
Outboard Racing Speed Hints

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NUMBER 1: Install a water speedometer so you can be sure of the effect each adjustment you make has on speed.

NUMBER 2: Try various motor angles until you find the one that works best. One notch of motor tilt on the original Spitfire was the difference between poor and excellent performance.

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motor about ¼ in. So have a supply of plywood shims ⅛, ¼ and ⅜ in. thick and the size of the top edge of the motor board with you. Use these shims under the motor bracket to raise or lower the motor to obtain best speed for water conditions.

NUMBER 4: Experiment with different types of propellers. Use the one that gives you the utmost acceleration as well as speed. If you intend to race seriously, have one prop for competition and one for knocking around.

NUMBER 5: Try different types of spark plugs in your motor to find the kind that works best for you. Also try various spark-lever settings. The wide open setting, ordinarily required for average boats, may not be best. You may be able to pick up a mile or so by retarding the spark slightly.

NUMBER 6: For fuel, use straight gasoline of the non-leaded type, 72 octane or better. Mix with highly refined and filtered S.A.E. #30 or #40 grade oil containing no detergents to the proportions of 1½ pts. of oil to 1 gal gasoline.

NUMBER 7: Our last item to secure slightly higher speed is to alter the bottom of the motor. Mercury Hydro Quick-Silver lower units are equipped with a small aluminum skeg to protect the propeller when setting the motor down. If this skeg is sawed off just below the gear case (be very careful not to cut into the gear case) the speed may be boosted up to 1 or 2 mph more. However, when this skeg is eliminated scant protection is afforded the propeller. The propeller, of course, can be removed when the motor is transported.

Want to Build Your Own?

If you're searching for that elusive extra mile an hour to put you ahead of competition with a small margin to spare, *Spitfire* is the boat for you. She is a step hydro, eligible for racing in sanctioned class B regattas.



Spitfire skimming across the water at 50 MPH.

She'll equal any three-point hydro with considerably better riding qualities. Hull rides well in rough water without excessive pounding and has beveled sides for taking turns at wide-open speeds without tripping. Trussed keel design and stressed plywood planking produce an extremely strong, lightweight hull.

Class B requirements specify that the hull weigh a minimum of 100 lbs. without steering gear and fin. To extract the last mile an hour from your Spitfire, keep its weight down to this minimum by using clear straight-grained spruce for all framing members except the stem, filler block and motor-board angle blocks. Use 1/4-in. fir exterior plywood for planking. Bond all joining surfaces with resin glue (*Elmer's Waterproof*, *Penacolite G-1124* or *Weldwood*).

Make the building form (Fig. 2) first. Use a stock-size lumber yard 2 x 6 in. plank of any type wood and carefully lay out the frame-notch locations. Draw the curve by bending a batten against nails driven in at measured points. Note that a filler block must be added forward of #1 frame notch. Saw out the building from and mount on two 2 x 4 in. legs. If you are working on a wooden floor (Fig. 3), temporarily nail the legs to the floor. If you are working on a concrete floor, add the 1 x 6 in. pieces indicated in dotted lines in Fig. 2-A.

Start construction of the boat by making full-size drawings of the three frames, transom and stem (Fig. 4) on heavy paper such as wall board is wrapped in. Draw in 6 in. extensions on all frames. Then transfer the outline of each piece to lumber with a toothed wheel similar to a

Here's a red hot hydroplane for Class B racing events

By WILLIAM D. JACKSON
Craft Print Project No. 242

STATEMENT OF USES

USES: Designed as a class "B" racing craft for competitive or impromptu racing with class "B" outboard motors.

FEATURES: Low center of gravity especially with hydro "quickie" lower units adapted to motor. Hull is stepped, but with proper motor adjustment, boat rides upon edge of after plane. Boat is not running correctly until daylight may be seen under hull at wide open speeds.

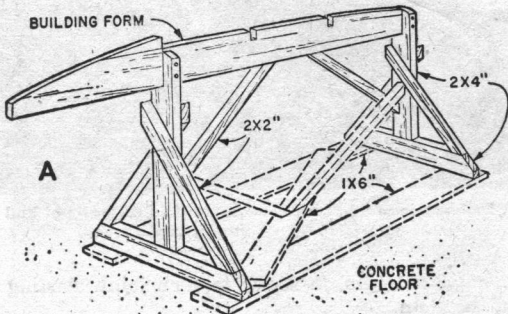
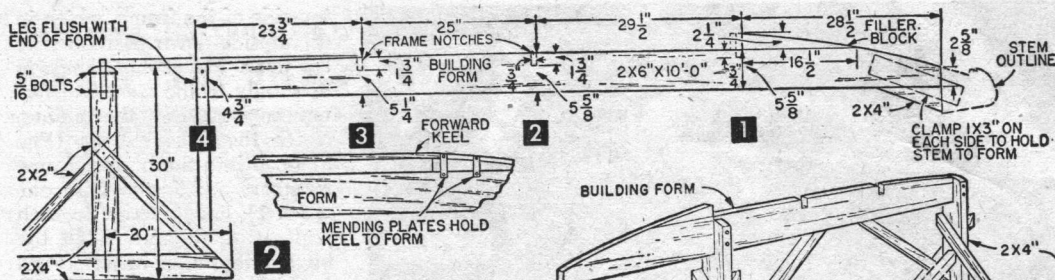
LENGTH: 9 ft. 10 in.

