



Many years back, I had a commission to build lockset displays. The job called for 18,000 holes with smooth bores and crisp edges in blocks of 1¾-in.-thick oak. At a flat rate of 9 cents a hole, I couldn't afford to let the wrong drill bits slow me down.

Before beginning, I experimented with a variety of methods. I settled on Multispur bits chucked in a drill press. They produced precise, tearout-free holes and allowed me to work fast enough that I finished the job in a little over a week. Depending on the project, other large-hole boring tools might be worth considering. The most common tools include Forstner bits, spur bits, spade bits, hole saws and wing cutters.

Furniture, craft projects, architectural work and home repairs often call for boring large holes. Large in my book is anything more than ⅝ in. dia., bigger than most commonly available twist drill bits. Big holes demand special bits, and the variety on the market includes everything from inexpensive high-carbon-steel spade bits to costly Forstners.

Before spending a wad of cash on a set of bits, consider how often you need to drill large holes, the precision of cut required and how quickly you need to get the job done.

**For precision holes, pick a Forstner or Multispur bit**

Like life forms, tools evolve over time, only much faster. Forstners were developed more than 100 years ago for use in hand braces. They were an improvement over the other bits of the time, such as brace bits, because Forstners could drill overlapping and flat-bottomed holes. Forstners cut on two fronts: A sharp outer rim continuously scores the wood, and a pair of horizontal cutting wedges removes most of the

# Boring Big Holes

When to use Forstners, Multispurs, spades, hole saws and wing cutters

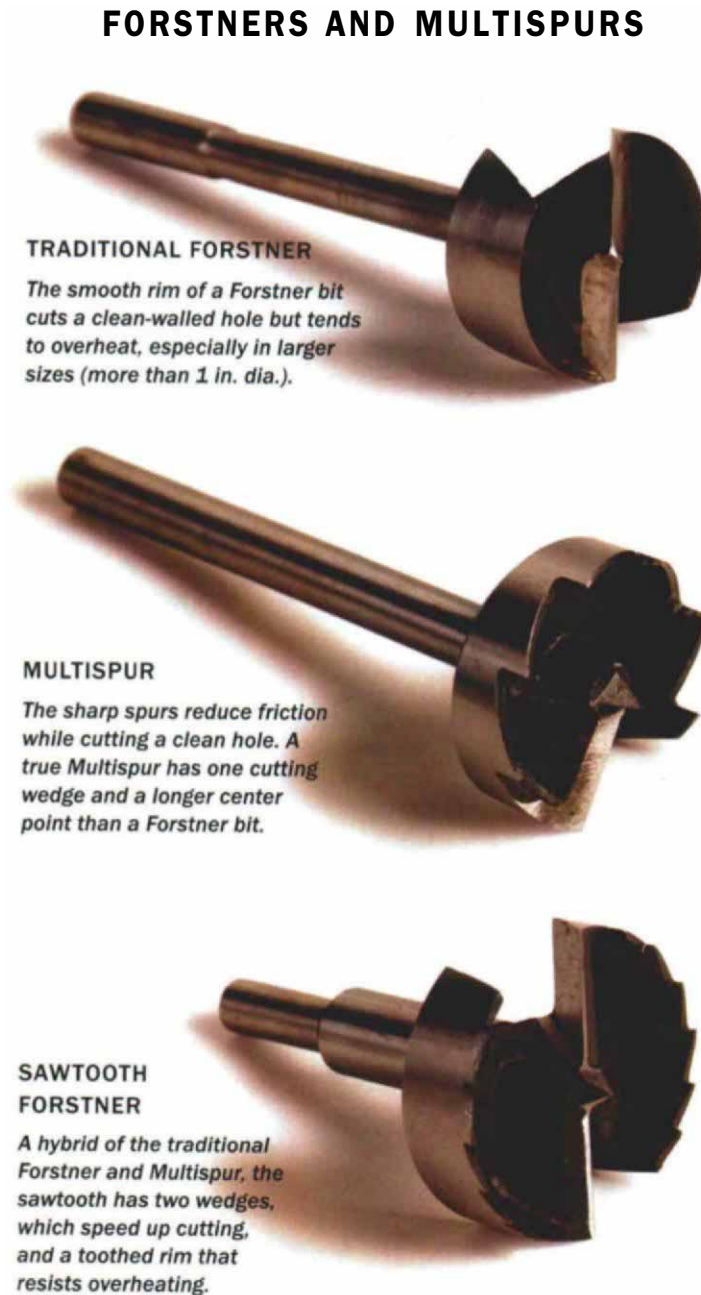
BY ROBERT M. VAUGHAN

waste inside the hole and shaves the bottom flat.

