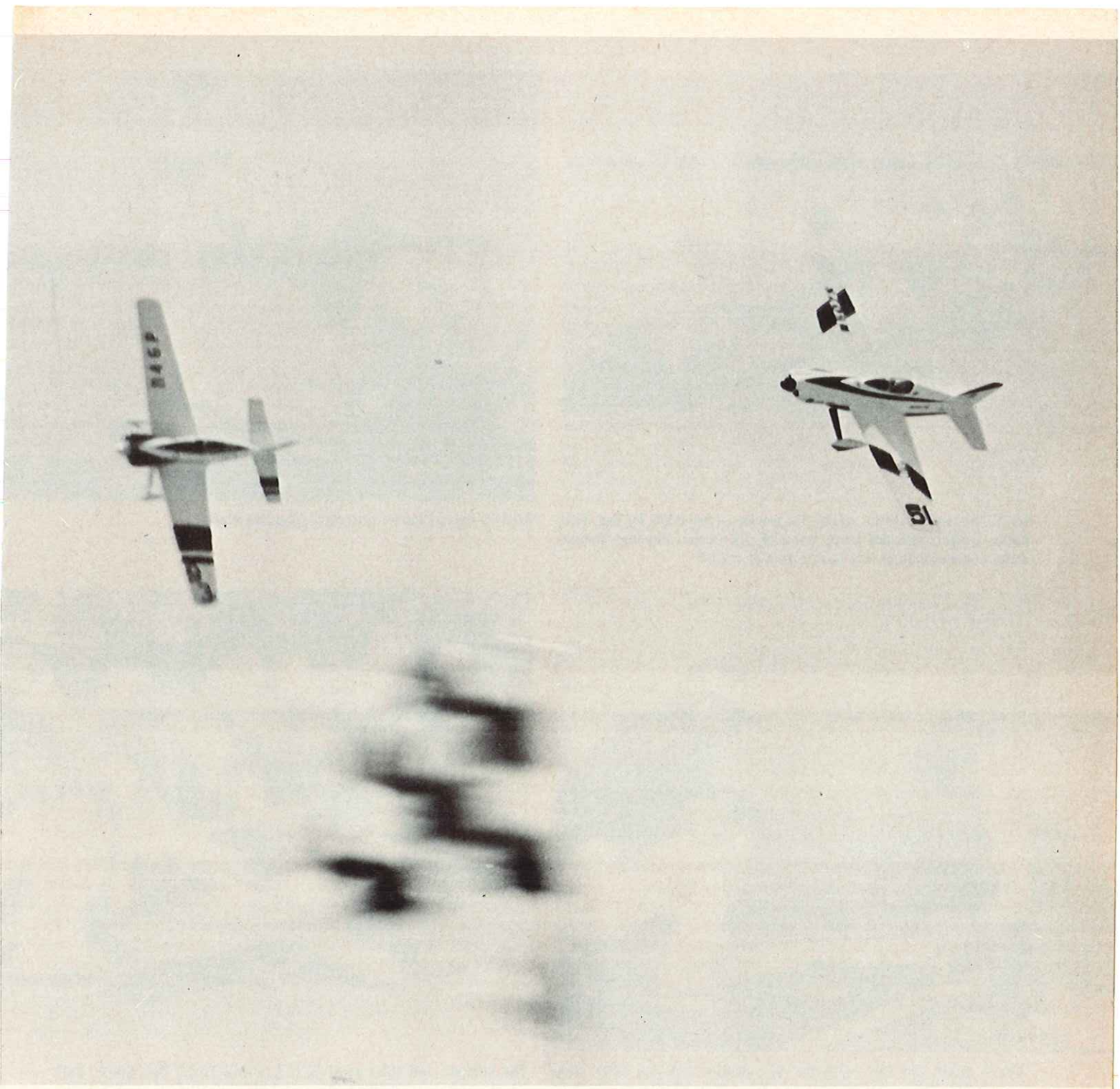
BARKS HOST 91 ENTRANTS IN GIANT WEST COAST FORMULA I PYLON MEET; BOB SMITH SETS NEW WORLD RECORD OF 1:27.9 WITH K & B POWERED 'MISS DARA.'

John Brodbeck and Larry Leonard. A Minnow and a Miss Dara, both powered by new K & B Scheurle engines. Note vast Famoso Airfield, 200 acres of asphalt.

Bob Smith and Clarence Neufeld, of the sponsoring BARKS, start up for the 1st place fly-off. Clarence fried a plug giving Smith the top prize.





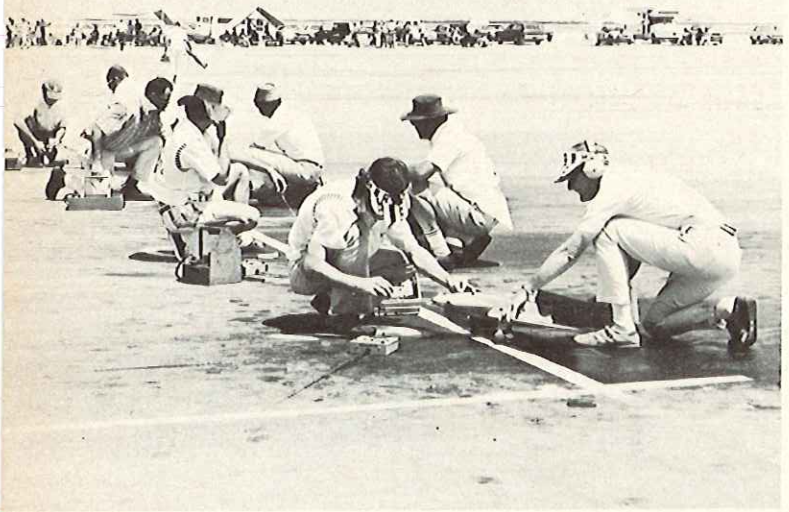


Bob Smith's Miss Dara closes in on Terry Prathers' Minnow around #3 pylon in a tight race. Smith won heat in 1:31 flat.

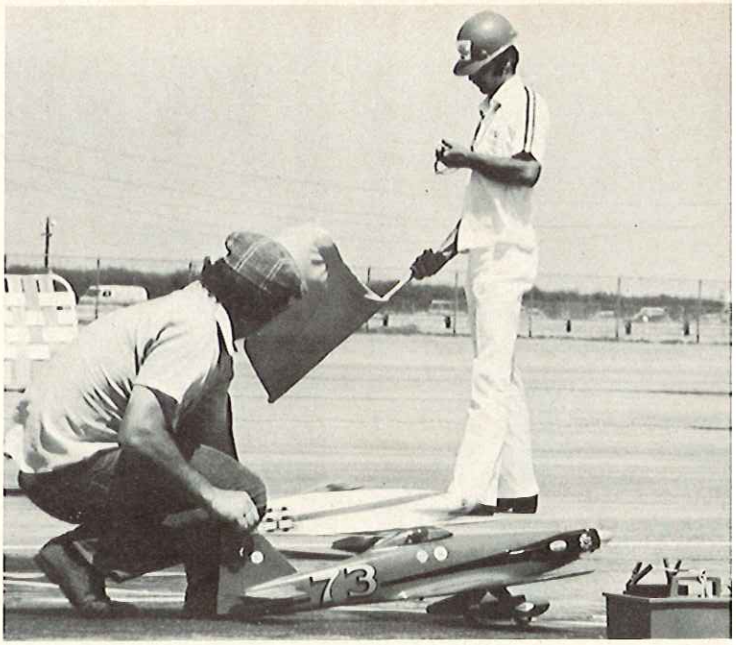
Racing was the order of the weekend, June 3 – 4, at the Bakersfield Aircraft Radio Control Society Famoso Airfield just north of Bakersfield, California. For this was the race the West Coast Formula I pilots had all waited for. Because of the central location and the BARKS reputation on running a pylon race, Contest Director Glen Spickler expected last year's 71 entries to be increased somewhat. And increased it was, as 95 entries and 119 airplanes were on the judging line Saturday morning! This was a colossal task for the scale judges but they handled the problem quite well and had the races going by 10 A.M. Paul White's beautiful Minnow gave the Santa Ana flier top billing.

Saturday was a "feeling out" day as the pilots experimented with propellers and fuel while the BARKS figured out the best way to handle so many entrants. This year Glen used club member Jerry Christensen as the official starter. The members of the club showed up in force and utilized the new lap counting and intercom systems developed by Chuck Smith of the Valley Flyers. Saturday took its toll of aircraft and the fastest time for the day was a 1:35.0 turned in by last year's winner, Terry Prather.

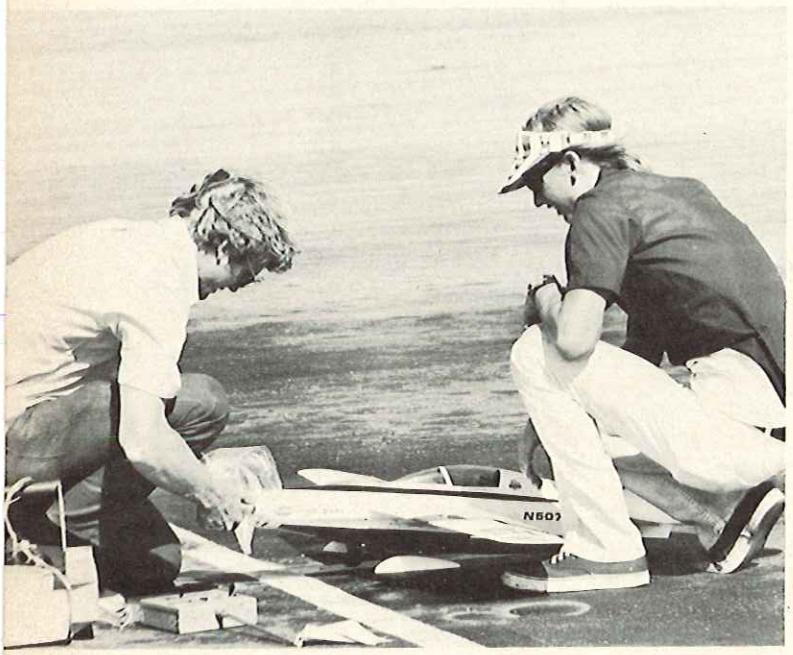
Sunday dawned with three rounds completed and the possibility of some record times due to a lowering of humidity. The new K & B Scheurle pilots kept pushing their times lower and lower as each round progressed



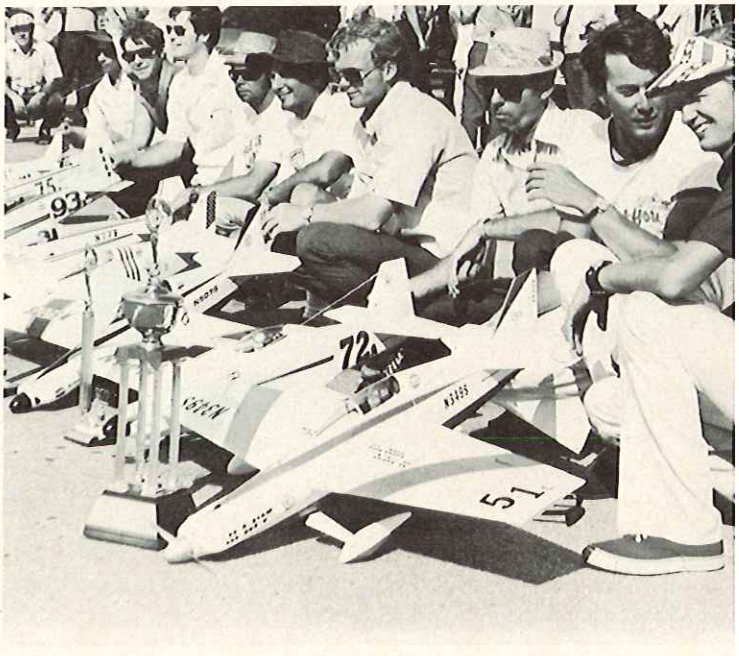
Whit Stockwell tachs his engine for needle setting while his dad, Bob, holds. Other racers are Larry Leonard, Ed Foster and Jack Hertenstein. Leonard won heat in record time of 1:29.4.



BARKS starter, Jerry Christensen, flags them off.



Chuck Smith gets ship ready for race. Brother Bob was caller. Note plastic bag, dirty engines don't run fast – Chuck's did! He finished 3rd in field of 95 with a fast time of 1:34.2.



The winners and their gold! R. to L. – B-S Team, Bob Smith, Jeff Bertken, Clarence Neufeld, Chuck Smith, Bob Bleadon, Bob Francis, Terry Prather, Ron Russell and Larry Leonard.

until, in the middle of round 6, Bob Smith, flying a Miss Dara, beat his old record of 1:30.0 with a 1:29.8. Then came the record setting 7th round. In the second heat Larry Leonard turned in an impressive 1:29.4. Not to be outdone, and 6 heats later, Bob Smith took the lead back and kept it with an official time of 1:27.9 and a new world's record!

After 7 rounds of racing, consisting of 151 heats, BARKS own Clarence Neufeld, flying a K & B Scheurle powered Minnow, and Bob Smith, were the only two pilots who had won all their heats and had a total of 28 points. Chuck Smith and Bob Bleadon, also flying K & B powered Daras, were tied with 27 points. Fifth place found Bob Francis and Terry Prather tied and eighth place had a four way tie to be decided between Larry Leonard, Joe Martin, Chuck Hayes, and Jeff Bertken. Most of the races in the past found all the tie-makers on the same frequency, thus eliminating any fly-offs. But not at Bakersfield 1972 – none of the tied pilots were on the same frequency.

Bob Smith walked away with the top prize as Clarence lost a glow plug on the starting line. Bob's brother, Chuck, was honored with third place when Bob Bleadon double cut a pylon. Terry Prather did the same in his fly-off with Bob Francis of Santa Cruz. The big fly-off with four aircraft was won by Larry Leonard in the

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The winner, Bob Smith, his airplane, Miss Dara, and the man who makes it go fast, John Brodbeck, Jr., of K & B. Duo is set with BARKS PR man, Gale Enstad, and some of his work – the Welcome to Bakersfield sign.

ADVANCED FIBERGLASS MOLD CONSTRUCTION

BY EDWARD MALHERBE

If you're tired of being handicapped by flat sheet and box construction and if you want those flowing curves that characterize a beautiful fiberglass fuselage, this article is for you. Try this step-by-step method for creating your own male mold, or plug.

If you find that you are building the same airplane for sport flying, or you have decided that you have a dream ship you would like to build, fiberglass construction becomes a beckoning possibility. When the choice is made to go ahead with a mold the decision has been made to invest a good deal of time and money in the project. However, the money problem can be overcome if the design is appealing so that you might sell a few fuselages to friends. The time problem is not significant if you have the desire to create, as most modelers do. The mold making is a trade-off between putting a beautiful finish on that balsa fuselage or having an almost finished fiberglass beauty.

Perhaps the major advantage of the fiberglass construction, for radio controlled aircraft, is that the fuselage can survive some of those violent crashes we all see once in a while, but can be repaired in a few hours or an afternoon. When you crash a balsa airplane it's generally delegated to the trash can in most cases. A second advantage is that your radio gear is more adequately protected while you make your mistakes in flying, or have the lapses in memory as to which correction you should have made to get out of the situation from the first mistake. Radio failure is almost a thing of the past, but we should include that dire possibility, as well. However, the third and most appealing aspect, is that one is no longer handicapped by flat sheet and box type construction.

TABLE I

(Some weights of commercially available(*) glass cloth and mat and approximate cost.

¾ oz x 50"	Glass Mat	$2.29 / sq. yd.
2 oz x 38"	Glass Mat	2.64 / sq. yd.
	Chopped glass	.49 / lb.
.010" x 50"	Surfacing mat	.65 / sq. yd
2 oz x 38"	Glass cloth	1.03 / sq. yd
3.14" x 38"	Tooling cloth	1.56 / sq. yd
4 oz x 50"	Glass cloth	1.10 / sq. yd
6 oz x 60"	Glass cloth	1.60 / sq. yd.
7.5 oz x 50"	Glass cloth	1.48 / sq. yd
8.5 oz x 60"	Glass cloth	1.80 / sq. yd.
10 oz x 50"	Glass cloth	1.75 / sq. yd.
13 oz x 50"	Glass cloth	2.22 / sq. yd.
20 oz x 50"	Glass cloth	2.93 / sq. yd.

* Plastic Mart – Santa Monica, California

The design approach can include those flowing curves that add beauty to any structure. The shape of the fuselage is basically determined by the location of the wing, motor, and horizontal control surfaces, but beyond that, the shape is almost anything you wish to create.

One of the greater drawbacks of fiberglass construction is the weight increase that is possible if you are not careful in the lay-up of the laminate. Some savings can be made by using epoxy resins because of the moderate increase in strength of the epoxy laminates. Having had good results with polyester resins, along with the appeal of less toxic materials to work with, I tend to use them for both molds and the finished fuselage. Since the finished laminate weighs about 66% of aluminum it pays to be prudent as to where, or how much, reinforcement is added. Each cubic inch of laminate will add about one ounce of weight to the final fuselage. This makes one more careful in the analysis and selection of the high stress points and just how much reinforcement should be added to adequately carry the flight and maneuvering loads in the fuselage. I have flown my 66 inch span, swept wing design, for about two years and, in spite of cracks from minor crashes, or dings and scratches, I have been able to retire it in a flying condition for another day. Considering the life of the fiberglass fuselage, along with the inherent repairability of glass, the trade-offs are well worth the effort and expense of this type of construction.

There have been some articles on the techniques of laying up glass laminates, such as Dale Willoughby's "Modern Fiberglass Techniques," Grid Leaks, July 1964, which was an excellent instruction article. However, the emphasis was not on the construction of the male mold, or plug. The original mold is the most basic step in the process, or design. What you carve at this stage is what you get.

