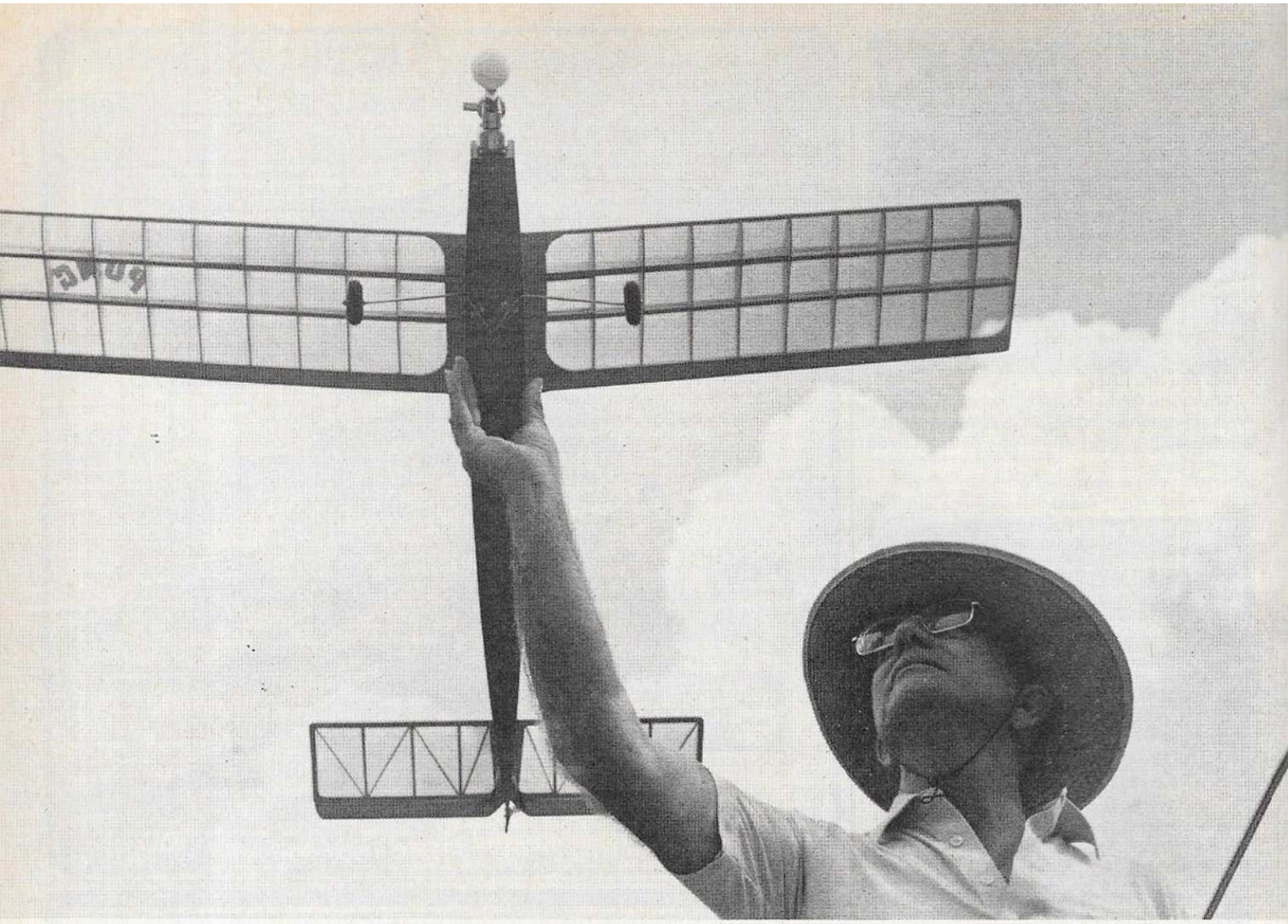


PHOTOGRAPHY: L.F. RANDOLPH

"Pong"

by L.F. Randolph

This two-channel trainer has a Ping-Pong ball spinner to absorb shocks while learning.

