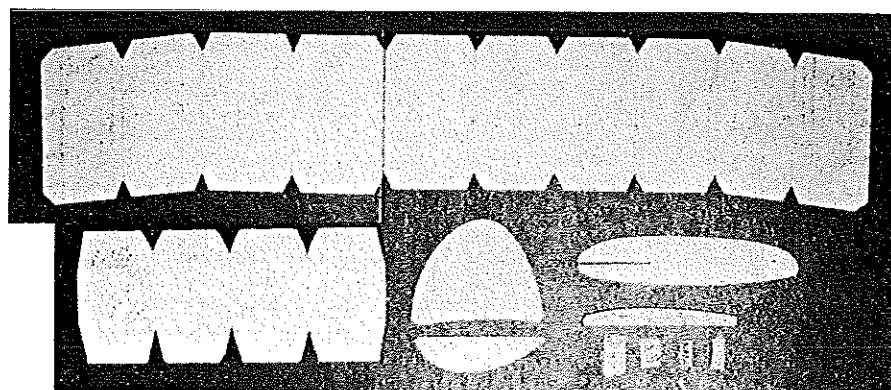


Our author poses with two versions of his model. The older one on the right is covered with condenser paper and holds several AMA Indoor records. The newer one on the left is covered with plastic, and as of this writing, it has not yet had a chance to prove itself in competition.

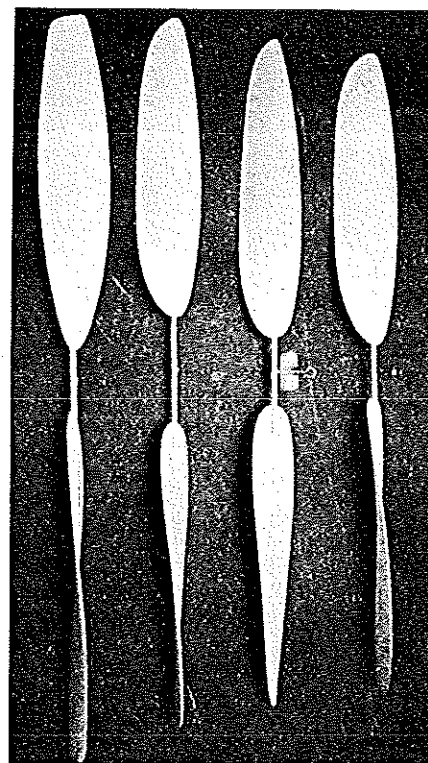
This article is intended to give you a starting point for combining your own pieces for a strong competitor in this popular class of Indoor models.

Manhattan Pieces

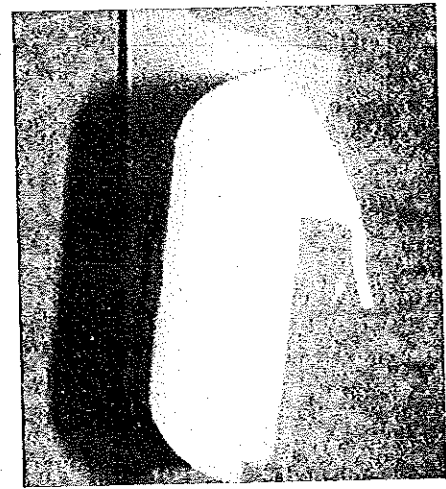
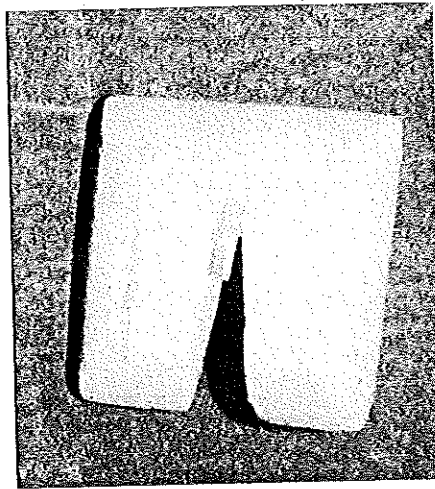
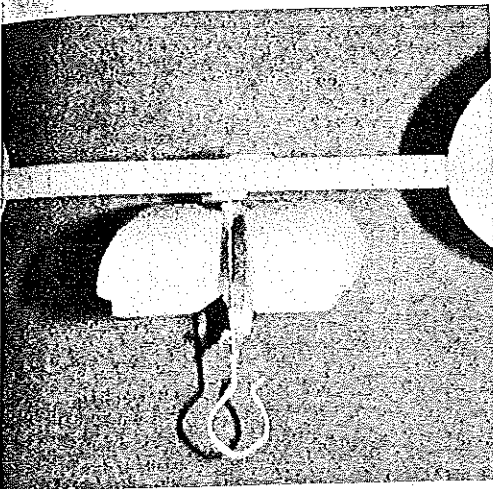
■ Walter P. Van Gorder 497



