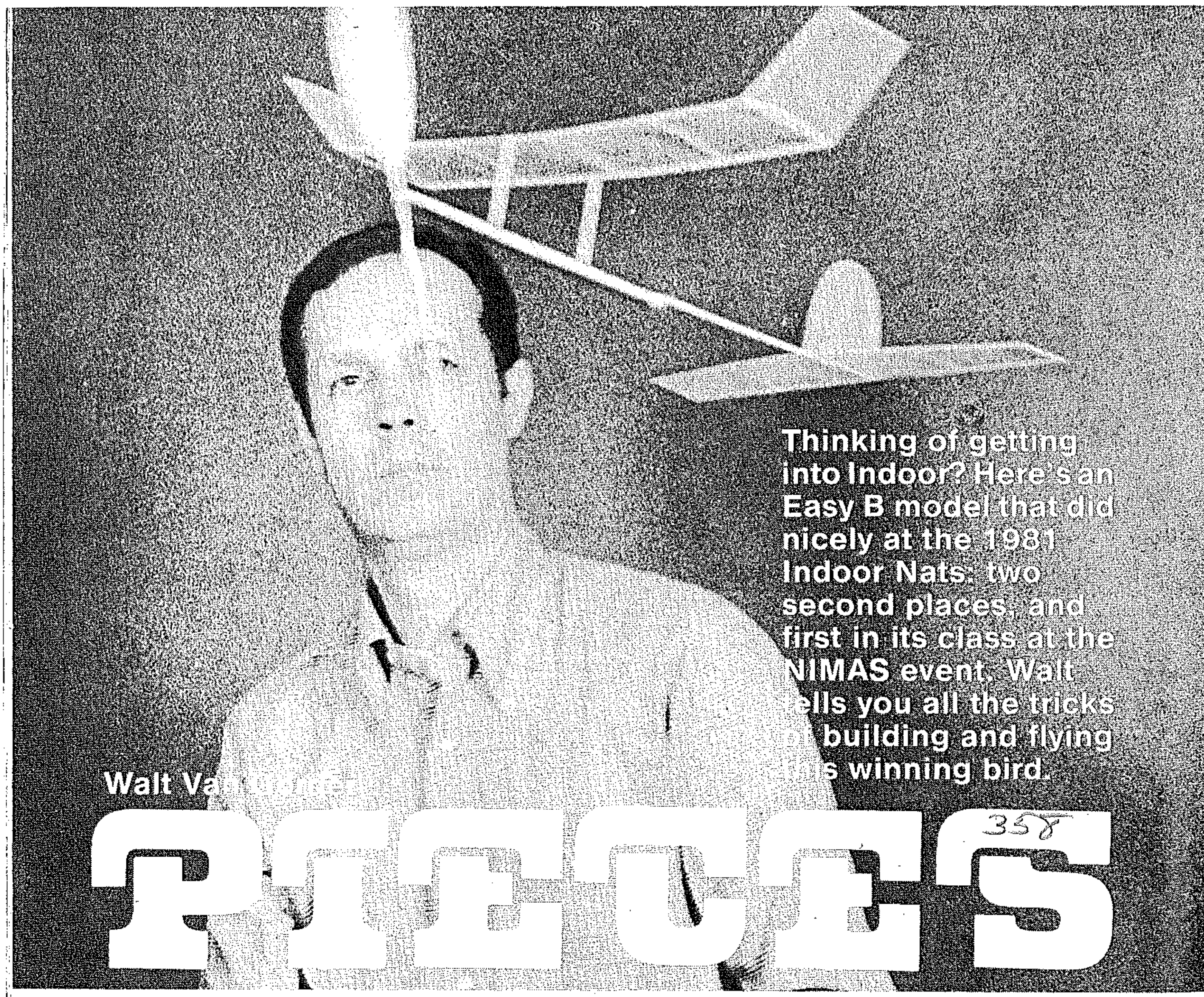


Thinking of getting into Indoor? Here's an Easy B model that did nicely at the 1981 Indoor Nats: two second places, and first in its class at the NIMAS event. Walt tells you all the tricks of building and flying this winning bird.