BEAM: 51 in.

WEIGHT: 100 lbs. without steering gear, fin, throttle control, etc.

SPEEDS: 50 MPH with Mercury Hurricane having hydro "Quickie" lower unit and at highest motor board setting possible.

dressmaker's wheel, or make a series of marks with a prick punch. Be sure to include extensions and mark location of clamp on each side frame. Extensions are used for attaching braces to building form and floor so as to make hull frame rigid during construction. When all of the pieces are sawed out, place the bottom and two side pieces on the full-size drawings to align them and fasten



with glue and three #8 x 1½ in. flathead (fh) screws at each joint. Fasten transom frame pieces to ¾-in. plywood transom with glue and #6 x 1 in. fh screws spaced 3 in. apart and driven through from plywood side. Stagger screws slightly to avoid splitting frame stock. When the glue has dried, cut notches in all frames for keel, floor member and chines. Cut the notches slightly undersize and when assembling, run a saw alongside members to enlarge notches for a snug fit.

Transfer the stem drawing to a piece of 1½ in. thick stock. Saw to shape and rabbet as indicated by making a saw cut and then chiseling to size. Cut two chines with beveled edges from a single piece of ¾ x 2¾ in. stock (Fig. 9) by rip sawing at a 40° angle.

You are now ready to start assembling the frame on the building form. Begin by clamping the stem to the end of the form with a piece of scrap 1 x 3 in. stock on each side (Fig. 2). Clamp the transom in position to the rear leg of the building form and place the frames in the notches cut in the form. Align the frames and temporarily clamp to the form with a cross brace, and to the floor as in Fig. 3.

Fit and fasten the aft keel, extending from the

transom to the top side of the aft-keel tie bar (Fig. 5), with two #8 x 1½ in. fh screws to each joint. Follow by fastening the fore keel first to the stem then to #1 frame notch as you did the aft keel. Leave the step end of the fore keel extend beyond #2 frame about 3 in. for the time being and mark, cut and fit the fore keel filler from 1½ in. thick soft fir. Filler extends from #1 frame to #2 frame between fore and aft keels (Figs. 5 and 7). Check with a straightedge as in Fig. 10 to determine height of filler block. Do not fasten the keel filler permanently in place at this time, merely clamp the two keels and filler together and continue by placing the chines in position. Bevel the chines to fit against the stem and recut the notches in each frame if needed. Fasten the chines to each frame alternately with

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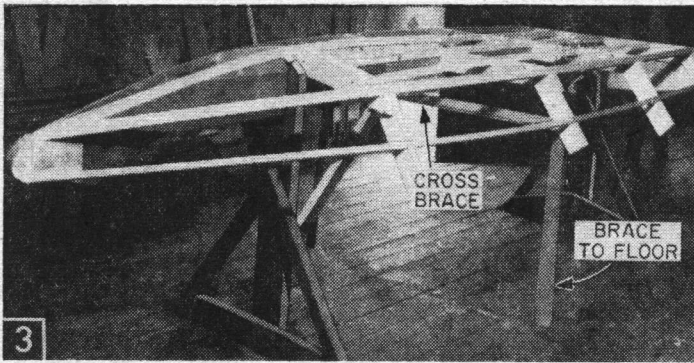
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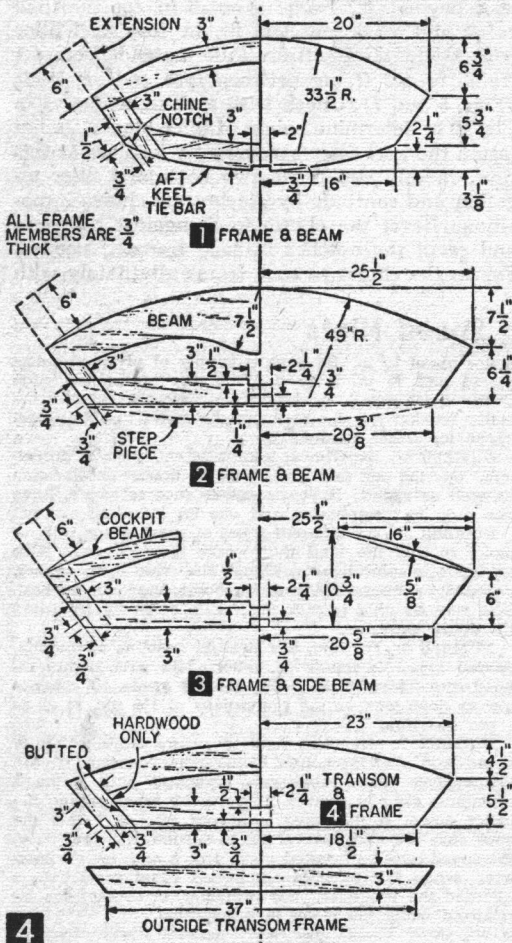
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Building form and braces securely hold all parts of hull frame in alignment during construction.

one #8 x 1½ in. fh screw to each joint, starting at the stem.

