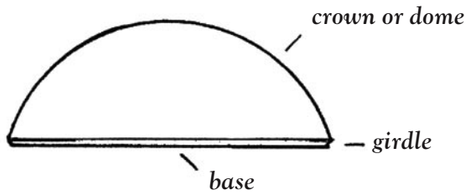
Gemstone Terminology

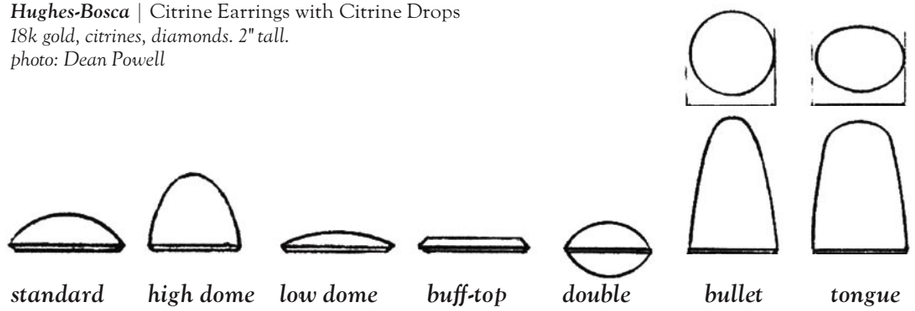
Cabochons

Cabochons are polished gemstones with smooth, rounded tops (the crown, or dome) and flat bases. Some cabochons may be flat on both top and bottom surfaces (called buff-top) and some may have two rounded surfaces (called double, or double-domed cabochons). The outer perimeter of the cabochon, where crown and base meet, is called the girdle. Most cabochons are opaque (impenetrable to light), or translucent (allowing some light to pass through). Transparent stones are rarely cut as cabochons and are more likely to be cut as faceted stones to take advantage of the illumination and reflection that results from penetration of, and interaction with, light.

Hughes-Bosca | Citrine Earrings with Citrine Drops
18k gold, citrines, diamonds. 2" tall.
photo: Dean Powell



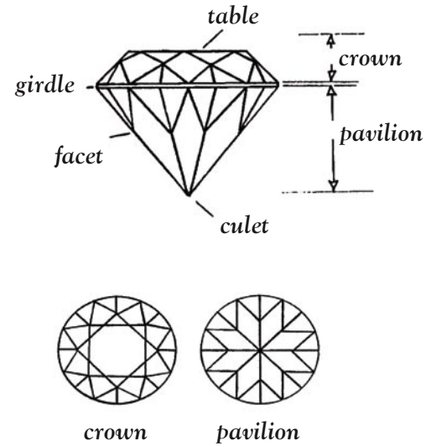
Parts of a faceted stone.



Cabochons are available in a variety of profiles.

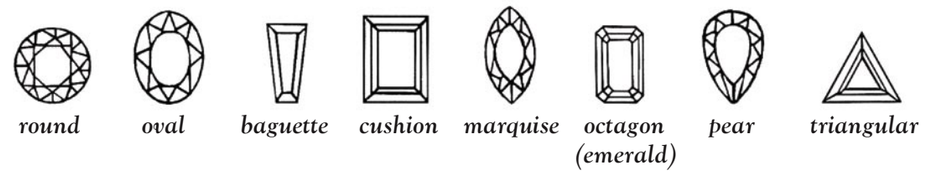
Faceted

Faceted stones have reflective planes arranged in specific configurations to enhance the brilliance of a gemstone. The flat facet at the top of the stone, parallel to the plane of the girdle, is called the table. The faceted tip at the base of the pavilion is called the culet. Far and away the gems most often cut as faceted stones are transparent, but occasionally translucent and opaque stones are faceted.



The proper names for parts of a faceted gem.