A while back, at the beginning of summer, it seemed a good idea to build an airplane similar to the ones we used to fly years ago. The project proceeded through the design stage and into the construction of a wing and fuselage, then died. The good flying of summer was much more interesting than the redesign of an old timer. Then came fall with shorter evenings and the change of time. It was no longer easy to get to the field after work and yet the weather was even better than in the summer. The obvious answer was an airplane that could be flown in the front yard or on the nearby school ground. Up jumped the old timer idea again and Pong was born.

Pong, named for the ping-pong ball spinner that keeps it from breaking windows in case of improper landing site selection, is a re-design of a pylon free-flight I flew years ago in competition. It flew quite well then with an ignition Arden .09 for power, and with a few changes to improve its performance with R/C it flys quite well now. The nose is longer and the lifting tail is gone to move the CG forward. If anything, the glide is better than the original. The glide is important, for the cool, fall, evening flying provides gentle thermals from the warm roof of my house and the houses of my neighbors.

The usual flying procedure is to hand launch, climb above the trees, do a few loops and a roll or two and then climb until the fuel is exhausted and look for some lift. The landing approach is usually a dive below the trees then very tight circles to a landing in the street. Pong can easily perform 720° turns between curbs of the average city street. I don't know if Pong will take off or not, I've never tried it because it seems so natural to hand launch. A gentle push with the nose slightly down and the thing is flying, what could be easier. The gear is there to land on, that's why it's called a landing gear. The muffled .049 is quiet, and I have had no complaints from the neighbors. The power available is more than the old Arden provided and the total weight of the airplane is about the same.

Construction

Please, please build this airplane like an airplane and not like a boat anchor. There is absolutely no need to make anything stronger. In fact, some of the beef in the wing center section (webs) could be left out with no detriment to the strength. Every gram of extra weight must be paid for in reduced performance and more damage in case of hard landings.

Wing

In keeping with the desire to be inexpensive and at the same time nostalgic, make a printed sheet of ribs by cutting out a template from card stock and use it to draw as many ribs as you can on a sheet of 1/16" medium balsa. One of the fine tipped fiber pens works great and about one and a half sheets of 3" x 36" stock should do it. Cut the ribs out and pin them together and sand them to the same shape with a sanding block then mark the spar notches on the top and

bottom and cut them into the block with a sharp modeling knife or razor saw. Select four ribs from the stack and trim 1/16"" from the top and bottom of each. These are the center section ribs (R2) so widen the spar notches 1/16" as shown to accept the dihedral braces. Cut the webbs from vertical grain 1/16" wood and trim four of them to correspond with the dihedral angle, these will go at the center and act as a gauge to set the center ribs. Notch the trailing edge and strip the 3/16" spars; then cut the four dihedral braces from 1/16" plywood and the wing is ready for assembly.

Build one panel at a time right over the plans. Cover them first with plastic wrap or wax paper then pin the bottom spars in place and use several ribs as gauges to locate the trailing edge in case the notches are not the same depth as shown on the plans. Shim up the two center ribs with scrap 1/16" balsa to provide clearance for the sheeting that will follow. Use the center webbs to position the center rib at the proper angle then add ribs out to the tip. When all ribs are in place, add the top spars and leading edge, and when the glue has set remove the panel and build the other in the same manner on the back side of the plan. The plan can be rubbed with cooking oil to make it more transparent. When both halves are complete use a sanding block and sand the spar ends at the center to match the angle of the center ribs and join the two with the plywood dihedral braces. Place one panel flat on the bench and elevate the other to the proper dihedral and check for any warps. If there are any, correct them before the glue sets. Clothes pins make excellent clamps to hold the braces in place until the glue has set. Sheet the center section with soft 1/16" sheet and add the tip cap pieces. Then sand the complete wing with fine sandpaper and add the 1/16" wire to the trailing edge. The wing is now ready to cover.