From a single piece of ¾ x 1¾ in. stock saw two clamps (Fig. 9) having a 12° bevel on each. Carefully mark and notch each frame for the clamps at the previously marked clamp locations. Be sure to place the bevel side of the clamps to the

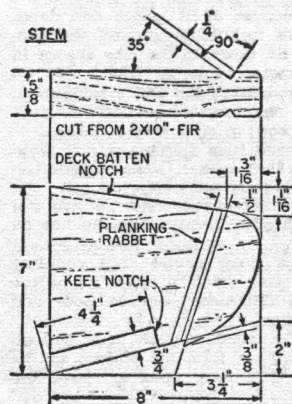


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top-side of the frame, which in this upside-down position is to the floor. Bevel the clamps to fit snugly to the stem and fasten as you did the chines. Notch the bilge battens (Fig. 5) flush into the bottom frame members and fasten with one #8 x 1½ in. fh screw to each joint. Cut, fit and fasten the bilge batten filler blocks (Figs. 5 and 7) with #8 x 1½ in. fh screws. Finish by sawing off the chines, clamps and battens flush with the transom and cover the exposed ends of keel battens and chines with the transom outer frame (Figs. 5

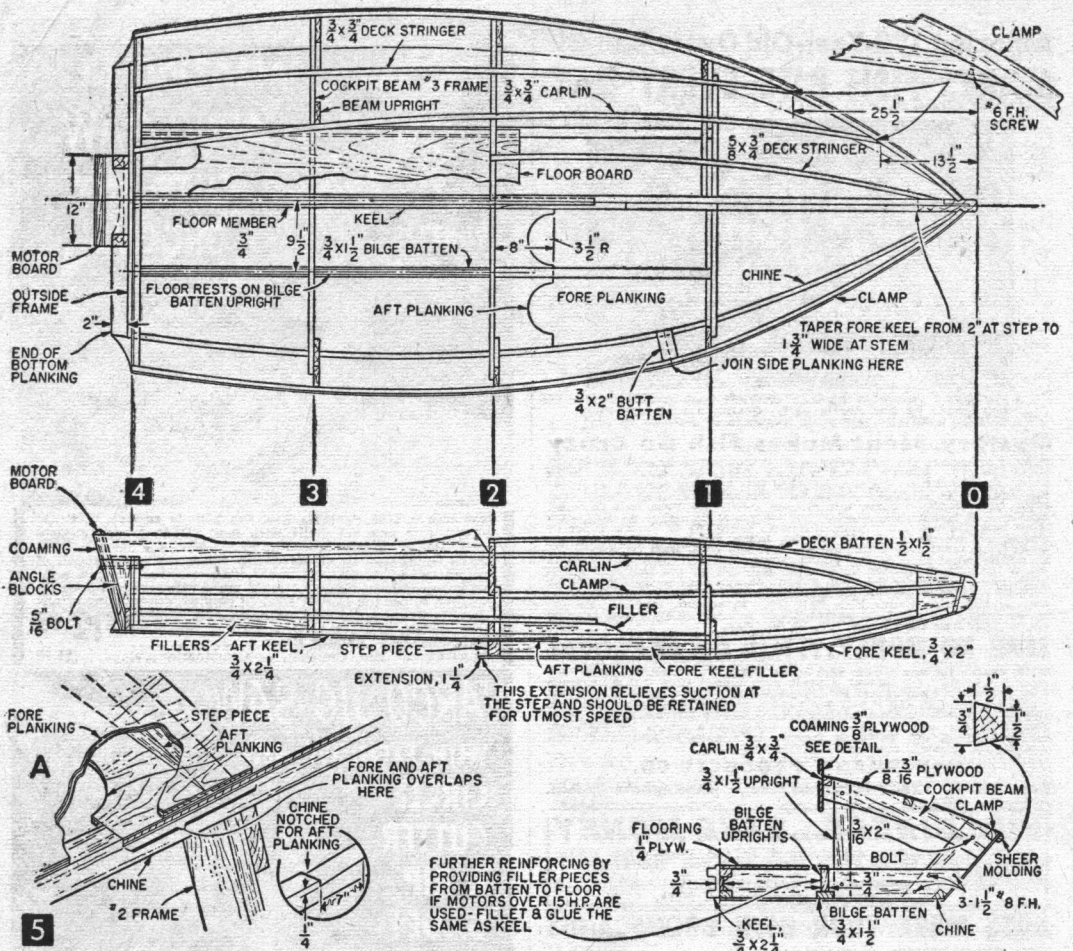
and 8). Coat entire surface of outer frame that contacts transom with Kuhl's bedding compound, clamp in position and fasten with #8 x 1½ in. fh screws spaced 3 in. apart in staggered fashion. Now, with a block plane and coarse wood rasp, fair the chine, keel and clamp surfaces to blend flush with the frame surfaces so that the plywood planking will touch all frame members.