Stuart Cathey | LV Ring
18k gold, quartz
photo: Robert Diamante



Standard shapes of faceted stones.

well and with skill, the time spent refining, burnishing and bright cutting a bezel represents time well spent. These operations can elevate an otherwise commonplace bezel to the Rolls Royce of bezels. Remember, little details make a big difference. It is what we do with our hands and our hearts, and how well we do it, that gives our work its true value.

Shoulder (or Bearing) Bezels

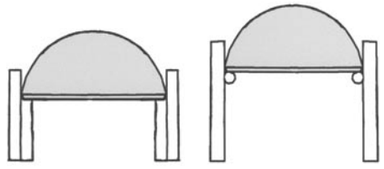
A basic bezel satisfies the fundamental requirements of a good handmade stone-setting: it is strong and secure, visually unobtrusive, simple to make, and easily adapted to cabochons and faceted stones of any shape. But basic bezels are not without limitations. The overall height is determined by the thickness of the stone, almost always restricting it to a low profile. It can only be soldered to a flat or nearly flat surface. Also, because of its low profile and relatively thin gauge, there is insufficient material to allow embellishment without compromising strength and security. Decorative appliqués cannot be soldered to its exterior surfaces because they would interfere with the proper closing of the bezel.

In addition to the functional disadvantages and limitations of the basic bezel, there exists another, more personal, design-related consideration. While a basic bezel may physically hold a stone in place, duct tape or epoxy might work too. The point is not only to secure the stone but to create a setting that integrates with the design of the piece. No single setting can be correct for every situation, and this applies to the basic bezel.

Fortunately, a modification to the simple bezel—the addition of an internal shelf or bearing—offers hundreds of possible variations. This upgraded bezel is commonly referred to as either a shoulder or bearing bezel.

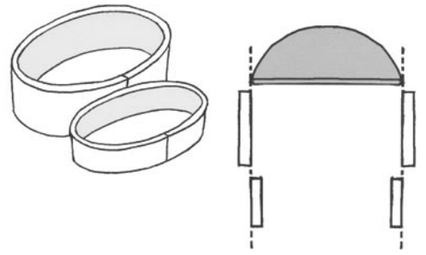
A bearing is a shelf inside the bezel upon which the stone rests. The introduction of a bearing effectively eliminates most functional restraints and opens up many design possibilities. Because a flat shelf is provided, independent of the background surface, the bezel can be fitted to a surface of any contour. Its height now becomes a matter of maker discretion, and its exterior surface can be greatly modified. Metal can be selectively removed above or below the bearing as long as you leave enough metal to safely hold the stone and to support the bezel. Decorative trims like textured appliqués or ornamental borders of differently colored metals can be added to the outside of the bezel. Remember to keep these below the bearing where they won't make it difficult to close the bezel. Especially when portions of the bezel are removed by sawing or filing, the result can look more like a prong setting than a conventional bezel.

Robert Grey Kaylor | Pendant
18k gold, lapiz lazuli, pearl, diamond
photo: Robert Grey Kaylor



Two common ways to create a rim inside a bezel are to make an interior bezel from sheet or a supporting ring from round wire.

The traditional method of making a bearing bezel is to start with thick sheet (16 gauge or thicker) and make a bezel that is too small to admit the stone. Cut a bearing with gravers or burs while simultaneously creating a bezel that is sufficient to close over the stone. This time-honored method produces a great shoulder bezel, but requires skill with gravers and burs, and the ability to figure out the correct size of the starting bezel.



Two views of a shoulder bezel assembly.

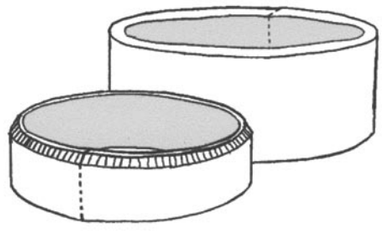
For most metalsmiths it is far simpler to assemble a shoulder bezel from two parts: an inner shelf to support the stone and an outer bezel to hold it—basically a bezel within a bezel. The inner bezel, or bearing, must be sufficiently lower than the outer bezel to allow the stone to be properly set. The height of the wall of the outer bezel must exceed that of the inner bearing by a third to a quarter the height of the stone (i.e. the same amount needed to set a basic single-walled bezel).

