Kid's Choice
Riding Biplane

We don't have any scientific proof, but judging from the project request letters that regularly cross our desks, rock & ride toys are near the top of most kids' wish lists.

This impressive Riding Biplane, from the "Timeless Treasure" line of master toy builders Barrels Of Fun, is sure to please just about any youngster old enough to climb aboard. But perhaps best of all, since it's made from inexpensive materials available at your local lumberyard, putting the Riding Biplane together won't require the bank account of the Red Baron.

What You'll Need

The easiest way to figure your material requirements is to glance at our pattern and stock layout illustrations, pages 51, 52 and 53. As shown, the wings (A, B), seat (C), horizontal stabilizer (D), disk, (E), exhaust trim (F) and accent pieces (G) are all cut from a single 2 ft. by 4 ft. section of 3/4 in. medium density fiberboard (MDF) or plywood. The plane in the photo uses MDF for these parts because it is cheaper than plywood, takes paint better, and doesn't have the splintering problem that plywoods usually have. But if your lumberyard doesn't sell MDF, plywood is an adequate substitute.

Although we show suggested layouts on 2 x 10 by 8 ft. long, and 2 x 8 by 6 ft. long construction-grade lumber for the fuselage parts (H, I), vertical stabilizer (J) and rockers (K), feel free to use whatever stock you may already have on hand. Just keep in mind that the actual thickness of these parts is 1 1/2 in.

A 3/4 in. thick length of pine measuring at least 5 in. wide by 6 ft. long will yield the propeller (L) and the three platform sections (M).

The remaining parts—the front supports (N), back support (O), wing connectors (P), propeller shaft (Q) and cap (R) are just lengths of various size dowels. If you can't find the exact sizes we show, feel free to substitute dowels in similar sizes. Closet rod (either 1 1/4 in. or 1 1/2 in. diameter) can be used for the 1 1/2 in. diameter back support specified.

As for the hardware parts, keep in mind that the screw sizes specified are merely suggestions. You may want to substitute hardware you have on hand.

Transfer Patterns

Although everyone seems to love full-size patterns, if you know how to work with grid patterns, an actual full-size pattern really isn't needed.

There are two options to follow when using grid patterns. If you have access to a photocopy machine with the ability to enlarge, simply enlarge copies of the grid patterned parts until the size of the grid squares is 1 in. You'll need to do this to each section of the pattern, and then cut and paste to make an actual full-size pattern from the smaller pieces of paper. Or, lay out a 1 in. grid pattern directly onto your stock, then transfer the pattern by looking at our original grid pattern and copying the profile to your full-size grid. With a project such as the biplane, it isn't important to copy our pattern precisely. In fact, feel free to "customize" some of the shapes to your own taste. Important: When transferring patterns, be sure to accurately transfer all screw hole and dowel locations.

Cut Parts

Once you've transferred the profiles for parts A through L to your stock, cut them out. The band saw is probably the best choice for cutting out most of the parts, but if you don't own a band saw, a hand-held jigsaw will also be fine. You'll need the jigsaw for cutting the pair of hand holds in the top wing. Rip and crosscut to yield the three platform parts. Once your parts are all shaped, use a drum sander to clean up the profile cuts and remove the saw marks.