The hull frame is now ready for the aft planking. First remove the clamps holding the fore and aft keels and filler block together and remove the filler block. Place a ¼ x 48 x 60-in. sheet of plywood on the aft section of the frame so that it extends under the fore keel and 8 in. forward of #2 frame. Clamp the plywood to the chines and mark underneath along the outside of the chine where the planking is to be trimmed. Also mark the underside of the planking on both sides of the keel, battens, frames and 2 in. beyond the transom outer frame (Fig. 5). With a compass, lay out four semicircular cutouts between the bilge battens and keel on the forward edge of the planking. Mark the chines at the fore edge of the planking so that the tapering notches for the planking (Fig. 5-A) can be cut in the chines later. Then remove the plywood, trim to shape and drill spot holes 14 in. apart through the plywood between the lines marked on each side of the keel, battens and frames. When the plywood is again



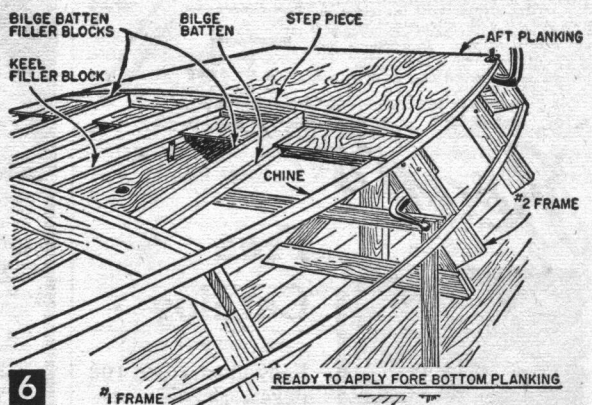
placed in position it will be a simple matter to line up screw locations by drawing pencil lines connecting the spot holes. Be sure to cut the tapering notches in the chines where the fore and aft planking will overlap, to make a good watertight seam.

To secure the aft planking to the frame, coat con-



tacting surfaces of the keel, battens, and frames with waterproof glue and the transom and chines with Kuhl's *Bedlast*. Also coat the underside of the planking between the pencil lines. Place the plywood planking in position on the frame, clamp down and fasten with #6 x 1 in. fh screws spaced 2 in. apart. Use a double row of screws along the transom. While the glue is drying, replace the keel filler block, mark and notch for the 1/4-in. planking, coat with glue and fasten to fore keel with #8 x 1 1/2 in. fh screws spaced 5 in. apart. Saw off fore keel flush with end of filler block.

Now, transfer the outline of the curved step piece, shown in dotted lines on #2 frame pattern (Fig. 4), to a piece of fir 2 x 4 in. stock and saw to shape. Coat the straight edge with glue and fasten in position (Figs. 5 and 6) on top of the aft planking with two #7 x 2 in. fh screws and three #7 x 3 in. fh screws driven through the plywood planking into the bottom #2 frame member. To make the bilge-batten filler blocks (Figs. 5 and 6), take the dimensions directly from the hull frame, cut from 3/4 in. stock

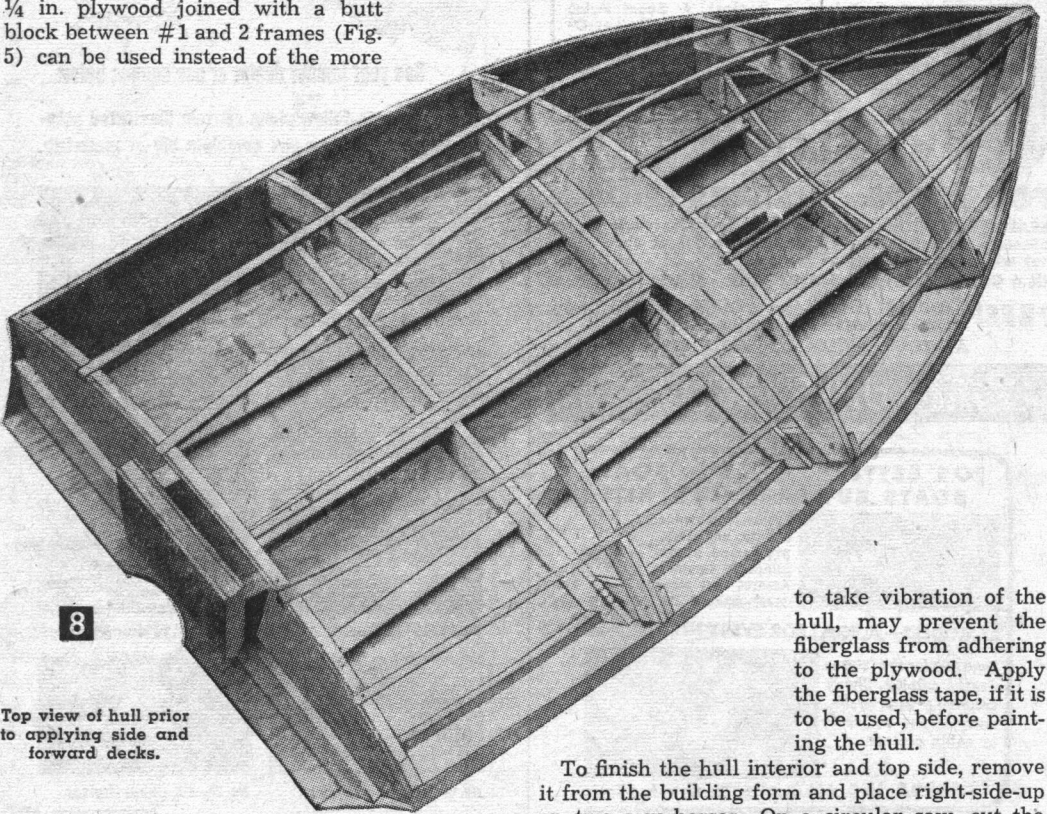
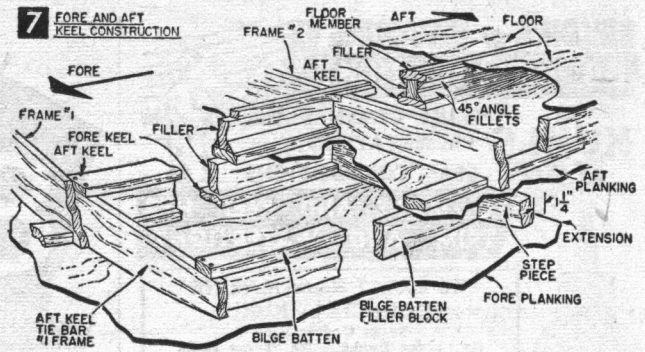


