



Thomas Jefferson's Writing Desk

Build the Revolutionary War relic used to write
the Declaration of Independence

BY LON SCHLEINING



In the spring of 1776, 33-year-old Thomas Jefferson had an idea. His frequent 200-mile coach rides from his home near Charlottesville, Va., to the Continental Congress in Philadelphia, Pa., could be more productive, he thought, if he could do some reading and writing on the way. After sketching his idea for a portable lap desk that would hold his supplies, he gave the drawing to Benjamin Randolph, a Philadelphia cabinetmaker. In July 1776, when the desk was brand new, Jefferson used it to write the Declaration of Independence.

This tiny writing desk, weighing only 5 lbs., is the result of Jefferson's ability to invent the obvious; a portable desk where he could keep all of his reading supplies and write comfortably. Jefferson used the desk for 50 years. The desk accompanied him wherever he went. In 1825, just a few months before his death, Jefferson gave the desk to his grandson Joseph Coolidge. Soon after Coolidge's death in 1880, his children gave the desk to the federal government for safekeeping.

The moment I saw Jefferson's little lap desk in the Smithsonian National Museum of American History, I knew I had to build one. On numerous visits to Washington, D.C., I peered endlessly at the original, taking several rolls of photos and filling a notebook with sketches. Crafted out of mahogany, the desk has exquisitely small dovetails in the drawer, tiny screws fastening the hinges and a small satinwood inlay for decoration. When opened, the desk offers a comfortably slanted, baize-covered writing surface. (Baize is a feltlike fabric used to cover billiard tables.) The lid's support stand fits into different notches so that Jefferson could change the angle of the top when he wished. Folded halfway, it becomes a

book rest. A mortise in the underside of the lid houses the arms and allows the lid to close completely. The single drawer has compartments for an ink well, writing quills, nibs, pen knife and paper.

I finally found rough dimensions for the piece in an out-of-print book about the desk, *Declaration of Independence Desk: Relic of Revolution* by Silvio Bedini (Smithsonian Institution Press). Using rough dimensions and photos I found in the book, I was able to reproduce the drawings for the desk, then build a replica of the desk itself. Though it looks very simple, the desk turned out to be one of the most interesting and challenging woodworking projects I've built. It is deceptively intricate with lots of tiny parts—just my kind of project.

Drawings reproduced from photos

The first task in building the desk was to reproduce the working drawings. I began by drawing the perimeter of the piece full size. Then, using photos—both my own and from the book—I slowly filled in the details. I made an enlarged copy of a photograph and then transferred the known dimensions—such as the width of the desk—to the copy. Using dividers and an inch scale, I was able to figure out other dimensions. Though the result is not 100% accurate, it's pretty close.

When scaling from photographs, you have to take distortion into account. The camera foreshortens the object, making it larger in the

front and smaller as it becomes more distant, so a little bit of guesswork is involved. One other useful trick with photos is to photocopy them. Enlarging the photos a little at a time, I was able to get full-scale copies, which made measuring details like the dovetail spacing much easier,

Shopmade plywood-core panels provide stability

The original desk is made of mahogany, except for a small satinwood inlay around the drawer front and a matching inlay on the back of the case. Most of the material is $\frac{3}{8}$ in. thick, but the drawer parts are much more delicate, as thin as $\frac{1}{8}$ in.

I could have slavishly duplicated the chest, imperfections and all, but I decided instead to incorporate modern materials, tools and techniques—such as using plywood-core veneered panels.