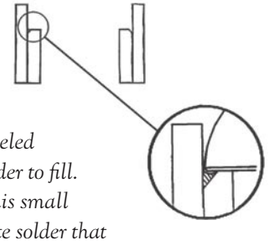
A variation on this creates a bearing by soldering a ring of wire into a bezel. In certain instances, where a very tall bezel would require too much material, or, in the case of earrings, where a solid bearing would add undesirable weight, the bearing can be made of wire rather than from a solid strip of metal. In either case, the bearing is eventually tightly fitted to the inside of the bezel and soldered in position.

Making a Shoulder (or Bearing) Bezel

Build a shoulder bezel like a single-walled bezel, with a few minor differences. Make the bezel (i.e., the outer unit) first, exactly fitted to the stone. The thickness of the bezel wall is a matter of personal choice, but the thickness of the bearing should be 24 gauge (0.5 mm). Thicker material is not necessary and only adds unnecessary weight. On the other hand, a thinner gauge may not provide enough support. The bearing should fit snugly inside the bezel.

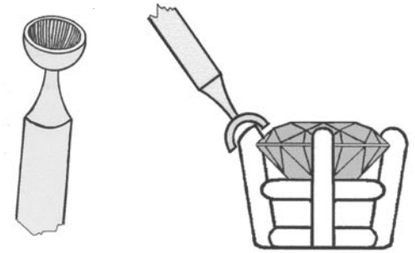
Solder the seams on both strips with hard solder. If there is excess solder on the outside of the bearing, file it away so the inner tube will fit tightly inside the bezel. If there is solder on the outer bezel, don't bother to remove it until the two-layered assembly is complete.

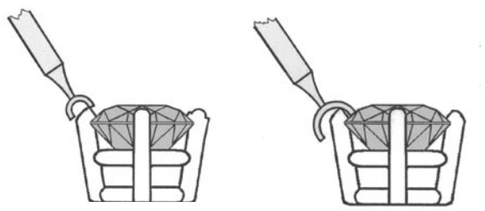




The outer edge of the interior ring (the shoulder) should be beveled to allow a space for solder to fill. As seen in the detail, this small angle will accommodate solder that will othersise prevent the stone from sitting flat.

ical tips use a commercial concave cutting bur. Select a bur that fits comfortably over the unshaped prong tips. If too large a bur is used, its interior cutting surface will not contact all areas of the prong tip uniformly, and the result is a, misshapen tip instead of a smooth hemispherical one. Also, the edges of an oversized bur are more likely to touch the stone, and that's not good. If you use a bur that is too small, it will cut overlapping circular grooves in the prong tip.





When using a concave bur to shape prong tips, it is important to select the correct size.

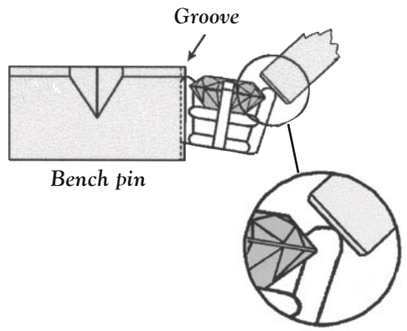
To prevent the cutting bur from clogging with metal debris, run it against a small piece of chalk. The chalk dust will fill the grooves between the teeth, preventing the removed material from glazing the burs interior surface. If necessary, brush out residue with a stiff brush.

To shape the tips, hold the bur over the tip of the prong with light pressure, its shaft in alignment with the axis of the prong, while rotating the handpiece in a circular motion. Run the bur at a slow speed, taking care not to tip the bur against the stone when rotating forward or to the sides. Also take care not to rock the handpiece backwards too far, where the bur could cut a notch into the outer surface of the prong. Check the progress often. Since the prong tip itself is hidden from view by the cutter, it is possible (especially in the case of a new, sharp bur) to overcut quickly. Re-chalk the concave cutting face of the bur after each inspection. Final touch-up or shaping at the point where the prong lies against the stone is done with the safe-edged barrette needle file.