For those who've never built models in this manner before, this is what a completed set of cardboard templates looks like. Their use, and a careful record of the size and weight of building materials, makes it easy to build duplicate models—or spare parts for repairs.



To cope with varying conditions and flying sites, Walt has an assortment of props that range from 12-14-in. diameter and 22-27-in. pitch. Prop building is detailed in the text.



Three views of the nose block and thrust bearing assembly. The V-notch allows different props to be fitted, avoiding the necessity of building a nose block for each prop. Affix the thrust bearing with glue; coat the nose block with clear dope to prevent rubber tube absorption.

THIS ARTICLE was written with the hope that the Manhattan Cabin class of Indoor Rubber will become even more popular than it has been, especially since the specifications are now in the AMA rule book.

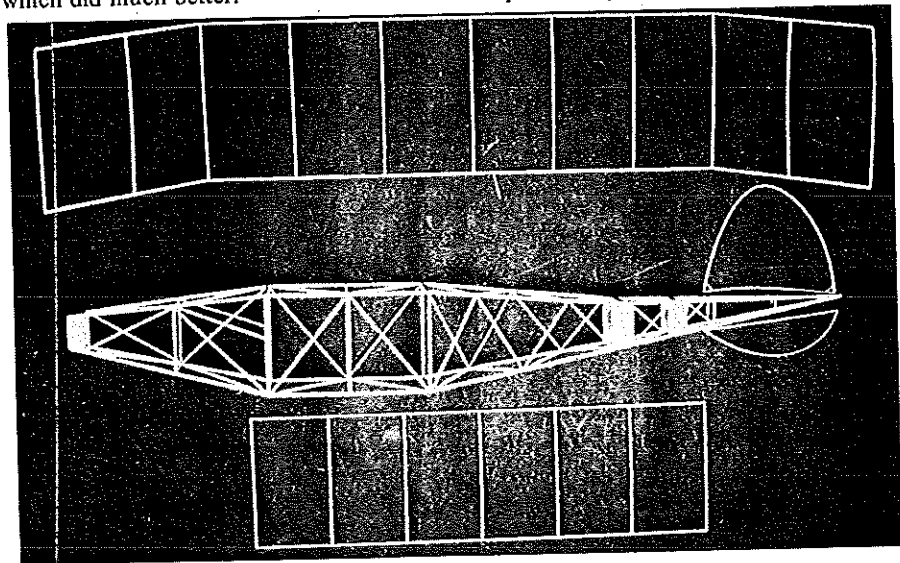
We have Ed Whitten to thank for introducing Manhattan Cabin about 10 years ago. He was trying to create a class having a mixture of Scale and pure duration concepts. I did not see a Manhattan Cabin model until 1977; I have been hooked ever since.

The original rules have held up very well, with only two changes to the time this was written. The model can now be covered with plastic film but no microfilm; condenser paper was the only covering allowed by the original rules. The other change allows the use of a 12-in.-maximum-span stabilizer, which is a great improvement.

