

Transform a **Chopstick** and a **Nail** into a **Mini Forging** **Hammer**



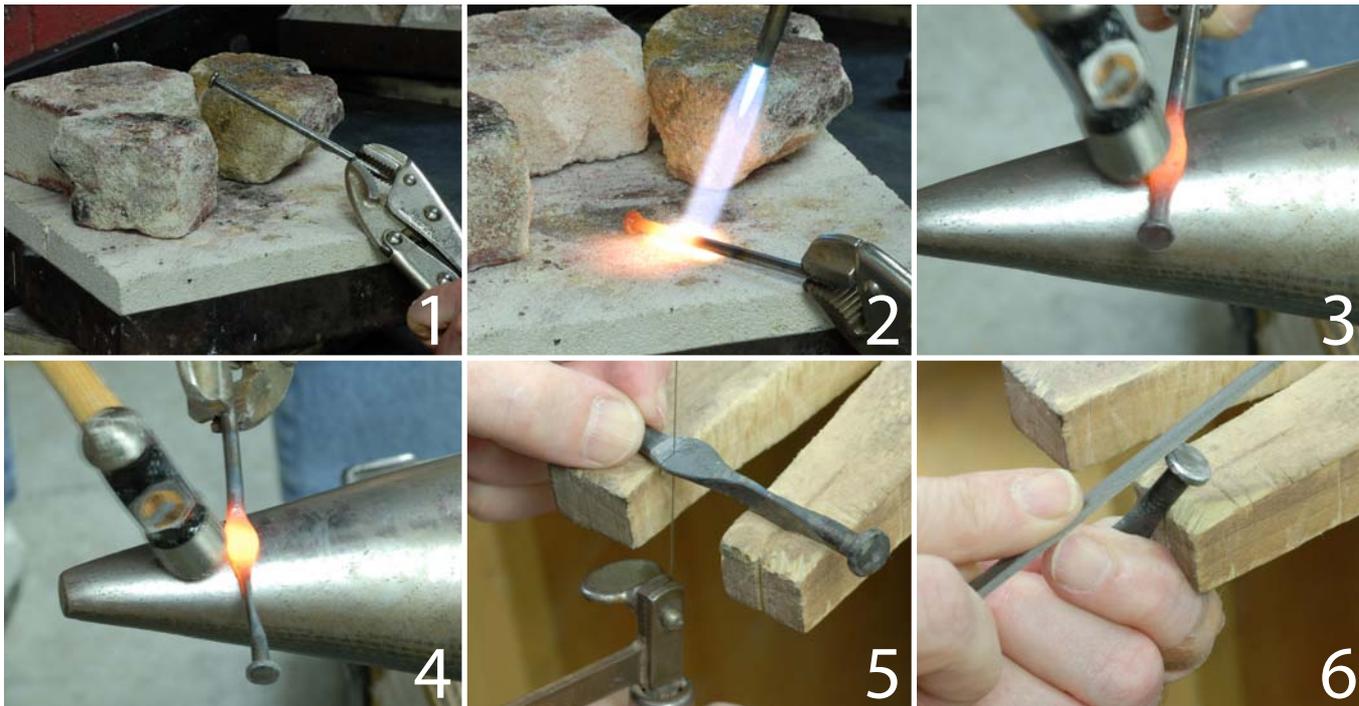


Use small-scale hot forging to make a tiny hammer that has a huge impact.

by Ken Bova

I first made this little hammer

almost 20 years ago when the studio I was teaching in didn't have a hammer light enough or small enough for the task at hand. After forging the hammerhead from a large nail, I realized I didn't have a hammer handle available. I did, however, remember that I'd saved the bamboo chopsticks from a Chinese restaurant at the Minneapolis Airport food court on my journey to the workshop. One of the chopsticks made a perfect handle: light, strong, long, and flexible. A bit of waxed dental floss for lashing material and a piece of wire to keep the handle from splitting, and I was in business!



