Plyak

By Steve Ellingson



Great for exploring rivers and lakes, this nimble, lightweight craft is easily built from readily-available plywood

In all countries of the world, particularly the United States, the kayak is enjoying newfound popularity. Here's a nimble, lightweight craft that has its roots in the Arctic as a basic instrument of survival, yet is branching out as a modern outdoor sport on our own rivers and lakes.

To the Eskimo, a kayak is more than a boat. When he's laced into his whale-bone and walrus-hide craft, he's ready for anything in the way of water or weather. To most of us, however, a kayak is pure adventure and fun. It's perfect for poking around uninhabited islands, exploring the bends of a lazy, winding river, or just breaking the peaceful surface of a placid lake at sunset.

Readily-available plywood is used for construction of this kayak, rather than the Eskimo's whale-bone and walrus-hide. The boat measures a little over 11 feet in length, and has a 30-inch beam and a gross weight of about 40 pounds. The "Plyak" is an excellent "one-man" boat, with possibly one child as "crew."

Note that both ends of this boat are exactly alike except for the keel, so corresponding frames at both bow and stern are identical. Begin construction by cutting out two each of frames 1, 2, and 3 from ½" EXT-DFPA plywood. Type A-C is suitable. Make the number 4 frames from oak or other hardwood according to the plan, with ¼" plywood gussets. The plans show ¾" thickness for these frames, as this thickness is readily available; however ½" thickness is acceptable. Fasten gussets with glue and nails or screws. Be sure to use waterproof glue here, and on all other joints in this boat.

Select a good, straight 12' 2 x 4 to use as a strongback on which to build the boat. Set this on edge on two sawhorses by nailing a scrap of ¾" plywood as a cleat to the

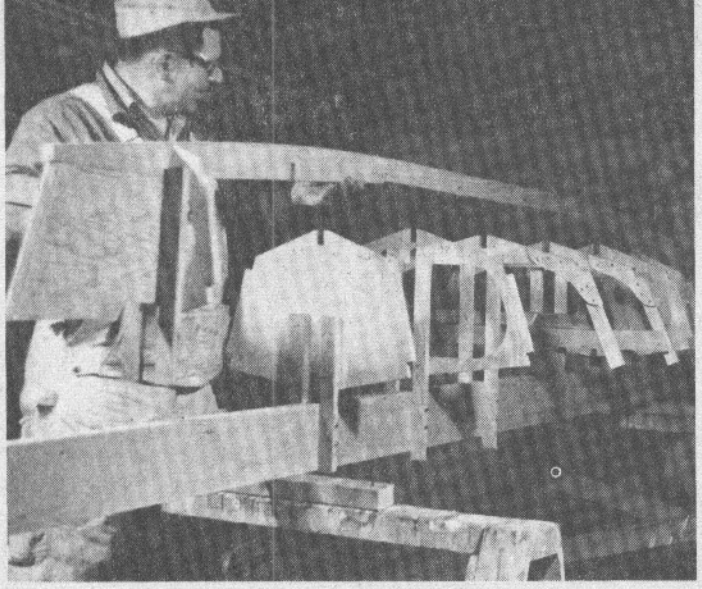


Fig. 1. All joints between keelson and frames should fit snugly. Remove keelson and daub glue in all frame joints. Replace keelson. Toe nail stem pieces to the center of the strongback.

