WOODWORKER'S JOURNAL

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Classic Project

In this plan you'll find:

- Step-by-step construction instruction.
- A complete bill of materials.
- Construction drawings and related photos.
- Tips to help you complete the project and become a better woodworker.

Toy Train Set

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Here's a train set that will inspire many young and perhaps even a few older imaginations. Our train is made mainly of oak and maple, with padauk used for the caboose and a few other parts, and fir stair rail or closet pole used for the locomotive boiler and the tank on the tanker car. Feel free to vary the combinations of woods to suit your taste and the stock you have available. Our thanks to Lynes Unlimited, of Greenleaf, Kansas, for the design.

At first glance the train set may seem like a lot of work. But don't be fooled. If you look closely you'll discover that the train is designed around a simplified common chassis system, where all the cars except the locomotive share identical undercarriages. Once you've set up your table saw you can easily knock off as many undercarriage parts as required by the number of cars you plan to build. To further simplify making the train set, we've arranged with Lynes Unlimited to offer kits that include all the wheels and turned parts. There's a single kit for the train as shown in the photo or you can order individual kits. There's one kit for the locomotive, a second kit that includes the wheels and pegs for making one undercarriage, and a third kit that includes one undercarriage parts kit plus the two vent buttons for the tanker car. This way you can order the kits separately and purchase only as many undercarriage kits as you'll need for the number of cars you decide to make. Ordering information is listed in the Bill of Materials.

Locomotive

The locomotive is basically just a series of blocks. All the parts are oak except for the padauk cab sides (E), the fir boiler (I), and the wheels and turned parts, which are maple or birch. Start with the chassis block (A). Cut it to size, notch the back end, and bore the holes as shown in the side elevation for the pegs holding the wheels. Then add the cab riser (B), the various cab parts (C, D, E, F), the boiler base (G) and the cow catcher (H). The cow catcher is just a block with three 45-degree angle cuts. Glue and clamp these parts, and when dry, use a 3/16 in. radius bearing-guided roundover bit in the router table to apply the stepped roundover edge detail (see exploded view). This last step is important, since it takes away some of the blocky appearance and gives the locomotive a more detailed, sculpted shape. Now add the wheels (L, N), the boiler, the two stacks (J, K) and the headlight (P). The boiler is just a 4 3/4 in. length of 1 5/8 in. diameter stair rail, or a section of closet pole with a flat planed on the bottom (stair rail or closet pole is available at most lumberyards).

Undercarriage

You could set about making the cars individually, but since the cars all share a common undercarriage assembly, the best approach is to start by making as many undercarriage assemblies as needed for the number of cars you want to make. For the train shown make four undercarriage assemblies. The undercarriage parts are all maple, except those for the coal car and caboose, which have padauk bottom boards (Q).

Each undercarriage consists of four wheel assemblies and a bottom board mounted to a base block (R). Rip and crosscut the base block stock. Then make a 1/2 in. wide by 3/4 in. deep dado cut in one end and a 5/8 in. by 1 in. notch on the opposite end of each base block, and drill the 3/16 in. diameter holes for the medium-sized pegs (V) that mount the wheel assemblies. Each wheel assembly consists of two wheels (T) mounted to a wheel block (S) with small pegs (U). To simplify the repetitive work of drilling the various peg holes in the bases and wheel blocks, it's best to use templates.

To assemble the undercarriage, first make the wheel assemblies, then mount them to the base block. Note that the wheel assemblies are not glued to the base block, but are free to pivot on the pegs. This produces a very realistic wheel assembly action, similar to the systems used on full-size trains. Add the medium peg for the leather hitch thong, and finally mount the bottom board. The hitch thong peg is the same peg used for mounting the wheel assemblies, but it's