materials

- 40D (forty-penny, or 5 in. [12.7 cm] nail)
- Square bamboo chopstick
- Waxed dental floss or bookbinder's waxed linen
- 20-gauge (0.8 mm) copper or steel binding wire

toolboxes, page xx

- Soldering
- Finishing

additional tools & supplies

- Medium weight ball peen hammer
- Closed-toe shoes
- Leather work gloves (optional)
- Vise grips
- Jeweler's saw with #2 saw blades
- Pocket knife or bench knife
- Flex shaft or rotary tool; #60 drill bit
- Standard hardware store pliers

Find out where to buy supplies, page xx
See Safety Basics, page xx

Hammerhead

Set up your workspace. Make sure your vise grips, torch, heating area, quench bucket or bowl, sturdy forging anvil, and medium-weight ball peen hammer are within easy reach. This will minimize the cooling of the nail before forging it, and will make for faster, safer, and easier work.

 **SAFETY NOTE:** Since you'll be working with hot steel and holding it with vise grips, follow basic safety practices and remain aware of your personal safety at all times. Wear closed-toe shoes, safety glasses, and an apron. Leather gloves are also useful if the vise grips get too warm.

Secure the nail. Use vise grips to secure a 40D nail near its pointed end [1].

TIP: Vise grips are designed to allow you to hold an object without constantly squeezing, preventing fatigue and increasing grip strength. They are adjusted with a large setscrew at the base of the handle, which allows them to act as a clamp. Pull up on the lever located on one handle to release the pliers.

Open the pliers, insert the nail into the pliers' jaws, and close the handles. Back

out the setscrew until you can squeeze the pliers shut to clamp the nail.

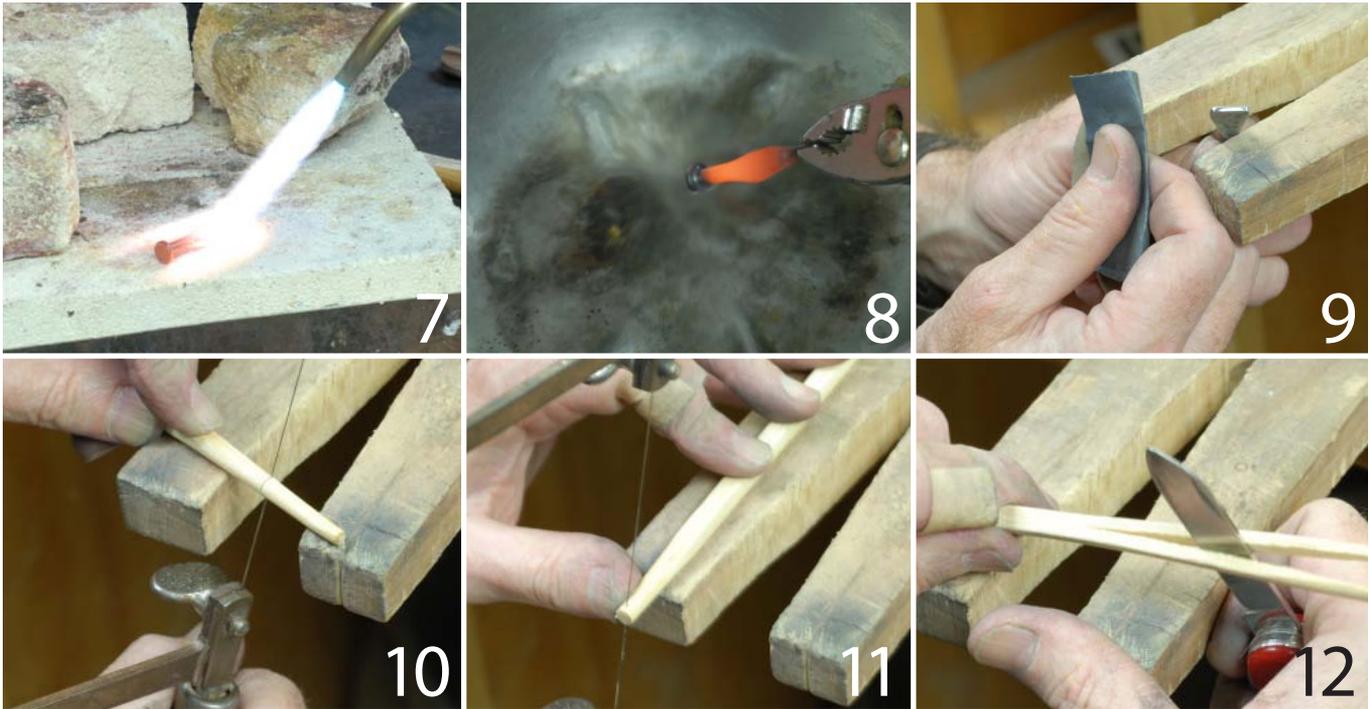
Forge the nail. Set the nail in an annealing pan or on a firebrick. Use a torch to heat the area just below the head of the nail to red hot [2]. (I use an acetylene/air torch setup with an approximately #3 tip.)