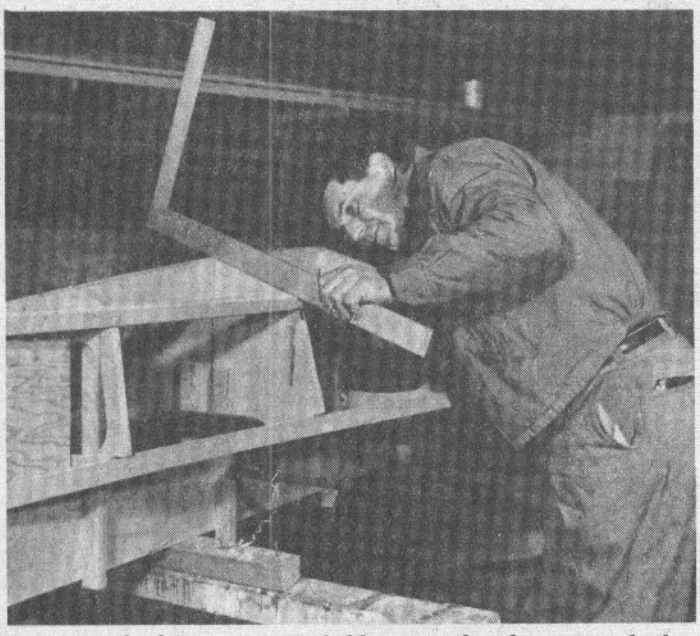


Fig. 2. Check as you go by holding straight edge against keelson, chine strip. Bevel on keelson, chine should conform to straight edge which should slide past frames, just touching.

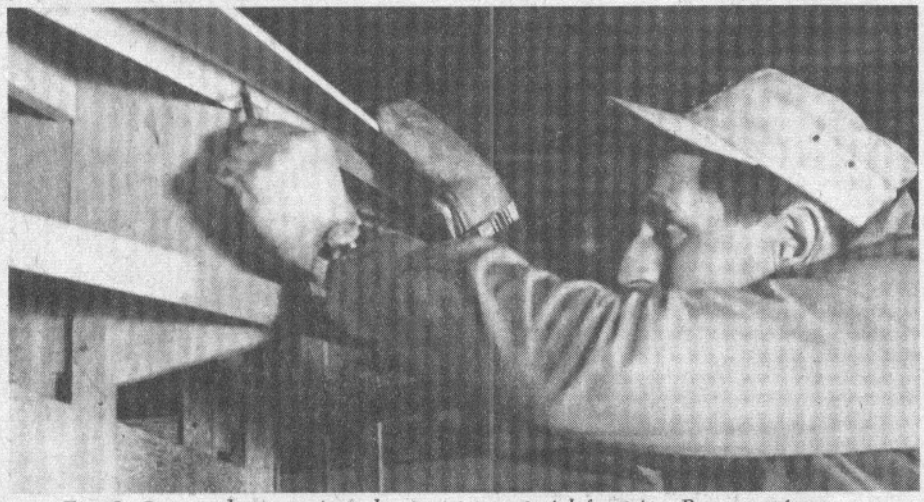


Fig. 3. Cut out bottom piece, leave extra material for trim. Because of curve in keelson, you'll have to trim edge of the planking to make it fit exactly.

2 x 4 at each place where it crosses a sawhorse. Then nail the cleats to the sawhorses.

Establish a datum line by drawing a line 1" down from the top of the 2 x 4, on each side. Make sure these lines are straight. Make a mark to locate one end of the boat near one end of the 2 x 4; mark the other end at 11'3" from the first mark. Lay out the frame stations as shown on the plans, at 15" intervals. Lay out the stations, starting at each end and working toward the middle.

Cut out the keelson, stem and stern pieces. Fasten the stem and stern pieces to the keelson with 2" flat head screws, and glue. Fasten the two #1 frames to these pieces, and to the keelson, with glue and screws.

Now attach the other frames to the 2 x 4 strongback as shown in the detailed drawing. On the two #4 frames, nail a temporary brace across the upper arms of the frame so that the upper edge of the brace is 1" below the datum line. Nail through the brace into the 2 x 4 to locate the frame.

When all frames (except the #1 frames) are fastened to the strongback, set the keelson assembly into place as shown in Fig. 1. Make sure that all frames are located properly, and that all joints between keelson and frames fit snugly. Stem pieces should just touch the strongback.

Remove the keelson assembly and add glue at all frame joints. Replace the assembly, toe nail the stem and stern pieces to the center of the strongback, then screw the keelson to the frames (if the fit is good, the glue alone is good enough).