The method of mold construction that follows is one approach to transforming that two dimensional beauty into a three dimensional mold. An advantage of this method is that the fuselage reference plane, or thrust line, is the primary reference as with conventional types of construction in balsa. The aerodynamic planes and centerlines are accurately keyed to this primary reference line. This insures that the wing and stabilizer incidence angles are correctly built into the

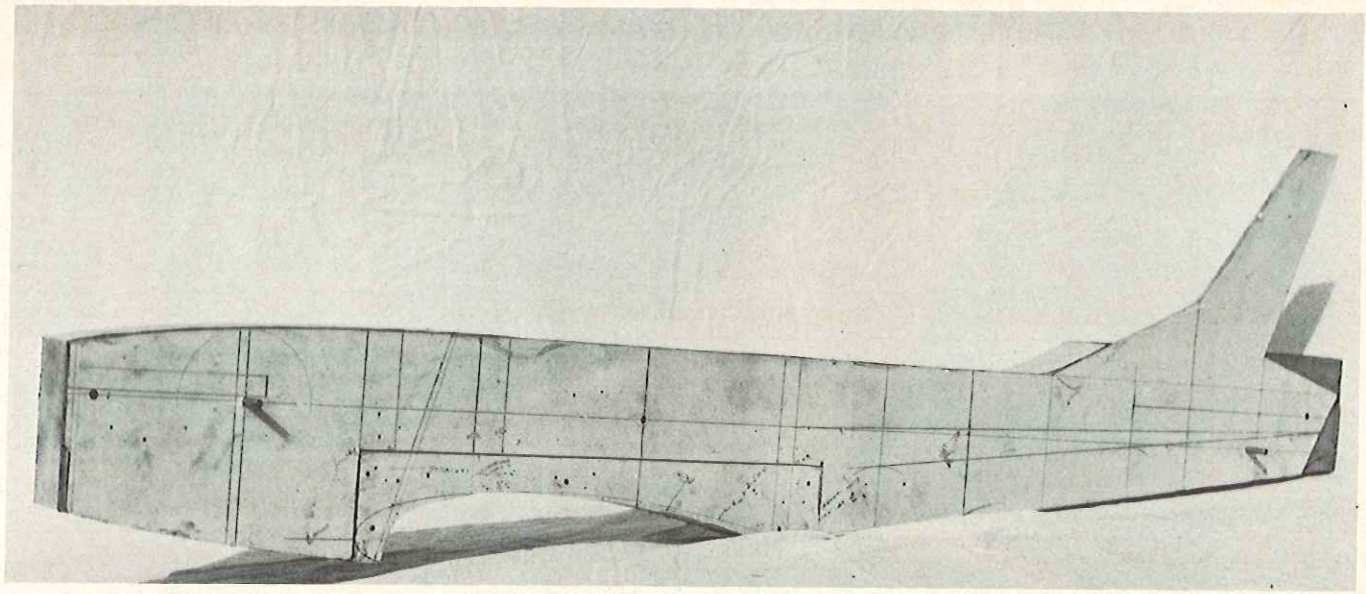


FIGURE 1: 1/8" ply pattern cemented to the soft pine block. Note indexing pins, thrust line, and station lines.

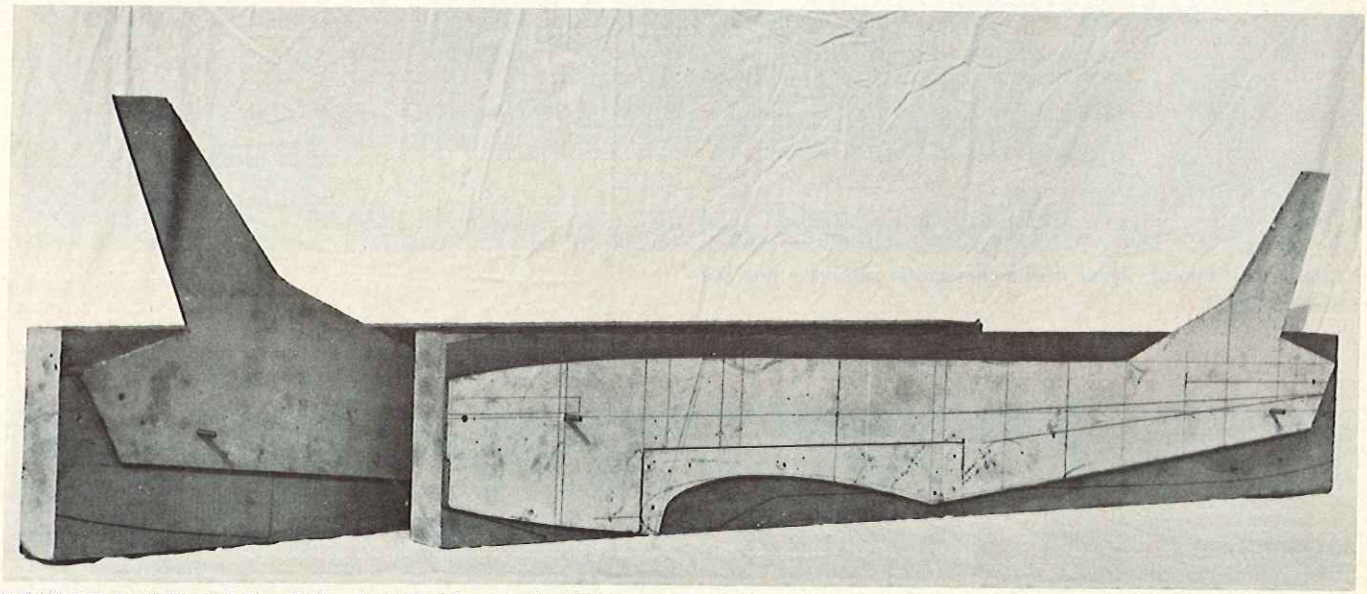


FIGURE 2: Both blank halves, left and right with vertical stabilizer patterns.

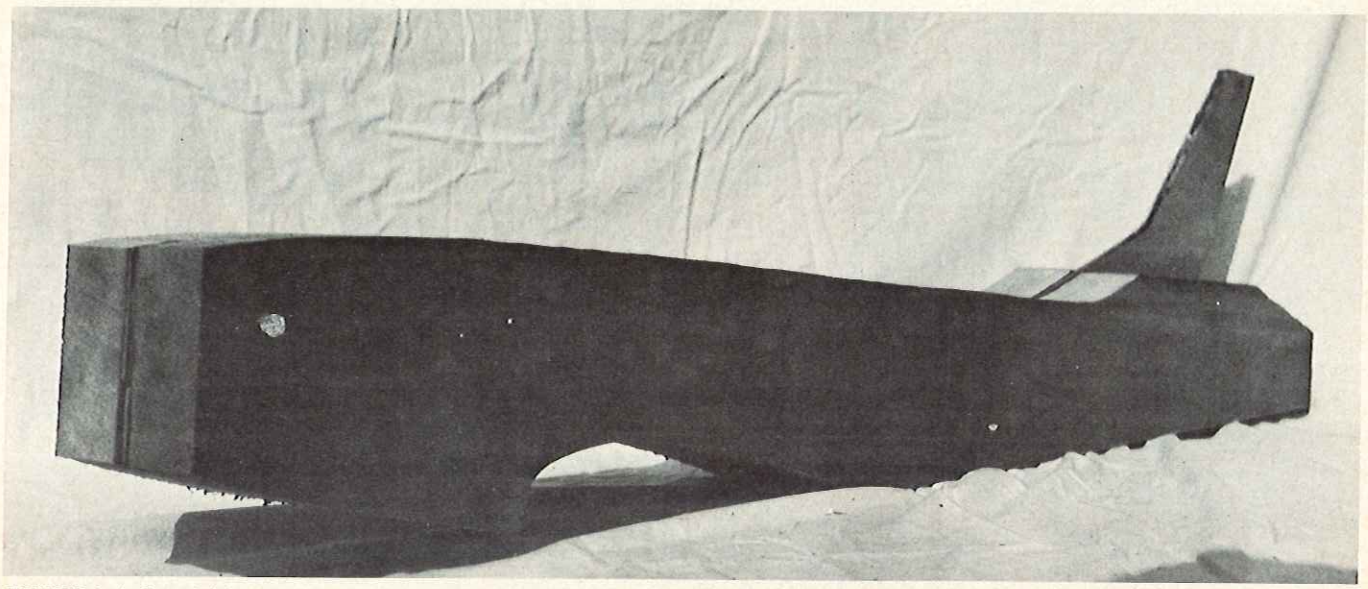


FIGURE 3: Left and right hand blanks pinned together almost ready for carving. Wing fillet and stabilizer fillets have to be added.

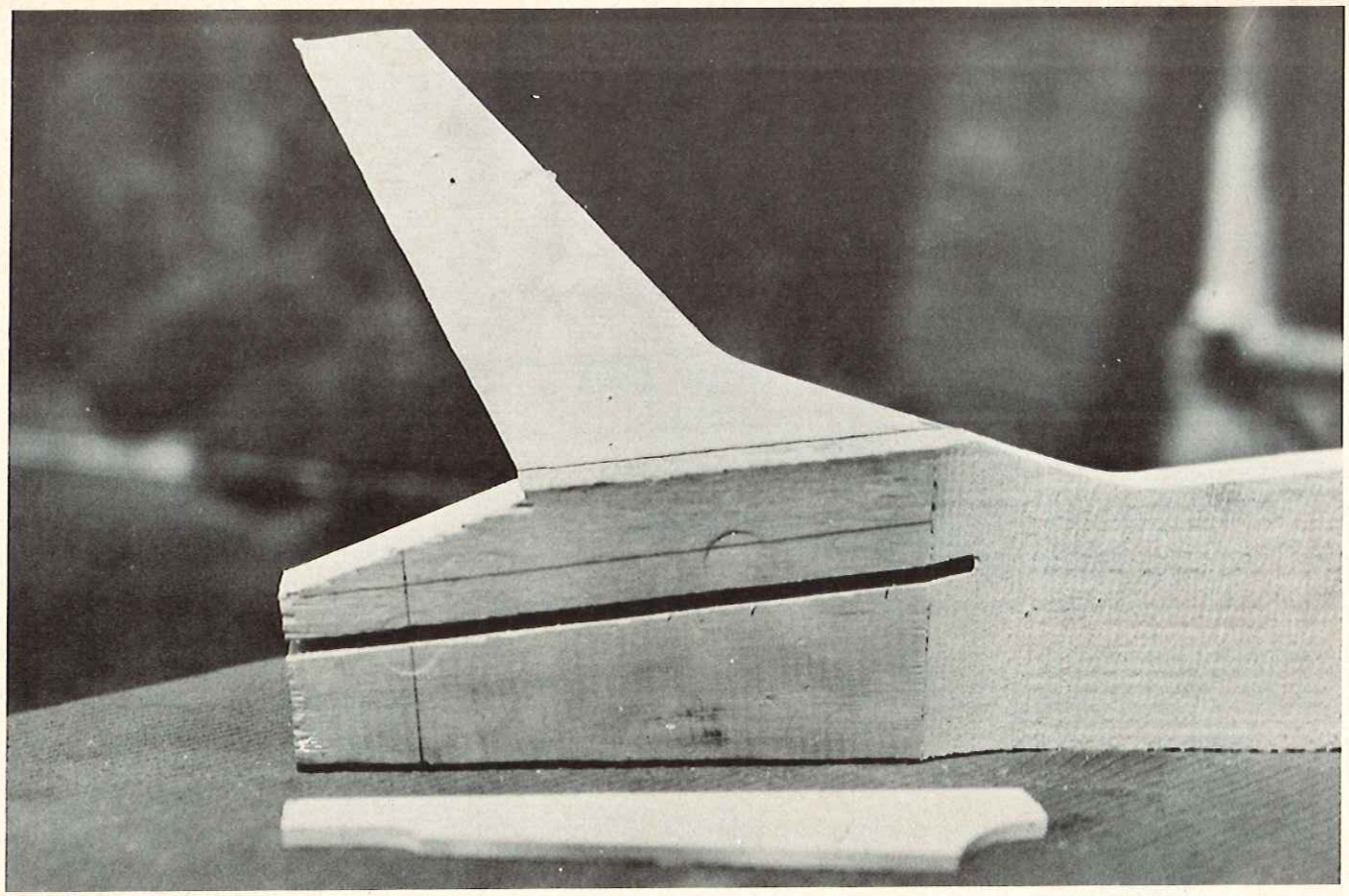
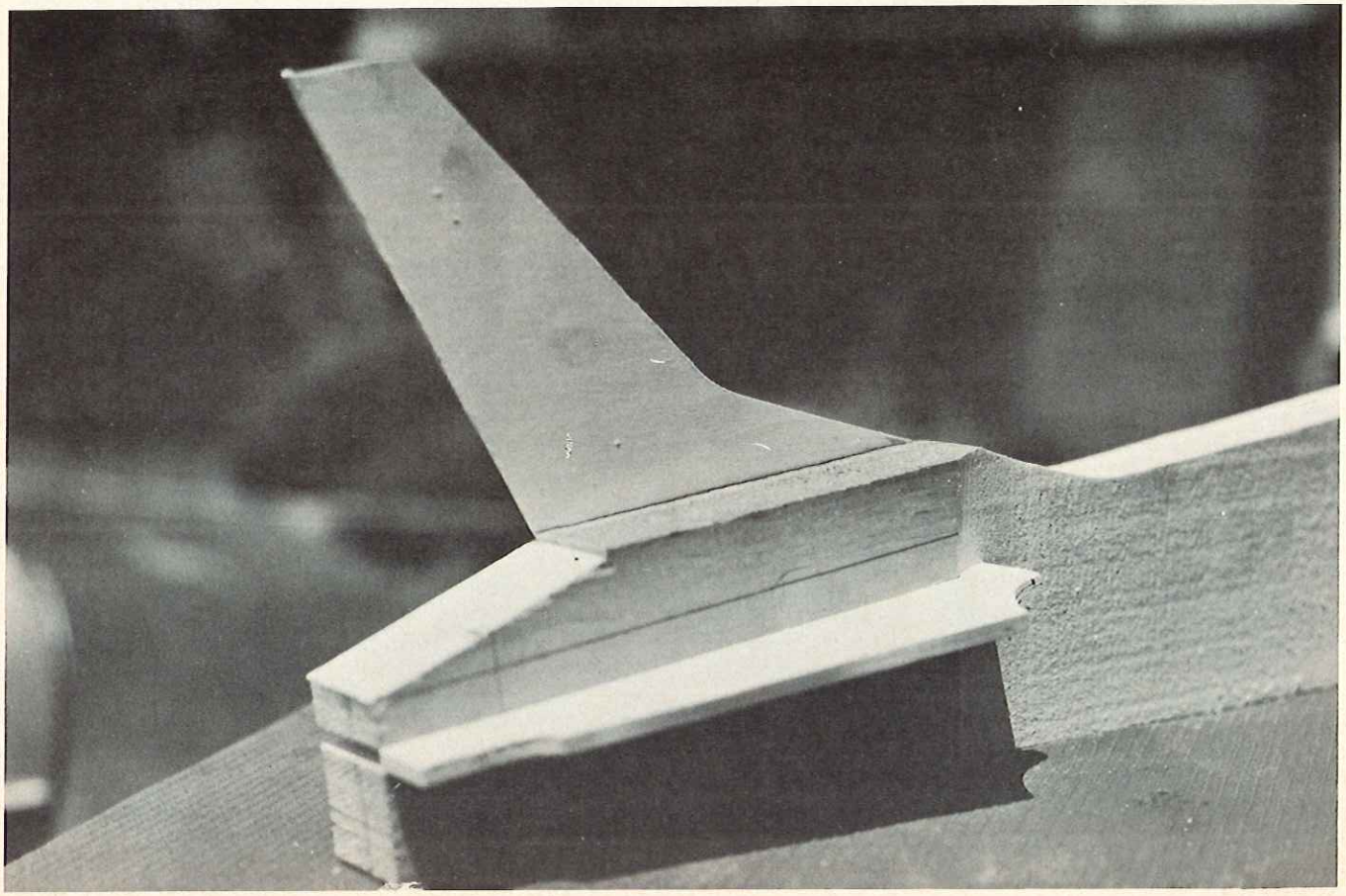


FIGURE 4: (Above) Detail of the horizontal stabilizer slot and contoured insert.

FIGURE 5: (Below) Partially installed horizontal stabilizer fillet insert. Vertical pine pieces have to be added to the vertical pattern.