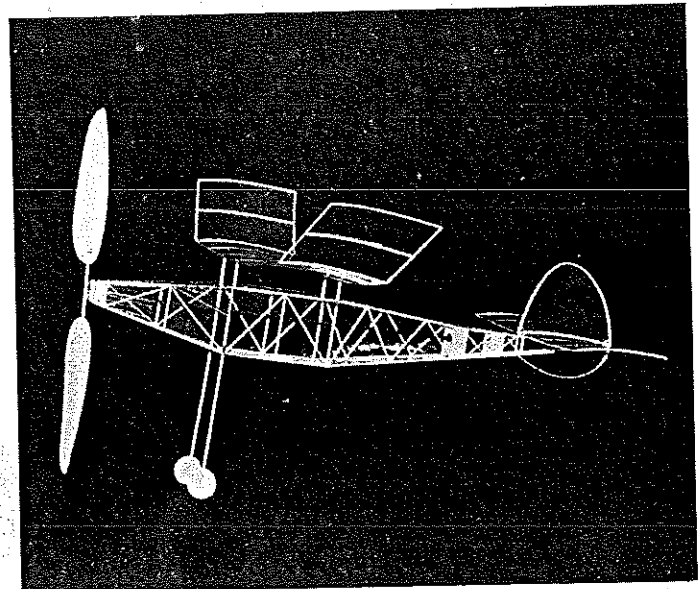
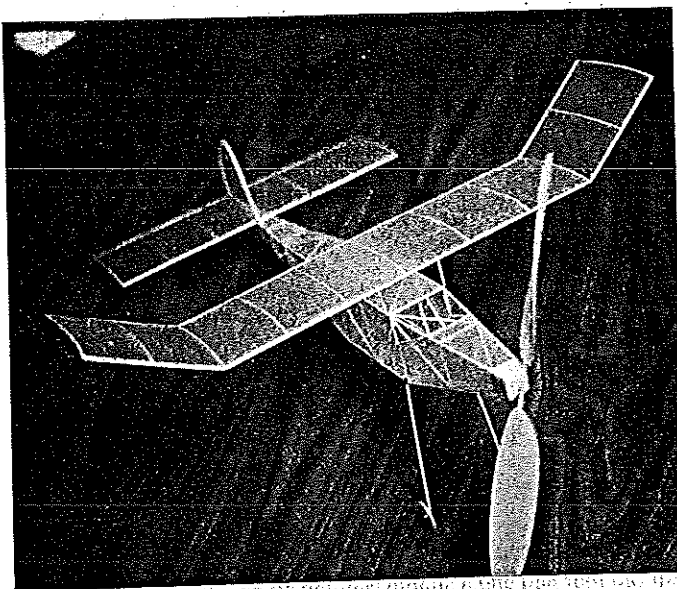
The model presented here, like most of my Indoor models, is made up of pieces of various models I have tried. That's why it is named Manhattan Pieces. My first Manhattan was a copy of John Triolo's Sky-scraper I; it was a bit heavy at five grams.

My second model was a copy of Jim Miller's Cabin Fever. Then I started mixing parts and came up with another model which did much better.

