

# Brick-Mosaic Patios

Creating patterns and pictures with dry-laid brick and a diamond-bladed saw

by Scott Ernst

"**T**hat was a memorable day to me, for it made great changes in me. But it is the same with any life. Imagine one selected day struck out of it, and think how different its course would have been. Pause you who read this, and think for a moment of the long chain of iron or gold, of thorns or flowers, that would never have bound you, but for the formation of the first link on one memorable day."—Charles Dickens, *Great Expectations*.

That day came the summer after I graduated from college with a degree in landscape architecture. I had been doing dry-laid brickwork for nine years, frequently working curves into my patio designs. And when you make curves with brick, it usually means a bit of cutting. So I was doing just that, one warm June day, when my design background suddenly collided with my years of brickwork, and a strange idea popped into my head: if I took the piece of brick that I had just cut off and replaced it with an identically shaped piece from a different colored brick, I could create patterns and pictures.

A few months later I produced my first piece of "masonry art"—a form that's similar in concept to stained-glass, mosaic tile and marquetry. That was five years ago, and since then I've come to specialize in brick mosaics (photos right). While the limitations are considerable, there's still room for a lot of creative freedom...and a lot of cutting.

**Brick colors and types**—After stumbling upon this concept, the first thing I had to do was find out what palette of colors was available. I spent many an hour strolling through brickyards, making mental notes on who had what colors and in which sizes. To date, my list includes basic red, several tones of brown and tan, grey, blue, rust and white. Many of these bricks also come "flushed," which means that they have a range of colors or tones within each brick variety.

The trick is to find the colors I want, all in one size. An assortment of brick sizes won't make a tight pattern and cutting them to a uni-



**This patio, depicting a heron scene that Ernst calls "Rising," is composed of variously colored brick, cut and pieced together on a dry base. Ernst admits that the technique takes a lot of time.**



form dimension is an excruciating job. Because of the need for consistent sizes, I like to get all of my bricks from one manufacturer. I use Glen-Gery bricks almost exclusively (Glen-Gery Corp. 1166 Spring St., P. O. Box 7001, Wyomissing, Pa. 19610; 215-374-4011). Their bricks are high quality and come in a wide variety of colors.

As a rule, the lighter the color of the brick, the denser it is, making it harder to cut. The clays used to make these bricks are finer and

contain less grog than the darker colors. These different properties allow me to make certain cuts with some bricks that just aren't possible with others. Harder bricks, for example, hold together better for fine detail work such as the grasses in the heron scene (photo below).

Bricks come in two basic types: molded and extruded. Each has its own look and application. Traditionally, bricks were shaped by slapping a bunch of clay into a mold, striking off the excess and letting it harden. This produces a fairly irregular brick, which when laid into a patio, tends to leave large joints between the bricks. This looks nice if you want the patio to appear old. For most inlays, however, molded bricks are not the brick of choice.

To keep the lines in a design crisp, I want bricks to fit together as tightly as possible, so I use extruded bricks for my inlays. These bricks are wire-cut instead of molded and thus are more uniform in shape and size. They are also more difficult to cut than molded brick.