While it's still red hot, hold the nail over the anvil horn, and hammer the nail flat just below its head [3]. This requires some force. Be careful not to strike the nail head, and concentrate your blows on the shank of the nail. You may have to flip the nail back and forth to achieve a uniformly flattened area if it begins to curve.

NOTE: Make sure the flattened area is no thicker than $\frac{5}{64}$ in. (2 mm). This may require reheating and forging the nail one or two more times, depending on the force you use to forge the nail.

Turn the nail 90°, so that the flattened section is perpendicular to the anvil horn. Reheat the nail a little further down (closer to the point of the nail), and repeat to forge a second flat section perpendicular to the first forged section [4].

Rough out the hammerhead. When the nail is cool to the touch, use a jeweler's saw with a #2 blade to cut the nail at the wide



part of the second hammered area closer to the nail's point [5].

Use needle files or a small #2 bastard-cut hand file to form your desired hammer face shape [6]. Sand both faces with progressively finer grits of emery paper through 400 grit, and finish with #0000 steel wool.

NOTE: I like my hammer faces slightly rounded to prevent the edges from making dings in my metal. Others prefer straight and flat faces. It's really a matter of personal preference.

Harden the hammerhead. Heat the hammerhead to red hot [7], pick it up with pliers, and immediately quench it in a bucket or bowl of water. Slowly swirl it around in the water to break the steam seal from around the hot metal [8].

NOTE: The nail isn't high-carbon steel, so you don't need to temper it past this point.

Re-polish the hammer faces. The hammer faces will have developed firescale during the previous step. Use 400-grit emery paper and steel wool to bring the faces back up to a polished shine [9].

Alternately, you could use a buffing wheel and a mild abrasive compound, such as Tripoli, to polish the faces.

Assembly

Prepare the chopstick. Use the jeweler's saw to trim approximately ½ in. (13 mm) off the tip of the narrow end of a square bamboo chopstick [10].

NOTE: Square-handled chopsticks are better made and a little bigger than round chopsticks. I prefer them because the square handle gives you a better grip.

Set the chopstick on a bench pin so that the narrow end faces you. Use the jeweler's saw to make an approximately ¼ in. (6.5 mm) cut down the center of the chopstick [11]. Be careful to saw parallel to the chopstick; any slight angle off parallel will cause the stick to split unevenly when you insert the hammerhead.

Gently insert a pocket or bench knife into the cut you just made, and pry the blade side to side, carefully splitting the chopstick down the middle a few inches.

SAFETY NOTE: It isn't necessary, or safe, to push the blade into the chopstick. Instead, place the chopstick across your bench pin with the blade on the outside of the bench pin [12]. The pin acts as a block, and prevents the blade from accidentally slipping down the split to your other hand.

Don't miss this!

