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Research and Exploration of Stone Settings

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RESEARCH AND EXPLORATION OF
STONE SETTINGS

RESEARCH AND EXPLORATION OF
STONE SETTINGS

BY
JONATHAN O. PARRY

Submitted to the Faculty of the School for American
Craftsmen in partial fulfillment of the re-
quirements for the degree of Master
of Fine Arts at Rochester
Institute of Technology

May 1972

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PREFACE

The purpose in writing this thesis is to present a single source of information concerning the construction of basic stone settings for the metals student. Because each stone setting described may have a great number of variations, its description is technically oriented, primarily to the construction of each setting.

Settings included are those that require a minimal amount of specialized equipment and only basic tools. Thus, although beaded and milgrain settings are widely used by commercial stone setters, they are not described, because beading and milgrain tools are not always available to the student.

ACKNOWLEDGEMENTS

I wish to take this opportunity to express my thanks to all who have helped me to reach this goal. Many have contributed generously with their guidance and friendly support, but most of all I wish to thank Stanley Lechtzin for a sound foundation in my basic understanding of stone setting, and Albert Paley for help and guidance to advance with the use of that understanding and knowledge.

INTRODUCTION

The settings described in this thesis are not geared to a beginning student, but to the advanced student with a good understanding of working with metals. Basic technical terms and concepts such as fire scale, pickling, polishing, refining, scratch brushing, solder crystallization and flowing qualities are not discussed; but it is assumed that the serious student is aware of the importance of terminology and therefore will review if necessary.

The procedures outlined for these stone setting methods are adaptable to personal working habits, and are meant to be guides, not restrictions. The craftsman is encouraged to use his own ingenuity in modifying the techniques to suit his own needs.

In constructing settings I myself prefer to refine each component before assembling in order to keep fire scale at a minimum and to insure a strong soldered seam, but the student is encouraged to develop his own means of dealing with this and other such technical problems.

FRONTISPIECE

Eight-Prong Cast Setting

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BASIC INFORMATION

Stone Cutting Information

Cut stones fall into the basic categories of cabochons and faceted stones.

Cabochons generally have a domed top and a flat or slightly domed back. Commonly they are round or oval, but are occasionally of angular outline and may be high or almost flat. Since the cut does nothing to enhance the brilliance of a transparent stone, it is generally used for opaque or translucent stones, and is excellent for displaying chatoyance as in cats-eye mineral.

Faceted stones are usually transparent, since the cut consists of covering parts of the surface with tiny angled planes in a set pattern to show off and increase the ability of the stone to refract light, which gives it life and sparkle. The facets are ground at predetermined angles to take the best advantage of the refractive index of the mineral being cut; thus certain cuts are traditional and the better the quality of faceting, the more the brilliance of the stone is displayed.

Each type of gem has a particular hardness by nature of its mineral constitution, and these are for convenience rated on a hardness scale of one to ten, the softest materials at the low end of the scale.

Moh's Hardness Scale

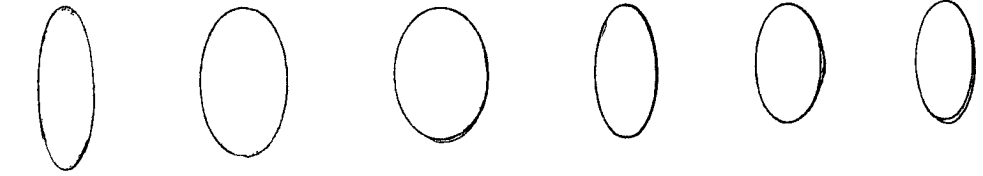
- | | |
|-------------|---------------|
| 1. Talc | 6. Orthoclase |
| 2. Gypsum | 7. Quartz |
| 3. Calcite | 8. Topaz |
| 4. Fluorite | 9. Corundum |
| 5. Apatite | 10. Diamond |

The majority of cut stones used in jewelry are of a hardness of 5 or better by Moh's scale, since softer stones like fluorite are usually too soft to withstand wear unless given special consideration in the design of the setting.

Commonly Used Tools

The following list is considered basic for producing the settings described in this thesis with professional skill, although the student may be able to circumvent the lack of a tool by ingenuity in some instance.