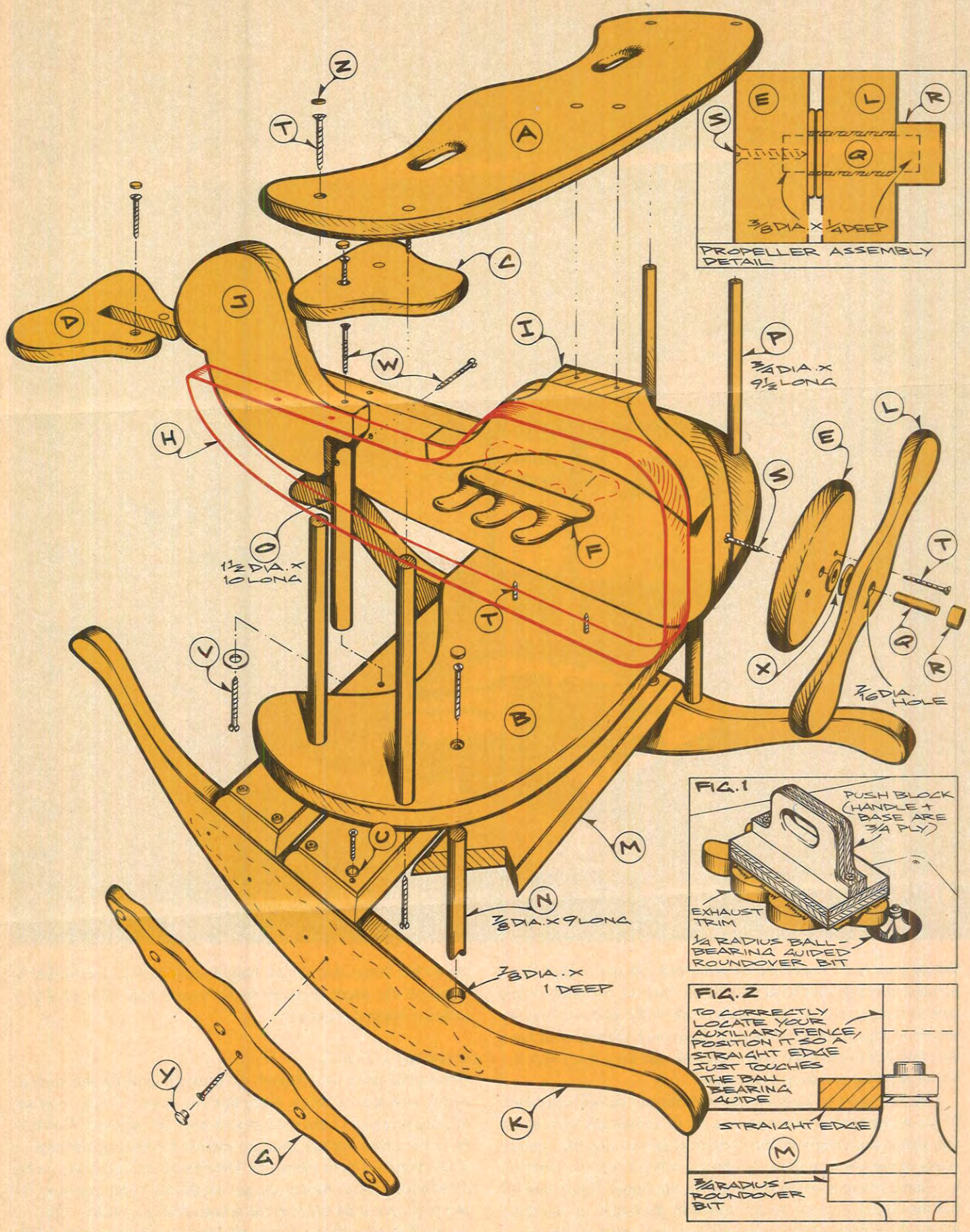
As you'll note from the photo, all exposed edges are radiused. With a 1/4 in. radius ball bearing guided round-over bit, mounted in either the router table or in a hand-held router, apply a 1/4 in. round over to both edges of the wings, seat, horizontal stabilizer, disk and propeller, and to the outside edge of the accents. But don't try to radius the outside edges of the exhaust trim on the router table, using your hands to guide the stock. Handling small pieces like this is an invitation to an accident,

