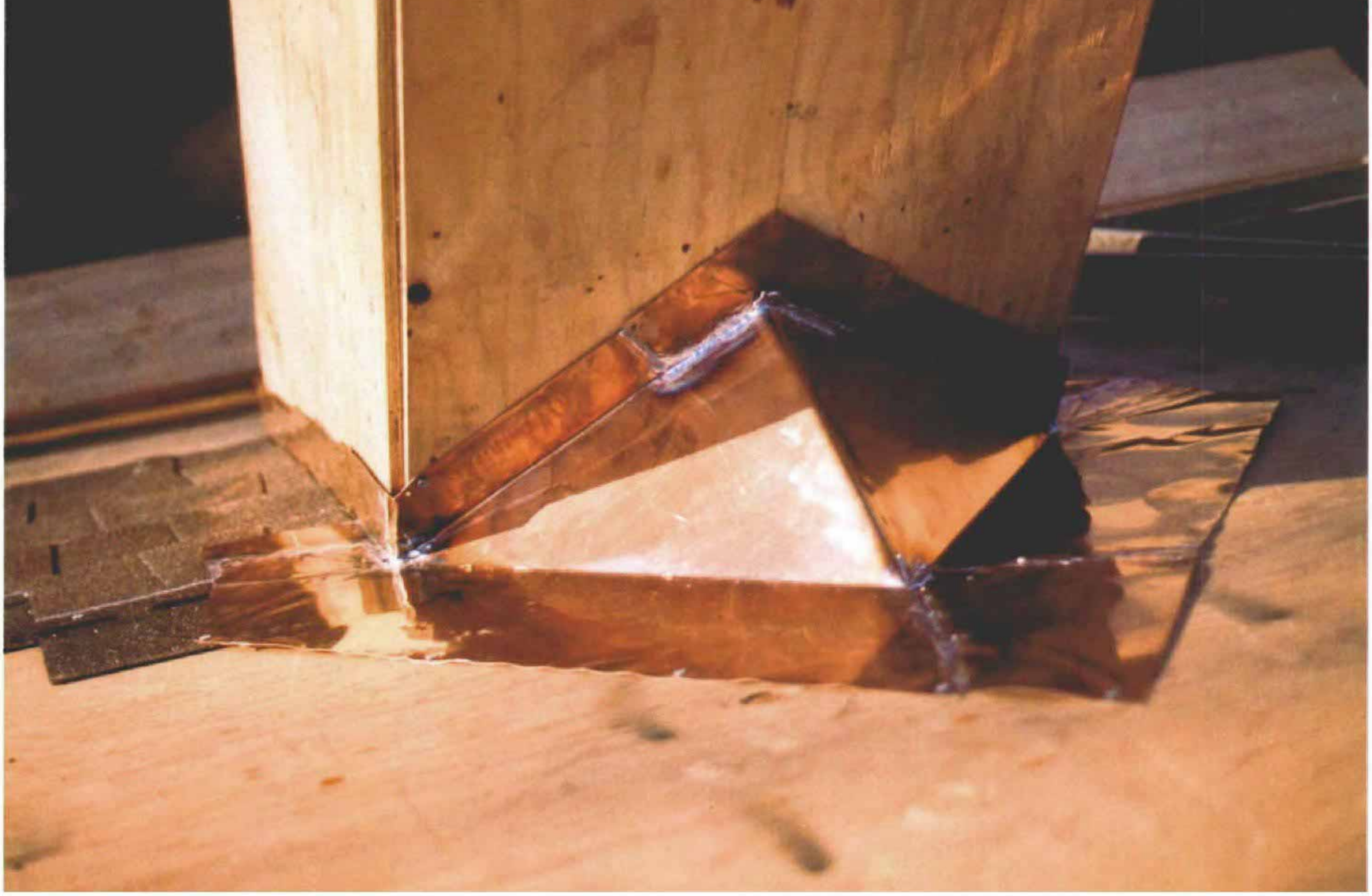


Building and flashing a cricket are the same whether for a masonry chimney or for a wooden chimney structure like the one above, which houses a pair of woodstove chimney pipes. Other metals will work for the hashing, but copper is the easiest to solder.