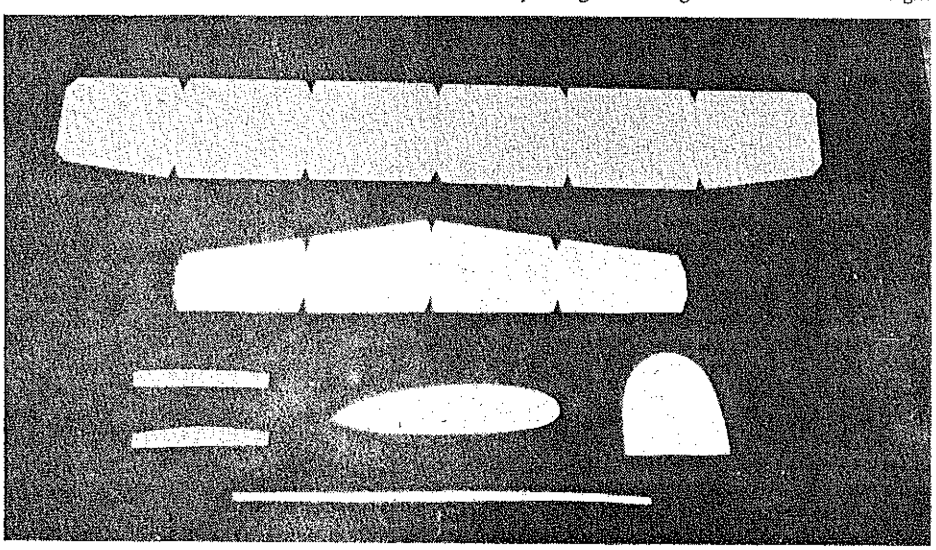
Walt Va

PIECES

PIECES IS a composite approach. I have taken two different models, added my own prop, and have come up with what I think is a very fine Easy B. I must thank Pete Andrews and Ron Roberti for two fine Easy B designs, but I feel that when they are combined, they make a much better model.

Pieces will fly with the best, but times go up dramatically as the weight goes down. My first ship weighed 1.4 grams and flew for eight minutes in a 40-ft. ceiling. With greater care in wood selection and building techniques, the latest Pieces weighs .68 grams and has flown 21 minutes in the 180-ft. hangar at Akron. Pieces won the 1980 Nats with a time of 16:44 in 64 ft., at .85 grams. There is no doubt that this ship is a winner.

The model uses Pete Andrews' motor stick, tail boom, stab, and rudder; and Ron Roberti's wing. I like to think the heart of the model is my own prop.