Next cut strips for chines and gunwales. Clamp a chine strip to the #4 frames, bend it around the other frames, and clamp it to the stem and stern pieces. Scraps of wood nailed across at an angle from the frames to the keelson will help keep these square with the keelson. Mark the bevels that must be cut on the frame edges, then remove the chine strip and cut the bevels with a dovetail saw. Bend the strip in place again, check fit at

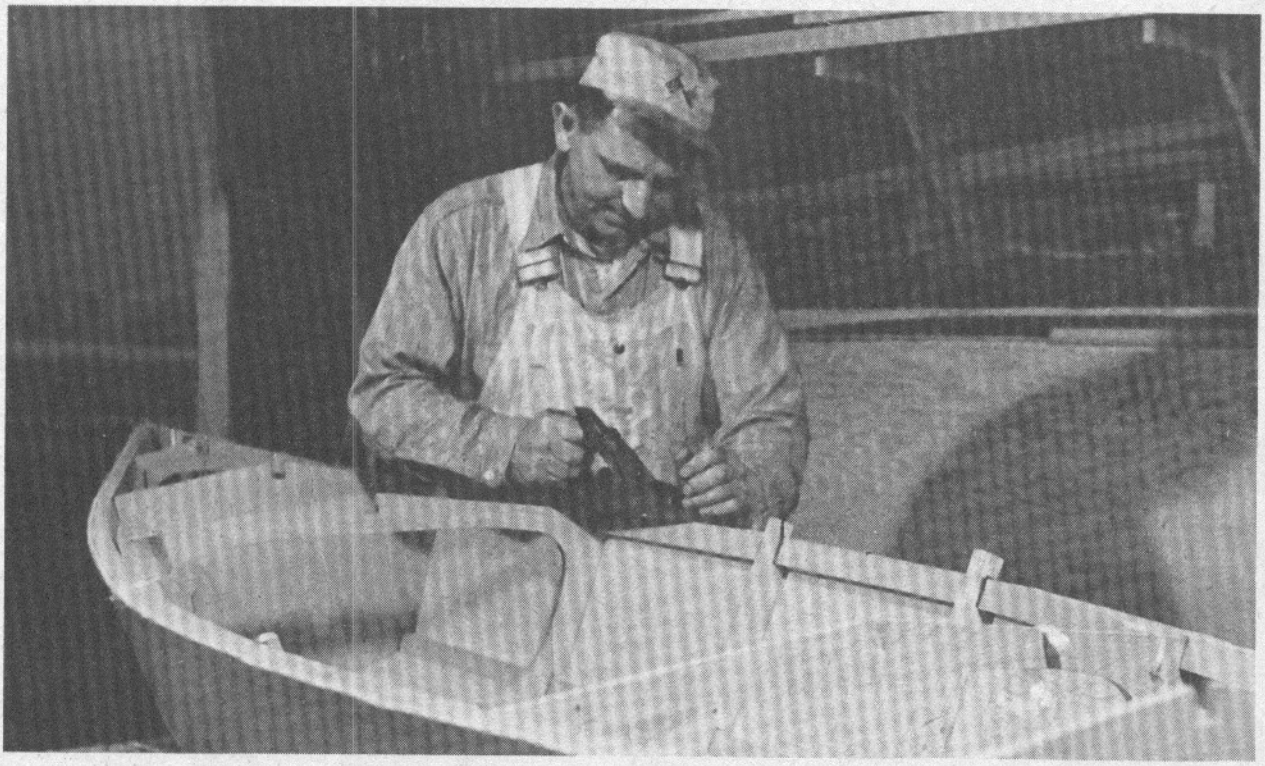


Fig. 4. Cut and screw on the gunwale fillers and cockpit corner knees, as shown on plans, then glue and screw these in place. Cut deck stringers and fasten them, then bevel them and edges of gunwale strips and frames to decking.

all notches. When you have a good fit at all frames, mark and cut the ends of the strip, fitting it carefully so the strip just reaches the dotted line on the stem and stern pieces (see plan detail A-A). Fasten the chine strip with glue and 1½" flat head screws. Put the screws a little below the center of the strip and countersink them well so when you bevel off the strip to match the angle of the frames, your cutting tools won't hit the screw heads.

Cut and fit the other chine strip and the gunwale (sheer clamp) strips in the same manner.

Bevel the chine and gunwale strips, the stern piece, the keelson, the stem piece, and the edges of the frames so the plywood planking will fit flush against all these members. Check your work as you go along by holding a straight edge against the keelson and chine strip (Fig. 2). The bevel on the keelson and chine should conform to the straight edge, and the straight edge should slide past the frames, just barely touching.