and assemble to frame with glue and #8 x 1 1/2 in. fh. screws spaced 5 in. apart, driven through from underside of bilge batten.

The fore planking can now be installed. Cut a Vee-shaped slit as in Fig. 9 down the center of the planking plywood. Lay out the shape oversize as indicated and clamp in position on the hull frame. The slit should close up completely as the

planking is clamped in place. Recut if necessary to make a tight seam. Be sure that the planking extends beyond the step piece as in Fig. 5. Mark along chines for final trimming and along frame members for spot drilling to locate screws. Then remove, trim, reassemble and fasten with glue and #6 x 1 in. *fh* screws as you did the aft planking. When the glue dries, plane the edges of the planking flush with the chines.

Since Spitfire measures a few inches over 10 ft. when measured around the sides, two 6 ft. lengths of 1/4 in. plywood joined with a butt block between #1 and 2 frames (Fig. 5) can be used instead of the more



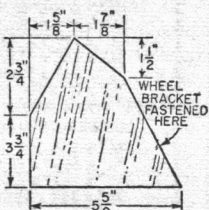
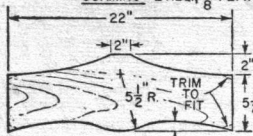
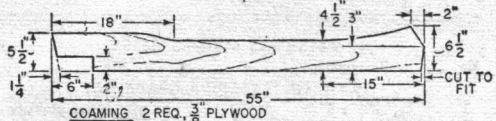
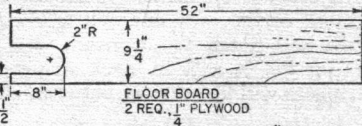
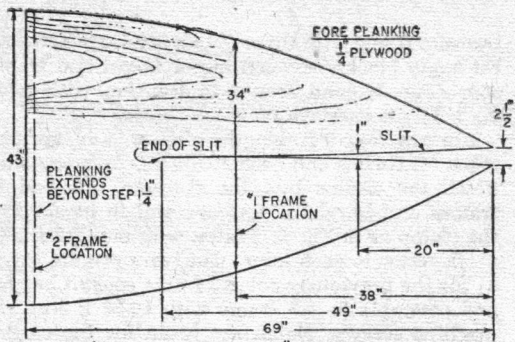
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Top view of hull prior to applying side and forward decks.

expensive 12 ft. lengths of plywood. Temporarily clamp the plywood to the sides, starting at the transom and working forward. Mark, remove and trim the plywood to shape. Coat the chines and transom with Bedlast and the clamp, frames and butt block with waterproof glue. Reclamp to the frame and fasten with #6 x 1 in. *fh* screws spaced 2 in. apart, to every frame member except the clamps where 3/4 in. galv. nails are used. After installing the planking to both sides of the frame, plane the edges flush with the bottom planking. If you intend to cover chine corners, transom and slit seam in fore planking with fiberglass tape and resin, use waterproof glue instead of bedlast where planking joins transom and chines. Bedlast, which always remains elastic

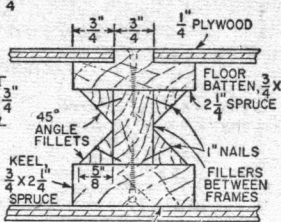
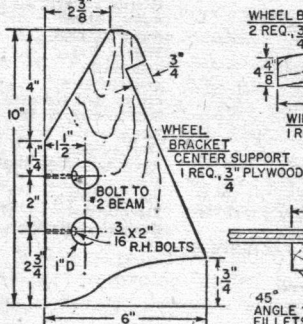
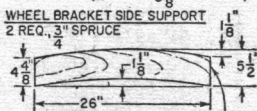
to take vibration of the hull, may prevent the fiberglass from adhering to the plywood. Apply the fiberglass tape, if it is to be used, before painting the hull.