If brace bits were life forms, they'd be the fish of boring tools. Forstners are the amphibians. The 20th century saw yet another major evolution: Forstners emerged from the swamp with teeth along their rims. Although it would seem that this would give the bit a bigger bite, something more significant happened. Like mammals, these sawtooth Forstners were more efficient at heat regulation. Getting rid of the solid "rim" meant less metal-to-wood contact, which creates heat-producing friction. With the advent of power tools, a cooler-running bit was needed. Smooth-rimmed Forstners, especially those 1 in. and greater in diameter, tend to scorch wood when used in an electric drill.

Today, we can choose among traditional Forstners, sawtooth Forstners, Multispurs and spur bits. All do the same thing: They drill flat-bottomed holes with clean rims and smooth sides. (Although a traditional Multispur has only one cutting wedge, the term *multispur* has become synonymous with the sawtooth Forstner, which has a pair of cutting wedges.) These bits are good for boring holes for dowels or hardware, architectural detailing or craft projects, such as clock making, where you need a precise hole.

True Forstners have a stubby center point that just barely protrudes beyond the edge of the rim. When centering the point on a mark, you have to peek under the bit to see if it's in the right place. Sawtooth Forstners and Multispurs have slightly longer center points, which make them easier to align. These bits range from 1/4 in. to as big as 4 in. dia., and prices vary widely (see the box on p. 46). Spur bits have a pair of cutting wedges and two small spurs. They're made for boring



#### TRADITIONAL FORSTNER

*The smooth rim of a Forstner bit cuts a clean-walled hole but tends to overheat, especially in larger sizes (more than 1 in. dia.).*

#### MULTISPUR

*The sharp spurs reduce friction while cutting a clean hole. A true Multispur has one cutting wedge and a longer center point than a Forstner bit.*

#### SAWTOOTH FORSTNER

*A hybrid of the traditional Forstner and Multispur, the sawtooth has two wedges, which speed up cutting, and a toothed rim that resists overheating.*



**Specialty spur bits.** Spur bits have a pair of small spurs on their rim, and they're made for boring at 90° to the surface. This one is made for installing 35mm cup hinges.



**Boring overlapping holes.** Forstner bits are good for roughing out mortises.

at 90° to the surface. Many 35mm bits for installing cup hinges are of this style (see the top right photo).

Because the outer rim of a Forstner is smooth, it won't catch when drilling overlapping holes (see the bottom right photo) or when boring at an angle. Sawtooth Forstners and Multispurs can also be used to drill overlapping holes, but be aware that the teeth on these bits can catch and hurl a workpiece that isn't clamped down. When

drilling overlapping holes with these bits, use a drill press and firmly clamp the workpiece.

#### For fast drilling, use a spade bit

A spade bit is one of the simplest drill bits. It's nothing more than a rod of steel with one end forged flat. The flat section is ground away, leaving a sharp point and a pair of cutting wings. Spade bits are mostly used in construction with portable drills. These bits bore

holes quickly but tend to wobble and vibrate, causing a raggedy rim on the entry side and tearout and splintering on the exit side. But when you're drilling holes for wire or pipe in studs and joists, speed matters more than looks. For deep holes, withdraw the bit frequently to clear the chips, so the bit won't bog down.

When sharp and used at slow speeds in a drill press, a spade bit can cut a fairly clean hole. Spades are inexpensive and



# What's the difference between cheap bits and pricey bits?

The prices of Forstners, sawtooth Forstners and Multispur bits vary widely depending on where you buy them, where they're made and how long and thick their shanks are. I tried four 2-in. bits from three continents, priced from \$15 to \$58, and drilled a bunch of holes in hardwood (see the top photo on the facing page). Used in a drill press, all were capable of boring holes with acceptably clean rims and fairly smooth walls, although the cheapest bit cut the slowest.

So why the big price difference? The size of a bit's shank plays some part: more steel means greater cost. Lower-cost bits have  $\frac{5}{16}$ -in. or  $\frac{3}{8}$ -in. shanks about  $2\frac{1}{2}$  in. long. Higher-priced bits have  $\frac{1}{2}$ -in. or  $\frac{5}{8}$ -in. shanks about 5 in. long. A hefty shank provides additional stiffness, and the extra length lets you bore deeper holes.