Fuselage

Laminate a pylon blank from three layers of balsa (one layer of 1/16" sheet on either side of a layer of 1/8" sheet). The grain must run as shown on the plans, and set aside to dry. Cut the two fuselage sides from medium 1/16" sheet balsa and add the doublers, longerons and uprights to the inside of each. Build up the two bulkheads F2 and F4 from soft 1/8" balsa and cut out F3 from the same material. The firewall F1 is 3/16" plywood. Pin the fuselage sides together with the doublers to the outside and sand them to the same outline. The edge of the workbench makes a good guide to keep the sanding block at right angles to the sides. Glue the two full length formers F2 and F4 in place on one fuselage side keeping them square with a drafting triangle or square and when the glue has set, add the other side directly over the first. Check alignment and glue in place, add F3.

While the fuselage is drying, cut the pylon from the balsa laminate and glue it into the slots in the top of the formers. Use a square against the pylon and the fuselage top to make sure it doesn't slant. Then sight from fore and aft to assure alignment with the fuselage. Now add the top sheeting in the pylon area and the 1/8" plywood landing gear mount on the bottom. Bring the tail together and glue, add the cross pieces on top and bottom then epoxy in the firewall up front. Install the nyrod guides to the elevator and rudder and complete the top and bottom sheeting. Do not sheet the area just below the pylon from the landing gear mount to F4, this is the area of the access hatch which is built up as shown from 1/16" plywood and strips of 1/16" by 1/4" balsa. Sand the complete fuselage.

The wing mount on top of the pylon is built upside down on the bottom of the wing center section. Put a piece of plastic wrap over the wing and pin and glue the 1/16" sheet in place to form a platform. It may be necessary to dampen the two front pieces to get a good fit against the wing. When the glue has set on the platform, glue it to the top of the pylon on the fuselage. Block up the wing tips with the fuselage flat on the bench, and check to be sure that the platform and wing are true with the pylon and fuselage. When the glue has set, carefully remove the pins and the platform from the bottom of the wing and add a micro balloon and white glue fillet between the pylon and the platform. Sand and shape the fillet and pylon and add the 1/8" dowel hold downs.

Tail assembly

The tafl surfaces are built flat over the plan with 1/8" medium stock for the outline and soft wood for the ribs and diagonals. It is important to keep weight down as much as possible in this area so use almost dead soft wood for the moveable surfaces, and harden them in the area of the horns with a drop of hot-stuff before they are covered. It is a good idea to install the 1/16" wire elevator carry-through in the leading edge before the rudder cut-out is made in the trailing edge of this surface. Sand all edges smooth and round.

Finishing

Pong should be covered with one of the plastic films because of the necessity to keep weight down, although, it is much easier to finish the pylon-platform area with matching fuel proof paint than to cover it with the film. Cover the stab and elevator first, then the fuselage. Cut the covering away from the stab where it contacts the top of the fuselage, and epoxy it in place. While the glue is curing, cover and hinge the fin-rudder and then cut the covering away from the top of the stab where the fin will mount and epoxy it in place. Use a square against the stab to assure that it is straight up and down. Cover the wing.