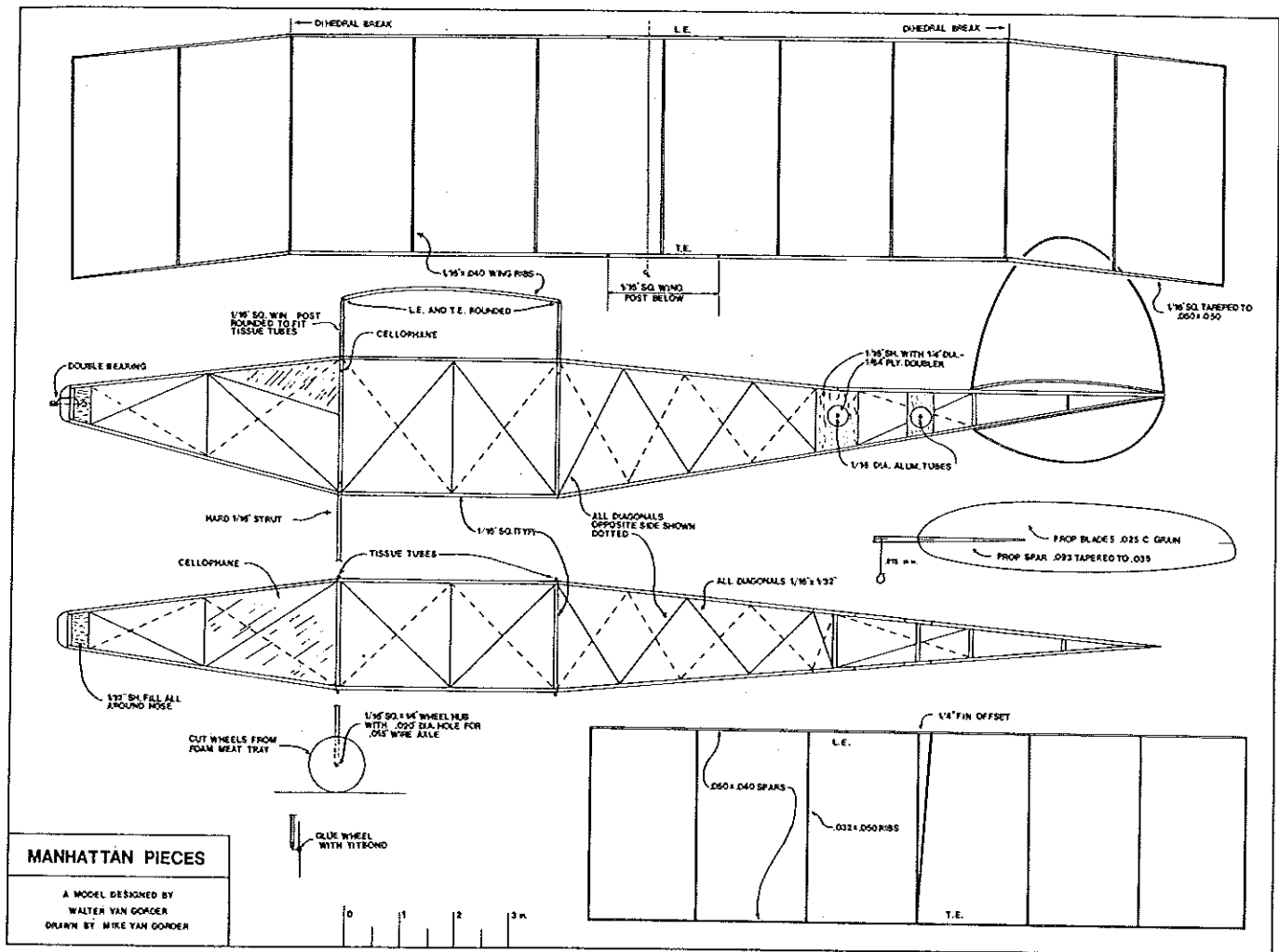
The latest version uses John Triolo's fuselage with modification to the rear hook position, Jim Miller's wing with modified swept-back tips, and John Triolo's prop



Completed bare bones ready for covering. You may wish to experiment with both types of covering discussed in the text to see which best suits your flying style and site conditions.



Left: The holder of four national records; this version covered with condenser paper has the "hardware" to prove its worth. Right: The same design covered with plastic has the appearance of being covered with microfilm (but microfilm covering is not allowed by Manhattan rules).



with modifications. At this time the Manhattan Pieces holds AMA records in all four ceiling categories—with a best time of 5:23 in Cat. I, 7:52 in Cat. II, 9:00 in Cat. III (without touching the site's 65-ft. ceiling), and 9:37 in Cat. IV. The model has had flights of 10:00 and 10:04 at West Baden before there were AMA records for the class. I think the model has the potential to fly for 11 or 12 minutes.

Let's get started with building. Keep good records of wood sizes and weights as you build the model as a point of reference for building another one or replacing broken parts.

Construction. The model is built to the four-gram minimum weight of the rules. If you cover your model with condenser paper, you will have to use wood in the 5 or 6-lb. range; if you cover the model with commercially-available plastic, you can use wood in the 7 to 8-lb. range (some of the plastic can be as much as half the weight of the lightest condenser paper).