Saw
Bench pin
Leather mallet
Chasing hammer
Snips or scissors for cutting solder
Ring mandrel
Soldering pick
Dapping block and tools
Rectangular chasing tool (Can be made from a rectangular needle file by grinding off the broken end and polishing a square end on the file)
Binding wire
Assorted polishing and grinding papers, emory paper
Assorted files
Jeweler's pliers
Asbestos pad
Coiled asbestos pad or charcoal block



22x18

20x12

18x13

18x9

16x9

16x8



24x10



16x12



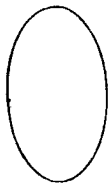
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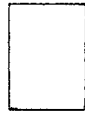
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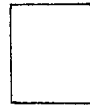
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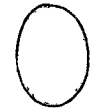
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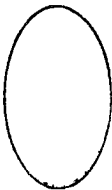
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14x12



12x10



25x15



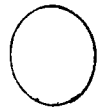
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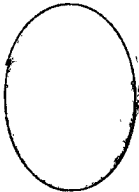
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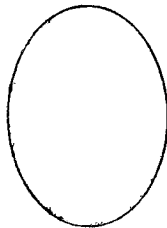
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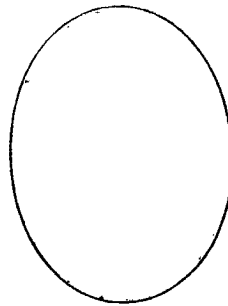
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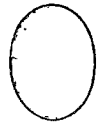
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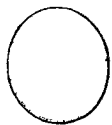
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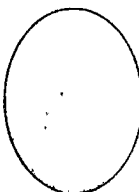
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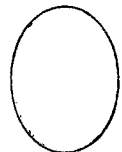
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16x14



25x19



16x15

POST AND WRAPPED SETTINGS

Introduction

Pearls and beads can be used as a central theme for a piece of jewelry itself. Pearls are not very durable and are easily damaged by heat and common chemicals such as alcohol and ammonia. They are very soft and are easily scratched if not well protected, so the setting of pearls is always a last step in finishing a piece of jewelry. Post and wrapped settings discussed in this section are adaptable to any drilled or irregular stones, but are most commonly used for setting pearls.

Cements

Over the years many types of stone cements have been invented of natural, and more recently, of synthetic materials. The most reliable at present is epoxy, generally bought as a hardener and a resin in separate tubes. These are mixed according to instructions on the tubes, and are then ready for use. An epoxy solvent which will not damage pearls is available. If the slow setting type is used, hardening can be hastened by placing the completed piece in an oven for about 20 minutes at 125 degrees Fahrenheit. A quick setting (five minute) variety is also available.

Straight Post Setting: for Half Drilled or
Full Drilled Pearls or Other
Drilled Stones

1. A wire is soldered with easy solder to the piece of jewelry where the pearl is to be set. This wire is the post, and it should be the same diameter as the drilled hole in the pearl or stone.
2. When the rest of the piece is completely finished, the pearl or bead is then epoxied to the post using a small amount of clear epoxy.
3. This setting can be used for full drilled pearls or beads by addition of a beaded and polished wire inserted at the opposite end of the hole, making a polished dot of metal to plug the opening.