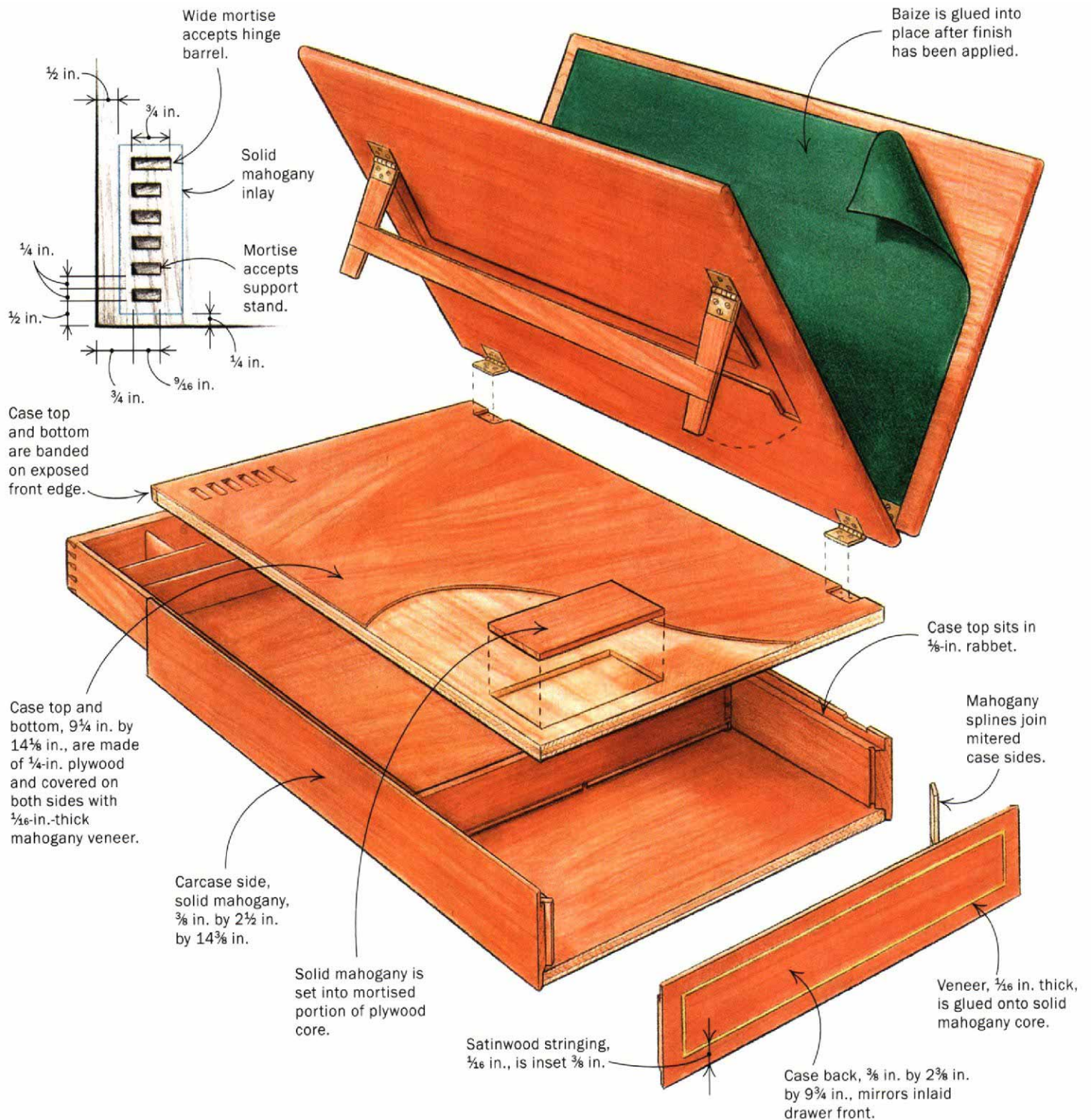
Countless changes in humidity caused the original desk's solid flatsawn mahogany panels to cup so badly that the screws holding the hinges appear to have been torn loose and repaired numerous times. It would be much easier to make these panels out of solid wood, as Randolph did—and it's an option you may want to consider—but I decided to deal with wood movement by making built-up panels consisting of a plywood core and bandsawn mahogany veneer. I figured the plywood core would stabilize the panels.