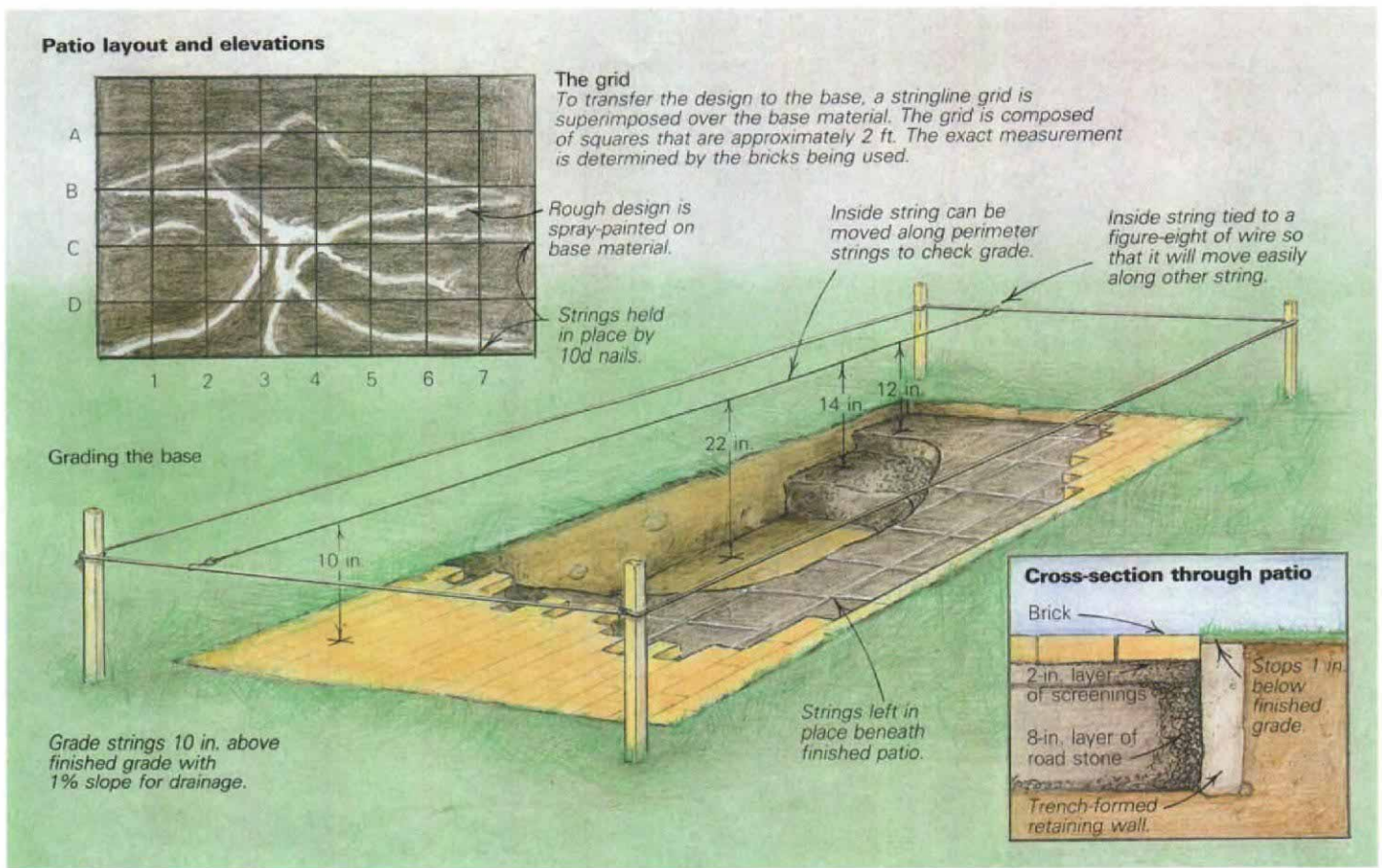
(For more on brick manufacturing see *FHB* #53 pp. 51-53.)

A third type of brick is the core brick, which has holes in it and is designed for building walls. Core bricks can be used as a textural element in mosaic designs, but I've only used them indoors. I have some reservations about how well they would stand up to freeze/thaw cycles outdoors.

Including a bit extra for breakage and cutting, there are about 4.7 bricks per square foot. I multiply this by the number of square feet of each color in the design to come up with the number of bricks I need.

**Design considerations**—The critical limitation here is that you cannot blend colors; everything must be drawn in blocks of colors or tones. It helps to study high-contrast black and white photos of your subject matter when designing a piece. These can often be simplified to two or three defined tones and turned into cutouts.

To a limited extent, it's possible to create color tone gradations within a brick inlay if



you use a flashed paver. The various tones in a pallet of flashed brick can be separated into piles of light and dark tones. Then when they are placed into the pattern, the bricks are used selectively to produce the effect of a gradual change in lighting or simply to highlight another block of color that overlaps the first. This technique does not work well using two different varieties of brick because they are not often in the same color family and will look out of place when blended together.

Also in the back of my mind when designing brick inlay is the fact that the bricks are going to get dirty and the contrast between colors will be reduced over the years. So when I choose the brick colors, I'm a little heavy-handed with the contrast; things will tone down later.

Another approach to the dirty-brick problem is to waterproof the bricks. The theory is that if no water gets into the pores, no dirt will get into the brick. This is something that I recently tried on a civic project in Reading, Pennsylvania, where I did a map of the city in brick. But it will be several years before I know how well the waterproofing works.

