A Deck Railing Without Fasteners

Top-grade lumber, clever joinery and some unexpected materials take the place of the traditional stuff on this Oregon deck

BY ARTHUR CHENOWETH

A few years ago, my wife and I moved to the Hood River valley, where the average rainy season is nine months long. All that rain makes for the sweetest cherries on the planet, but it's murder on outdoor structures such as decks. Our deck had long since succumbed to Mother Nature.

Besides the rot, I found three separate carpenter-ant nests, and I ended up replacing most of the Douglas-fir joists as well as all the old decking. The 70s-style guardrail had Swiss-chalet scalloped newels that angled out. It, too, was in horrible shape and definitely not built to code. Replacing the deck railing became the real challenge.

Stain and rot begin at the fasteners

I've done my share of decks and railings over the years, and I've always tried to avoid exposing fasteners to the weather. In my experience, that is where stains and rot begin. So with this job, I tried to find ways to keep fasteners to a minimum.

I'd installed a balustrade around an interior stairwell the year before. For that railing, I'd made 2x6 white-oak frames and then filled in the space with ½-in. black pipe spindles. I adapted a similar system for the new deck's guardrail (photo above).

Foundation bolts secure the newels

The new 4x4 newel posts are clear cedar. I chamfered the top 36 in. of each newel on all four edges. A simple router jig made quick work of the chamfers (top photo, facing page). I put a 1-in. straight bit into a router with two 45° guide blocks screwed to the base. A carriage held the post at a 45° angle, and I ran the router from the top end to a measured point. I finished the chamfers with a chisel, leaving the last 14 in. of each post with square edges.

Putting newels in and getting them plumb can sometimes give you fits, so I borrowed a method mat I use to brace strongbacks to concrete-wall forms using regular L-shaped foundation bolts.

I drilled bolt holes through the newel, through the rim joist and then through the joist at right angles to the first holes (center photo and drawing, facing page). The hook end of the bolts goes into the hole in the joist, and the threaded end runs through the rim and through the newel. Tightening the nuts on the bolts pulls the newel tight to the rim, making it easy to plumb the posts in both directions.

This system worked fine, except where the deck had a 45° turn. Here, I used regular bolts through a doubled rim joist. The spacing of the newels reflected the joist spacing, and the old joists were not uniform. Consequently, the spaces between newels and, therefore, the size of the guardrail sections varied. Out of 15 sections, only four were the same.

Build railing sections in the shop

The new deck boards I'd installed were tight-knot cedar but wouldn't do for the railing. I doubted that cedar's strength and knew the difficulty of working with knots in the join-

ery, so I opted for clear western red cedar instead. It cost about four times more than the decking but lacked the disadvantages. That fact combined with the clear cedar's appearance made it worth the price.

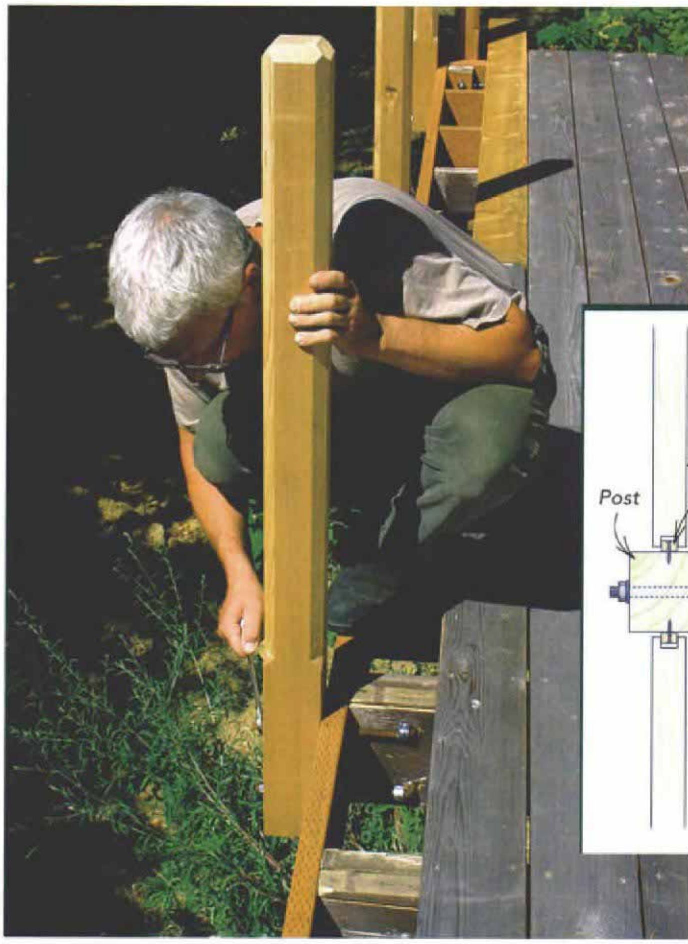
The 2x stock wasn't uniform, and some pieces were slightly warped. So I ran everything across the jointer, ripped it to width and planed all stock to the right thickness. Then I cut all the stiles (vertical frame members) and rails (horizontal frame members) to length.