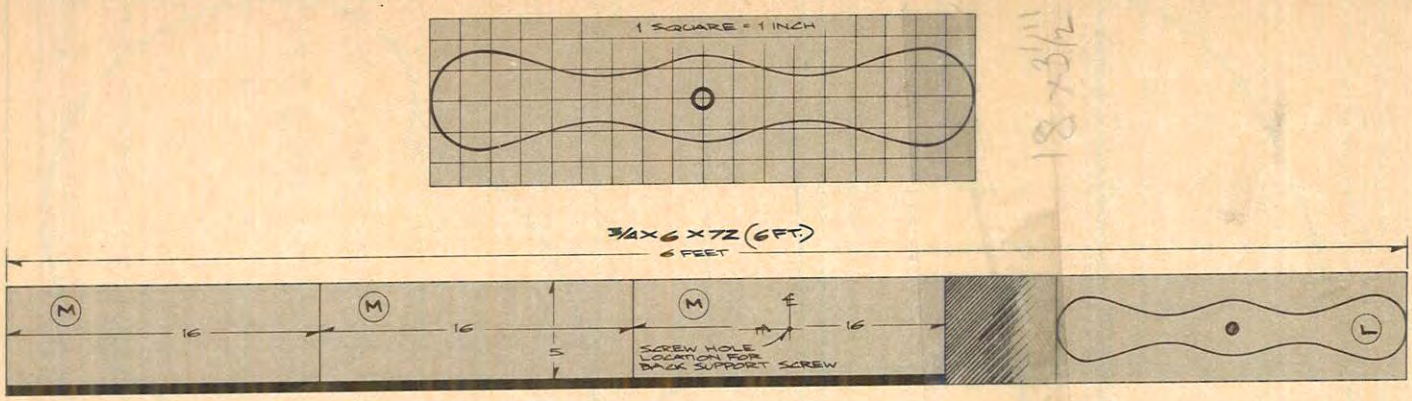
should your hand slip or the bit catch and jerk the workpiece—perhaps drawing your hand into the bit. Instead, use doublestick tape to temporarily fasten a push block to the exhaust trim, as shown in Fig. 1. Make several of these push blocks, with handles fastened to them for ease of control, and keep them near the router table for handling small parts.

Switch to a 1/2 in. radius round over bit and radius both edges of the rockers, then move up to a 3/4 in. radius round over bit and radius both edges of the vertical stabilizer and the outside edges of the fuselage sides. As shown in Fig. 2, use the same 3/4 in. radius round over bit (mounted in the router table, with all but the cutting edge of the bit buried in the fence), to mold the edges of the three platform boards. Set your fence by holding a straightedge so it just touches the ball-bearing guide on the router bit. Note, that the bit height must be set as indicated to establish the small shoulder on the round over. This profile is called a stepped roundover.

Pre-drill Holes

Once your parts are shaped, go to work drilling the various screw and dowel holes. Note that no. 8 by 1 1/2 in. long assembly screws (T) are used to join most of the parts. Counterbore for those screws that are covered either by decorative screw buttons (Y) or plugs (Z). The buttons are used only on the 12 screws used to mount the accent pieces to the rockers, and the plugs are used only on the screws that are visible. There is no need to plug those screws that are on the underside of the plane. A 7/8 in. diameter by 1 in. deep hole is drilled into the


PROPELLER ASSEMBLY DETAIL
3/8 DIA. X 1/4 DEEP
FIG. 1
PUSH BLOCK (HANDLE + BASE ARE 3/4 PLY)
EXHAUST TRIM
1/2 RADIUS BALL-BEARING GUIDED ROUNDOVER BIT
FIG. 2
TO CORRECTLY LOCATE YOUR AUXILIARY FENCE, POSITION IT SO A STRAIGHT EDGE JUST TOUCHES THE BALL BEARING GUIDE
STRAIGHT EDGE
3/8 RADIUS ROUNDOVER BIT
3/4 DIA. X 9 1/2 LONG
1 1/2 DIA. X 10 LONG
7/16 DIA. HOLE
3/8 DIA. X 9 LONG
3/8 DIA. X 1 DEEP



rockers for the two front support dowels (N), but all the remaining large dowel parts—the back support (O) and wing connectors (P)—are screwed in place. Note that decorative washers (U) are used on the 12 screws that mount the three platform boards. Pre-drill these screw holes, to avoid splitting the stock.

Propeller Subassembly

As the detail on page 50 shows, the propeller mounting system consists of a shaft (Q) and cap (R). Drill a 1/4 in. deep hole in the cap for the 3/8 in. diameter shaft, then glue the shaft into the cap. Drill a 7/16 in. hole through the propeller for the shaft, and drill a 3/8 in. diameter by 1/4 in. deep hole into the front center of the disk, also for the shaft. Pre-drill through the disk for the propeller mounting screw (S) and for the pair of assembly screws that mounts the disk (and the propeller subassembly) to the biplane. Do not complete the propeller subassembly at this time.