It's simple enough to buy sliced veneer, but I



Revolutionary laptop. Thomas Jefferson wrote much of the Declaration of Independence on this small mahogany desk. The original (at left) is in the Smithsonian Institution. The closed version at the top of the page is the author's replica.

INTRICATE JOINERY IN A SMALL PACKAGE



wanted more control over the thickness and grain pattern. To make your own veneer, you need a bandsaw and a benchtop surface planer. I cut the veneer a little thicker than $\frac{1}{16}$ in. on a 14-in. bandsaw with a riser block, which allowed a full 10-in.-wide cut. If your bandsaw won't support a cut this wide, simply cut two 5-in. pieces and glue them together. When setting up the bandsaw, be sure to take drift angle in-

to account (for more on making shopmade veneers, see *FWW*#145, pp. 44-49).

Joint or plane one face of the mahogany, make the bandsaw cut, then surface the face of the board once more. The veneers will be smooth on one side but rough on the other. The veneer is too thin and flexible to run through the planer on its own, so tape the veneer—smooth side down—onto a piece of melamine, using double-faced

tape. The whole assembly can be run through the planer, which will give you a clean surface on both sides.

Gluing the veneer to the core—The first job of gluing up the panels is to cap the plywood edges and inlay areas that will be mortised out for the desk support stand and the notches in the top of the carcass panel. I ran all of the grain in the same di-

rection so that it would look like a single, solid piece of mahogany, end grain and all. First mill some mahogany to the thickness of the Baltic birch plywood core. For the long edges, rip strips about 1/4 in. wide. Carefully cut some pieces of end-grain edging about 1/4 in. wide. This edging—quite fragile when first cut—gets reinforced when the veneer is glued in place. By cutting the banding out of the same piece of wood you use for the veneer, the color and grain pattern should be pretty close.

Rout out the areas where the mortises will go and glue in mahogany pieces, carefully outlining the backing areas on the outside of the veneer so you'll know what goes where after the veneer has been glued on. Glue the mahogany into the mortise, then use a cabinet scraper to flush it to the plywood core.

The plywood is sandwiched between layers of veneer, and all of the panels are glued up at once. To save time, use a roller to apply glue to both the plywood and the veneer. With one layer of melamine between the panels, stack more layers of melamine, sandwiching the panels to help distribute clamp pressure evenly. Once the glue has set, the veneer can be trimmed flush with the edges.

Straightforward carcass construction

The carcass for the original desk consists of five boards joined with rabbet joints and a few brads. The grain orientation of the top and bottom panels is across the width of the desk. The end is mitered and has satinwood stringing matching that of the drawer front on the opposite end of the desk. The miter joints in the original probably have hidden dovetails, but I used splined miter joints instead.

Again, I opted to glue up veneered panels for the top and bottom of the carcass, although in the original these solid mahogany panels are nailed to rabbets in the sides of the desk and seem to have stayed flat just fine. If you glue up plywood-core panels, you must inlay mahogany where the notches are in the top panel. Because only one edge on each of the panels shows, only that edge needs banding.

Inlay the satinwood detail—At about 1/16 in. wide, the stringing on the end piece looks like it was set into a slot in the original. But I approached it as a marquetry project. Using a razor knife and straight-

Edge-banding is the key to seamless veneering



Making veneer on the bandsaw. Slicing veneer isn't hard as long as your bandsaw is tuned up and working well. A new blade, a riser block, an auxiliary fence set to the drift angle and a nice, easy feed pressure will help you achieve a very satisfying cut.