BASICS & VIDEOS

Learn fundamental techniques in these bonus tutorials:	B	👤
Basic sawing of metal	●	●
How to file		●
Sanding	●	
Drilling through metal	●	●

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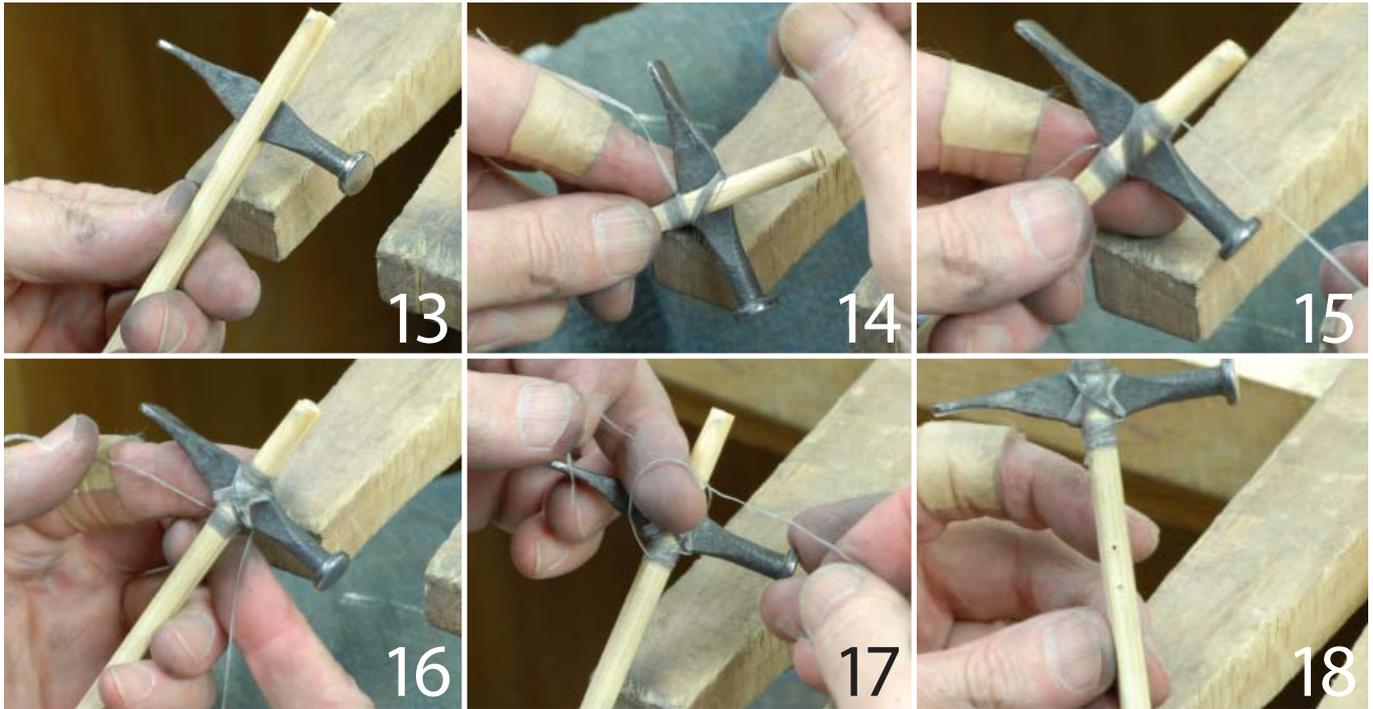
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Insert the hammerhead. Insert the hammerhead into the chopstick approximately 1 in. (25.5 mm) from the end [13].

NOTE: Take care to position the hammerhead at the angle with which you feel most comfortable. Flip it over or angle it a little differently to get the right feel to the relationship between the handle and head so that when it's in use, it strikes a rivet or the metal in a way that works for you.

Lash the hammerhead to the handle. Open the waxed dental floss and pull out 6–8 in. (15.2–20.3 cm), but don't cut the floss from the container.

NOTE: The wax and multiple fibers in dental floss make it both sticky and strong. You can also use bookbinder's waxed linen cord, which comes in a variety of colors. I've made several hammers with it and find it to be a handsome alternative.

Place the end of the floss at the base of the hammerhead, behind the handle, with the tail end to your left (leave a 6–8-in. [15.2–20.3 cm] tail). Tightly wrap the floss around the chopstick underneath the hammerhead several times to form a seat for the hammerhead. Pull tightly as you wrap, and pull additional floss out of the box as needed.

Hold the hammerhead steady, and wrap across the hammerhead several times diagonally from the lower right to the upper left as tightly as possible [14].