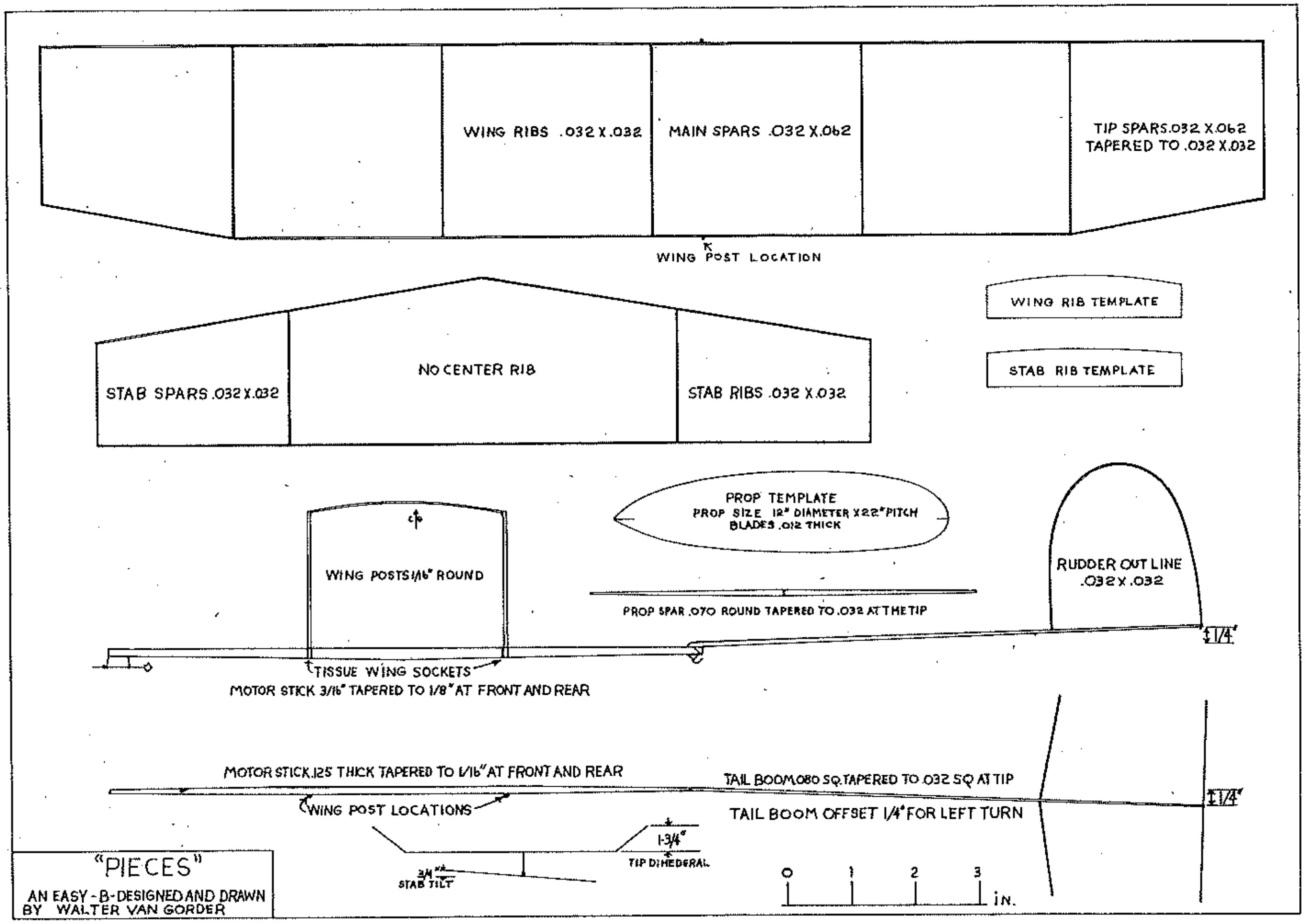


For those who've never tried this before, here's what a set of cardboard templates looks like.

Construction. Let's start constructing the wing. Cut out a cardboard template, cutting small triangles out where the ribs meet the wing spars. I use old soap cartons for all templates. Cut some 1-in. squares from the scrap left over. They will be used later on to hold the spars in place against the template, since you cannot put pins into any of the wooden parts to hold them in place. Be sure to make the template 1/16-in. undersize on the chord, so that your finished wing will not be oversized.

I always use 1/32-in. spars on wings. A balsa stripper makes spar cutting a bit easier, but you can cut them with a good straightedge and a very sharp razor blade. If this is your first attempt at Indoor, start out with a 6- or 7-lb. wood for your spars. Make them .032 x .062 from A- or B-grain

FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 140



balsa. Cut the tip spars .032 x .062, tapered to .032 square at the tip.

Make a template for cutting ribs. I like to use a little thicker cardboard for this so there is more to hold onto when you slice the ribs. Use 6- or 7-lb. C-grain balsa for this. I always make up a few extra ribs; it seems I always manage to break a rib or two. Make ribs .032 x .032. I use a pane of glass as the work surface for cutting the sliced ribs.

Lay the spars up against the template, and use the 1-in. squares pinned to hold them in place. Make sure each rib fits snug enough to keep it from falling over. This keeps the airfoil the same and helps to minimize warps caused by improper fit. Let the wing dry overnight.

Light, strong cement is a must in indoor building. I use Ambroid cement thinned 50/50 with acetone. The more cement you use, the heavier the model will be. Cut a bevel at the dihedral break points so you will have a good fit. Prop up each tip 1¾ in. Make sure each side is exactly the same. Let this dry overnight.