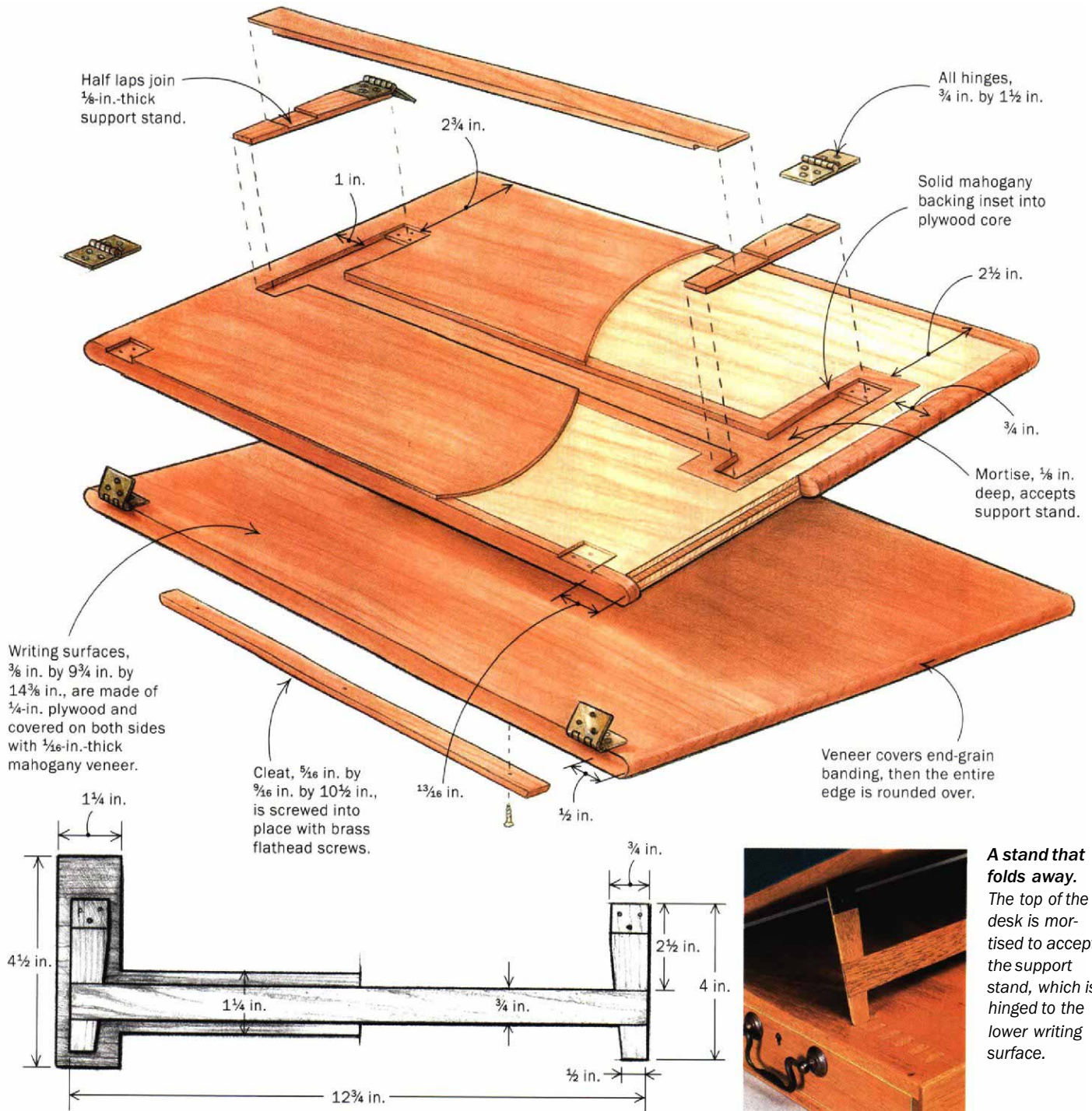


Cutting the plywood band. For a seamless edge that will look like solid wood, cut banding from the end grain of the same mahogany board you used to cut the veneer.



Gluing the banding in place. The perimeter of the plywood is banded with mahogany prior to gluing the veneer. The end grain is fragile at this point, but the glued-on veneer will provide reinforcement.