Chimney Cricket

Soldered copper flashing for a rooftop watershed

by Scott McBride

The best place for a chimney to exit a roof is at the ridge. Water will run away from the chimney, not toward it, and flashing becomes a fairly simple matter. Builders in New England did this back in the days before sheet metal was readily available.

When you move a chimney downslope, however, runoff will strike it, often forcing water up under the flashing and down into the house along the bricks. Leaves and other debris can build up behind the chimney and decompose into a moisture-laden compost that rots roof boards and corrodes the flashing. The way to avoid this mess is to build a well-flashed cricket.

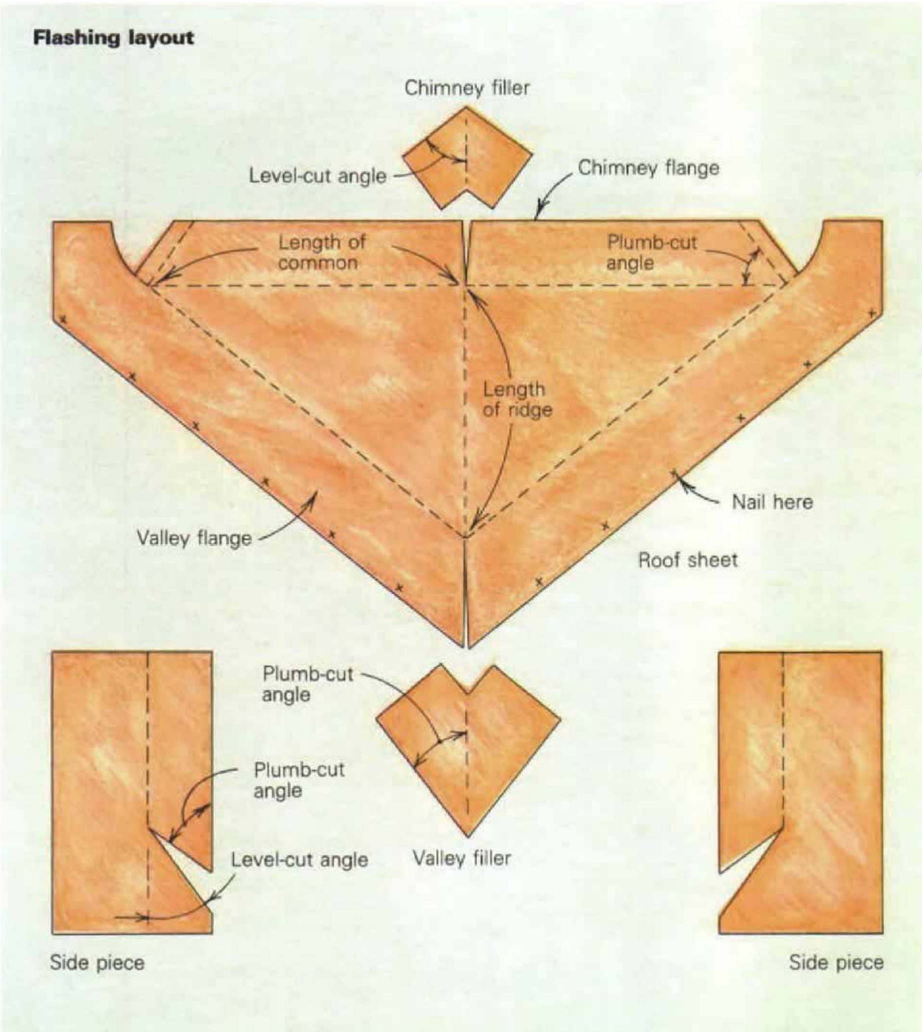
A cricket, or saddle, is a miniature gable roof covered with metal that sits between the back of the chimney and the main roof. The intersection of cricket and main roof produces a pair of valleys that divert water, snow and debris around the chimney. Recently I built a small cricket for a wooden chimney structure that houses a pair of woodstove chimney pipes. Although the wooden chimney structure made attaching the cricket easier, constructing the cricket and flashing it were much the same as they would be for a masonry chimney.