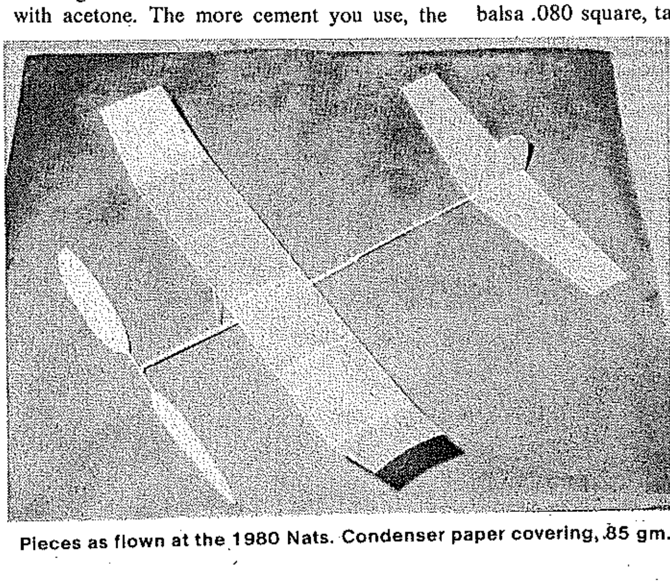
The stab and rudder are constructed in the same manner as the wing. Spars for the stab and the rudder outline are .032 x .032 square cut from 6-lb. wood. Stab ribs are .032 x .032 square from same sheet as wing ribs.

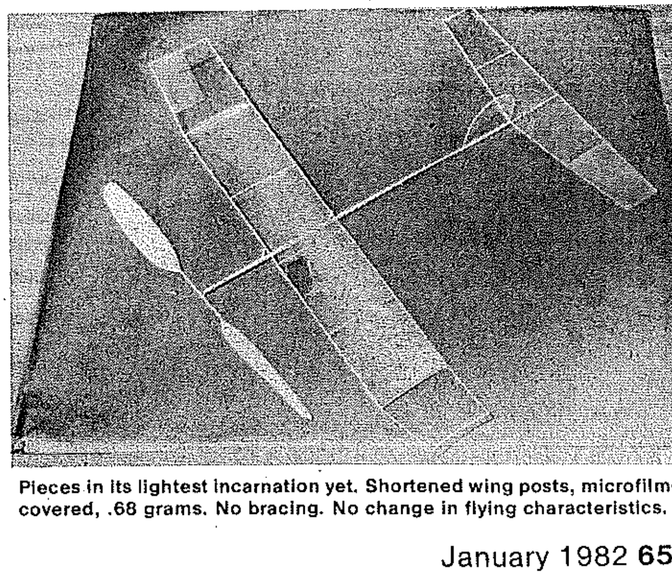
Put a piece of wax paper on your building board and pin the rudder template down on the wax paper. The .032 square should be soaked in hot tap water for 10 minutes. Lay it flat on the board next to the template, and carefully pull it around the shape of the template. Hold it in place with some of those handy 1-in. squares we used on the wing. Let this dry overnight.

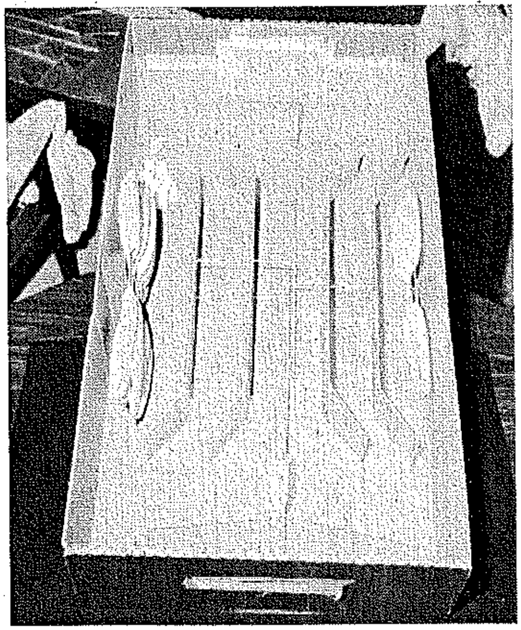
The tail boom is made from 6-lb. A- or B-grain balsa .080 square, tapered down to about .032 square at the tip.