PLYWOOD CORE STABILIZES HINGED WRITING SURFACES



A stand that folds away. The top of the desk is mortised to accept the support stand, which is hinged to the lower writing surface.

edge to cut the pieces, glue up the veneer with the stringing in place. Then glue the veneer back on to the substrate, in my case a piece of solid mahogany.

Rabbets and hidden splines hold the case together—The spline cuts are easily made using a tablesaw sled. Place the carcass parts flat on the sled and angle the blade at 45°. Use a stop block to register

the cut, and make sure that the cut is entirely hidden in the rabbet. I cut solid mahogany spline material so that the grain runs the same direction as the sides of the carcass, allowing for expansion and contraction all in the same direction and at the same rate.

Assembling the carcass—Because the plywood-core panels minimize wood

movement, you can glue the top and bottom to the sides of the carcass. If you're using solid wood panels, I would suggest that you use just small brads without glue; this will allow the wood to move just a bit and should keep the desk from tearing itself apart.

Glue up the carcass first, then fit the drawer to the opening. Be sure the carcass is flat when you glue it up. Either set it on a

Solid wood is inlaid in areas to be mortised



Inlay the plywood core. Because the top of the carcass and the writing surfaces will be mortised to accommodate the support stand, the plywood is mortised and inlaid with solid wood. After using a Forstner bit to remove the bulk of the material, a straightedge jig helps guide a laminate trimmer to clean up the edges.

Roll on the glue. Use a roller to apply glue to both the veneer and the plywood core, making sure that there is 100% coverage on both.



Mortising for the support stand. The lower writing surface of the desk is mortised to accept the support stand. After material has been hogged out with a router, a chisel is used to square up the corners.



flat surface or use winding sticks on the surface to sight along the top surfaces.

It's a challenge to build and fit the drawer

The drawer in the original is a traditional, dovetailed box with a solid wood bottom. It's an especially challenging job, just as it must have been then, because the sides

and partitions are so thin— $\frac{3}{16}$ in. for the sides and $\frac{1}{8}$ in. for the partitions.

Start by fitting the drawer sides and front into the carcass, allowing for a bit of expansion over time. The dovetails in this drawer are so small that even an $\frac{1}{8}$ -in. chisel is too large. (I ground an old chisel down to a little less than $\frac{3}{32}$ in. for the job.) Lay out and cut the dovetails, fit the bottom of

the drawer into a groove and tackle the partitions last (for more on making drawers, see *FWW*#117, pp. 45-49).

The thin drawer partitions are held in place with V-grooves and mitered points, which act as tenons. These are easier to cut than you might think. Mitered points can be cut on a miter saw, and the grooves are easily made on the tablesaw with a cross-cut sled and the blade set at 45° .

A delicate touch is required to make and install the support stand

Made of $\frac{1}{8}$ -in.-thick material, the support stand is a very delicate assembly. Cut out the pieces and run the half-lap joints and hinge mortises on the tablesaw crosscut sled, then smooth the cuts with a scraper.

The support stand is housed in the lid when the writing surfaces are closed. Carefully position the support stand in the spot it will occupy in the panel recess, then trace around it with a sharp pencil. I used a laminate trimmer with a $\frac{3}{16}$ -in. straight bit to cut the mortise, but a router would work as well.

To help guide the laminate trimmer, use a simple jig consisting of a small piece of plywood with a straightedge glued along one face. With the small straight bit in the laminate trimmer, trim the jig so that its edge is at the edge of the cut. With this jig, the bit cuts exactly along the edge of the plywood. It's easy to clamp the jig along the pencil line, starting and stopping the cut as needed. The round corners of the mortise can be squared up with a chisel.