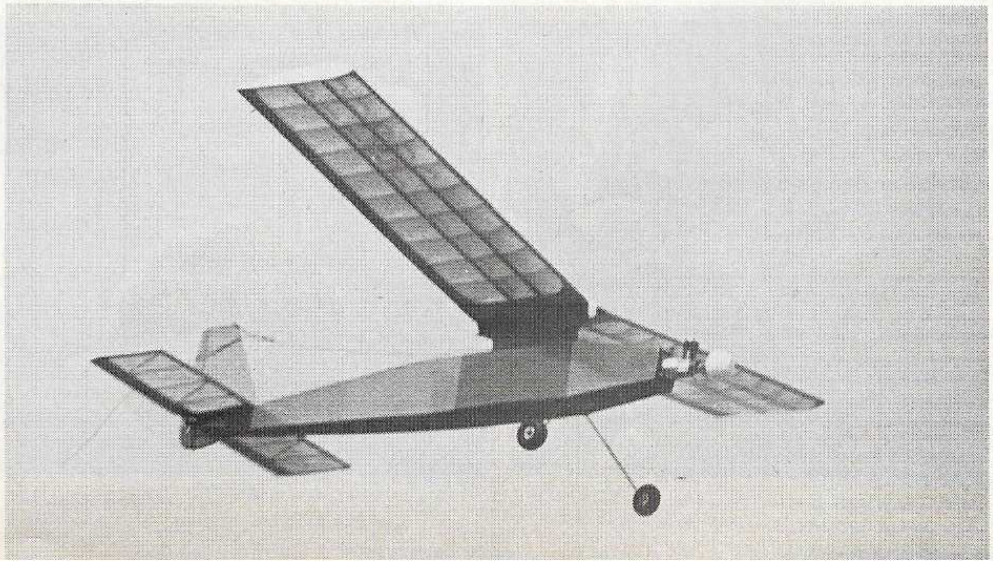
Bend and epoxy the tail skid in place and apply a thin coat of epoxy or paint to the firewall to seal the covering from fuel and oil. Bend the landing gear, solder the wheels in place and mount it in place with two brackets and wood screws. Drill a hole through the rear of the access hatch and into the plywood anchor for a small wood screw to hold the hatch in place. Mount the engine by drilling small holes in the firewall, then add a drop of epoxy in each hole and attach the engine with wood screws.

When installing the radio it is a good idea to mount the servos on a plywood tray that fits between the sides and on the servo rails. Then slide the tray back and forth until the airplane balances at the CG (with batteries and receiver installed) and glue it in place. Install the nyrods, horns and clevises and adjust the surfaces for neutral when the trims on the transmitter are centered. Throw should be about 3/16" up and down and left and right. When everything is installed, range check the radio with the engine running and the airplane is ready to fly.

The spinner is made by drilling a 1/8" hole through a ping-pong ball then enlarging one of the holes just enough to allow the prop screw and spinner washer to enter the ball. It is installed by putting the screw and washer into the ball, and then the screw goes through the smaller hole and through the prop into the shaft. Tighten with a screw driver through the large hole. The spinner will slow the engine somewhat when it is installed but the reduction in power is really not missed.

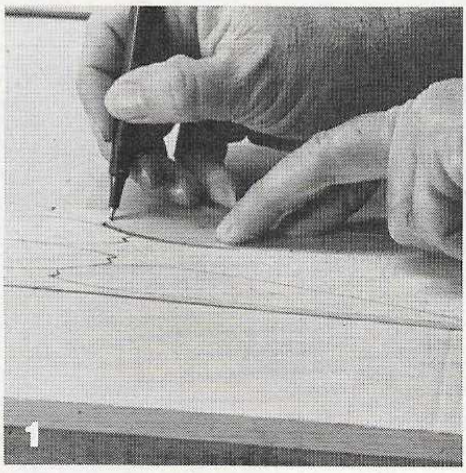
Flying

Give it a fair shove with the nose slightly down and it will be flying. Control response is fairly rapid under power but quite comfortable in the glide. Pong is not really an acrobat but it will snap roll and loop and any combination of the two. Outside performance is nill although it will maintain inverted flight. The glide is slow and flat and it is a good thermal machine because of the very tight circles it can make in small areas of lift, like a hot roof . . . Good luck and good flying . . . at home.



