FUSELAGE DETAILS

REAR PONTOON STRUT
FRONT PONTOON AND LANDING GEAR STRUT
NOSE GEAR STRUT
F-1
F-2
F-3
F-4
F-5
F-7
T-1
T-2
CUT OUT TO SUIT TANK
1/16" PLYWOOD
3/16" PLYWOOD
1/8" PLYWOOD
SIDE AND UPRIGHT BEAM MOUNTS SHOWN

℄ RADIAL MOUNTING RECOMMENDED
3/16" SHEET BALSA
VECO ELEVATOR HORN

STAB PLAN
CLOTH TAPE HINGES

R-9

WING LEADING EDGE 1/4" SQ. BALSA
1/8" SHEET BALSA WING RIBS
1 OZ. BALLAST
3/32" DIAM. ALUM. TUBING
LEAD-OUT WIRES
1/8" HARD SHEET BALSA TIP

WING PLAN

1/4" x 3/8" HARD BALSA WING SPARS
1/8" PLYWOOD CONTROL UNIT MOUNT
ROBERTS FLIGHT CONTROL SYSTEM
SPAR JOINERS
TO EXHAUST SLIDE
R-1 R-2 R-3 R-4 R-5 R-6 R-7 R-8 R-9
FOR RIBS R-3 TO R-7, STACK 1/8" SHEET BALSA BETWEEN R-2 AND R-8 TEMPLATES. TRIM AND SAND TO SHAPE.
3/32" x 3/4" BALSA CAPSTRIPPING
PUSHROD
3/4" DIHEDRAL HERE
WING TRAILING EDGE 1/4" x 1" HARD BALSA
1/4" HARD BALSA
1/16" SHEET BALSA FAIRING
STRINGERS REMOVED FOR CLARITY
1/2" OFFSET
1/8" PLYWOOD SPAR JOINER

PONTOON TOP 1/8" SHEET BALSA

FUSELAGE AND FLOAT TOP VIEW

FASTEN WITH "J" BOLTS
SOLDER STRUTS TO "J" BOLTS
1/8" SHEET HARDWOOD CROSSMEMBER
FOUR TANK TRAY KEYS CEMENTED IN FUSELAGE
3/32" SHEET BALSA
COWL DOUBLER 1/4" SHEET BALSA
TOP PLANKING PATTERN
NOSE DOUBLER 1/8" PLYWOOD

SOFT BALSA COWL
1/16" DIAM. WIRE HATCH PIN
EXHAUST SLIDE
SAW BLADE STOCK
PONTOON POSITION
C.G.
1/8" DIAM. DOWEL
1/4" SHEET BALSA CABIN ROOF
FUSELAGE FORMERS ARE 3/32" HARD SHEET BALSA EXCEPT WHERE NOTED.
3/32" SHEET BALSA SIDES
P-6
FIN
RUDDER
1/8" HARD SHEET BALSA
ELEVATOR CONTROL HORN
K & B. 32 SHOWN INSTALLED
1/16" DIAM. WIRE TO EXHAUST SLIDE
3/16" SQ. BALSA
F-1 F-2 F-3 F-4 F-5 F-6 F-7
T-1 T-2
PLYWOOD DOUBLER ENDS HERE
3/16" SQ. BALSA BRACING ON RIB SIDES
R-1
1/8" x 3/16" HARD BALSA STRINGERS
1/16" DIAM. WIRE PUSHROD
1/16" SHEET BALSA BOTTOM
1/8" PLYWOOD SKID

P-1 P-2 P-3 P-7 P-8 P-9 P-10

FUSELAGE AND FLOAT SIDE VIEW

COWL DOUBLER
1/8" DIAM. WIRE
1/8" PLYWOOD PLATE
SOFT BALSA BOTTOM
3/32" DIAM. WIRE
1/32" DIAM. WIRE
BIND AND SOLDER
1/8" PLYWOOD
3/32" DIAM. WIRE
F-4A
P-4
TYPICAL SECTION P-5
F-6

WINDSHIELD PATTERN
HEAVY CELLULOID

1/8" SHEET BALSA
SOFT BALSA NOSE BLOCK
2" DIAMETER WHEELS
1/8" SHEET BALSA
1/8" x 3/16" BALSA BRACING
3/16" HARD SHEET BALSA KEEL
3/16" SQUARE BALSA
PONTOON FORMERS, SIDES AND BOTTOM ARE 3/32" SHEET BALSA EXCEPT WHERE NOTED.
SHEET ALUM. RUDDER
P. D. G.