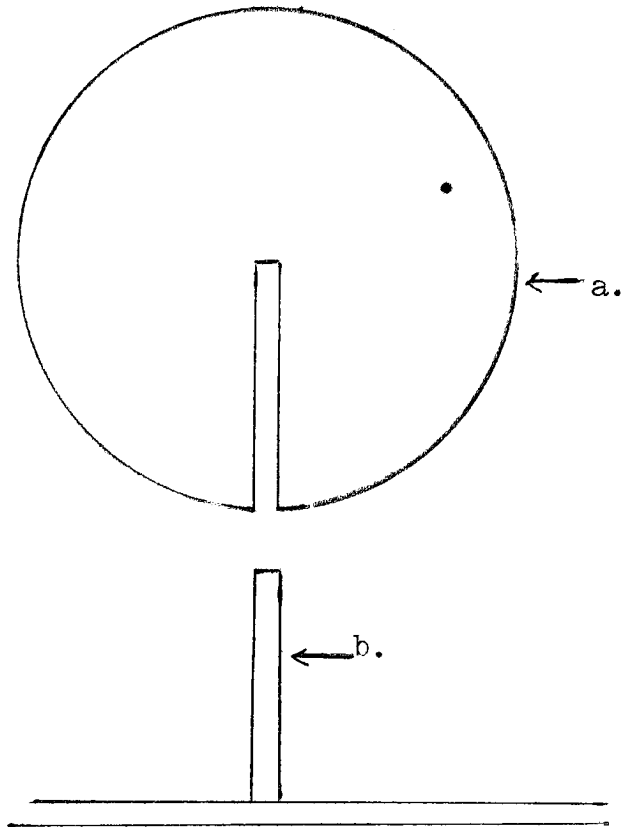


Fig. 1: Straight Post

Cross section before setting drilled pearl or stone

a. drilled pearl

b. post

Cup and Post Setting: for Half Drilled or
Full Drilled Pearls or Other Stones

This setting gives the pearl more protection than the simple post setting, as the cup may be made as deep as desired. See Figure 2.

1. Dap a cup from 20-24 gauge metal to snugly fit the bottom of the pearl.
2. Solder a post of the correct diameter to fit the drilled hole to the middle of the inside of the cup. The setting is now ready to be incorporated into the piece of jewelry.
3. When the rest of the piece is entirely finished the pearl or bead is affixed to the post in the cup, using a small amount of epoxy. If desired, a full drilled hole may be finished by inserting a wire with polished bead into the exposed end.

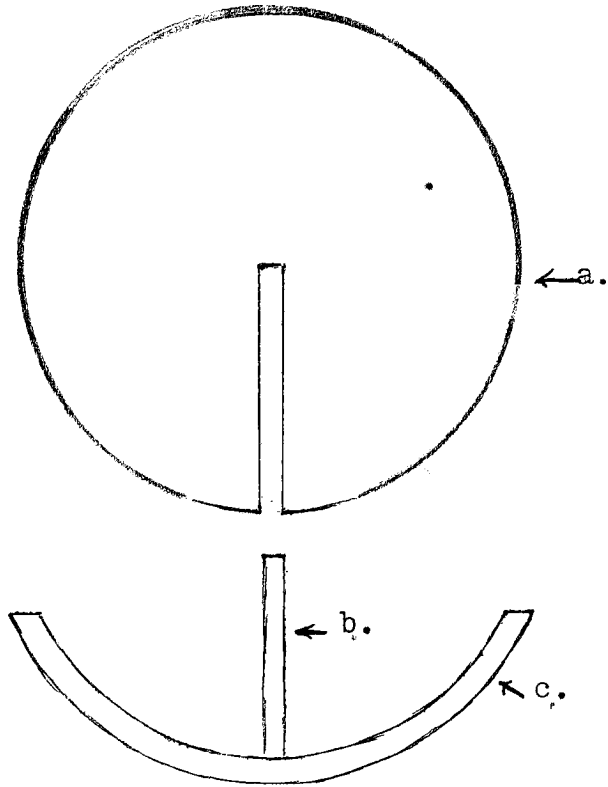


Fig. 2: Cup and Post

Cross section before setting pearl

a. pearl or stone

b. post

c. cup

S-Post: for Half Drilled Pearls or Beads

This is a stronger setting than the straight post if the S curve is bent so the wire touches both sides of the drilled hole. It is also useful when the available wire is smaller in diameter than the hole in the stone or pearl. Refer to Figure 3.

1. A wire smaller in gauge than the diameter of the drilled hole is soldered with easy solder to the piece of jewelry where the pearl is to be set.
2. The post is bent to have a slight double or S-shaped curve in the wire.
3. When the piece of jewelry is otherwise completely finished, the pearl or bead is affixed to the post with a tiny amount of epoxy.