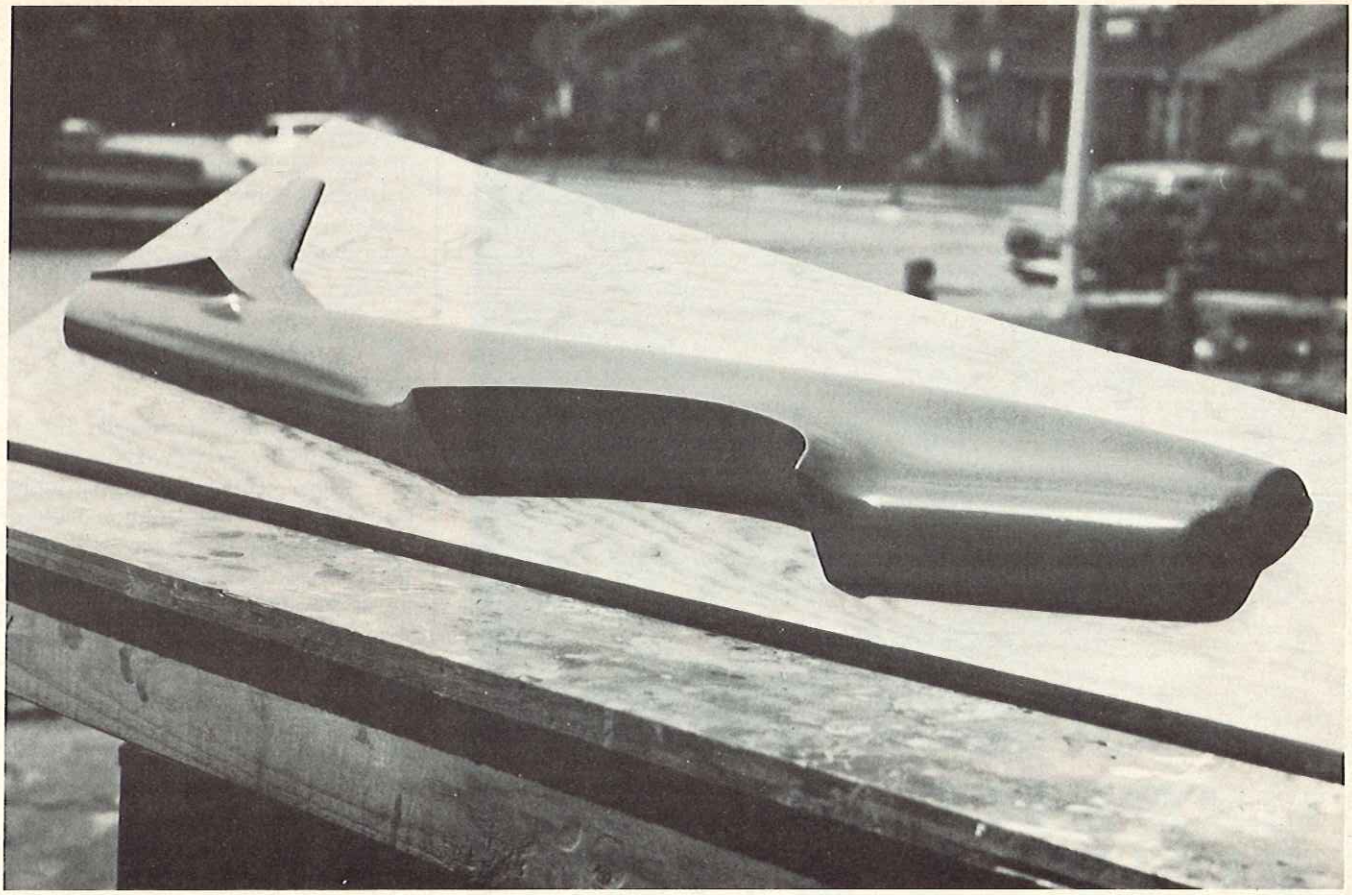
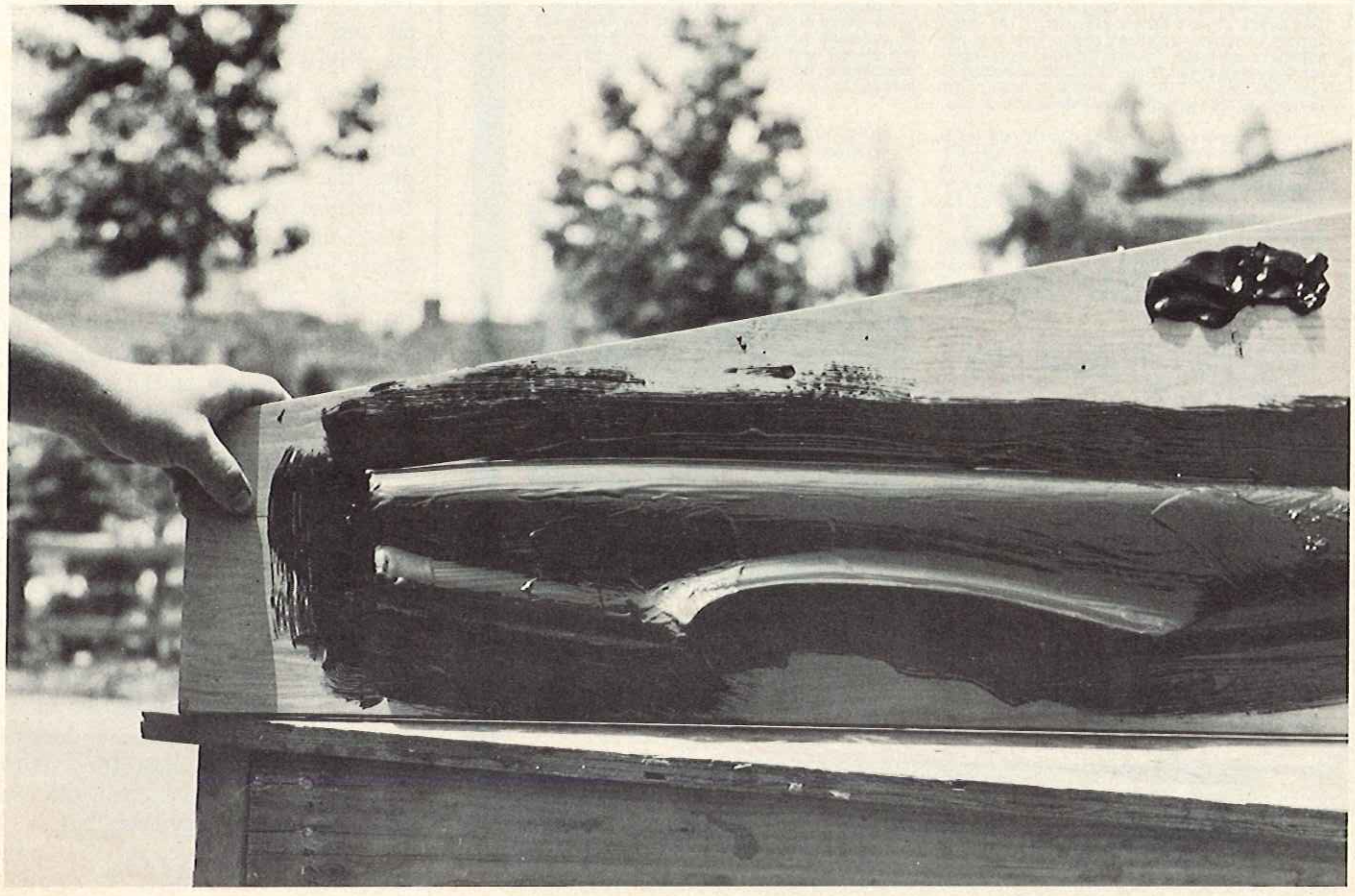


FIGURE 6: (Above) The completed and waxed male mold half mounted on base board, ready for first Gel coat.

FIGURE 7: (Below) The male mold with the Gel coat applied. Gel coat can be brushed or sprayed on the mold.



fuselage. Since the vertical stabilizer is constructed integrally with the fuselage, it's relationship to the centerline is built-in when the fuselage halves are properly joined. If the wing is constructed in a good jig, to prevent warpage, the end result is a true flying airplane. I have built about five swept wing models, including the wood prototypes, and each has only required one or two turns of the elevator control linkage in order to get "hands off" flight characteristics after the initial flight.

Where the incidence angles are off, or if there is an aerodynamic twist in the wing caused by construction errors, further compensation required in rudder, ailerons, or elevators makes the trim of the airplane a function of air speed. In fact, since lift varies as the square of the air speed, major corrections in airfoil sections can cause large differences in slow and high speed flight. However, that's enough drum beating. Let's get on to the procedure for the construction of the male mold.

Assuming that you have a good side view and top view of the fuselage, to scale, and enough sections to make templates of the shape at key points, we can start by rubber cementing a tracing, or print of the side profile on to a piece of 1/8" aircraft plywood. This is clamped to a matching piece of ply and 1/8" or 3/16" diameter holes are drilled through both pieces precisely on the thrust line. Two holes can be placed to span the motor mount area and two others spaced over the wing section and the horizontal stabilizer location. Dowel pins, either metal or wood, key the two sheets together. The profile is accurately cut out with the sheets pinned together. This includes the vertical stabilizer profile also. When accurately finished on the edges, each panel is cemented to a piece of sugar pine, or laminated block, that is sufficiently thick to include half of each fuselage section. In my case I used 2 x 6 x 42 inch blocks. Be sure you have right and left hand blocks at this stage. It's easy to wind up with two rights or two lefts at this point. Drill the indexing holes from the ply pattern deeper into the blocks. By using longer dowels both blocks are keyed together from the inside of the plug and the outside is clear for carving. The blocks are then individually profiled to match the plywood patterns. By tacking the trimmed sections to the top of the joined halves, the top view

can be traced on the upper surface and the profile is again cut to the pattern. At this stage the plug looks like the one shown in Figure 1. The station lines, thrust or reference line, and indexing pins locations are shown. Figure 2 shows both the right and left hand blocks with the 1/8" ply attached. The pattern, or profile, of the vertical stabilizer is clearly visible also. Fig. 3 shows the right and left hand blocks pinned together ready to glue the wing fillet blanks in place. The wing fillets are cut from a smaller piece of sugar pine and are glued to the blocks separately. This saves a lot of carving time since the amount of material to be removed from the main blocks is now a minimum.

At this point, the halves should be taken apart and saw slotted to take the insert for the horizontal stabilizer fillet as shown in Figure 4. The centerline of this insert accurately fixes the incidence angle of the stabilizer. Each half of the plug has its own ply insert. They are separate at the centerline. Since the center of this insert is the reference line for the horizontal stabilizer, all carving is done with respect to this reference. Figure 5 shows one insert partially installed. Enough wood is added to the fillet areas so that the contours can be carved later. Additional thin slabs of sugar pine, or what have you, should be added to the vertical patterns so that the vertical stabilizer can be carved. This completes the construction of the basic plug form.

While the blanks for this plug were made of one piece of sugar pine, at the later stages of carving, I felt that a laminate wood structure of pine/mahogany or pine/birch would have been a better aid in the later carving stages. Laminated structure aids in fairing the fuselage and the fillets for the glue lines form contour lines which clearly indicate deviations from faired contours. The only thing to watch for here is that one layer of wood is not much harder to carve than the other. This could cause some differences in carving. Direction of the wood grain is another consideration, even in placing the fillet additions.

Now comes the work, but it is also the creative part. The blanks can be roughly shaped together or as separate pieces. You can use a drawknife for large cuts, and wood removal, switching to chisels for the delicate cuts. Frequent checking with contour patterns is recommended, even at the

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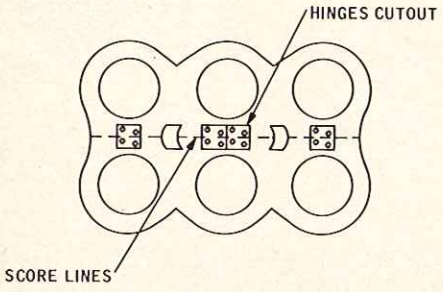
FOR WHAT IT'S WORTH

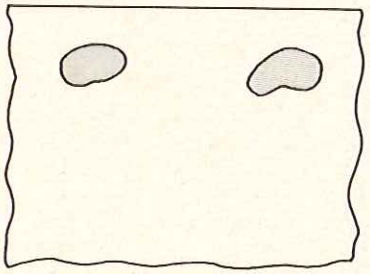
For sanding contoured fuselages and wing tips, try using Scotch Double-sided tape on the back of a dry sponge as a sanding block. This makes an easy-to-hold and flexible sanding pad, as suggested by Gregory Heifner, of Columbia, Missouri.

If you have a free evening, go to your balsa box and select a dozen or so scrap pieces of 1/16" balsa approximately 4" square. Place 1/3 of these on a piece of plate glass and coat the upturned surfaces with white glue. Now place another piece of balsa on each face cross grain, again coating the faces with white glue, then place the remaining balsa squares on the glued surfaces, making sure that the grain is at 90 degrees to the previous piece. Now place another piece of glass over the wood and put a heavy weight on top and leave overnight. The result of all this gluing and pieces of scrap will be 4" squares of 3/16" pieces of laminated balsa which are much stronger and a lot lighter than a corresponding piece of ¼" and ideal for use as bulkheads. This idea was submitted by Dennis Sher, of Transvaal, South Africa.

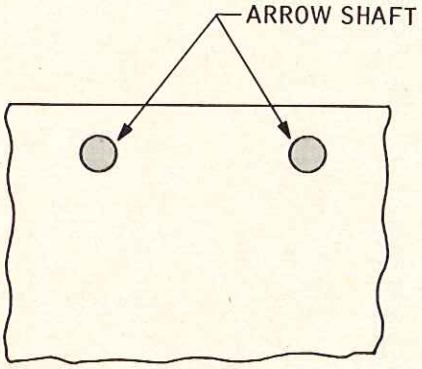
Laird W. Stanton, Monterey, California, believes that he has found an outstandingly free hinge material. This consists of the plastic webbing that holds together six packs of beer and soft drinks. The best one that Laird has found is that used by Pepsi Cola, inasmuch as it already has a score line in the plastic. Laird has been unable to break a hinge made of this material, to date. He mounts them just like a nylon hinge with epoxy and a couple of punched holes in each side.



Tim Gantick, of Plano, Texas, submitted the following idea for the installation of wing hold-down bolts. If you have experienced difficulty with your wing shifting due to the wing bolt holes routing out during flight, such as in drawing #1, simply take a small piece of scrap arrow shaft and epoxy it into the holes as in drawing #2.

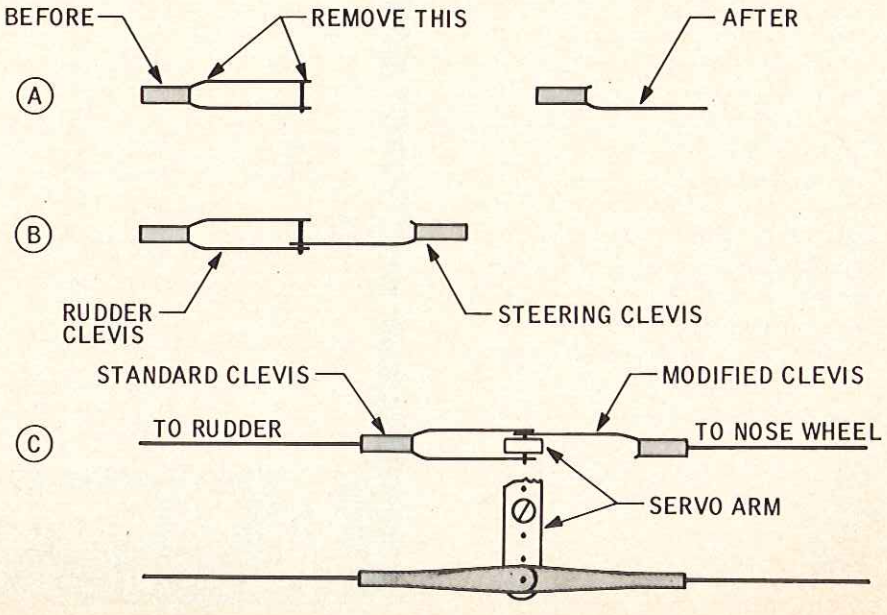


NO. 1



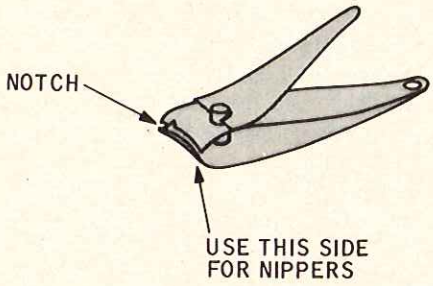
NO. 2

If you have experienced difficulty getting your nose wheel pushrod connected to your rotary output rudder servo, due to control clevis interference, try this method from George Radcliff, of Wintersville, Ohio. Take one Du-Bro clevis and cut the top portion off, as shown in Figure A. Now screw this on to the threaded coupler going to the servo and then hook it up between the clevis and the rudder cable as in Figure B, attaching this to the servo as in Figure C. This method has worked successfully in three aircraft with many flights on each plane.



James Fuller, of Roswell, New Mexico, submitted the drawing of a fingernail clipper that has been modified by filing a notch into one side. It is very useful when assembling small parts to a printed circuit board. It can also be used as a wire stripper by inserting the wire into the notched side, squeezing the wire with the clipper, and then pulling the wire from the

to page 70



FIBERGLASS MOLDS

from page 57

early stages, for the pine carves so easily that one can get carried away and take off too much. As you get close to the contour things should go slower. If a mistake is made, a correction can be made by cutting out more material and adding another lamination. One advantage of original design is that you can make a mistake at this stage and correct by refairing the sections. If you are duplicating in scale there is little room for error. The sections should be more precise for scale versions. The section patterns should be made from 1/32" or 1/16" sheet plywood. In tight fillet areas the thinner these are, the better the match. Only half of each section is required, for the halves should be checked separately on a bench or flat surface. In small fillet areas "eyeballing" is fairly accurate and can be used. I say this with a smile. In this plug the horizontal fillets were not the same. While not obvious, if one looks for a difference, it's there. This could be seen on the finished model. A little Epoxilite faired in the horizontal stabilizer and the final product looked good. For an exact reproduction, I highly recommend templates.

In Figures 1 and 2 it might be noted that the wing profile is a separate piece of plywood. This was done so that the incidence angle could be accurately adjusted to the thrust line. It was easier to cut the profile on a smaller piece of ply and was more accurate.

Having progressed to the sanding stage, the plug having only minor carving marks, rough sanding can begin with 50 or 60 grit garnet paper. It's a good idea to use flat sanding blocks for the straight sections and rounded sanding blocks for the fillet sections. The rounded blocks used for matching fillets produce more symmetrical fillets and they fair better. When the major roughness, and gouge marks, are smoothed out, switch to 100 grit garnet for finer shaping. For the final sanding 220 garnet is adequate. While the 220 finish is not as smooth as the final plug surface, it is adequate for applying the filler coat of sanding resin.