I ordered a \$15 sawtooth Forstner bit, made in China, from

Woodcraft (800-225-1153), a retail chain and mail-order company. This economy bit was slow-cutting. The rim of the hole had some minor tearout, but overall, it was acceptable. The spurs and cutting wedge weren't ground as sharp as the other bits. For occasional use, this bit would be a good value.

A \$35 Forstner bit from Austria, ordered through Woodcraft, came with a sharply ground outer rim. This Forstner cuts faster than the Chinese bit, leaving a clean hole. A \$46 Multispur from Forest City Tool, made in Hickory, N.C., cut faster than the other bits. The Multispur produced some minor tearout at the edge of the hole and on the wall. The most expensive bit, a \$58 sawtooth Forstner from Austria ordered from Woodcraft, cut as fast as the U.S.-made bit but left a tearout-free rim and a clean wall.

—Anatole Burkin, associate editor



**For speed, choose a spade bit.** Holes for threading pipe or conduit in framing lumber don't have to be pretty.

**Spades are easy to customize.** Just file away equal amounts on each side of the blade to create a narrower or tapered bit.



simply designed, which makes them a good choice if you need to reshape one for a special job. If you need to drill a hole to accept a 1-in. dowel that's sized a hair under 1 in., just file away an equal amount on both outside wings of a 1-in. spade bit to match the dowel's diameter (see the bottom left photo). Or, if you want a slightly tapered hole, you can file a taper onto the outside wings. Spade bits range from  $\frac{1}{4}$  in. to  $1\frac{1}{2}$  in. dia. and cost about \$2 apiece.

## Hole saws are good for installing locksets

A hole saw, like a spade bit, has limited use in furnituremaking, but it can be handy around the house. Hole saws come in different styles, but they generally have an arbor that holds both a pilot twist drill (usually  $\frac{1}{4}$  in.) and a larger cutting cylinder,  $\frac{5}{8}$  in. or larger (see the photo at right). More expensive hole saws come in kits with an arbor that accepts hardened steel cylinders of various sizes. Costs are based on the size of cylinders; for a good arbor and a 2-in. bit, expect to pay about \$20.

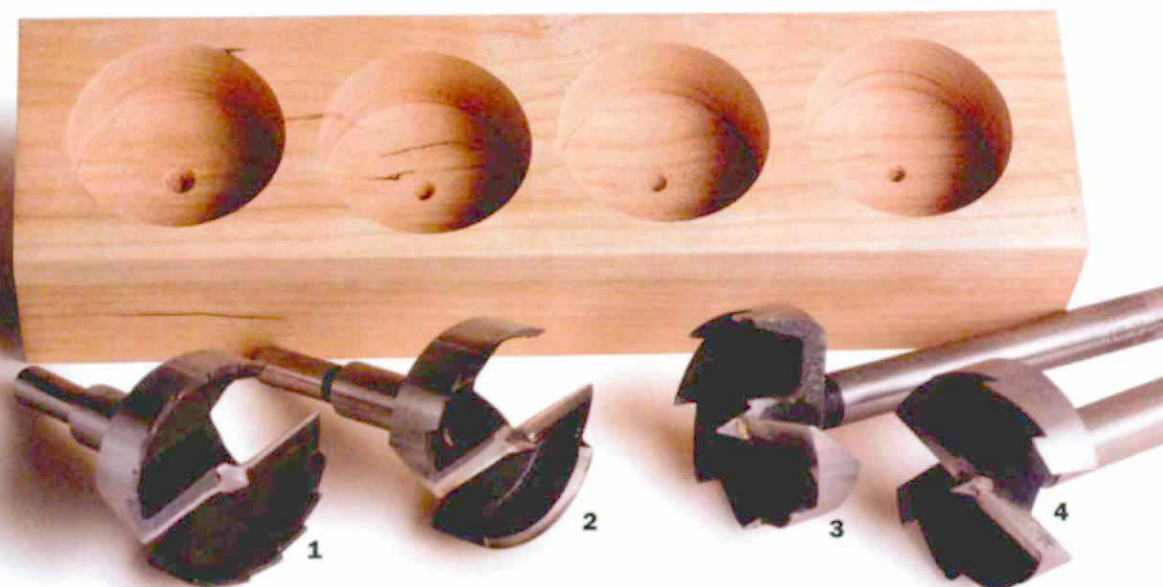
The cutting cylinder has fine teeth, like those found on a hacksaw. Inexpensive hole saws have thin-walled cylinders that flex like a hacksaw blade, and these sometimes pop off the arbor. They cost about \$10.