**Base preparation**—A variety of base materials can be used for dry-laid brick. Among them are sand, stone-dust screenings (also called quarry process) and fine gravel. I long ago quit using sand under my patios. It just isn't stable enough for my taste. It isn't bad; there are just better options.

I use screenings most of the time. This is

the stuff left over when stone is crushed and gravel is screened out. The size of the chunks ranges from  $\frac{3}{8}$  in. down to a fine powder. The large pieces give stability, and the powder fills in the gaps. When it is wetted and tamped, the base becomes very stable and can be walked on without disturbing the grade.

Another good option for base material is  $\frac{1}{4}$ -in. gravel. It can be compacted quickly and provides extremely good drainage, which keeps root intrusion from nearby trees to a minimum. The problem is that it's hard to find (at least here in central Jersey).

For an average dry-laid patio, a 4-in. base will last 15 to 20 years before it needs a bit of regrading. The Romans used a 6-ft. base under roads that are still in place. I kind of hedge my bets. If I'm going to sink four or five months of my life into a patio, I'd like to see it last longer than 20 years, so I use 10 in. under my inlaid patios. Rather than use a full 10 in. of screenings, however, I put down 8 in. of road stone (screenings with  $\frac{3}{4}$ -in. to 1-in. gravel mixed in) and cap it with screenings. The road stone gives the base an added measure of stability. A deep base must also be tamped in lifts (layers) of about 3 in., or you won't get good compacting.

Another method of base prep is to pour a 4-in. to 5-in. reinforced-concrete slab, leaving room for  $\frac{3}{4}$  in. to 1 in. of screenings on top. This method is more common for commercial installations that get lots of traffic.

Methods of base prep not applicable to this type of inlay are wet laying and drypack (lay-

ing the brick on a dry mortar base and wetting). The reason for this, as you will see later, is that the bricks are all placed and then individually lifted and cut. If these methods were used, the bricks would be stuck to the ground and I wouldn't be able to cut them.

The actual grading of the base is no different than standard dry-laid work. For most residential patios, I use four stakes, connected by stringlines set 10 in. above finished grade and set at about a 1% slope for drainage (drawing above). Ten inches puts the strings at a convenient height so I can work over or under them. I run a fifth string between the two longest sides, tied so that I can slide it along them to check the grade anywhere inside the perimeter.

I dig 22 in. below the stringlines, then start adding base material, which I level roughly with a rake and compact with a 10x10 hand tamper (I'll rent a power tamper for big jobs). I tamp 3-in. layers until the base is about 10 in. deep; I do the final grading with a 2-ft. and then a 6-ft. board, screeding the base like concrete.

**From paper to brick**—After I superimpose a scaled grid onto both my final drawing of the design and the base material, I use the grid to enlarge the drawing. For projects that are highly detailed, a 1-in. grid on the drawing and a 2-ft. grid on the base seem to work well. A larger grid will be fine for small or less-detailed designs.

I lay out the grid on the base with strings tied to 10d nails pushed into the base material (drawing above). Both the grid on the drawing





**Extra effort.** After tracing the S-shaped pattern onto the brick (1), Ernst makes a series of cuts on a tile saw (2) and knocks out the pieces with a hammer and chisel (3). Then he smooths the edges on the tile saw and traces the negative shape onto the next brick (4).

and the grid on the base are then labeled A, B, C, D, up one axis and 1, 2, 3, 4, across the other, giving me reference points to work from while transferring the design.

It is important to note here that different varieties of brick that are theoretically the same size usually are not. For example a Glen-Gery 4x8x2¼ "Chambersberg" paver is always a hair smaller than Glen-Gery's "Longwood," which is truly 4x8x2¼. If I were laying either of them by themselves, this size difference wouldn't be a problem, but when placed tightly together into a patio, the pattern begins to wander. For this reason my string grid is doubly important. I lay it out in modules based on the largest brick.

I determine these modules by laying out a test pattern of the largest brick and measuring it. In bricklaying, unlike mathematics, the sum of the parts does not equal the whole. This is because no matter how tightly you lay your pattern, there is always a bit of space between the bricks. Consequently the actual grid will be anywhere from 23½ in. to 24½. The rest of the brick varieties will then be spaced to fill the grid. I don't fret about these gaps, though; they're usually minimal.

Using the numbers and letters on the grids

as reference points, I now go grid by grid and spray paint the design onto the base, using the cheapest paint I can get. The screenings are dark, so I use white paint. Detail is not important here—that will be worked out later. This step is meant only to give me proportions for laying the bricks.