SCALE IN INCHES
0 1 2 3 4 5 6 7 8

MODEL AIRPLANE NEWS • November 1952

SURE FUN

As seaplane, ship gets on step, rises like real crate. Amazing sight is inverted flight.

For land or water this is the sport plane to end all sport planes! The J. Roberts Flight Control System makes Sure Fun dream to fly.

As landplane, craft looks like Goodyear racer. Does all loops, and horizontal eights.

Third line—as rigged here—operates sliding exhaust throttle for an excellent low speed.

by VERN CLEMENTS

► This sport model is controlled by the J. Roberts Flight Control System which gives you complete control over your engine speed at finger-tip command. You can fly at any speed you want, yet the control response is instant with no lag.

A typical flight with the Flight Controlled model presented is as follows: From your position next to the water's edge you signal your helper to release the twin-pontoon model. You give it just enough throttle to get on the step and let the plane skim over the water's surface. Apply back pressure with the throttle finger; the motor instantly roars to full power, a little more up elevator and the seaplane is airborne in a most realistic manner. Now you begin feeling out the controls. It flies nicely inverted, giving a very unusual appearance with the pontoons facing the sky. Just for fun, idle down and make a low-speed pass over the water with the rudder almost touching the surface—the spectators will turn pale but you have power control at your finger-tips. You now try several horizontal eights, inside loops, outside loops, and wingovers. The ship is very smooth on maneuvers although more sky is used than with an all-out stunt model due to a higher wing loading. Now try full idle control—the engine is now very quiet since the exhaust back pressure slide is almost closed. This adds considerable realism to the landing approach. After a slow landing speed has been reached, touch the pontoons to the water and let the plane taxi as far as you like before giving throttle and becoming airborne again. If you misjudge on the approach, you can use a little throttle and come around for another try. Yes, this is Sure-Fun. (*Continued on next page*)

In a matter of minutes the Sure-Fun can be changed over to a land plane by simply changing the removable bottom fuselage hatch. Two hatches are used, one with pontoons mounted on it, and the other with a wheel gear attached. The two-hatch system allows proper strut positioning for both gear types as well as giving accessibility to the removable gas tank mounting and the Flight Control plane unit. The tricycle wheel gear is positioned for safe take-offs and smooth touch-and-go landings, even on a grass surface.

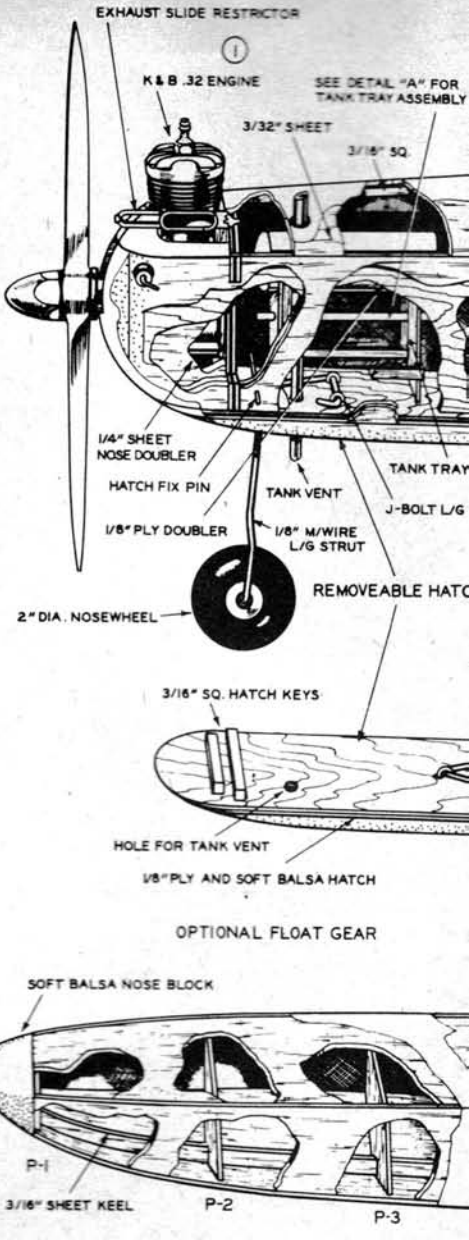
The J. Roberts Flight Control system is a three-line method of control. Line pull is distributed evenly to all three lines during any control movement. This allows lighter lines to be used than with a two-line system. The Sure-Fun flying wires are made up of three equal lengths of .012 stranded cable. The wing tip elevator lead-out cables (the outer two cables) are tied even in length. The center cable (the power cable) is then tied 2⅛" longer with the elevator cables pulled tight. This is full motor speed position of the Flight Control plane unit.