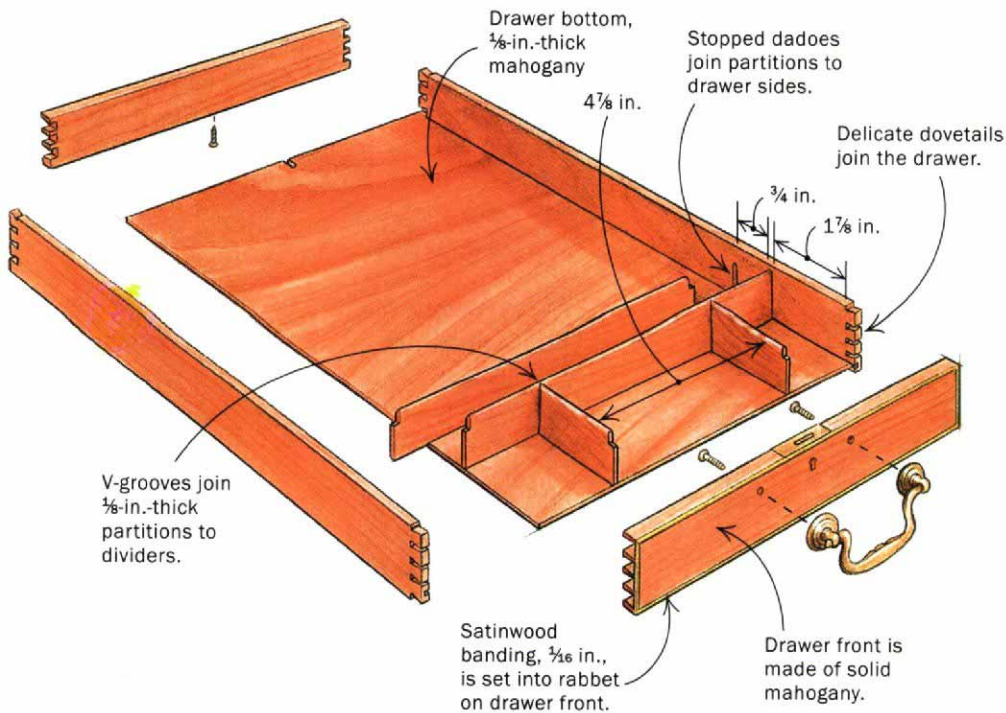
This small desk takes a lot of hardware

For such a small piece, there is a considerable amount of hardware to mount—six hinges, a mortised lock and the handle. You can mortise for all of the hinges at one time, using the same straight router bit you used to cut mortises for the support stand. Then square up the corners and trim the edges with a knife and chisel.

To find the depth for the hinge mortises fastening the bottom writing surface to the carcass, hold the hinge leaves closed but parallel. Half of this measurement, not the thickness of the leaf, is the right depth for this hinge mortise. For the other hinges—fastening the support stand and holding the upper writing surface to the lower one—only mortise to the depth of the hinge-leaf thickness itself.

The hinges used in this project need very

DELICATE DOVETAILS AND MORE



small screws. But wood screws, even small ones, have a smooth shank, then taper from there to the end of the screw. This means that there are only very shallow threads for the lower 1/8 in. To make matters worse, the support stand is only 1/8 in., so it's impossible to use conventional wood screws to mount the hinges. Though unconventional, I used solid-brass, slotted machine screws (#2 by 56 tpi by 1/4 in. long). First drill 1/16-in. pilot holes, then use an awl to enlarge the holes slightly. The machine screws have a remarkable amount of holding power, even in the thin support stand. I shortened the screws for

the support stand by holding them with pliers against the grinding wheel of a bench grinder.

The lock mortise is pretty straightforward to cut with a router and chisels. Just make sure that you cut the mortise for the lock and drill for the drawer pull *before* you assemble the drawer.