The motor stick is made from a piece of 6-lb. stock ⅛ x 3/16 x 9¼ long. Cut and sand it to the shape on the plan. Use any light dual thrust bearing available from your favorite Indoor supplier. The rear hook is bent from .015 wire, and it can be glued on now. Be sure to bend the rear hook up at the end as shown on the plans. If the motor completely unwinds, this little extra bent-up portion will keep the motor from falling off.

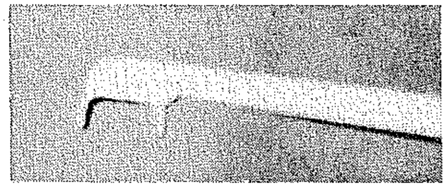
Take the rudder outline and glue it to the tail boom. While this is drying, the tissue wing sockets can be made. Cut tissue strips about ¼ x ½ in. long. Take a few drops of white glue, and mix with a few drops of water. Lay a strip of tissue in the glue. Take a 1/16-in. drill bit, and roll the tissue around the smooth end. Very carefully slide the tissue tube off the drill bit, and place it on a piece of wax paper. Let it dry

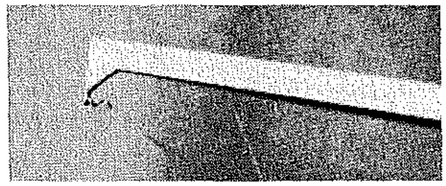

Pieces as flown at the 1980 Nats. Condenser paper covering, .85 gm.


Pieces in its lightest incarnation yet. Shortened wing posts, microfilm-covered, .68 grams. No bracing. No change in flying characteristics.

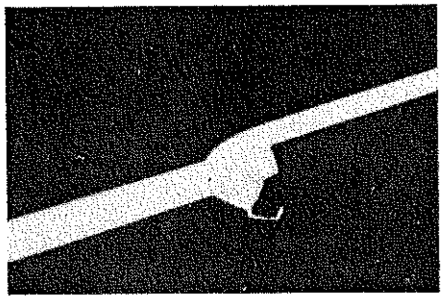


Inexpensive carrier made from corrugated storage box. Foam rubber blocks are glued to sides and slotted for prop storage.

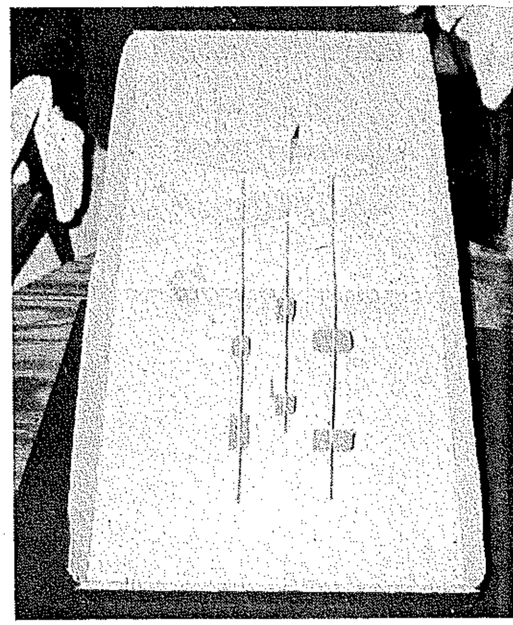




Two types of thrust bearings. Top is standard, made by Micro-X; bottom is pigtail wire bearing, made by wrapping wire around a straight pin.



Closeup of the rear hook; see text.



Top of the box can also be used for storage. Foam rubber blocks hold tail groups.

completely.

Care must be taken when covering such light models with condenser paper. This covering material shrinks rather dramatically when exposed to heat. To counter this, the model should be covered in as high a temperature as possible.