The special Flight Control handle unit hook-up cables are staggered for proper control when hooked up to the plane lead-outs with the three equal length flying wires. The forward position of the handle trigger is for low speed, back is full power, with any speed you want in between these two positions. This handle gives you complete elevator and engine speed control with one hand.

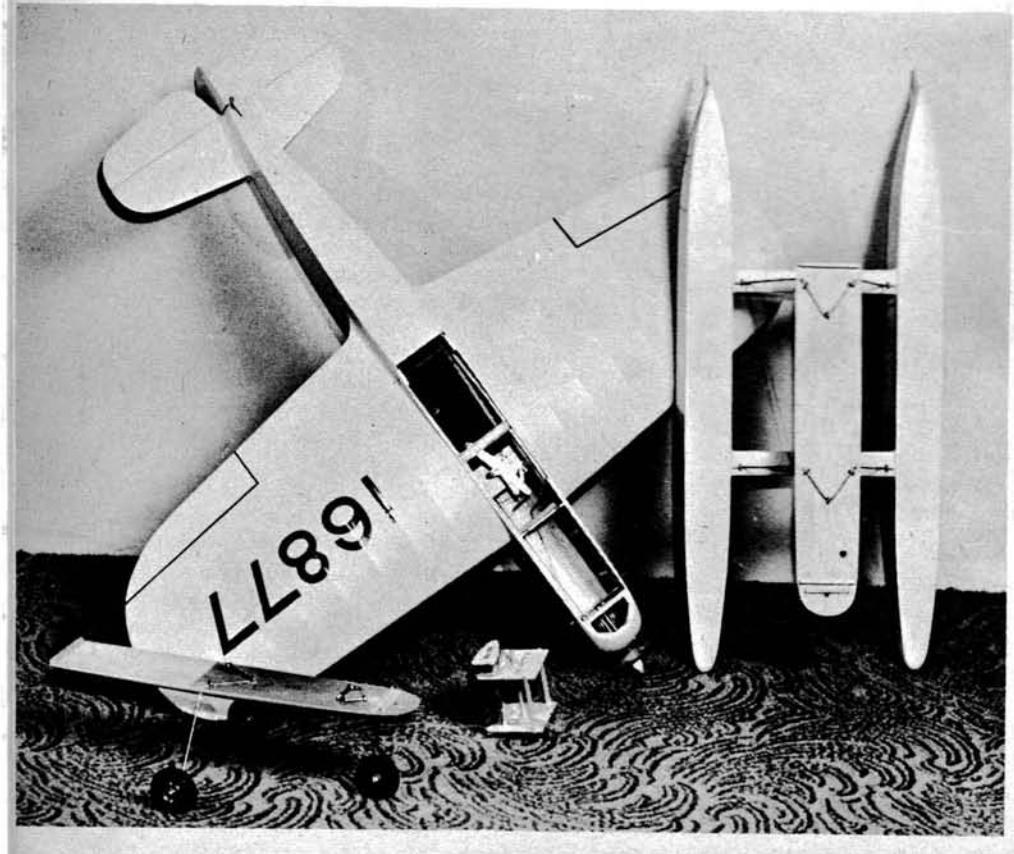
Construction of the Sure-Fun is simple, considering the realistic semi-scale appearance of the finished product. Stress points are strongly reinforced and keyed in place. In choosing wood sizes the weight element was considered secondary to the strength and long life desired, especially since the wing loading was to be higher than a stunt ship to allow good spot landings without ballooning tendencies. If you plan to use a lighter engine than a .35, keep the tail end of the ship light and don't spare weight in the nose construction.