The polyester sanding resin can be applied with a brush. The brush marks, if any, are not important at this stage. The resin may be any standard polyester type. I used Plastic Mart PB35B. It sands quite easily, and to a smooth finish with 100 and 220 grit paper. It is mixed similar to the laminating resins and instructions are on the can. This coat can also be pigmented with polyester type color pigments. It makes the finish easier to see on the plug. When the surface is smooth, one or two coats of polyester coating resin can be applied. This coat produces a hard resin surface. While it doesn't sand as easily as the sanding resin, it can be sanded, rubbed out, and finished to a mirror-like surface. I have found that hand finishing at this stage is adequate, but this resin surface can be buffed with a soft wheel and rouge to obtain a better finish. Hand rubbing with DuPont rubbing compounds, red for coarse, white for fine, produced a mirror finish which was suitable for the final male mold surface.

When all the labor has been completed on the plug halves, each half is mounted on a good, flat ¾" plywood base. The same sanding resin and coating resin treatment should be given to the mount surfaces of these boards. The plug halves are then epoxied, or glued to these boards. Screws from the back side will pull the

plugs down onto the surface. At this point any small cracks between the mount board and the plug should be carefully filled with resin. Powdered glass is available to mix with coating resin to form a paste. This is applied in the seams. I didn't do this, in this plug and, as a result, some of the gel coat ran under the plug. When the mold was removed it chipped the edges from the critical trim surfaces. As the final fuselage is layed-up in the mold the mating edges are rough and require work that would not have been necessary if more care had been taken in the first place. Normally, when they are trimmed correctly the fuselage halves will match perfectly. This is the primary reason for using the 1/8" ply sheets on the plugs. These have been made as matching contours.

When the plugs are mounted, and filled along the seams, they should be waxed thoroughly with a good high temperature mold wax, such as Plastic Mart 1910, and buffed to a high gloss. A good waxed surface here will insure that good separation will occur when the female mold is removed from the plugs. Be sure to wax the surfaces well. On the last waxed surface rub the plug gently so as to leave sufficient wax to act as the parting agent. Figure 6 shows one half of the plug waxed and ready for the gel coating operation.

Now, we have finally arrived at the nerve shaking part of this whole operation – the application of the Gel Coat. This can either be sprayed or brushed on the plug. I prefer spraying because I feel that the chances of getting surface bubbles is far less than when using a brush. More care has to be used in brushing to avoid this air entrapment.

A "hot mix" of neutral Gel coat is made. It is worthwhile to add black polyester pigment before adding the hardener. This black background in the female mold will allow one to see entrapped air bubbles as the second layer is applied. After the pigment has been mixed, add in the hardener, 1 teaspoon of hardener per pint of Gel coat, at 70 degree F. For a hotter mix this can be 2 teaspoons per pint. Where there are extreme temperature differences refer to the instructions on the containers. As a general rule, 1 or 2 ounces of Gel coat will cover a square foot of mold surface. If it is thinned to spray, about a half a pint will cover, although I always mix more than this to be sure of coverage. If the Gel coat is brushed on don't thin it at all. When thinning, use polyester resin thinner and add the minimum amount necessary. Instructions on the can will undoubtedly warn against using too much.

The Gel coat is an air inhibited resin, which means it remains tacky and you don't have to hurry to apply the second coat of glass. When the Gel coat has hardened (1 to 2 hours) you can start the lay-up of the glass. Figure 7 shows the plug half with the first Gel coat applied. Believe me, it's hard to believe that this mess will ever come off the plug, but it really does.

The first coat over the Gel coat is a mixture of resin and chopped glass. This forms a paste of glass fibers that readily bonds to the Gel coat with virtually no air entrapment between. If glass cloth is used here, entrapment of air is almost assured. The final mold surface of Gel coat will easily rupture leaving a hole in the finished mold if there is an air bubble and the Gel coat is not supported. The same is true on laying-up the final fuselage. Use laminating resin for the remaining lay-ups. I used Plastic Mart PM15C. The resin is first mixed with the chopped glass and completely wetted. The hardener is then added. It is better to follow the mixing instructions on the can of resin observing the temperature to get the correct resin-hardener

ratio. This mix is applied over the Gel coat as a structural backing and care should be taken around the fillets and curves to be sure that no air is trapped. Air will appear as white areas against the black Gel coating. There is a mild toxic effect from the polyester resins, principally from the hardener, so you may wish to use rubber gloves. Have lots of acetone around for cleaning hands, or gloves, or brushes during all lay-ups. The rubber gloves tend to become quite slippery from the resin. The Gel coat layer and the second chopped glass layer really determines how well the finished mold will turn out. Care should be taken at these stages.

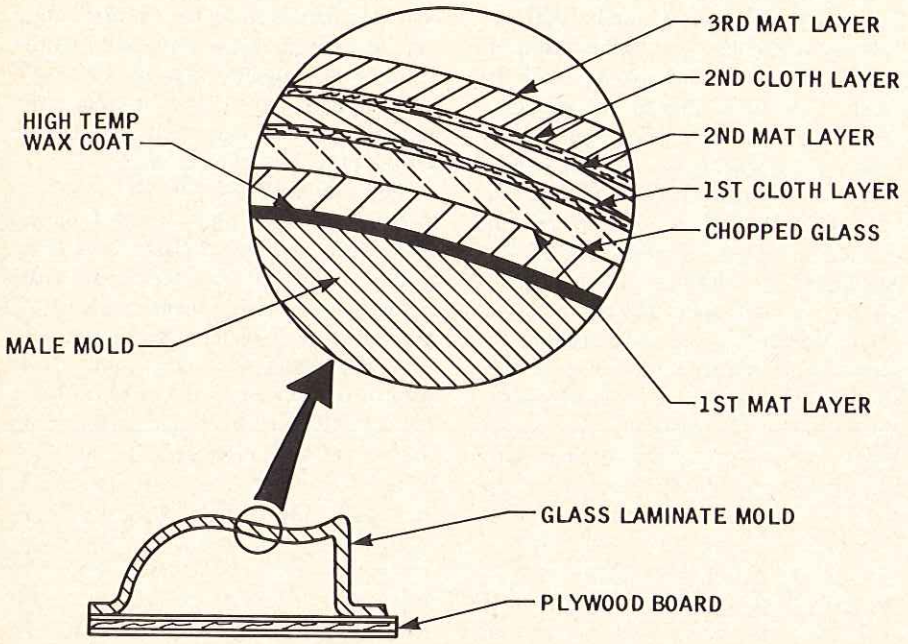


FIGURE 8: A cross-sectional view of the laminated mold structure of the female mold. The Gel coat and the second coat of chopped glass determine the quality of the mold.

Once the chopped glass layer has been applied to the mold you can start on the structural backing. This consists of alternate layers of glass mat and then glass cloth. The laminating resin mix for the mat can be brushed on or poured on. The mat should be cut into 2 x 4 to 2 x 10 inch strips and placed in an old cookie pan covered with Saran Wrap. The Saran Wrap makes the clean-up problem a little easier. A normal mix of resin and hardener is made and poured over the mat. When 6 or 8 pieces are saturated carefully start placing them over the chopped glass. The mat will thicken, when wet, to about twice it's dry thickness and with a small amount of manipulation can be made to conform to all the fillet areas nicely. Glass fabric takes more effort to make it conform to contours. After the mat has hardened repeat the same process only, this time, apply a layer of glass cloth to back up the mat layer. I generally use

2 ounce mat and 4 ounce glass for these layers. The weight of mat is per square foot and cloth per square yard, generally.

By the time the first mat/cloth layer is applied the sharp fillet areas are not as sharp. This makes the lay-up of the subsequent layers much easier. At this point, bubbles aren't critical, and you can get a little reckless. I have found that two layers of mat/cloth are sufficient to keep the mold stable if the halves are stored taped together. The mold is 3/8 to 1/2 inches thick. If you want to be sure, another layer never hurts. With a mold of this thickness I haven't found it necessary to stiffen the mold with conduit as is sometimes done. But I do strap the halves together securely when they are stored.

Having completed the lay-up of the mold it is better to set it aside overnight and allow it to cure. I have been told that you can take the mold off the plug as soon as it is cold. Dale Willoughby recommended one week curing, probably a month. In my molds I haven't found this to be critical since I don't sand the inner surface to improve the finish. All the finishing required has been with rubbing compounds.

When the cure time is complete, the female mold is ready for removal from the plug, and the moment of truth has arrived. If you've done all the homework and waxed the plug correctly, the female mold can be removed by gently prying between the mold flange and the base board. Pry gently, and uniformly, all around the flange. Usually there will be a popping sound as the mold breaks loose and you are home free. There is always the possibility that you missed waxing a small area, but rather than to describe the horrible experience I suggest you read the part, once again, about waxing the plug!

When the female mold is removed from the plug you could be somewhat disappointed. It isn't the mirror finish you had hoped for when you started. This is probably due to some of the wax finish adhering to the female mold surface. When the inside of the mold is rubbed out with coarse rubbing compound, then fine, the change will lighten even the most dejected heart. The interior of the mold has been transformed into the most beautiful, glass mirror surface you have ever seen. At least after all the work it seems that way.

This is what it's all about. The

finish you see in the mold is the finish of the glass fuselage to be made from the mold. About 80% of the work is complete. The final lay-up of the fuselage is much easier. The rewards are infinitely greater. Now you are a day away from the first complete glass fuselage. From here on you can make as many as you wish all identical to your first original.

TURN!

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speedy time of 1:29.8. He was also flying a K & B powered Miss Dara. Ron Russell of Van Nuys sneaked in ahead of the four way tie with 24 points to capture 7th place.

Probably the most impressive finish of the race was Chuck Hayes' 10th placing. Chuck, who is half of the Kraft-Hayes manufacturing team, hasn't flown in several years! Apparently you never lose that champions touch. He also graciously donated a case of their new wheels to the BARKS free raffle held for the pylon workers. Bob Seigelkoft also donated some of his excellent CB Spinners to the raffle pot which already included two ARF airplanes. The free raffle was the BARKS solution to an old problem – how do you convince a stunt pilot he should spend his weekend standing behind a barricade with airplanes travelling 150 mph right at him?

The Third Annual Bakersfield Air Races are now a part of the past, but never forgotten. Because a year will pass before the West Coast's best gather at Famoso for the Fourth Annual Meet . . . the race of races!

The following are the winners in the first fifteen places – their Name, Points and Fast Time respectively. BOB SMITH, 28 points, 1:27.9 (new world's record); CLARENCE NEUFELD, 28 points, 1:30.2; CHUCK SMITH, 27 points, 1:34.2; ROBERT BLEADON, 27 points, 1:37.9; BOB FRANCIS, 26 points, 1:37.7; TERRY PRATHER, 26 points, 1:32.5; RON RUSSELL, 24 points, 1:53.5; LARRY LEONARD, 23 points, 1:29.4; JOE MARTIN, 23 points, 1:39.4; CHUCK HAYES, 23 points, 1:39.8; JEFF BERTKEN, 23 points, 1:31; JOE VARTANIAN, 22 points, 1:35.7; WHIT STOCKWELL, 22 points, 1:37.2; DAN MCCAN, 22 points, 1:37.3; JOE FOSTER, 22 points, 1:39.5. □

FOR WHAT IT'S WORTH

from page 58

covering. The other side of the jaw is used for cutting component leads and will cut them flush with the solder land when used as a nipper.

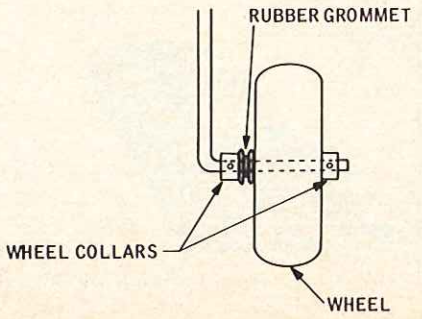
Bill Thienes, of Houston, Texas, uses a homemade air compressor with a volume tank for his finishing work and, initially, used a pressure switch. However, even with a 1/2 horsepower electric motor, the compressor would not start against more than 20 psi pressure. The cost of a compressor unloader valve was more money than the entire rig was worth. In lieu of an unloader valve, Bill used an inexpensive and adjustable relief valve in the volume tank. The motor-compressor runs continuously with the relief valve serving as the pressure regulator. The valve costs $2.00 at supply houses such as W.W. Grainger, Inc. The part number is No. 2X947. The valve is very easily adjusted for whatever pressure range is desired.

One of the major problems in cutting foam for model making has been the method used to hold the hot wire pattern in place. The solution, found by Dick Hansen, of Portland, Oregon, is to use double sided tissue, #465 manufactured by the 3M Company. It is a tissue and not a tape and is so listed in their catalog. It holds firmly and can be repositioned many times before the tissue has to be replaced on the pattern. Dick has not only used the tissue on all patterns to cut foam

floats, but also to bond any type of covering on float and wing cores. The tissue is much lighter and easier to work with than contact cement. It has been extensively tested and is highly recommended by the SkyKnights R/C Club, Inc., of Portland, Oregon.

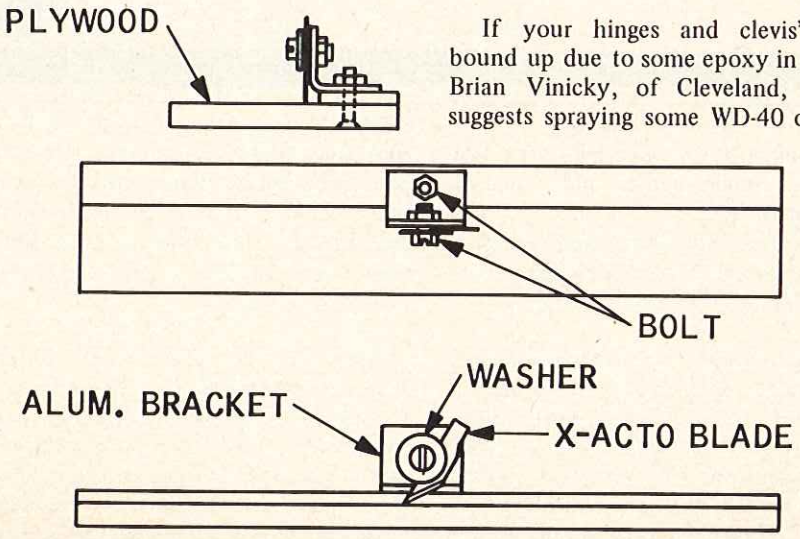
If you want to construct a simple and cheap replacement for an aileron bellcrank, try installing a 4-40 mounting screw in the wing. Fabricate your bellcrank from 1/8" plywood, drilling holes for the pushrods. Install a 4-40 blind nut at the pivot point in the bellcrank. Coat the plywood with a thin layer of epoxy glue for strength and screw the bellcrank onto the wing screw. You now have a low friction bellcrank at a minimum of cost. This idea was submitted by Stephen Pendo, of Barre, Vermont.

Here is an idea from Ralph Romans, of Halifax Co., Nova Scotia, Canada, for a simple and effective drag brake. This brake comes in handy on short runways. Simply take a rubber grommet that will fit over the wire strut and position the wheel as shown. On tricycle geared aircraft, use the grommet on the main wheels only. The amount of drag can be adjusted



with the wheel collar.

If you want to cut cap strips or planking strips, here's an old time method that is still used successfully, as suggested by Cliff Love, of Walnut Creek, California. It is simple and works like a charm. The washer clamps the X-Acto blade to the aluminum bracket. The slotted bracket is then bolted to the top of the rip fence. Simply push your sheets through the blades for accurate stripping.

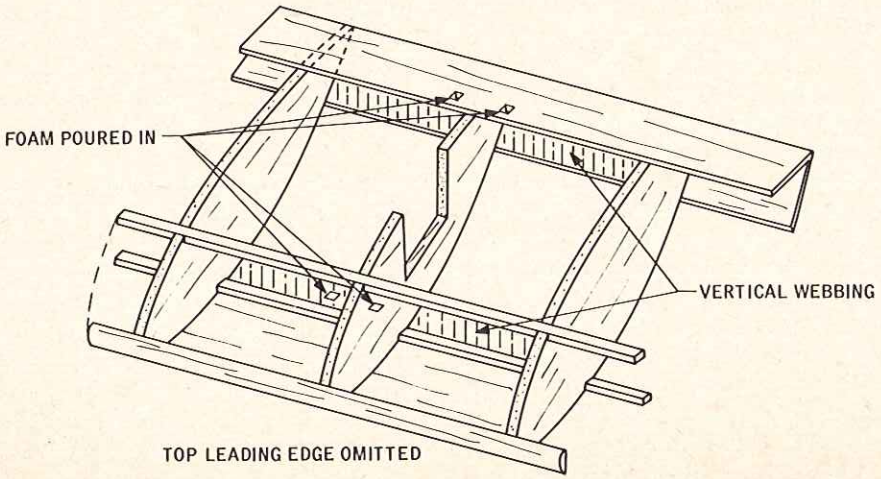


Dan Baun of Poland, Ohio, was having difficulty finding a mixture of paint that would look realistic on a scale pilot face such as a Williams Brothers pilot. Then, one day when his girlfriend was putting on her make-up, Dan got the idea of using regular make-up for the pilots complexion. This worked out extremely well and the best kind to use was found to be the thicker liquid cosmetic make-up. Apply it with a small brush, let dry, and it will dry flat and natural looking.