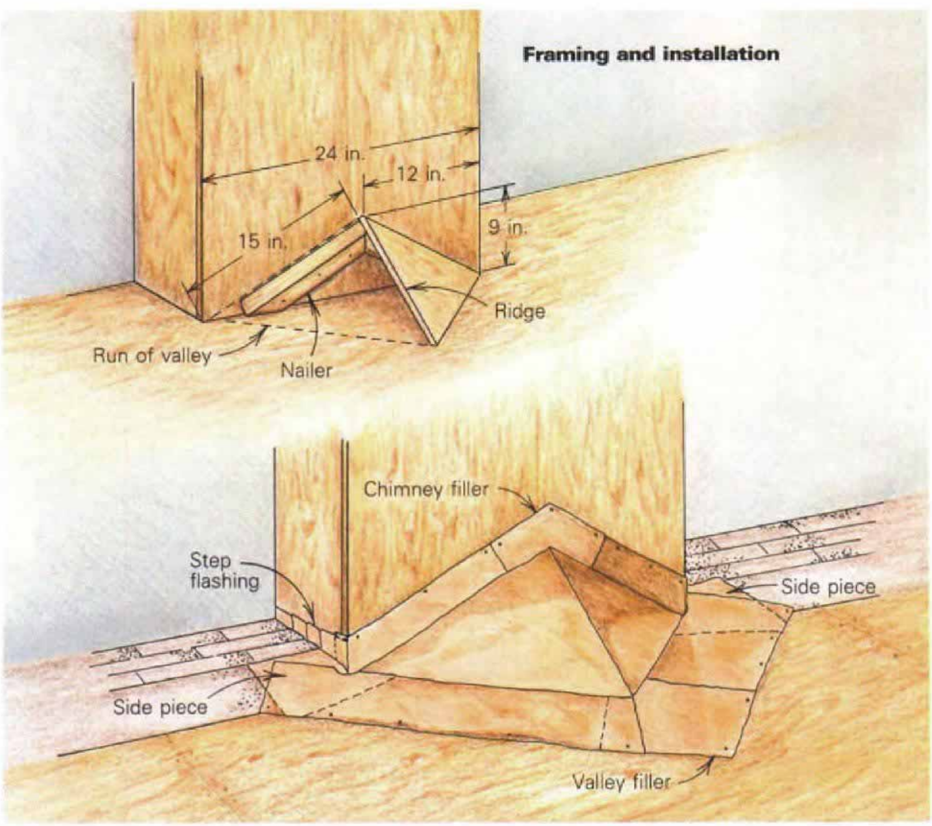
Carpentry—The cricket I built was small enough to make with plywood—no rafters—but I'll speak in terms of common and valley rafters in order to relate the geometry to standard roof framing. Since the chimney structure was 2-ft. wide across the back, the run of the cricket common rafter was half of that (12 in.). The main roof of the house had a pitch of 9-in-12, so to make things easy I gave the same pitch to the cricket. The run of the cricket common rafter being 12 in., the rise was 9 in. and the length, or slope, an even 15 in. You can calculate this using the Pythagorean theorem, but it's easier just to measure the diagonal on a framing square.

Each half of the cricket roof surface (bottom drawing, next page) is a right triangle with one leg 12-in. long (the length of the ridge) and the other leg 15 in. long (the length of the common). The hypotenuse connecting these two sides is the valley. To begin construction, I took a piece of ½-in. CDX plywood 12 in. by 15 in. in size and cut it diagonally, giving me both halves of the cricket at the same time.

To make the pieces fit properly, I beveled the ridge edges at 37°, which is the equivalent of a 9-in-12 common-rafter plumb cut. Then I beveled the edge that runs along the valley at 45°. This was a sharper bevel than was necessary, but the resulting undercut wasn't a problem.

I held the two pieces of plywood in place on the roof and traced the outline of the cricket onto the roof sheathing and the chimney structure. One-half inch below the lines on the chimney, I drew parallel lines marking the top of my nailers. To make these, I cut a





pair of 2x4s with a 9-in-12 plumb cut at the top and a 9-in-12 level face cut at the bottom and nailed them in place. I didn't bother with an edge bevel at the bottom since the nailers wouldn't actually have to bear on the roof (drawing, below left). Had this been a masonry chimney, however, these pieces would have been cut as actual rafters. This would have required compound miters on their bottom ends, consisting of a 37° bevel in conjunction with the level face cut. They could then be installed an inch or two away from the brick for heat clearance.