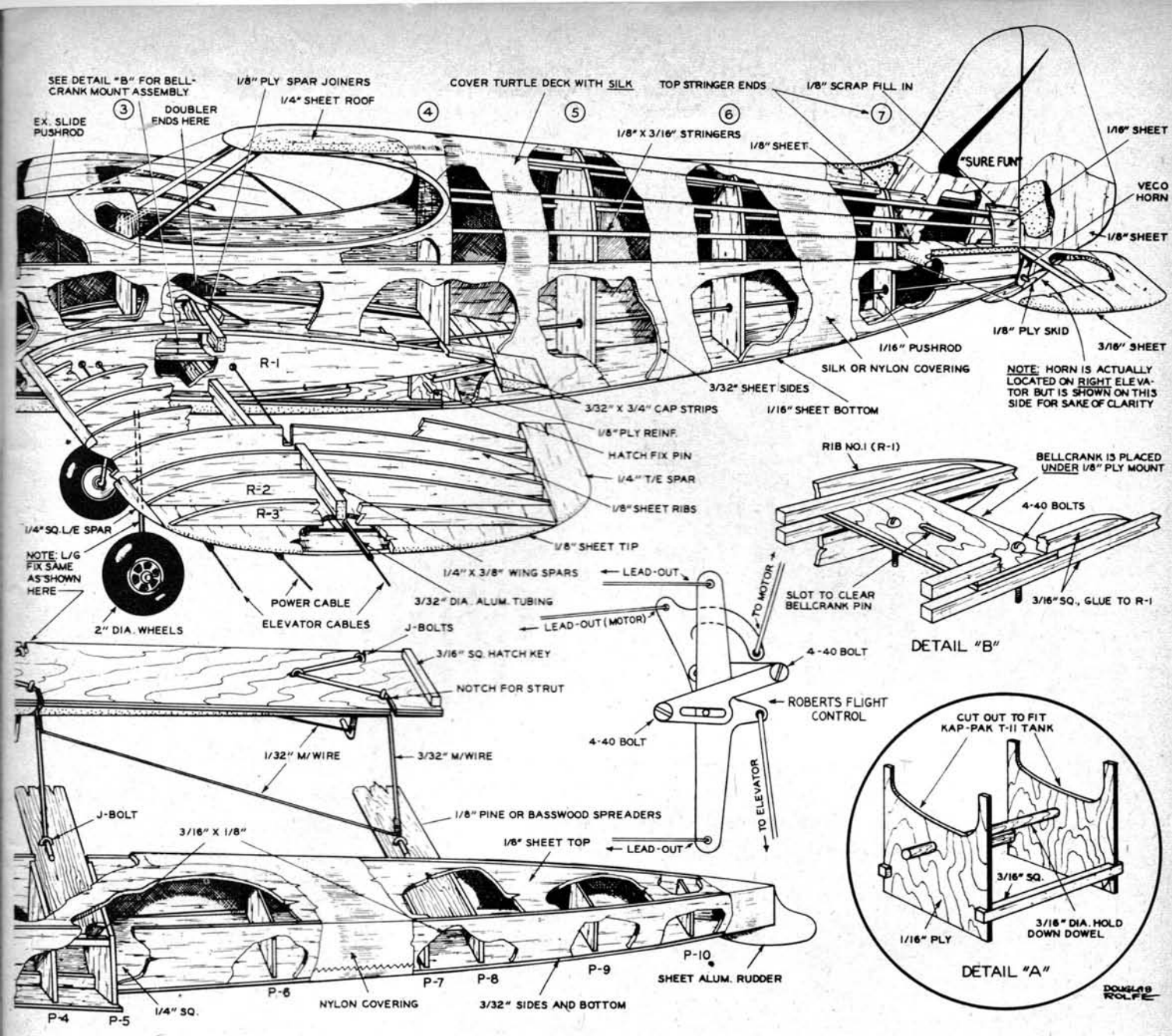
The 3/32" medium hard balsa fuselage sides should be pinned together for cutting and sanding to shape. After cutting to shape lay the sides on the plan and double check for accuracy of wing cut-out and the notches for Former #1 (firewall) and Former #2. Cut nose doublers and rear hatch pin reinforcements from ⅛" plywood. Rub a coat of cement on joining surfaces of these pieces and allow to dry before applying more cement for permanent attachment. The first coat of cement merely soaks into the wood—the above pre-gluing method will greatly increase the strength of any model. The sides should be clamped together and holes drilled for the two 1/16" piano wire pins to be pushed through the fuselage later for the removable gear hatch rubber band attachment. The pushrod slot should be cut in the tail of the right fuselage side for pushrod outlet to the control horn.