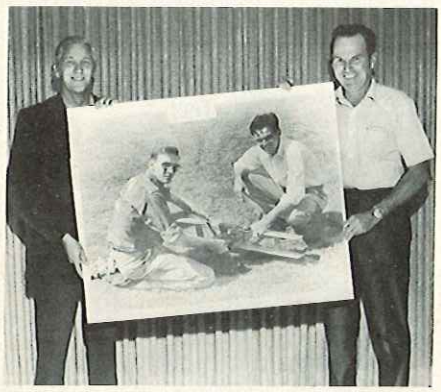
If your hinges and clevis's are bound up due to some epoxy in them, Brian Vinicky, of Cleveland, Ohio, suggests spraying some WD-40 on the

hinge or clevis and working it in by moving the part. The WD-40 will loosen all epoxy and lubricate the hinge clevis. This material is available at most hardware stores and larger department stores.

If your built-up wing has been completely constructed except for sanding and covering, try cutting small holes in the sheeting on either side of the center rib. Next, pour in small amounts of expandable foam in the holes until the volume enclosed by the top and bottom sheeting, leading edge, and vertical webbing, is completely filled with the foam material. This will give a very strong and light center section without having to use reinforcing tape. Howard Garrison, of Mehlville, Missouri, mentioned that he had used this method on several aircraft and has not had a wing break in the center section. In fact, some while ago, a large tree jumped in front of Howard's plane, which was traveling at full bore. The largest piece he could find was the wing center section complete with servo. The sketch should be self-explanatory. □



CUNNINGHAM ON R/C



25 years later and still playing with models. Helmer Johnson (l) and Edd Alexander (r).

A fair measure of personal pride must creep into this next report. In late April of this year the Fort Worth Thunderbirds put on what surely must rank as one of the all time best contests. It was a pattern and stand-off scale meet, but the thing that set it off from all of the other events of a similar nature was the manner in which all of the contestants were treated. It was a two day affair, and on Saturday the contestants were treated to a free lunch on the field, plus free soft drinks and free beer for all contestants, their families, mechanics, judges and their families, and almost anyone who walked up. Then on Saturday night all contestants and families, and contest workers and families were treated to a free Texas barbecue with all the trimmings and all of the free beer that could be consumed, plus a free chartered bus to take the contestants and families to the barbecue site, plus a free Dixie Land Band concert after dinner, plus a free demonstration of AMA President, Johnnie Clemmons fast lip.

Next day, back to the contest and another round of free drinks and lunch for all plus ten cases of Fox fuel purchased by the Thunderbirds to be given away plus many, many visits from the "Goodie Man" bringing lots of good stuff from area manufacturers. Then to top off a great day, an airshow that had been previously advertised to the public through TV, newspapers, a static display in one of the downtown banks, and lots of posters around the city. The crowd was estimated at more than 10,000. People everywhere, 500 free gliders given away to the kids made a great hit. Al Signorino brought Snoopy and his Dog House down from St. Louis to add his bit to the air show, and the cheer that went up from the crowd when Snoopy took to the air to combat the Red Baron was something to hear. Contestants came from all over the Southwest, with the farthest ranging from Phoenix, Arizona, to West Virginia, to Indiana. The second Annual Lone Star Aerobatic Convention was a great success, and if this was an example of what is to come next year, then, as a famous sage once said, "Let the good times roll."

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For the past several months I have been thinking about the direction future columns should take. The Reader Survey that I ran several issues ago was a help in formulating my ideas. Nothing seems to be quite so fragile as the words printed in a magazine a year ago, or five or six months ago, or for that matter, last month. Into this sport/hobby each month ventures a neophite, and all

that has gone before him as far as he is concerned, never was. History is primarily a record of man's mistakes, and those who study history, whatever the form, learn not to make the same mistakes, but to spend their time making new ones. Well, at least some do.

But, in this phase of endeavor we seem to be unable to clearly transmit history to the newcomer, so he blissfully goes ahead and makes the same mistakes that hundreds have made before him.

With this in mind, I wandered back and looked at some of the columns that I did in the past, and decided that a lot of this information is as helpful today as it was when it was first written. In the only Annual that RCM ever published (the 1966 Annual) I wrote a long article called The Instructor. Its primary purpose was to take a beginner through the trials of setting up a minimum shop, to buying equipment, to building an aircraft, THE INSTRUCTOR, and teaching himself how to fly. Don Dewey has now done much the same thing in a greatly expanded form in his new "Flight Training Course." I recommend this be **required reading for each newcomer.** In addition, I plan to review the Instructor series and to up-date it in the light of today's equipment.

Even though you may not be a rank newcomer to this sport you may still gain some benefit from reading the following series. If you have fifty flights under your thumbs, and five aircraft returned to kit form, you still don't really feel comfortable on the control sticks because your reactions have not become automatic. Let's hope that some of the ideas to follow will help preserve some of your birds for a little longer.

Equipment: Today, unlike six years ago, the selection of equipment is quite simple. You buy a proportional radio, in two, three, four, or more channels. I personally feel that if you are serious about your entry into modeling that you purchase at least a four channel rig. If you are going to fly only sailplanes, then a two or three channel will be the best buy, but if you are going to have the stuff that it takes to stay with this sport, then invest a little more money and go for a full four channels. Five and six are great if you plan to eventually go to flaps and retracts, so give some thought to what your long range goals are, and then invest. I will not advise you as to what brand of set to purchase because, in my view, any of the nationally advertised radios are a great buy. They all work, and work well. Of course, you hear of some lemons in each line, but you never hear of the hundreds of satisified customers. Pick out the set to purchase that seems to work best in your area. If it is Red Box county, buy Red Box; if it is Gold Box country, buy Gold Box; if it is Black Box or Blue Box, or Green, or whatever, then stick with these colors. Why? Simple. If you are one-of-a-kind flying a different colored transmitter than everyone else, each little problem will be magnified by those around you with an "I told you so" air. If you have a bit of a radio problem with the "standard" radio, nobody pays any attention to it, and you can relax. Another reason is for ultimate resale. If you are trying to sell a used Ford in Chevy country it's harder to get a good price. The same goes for used radios. The buyer of a used radio has an automatic suspicion of another type of radio than the ones that predominate at the local flying field.

When you purchase your new equipment, take care of it. It isn't a toy, it is a very precise piece of equipment, and should always be

treated with a great deal of care. Follow the manufacturers advice and charge the batteries for the amount of time specified. Just because these batteries are sealed up in a lovely plastic box doesn't automatically make them a thing of perfection. They can have a flaw, just as a new radio can have a component that does not function correctly. All of the equipment builders try their very best to provide you with a perfect piece of gear, but it is impossible to test out each and every component before it is assembled into your new radio. So, it is up to you to assure yourself that everything is working correctly before you cram the radio into the balsa belly of your dream ship. Not that the radio manufacturers wouldn't like to check out each component completely, but to do so would raise the cost of producing the radio way out of sight. As it is, they check each of the critical parts and then check the assembled radios before they ever leave the factory. But, it's your radio now, so care for it.

After charging the batteries fully, hook up all of the servos to the receiver and start playing with your set. Range check it to see that everything seems to be correct. Your instruction sheet will tell you how much range to expect on your rig. Cycle your radio through each control function until you get tired of playing with it. But, don't turn off the switches, let the radio sit for awhile and then go back and run through the controls again. Do this for about two hours, then turn everything off and recharge the batteries again. When you have done this for a couple of days, you will have a pretty good idea that everything is working as it is designed to.

While you are checking and "burning in" your new radio, and if you are pretty much of a beginner, take this time to practice your "dry flying." By this I mean that you should learn to play with your new toy. Find out what the control sticks feel like under your thumbs. Learn to find the position of the trim levers without looking at the transmitter case. Learn your control board. Try this: Set your receiver and servos up on a bench and turn on the switches. Grab your transmitter, settle back in an easy chair, turn on the transmitter, then the receiver. Lean back in the easy chair and picture yourself about to take your new bird down the runway for a take-off. Gee, what do you do? First, check around for any other aircraft that may be landing or taking off. Those on a landing approach have the right-of-way over those waiting to leave the ground. When all is clear, rev up the throttle a bit (that's advance the throttle stick a bit) and start to taxi out. Turn down wind and taxi to the end of the runway. Walk down there with your aircraft and stand behind it. Turn the airplane into the wing, and slowly advance the throttle and watch it begin to pick up speed. Hold a bit of right rudder to compensate for the effects of torque. As she begins to pick up speed ease back on the stick just a little to let her break ground and then, there you are, up in the wild blue yonder . . . at least in your mind. Practice flying around in your imagination for awhile, then set up for a landing, and bring her on down, taxi up to the pit area, kill the engine, then turn off the transmitter and receiver switches.

Fun, wasn't it? Do it again. Get yourself thoroughly familiar with the way the transmitter feels to you, and where each of the controls are located. Get your mind subconsciously working for you. All of this can be done quite easily while you are checking out your new radio, and in the peace and

quiet of your own home.

O.K., now that you have purchased a set of radio equipment, how about the airplane? Each and every one of us who starts to get interested in this sport sees himself pushing a beautiful scale bird around the air. Each of us wants to make a low pass across the field, multi engines howling, mock machine guns spewing, and a bomb or two dropped on the runway, just to prove that we can hit the target at a couple of hundred miles an hour. Come on, guys, be honest, that's really what lurks in the back of your minds, isn't it?

Forget it, Charlie; be practical. Learning to fly these little demons really isn't easy. And, therein lies the secret of the real fun behind this sport. If it were easy to do, it would not remain fun for long. Some people can become addicted to playing a sport that is very easy to master, such as putting around a miniature golf course. Sure, it's fun, and you and your girl friend, or wife, or the three of you, can have a fun evening just putting the ball around and come up with a pretty decent score for your round of 18. If fact, you can just about take anyone into this type of endeavor, and he will become pretty good at it in 30 minutes. 'Taint so with Radio Control! It's hard to do, demanding on your nerves and reflexes, and damaging to your pocketbook unless you prepare yourself carefully. So, the smart man will take his time, study the problem, and try to arrive at a solution that will suit him the best, and allow him the maximum enjoyment with a minimum of problems. Since none of us are this smart to start with, let's decide what engine we are going to buy and what size aircraft we are going to build.

For a long range investment, one of the big, powerful, snarling sixty size engines is a good bet. But, do you really need one like this to learn to fly? Do you really need to herd a monster around the sky that is quite capable of ripping up the heavens at eighty to a hundred miles an hour? No! Why not start with something a bit smaller, much less expensive and one that consumes much less fuel for each flight. Save the big birds for later, and start smaller. With today's light radio equipment the .15 to .19 airplane is a wonderful way to enter this sport. The engines will set you back only about twenty bucks, and an airplane somewhat the same amount. Of course, if you go the large engine route, you must buy a large aircraft for it, but if you do, for gosh sakes, don't buy a low wing pattern type aircraft. It won't last out the first several flights. Stick with a nice high, or shoulder wing aircraft. The Senior Falcon, the Ugly Stik, the Bridi/RCM Advanced Trainer, the J & J Trainer, are kits that come to mind. For magazine airplanes the Instructor for engines from .19 to .35, or the Professor for big engines will do a great job. Both are available from RCM's Plan Service. For the smaller engines, the Falcon .56 and the new Bridi/RCM Basic Trainer are just great. Don't fall into the trap of buying one of the new Quarter Midget kits on the market simply because they are for small engines. Sure, they make good Sunday Flying airplanes for the experienced pilot, but not worth a hoot for the rank beginner. There isn't any question about it, I am very partial to the smaller engine sizes as compared to the larger, for the beginners, and I'll tell you why. First, as I have mentioned, is the factor of cost. The engines are reasonably priced, the props can be plastic and therefore much longer lasting than wood, though don't ever, ever, ever, use a plastic on a big engine; you may lose an eye as a blade comes

sailing off at you! Fuel consumption is considerably lower, airplanes are cheaper and simpler to build. Flying speeds are much lower and, therefore, safer, and repairs can be made to crunched aircraft that in a large airplane would mean a trip to the trash can.

When you consider what aircraft to build, don't overlook the sailplanes. This, to me, is the very easiest type of aircraft to learn to fly. I don't mean that it is easy to become an expert at slope or thermal soaring, but I mean that just for simplicity of flying, it is pretty easy to get out of trouble before trouble reaches up and bites you in the seat of your pants. A good, simple, easy to build sailplane, not an eight or ten foot monster, but a nice clean six or seven foot sailplane can teach you a lot of the elements of flight, so that when you try powered flight for the first time you will have a feeling for what happens to the aircraft in the air when you push a lever on the transmitter. It still won't keep you from the problems of what to do with engine power when you make the transition, but it will help, and who knows, you may become hooked on silent flying and never even want to bang your finger on a prop.

While you are constructing your new aircraft, no matter what size you finally decided upon, and while you are laying back in your easy chair making flying noises in your throat while "dry flying" your creation in your mind, use this time to also break-in your new engine. Don't do it in your back yard unless you have the greatest neighbors in the world, or you live on a ranch in far West Texas. Too many people have learned to hate the sound of a model engine already. A product of too much ukie flying from every school yard with a snarling, unmuffled engine in years past has conditioned the average citizen to think of anything connected with model flying as being very objectional.

Lug a weighted box out to the flying field, or even better yet, to some remote part of the country and break-in your engine where you won't disturb a lot of people. Each engine needs to be broken-in, the degree and amount of running time varies from engine to engine, but, to get the best performance from your engine, and for the longest life, a successful break-in period should be allowed. Some engines can be broken-in while in the air, flying an airplane, provided that you run it very rich, and that you don't put a strain on the engine, but most need a good run-in on the ground first. If, for no other reason, than an unbroken-in engine may falter on take-off and die, thus causing your aircraft to die quite rapidly, too. It is a good idea not to use a muffler while breaking-in your engine, since the muffler tends to cause the engine to run hotter, thus entertaining the possibliity of ruining a new engine.

While breaking-in your new engine, be sure to run it very rich. This will keep it cooler while tied to the ground, and will insure that each of the parts gets adquate lubrication from the oil in the fuel. Use a fuel for breaking in that has at least 25% oil, and forget the nitro. Leave the hotter fuels for later when you have become a hot pilot.

Practice your "dry flying," burn in your radio, break-in your engine, and build your trainer aircraft this month. Next month we will take a look at a pre-flight checkout of your airplane, and then take it up for a flight. Use lots of epoxy glue on that aircraft you are building remembering that it just may contact the ground with something more than a gentle kiss.

Good luck, and let's get ready to go flying. □

SOLARFILM

from page 43

P.O. Box 122, Wheaton, Illinois 60187. This Super Shoe simply replaces the one that comes on your Sealectric iron and is more advantageous due to its double tapered tip, allowing you to get into corners such as the junction between the fin and the stabilizer much more easily than the standard shoe supplied with the Sealectric iron. The Robart Super Shoe has a generous coating of tough Teflon "S" and, given reasonable care, this coating will provide many years of service to you. A good idea is to cover the shoe of the iron with an infant's size 4 sock, which will protect the Teflon base as well as provide a scratch-free covering job.

Start covering your plane by doing the primary flight surfaces first, such as the rudder and elevator, in order to learn the techniques of applying this type of material. Place a sheet of Solarfilm on table and lay the part to be covered on it. Cut the panel of the covering material approximately 1" larger chordwise, and 2" or so longer than the length of the panel. Whenever you are covering wings, stabilizers, and elevators, it is recommended that the bottom be covered first.

Remove the Solarfilm from its backing sheet and lay it on the part to be covered, adhesive side down. If you cannot determine which side has the adhesive, touch the iron point to the edge of the material. The iron will stick only to the adhesive side. Be sure to allow at least ½" overlap all around. We do not recommend "wrapping" the material around the piece to be covered, but use one piece to cover each side.

Setting your Sealectric iron just under its hottest temperature setting, tack down all four sides or edges just as if you were doping down the edges of silkspan when covering an open structure. Since the material shrinks when heat is applied it takes a little patience to do this neatly. Try to gently tighten the material as you do this operation, getting it as smooth as possible, using your Sealectric iron. Remember, you are using one piece for the top surface and one piece for the bottom, which means that the two will have to overlap. For minimum seam visibility, cover the bottom surfaces first.

After you have one panel tacked down all around the edges, use your electric heat gun and a pad of several layers of Kleenex to shrink the material. This process is quite simple and is illustrated in the photographs. By applying heat to a small area at a time, that area will shrink up tight and it is immediately rubbed down with the pad of Kleenex so that the adhesive, which has become tacky from the applied heat, will adhere the material to the balsa surface. If the material is not adhered to the surface, no structural value of any kind will be gained from the covering material. By using the heat gun and the pad of Kleenex, instead of the iron, you will eliminate all scratches and mars that the iron would otherwise put on the surface of the Solarfilm. Do a small section at a time until you finish the section to be covered. When you get near the end of a sheeted surface, trapped air and heat will cause the material to bubble and you will have difficulty making it adhere. Simply prick the bubbles with the end of a pin, then reheat and rub down with the pad of Kleenex. Do this as often as necessary and you will obtain a smooth wrinkle-free surface. The pin holes will not show once the Solarfilm has been completely sealed to the wood. When you get to the

rounded tips of your rudder and elevator, and particularly on the compound curves of a wing tip, you will find out how really good Solarfilm is. By patiently heating, pulling, and reheating, it will go completely around compound curves and, miraculously, the adhesive (and color) does not separate from the mylar base even with repeated reheating. There is also very little bleed of the liquified adhesive. In fact, any of the adhesive that remains can be wiped off with alcohol or lacquer thinner. You can obtain a smoother wing tip by working the material further around than intended, then pulling slightly loose and trimming where originally planned, followed by sealing the edge down again.

By the way, when sealing overlapped edges with a small iron, use a little pressure. A tiny little bit of gooey adhesive that seeps out can later be removed with a rag dampened with dope or lacquer thinner. You will find that, by this method, seams are almost invisible. In order to trim overlapped materials so that the slightly visible seam will be straight, apply a straight guide line with ¼" wide masking tape on the unwanted portion of material. Use the masking tape line as a guide for trimming the material with a sharp #11 blade in your X-Acto knife. Pull on the masking tape and the unwanted material and tape will be removed leaving you with an absolutely straight seam.