I joined the stiles and rails for each section with mortise-and-tenon joints. With about 60 mortises looming ahead of me, I bought a Powermatic 719 hollow-chisel mortiser (800-274-6848; www.powermatic.com) with a ⅝-in. bit. Two days' work with the mortiser let me finish a job that would have taken forever with the usual method of boring and chiseling.

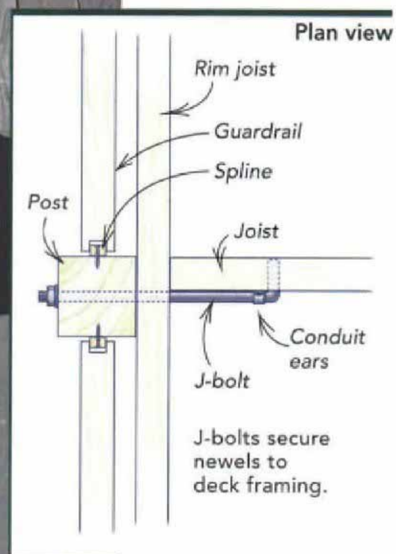
The top edges of the rails have a 45° bevel to shed rain better. Each end of the top rail has a mortise cut into it about 3¼ in. deep, the maximum I could get with the machine. The

NEWELS TAKE SHAPE

A simple jig for chamfering. *To get the chamfers on the edges of the newel posts, 45° angle blocks guide a router equipped with a 1-in. straight bit.*



These fasteners aren't standard. *Adopted from concrete formwork, the only fasteners in this railing are the J-bolts that hold the posts to the rim joist. Conduit ears hold the bolts in place during installation.*



Alignment splines. *Wood splines glued and screwed to the sides of each newel post fit into grooves on the sides of the railing sections.*

Drawing: Dan Thornton

RAIL SECTIONS ASSEMBLED IN SHOP

Holes on the top, dowels on the bottom. *Before the frames are assembled, provisions are made for pipe spindles, which fit into holes in the top rail. On the bottom rail, the spindles slide over dowels (photo left). A hole saw reduces the dowels' diameter to that of the pipe.*

Waterproof glue *binds the mortise-and-tenon joinery. The sections are clamped until the glue sets.*

bottom rail has ⅜-in. wide tenons cut into each end. Each stile has a tenon at the top and mortise on the bottom. Aside from looking better, this configuration keeps the end grain of the stiles from facing up into the rain. I tenoned the bottom rail into the stiles for added strength for those inevitable occasions when someone decides to stand on the bottom rail.

Cutting the stile tenons on the table saw was easy, but the bottom rails were too long to cut that way because of the 10-ft. ceiling in my shop. So I cut those tenons with a sliding compound-miter saw, making multiple kerf cuts and finishing the cuts with a sharp chisel.

Spindles made of conduit

Because of cost, I decided to use ½-in. EMT electrical conduit for the deck spindles instead of the black pipe I'd used inside. On the top rail, each spindle slides into a 2-in. deep, ¾-in. dia. hole, which is wide enough for the O. D. of the EMT. I bored those holes on the drill press, spacing them 4 in. o. c.

If I had simply drilled holes in the bottom rail for the spindles, those holes would have filled with rain. Instead, the spindles fit over ⅝-in. wooden dowels that I drilled and glued into the bottom rail, projecting up 1 in. (photo top left).

The I. D. of ½-in. EMT is just less than ⅝in. To pare down the diameter of the dowels to fit the EMT, I ran a ¾-in. hole saw over the stub of each dowel (photo top right). The conduit was all cut to length, cleaned and then sprayed with many coats of gray primer and flat black paint (photo bottom right, facing page).

Frames don't have to fit exactly

To assemble the frames, I used waterproof Titebond II glue (www.titebond.com; 800-669-4583) on the mortise-and-tenon joints (bottom photo). I then clamped the whole assembly until the glue set. For added strength, I pinned each corner with two ¼-in. dowels. After sanding, I applied DAP WoodLife (800-556-7737; www.dap.com) to prevent moss from growing on the railing.