The low-humidity box that I have built has cured all the problems I encountered with my first model. Here's how to build one.

Buy a cardboard box of a size that you can get for about $1.50 at your local department store. The size I use measures about 24 x 11 x 12 in. Lay the box on its side so the top opening is facing you. Install two 150-watt light bulbs in the top of the box. Attach a piece of clear plastic to the opening in the front of the box. I use four or five large thumbtacks to hold it in place. *(Editor's note: Be sure that the bulbs don't touch the box, or you could have a fire on your hands. DRP.)*

I use a humidity gauge inside the box. You can buy one for $2.00 at your local hardware store. Turn on the lights, drop the plastic over the front, and in half and hour or so, the humidity will be down around 20 to 30 percent. Put the part to be covered into the box along with the piece of condenser paper for a half hour to remove the excess moisture. When you are ready to cover, raise the plastic about half way up so you can get inside to cover the part you are working on.

When you remove the part you have covered from the low-humidity box, the condenser paper will get limp. Since you will seldom fly in humidity of less than 20 to 30 percent, your model will never be warped because of the condenser paper.

Carving the prop. The prop for this model is 12-in. diameter by 22-in. pitch. Take your time here, because a good prop is a crucial part of the model's performance. Make a cardboard template of the blade, and cut two blades from 6-lb. .012-in. C-grain balsa. Lightly sand blades with No. 600 sandpaper. Be very careful to sand the blades in one direction.

The prop spar is made from 6- or 7-lb. ⅛ sq. x 6, sanded round to .070 at the center and tapering to .032 at the tip. This is done by taping a full sheet of 180-grit sandpaper to your work board, and another to a large sanding block. Sand off the corners of your spar. Without holding the spar, sand it between the two sheets of sandpaper, using a diagonal or circular motion. The spar will come out perfectly round after a few strokes. The same method is used for making the wing posts round.

Tapering the ends of the prop spar to .032 is done (after getting it round) by tilting the sanding block. Bob Meuser had an article on how to do this in *Model Aviation*, June 1977. The prop shaft is made from .015 wire bent to the shape on the plan. After the shaft is put into the center of your spar, bend the end at a 90-degree angle, and cut off the excess. Use a drop of Hot Stuff to secure it.

Soak the blades in hot tap water for 15 minutes. Lay them on the prop form. You can use a can, bottle, jar or jug of 5- to 6-in. diameter that has smooth sides. Lay the wet blades on the form 15 degrees to the left of center. Lash them to the form with stretch gauze bandage, just snug enough to hold them in place. Put two or three strips of masking tape around this to hold everything in place, and place it all in a pre-heated oven at 250 degrees for 15 to 20 minutes. After everything has cooled down, remove the blades *very carefully*.

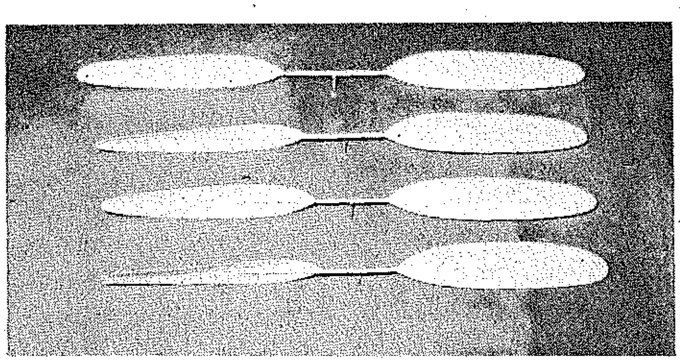
Make a jig to assemble the blades to the hub so they are at 45 degrees at 3.5 inches from the center of the hub. It is very important that both blades are set at exactly the same angle, so take your time and do it right.

Attach the wing posts to the wing spar as shown on the plans. Make sure the posts are 90 degrees to the wing spars and in perfect alignment with each other front to rear. Attach the tail boom and rudder assembly to the motor stick with ¼-in. of left rudder and ¼-in. of negative incidence as per the plan. Attach the stab with a ¾-in. tilt for left turn. The left side will be higher when viewed from the rear of the model.