After you have finished the rudder, elevator, etc., do the wing next. Even if you have a perfectly straight wing with no dihedral, no sweep or taper, use four pieces of Solarfilm: A top and a bottom piece for each wing half with a lap in the dihedral joint. The process for the wing is to cover the bottom panels first followed by the top panels overlapping on the trailing edge and making your overlap on the bottom side of the wing just past the front of the leading edge. Start the wing by tacking down from the center of the leading edge out to each end and from the center of the trailing edge out to each end then seal the material at the center section and at the last wing rib. Now, doing a small section at a time, follow the same procedure as previously outlined using the heat gun and Kleenex pad until all wrinkles have been removed from the wing covering, the covering is drum tight, and completely adhered to the ribs and leading and trailing edge sheeting. Now, trim off all excess material from the center section and leading and trailing edge leaving an overhang in material for the compound curve of the tip. To finish the tip, pull the excess material while applying the heat to the surface. The heat will make it pliable so that it may be pulled out over the tip using the point of the iron. Repeat this process every inch or so along the tip until the tip has been completely sealed, and then, and only then, use the electric heat gun and Kleenex pad to finish out all wrinkles in the Solarfilm. Be absolutely certain that you do not apply the heat from the heat gun too close to the material or you will melt a hole directly through it! If this happens, you can either patch the area or, alternately, completely remove the covering from the panel and start over again. It is much easier to apply too little heat, and increase the amount of time the heat is applied to a given area, than to try to come too close and apply too much heat at once, causing the material to pull away or, even worse, to melt completely through the material.

When covering the fuselage, do the bottom, then the top of the stabilizer with an overlap on the fuselage and rudder. As for the fuselage, you can do the top and bottom followed by the two sides or you can use two pieces

with a joint down the center on the top and the bottom of the fuselage covering the joint with a contrasting piece of trim material. If there is a hatch, cover separately as shown in the sketch, otherwise the edges would eventually lift. Inside the engine compartment where it could be almost impossible to do a neat job, finish (and fuel proof at the same time) with either matching color dope or Hobbypoxy paint. You will find that a combination of Hobbypoxy paint and AeroGloss dope will match the various colors of Solarfilm.

The final step is putting on the trim. We have found that the best way to do this is to use Solarfilm solvent and wipe a slight trace on the adhesive side of the Solarfilm. Lay it in position and press out any bubbles. This trim is simply applied directly over the Solarfilm base color and smoothed out until no bubbles remain. The edges can be sealed with a very light application of low heat from your small iron or a "distant" application of low heat from your electric heat gun and the Kleenex pad.

If you are applying large areas of trim, such as a contrasting color to a wing, it is easier to remove the base covering if you have a fully sheeted wing, then apply constrasting trim about ½" larger all the way around than the material that you have removed. If you do not cut the base color away on large areas, the air trapped between the two layers cannot escape and the result will be large bubbles and wrinkles.

If you are building a model that requires a canopy such as a low wing competition multi, the installation of the canopy can be a problem. Fit the canopy to the fuselage then trace the outline of the canopy on the Solarfilm with a sharp pencil. Cut away this material completely exposing the balsa wood and use the cut away portion as a pattern for cutting a smaller piece (1/16" smaller around the entire circumference of the material) and use this to cut out a inner piece from flat black Contact Shelf paper. Apply this to the balsa wood area from which you previously removed the solarfilm. This will leave a 1/16" bare balsa wood strip all the way around where the canopy will rest on the fuselage. Now you can apply Dupont Plastic Cement to adhere the canopy to the balsa wood or, alternately, a product called Bond, available at some craft shops, has been found to hold canopies as well as any adhesive yet

discovered. This is not an easy-to-find material, but with a little diligence you should be able to find it at a local craft shop.

Finally, you can apply a piece of tape or Solarfilm all around the perimeter of the canopy to give a nice clean trim to the canopy-fuselage joint. If, at anytime, you have to remove the applied covering, the adhesive residue can be removed from the balsa with a cloth moistened with acrylic lacquer thinner.

As with any other type of finish, the application of Solarfilm takes practice, patience, and more practice. Your final reward will come when you have applied this material to several aircraft, become completely familiar with its peculiarities, and have fully developed your application techniques. At that point, when another modeler walks up to you and asks you what you painted your model with, you will know that you have achieved the end result – a perfectly finished model that is easy to maintain and repair and can compare with the best applied paint finish with far less time and elbow grease required! □

BELL HUEY COBRA

from page 36

and the bracket. It all sounds complicated, but study the photos and drawings and you will see how simple it really is.

The nosegear is simply two pieces of music wire which are inserted into the tubing "guns." The wheel is attached to the wires by means of stamped fittings (available from Model Helicopters) using a 3mm screw as an axle. The nosegear is bent to bring the helicopter into a level position. Wheel collars installed over the tubing "guns" will squeeze the tubing sufficiently to hold the wire struts in place. (Ed note: Our "guns" were made with 5/32" O.D. tubing, requiring 1/8" wire gear. It is recommended that 3/16" O.D. tubing be used, with 5/32" wire). A training gear hardware package is available from Model Helicopters.

For convenience, we recommend using regular headed screws in the gear attaching collars rather than the Allen set screws. A small "wing," fabricated of 1/32" brass sheet, soldered into the slot will provide sufficient leverage to

tighten without tools. The shock mount nuts should also be modified or replaced with wing nuts.

At this point, you should have all of the individual parts of your Bell Huey Cobra completed. Now, let's proceed with the final assembly. If you have run in your engine and transmission as instructed, drain the oil and replace with fresh Hypoid 90 (35cc). Install the main rotor shaft into its coupling. Securely attach the main rotor mounting ring to the top of the pylon. Attach the training gear pylon bracket ¾" behind the main rotor mounting ring. Also attach the balls for the Missing Link attachment of the anti torque rod. Be certain that all hardware is securely tightened, as it is near impossible to reach once the engine plate is in place. We suggest a drop of Loctite on each nut.

The fuel tank, fuel shut-off valve and fill nipple are now added, and all fuel lines run. Now, carefully, insert the engine/clutch/transmission plate into the fuselage, hooking up the fuel line and guiding the main rotor shaft through the mounting ring on the pylon. Fasten with eight (8) M3 stop nuts, and tighten firmly. Again, Loctite is recommended. Incidentally, Loctite can generally be found in a motorcycle shop if your local hobby dealer doesn't stock it. You can now install your starting battery jack (or switch), muffler and needle valve.

At this point, it is a good idea to mount the landing gear to provide a working platform. Fit the aluminum drive shaft coupler to the tail rotor gear box (we filed flats on the shaft where the set screws would seat) then install the flexible drive shaft into the coupler and tighten the set screws. Liberally grease the drive shaft, and check that there is adequate grease in the rotor gear box. Carefully slide the drive shaft into its tube until the tail rotor gear box can be positioned in the fin. In this position, check that there is at least 1/16" clearance between the end of the flex shaft and the drive shaft on the transmission (if not, cut a small amount off of the flex shaft). Install the brass coupler between the transmission and the flexible shaft, but do not tighten the set screws. Insert the tail rotor pitch control shaft with its collars through the fin and the gear box and screw the gear box securely into the fin. The set screws at the transmission end of the drive shaft can

now be tightened.

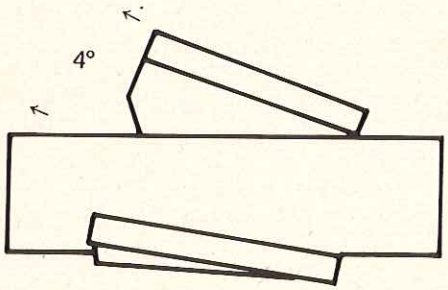
All of your radio equipment should now be packed into place and all pushrods installed. Turn on the transmitter and receiver, and neutralize all of the servos. Turn off the receiver and transmitter – in that order. Now shim up the fuselage or wheels until the main rotor shaft is vertical (a small horizontal/vertical level will be most helpful for these next steps). Slip the swash plate assembly onto the main rotor shaft, and adjust the Missing Links from the servos until the top of the swash plate is horizontal (level) both along the axis of the fuselage and across the fuselage. Slide the swash plate driver (05.01) onto the shaft and down tight against the swash plate and tighten to the shaft. Install the anti torque rod between the swash plate and the pylon.

Now, install the main rotor head assembly onto the main rotor shaft, and fasten with a 3mm socket head screw and stop nut. The main rotor blades must be removed in order to balance the stabilizer bar. Loosen the set screws on the collar and the steering arm so that the stabilizer bar can be slid back and forth through the rotor head. Adjust the bar in the rotor head until it is perfectly balanced (horizontal), then tighten the set screws (recheck the balance). Adjust the links on the steering control rod (06.07) between the swash plate and the steering arm, and through either of the large holes in the see-saw, until **both** stabilizer blades are level (0° – 0°).

The following alignments and balance are critical to successful performance, and should be carried out as carefully as possible. Begin by cutting a blade alignment gauge from 1/8" – 3/16" balsa, using the pattern provided. The instructions included with our kit called for twisting the blade see-saw to achieve the 4° incidence angle in the rotor blades. **This is in error! Under no circumstances should the see-saw be bent!** Correct blade incidence is obtained by twisting the thin steel **blade holders** to the correct angle. This can be accomplished in several ways. We shall describe only the simplest (requiring no special tools) and safest procedure.

With the blade holders fastened securely to the see-saw, grasp the overhanging end of one of the upper holders with a pair of needle nose pliers, with the pliers against the end of the see-saw. Now, carefully, twist the overhanging end clockwise until the end is at approximately a 4° angle to the see-saw end (twist across the see-saw). Try to maintain the rear edge of the blade holder (right side as viewed from the end) in a straight line, with the twist raising the front edge (left as viewed from the end) between the end of the see-saw and the first screw. When satisfied, grasp the lower blade holder about 1/8" from the end of the see-saw and twist clockwise, again making the bend in the front edge. Make these bends carefully, try-

ing to avoid bending too far – work a little at a time. When correctly twisted, the end of the see-saw and blade holder should look like this:



Twist the blade holders on the other end of the see-saw in the same manner. Now attach the completed rotor blades, using only the first and last M3 screws and nuts (omit the center screw). Using a large square, adjust one of the blades until its leading edge is perpendicular to the stabilizer bar. Now, very carefully, adjust the position of the other blade until the stabilizer bar is again sitting level. This assures balance along the axis of the rotor blade, and since the stabilizer bar alone was in balance, also insures proper alignment of the rotor blades to each other.

Since wood densities vary widely, it is also necessary to balance the blades along their length. This is most easily done by threading and epoxying a screw into the end of the lighter blade. The length of the screw can be determined by setting various length screws (#4 or #6) on top of the tip of the blade, until the blades hang level (horizontal). Once determined, drill into the ash portion of the end of the blade, and epoxy the screw into place. If you are lucky, the result will be a perfectly balanced set of rotor blades. However, most likely, the blade which was light is still on the light side (a few grains of sand on the tip will unbalance the system). The unbalance is probably due to the removed weight of the wood in the screw holes.

To bring the rotor into perfect balance, carefully drill holes into the heavy blade until they hang level with no external weights. These holes have an added effect, in that they cause the blade tip to whistle when rotated at high speed. A sharp ear can "hear" lift off rotor speed. True horizontal balance of the blades can be easily determined by setting your transmitter at the end of one blade, and extending the antenna until the top of the antenna is even with the underside of the blade. Now, without moving the Tx, rotate the blades until the opposite blade is at the antenna. If the blades are horizontal, the antenna should be even with the underside of this blade, also. If it is above the blade, the blade is heavy; if below, the blade is light. Place a small piece of tissue on one tip and notice the amount of movement – it doesn't take much! If the blades check within ¼", the balance is adequate, but the closer, the better!

With the entire main rotor system

in balance all that remains is the **final** adjustment of the blade incidence angles. Attach the blade alignment jig to the underside of one of the blades, 5-7/8" from the tip. By sighting across the stabilizer bar, the incidence of the blade can be checked. The top of the jig **must** be parallel with the stabilizer bar. The pre-twisting of the blade holders, if done carefully, should have positioned the blade incidence pretty close. Final adjustment is made by grasping the blade with an adjustable wrench, positioned between the blade mounting screws (in the area of the missing center screw) and tight against the inner screw. Grasp the see-saw with another wrench, and **carefully** twist the blade with respect to the see-saw until the top of the alignment jig is parallel to the stabilizer bar. When satisfied, repeat the operation for the other blade. Any misalignment of incidence angles will cause the blades to track different paths – so do the best job possible. Now install the missing center screws, completing the main rotor.

Once the main rotor and blade assembly has been properly aligned, it is a good idea to remove it from the shaft and set it aside, thereby preventing it from getting bumped, and possibly knocked out of alignment.

The completed tail rotor blades should also be balanced, this being done before assembly to the tail rotor. In order to check blade balance, insert a tight fitting shaft through the blade mounting hole in each blade. Slip a small rubber grommet against the outside of each blade, followed by a wheel collar on each end. Squeeze the blades together between the grommets and collars and tighten the collars. The blades can now be positioned opposite each other and the entire unit balanced on a prop balancer (razor blade type). When completed, remove the blades and install into the tail rotor blade holders, using M3 screws and locknuts. These screws should be tightened enough to firmly hold the blades in position, but still allow the blade to pivot without undo strain. Carefully adjust the pitch collars to provide 10° (use template) pitch in the blades.

You have now completed the assembly of your new Huey Cobra Helicopter! – But don't run out and try to fly it quite yet! The machine **must** be balanced. If you have followed instructions, your machine is now fully assembled, including radio equipment, linkages and training gear, with only

the main rotor head removed. Drive a good sized nail into the rafters (living room ceiling, or wherever) and tie a heavy cord (capable of supporting the helicopter) to it. Insert a bolt or rod through the hole in the top of the main rotor shaft, and suspend the helicopter on the cord. To be safe, fill the fuel tank, then add weight to the nose (most likely) or tail (doubtful) until the ship hangs just **slightly** nose down, which places the C.G. just ahead of the main rotor shaft. DO NOT ATTEMPT flight with the C.G. behind the shaft – even slightly! Nose weight can be added to the nosegear, or in the fuselage. Our procedure was to tape a small cup to the nose, just above where the weight was to be added. Number 9 shot (available at sporting goods stores) was then slowly poured into the cup until the desired balance was obtained. The radio battery pack was then removed from the nose. The shot was mixed with about 1/2 ounce of polyester resin, producing a glop not unlike mixed concrete. This was poured into the nose with the fuselage vertical. The weight was covered with a piece of glass cloth, and allowed to cure – presto, molded in place balance weight. (Ed. note: This system works well for any balancing requirement, since the small size lead shot packs very tightly, and a small amount of resin casts it into a solid mass, which will fill any cavity). Once the weight has cured, reinstall the battery pack, check the radio installation, and replace the main rotor.

Now comes what it's all about – time to add the breath of life to the big bird. It's been a long road, so don't blow it now; be sure your batteries are charged before proceeding! The tank is still full from balancing so let's go. For initial tests, calm weather is best, at least until some skill is acquired. There is really no need to run out in the boondocks for initial testing, **provided**, that you can test in the back yard without attracting an **uncontrollable** group of kids, adults, horses or what-have-you. Besides the guy **behind** the controls is, at this point, uncontrollable – and that's enough. At any rate, once you have picked the site for this historic event, assemble the following: Huey Cobra, transmitter, starter and battery, starting battery, two bricks, heavy cord, whatever tools you might need (?), if far from the shop, and a bottle of tranquilizers.

Tie a piece of heavy cord **securely** to each of the bricks, then leaving 4" – 6" slack, tie one to each of the main wheels – DO NOT omit this step unless you are experienced with model helicopters! Once the blades are turning, your power to resist the inevitable will be very weak – but the bricks WILL prevail! Turn on your transmitter, turn on your receiver, check and double check control responses. Set the throttle control to LOW THROTTLE. Attach the starting battery. Set the throttle control to LOW THROTTLE. If help is available, have someone hold the main rotor **by its center** to prevent rotation. Engage the starter motor into the starting belt, then recheck again for LOW THROTTLE. Set the transmitter away from the helicopter – beyond reach, once again check for **low throttle**. Starting requires laying beside the machine, opening the fuel valve and firing the starter motor. Once the engine is running, remove the starter and carefully raise the starting belt inside of the machine. Disconnect the starting battery, and carefully get out from under the blades. (Note: If the engine and transmission are accurately positioned, and the engine idle is

below 2500 rpm, the blades should not rotate). If the engine is idling a **little** high, or there is some misalignment, and the blades are rotating, lightly apply finger pressure to the clutch housing and stop the rotation before getting up. Once stopped you can reach up and hold the center of the rotor hub (assuming you are alone). If you cannot stop the blade rotation, close the fuel valve, stopping the engine. Locate and correct the problem – most likely misalignment between the engine and transmission.

Pick up the transmitter, being careful to maintain the throttle setting in LOW. Step behind the Cobra a few feet and very gradually increase the throttle, remembering that it takes time for this large rotor to pick up (or lose) speed. Advance a nitch – then wait, advance a little more then wait. Try to reach a setting where the helicopter is just below lift off speed. If it should accidentally lift, don't panic, simply reduce throttle **slightly** and let it settle. Sight across the blades from the rear and from the side. If all of the adjustments were made correctly, the main rotor blades should both track through the same path, creating a horizontal disc from both directions. Should one blade be tracking higher than the other, reduce the throttle, and using the colored checkers on the blade tips, determine which blade is running high. Correct by **very** slightly decreasing the incidence in this blade and recheck. Repeat until both blades track true.