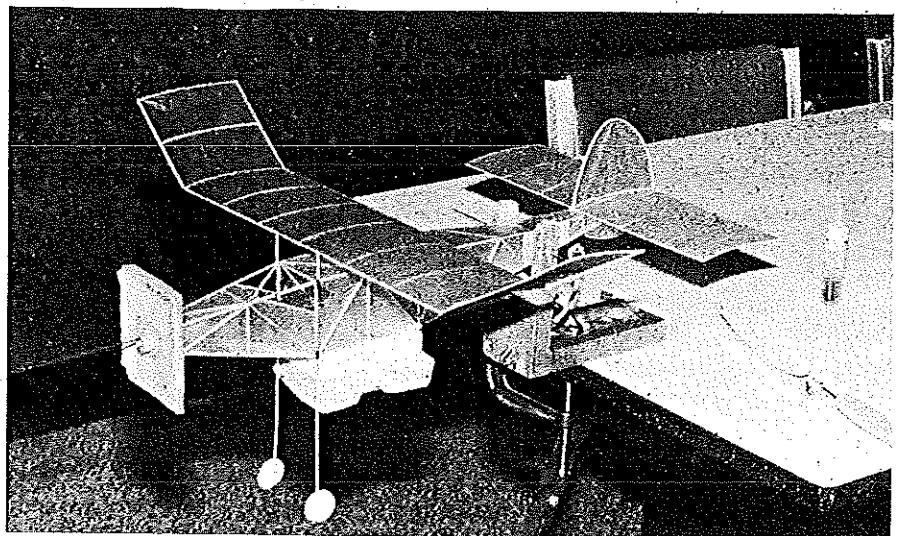
The construction notes refer to the condenser-paper-covered model that holds all the records. I do have a new plastic-covered model, but I have not been able to test it enough to make a fair comparison between the two. One thing that is very noticeable with the plastic-covered model is that it flies much faster. I think the reason is that the covering is so tight on the wing and stabil-

izer that the airfoils are much truer. In contrast, condenser paper must be put on the model much looser; therefore, the airfoils are much thicker. (Ron Ganser also builds a lot of Manhattans, and he says his new model with plastic covering also flies much faster.) I think the new plastic coverings will lead to more experimentation with different airfoils.

I use Ambroid cement reduced 50% with

thinner. Build both fuselage sides one on top of the other so they will be exactly the same—except for diagonals that alternate as per dotted lines on the plan. If this is your first attempt to build an Indoor model, don't be too concerned about the weight. Just build a good, solid, well-aligned model and work from there.

The nose is filled with $\frac{1}{2}$ sheet to provide
Continued on page 158



With an aluminum tube for the rear peg and a simple winding stooge, winding the motor is a one-man operation. Follow directions in the text for polishing the tube to eliminate burrs that can cut the rubber. The nose guard provides protection against rubber breakage.

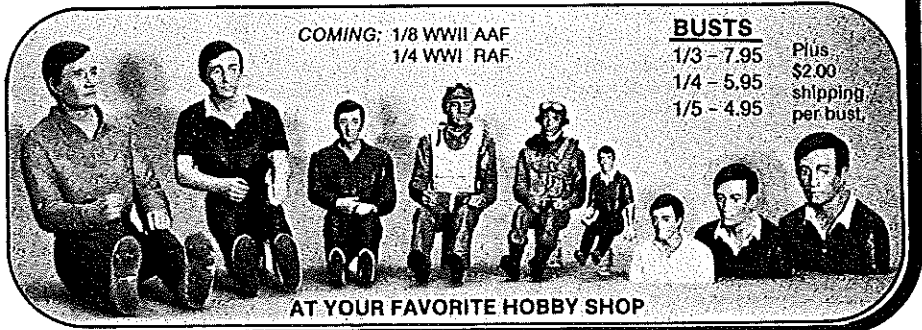
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and help underwrite the costs at the host club. You may not win your very first contest, but you will gain experience and enjoy the camaraderie associated with competition. Soon, you will be winning your share of the trophies, even if the tension of the meet never goes completely away. All of us make mistakes at contests, but that is only natural. No one is ridiculed (not seriously, at any rate). Even if you do foul up and crash in front of your friends, at least you are not riding in the thing, and personal injury is remote—even if injured pride is not. Why not give competition a try? You may, like so many of us, become hopelessly hooked.

Found and Lost: A model has been found near the site of the LaJunta SAM Champs. There is no description of the model other than the number A9663 on the model. AMA has no record of this number, but if it's yours, you can claim the model by identifying it to Nels C. Larsen, Jr., 601 Elm St., LaJunta, CO 81050.

Clarence Haught, 3226 Honeysuckle Dr., Coeur d'Alene, ID 83814.

New Ally/McIlrath

Continued from page 67

more accurate word than *satisfactory*, but we tried not to be too optimistic. In the past, great-sounding plans like this almost always went awry: the building custodian would forget to show up with the key or a volleyball game would be scheduled for the same time as our session.