Paint & Finish Parts

All parts are finished before assembly. You may use our color scheme—red for the wings, stabilizers and propeller shaft/cap, blue for the rockers, yellow for the seat, green for the disk, black for the propeller and exhaust trim, white for the accents, and natural for the remaining parts—or develop your own color scheme. When painting the various parts, don't neglect to also paint the screw hole buttons and plugs. But don't get any paint or finish on the areas where the sides, center and vertical stabilizer are glued together. For ease of application and cleanup, we recommend that you use water-based acrylic finishes. The smooth, seamless appearance of the finish on our biplane was the product of a spray application, but if you don't have a spray outfit, brushes are fine.

Bill of Materials (all dimensions actual)

Part	Description	Size	No. Req'd
	3/4 in. Medium-Density Fiberboard (or 3/4 in. plywood) parts		
A	Top Wing	See Pattern	1
B	Bottom Wing	See Pattern	1
C	Seat	See Pattern	1
D	Horiz. Stabilizer	See Pattern	1
E	Disk	See Pattern	1
F	Exhaust Trim	See Pattern	2
G	Accent	See Pattern	2
	"Two-by" Construction Lumber Parts		
H	Fuselage Side	See Pattern	2
I	Fuselage Center	See Pattern	1
J	Vertical Stabilizer	See Pattern	1
K	Rocker	See Pattern	2
	3/4 in. Pine Parts		
L	Propeller	See Pattern	1
M	Platform	3/4 x 5 x 16	3
	Dowel Stock Parts		
N	Front Support	7/8 dia. x 9	2
O	Back Support	1 1/2 dia. x 10	1
P	Wing Connector	3/4 dia. x 9 1/2	4
Q	Propeller Shaft	3/8 dia. x 1 1/2	1
R	Cap	5/8 dia. x 1/2	1
	Hardware Parts		
S	Propeller Screw	No. 6 x 3/4 RH	1
T	Assembly Screw	No. 8 x 1 1/2 FH	46
U	Dec. Washer for No. 8 FH screw		12
V	Back Support Screw &Washer	No. 12 x 2 RH	1 ea.
W	Anchor Screw	No. 12 x 3 1/2 FH	2
X	Washer	7/8 dia.	2
Y	Screw Hole Button	1/2 dia.	12
Z	Plug	3/8 dia.	13