Restart the engine, if necessary, and again bring the rotor speed up slowly to just below lift off. Now work the main rotor controls, observing the rotor's response to your commands. The rotor should tip in the direction that the control stick is moved, moving the tips up and down about 3". If the rotor does not follow the control stick, stop and recheck your servo hook-up. With the rotor turning at a speed just below lift off, you will be able to swing the tail by working the tail rotor pitch control. It is a good idea to run through a tank of fuel in this mode, becoming accustomed to the feel of the controls and observing the response. A very light touch on the controls is all that is required, but your reactions must be quick.

Now refuel, set the **throttle to low** and restart. This time gradually advance the throttle until the ship lifts (the lines attached to the main gear will eliminate any chance of damage, so relax). Stand behind the helicopter and always keep it pointed into any breeze. Concentrate on keeping the tail from rotating (stop and re-adjust the blade pitch if necessary). The tail should stabilize near the neutral position of the control lever. Work with the main rotor controls until you can position the Cobra without extreme pull on either line. When you think you have the feel of it, increase the lines to 12". Now begin working with the controls until you can predictably hold the Cobra about 6" from the ground without tightening either line for at least 10 – 15 seconds. This will take perserverence and practice. During this training period, use the trim levers to reach as closely as possible a neutral condition where the helicopter does not attempt to move in any direction (this must be done in calm air). Re-adjust linkages after each attempt until the best trim is reached.

By now, you should be ready to remove the lines and try free flight (Ed note: Free Flight?). Remember – it takes **time** for the main rotor to reach speed, and to slow down, so attack the throttle control slowly and gently, whether going up or down. **Under no**

circumstances should you allow your Cobra to climb more than three or four feet. At this altitude, even a complete panic retarding of the throttle will most likely result in no damage. As the Cobra lifts off, be ready for the tail to swing in either direction – don't let it. Also, expect it to try to fly in any direction, because it is setting on a bubble of air, and wants to slide off in any direction that you will let it. Flying a helicopter is not unlike trying to balance a marble on a rolling balloon. It takes patience, and it takes practice. It is a new art, and unless you are extremely lucky, there is no one to offer assistance. You must be your own teacher. It can be done, and you too, can do it. If you will remember the 4 foot altitude ceiling until you can reliably control the helicopter, it will still be flying when you have mastered it.

Between flights, check your hardware, tightening as required. Check that all bearings and moving surfaces are lubricated. Keep the bird clean inside as well as outside (low level flying sucks a lot of exhaust and dirt into the fuselage). Before starting, always double or triple check that the throttle is in **low** – starting in high is **extremely dangerous**, as it is nearly impossible to hang on to the Cobra with the blades turning at top rpm. (Ever grab a Cobra by the tail? Bad scene!) Always check the "spinning disc" created by the blades, before lift off, to assure that nothing is amiss from the last flight. If trouble occurs during flight, ease off the throttle and let the ship settle.

That's about it, the next move is up to you. There is no way in which words can describe the actual technique of flying, nor can they convey the feeling of excitement, achievement, and pride that comes with each new success.

R/C helicopters have come a long way. They are expensive, but then, so is that radio that you pack inside. They offer a challenge greater than any in the hobby. A thirty second controlled flight leaves you with much the same feeling as you might expect after completing a **perfect** FAI pattern!

Our thanks to Dale Willoughby and Model Helicopters, 14695 Candeda Place, Tustin, California 92680, for their gracious assistance in providing the prototype of the Bell Huey Cobra for this series of articles.

Good Luck and Happy Flying – VERTICALLY! □

der JAGER

from page 23

are made from 3/64" music wire with 1/8" brass tubing for clevises.

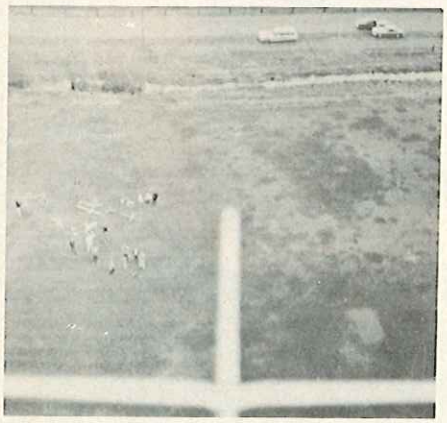
The finished plane met or exceeded my highest hopes. Balance was a bit of a problem since it was nose heavy. Absurd as this sounds, it was true, even with the battery pack located behind the seat back. It was finally resolved by adding 4 oz. of lead to the tail. The final weight was 10¾ pounds. This made my wing loading 25 oz./sq. ft. Better than a lot of pattern ships I know of.

CONCLUSIONS

I feel like I have built a real homebuilt. After all, the model has just about the same number of pieces - - - they are just smaller. As I said before, this model is not for the beginner. I build fast and can normally complete a pattern ship in two to three weeks. I estimated that der Jager would take about two months. Boy, was I wrong, it took thirteen months. This was the first full scale ship I have built and I forgot to take into account the times it was set aside due to discouragement, other projects, and just plain being tired of working on the same plane. It is very hard to keep your interest week after week and month after month. Now that it is flying I can look back and say that it was worth it, but it will be some time before I start another project like this.

For those of you who are interested in the full size aircraft, why not drop a line to Marshall White and ask him for the information packet on der Jager. (1863 West Street, Anaheim, California 92802.) He has several other planes in the works and they, too, will probably make good scale models. If I can be of any help to you just drop me a line at 707 North Acres Lane, Springhill, Louisiana 71075.

Fly low. □

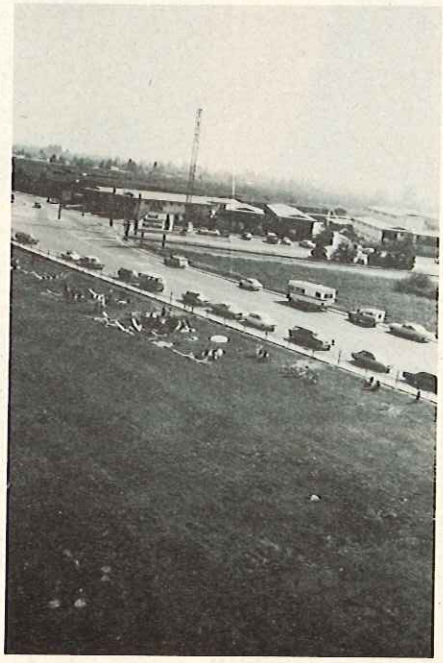


SUNDAY FLIER

from page 16

admit that it works quite well. And the cost is practically nothing – assuming you have the camera to begin with.

More sophisticated equipment will be appearing, you can be sure, as the radio control units keep on getting more reliable and more powerful. Servos with over five pounds thrust are already here. So bigger airplanes can be controlled – and carry larger payloads – thus leading us further into the situation in which we are flying



radio controlled, unmanned aircraft, which must share the available airspace with manned aircraft. And when that airspace becomes crowded, as it does in the control zones of airports, satisfactory safety measures must be established – and conformed with – if we are to live up to the claim of the Academy of Model Aeronautics that the model airplane sport enthusiasts are responsible, mature individuals.

So, like I said right at the start, we've got growing pains, and the sooner we find a cure for the ailments, rather than treating the symptoms, we'll have gone a long way towards obliterating the unwanted image of grown men playing with their toys. Even though, in one sense, there's nothing wrong with that, either. Some men amuse themselves with dune buggies, others with pleasure boats, others with full scale airplanes. And then some men amuse themselves with fashion models rather than airplane models.

Maybe some of the modelers do both, judging from some of the photos we get.

Judge for yourself. I ain't talkin'.

The following letter was received from Dremel Manufacturing Company.

Dear Mr. Willard:

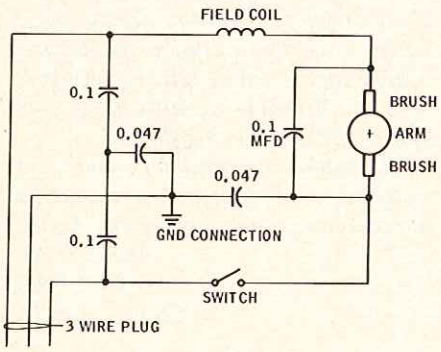
I have just finished reading your article in the July issue of R/C Modeler pertaining to the letter and schematic drawing which I sent you.

On examining the schematic, I noted a serious error in the ground symbol. I have included a copy of this page with a correction. The way it is

printed could cause a direct short circuit to ground.

Your readers should be notified of this as soon as possible.

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



RFI SUPPRESSION CIRCUIT FOR #2 MOTO-TOOL

ENGINE CLINIC

from page 12

rod at the wrist pin was worn out egg shaped and the wrist pin bore in the piston had excessive amount of wear.

Since then I have replaced the piston and pin and con rod. I am writing to you because my curiosity has gotten the better of me and I have this strange feeling it will happen again. It seems to me that the rod should be brass bushed.

Other than this problem, the engine is very reliable and quite powerful. Incidentally the new rod, pin and piston seemed quite sloppy too.

Sincerely,
Lou Ostrander
Midwest City, Oklahoma

Only two things cause excessive wear of the wrist pin holes in the piston and upper end of the con rod. Running the engine too lean so that it does not get adequate lubrication, or a fuel that does not contain adequate lubrication. As you are using Duke's fuel which contains 22% castor oil, you can rule out the fuel as this is plenty of lubrication for a broken-in engine. Evidently you have been running the engine a little leaner than you think, Lou. The evidence is there. As for bronze bushing the upper end of the rod and holes in the piston, this would naturally be desirable. However, it is an extra production step that would increase the cost of the engine so, in trying to keep the costs down, many manufacturers eliminate bushing these parts. As for the new parts fitting loosely, it is a little hard for me to comment, having never seen them. A correctly fit part will have some play. Too many fellows expect the parts to slip together like a watch. You must have enough clearance for lubrication. If you have the means of checking the fits, the big end of the con rod should be .0015 – .002" larger than the crank pin. The holes in the upper end of the rod and piston should be .001 plus or minus .0001. These figures are for a new engine. A used engine would naturally have greater clearance. But at no time would you want the fits to be tighter than this.

Dear Mr. Lee:

Your comments concerning engine cooling on fully cowled scale ships was most helpful. I have a Vic's 9' Taylorcraft. The scale air inlet directly in line with the cylinder head is inadequate. The air outlet is sufficient. The engine, Fox 74, is side-mounted. I have room for a heat sink back of the cylinder head. Are heat sinks advantageous? How could they be constructed? If weight was not a problem (especially

in the nose area) what are the possibilities of water cooling? Any suggestions how this could be accomplished?

I'm building a scale BD-5. If I install a .60 in the rear (it's a pusher) and the cylinder head exposed, will it overheat on idle? Would a heat sink take care of the idle situation? If the BD-5 is too tail heavy I would like to install the engine deep inside the fiberglass fuselage. The space inside the fuselage would be like a cavern and measure approximately 8" x 20" at the engine location. There would be plenty of air volume inside the fuselage, but no velocity during ground idle. Would a heat sink suffice?

The next problem is a prop shaft extension approximately 10" long. Could this be accomplished using an Octura universal joint at the engine plus 2 or 3 bearing points along the way? Any ideas on how this could be done?

Mr. Lee, I could ask enough questions to fill your column for the next six months. For example, since overheated engines are so often a problem, why don't engine manufacturers provide larger area cooling fins?

Hopefully my ignorance and your knowledge will provide your readers entertainment for the coming issues.

Yours Truly,
Robert Milne
Quebec, Canada

The purpose of a heat sink is to expose more surface to the air and dissipate the heat faster. Unless the heat sink is exposed to cooling air, it is going to be of little use. By enclosing it within the cowl it would be of little benefit. Bob, you seem to have missed the point of my whole article on cooling engines in scale models. If the scale opening is not large enough to cool the engine properly, then deviate from scale and make it so that it is. Otherwise be prepared for engine problems! As for water cooling – this would require a tank to hold the water supply, a pump to circulate the water, and a radiator to cool the water. I think you can see how impractical this would be.

As long as you expose the cylinder fins on your BD-5, the engine will get adequate cooling at idle. The propeller doesn't just blow air but moves it. As far as burying the engine inside the fuselage and using an extension shaft, I think you would be asking for a lot of problems. Cooling the engine at idle would be a major problem and a heat sink would not solve it. You would

also have problems with bearing lubrication, shaft whip, etc. Better to mount the engine in the tail conventionally. The wing on the BD-5 is far enough aft so that you have quite a bit of nose moment. With all radio gear, and the battery in particular, forward, you should be able to balance the ship without too much additional lead in the nose.

As for manufacturers using larger cooling fins on the engines, it isn't necessary if the engine is exposed to the air as intended. It is only the fellows who try to vary from the normal who have trouble. If the fin area was increased, then a properly mounted and cooled engine would run too cold. If an engine runs too cool it will not four cycle properly without dying and getting it to idle becomes a real problem as the glow plug goes out, etc. □

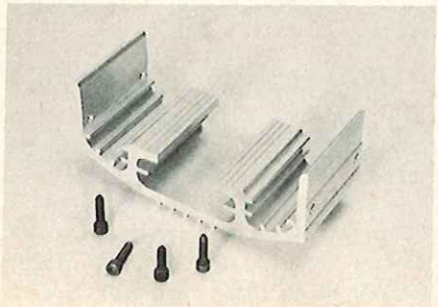
TAKE A LOOK AT THIS

from page 8

a first prize of $50.00 to the person who comes up with the best name describing this class of throw toys. (They can't go on simply calling them saucers, or throw toys or things.) They will also send a free gift of one Sling-A-Ring to every entrant and will respond appropriately to every entry.

*

Octura Models, P.O. Box 536, Park Ridge, Illinois 60068, announces the third in its series of high tensile strength extruded aluminum motor mounts for radio control model power boats. The Octura 5-55 motor mount is designed for .40 through .65 engines and weighs 7½ oz., with a width of 5". To facilitate its additional function as a heat sink for the crankcase, cooling fins or ribs have been incorporated, while to simplify fitting the mount to the engine being used, guide grooves are scribed on the undrilled motor mounting pads. Four 8-32 socket head screws are included for mounting the engine. Side mounting pads are drilled for 8-32 screws. Price of the Octura 5-55 extruded aluminum motor mount with four 8-32 socket head screws is $5.95 plus 50 cents postage and handling.



*

Klett Plastics, P.O. Box 21023, Fort Worth, Texas 76126, has produced their new Klett Nylon Hinges #RK3-15. These new hinges are heavier duty than the smaller Klett hinges and feature a .032 diameter hinge pin. Designed by the makers of the famous R-K Hinge, the original nylon hinge. RCM has Tested,

Approves and Recommends these hinges to your consideration.

*

JCM Specialties, Box 181, Medinah, Illinois 60157, has introduced three new items, the first of which is a Vibration Switch Saver which greatly decreases on/off switch malfunctions due to vibration and shock during the most strenuous flight conditions. When used as directed, the Switch Saver will prevent electrical and mechanical failure in your airborne switch. Complete hardware to shock mount existing switches includes a high quality, epoxy coated, brushed aluminum switch plate with peel-off protective paper; die cut sponge rubber gasket; a switch adaptor plate; and aircraft type elastic stop nuts and binder head bolts. The second item from JCM are Wheel Well Liners vacuum formed in lightweight, flat black, high impact styrene in four popular sizes: 2½", 2¾", 3", and 3¼" diameters with a 5" long strut section. Simply rough cut the wheel area and install the liner for that quick and easy professional looking job for your retract gear. The third item is a heavy duty Landing Gear Coupler, which is designed to extend or shorten 5/32" diameter landing gears. These split couplers are 1½" long and are pretinned for solder or silver solder. All items have been Tested, and are Approved and Recommended by R/C Modeler Magazine.

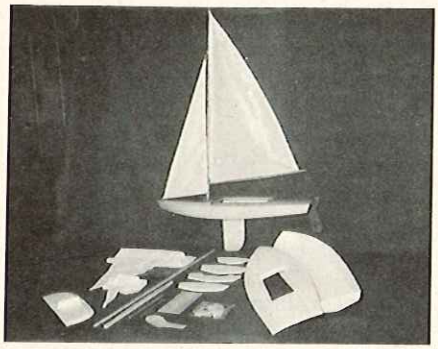
*

Hobby Lobby International, Route 3, Franklin Pike Circle, Brentwood, Tennessee 37027, has released their new 1972 Illustrated Catalog. Priced at $2.00, this is one of the finest hobby industry catalogs that we have seen produced to date. Perhaps we are prejudiced since they used one of RCM's cover photos for the cover of their catalog, but this book would be, in effect, a valuable reference for any modeler's shop. Hobby Lobby is renowned for their fast and prompt retail mail order service as well as providing Tennessee area residents and visitors with an attractive new sales office building in Brentwood, Tennessee.

*

Victor Model Products, P.O. Box 2168, Downey, California 90242, has released their first kit, the Snipe Type sailboat for the novice. The hull, deck, bulkheads, and keel are fabricated of hi-impact plastic, all parts being completely formed and trimmed. Light sanding is all that's required prior to

assembly. The model can easily be assembled in one evening. The kit includes finished Dacron sails, ballast, and all other parts required to complete the model. Step-by-step instructions include a typical R/C installation utilizing Orbit PS-3 type servos for rudder and sail trim. Reed equipment is also detailed for those wanting to find a use for their older radios. The price is $14.95 postpaid, and is available from Victor Model Products.



BoLink Industries, of Atlanta, Georgia, has announced plans to manufacture Jerobee racing accessories. The company released their first product recently: The "BoLink Brake." Designed to fit the Jerobee Comando, the brake retails for $5.00 and requires no difficult modifications making it easily installed in less than 15 minutes.