Planking is ¼" A-A grade Exterior plywood, in 4' x 12' or 4' x 8' sheets. If you use the 4' x 12' panels, no splices will be needed. If splices are needed on the bottom, make one at each end where the hull is fairly narrow.

Install the bottom first. Lay a sheet of plywood on one side of the bottom so the edge is along the centerline of the keelson. Clamp it in place near the middle and bend it over the bottom. Have someone hold it down while you mark along the chines and ends. See Fig. 3.

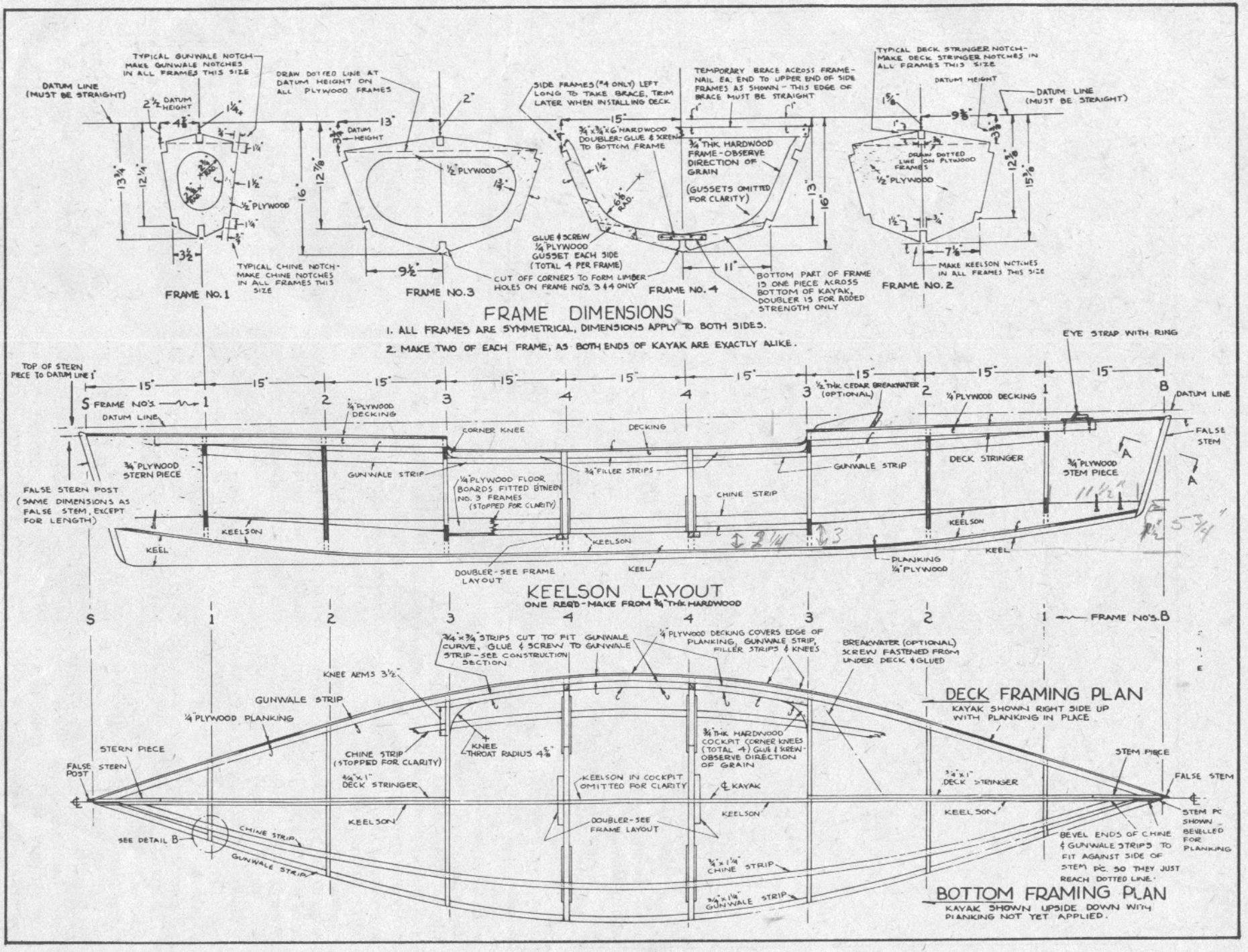
Cut out the bottom piece, leaving a little extra material for trim. Clamp, mark and cut the second bottom panel in the same manner. Note that because of the curve of the bottom, some material will have to be trimmed from the keelson edge of each panel to get an exact fit. Fasten the panels in place with glue and ¾" flat head screws, then plane the chine edges smooth with the chines.