Radial or beam mounts are shown on the nose former patterns. Check your engine mounting dimensions against the plans before tracing the 3/16" plywood firewall (Former #1) and the ⅛" plywood Former #2. An upright engine mounting is recommended for seaplane use. When tracing the formers don't forget to indicate pushrod hole positions. Drill these holes before assembly. Cement 1/16" I. D. eyelets in Formers #5 and #6 pushrod hole positions. After the wing is in position and the controls are hooked up don't forget to cement a wire pushrod guide at Former #4 Position. This guide may be bent from a bobby pin or 1/32" piano wire and cemented in place with a small strip of gauze for strength. Drill a 3/32" hole in Former #2 for the motor exhaust slide pushrod. The pushrod fit must be loose in this hole to prevent binding.



Either wheeled gear or floats strap to fuselage bottom with rubber over dowels, ala the RC jobs. Another keen idea is the removable tank, which slides into place. Note bellcrank.





Cement the formers in position and check alignment carefully. Cut and sand the stabilizer and elevator to shape, drill holes in the elevators for a Veco Control Horn (No. 340) and assemble, using aircraft pinking tape for hinges. Cement the stabilizer in position before cementing the vertical fin in place. Note that the fin extends to the top of the stabilizer. Do not cement the rudder to the fin until the stringers are in place and covered with soft 1/16" sheet between Former #7 and the tail-end of the fuselage. You will note that the stringer ends must be beveled before cementing to the fin sides. Carve 1/16" off the outsides of the stringers from Former #7 to the fin trailing edge for the 1/16" sheeting. Do not build up the cabin or sheet the nose top and fuselage bottom until the wing is in place and the controls are installed and working properly. Cement hard balsa cowl blocks in place, carving and sanding to shape when dry.

The tapered wing ribs are easily made by using the stacked rib method. Make plywood or metal patterns for ribs #R-1 and #R-2. Stack eight sheets of medium soft balsa between these patterns, drill two holes through the stack and bolt together with motor-mount bolts. Carve and block-sand the rib stack down to the patterns. Hand saw the leading edge and spar notches and drill the lead-out wire holes. You can now take the bolts out and go through the above procedure again, eliminating the lead-out wire holes for the other set of ribs. Ribs #R-3 are traced and cut out separately and cemented to the top and bottom of the wings ⅛" sheet tips. The wing spars should be cut from hard balsa. They are tapered between ribs #R-2 and #R-3 to allow smooth wing-tip covering. Cement the four ⅛" plywood dihedral braces in place, checking the dihedral angle. Next, cement the ⅛" plywood control unit mount plate in place —3/16" square strips are cemented above and below the plate, inside ribs #R-1. After the wing center section cement is dry, trim 3/32" from ribs #R-1 (do not notch into the spars) and cement the 3/32" sheet cap strips in place. Wet the outside surface of the cap strips for easier bending to the rib curvature.

Bind and solder the three flexible wing lead-out cables to the Flight Control plane unit, thread the cables through the wing ribs and bolt the control unit in place. Use washers between the control unit and the mounting plate for spacing to prevent the pushrods from rubbing on the plywood control mount plate. Cement gauze over the wing-tip lead-out-wire tubes.

The Flight Control plane unit comes with complete (*Continued on page* 34)

instructions for cutting the slots in your engine exhaust for the exhaust-slide control as well as detailed control hook-up instructions. The manufacturer will install the slide-control on your engine for a nominal fee if you don't want to do it yourself. You can also use a Roto-Valve or Bramco Throttle linked with the Flight Control unit for motor speed variation.