This time, unlike the others, we had the help of experienced professionals. The Community Services' staff publicized the meetings, scheduled the gym, handled inquiries and registration, collected the tuition, and showed up on schedule with the key. Theirs was a quality operation from start to finish. During a winter of flying we hit some snags, of course, but when there were problems, the staff handled the phone calls and knew the ropes for locating an alternate site on short notice.

As for the "students," I think they ap-

preciated this rare opportunity, and they responded with enthusiasm. I didn't even hear any arguments about the rules or complaints about the quality of judging. That's quite incredible.

The message: If you have potential Indoor fliers in your area but are stymied by the lack of a place to fly, investigate the adult education facilities of your nearest community college. (The name of your local organization may be different; those with names of junior college, area college, adult education, and extension service are all worth checking out.) Whatever their name, talk it over with them. You might find the best friend a homeless Indoor flier ever had.

Manhattan/Van Gorder

Continued from page 70

strength for handling when connecting the fully-wound motor to the prop assembly. The rear motor supports are made of 1/8 sheet with a small 1/4-in. round piece of 1/4 plywood glued on the inside for added strength.

A little trick I use is to make sure the aluminum tubing used for the rear peg is highly polished. I use rubbing compound, but toothpaste will also work. Polishing removes even the slightest nicks in the tubing; I have found that little nicks can cause a small nick in the rubber motor and result in premature failure. One other nice feature about the aluminum tube rear motor peg is that you can put a .032 wire through it to hold the model in a winding stooge.

Build the rectangle part of the fuselage first. Crack the joints at the front and rear of the rectangle; glue the rear end together, and then put the nose together. You will end up with a very straight and true, well-aligned fuselage. When dry, lightly sand and set aside.

Prepare for building the wing, stab, and upper and lower rudders by making a set of cardboard templates as shown in one of the pictures (I use soap cartons for the templates). Make sure the templates are under-size to allow for the spars. I use 1-in. squares of scrap cardboard to hold the spars against the template during construction.

The wing structure and its construction are very simple. Use the following wood sizes/weights: main spars are 8 lb. $\frac{1}{16}$ x $\frac{1}{16}$ sq.; ribs are 6 to $6\frac{1}{2}$ lb. $\frac{1}{16}$ x .040 A- or C-grain; tip spars are 6 lb. $\frac{1}{16}$ x $\frac{1}{16}$ tapered to .050 x .050. After the wing is dry, sand the leading and trailing edges of the main flat section to an airfoil shape. Tip dihedral is $2\frac{1}{16}$ in.; use care and be exact. Make four $1\frac{1}{4}$ -in. wing posts from 6-lb. balsa, and sand them round.

The stabilizer uses 6-lb. spars .050 x .040; ribs are 6-lb. .032 x .050 A- or C-grain. The airfoil is the same as the wing, except the rib is just cut off at the trailing edge. The rudder outline is made of 5-lb. .040 x .040 A-grain balsa.

The landing gear must be sturdy enough to support the weight of the model. The strut is made from hard $\frac{1}{16}$ sq. balsa. Wheels are cut from the bottom of a foam meat tray; a $\frac{1}{16}$ sq. strip $\frac{1}{4}$ in. long was drilled lengthwise with an .020 bit for a wheel bearing. If you do not have a .020 drill, glue small squares of $\frac{1}{16}$ sheet balsa on each side of the wheel, and make a small hole through the squares (use white glue so the foam will not dissolve). A small piece of .015 wire glued to the strut acts as the axle.

This is the procedure for making the wing and landing gear sockets. Cut tissue strips about $\frac{3}{8}$ x 2 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 $\frac{1}{16}$ -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 completely, then slide the tube back on the smooth end of the drill and cut into the required lengths.