After the tips are shaped, they may appear to be pressed against the stone, but this is often an illusion caused by the thin metal burr created during the shaping process. The tips require a final tightening.

Though some setters may also do the final closing and tightening of the tips entirely with the chain-nose pliers, the danger of crushing or distorting a setting is so great that I recommend that final tightening be done with the stone pusher. It is actually much easier to monitor and control the force being exerted by the stone pusher, because that force is transmitted directly from the hand.

Place the end of the pusher on each tip with its shaft perpendicular to the slope of the crown, and push firmly while slightly rocking the tool side to side. Remember



Support the setting against a prepared face on the side of the benchpin and secure the prongs with a bezel pusher.

to brace the opposing prong to prevent misalignment. As each prong tip is pressed against the stone, the small burr left from filing will be pushed outward, creating a ragged border. Carefully cut this rough edge with a flat graver, an X-Acto knife, or (my favorite) a single-edged razor blade.

After the burrs have been removed, inspect the finished setting to make sure there are no gaps or snags—use an Optivisor or loupe and silhouette the setting against a strong light source. Rub the tips of the prongs briskly on cloth, such as a T-shirt. If the prongs snag or pick up bits of fibers after rubbing, further tightening is needed. When you are satisfied that the prongs are properly secured against the stone, inspect the surfaces of the prongs and polish off any marks that were made during the final setting. Use a light touch so you don't remove any more metal than necessary.

Polishing Prong Settings

Because the tips were shaped with a fine-cut needle file, only light polishing should be needed to smooth and brighten the prongs. Excessive buffing can thin and weaken the prongs, or even round off facet edges on soft gemstones, so care must be taken at this step.

Buff prong settings with a small diameter muslin buff or a circular soft-bristle brush, lightly charged with rouge. A 2.5" or 3" diameter is ideal; a buff or brush of this size has a lower surface speed than a larger buff. The tips should require only brief contact with the buff to smooth and brighten their surfaces. The manner in which each prong tip is gently and lightly presented to the buff is sometimes referred to as kissing the buff. Each prong should be polished individually, positioned so the direction of the spinning buff as it passes over the tip of the prong rotates away from the stone. Avoid direct contact with the buff, and use only the light charge of rouge. If the buff or brush becomes overcharged with rouge, scrape off the excess with a hacksaw blade or the tines of an old fork. After buffing, inspect the prongs one last time. If all marks and any roughness from the setting operations have been removed, the surfaces of the prongs are suitably lustrous and the buffing has not revealed any loose tips or gaps, wash the finished setting with soapy water and dry it with a soft cloth.

Specialized Prongs

Wire settings designed for stones with corners usually use sheet metal rather than wire for the prongs. Though it is possible to seat an angular corner in a round wire prong, this is generally not the sturdiest solution. Rectangular, square, and marquise settings are often constructed exclusively

Stephani Briggs | Necklace
22k gold, pearls
photo: Robert Diamante

Patty Bolz | Earrings
18k gold, chalcedony
photo: Robert Diamante

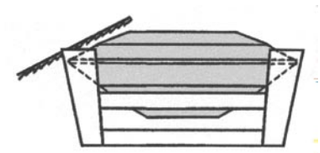
where you plan to trim off the excess. As described earlier, I darken the prong with permanent marker so the scribed line will show up clearly.

Remove the stone, saw off the excess, then sand the edges to remove burrs. Put the stone back into the setting and double-check the height of the prongs. Unlike wire prongs, it is difficult to remove extra material from these prongs after the stone has been set, so it is important to find the perfect height now.