Next comes the easy part. I start in a corner with the color that belongs in that corner and begin laying my pattern. When I hit one of the spray-painted lines, I begin laying the color that belongs in that section, then the next, etc., until the whole patio is laid. At this point the design will look somewhat like an enlarged computer image, only with bricks instead of pixels.

Now I draw the finished design onto the bricks, using the blocks of color as a reference for the proper proportions. Fine details that were hinted at in the drawings now must come to life. Compositions within the design when they were 1-in. tall may need to be re-drawn when they swell to two feet.

Chalk works well for the initial sketching as it erases easily with a large, damp sponge. Once everything is finalized, though, the drawing gets hard-lined with a more permanent marking (photo above left). China markers,

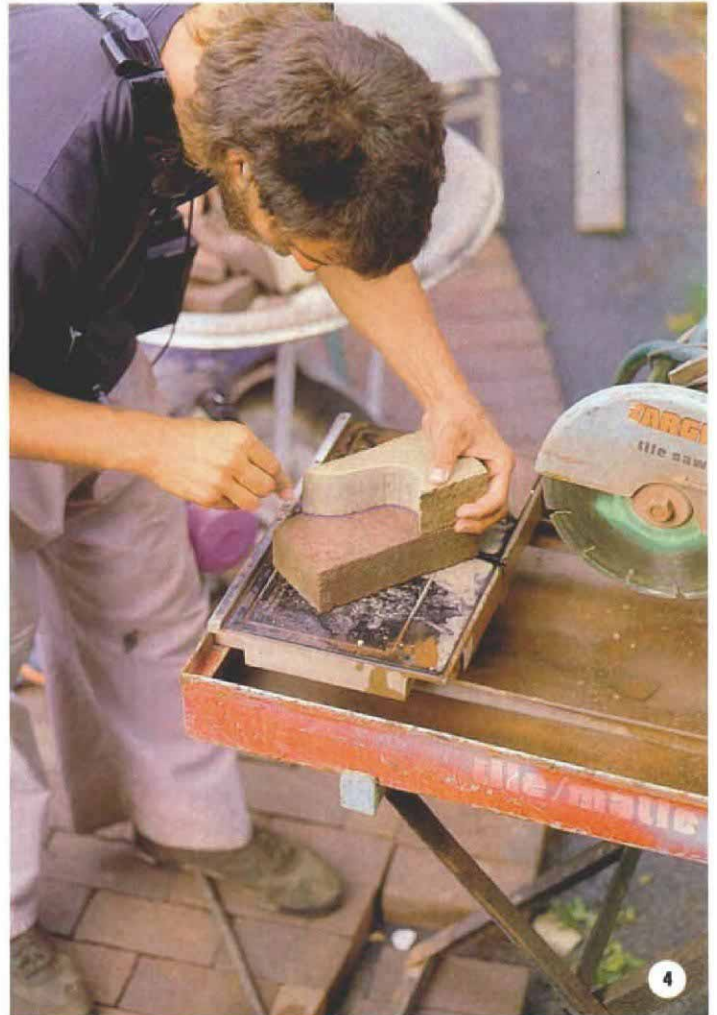
grease pencils and some brands of colored pencils all work for this. I prefer Prismacolor pencils because they go on and stay on well, have vibrant colors that contrast with the colors of the brick and give a nice, fine line.

**Tool tech**—The machine I've found that cuts curves in bricks most efficiently is a 10-in., water-cooled circular saw with a diamond blade. I've experimented with a few brands and my favorite is the Target Tile Saw (Target Products, Inc., 4320 Clary Blvd., Kansas City, Mo. 64130; 816-923-5040).