Assembly

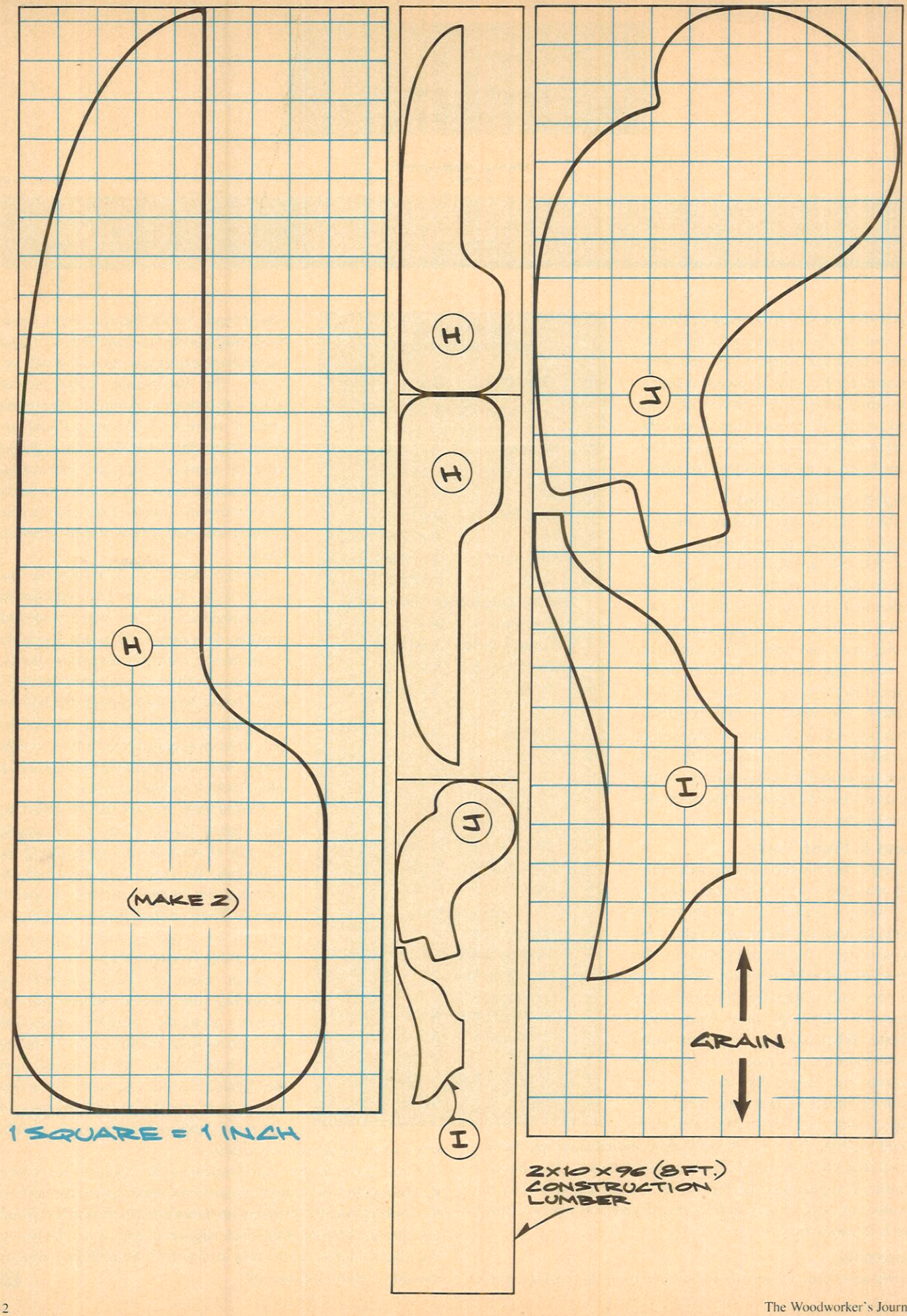
Fuselage: Once your finish has dried on the various parts, you're ready for the final assembly. Start by gluing up the fuselage sides around the fuselage center and vertical stabilizer. Screw the horizontal stabilizer in place—this helps to properly locate the vertical stabilizer. Use a pair of long anchor screws (W)—one down through the vertical stabilizer, the other in through the fuselage side—to mount the back support dowel. Then add the seat and the exhaust trim (the trim is simply glued in place).