Antiquing the hardware—The drawer pull came polished, the hinges came plain, and the mortise lock was brushed. I wanted it all to look the same, so I decided to antique all of the brass. I soaked the hardware in lacquer thinner to take off the lac-

quer, then used Brass Darkening Solution from Crown City Hardware (626-794-1188) to make everything the same color. It took only about 30 minutes and worked *amazingly* well, leaving everything a uniform dark brown. By polishing slightly with 0000 or synthetic steel wool, you can bring the surface finish back up to whatever polish you like.

After all of the hardware is in place and adjusted, remove it to sand and finish the entire project.

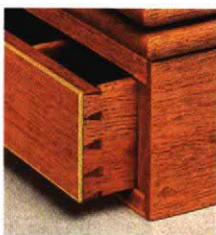
Hand-rubbed varnish is an ideal finish for the laptop

Though you can just as easily scrape, plane or sand the surfaces of this laptop for finishing, I sanded by machine during the building process with a belt sander and 120-grit paper, then sanded by hand using a felt block with 120 grit and then with 150 and 220 grit.

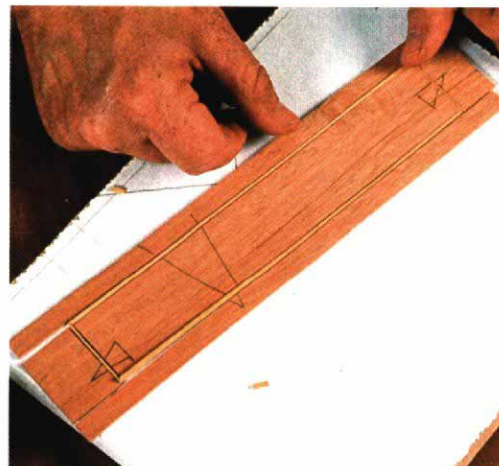
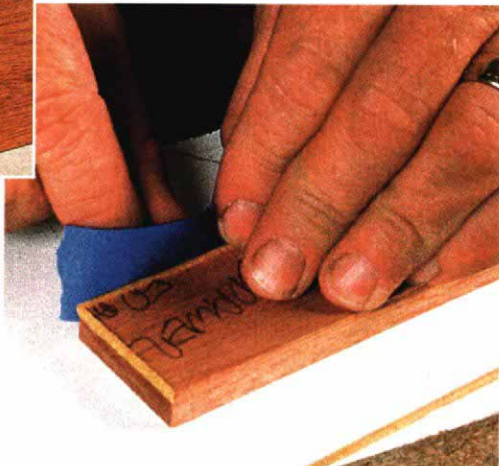
The finish for the desk should have a satin sheen—not too glossy and not too dull. All you need to get a nice, durable, hand-rubbed finish is high-gloss spar varnish, thinner (I used turpentine), 400-grit wet-or-dry sandpaper, some rags and a little elbow grease. Simply rubbing gloss varnish onto the raw wood, then wiping off the excess with a rag will provide the protection and sheen that closely match the 225-year-old original, not the glossy sheen you'd expect from a high-gloss varnish. Gloss works best as a wipe-on finish because it has greater clarity and will not hide the wood grain as a semigloss or eggshell finish would.

Wearing gloves and using the wet-or-dry sandpaper, rub all of the surfaces with var-

Satinwood stringing mimics drawer banding



Detailing the drawer. Satinwood banding is applied to a small rabbet on the drawer front. Tape holds the banding in place until the glue dries.



Slice and rejoin veneer. On the back carcass panel, instead of inlaying the satinwood stringing, approach it as a marquetry project. Use a small knife to cut the veneer into sections.

nish thinned by one-third. Cover the entire surface and sand until you produce a slurry, which acts as a pore filler.

With the varnish still wet, wipe the surface with a soft cotton rag and buff until the surface is slick and smooth. Polish again with a clean, dry cloth after a few minutes to make sure no wet spots remain. The next day, lightly sand it dry with 320-grit paper. Repeat the process with unthinned varnish each day until you build up three or four coats. Each coat will produce slightly more luster. Rubbing gloss varnish this way produces a lovely hand-rubbed sheen that's hard to beat.