Construction Sequence photos

1. Make a template from file-folder cardboard, and use it to trace rib outlines onto 1/16" balsa sheet. **2.** Cut the ribs from "the printed sheet" and stack them for gang sanding and notching. **3.** The completed ribs, sanded and notched with the webbs, ready to be assembled. **4.** The wing is assembled right over the plan. Note the center rib and webb ready to assemble. **5.** The two wing halves are butt joined at the center, then the dihedral braces are added. **6.** The center section sheeting has been completed and the wire brace has been added to the trailing edge. After sanding the wing will be ready for covering. **7.** The fuselage ready for assembly. The doublers, longerons, up-rights and servo rails have been added to the fuselage sides and the bulkheads and pylon cut-out or built-up. **8.** The pylon is cut from a plywood made from three layers of balsa sheet, 1/8" center and 1/16" sides. Note the grain direction. **9.** Use a square to assure alignment of formers on one of the fuselage sides. **10.** Again use a square when attaching the other fuselage side to form the fuselage box assembly. **11.** Glue the pylon into the slots on the top of the formers and use a square to check trueness. **12.** Build the pylon platform on the bottom of the wing. Use a piece of clear plastic or waxed paper to prevent the platform from sticking. **13.** Glue the finished platform to the pylon, then add a micro-balloon and white glue fillet between the platform and the pylon. **14.** This is the Nyrod guide exit for the rudder linkage. The elevator guide exits on the other side of the fuselage. **15.** This photo shows the access panel and the method of attaching it to the fuselage. **16.** The landing gear is attached with two brackets and small wood screws to the plywood mounting pad on the bottom of the fuselage. **17.** A piece of sandpaper wrapped around a dowel makes a good tool for rounding the inside of gussets. Make several different sizes of small sanding blocks for detail sanding in tight areas. **18.** The complete fin-rudder and stabilizer-elevator assemblies ready to cover and hinge. Light weight construction in the tail section of the plane is essential for proper balancing. Choose your wood accordingly. **19.