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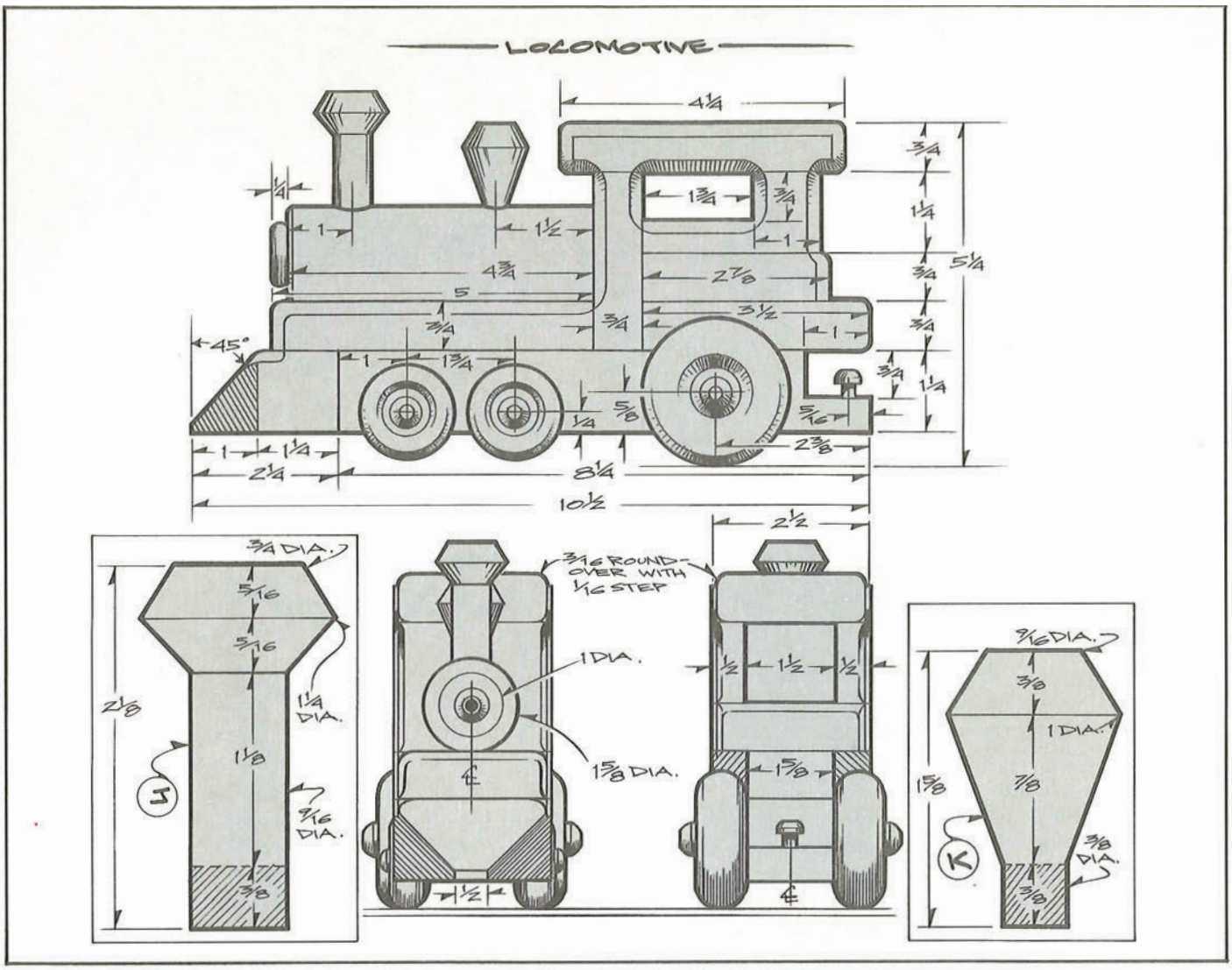