Applying the baize can be tricky

The cloth used on the writing surface looks a lot like felt, but it's actually a woven fabric. It's called baize and is available in a wide range of colors from billiard supply houses. Make sure you mark the back of the cloth.

Apply the cloth to the writing surface after the finish has been applied and the hinges are in place but before mounting the book stop. This way the top and bottom writing surfaces can be laid out flat on the bench.

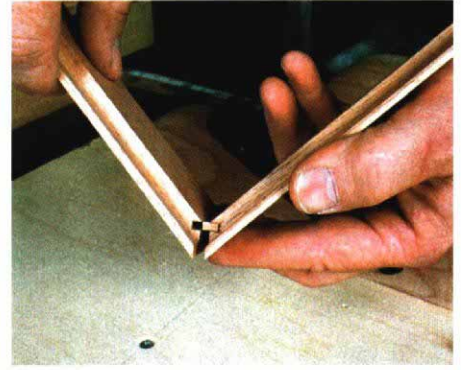
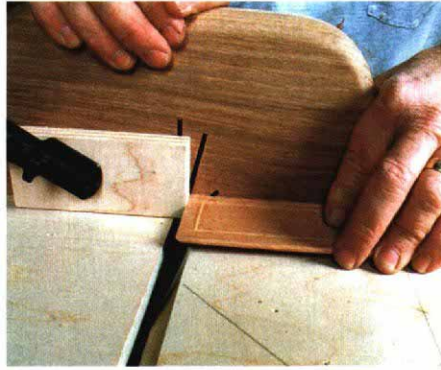
Using blue masking tape, carefully mask off a wood border of about ½ in. around the cloth, then cut out a piece of cloth about 1 in. oversized, I used 3M Super 77 spray adhesive in an aerosol can, applying the adhesive to both the writing surface and the back of the cloth. Use only a light coat on the fabric so that the adhesive doesn't bleed through. After about 30 seconds of drying time, begin laying the cloth onto the working surface, smoothing out the wrinkles as you go.

Now comes the tricky part. Using a razor-sharp utility knife and a straightedge, carefully trim the cloth to size, trying not to cut too deeply into the wood but making sure you cut all the way through the fabric. As the cuts are made, pull up the extra fabric and masking tape.

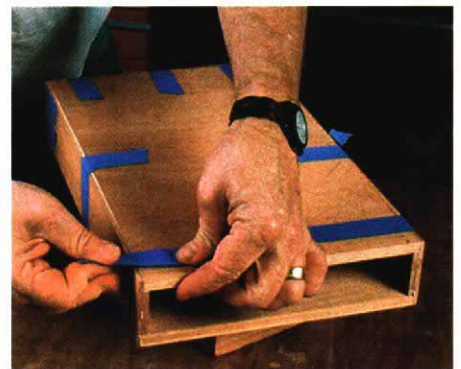
Only about the size of a stack of legal pads, this project combines traditional joinery with modern tools, materials and techniques, resulting in a replica of the lovely little writing desk that played such a large part in U.S. political history—a "Relic of Revolution," indeed. □

Lon Schleining sells full-sized plans of this project on his web site: www.woodbender.com.

Miters and rabbets join the carcass



Splined miter cuts. The carcass is assembled with miters and reinforced with splines. With the ends of the stock cut to 45°, the spline slots can be cut on the crosscut sled at the tablesaw. To allow for uniform expansion, cut spline material to fit with the grain going the same direction as the sides of the carcass.



Tape up the mitered carcass joinery. Tape helps hold the joints in place before the clamps go on. After applying tape to the outside of the mitered joints, flip the assembly and coat the mitered ends with glue.



Assembling the carcass. Once glue is applied to all the joints, tape helps hold the carcass assembly in place. Once the assembly is clamped up, use winding sticks to check the flatness.