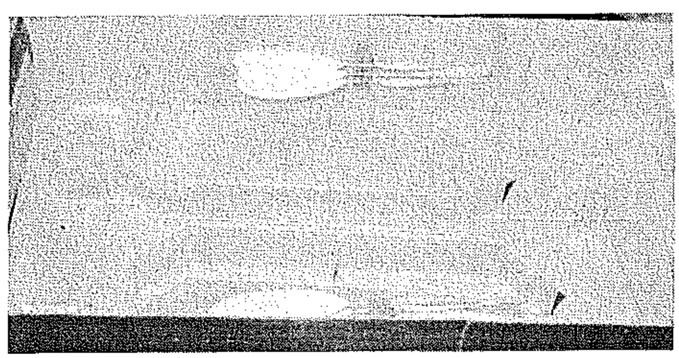
To locate the CG put the prop on, and install a loop of .045 rubber between the prop shaft hook and the rear hook. Make sure it fits with a slight tension. Find the balance point, and mark it on the motor stick. Locate and cement the wing post sockets so that the C.G. is at 55 percent, approximately 1.65 in. back of the leading edge of the wing.

Your model is now ready to fly. Install the wing

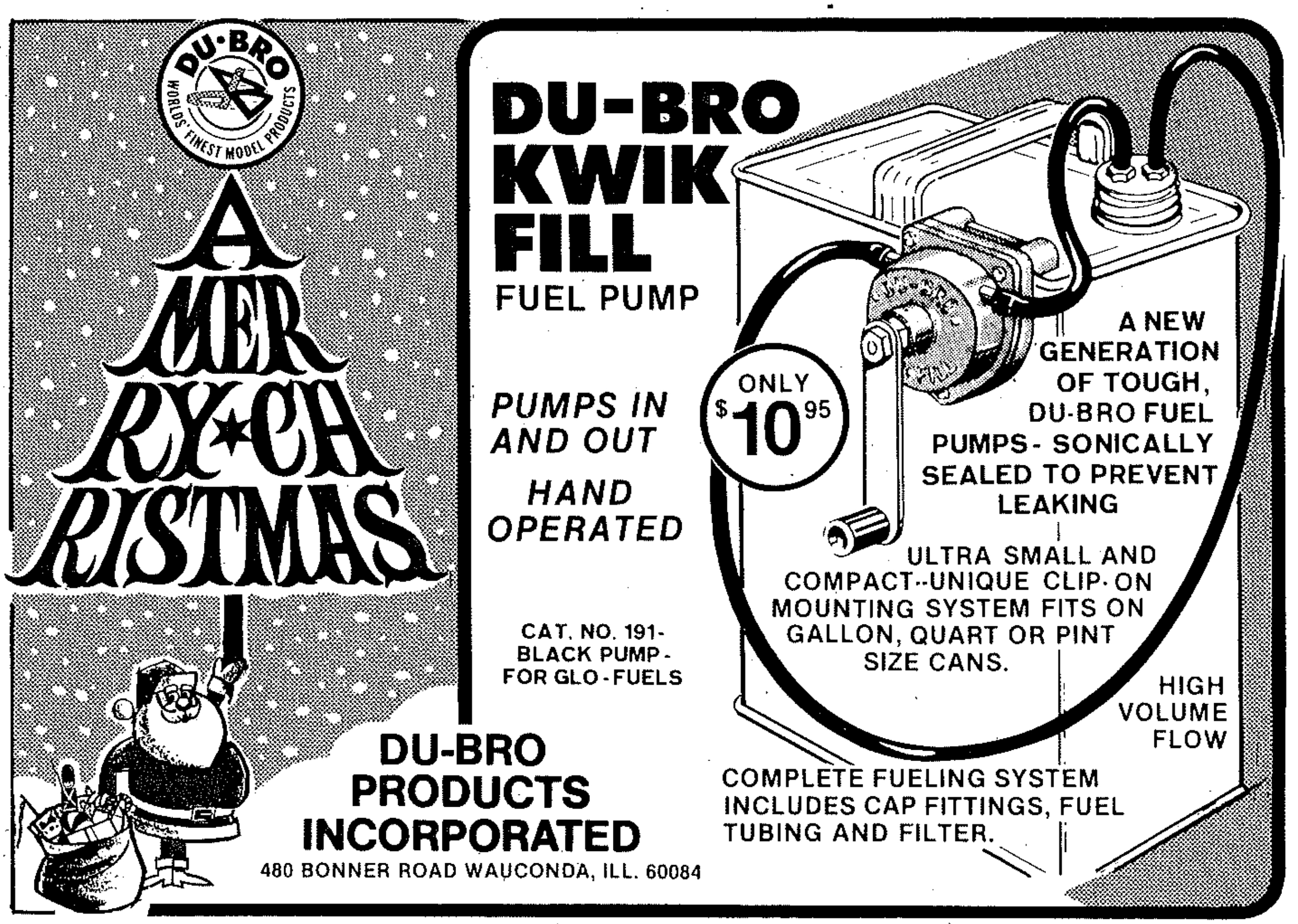
Continued on page 131



To cope with changing conditions at flying sites, Walt has an assortment of props handy, 12—13 in. diameter and 22—24 in. pitch.



Another view of Walt's transport box. Light foam blocks are glued to the walls and slotted to hold different props.



I would suggest, from a timer's standpoint, to at least look around before letting an Old-Timer loose. Some of the current AMA models don't seem to be bothered with such minimal things as wind direction, but I have yet to see an Old-Timer, with *any* type of engine, that doesn't need a bit of aligning prior to letting 'er go!"

I might also add that some of these modelers fail to check for obstructions in the takeoff path, i.e., motorcycles, toolboxes and people. Keep it safe!

Anderson Pylon: Just received a comment from Carl Goldberg regarding the Anderson Pylon photo in the October issue (page 60). He pointed out that the Anderson Pylon (built in 1938) actually *followed* the Valkyrie (built in 1937). He wanted to emphasize that the Anderson was actually a *simplified* and *smaller* version of the Val, and that the sequence of model designs was really: Valkyrie/Anderson Pylon/Zipper. He thinks the Anderson is actually more aptly described as a forerunner of the Diamond Zipper. There you have it from an undisputed Authority!

Clarence Haught, Rt. 5, Box 16, Coeur d'Alene, ID 83814.

Pieces/Van Gorder

Continued from page 66