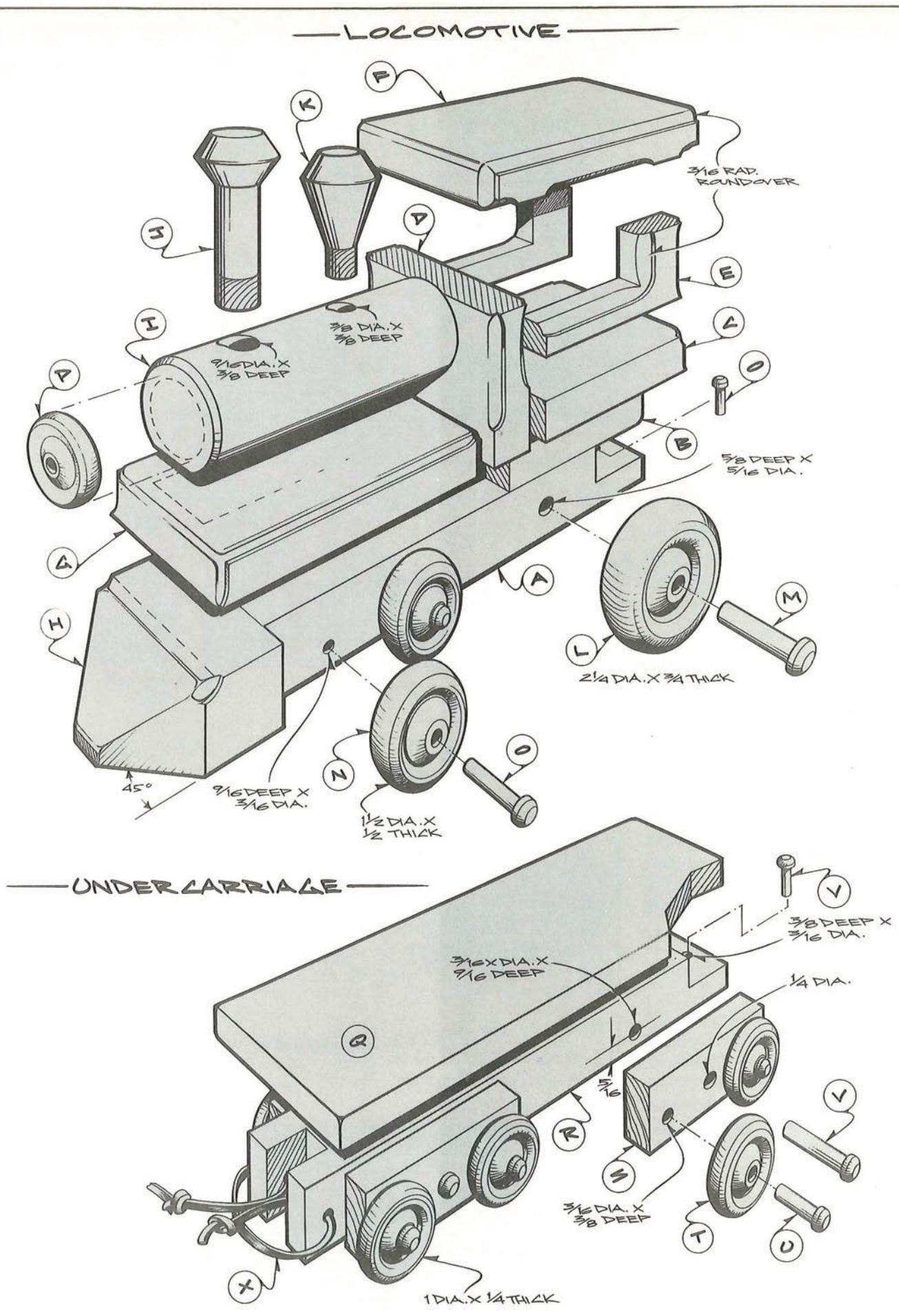
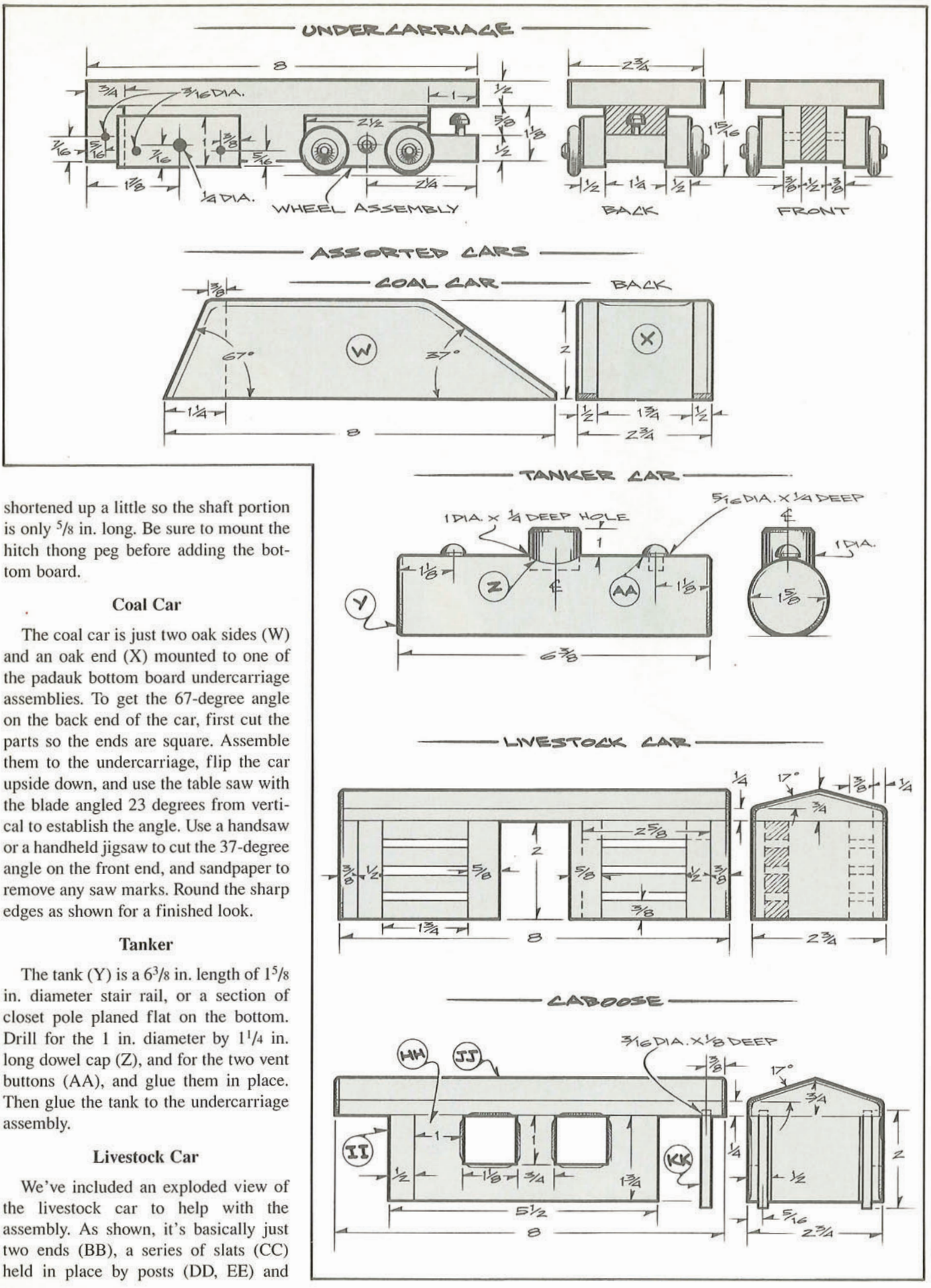


Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
	Locomotive		
A	Chassis	1¼ x 1⅝ x 8¼	1
B	Cab Riser	¾ x 1⅝ x 3½	1
C	Cab Bottom	¾ x 2½ x 2⅞	1
D	Cab Front	¾ x 2½ x 2¾	1
E	Cab Side	½ x 1¼ x 2¾	2
F	Cab Top	¾ x 2½ x 4¼	1
G	Boiler Base	¾ x 2½ x 5	1
H	Cow Catcher	1¼ x 2½ x 2¼	1
I	Boiler	1⅝ dia. x 4¾ long	1
J	Front Stack	See Detail*	1
K	Rear Stack	See Detail*	1
L	Back Wheel	2¼ dia. x ¾ thick*	2
M	Large Peg	See Detail*	2
N	Front Wheel	1½ dia. x ½ thick*	4
O	Medium Peg	See Detail*	5
P	Headlight	1 dia. x ¼ thick*	1
	Undercarriage (No. Req'd. is for one car)		
Q	Bottom	½ x 2¾ x 8	1
R	Base	1⅛ x 1¼ x 8	1
S	Wheel Block	½ x 1 x 2½	4

Part	Description	Size	No. Req'd.
T	Wheel	1 dia. x ¼ thick**	8
U	Small Peg	See Detail**	8
V	Medium Peg	See Detail**	5
	Coal Car		
W	Side	½ x 2 x 8	2
X	End	1¼ x 1¾ x 2	1
	Tanker		
Y	Tank	1⅝ dia. x 6⅜ long	1
Z	Cap	1 dia. x 1¼ long	1
AA	Vent Button	See Detail***	2
	Livestock Car		
BB	End	⅜ x 2 x 2¾	2
CC	Slat	⅜ x ⅜ x 2⅝	16
DD	Door Post	⅝ x ⅝ x 2	4
EE	End Post	¼ x ½ x 2	4
FF	Spacer	⅜ x 2 x 1½	2
GG	Roof	¾ x 2¾ x 8	1
	Caboose		
HH	Side	½ x 1¾ x 5	2
II	End	½ x 1¾ x 2¾	1
JJ	Roof	¾ x 2¾ x 8	1
KK	Post	3/16 dia. x 2 long	2