NOTE: This first diagonal lashing tends to push the hammerhead down to one side, so make sure to correct any misalignment before continuing.

Continue wrapping clockwise, shifting to wrap the chopstick above the hammerhead. Wrap tightly around the chopstick

several times to secure the hammerhead against the wrapped seat [15].

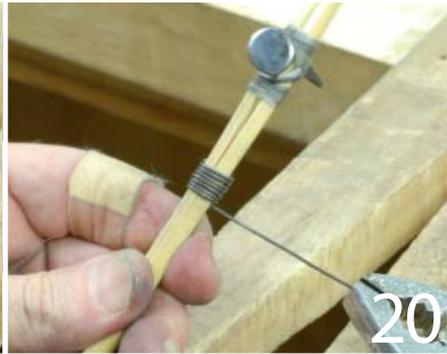
Wrap around the hammerhead diagonally from the upper right to the lower left several times. Bring your floss back to the original starting point.

NOTE: You should have wraps on the chopstick below and above the hammerhead, and diagonally from the lower right to upper left, and from the upper right to the lower left.

hammer maintenance

As with most tools, your chopstick hammer will eventually need a little bit of maintenance. Whether the faces are marred or the head starts to loosen with use, there are a few quick fixes that will make it look and work as well as the day you made it.

- Occasionally oil or wax the handle to keep it supple and prevent it from drying out. Without this treatment, bamboo can splinter or crack with repeated use. I use cooking oil or Renaissance wax.
- Since the head is affixed to the chopstick with waxed dental floss, it may loosen with heavy use. It is easy to tighten by simply re-lashing the head to the handle.
- If the hammer's faces become dinged or damaged, they can be easily refinished by lightly sanding with emery paper and repolishing with a soft cloth or on a buffing wheel.



Bring the floss to the bottom right side and behind the chopstick, opposite the original tail end [16]. Test the hammer by wiggling the hammerhead to make sure it's secure and tight.

Cut the dental floss from the box, leaving a 6–8 in. (15.2–20.3 cm) tail. With both tail ends of the floss on opposite sides of the chopstick, tightly tie two or three simple overhand knots [17] and trim the ends.

Bind the handle. Binding the chopstick handle ensures the split made for the hammerhead doesn't continue down and completely split the handle in half.

Use a #60 (0.04 in./1.02 mm) drill bit in a flex shaft or rotary tool to drill a hole in the chopstick 1 in. (25.5 mm) below the hammerhead. Drill a second hole 1 in. (25.5 mm) below the first [18]. Make sure the holes aren't at an angle.

Insert a piece of 20-gauge (0.8 mm) copper or binding wire through the top hole. Hammer one end of the wire so that it can't pull back through the hole. Tug on the wire until it's snug against the handle, and bend the forged end down against the chopstick. Begin tightly wrapping the wire around the chopstick downward toward the lower hole [19].

When you reach the lower hole, cut the wire from the spool, leaving 6–8 in. (15.2–20.3 cm) Push the wire through the lower hole, and pull the wire with a pair of standard hardware store pliers to draw it tight against the handle [20]. Cut the wire to leave approximately ¼ in. (6.5 mm) extending through the hole. Hammer the end flat and fold it down against the handle [21]. 

about your hammerhead

40D (forty-penny, or 5-in. [12.7 cm]) nails may be difficult to find in some areas. They are a common hardware store size in the western U.S., but tend to be less prevalent on the east coast. You may have to order them. Check local agricultural supply and construction businesses first.

The forging process will produce natural variations in the shape and form of each hammer depending on the individual maker. Because of this, no two hammers are alike, and yours will be a unique reflection of your sensibilities.

Remember that the hammer is made from a construction nail, not high-carbon steel. Use it for light-duty processes: riveting, texturing, and forging softer, non-ferrous metals.



ASK THE ARTIST: KEN BOVA



What's the strangest thing you've ever used as a tool?

The strangest tool I've ever used was a dog's tooth; an actual canine's canine. I used it to burnish gold leaf for gilding. It's a classical medieval tool for burnishing gold because of its natural curve and smooth enamel surface used for getting into tight places and polishing gold leaf onto the mordant.