To finish the hull interior and top side, remove it from the building form and place right-side-up on two saw horses. On a circular saw, cut the two 1/4 x 3/4 in. rabbets in the floor member (Fig. 9), and fit into notches cut in the bottom frame members. From 3/4 in. thick stock make the three filler blocks between the keel and floor member (Fig. 9). Coat with glue and fasten to keel with 45° angle fillets toe nailed through fillets with 1 1/4-in. galv. nails (Fig. 9). Then place the floor member in position and fasten to the frames and fillers with #8 x 1 1/2-in. *fh* screws spaced 4 in. apart. Add fillets to underside of floor member.

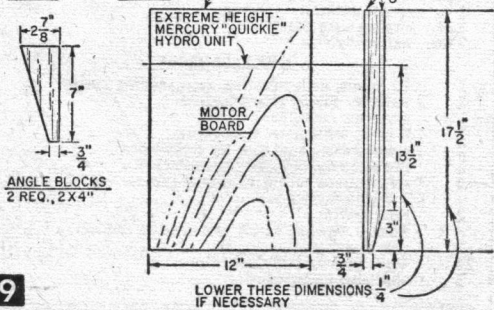
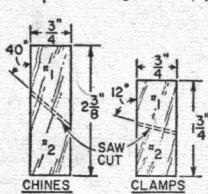
The previously cut deck beams are now bolted in place. Use one 10-32 x 2-in. roundhead (*rh*) machine screw to each joint with washers on each side. Make the motor board and angle blocks as in Fig. 9. Coat 3 in. beveled area of motor board with Bedlast and fasten to exact center of outer



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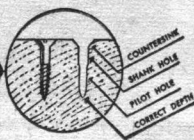


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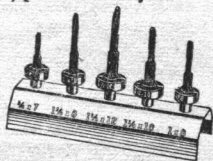
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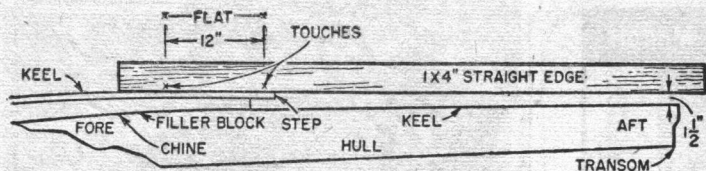
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transom frame with three #12 x 2½-in. fh screws. Fit angle blocks between motor board and transom (Fig. 5), and secure to transom with two 5/16 x 5½-in. carriage bolts.

Rip saw four 9 ft. lengths of ¾ x ¾-in. spruce stock for carlins and deck stringers. Measure and notch the carlins into the transom, #1 and 2 frames and bevel the forward end to fit against the clamp as in Fig. 5. Fasten with one #8 x 1½ in. fh screw to each joint. Cut two uprights (Fig. 5) for the previously cut #3 frame cockpit beams and assemble to #3 frame with 10-32 x 2-in. rh machine screws. Notch the beam for the carlin and fasten carlin with one #8 x 1½ fh screw. Measure and notch the transom, #1, 2 and 3 frames for the ¾ x ¾-in. deck stringers so that the stringers will be midway between clamps and