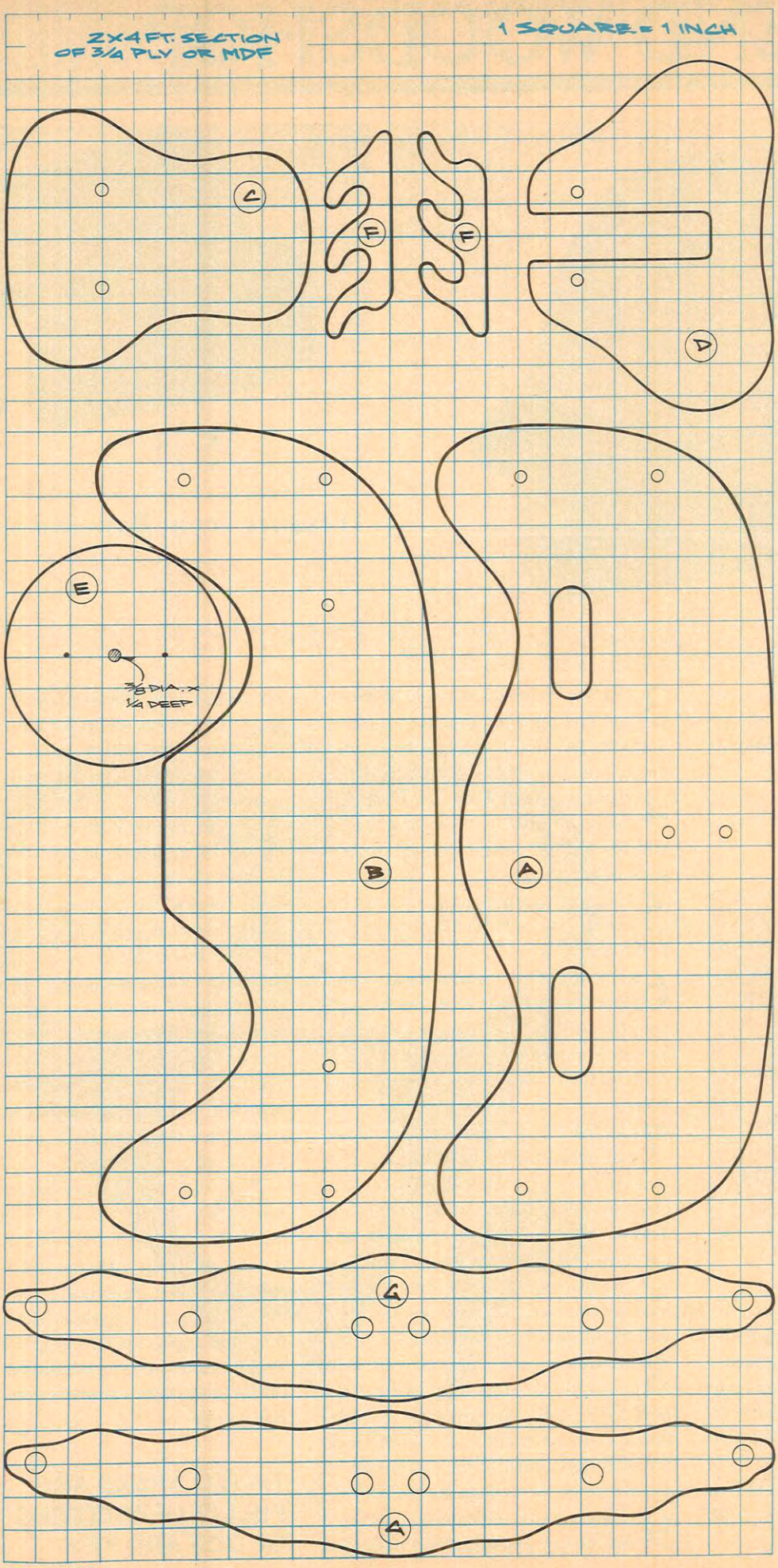
Wings: Next up is mounting the wings. First, screw the top and bottom wings together with the wing connector dowels, then mount the wing assembly to the fuselage with six assembly screws, two through the top wing into the fuselage center, and four though the bottom wing into the fuselage sides. Mount the pair of front supports, then fill all visible screw hole countersinks with painted plugs, which are glued in place.

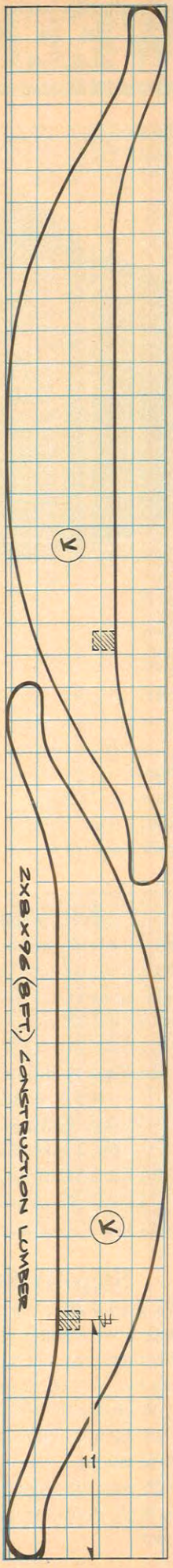
Propeller: Mount the propeller by first sliding the shaft into place, adding the pair of washers (X), then gluing the shaft into the hole in the disk and anchoring the shaft with the propeller screw. Then, mount the propeller assembly by screwing the disk into the front of the fuselage sides.

Base: Start the base assembly by screwing the accent pieces to the rockers, using the assembly screws. Fill the screw hole countersinks with the screw hole buttons, which should have been painted white—to match the accent color. Now join the pair of rockers with the three platform pieces, using assembly screws and the decorative washers.

Final Assembly: Join the biplane to the rocker subassembly by gluing the front support dowels into their respective holes in the rockers, and by screwing up though the back platform board and into the bottom of the back support dowel, using the heavy-duty back support screw and washer (V). Your Riding Biplane should be ready for take-off!


H
(MAKE 2)
1 SQUARE = 1 INCH
H
H
J
I
2X10 X 96 (8FT.) CONSTRUCTION LUMBER
J
I
GRAIN





1 SQUARE = 2 INCHES