Another BoLink product available for the Jerobee cars is the "BoLink Enduro Tank," a 1 oz. side mounted tank complete with mounting strap and wooden tank aligning platform – retail is $3.00.

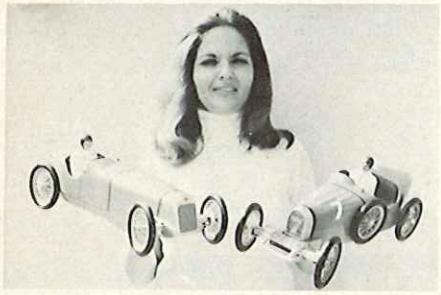
One of BoLinks "mail order only" products is their "Custom Tuned Jerobee Race Car." Completely assembled and tuned with all the latest goodies, enduro tank, BoLink brake, and spoiler kit. Retail price approximately $100.00.

Other accessories are on the drawing board and some already in the works. Anyone interested in BoLink parts should write: BoLink Industries, Box 80653, Atlanta, Georgia 30341.

*

The 1/8" scale model of a 1927 Grand Prix winning Delage racing car which was designed for radio control or display, has been added to the C & F line of classic car kits.

The kit includes aluminum chassis, steel rear axle, steerable front suspension, bull gear, five tough molded wire wheels, simulated rubber tires, vacuum formed car body, and a vacuum formed driver body with steering wheel.



Priced at $34.95, this kit is now available by mail order or through your dealer. Write to C & F direct at 1047 Cheyenne Street, Costa Mesa, California 92626.

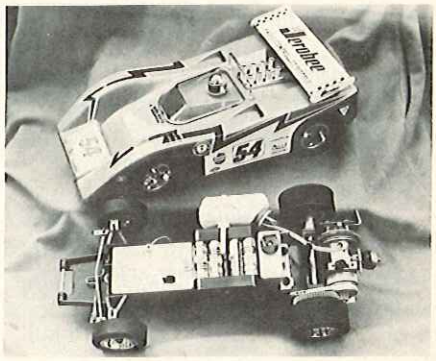
*

William Dixon Company, 750 Washington Ave., Carlstadt, New Jersey 07072, manufacturers and suppliers of precision tools since 1868, with main offices in Carlstadt, New Jersey, has introduced a mini-sized twist drill merchandiser indexing a complete selection of 31 carbon steel drills, numbers 50 to 80. Drills are packaged one dozen of a size to a vial. Designed to hang on wall behind selling counter, the Select-a-Drill Merchandiser is compact (8½" x 15"), keeps inventory orderly and accessible, creates impulse sales, and saves valuable selling time. Merchandiser No. H-5000.

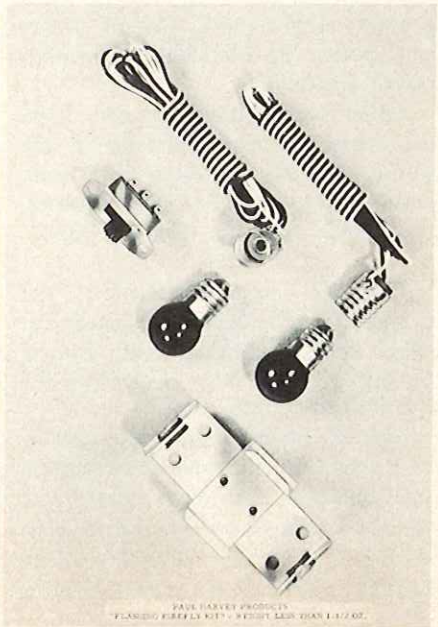
*

Now available, from Jerobee Industries Inc., 120702A N.E. 124th St., Kirkland, Washington 98033, is the most authentic looking racer ever produced in any scale. An exact likeness of the 8-B McLaren owned by Auto World and campaigned on the Can Am circuit by Oscar Koveleski and Tony Adamowitz. Every detail down to the tiny lightning strip are included on the decal sheet. (Body, with wing and decal sheet available separately – Part No. 305 – $6.95.

In addition to looks, the new car has many new race features. An aerodynamic wing – brass front wheel bushings – chrome front and rear mag wheels – velvet touch brake – high compression glow head – heat sink for tank – 1 oz. LeMans fuel tank – trued rear race tires.



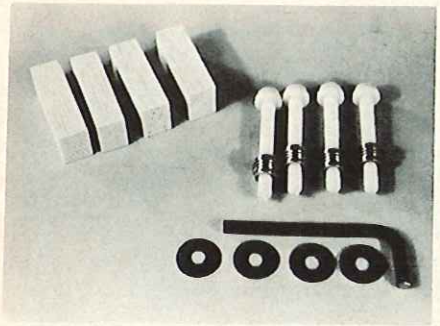
Paul Harvey Products, Inc., 1035 Park Ave., River Forest, Illinois, has



produced their Firefly Lights. These are flashing wing tip lights with a red light for the left wing tip and a green light for the right for maximum visibility from ahead and below. These running lights help beginners know whether they are coming or going and experienced fliers can enjoy early dusk flying. Complete kit is available from Paul Harvey Products and includes lights, sockets, switch and battery case for one "C" sized alkaline energizer which should keep the lights flashing for four hours of flying time without recharging.

*

Wing Manufacturing, Box 33, Crystal Lake, Illinois 60014, has produced a highly innovative Wing Installation Kit. Priced at $2.00 and consisting of 17 individual pieces, this wing hold-down kit includes four low-profile nylon wing bolts which utilizes an Allen wrench included in the kit to eliminate scratching and dinging your wing with a conventional screwdriver. The kit also includes four large nylon washers, four wood mounting blocks, four steel Speed inserts plus one hex wrench. All that is necessary to install the Wing Installation Kit is to glue the block to the side of the fuselage at the wing saddle, then install the wing and push the nylon wing bolt through the hole in the wing until it hits the block. Mark the center of this point and drill a 3/8" hole through the hardwood block. Finally, screw in the Speed insert and then simply tighten down the nylon wing bolts with the hex wrench. Tested, Approved and Recommended by RCM.



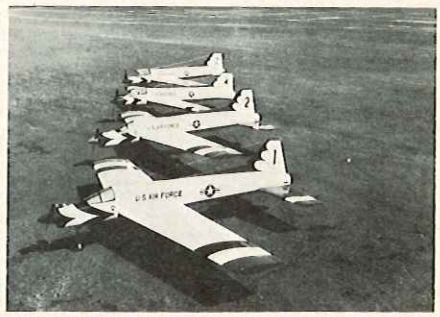
Banner Model Company, 218 West Palm Ave., Burbank, California, has a new way to put wheels on axles. Gone are wheel collars with set screws or soldering of washers as wheel retainers. All that is required with the new Banner "EZ-ON" Streamlite Aluminum Hub Wheel is to simply smooth the end of the axle and push the wheel on. The wheel will remain in place although it can be removed and reinstalled any number of times. These are long lasting, true balloon type treaded sponge tires with authentic appearance in sizes from 1" to 3". The wheels consist of an aluminum hub, a nylon keeper and a nylon lock ring. They are available with either Cycolac® molded hubs or machined aluminum hubs, all with an "EZ-ON" method of installing. Banner also has oil tempered steel axle shafts in three sizes, 3/32", 1/2", and 5/32" diameters designed for dural aluminum gear to fit their "EZ-ON" wheels. These wheels are completely unique

for model aircraft usage and have been Tested and are Approved and Recommended by RCM.

*

Super-Pro – EK-logictrol has replaced its Pro series this year with the Super-Pro, a new unit for serious-minded competition flyers. The Super-Pro features 14 tuned circuits with triple-tuned RF stage, followed by a dual conversion mixer section and a narrow band, solid state filter block. The Super-Pro also features the new precision I/C servo amplifier and a 6-bit shift register. Six controls are standard, as are the precision control sticks with adjustable tension. List price is $399.95 for the two-stick Super-Pro and $419.95 for the single-stick Super-Pro. For details, write: EK-logictrol, 3233 W. Euless Blvd., Hurst, Texas 76053.

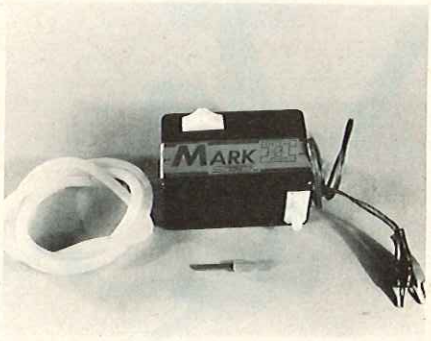
Fibre Foam Products, 6370 East 22nd Street, Tucson, Arizona 85710, has added the Vulcan Mark II fiberglass pattern ship to their kit line. This kit is priced at $79.95. The second addition to the Fibre Foam line is a deluxe balsa scale kit of the D.H. Tiger Moth priced at $64.95.



One of the most interesting catalogs we have seen is the Edmund Scientific Company, 701 Edscorp Building, Barrington, New Jersey 08007. It is a catalog of ecological and physical science, optical, scientific, hobby and lighting effects equipment and accessories. This 147 page catalog is jam packed full of interesting and unique items for the craftsman and hobbyist. We invite you to write Edmund for a copy of this catalog which you will find invaluable in your shop.

*

The new Mark II Electric Fuel Pump from Sonic-Tronics, Inc., 8017 Craig St., Philadelphia, Pennsylvania 19136, has to be seen and used to be believed. This unit is designed to operate from a 1½ to a 6 volt battery with the optimum being between 2½ and 4½ volts. The unit is guaranteed by Sonic-Tronics for 2 years from the date of purchase provided the unit is registered by the owner and the registration is mailed within 3 days of the purchase date. All we can tell you about this pump is that it has been thoroughly Tested and is Approved and Recommended by RCM as the finest electric fuel pump we have used to date.



LETTERS

from page 6

aircraft fly around us. They share the same sky as we do and should be aware of the idea of sharing.

Today I was flying my glider from a college athletic field in Scottsdale. This was the "Plank," which was featured in RCM, with several one hour thermal flights to its credit. One of its great features is its ability to dive out of heavy thermals which are common here. A Cessna "150" soon came flying over doing tight turns at low altitudes over nearby houses and school buildings. Pretty soon he spotted my plane and came over to have a look. The Cessna seemed terribly close as he came by the first pass and when he came by for another look I put my plane in a steep dive to avert an accident. The Cessna even tried to follow me. However, the wing finally came off my plane and the pieces came down and turned my Kraft radio back into parts. The other pilot wagged his wings as if to say, "Sorry," and left. Unfortunately he is not as sorry as I am.

Several people at the field expressed their feelings about the full-size pilot in colorful terms, but no one could see his plane's I.D. number. Too

bad they (aircraft) don't have to identify themselves anymore!

Conclusions? Why don't full-size aircraft have I.D. numbers beneath their wings anymore? The Cessna was way below 500 ft. altitude, but none of us could read his number. I think this would help identify some of the incompetents who fly in light planes at 400 feet over homes.

Thanks,
John Patton
Phoenix, Arizona

KUDOS FOR A MANUFACTURER

Dear Sir:

Getting started in modeling has been a wonderful experience to me. I was introduced to flying by Bill Moore about five months ago. Bill has used Fox motors for power for some 20 years and in our flying together, he has convinced me that I should own a Fox engine (or more).

November 19, 1971, I wrote Mr. Duke Fox of Fox Manufacturing Company and asked if it would be possible to obtain a tour through his company. On the 23rd, I received a reply in favor of my request. The 26th, Bill, his family and I, went to Ft. Smith, Arkansas, and Mr. Fox greeted us at the entrance of his Company, where I explained to him I was in the market for a Fox .40 RC.

As we toured, Duke showed us how they machined most all parts from bar stock, and the .40 RC was on the line being assembled at that time.

At the engine test cell, Mr. Fox picked one of the .40's, set it on the test block, ran it, adjusted it, and when he got a ONE FLIP start, he let me have it (for $26.00, of course).

My deep thanks to Mr. Duke Fox and his fine equipment; Bill Moore for helping me as I am learning to fly and build models; and R/C Modeler Magazine for all of the articles in their very fine magazine.

Happy Flying Forever,
Joe D. Satterwhite
Del City, Oklahoma

CAN YOU HELP?

Dear Don,

Having just completed reading the May issue of R/C Modeler Magazine, I think I could use your help. I have not been active in modeling for over 10 years. However, I once again find myself drawn to this enjoyable sport.

My problem: I cannot locate any active RC fliers in my area. Would it

be possible to print my letter as an open plea to be contacted by an individual or a club in my area. I am interested in flying fields, etc. My address is W.A. Hightower (Bill), 7 Raleigh Court, Berkely Heights, New Jersey 07922. Many thanks for any help your readers can furnish.

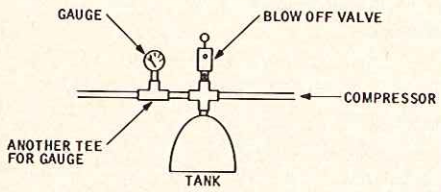
Bill Hightower

PAINT COMPRESSOR MOD'S

Dear Sir,

This is in regard to your article, "You Can Build Your Own Paint Compressor," by Max Blose. I see you have all the parts to make your air compressor work, except the most important part of all – "a SAFETY blow-off." If your pressure switch fails, you must have a means to blow off your excess air. These compressors are capable of delivering more pressure than you think. The idea is great, but please, protect yourself and others with a safety blow-off valve.

Yours Sincerely,
Irv Oringer
Cliffside Pk., N.J.



IN MEMORIAM
by Dr. Warren T. Chancey for "Flint Flyers"

Ellis Eugene (Gene) Dill, 34, of Americus, Georgia, died in the crash of his cropdusting plane on May 20, 1972. He is survived by his wife, Marijane, and two young sons.

Gene was a charter member of the "Flint Flyers" R.C. Club which meets at the Veteran's Memorial State Park on Lake Blackshear. He was a fine, amiable young man who loved to build and fly R.C.

When he came to the field, it was, "Hi, Gene," from everyone. "Here, Gene, fly my plane." "How does it feel to you?"

We all welcomed the opportunity to give him our transmitters, as he was truly a fine pilot. He, too, offered his plane to anyone to fly, especially if they had crashed the previous week.

All who knew Gene Dill will think of him often and cherish his memory.

"Gene, we miss you. The field won't be the same without you." □

FROM THE SHOP

from page 4

perched on a pinnacle of velvet in a rather unbecoming lead-sealed glass case. Displays of the more conventional bird models surround it.

Dr. Messiha, who won a prize some years ago for constructing model aircraft, is convinced that other "glider" models exist and that somewhere there should be the remains of a full-scale version. He hopes to carry out excavations at Saqqara, where he believes other models will be found. He is also going to examine other items discovered previously and stored in the museum.

"This is no toy model," he says. "It is too scientifically designed and it took a lot of skill to make it. The man who did this studied bird flight very carefully. The bird that this model most resembles is the kite, which has a horizontal tail which can be twisted to a near vertical position in flight."

The doctor, who is 48, studied fine art for five years before taking up medicine, and is also an illustrator and engraver. He is, at present, engaged on research into ancient Egyptian sciences and engineering. He believes they were very advanced in certain areas of knowledge, including elementary aeronautics.

Supporting the doctor's theory is an interesting reference to early flight quoted in A. Newburger's TECHNICAL ARTS AND SCIENCES OF THE ANCIENTS. This says: "Archytas of Tarentum, about 400-365 BC, set in motion a flying machine in the form of a wooden dove by means of compressed air." Archytas was a Greek philosopher and friend of Plato.

Dr. Messiha believes there is a connection between his model and the reference to Archytas, although he cannot explain the use of compressed air. It all lends a little credence to the fable of Icarus. There are many mysteries at Saqqara. Not the least is

this latest one of man's first flying machine.

•

Jerry Dye, of Strictly R/C, 7868 S.W. Highway, Portland, Oregon 97219, recently suffered a burglary at his hobby shop with over $11,000 worth of merchandise being taken including radios, accessories, and built-up model aircraft that were ready to fly. If any of our readers have any information that leads to the names of the persons who broke into Jerry's shop, or if you see any merchandise that you feel may have been stolen, contact Jerry Dye immediately . . . there will be a reward of any Pro-Line radio system for information leading to the arrest and conviction of the individuals responsible for this theft.

•

In closing, we'd like to share with you a small epic which we received in the mail this month as an anonymous contribution:

TYPES OF R/C FLYERS

FORMULA 1
Leaps tall buildings in a single bound,
Is more powerful than a locomotive,
Is faster than a speeding bullet,
Walks on water,
Gives policy to God.

FAI
Leaps short buildings in a single bound,
Is more powerful than a switch engine,
Is just as fast as a speeding bullet,
Walks on the water if the sea is calm,
Talks with God.

QUARTER MIDGET
Leaps short buildings with a running start,
Is almost as powerful as a switch engine,
Is faster than a speeding BB,
Walks on water in an indoor swimming pool,
Talks with God if special request is approved.

NOVICE PYLON, ALL CATEGORIES
Barely clears a Quonset Hut,
Loses tug of war with a locomotive,
Can fire a speeding bullet.
Swims well,
Is Occasionally addressed by God.

PATTERN
Makes high marks on wall when trying to leap buildings,
Is run over by locomotives,
Can sometimes handle gun without inflicting self-injury,
Dog paddles,
Talks to animals.

SCALE
Runs into buildings,
Recognizes locomotives two out of three times,
Is not issued ammunition,
Can stay afloat with life jacket,
Talks to walls.

GLIDERS
Falls over doorstep when trying to enter hobby shop,
Says, "Look at the Choo-Choo,"
Wets himself with a water pistol,
Plays in mud puddles,
Mumbles to himself.

SUNDAY FLYER
Lifts buildings and walks under them,
Kicks locomotives off the track,
Catches bullets in his teeth and eats them,
Freezes water with a single glance,
Is God . . . . .