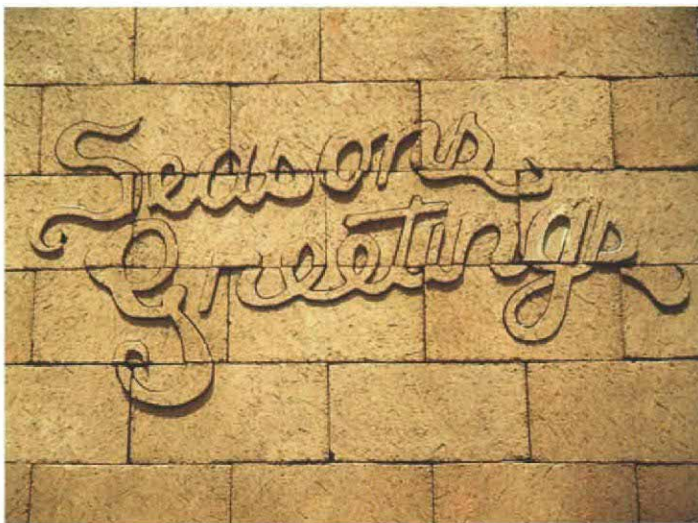
Blades come in two basic styles: segmented and continuous rim. The continuous rim is just that; it looks like a blade with no teeth. The outside edge of the blade, though, is embedded with diamond bits. A segmented blade works on the same idea, but it has cutouts that break the rim into segments. This is the superior blade type if you're going to do a lot of cutting. The segments add a bit of extra bite that increases cutting speed and blade life.

Diamond blades are made for a number of applications, one of which is brick-cutting. But of course, it is isn't *that* simple. Blades are available for hard brick and soft brick,





**Beautiful results.** Although brick mosaics entail a lot of cutting, the results, like the tree shown on the facing page, are certainly beautiful. Experimenting with a diamond-bladed bandsaw, Ernst cut out the jolly message at left to photograph for his Christmas cards.



long life and fast cutting. I've been pleased with NED-KUT (N-E-D Corp., 18 Grafton St., Worcester, Mass. 01604; 508-798-8546) and Pearl blades (Pearl Abrasive Co., 6210 Garfield Ave., Commerce, Calif. 90040; 213-773-1625), but have had problems with Target blades.

You might be wondering why this knuckle-head doesn't just go out and pick up, oh, a diamond-bladed bandsaw, or something like that. After all, a bandsaw cuts curves better than a circular saw. Well, I thought the same thing. So I picked one up and discovered, much to my dismay, that the blade just didn't cut brick very fast. Still, the bandsaw is great for certain highly detailed projects, like the "Season's Greetings" mosaic that I did as a Christmas card (photo above).

**Cutting, and more cutting**—First of all, I always wear a full face shield, hearing protection and a respirator when I'm cutting brick. Once I've suited up and am ready to cut, I take a stout screwdriver and pry out one of the bricks slated to be cut. If the cuts are straight, they're easy to make. Put the brick on the saw, roll it under the blade, and wham, it's cut sweet as can be. If I'm cutting curves, though,

the process is a bit more complex. External curves with the circular saw aren't too bad; I simply make a series of straight cuts tangent to the curve (top right photo, facing page).

Internal curves are more time consuming. For these I make parallel cuts into the curve anywhere from from  $\frac{1}{8}$  in. to  $\frac{1}{2}$  in. apart (as though cutting teeth for a comb). This is complicated by the fact that the blade is above the work surface, like a radial-arm saw, instead of coming out of the work surface like a table saw. This means that none of the cuts are square; they're all over-cut. To correct this I lift the leading edge of the brick and point it at the center of the blade while cutting so that the top and bottom are cut equally. While this is a commonly used technique among brick masons and tile setters, it should only be performed by an experienced tradesman, and some portion of the brick should *always* be in contact with the table. After making the cuts, I knock out the teeth with a cold chisel or hammer (photo, top left) and grind the cut smooth with the edge of the saw blade, again tilting the brick up.

The basic idea is that two colors are meeting along a line that I've drawn. The brick in

my hand is one of those colors, and I want to cut off the part of that brick that is in the way of the other color. Later I cut a piece of the other colored brick using the first piece as a template (photo above right). When I fit it against the first piece, I'm back to the original brick dimensions. I drop this unit back into the patio and pry up the next brick to be cut. After doing this for a few months, I've got an inlaid patio (bottom right photo, facing page).

Once the brick is all laid, I dig a trench around the perimeter of the patio, usually 10 or 11 in. deep and 4 in. wide, which I fill with concrete mixed on site (drawing, p. 81). The dirt serves nicely as formwork. I trowel off the concrete about 1 in. below finished grade; this way it serves to retain the brick but can still be covered with topsoil and grass. As a final step, I buy bags of play sand (which is drier than sand I can get from a masonry supplier), broadcast it on top of the patio and sweep it into the cracks to lock the bricks into place. □

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