If splices are necessary, cut a scrap of ½" plywood about 3" wide to fit between the keelson and chine strip at the place the splice will be. Fasten this strip to the inside of the planking with glue and screws. Leave half the strip exposed so the second section of the bottom panel can be butted to the first, and glued and screwed to the strip.

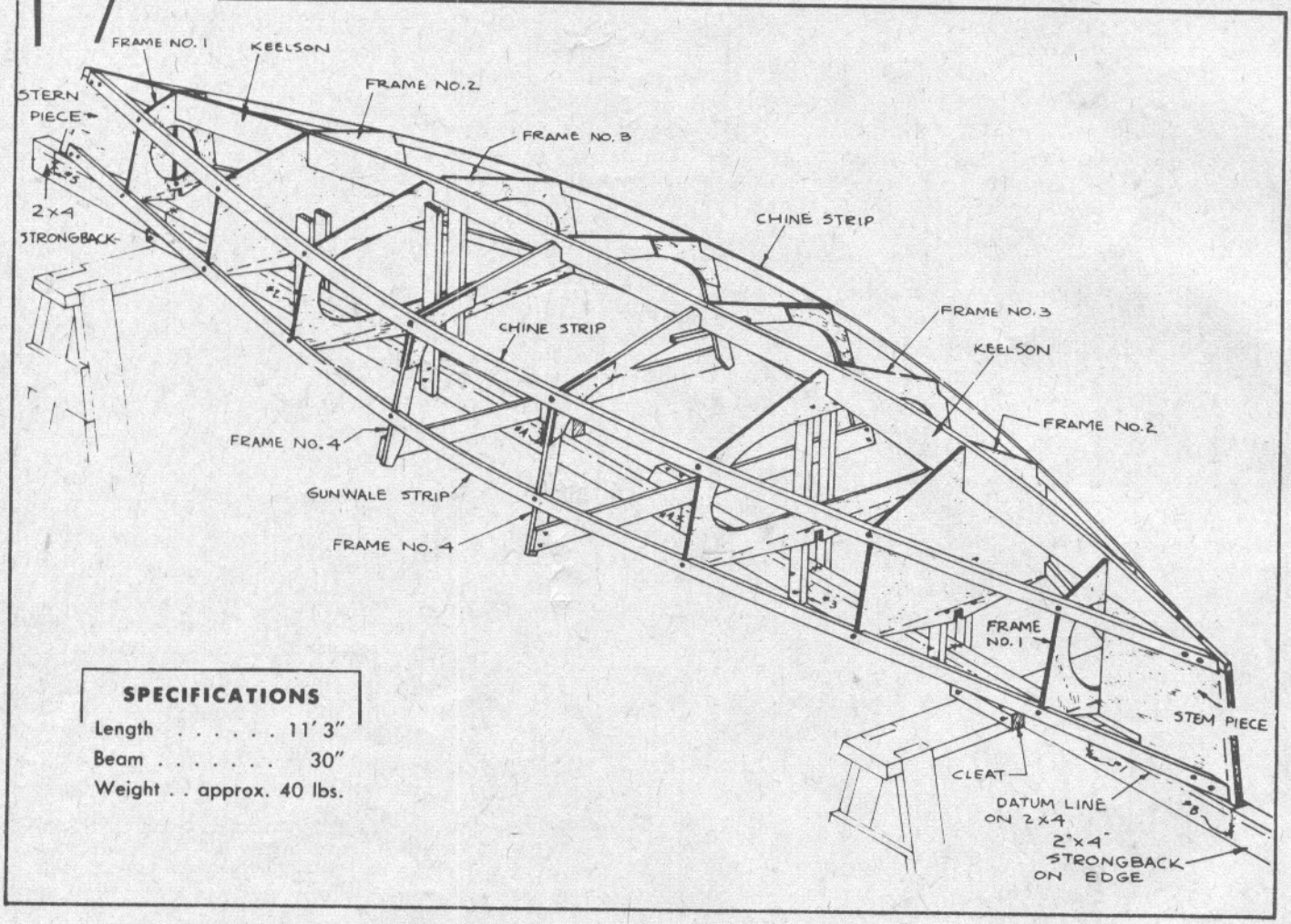
Add the side planking in the same manner as for the bottom. However, if splices are needed, put these in the middle of the boat, between the two #4 frames. The backing piece should be at least 4" wide, and it should be glued and screwed in place after all the side planking has been installed. The backing piece extends between the chine and the gunwale strip.