** Pong derives its name from the Ping-Pong ball spinner. This feature prevents broken windows when flying in confined areas. Pong was designed to be flown from a large back yard or a small school field. Its light-weight construction makes it it an ideal trainer type of aircraft. Note the use of a muffled Cox .049 engine. **20.** Cover Girl, Donna Smothers adjusts the needle valve before launching the Pong from her front yard. Note the radio switch on the left fuselage side. The simple straight lines of the Pong make for ease of construction. It's a project for beginner and expert alike. Note the transparent covering, just the thing for high visibility in confined areas. The design is reminiscent of a 1950's Freeflight ship. A bit of downthrust can be seen in this photo. Use any two channel radio system. Now, go have fun!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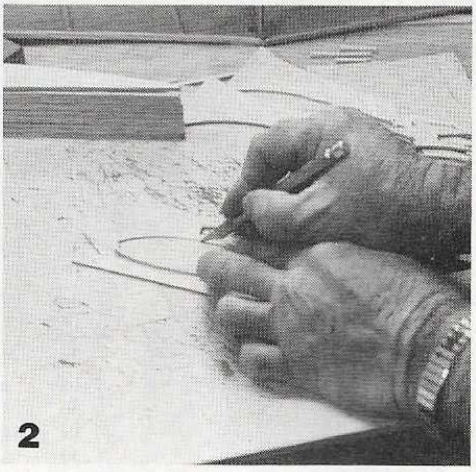
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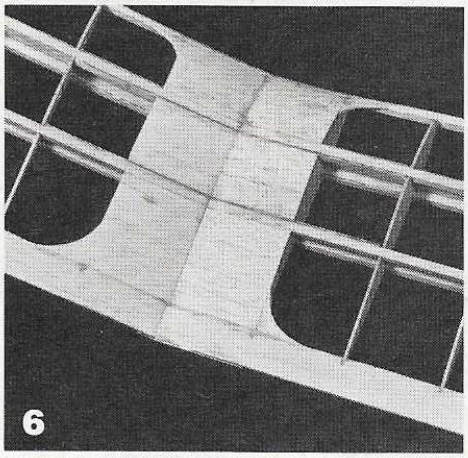
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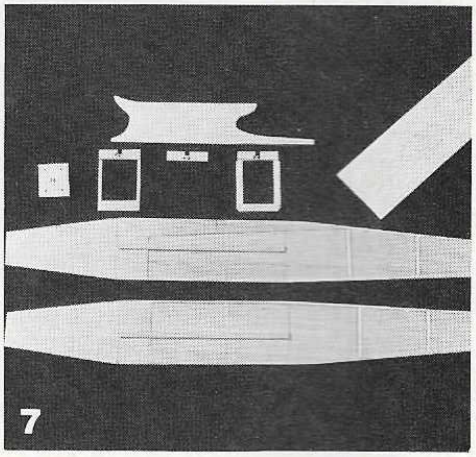
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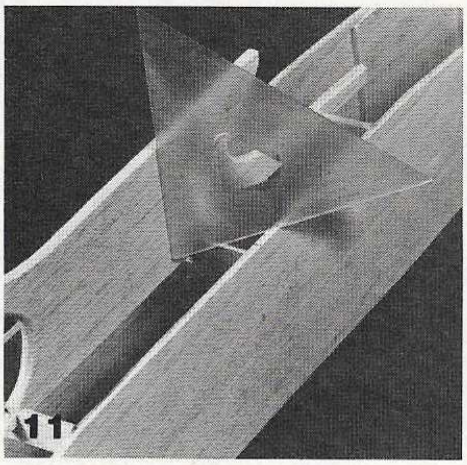
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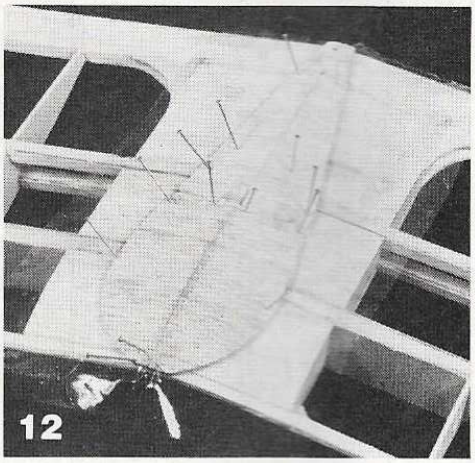
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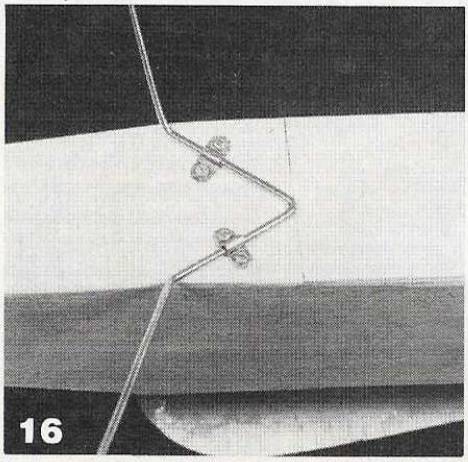