Bolt your engine in place (with offset thrust per the plans) before bending the 1/16" piano wire exhaust and elevator pushrods. Cut a notch in the firewall to allow pushrod travel. Bind pushrods with soft wire to the control-unit attachment wires and check elevator and exhaust control action before soldering permanently. The closed position of my exhaust slide leaves a 1/16" triangular exhaust port opening for a slow engine idle speed with the K & B .32. The port opening will vary with different engines. If desired, you may adjust the slide to close completely so that you may stop the engine at will. Be sure that the exhaust port slide opens completely when the two elevator control wires are both pulled at the same time. If you like you may bend a small V in the exhaust pushrod to allow pushrod length adjustment.

You are now ready to cover the top of the nose with 3/32" sheet balsa, wetting the outside for easier curving over the formers. The outside edges of the stringers are notched 3/32" to allow the sheeting to come in contact with Former #4. The ¼" soft sheet cabin top is cemented in place and is rounded off after the 3/32" scrap window top outline pieces are cemented in place.

The removable gas tank tray is built up as a separate unit. The tank is held in place with rubber bands looped over the tank tray's 3/16" hardwood dowel. Slide the tray (with tank) into position from the bottom of the nose and center the tank with the needle valve body for smooth inverted operation. Make sure the tank does not come in contact with the exhaust slide pushrod. I used a Kap-Pak No. T-11 stunt tank. After you have found the proper tank tray position in the nose of your ship, you can cement the 3/16" square keys in place per the plans. In the event of fuel system troubles at the flying field you simply remove the gear hatch, disconnect the fuel line, and slide the tank tray unit out of your ship. Tank repairs can then be made, or a spare tank installed, in a matter of minutes without going back to the workbench. Tank air-tube holes should be drilled in the top sheeting and the hatch to allow the tank filler and air tubes to extend outside the ship. Flexible fuel line tubing can be slipped over the tank vent tubes for extending outside the nose. The removable feature of the tank tray unit necessitates a radial engine mounting. If you are using beam motor mounts, the tank mounting formers can be notched for the motor mounts and cemented in place for a permanent tank mounting.

The pontoons are assembled upside down. Pin the ⅛" top sheets to the workbench, then cement the formers in their respective positions. When dry, cement the keel and the ⅛" x 3/16" crossbrace reinforcements in place. Cement and pin the sides in position and let dry while the assemblies are still pinned to the workbench. The two pontoon crossbraces can be fashioned from basswood or yardstick material. Round the edges of these braces before sliding them through the pontoons and cementing in place. Pin upside down on the workbench to dry. Be sure that the pontoon centerlines are parallel to each other. Block-sand the bottoms of the pontoons for proper contact of the bottom sheeting. Before covering the bottoms, a couple of coats of clear dope should be applied to the interior of the pontoons. Clear dope the inside of the bottom sheeting before cementing in place, applying water on the outside of the wood from the step forward to allow easier bending.

The landing gear struts are J-bolted to the removable hatch ⅛" plywood flooring after the hatch has been rounded to shape on the bottom to blend in with the lines of the fuselage. After the J-bolt nuts are screwed on, fill the holes over them with plastic balsa. Don't forget to cement the 3/16" square hard balsa keys to the hatch floor to maintain proper hatch alignment on the fuselage. Also note that the pontoon struts are soldered to the J-bolts on the pontoon crossbrace mountings. I found this to be very important after making an unnecessarily hot water touchdown which sprung the gear out of the J-bolts.

In preparation for covering, the entire ship should be sanded to a smooth surface. The formers between the stringers should be sanded flat for smooth covering contact. Give the entire structure a coat of clear dope (three coats on the pontoons) and sand lightly after dry. I also gave the internal structure of my ship one coat of clear for protection against water.

A tough covering material is recommended, preferably Berkeley model nylon or silk. Nylon should not be used over the fuselage stringers to prevent warping, silk will work out nicely here. The tail surfaces should not be covered, thus saving weight behind the center of gravity. The pontoons should be covered with nylon, overlapping the seams to prevent the possibility of a leak.

Give the covering two thinned coats of clear dope before lightly sanding. Apply a couple of coats of filler to the covered wood areas and sand again with fine sandpaper. Finish with another coat of clear and four coats of thinned color dope, trimming to suit your taste. The original Sure-Fun was given a finish of butyrate orange-yellow dope with red trim, resulting in a nice effect on the water.