Flashing—After nailing down the plywood, I laid out the copper flashing for the cricket. You can use other metals for this, such as aluminum or galvanized steel, but copper is the easiest to solder, and soldering is the best way to seal the joints. Copper comes in sheets and rolls, and is available in different weights and tempers. For this job, I bought 14-oz. hard copper from a local roofing supply. It comes in 3-ft. by 8-ft. sheets, and I paid $45 per sheet.

The flashing assembly consists of one large piece and four smaller ones (top drawing, left). For the large piece, I started with the same dimensions obtained for the plywood, then added 4 in. for a flange against the chimney structure and 8 in. for a flange against the roof. Vertical surfaces, such as the sides of the chimney structure, don't need as much protection as the roof surfaces, which is why I made the chimney flange so much smaller than the valley flange.

Two of the smaller pieces are fillers, covering gaps that open up at the chimney flanges and at the valley flanges when the large, main sheet is folded at the ridge line. The chimney filler was given a notch that was twice the angle formed at the top of each nailer. The valley filler was given a notch that was twice the angle between the valley and the nailer on the cricket's roof surface.

The other two pieces of flashing are side pieces that tie the valley flange, chimney flange and roof sheet together where they meet. The side pieces also turn the corner of the chimney structure and overlap the step flashing coming up along the chimney's side.

To make the side pieces, I started with a rectangular piece of copper and cut a slot in from one edge at 37° (the plumb cut angle). This allowed a flange to be turned up that would butt into the upturned chimney flange. I left tabs on the ends of the chimney flanges to create an overlap with the side pieces.

Most of the bending (top photo, facing page) was done on a portable aluminum J-Brake (Van Mark Products Corp., 24145 Industrial Park Drive, Farmington Hills, Mich. 48024). But after making a series of bends, I could no longer slip the roof sheet into the brake and had to form the ridge crease over the edge of a 4x4 post. I also used hand seamers for some of the smaller bends. These are like pliers with broad flat jaws and are made specifically for working sheet metal.

Drawings: Michael Mandarano

To facilitate assembly and ensure accurate positioning of the pieces while soldering, I built a mock-up of the chimney structure. The mock-up allowed me to work in the shop and keep the heat of soldering away from the building itself—something that's always made me a bit nervous when soldering flashing in place.

Soldering copper—The secret of the tinknocker's art lies not in the soldering itself, but in the fabrication of the parts. Close-fitting joints will suck in the molten solder just like joints in copper plumbing do, which makes sound, neat joints requiring minimal heat. Big gaps, on the other hand (anything over 1⁄16 in.), will require lots of solder and repeated heatings to seal them. Also, the excess heat causes the metal to warp, which drives the mating pieces even farther apart. The result is a thick, sloppy bead that may not be watertight. Once this happens, it's too late to go back and refit the copper, so the job has to be done right the first time.

After cutting out and bending the pieces, I cleaned the contact surfaces with steel wool (emory cloth works, too). New copper doesn't need much of this, but old tarnished copper requires mountains of elbow grease to get clean. Next, I carefully applied flux only to the areas where I wanted the solder to stick. Limiting the application of the flux in this way helps contain the molten solder once it starts to flow and enables me to peel hardened solder from those areas left unfluxed. I brushed on a liquid-type acid flux, as opposed to the paste flux preferred by plumbers. The liquid leaves less residue and is easier to wash off. I'm very careful not to get it on me—especially not in my eyes.

Before soldering each joint, I arranged the pieces so that the joint to be soldered was level. This reduced the tendency of the liquified solder to run away from the joint. I then clamped the pieces in place, keeping the clamps far enough away from the joints so they wouldn't act as heat sinks. Locking pliers, especially the deep-reach kind, are my favorite clamps for this. To keep the joints tight, I had a helper press down on either side of the flame with a pair of screwdrivers and move along with me as I soldered. This type of "moving clamp" is a great help.