MATERIALS LIST—SPITFIRE		
No.	Description	Use
PLYWOOD (EXTERIOR GRADE AA)		
1	¼" x 4' x 5' fir	aft bottom planking
1	¼" x 4' x 6' fir	fore bottom planking
1	¼" x 4' x 8' fir	side planking—floor
1	¾" x 12' x 8' fir	coamings—motor board
1	¾" x 10' x 4' fir	transom
2	½" x 24' x 5' mahogany or birch	side decks
1	¾" x 8' x 30' fir	steering wheel brackets
(¾" spruce lumber may be substituted for ¾" plywood)		
LUMBER (SPRUCE EXCEPT WHERE SPECIFIED)		
2	¾" x 3' x 12'	frames
1	¾" x 5½" x 6'	#1 frame bottom
1	¾" x 2¼" x 36"	aft keel tie bar
1	¾" x 12' x 12'	deck beams, steering brackets, etc.
1	¾" x 23½" x 10'	makes 2 chines
1	¾" x 17½" x 10'4"	makes 2 clamps
2	¾" x 1½" x 7'	bilge battens
1	½" x 1½" x 6'	deck batten
2	5/8" x ¾" x 6'	deck stringers
4	¾" x ¾" x 10'	carlins, deck stringers
2	¾" x 2¼" x 7'	floor member, aft keel
1	¾" x 2" x 6'	fore keel
2	½" x ¾" x 10'4"	sheer molding
1	2" x 4" (15/8" x 35/8") x 16" fir	motor board angle blocks
1	2" x 10" (15/8" x 9 1/2") x 12" fir	stem
1	2" x 6" (15/8" x 5 3/8") x 10' fir	building form
1	2" x 4" (15/8" x 3 5/8") x 10' fir	keel fillers—step piece angle blocks
FASTENINGS		
4 gross	#6 x 1" fh screws	
1 gross	#8 x 1½" fh screws	
1 gross	#6 x ¾" fh screws	
2	#7 x 2" fh screws	
3	#7 x 3" fh screws	
3	#12 x 2½" fh screws	
12	#3 x 5/8" fh screws	
6	10-32 x 2" rh machine screws	
2	5/16" x 5½" carriage bolts	
1 box	5/16" copper tacks	
PAINT		
1 qt.	Kuhl's Brushlast	
1 pt.	Condon's Boatlife (white)	
1 pt.	Condon's Boatlife (red or green)	
1 pt.	Condon's Boatlife (clear)	
1 qt.	Firzite (white)	
2 qts.	airplane wing dope	
2 lbs.	waterproof glue	
MISCELLANEOUS		
1	15 in. dia. dash-mounting, racer steering wheel	
1	Keller or Finson racing throttle	
1	aluminum racing fin	
1	0 to 50 MPH water speedometer	
2	sponge-rubber knee pads for cockpit floor	
1	life preserver (bright orange color)	
4	steering rope pulleys (2 with eye snaps, 2 with flange eyes)	
2	rope tighteners	
5 ft.	Bowden wire and casing (for throttle control)	
2	rope clamps	
24 ft.	¾" nylon covered steel tiller cable	
3	aluminum lifting handles	

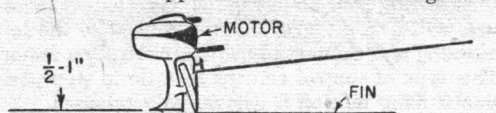


10 HOW TO CHECK LIFT AT TRANSOM & FLATNESS AT STEP MAINTAIN THRUOUT CONSTRUCTION

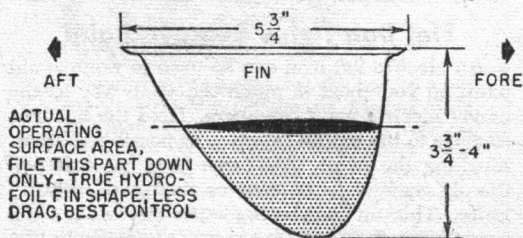
carlins. Bevel fore end of stringers to fit against clamps (Fig. 5). Fasten with #8 x 1½-in. fh screws to each joint. Notch the #1 and 2 frame deck beams and stem for the ½ x 1½-in. deck batten and fasten with 1¼-in. galv. nails. Similarly notch the forward deck beams for the ⅝ x ¾-in. stringers located midway between the deck batten and carlins. Fasten with 1¼-in. galv. nails.

Thoroughly clean the inside of the hull with a vacuum cleaner and give the interior three coats of marine varnish. Do not varnish the top sides of the carlins or stringers because the sides are to be decked over with plywood and the deck forward of #2 frame covered by heavyweight, unbleached muslin. Stretch the muslin in place and tack along the sheer edges and #2 deck beam. Apply four coats of airplane-wing dope, allow each coat to dry and sand last two coats lightly. Cover the sides from carlin to sheer clamp and transom to #2 frame with ⅛ in. mahogany or birch plywood. Fasten with glue and #6 x ¾-in. fh screws spaced 3 in. apart. Trim the side decks flush along the sheer, transom and carlins.

Make the sheer moldings as in Fig. 5 and fasten with #6 x 1-in. fh screws spaced 7 in. apart. Cut two floor boards (Fig. 9), varnish and fasten to floor member and frame bottom members with #6 x 1-in. fh screws. Lay out and saw to shape two coamings (Fig. 9) and fasten to motor board with three #8 x 1½-in. fh screws and to carlins with #6 x 1-in. fh screws spaced 4 in. apart. With both coamings in place, make and attach center and side wheel bracket supports (Fig. 9). Center support is through bolted to center of #2 deck beam and side supports fastened to coamings with