Hole saws are commonly used in portable drills by plumbers and electricians for boring pipe and conduit holes. They're good for drilling holes for locksets in doors. When using a hole saw,



**Hole saws have self-centering pilot bits.** They make quick work of drilling out doors for locksets. You can use them in a portable drill or drill press.





**Bits for every budget** **1.** Chinese-made, short-shank Forstner (\$15) cuts slowly but produces an acceptable hole with only minor tearout at the rim. **2.** Austrian-made, short-shank Forstner (\$35) drills a cleaner hole. **3.** U.S.-made, long-shank Multispur (\$46) bores faster but leaves minor tearout. **4.** Austrian-made, long-shank sawtooth Forstner (\$58) cuts as quickly as the U.S.-made bit but leaves a cleaner hole.

**A wing cutter gives you infinite adjustability.** The single cutting wing can be positioned anywhere along the bar and is held in place with a setscrew. Properly sharpened, a wing cutter can make a clean entry hole, but the walls will have some tearout. Use a drill press running at slow speeds with this tool.



the pilot bit enters first, followed by the cutting cylinder. For a relatively clean entrance hole on two sides, the drill is stopped as soon as the pilot punches through the door. The hole saw is withdrawn, and the hole is completed by drilling from the other side. A hole saw doesn't leave a big pile of shavings like a Forstner; rather, most of the waste is in the form of a cylinder stuck to the pilot bit. Only through-holes can be bored with a hole saw. The surface left

by a hole saw is fairly rough, so it's not a good choice when the cutout will be exposed or if you need a precise fit.

### Wing cutters and circle cutters are adjustable

Wing cutters, like hole saws, have a center pilot bit. But instead of a cutting cylinder, a wing cutter has a single vertical cutting blade attached to an adjustable bar (see the photo above). The adjustability has some appeal. If you only need

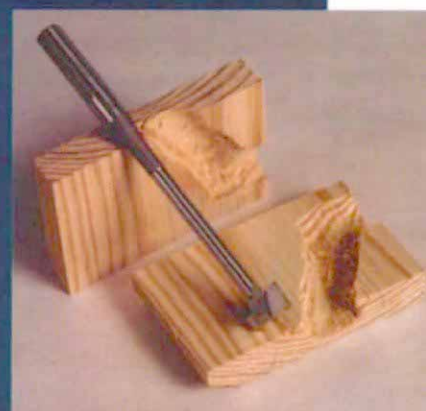
to drill a few large holes, a wing cutter, which can be purchased for about \$20, is cheaper than a large Forstner or Multispur bit. Some wing cutters can cut holes up to 6 in. dia. That makes them useful for drilling out holes for large fixtures such as light canisters. You can also use a wing cutter for cutting out wheel blanks used in toys.

A wing cutter works slower than most hole-boring bits. Its shape makes it prone to vibration, and the rotating cutter arm can give you good cause for anxiety. A wing cutter bores by cutting a groove in the workpiece, leaving a disc or cylinder. You can adjust the cutter to bevel either the waste disc or the hole. Wing cutters must be used at very slow speeds (250 rpm) in a drill press, and the work must be clamped. There are a variety of wing cutters on the market. The ones marketed as wheel cutters leave a more desirable profile on the disc. □

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## A new curve in drill bits

The 3D-Bit was designed in Europe with electricians, plumbers, carpenters and locksmiths in mind. The narrow shank makes it possible to slightly alter direction when drilling, which is useful when cutting curved holes to rout pipe or cable (see the photo below). The bits have a stubby center point and a pair of scoring wings, like a brad point, and a pair of cutting wedges sharpened on their horizontal and vertical edges. All these cutting edges, plus a narrow shank that lets the sawdust escape, make these bits fast-cutting. The cutting wings of a 3D-Bit



score the wood, much like a brad point, leaving a clean entry hole. Used with a drill press, the 3D-Bit bores a hole nearly as well as a Forstner bit. 3D-Bits are being marketed by RotoZip Tool Corp. (800-521-1817). Currently, they are only available in metric sizes. They cost about \$75 for a set of four. —A.B.