and prop, and test glide it without the rubber motor. Start out with 0 incidence. Make several test glides. Adjust the wing until you get a smooth glide with the prop turning and a slight nose-down attitude. If your model weighs over one gram, it will require a motor of .050 x 18 inches. If the model weight gets down near 0.85 gram, it will fly on 0.40 to .045. The point here is that as model weight goes down it takes less rubber to get it up, which also helps performance. It may be necessary to add wash-in to the left panel of your wing, but test flying will be necessary to determine how much.

You have now completed a model that has proven to be a good flier. How much duration you get will depend upon how familiar you become with the model. Fly it at every chance. Don't be afraid to change the size and length of your motor. Record you results. You will soon find the combination that will be just right for your model.

If you have questions concerning construction or adjusting Pieces, my address is 5669 Victoryview Lane, Cincinnati, Ohio 45238. Please include a self-addressed and stamped envelope.

Solar Power/Blakely

Continued from page 69

times voltage), at a given irradiance, is obtained with voltage and current somewhat below their respective maxes (see graphs).

Connecting cells in parallel (as with batteries) provides more current. A cell aimed away from directly at the sun will receive less radiance and generate less current. Another factor to consider is temperature. When solar cells heat up, as they will when exposed to full sunlight, they become somewhat less efficient. The installation design should attempt to minimize heat build-up.

Solar Nomad II and Solar Wanderer. I have used solar cells on two Sailplanes; a Nomad II completed in the Spring of 1978 and a Wanderer completed in the Summer of 1978. The Wanderer NiCds have never been conventionally charged; the plane doesn't even have a charging jack receptacle. It has hundreds of hours on it and is still in active service.