The solder used by roofers is half lead and half tin. It comes in 1-lb. bars about 10-in. long. Traditionally, roofers melt it with a copper soldering iron heated in a charcoal-fired brazier. I've never had good results with this tool, however, so I use a propane torch. The drawback to the hardware-store-variety torch is that most are cheaply made—some of the ones I've used barely have outlasted the fuel canisters they were mounted on. An alternative is the heavy-duty air-acetylene torches commonly used by plumbers.

After adjusting the torch to burn with a sharp blue flame about 1½-in. long, I use a circular motion and play the tip of the flame over a broad area to warm up the copper a bit. As I do this, I hold the bar of solder close to the flame so that it will also catch some of the heat. When the flux starts to sizzle, I put the tip of the flame down onto the work at the beginning of the joint. Then I press the tip of the solder bar against the work about ½ in. from the end of the flame and let the heat flow through the copper to melt the bar. I move the flame along the joint, followed by the solder bar (photo right). When you do this, you have to move at an even, moderate pace. If you move the flame too fast, the solder won't flow, but you can't linger either or you'll warp the metal with too much heat.

Most of the folds were made on the metal brake shown above. Eventually the configuration of bends prevented the roof sheet from slipping into the brake, so the final folds were handmade.

McBride solders the flashing in his shop, instead of on the roof. This way he can position the flashing so that the seams are level when he solders them, which keeps the molten solder from running out of the joint.

Textbooks on soldering will tell you that the heat should always be conducted through the work as I've just described, and that you should never melt the solder directly with the flame, dripping blobs of molten solder onto the joint. Well, that's fine if you've got a perfect joint lying flat on the bench.

But sometimes—especially if you have to work up on the roof, with your pieces at an angle, or if the pieces don't fit real tight—there won't be enough capillary action to keep the liquified solder from running out of the joint as fast as it runs in. The only practical way to deal with the situation is to pull the heat back a little so that the copper is hot—but not *that* hot. If you then drip molten solder onto a slightly cooled joint, it'll stick. It might not be as strong as a properly soldered joint, but at least it won't leak. And it's still better than a dollop of roofing tar.

After soldering, you have to clean off any remaining flux with water and a stiff brush in order to prevent corrosion.

Installation—Before cloaking the wooden cricket in its copper cape, I shingled up the sides of the chimney structure, inserting step flashing as I went. When I got up to the back of the chimney, I slipped the sidepieces of the cricket flashing down over the uppermost shingle course and the top piece of step flashing. I anchored the cricket flashing with roofing nails sunk along the outside edges of the valley flange and chimney flange only (photo on page 61). Then I continued with the roofing, bringing my shingles up to the centerline of the valley, but keeping all roofing nails off the flashing itself.

Since this was a wooden chimney structure, the vertical fins of the step flashing and the chimney flange were eventually covered by siding. Had this been a masonry chimney, a separate cap flashing, tuckpointed into the brickwork, would have been used as coverage. □

Scott McBride is a carpenter in Irvington, N. Y. and contributing editor to Fine Homebuilding. *Photos are by the author.*

SEE ERRATA AT END OF ARTICLE

ERRATA

Copper-cricket nails

In the article "Chimney Cricket," *(FHB* #47, pp. 61-63) author Scott McBride said to use roofing nails to anchor the cricket to the roof deck. Most such nails are hot-dipped galvanized, but it would be wise to use only copper nails to secure copper flashing in order to avoid electrolysis. Also, my experience has shown that copper flashing is sometimes incompatible with cedar siding or cedar roofing, particularly in a rainy climate, because the tannins leaching from the cedar will eat through copper sheets along any drip line,

—Hans Nelsen, Vashon, Wash.

Author Scott McBride replies: You're right. Nails used to attach copper flashings should always be copper, even when they'll be protected from the weather by roofing or siding. Where copper is used in the presence of corrosive substances such as cedar leachates, salt air or acid rain, longer life can be expected from lead-coated copper, which has a gray color. Using lead-coated copper can increase the cost of the material by about 15%, but is considered a good investment by many roofers.