Now cut the boat loose from the strongback, and turn it over. Take off all the strips that held it to the strongback, and cut off the tops of the #4 frames flush with the gunwale strips (see Fig. 4). Cut out the gunwale fillers and cockpit corner knees as shown in the plans, and glue and screw these in place. Cut the deck stringers and fasten them, then bevel them and the edges of the gunwale strips and frames to take the decking.

Before putting on the decking, you might want to fill the watertight compartments formed by the


TYPICAL GUNWALE NOTCH - MAKE GUNWALE NOTCHES IN ALL FRAMES THIS SIZE
DATUM LINE (MUST BE STRAIGHT)
DATUM HEIGHT
TYPICAL CHINE NOTCH - MAKE CHINE NOTCHES IN ALL FRAMES THIS SIZE
FRAME NO. 1
DRAW DOTTED LINE AT DATUM HEIGHT ON ALL PLYWOOD FRAMES
½" PLYWOOD
CUT OFF CORNERS TO FORM LIMBER HOLES ON FRAME NO'S. 3 & 4 ONLY
FRAME NO. 3
SIDE FRAMES (#4 ONLY) LEFT LONG TO TAKE BRACE, TRIM LATER WHEN INSTALLING DECK
¾" x ¾" x 6" HARDWOOD DOUBLER - GLUE & SCREW TO BOTTOM FRAME
GLUE & SCREW ¼" PLYWOOD GUSSET EACH SIDE (TOTAL 4 PER FRAME)
TEMPORARY BRACE ACROSS FRAME - NAIL EA. END TO UPPER END OF SIDE FRAMES AS SHOWN - THIS EDGE OF BRACE MUST BE STRAIGHT
¾" THK. HARDWOOD FRAME - OBSERVE DIRECTION OF GRAIN
(GUSSETS OMITTED FOR CLARITY)
BOTTOM PART OF FRAME IS ONE PIECE ACROSS BOTTOM OF KAYAK, DOUBLER IS FOR ADDED STRENGTH ONLY
FRAME NO. 4
TYPICAL DECK STRINGER NOTCH - MAKE DECK STRINGER NOTCHES IN ALL FRAMES THIS SIZE
DRAW DOTTED LINE ON PLYWOOD FRAMES
MAKE KEELSON NOTCHES IN ALL FRAMES THIS SIZE
FRAME NO. 2
FRAME DIMENSIONS
1. ALL FRAMES ARE SYMMETRICAL, DIMENSIONS APPLY TO BOTH SIDES.
2. MAKE TWO OF EACH FRAME, AS BOTH ENDS OF KAYAK ARE EXACTLY ALIKE.
EYE STRAP WITH RING
TOP OF STERN PIECE TO DATUM LINE
FRAME NO'S
DATUM LINE
¼" PLYWOOD DECKING
½" THK. CEDAR BREAKWATER (OPTIONAL)
FALSE STEM
¾" PLYWOOD STERN PIECE
FALSE STERN POST (SAME DIMENSIONS AS FALSE STEM, EXCEPT FOR LENGTH)
CORNER KNEE
GUNWALE STRIP
¼" PLYWOOD FLOOR BOARDS FITTED BTWEEN NO. 3 FRAMES (STOPPED FOR CLARITY)
¾" FILLER STRIPS
CHINE STRIP
DECK STRINGER
¾" PLYWOOD STEM PIECE
KEELSON
KEEL
DOUBLER - SEE FRAME LAYOUT
PLANKING ¼" PLYWOOD
KEELSON LAYOUT
ONE REQ'D - MAKE FROM ¾" THK. HARDWOOD
¾" x ¾" STRIPS CUT TO FIT GUNWALE CURVE, GLUE & SCREW TO GUNWALE STRIP - SEE CONSTRUCTION SECTION
¼" PLYWOOD DECKING COVERS EDGE OF PLANKING, GUNWALE STRIP, FILLER STRIPS & KNEES
BREAKWATER (OPTIONAL) SCREW FASTENED FROM UNDER DECK & GLUED
KNEE ARMS 3½"
GUNWALE STRIP
¼" PLYWOOD PLANKING
STERN PIECE
FALSE STERN POST
CHINE STRIP (STOPPED FOR CLARITY)
KNEE THROAT RADIUS 4⅝"
¾" x 1" DECK STRINGER
KEELSON
SEE DETAIL B
CHINE STRIP
GUNWALE STRIP
¾" THK. HARDWOOD COCKPIT CORNER KNEES (TOTAL 4) GLUE & SCREW - OBSERVE DIRECTION OF GRAIN
KEELSON IN COCKPIT OMITTED FOR CLARITY
℄ KAYAK
DOUBLER - SEE FRAME LAYOUT
¾" x 1¼" CHINE STRIP
¾" x 1¼" GUNWALE STRIP
DECK FRAMING PLAN
KAYAK SHOWN RIGHT SIDE UP WITH PLANKING IN PLACE
STEM PIECE
FALSE STEM
STEM PC SHOWN BEVELLED FOR PLANKING
BEVEL ENDS OF CHINE & GUNWALE STRIPS TO FIT AGAINST SIDE OF STEM PC. SO THEY JUST REACH DOTTED LINE.
BOTTOM FRAMING PLAN
KAYAK SHOWN UPSIDE DOWN WITH PLANKING NOT YET APPLIED.