shortened up a little so the shaft portion is only 5/8 in. long. Be sure to mount the hitch thong peg before adding the bottom board.

Coal Car

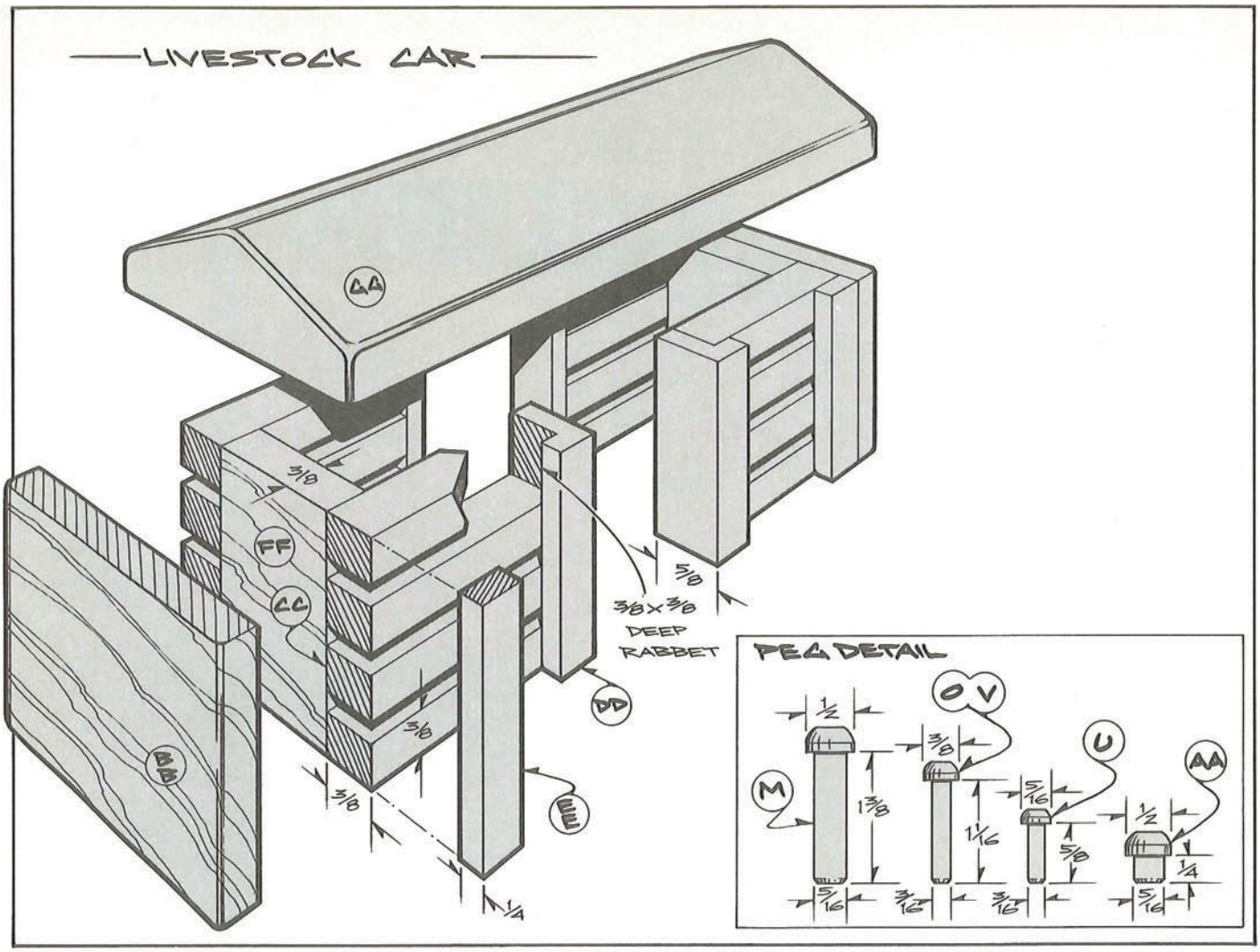
The coal car is just two oak sides (W) and an oak end (X) mounted to one of the padauk bottom board undercarriage assemblies. To get the 67-degree angle on the back end of the car, first cut the parts so the ends are square. Assemble them to the undercarriage, flip the car upside down, and use the table saw with the blade angled 23 degrees from vertical to establish the angle. Use a handsaw or a handheld jigsaw to cut the 37-degree angle on the front end, and sandpaper to remove any saw marks. Round the sharp edges as shown for a finished look.