The next step was slipping the rail sections into place (photo top left, facing page). I'd cut ⅝-in. wide by ½-in. deep slots into the outside edges of the stiles. These slots fit over clear Douglas-fir mounting strips that I'd glued and screwed to the newel posts (bottom photo, p. 99). All the different-size rail sections didn't faze me. As part of the system, I undersized each section by ½ in., giving me ¼-in. gaps on each end at the newel post. The narrow gap looks nice and helps to hide discrepancies in frame or newels (photo top right, facing page).

I spread glue on the mounting strips to add a little lubrication during installation and to seal the joint after the frame was in place. The final step was putting in the spindles. They go up into the holes in the top rail and then slide down over the dowels in the bottom rail (photo bottom left, facing page). The 45° bevel on the bottom rail facilitated this process.

The contrast between the weathered-gray cedar and black pipe looks great. I probably won't glue the pipe spindles to the dowels. We don't have kids around, and if you don't pull the spindles up and out, they won't move. □

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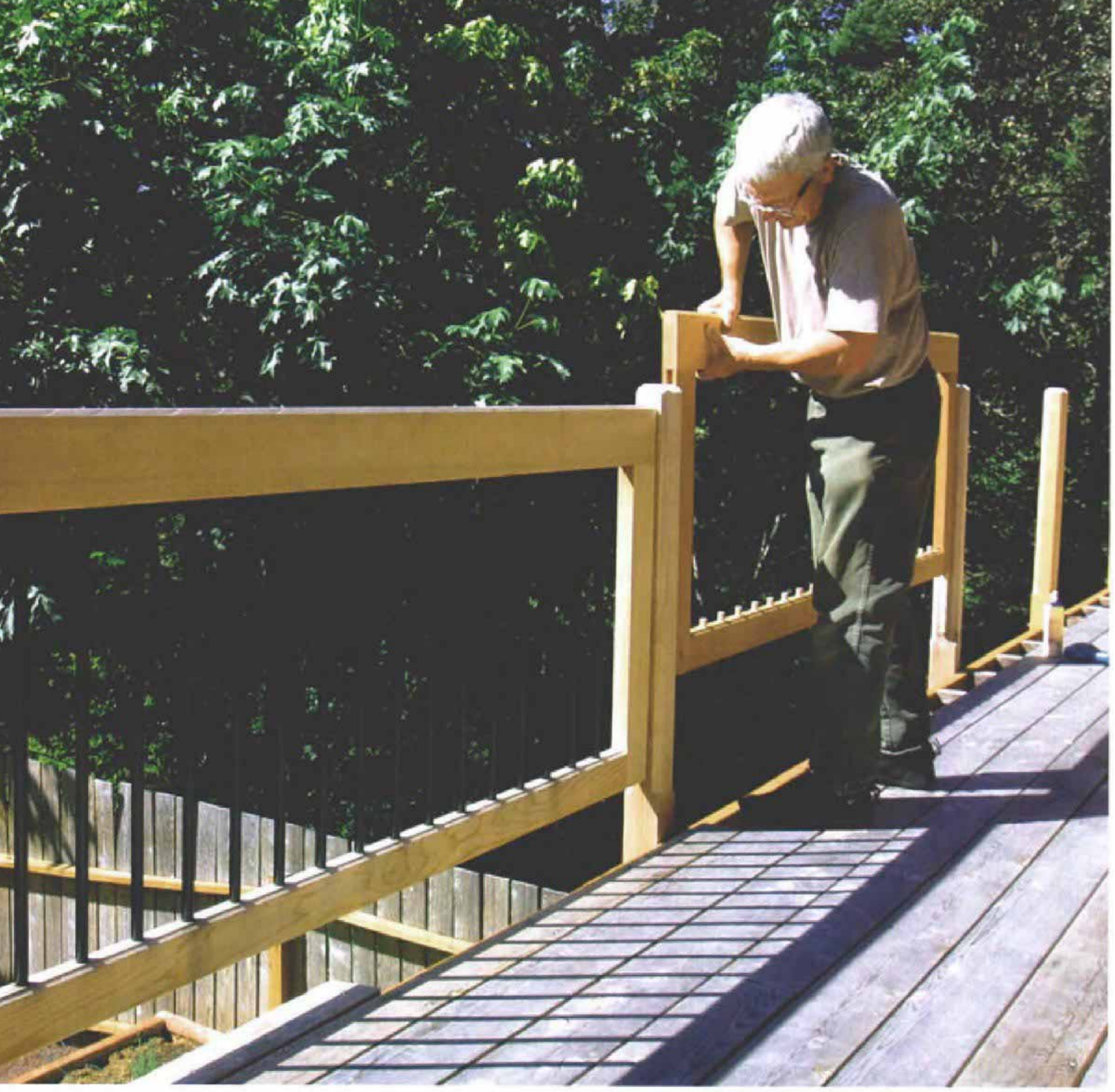
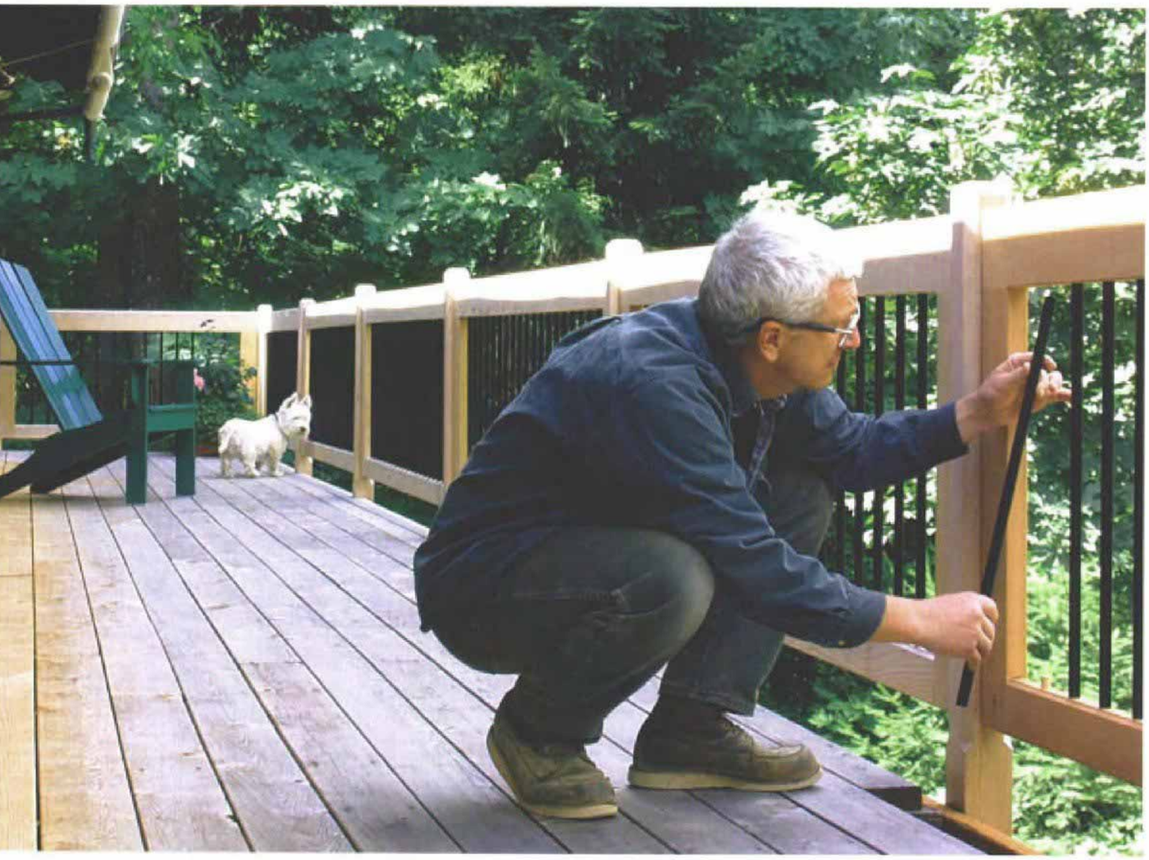


FRAMES SLIDE DOWN, SPINDLES SLIDE UP

Railings **are *glued to newel posts.*** *Mounting strips on the newel posts slide into slots in the stiles of the railing frames (photo left). Making frame sections smaller than the opening results in a ¼-in. reveal that helps to disguise any small variations in the frames or the newel posts (photo below).*



Painted spindles slide up and then down. *Large nails partially driven into an old beam hold the conduit spindles as they receive numerous coats of primer and paint to protect them from the elements (photo above). As the final step, the author pushes the spindles up into the holes in the top rail and then down.*