Plyak



SPECIFICATIONS

Length	11' 3"
Beam	30"
Weight	approx. 40 lbs.

solid #2 frames with liquid foam. If you don't do this, give the whole interior two coats of wood sealer. Now put on the deck planking in the same manner as the bottom and side planking. It overlaps the side planking, and ends at the after edge of frame #3. Cut some strips to fit the narrow areas alongside the cockpit and glue and screw these in place. Use a length of ¾" or ½" half round hardwood to make a rub rail that runs all along the outside of the boat at the gunwale.

To make your boat really waterproof and tough, you should lay fiberglass tape over all the joints in the planking. Put a strip down the centerline of the bottom and fasten the keel in place with long screws before the resin sets. If you have a router, you can rout out a channel along the edge of the keel that goes against the planking in order to make a better fit.

Cut out the floorboards and the back rest from leftover planking material. Make the double paddle as shown on the plans, with the blades set into slots cut in the ends of a 1⅜" closet pole. The overall length of the paddle should be about 9'. Just set the back rest in place on the floorboards so it leans against the afterdeck.

Finish your boat with a coat of sealer and two coats of a good marine enamel. A small eye fastened to the bow comes in handy for attaching a bow painter. ■

For large-scale detailed Plyak Pattern No. 504, send $2.00 (add 65¢ for airmail delivery) to Steve Ellingson, U-Bild Enterprises, Dept. DPI, P.O. Box 2383, Van Nuys, Calif. 91409.

BILL OF MATERIALS

Quan.	Size	Material & Use
1	¾"x5¾"x10'9"	mahogany or oak, for keelson
4	¾"x1¼"x12'	yellow cedar, for chine and gunwale strips
2	¾"x1"x3'1"	yellow cedar, for deck stringers
2	¾"x3⅝"x40"	oak, for #4 frames
1	¾"x3¾"x30"	false stem and stern posts
1 or 2	¼"x4'x12' ¼"x4'x8'	EXT-DFPA-A fir plywood, for planking
1	½"x4'x4'	EXT-DFPA A-C fir plywood, for frames #1, 2, 3
2	¾"x14½"x10'	EXT-DFPA A-C fir plywood, for bow and stern pieces
1	¼"x4'x8'	EXT-DFPA A-C fir plywood, for deck planking, floor boards, etc.
2	¾" or ½"x12'	half round, for rub strips
1	1⅜" Dia. x 7'	fir dowel, for paddle handle



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