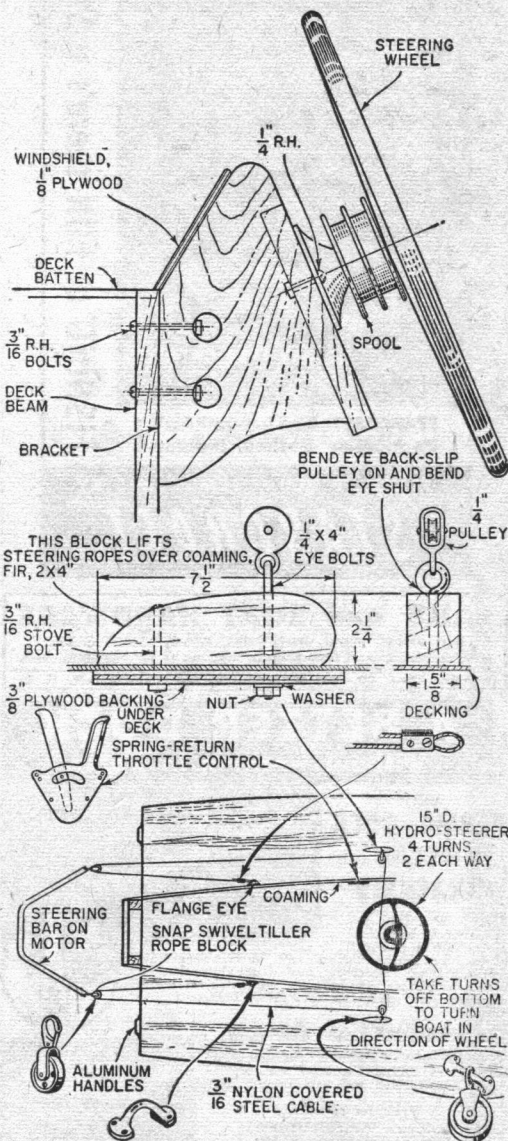


FOR UTMOST SPEED, CARRY CAVITATION PLATE ½ TO 1" ABOVE BOTTOM OF BOAT- TEST BY EXPERIMENT
 PROPELLER - JOHNSON OR AQUA JET, ADAPT PROPELLER TO BOAT, DRIVER'S WEIGHT, ETC.



#6 x 1-in. fh screws. Cut the steering-wheel bracket and wooden windshield (Fig. 9) to shape next, and fit in place on the hull. Fasten the wheel bracket to supports with two #8 x 1½-in. fh screws to each joint and the windshield with #3 x ⅝-in. fh screws.

Your boat is now ready for painting. Turn the hull over and apply a priming coat of white *Fir-zite* to bottom and sides. When dry, fill all screw heads with marine white-lead putty, allow to harden and sand the entire hull until smooth. For a good friction-free finish, first apply one coat of *Kuhls Brushlast* and when dry, sand lightly



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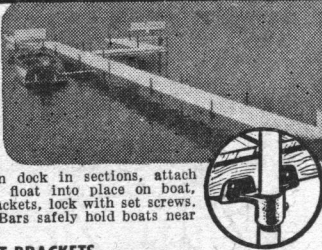
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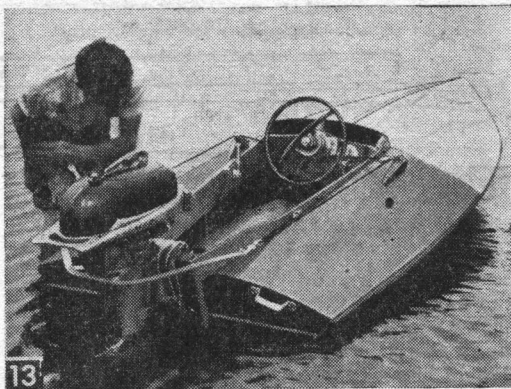
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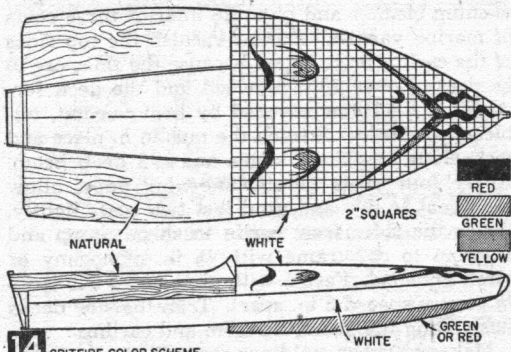
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14 SPITFIRE COLOR SCHEME

and apply two coats of Condon's *Boatlife* (red or green) on the bottom and white on the sides. Turn the hull right side up and give the side decks and transom two coats of *Boatlife* clear and the muslin deck one coat of thinned *Boatlife* of the desired color. Decorate as in Fig. 14.

Purchase an aluminum racing fin and cut down to size (Fig. 11). Fasten to underside of hull 34 in. forward of transom. Bolt a 15-in. steering wheel to the center of the wheel bracket and rig the steering gear as in Fig. 12. As a safety measure, bolt a safety grip throttle control to the left coaming and connect to throttle control on motor. This type of control returns throttle to stop position if hand tension is accidentally released.

● Craft Prints in enlarged size for building hydroplanes are available at \$1 each. Order by print number, enclosing remittance (no C.O.D.'s or stamps) from Craft Print Dept., SCIENCE AND MECHANICS, 450 East Ohio Street, Chicago 11, Illinois.

Flat Iron Helps Remove Paint

● An electric flat iron can be used to remove old paint on your boat in much the same way as the newer electric paint removers. Hold the hot iron as close to the painted surface as possible without touching the paint. After the heat has softened the old coats of paint, remove them with a putty knife. This method works especially well when removing paint from canvas covered surfaces like decks, cabin tops and canoes.


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