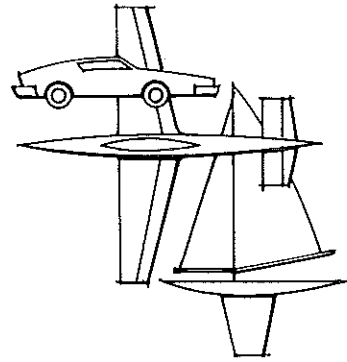
The nose block is made from one piece of $\frac{1}{8}$ -in. sheet. A plug cut to exactly fit the nose opening is made of $\frac{1}{16}$ sheet. The grain should run perpendicular to the nose block for strength. Cut a V in the nose block as per one of the pictures, and use a standard thrust bearing for Indoor models. By doing this, you can change the prop without having to make a new nose block for each prop. You may contour the nose block to get rid of the squared-off look. Give it a light coat of clear dope to keep rubber lube from soaking into the wood (which makes it very weak). Be sure to securely glue the thrust bearing.

Propellers are a very important part of any Indoor model, so take your time with them. To meet varying conditions, I fly with props ranging from 12 to 14 inches in diameter and pitches from 22 to 27 inches. I will describe a good general-purpose prop for you to start with: $12\frac{3}{4}$ -in. dia. by 22-in. pitch.

Make a cardboard template of the blade, and cut two blades out of 6-lb. .025 C-grain balsa. Try to match the grain of the wood in each blade as closely as possible. Sand the blades just enough to round the edges a bit.

Soak the blades in hot tap water for 15 min. Lay them on the prop form. You can use a can, bottle, jar, or jug of 6 to 8 in. in diameter that has smooth sides. Lay the wet blades on the form 15° to the left of center.

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To obtain pre-registration Static Competition forms, write (include self-addressed stamped envelope) Allen Reinhardt, 2 Douglas Drive, Pleasantville, N.Y. 10570
Judging takes place Sunday afternoon.
Entries accepted until 12 Noon Sunday.

Special admission area will be provided on both days for static display contestants with built-up models.

Registration of models will start at 8:30 a.m. each morning.

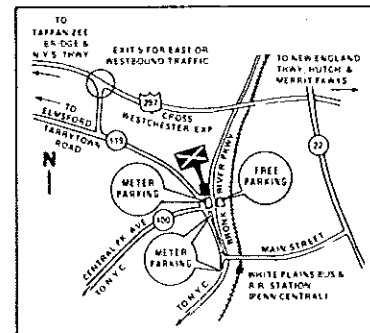
SWAP SHOP

The WRAM's Swap Shop has become one of the major show attractions with thousands of individual items changing hands. To help eliminate "registration crush," the Swap Shop will provide for preregistration forms. To receive these forms send a self-addressed stamped envelope to: John Isbister, 4 Devon Rd., Larchmont, N.Y. 10538.

SPECIAL NOTE

This year there will be no restrictions in the number of built-up models a registrant may place in the Swap Shop.

For further information, write (enclose self-addressed, stamped envelope) or call: Jerry Judge, 39 Rome Ave., Apt. 10B, Bedford Hills, N.Y. 10507, 914-666-2604.



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February 22/23

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10 A.M. to 6 P.M.

Visit a major Model Engine Collectors Association (MECA) display and sale of Antique Model Engines during the weekend of the annual WRAM Show in White Plains, NY. The MECA activity will be on Saturday Evening, February 22, 1986 from 4:00 p.m. to Midnight at the Ramada Inn in Elmsford, NY.

The Ramada Inn is only $3\frac{1}{2}$ miles from the WRAM Show, on Route 9A, one mile north of Exit #2 off Interstate #287. A \$5.00 door donation is requested to help defray costs.

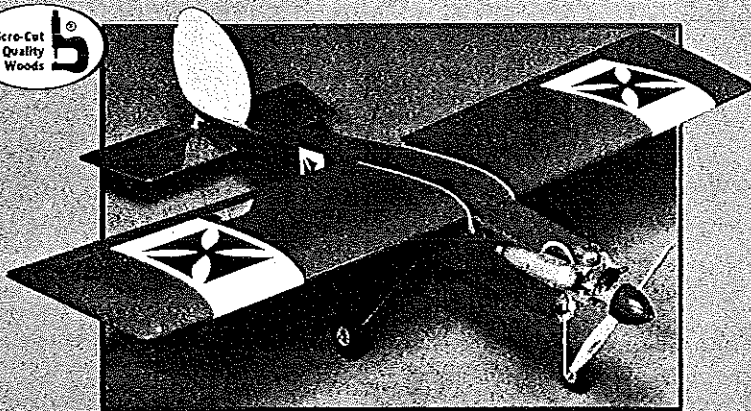
Lash them to the form with a stretch gauze bandage just snug enough to hold them in place. Place it all in a preheated oven at 250° for 15 to 20 min.