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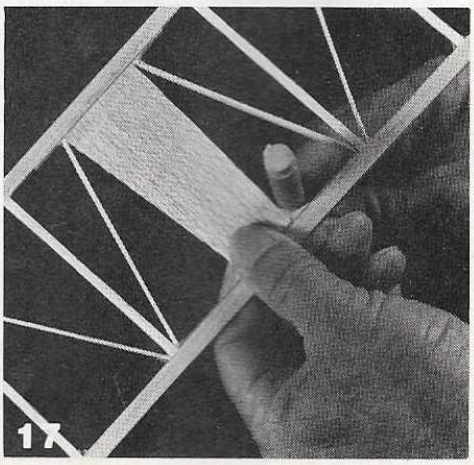
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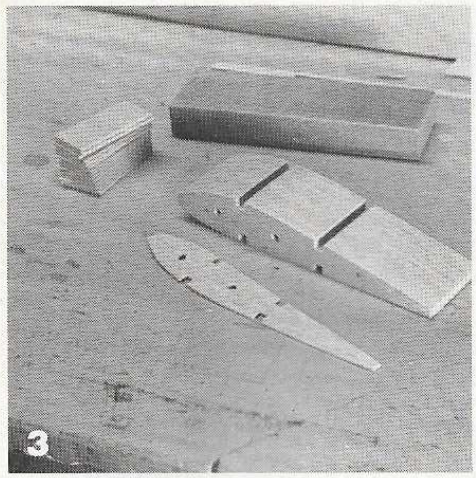
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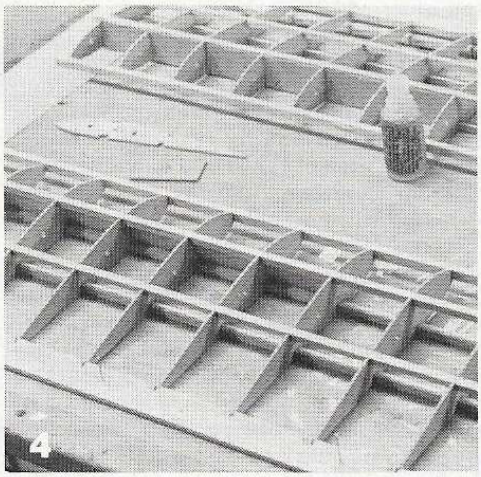
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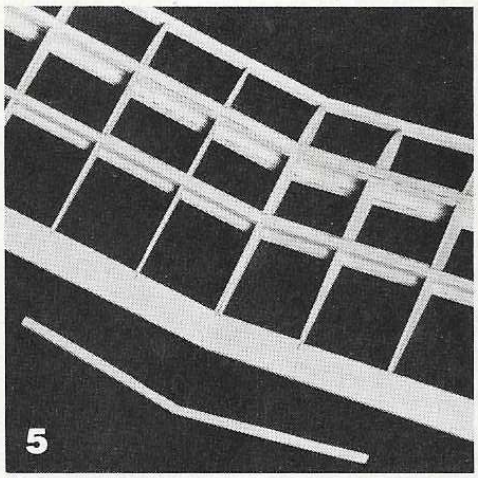
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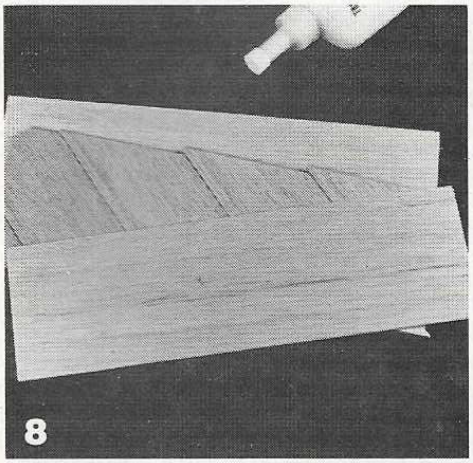
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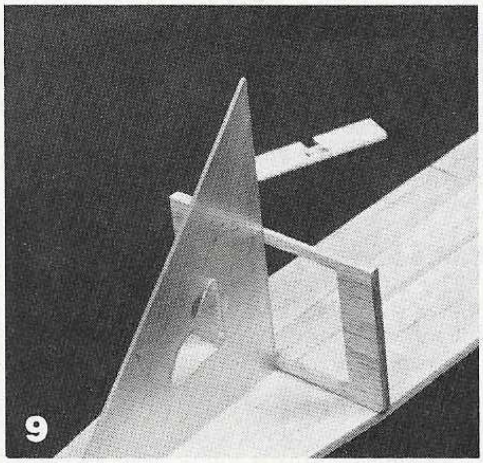
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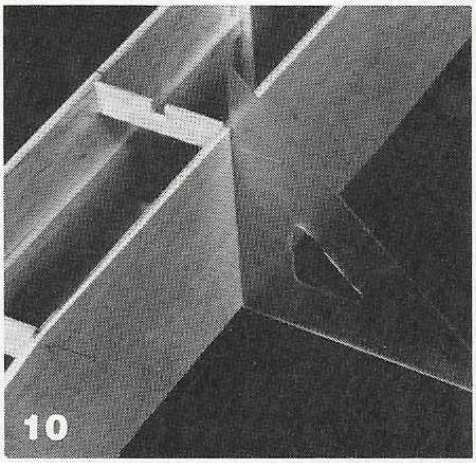
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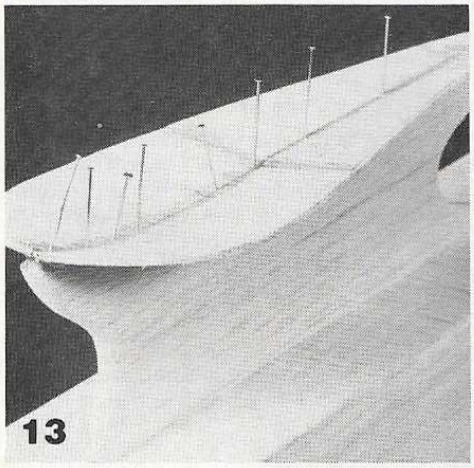
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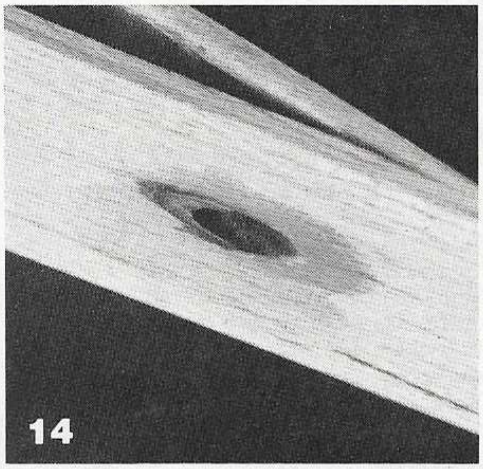
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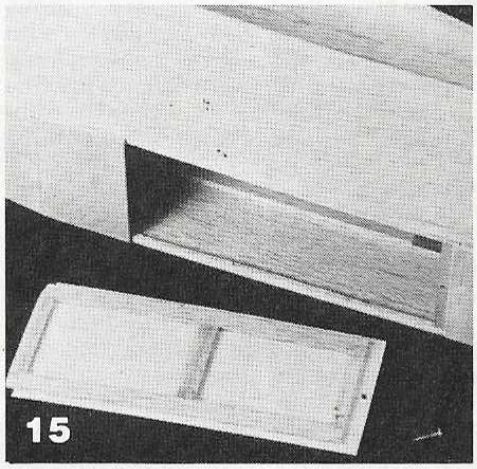
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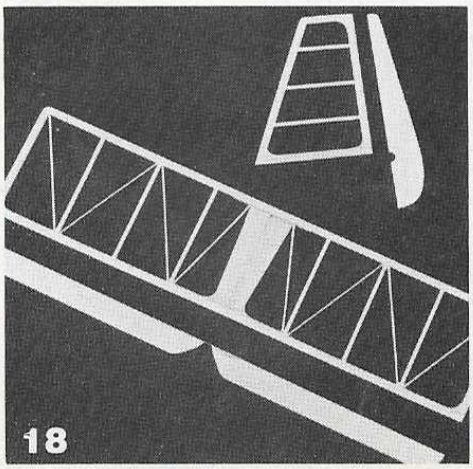
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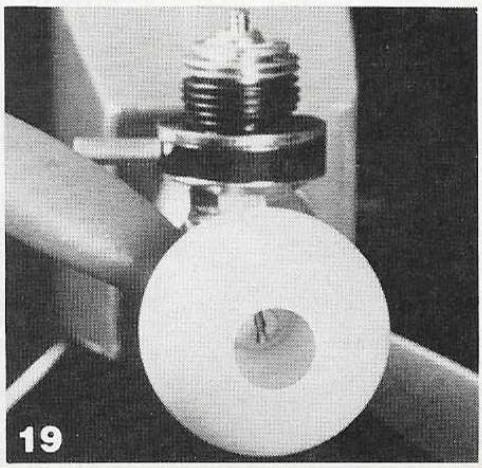
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