Tanker

The tank (Y) is a 6 3/8 in. length of 1 5/8 in. diameter stair rail, or a section of closet pole planed flat on the bottom. Drill for the 1 in. diameter by 1 1/4 in. long dowel cap (Z), and for the two vent buttons (AA), and glue them in place. Then glue the tank to the undercarriage assembly.

Livestock Car

We've included an exploded view of the livestock car to help with the assembly. As shown, it's basically just two ends (BB), a series of slats (CC) held in place by posts (DD, EE) and



spacers (FF), with a roof (GG) over it all. Note that the posts on our livestock car are padauk, while the remaining parts are all oak.

The best way to make the slats and door posts is to start with lengths of stock planed to thickness and ripped to width. For the door posts you'll need about 10 in. of 5/8 in. square stock, for the end posts you'll need 10 in. of 1/4 in. thick by 1/2 in. wide stock, and for the slats you'll need about 4 ft. of 3/8 in. square stock. Cut a 3/8 in. by 3/8 in. rabbet in the door post stock. Then set up a stopblock on the table saw to facilitate crosscutting the posts to their 2 in. length. You'll need to reposition the stopblock for the 2 5/8 in. long slats.

Glue up the parts on one of your pre-assembled undercarriages, then cut and fit the roof. To get the slope on the roof, set up the rip fence on the table saw, raise the blade 1 1/2 in. high and tilt it 17 degrees from the vertical. Cut one side, then flip the roof stock end-for-end and cut the other side. Be sure to use a pushstick for all your ripping cuts.

Caboose

The caboose is just two padauk sides (HH) and an end (II), mounted to the remaining padauk bottom board undercarriage, and topped by a roof (JJ) that's also padauk. Two 3/16 in. diameter by 2 in. long maple or birch dowel posts (KK) complete the caboose. Cut the roof slope using the same table saw setup as for the livestock car roof. Make the window cutouts and drill for the posts before assembling the caboose on its undercarriage.

More Cars

We've shown only a locomotive and four cars, but don't let that limit you. You can easily make several tanker and cattle cars, and by adding an undercarriage by itself you've got a flatbed car. In fact, by customizing the basic undercarriage you can make just about all the cars you might find on any real train. Add some stakes to an undercarriage and you've got a car for hauling logs. It isn't much trouble to come up with hopper cars, passenger cars (just lengthen the caboose and add more windows) and car carriers. To customize the undercarriage assembly for a longer car, split an undercarriage base in half, lengthen the bottom board to 10 in., and leave a 2 in. space between the front and back base halves when you glue them to the bottom. Just be sure to order enough undercarriage parts kits.

Finishing Up

Round any sharp edges and final sand. If you like a finish, you could try one of the new water-based clear polyurethanes, or just apply a penetrating oil as we did on our train. Most of the new water-based finishes and many of the penetrating oils are safe for toys since they're nontoxic when dry. Check the can for precautions before you start. The leather hitch thongs are lengths of leather lacing, sold at most shoe and department stores. Note how the knots on the ends of the hitch thongs fit within the dado that's cut in the front end of each undercarriage base. One pair of laces yields more than enough hitch thong material for one train.

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