The prop spar is made from 8 lb. $\frac{3}{8}$ sq. by $5\frac{1}{4}$ -in. length sanded round to .093 at the center and tapering to .035 at the tips. The prop shaft is made from .015 wire bent to the shape shown on the plan. After the shaft is put into the center of the spar, bend the end at a 90° angle and glue with Hot Stuff.

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

If you use plastic for covering the model, be sure to cover the wood where the windshield and side windows go with black tissue (or use a black marking pen). If you use condenser paper, be sure to pre-shrink it. Condenser paper shrinks rather dramatically when exposed to heat; this can be countered by covering the model in a high temperature environment, such as in a high temperature, low humidity box I built and will describe for you.

Buy a cardboard box of a size you can get for about \$2.00 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 150W



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light bulbs in the top of the box. *Be sure the bulbs do not touch the box, as this would be a fire hazard.* 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). Place a humidity gauge inside (you can buy one for about \$3.00 at a hardware store). Turn on the lights, drop the plastic over the front, and in a half-hour or so the humidity will be down around 20% to 30% with 90° to 100° temperature.

Place the part to be covered with the condenser paper into the box for a half-hour to remove excess moisture. When you are ready for covering, raise the plastic about half way so you can get inside to do the work.

I used thinned Micro-X condenser paper

cement to adhere the covering. It works great on condenser paper or the plastic film.

When you remove the covered part from the high temperature, low humidity box, the condenser paper will get limp. Since you will seldom fly in humidity of less than 20% to 30% or temperature exceeding 90° to 100°, your model should never warp because of condenser paper shrinkage.

With all the parts finished, it is time for final assembly. Glue the tissue wing sockets onto the fuselage, then put the wing posts into the sockets. Glue the wing to the wing posts. Offset the wing ¼ in. to the left of center when looking from the rear of the model—which makes the wing panel ¼ in. longer on the inside of the left-hand circle.

Glue the stabilizer on the fuselage, mak-

ing sure the trailing edge is ½ in. higher than the leading edge. Glue on the rudder with ¼ in. offset for turn. Glue on the sub-rudder in the center. Glue a ½-in. shim on the right side of the fuselage nose to get left thrust. Glue the tissue landing gear sockets on the fuselage, and you're ready.

Test flying. Start out using a 25-in. loop of .085 rubber (the rubber I use is obtained from FAI Model Supply). Put about 50 turns in the motor, and launch the model by hand. It should fly to the left in circles of 25-30-ft. diameter. As you add more turns to the rubber (and torque), you will have to put in about ¼ in. of washin on the left wing panel. Also, I use about ½ in. of washin on the left side of the stab.

For best results, trim the model to fly just on the edge of a stall on full-power takeoffs. The center of gravity (CG) should be as rearward on the model as it will take and still have stable flight. To adjust the CG, I put a dab of clay on the back of the fuselage.

How much duration you get will depend upon how familiar you become with the model. With experimentation, you will soon find the combination of prop and rubber that will be just right for your model.

Suppliers for Indoor models: Jim Jones, 36631 Ledgestone, Mt. Clemens, MI 48043; Indoor Model Supply, P.O. Box 39, Garberville, CA 95440; Micro-X-Products, Inc., P.O. Box 1063, Lorain, OH 44055; Ray Harlan, 15 Happy Hollow Rd., Wayland, MA 01778.

I will be glad to answer any other questions you might have. Send a stamped, pre-addressed envelope to: Walter P. Van Gorder, 5669 Victoryview Ln., Cincinnati, OH 45238, or call (513) 922-3351.

CL Aerobatics/Fancher

Continued from page 72

"The two-day seminar was attended by 20 to 30 fliers per day. Our futile flying efforts (speaking for myself) were observed by "Big Art" and Archie Adamison, Bill Zimmer, and Bob Gialdini. Art had a set pattern that we were to do, and after the attempt was finished, we were shown by

Continued on page 162

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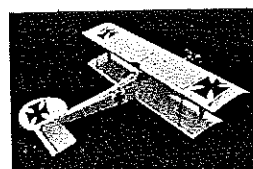
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