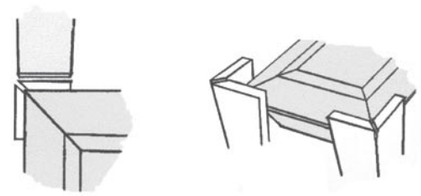
With the stone back in place, carefully saw down the vertex of each chevron prong to the top of the girdle. Use a fine sawblade (4/0 to 8/0) and hold the saw at an angle so the blade is parallel to the slope of the stone. Use a light pressure and stop when you feel the blade meet the stone. Usually any stone you'd chose to set in this type of setting will be harder than a sawblade, so if you use a gentle touch, you won't hurt the stone.

The saw cut has now created two flaps separated by the kerf of the sawblade. Push these flaps toward each other with a bezel pusher, stopping as soon as the edges of the flaps meet. Saw through this point of contact; this will create another gap. Press the flaps in again until they touch, then repeat. The repetitive sequence of sawing and pushing results in a crisp, tight, and neatly mitered corner. Remember to work back and forth across the stone to keep it level as you close the prongs.

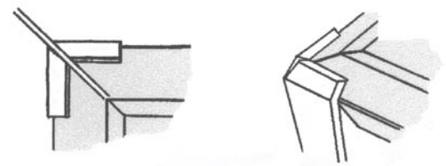
Once all the prongs have been tightened against the stone, use a safe-edged barrette file to smooth and refine the upper flat planes of the prong tips, then rub the outer edges toward the mitered seam with a burnisher to close any miniscule gap. When done properly, the saw cut will be virtually invisible. As a final touch, use a #42 flat graver to bright cut the inner edge of each leg of the prong, cutting from the outer corner to the center of the "V." When viewed from above, a mitered prong is a simple "V" with legs of uniform width that parallel the edge of the stone.



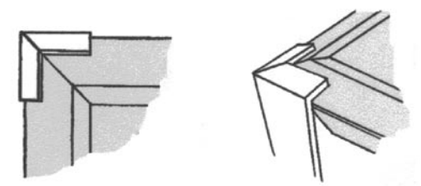
Saw through the corner of each prong with a narrow sawblade.



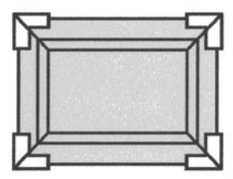
With a bezel pusher, press the flaps of the prong sides together just until they touch.



Saw again to create another small gap, then press the flaps together until they touch. Continue this process until the top plane of each prong lays firmly on the stone.



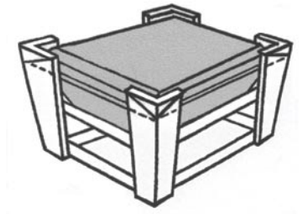
File and burnish to yield a crisp corner with an almost invisible seam.



Top view of the completed setting. It is important that all planes of the prongs match in length and width.

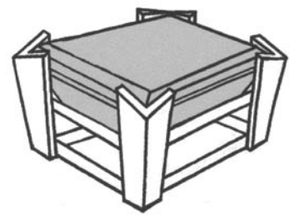
The "Picture Tab" Method

In this method, no saw cut or mitering is required. Instead, the prongs are filed in such a way that the legs are shaped into triangular flaps that are pressed over the girdle of the stone. The first step, as just described, is to adjust the prongs to the proper height. Once you have done this, darken the exterior corner of each prong near the top so scribe marks will be clear. With the stone temporarily in place, mark the location of the top edge of the girdle on each prong. Remove the stone; filing with the stone in place might cause damage.



With the stone in place, mark the place where the top of the girdle hits each prong.

Use a flat hand file held at a steep angle to carefully lower the corner of each prong down to the mark you've just made. This will create a V-shape on the top of each prong with the outer ends of the legs left at their original height. Sand these sloping surfaces to remove the file marks and deburr. Place the stone back into the setting and check that the inner corner of each prong is at the same level as the upper edge of the stone.



File to top of each prong at an angle so the the corner is even with the girdle and the "wings" are taller.