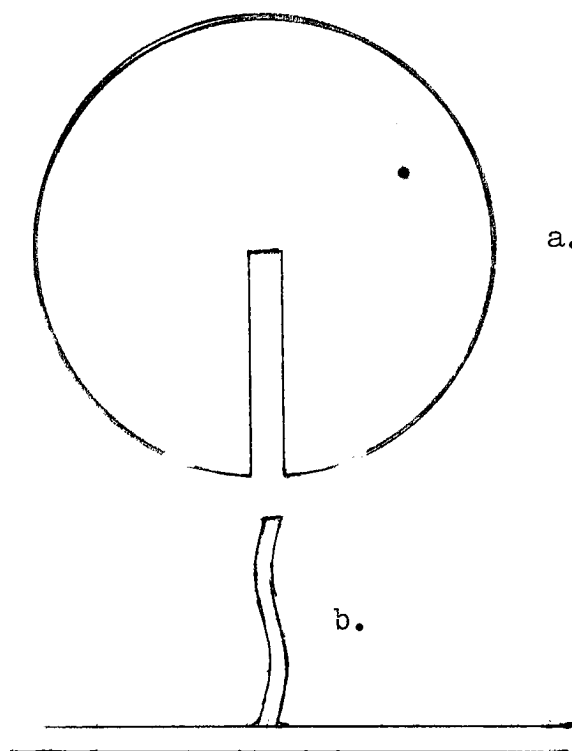


Fig. 3: S-Post

Before setting half drilled pearl or stone

a. pearl

b. S-post

Threaded Post Setting: for Half Drilled Pearls

1. Select wire the exact diameter as the drilled hole in the pearl for snug fit, and using a tap and die set thread the wire. See Figure 4.
2. Solder the threaded wire to the piece of jewelry where the pearl is to be set.
3. When the piece of jewelry is finished, set the pearl by introducing a tiny amount of epoxy into the drilled hole and then screwing it firmly down the wire to its base.

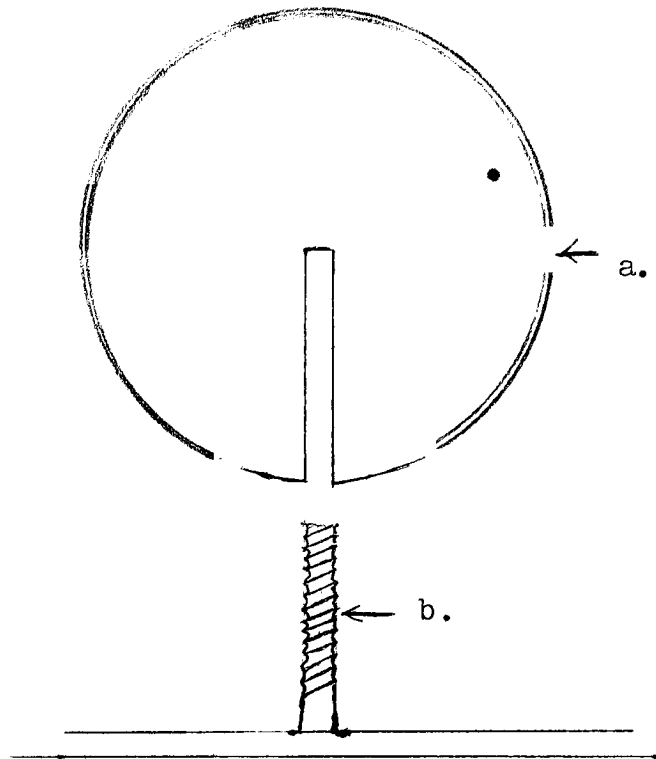


Fig. 4: Threaded Post

Cross section before setting pearl

a. pearl shown in cross section

b. threaded post

Split Post Setting: for Half Drilled Pearls

This setting is usually reserved for large and expensive pearls. Once the pearl is set, it cannot be removed from the setting without risk of damage to the pearl.

1. The hole drilled in the pearl should be 16 or 18 gauge.
2. Using a small burr, insert it in the drilled hole and rotate it to grind out a space the shape of an inverted cone with the widest part of the cone at the center of the stone. See Figure 5.
3. Select for the post wire of the same gauge to fit snugly in the mouth of the drilled hole. Measure the radius of the pearl and use an 8/0 saw blade to split the end of the wire lengthwise down to a distance from the end not less than the radius of the pearl.
4. Using a scrap of the same wire the post is being made from, file out a tiny wedge which should be shorter than the saw cut in the wire, and approximately $1/4$ to $1/3$ the thickness of the wire.
5. Solder the post to the proper position in the piece of jewelry.
6. When the rest of the piece of jewelry is completely finished, set the wedge into the slit in the post so that the point of the wedge forces the two halves of the post apart and a straight edge of the wedge is uppermost. See Figure 5.

7. Introduce a tiny amount of epoxy into the drilled hole and set the pearl in position on top of the post and wedge.

8. Gently but firmly push the pearl down the post. As it descends it will push the wedge into the saw cut, forcing the halves of the post to spread apart.

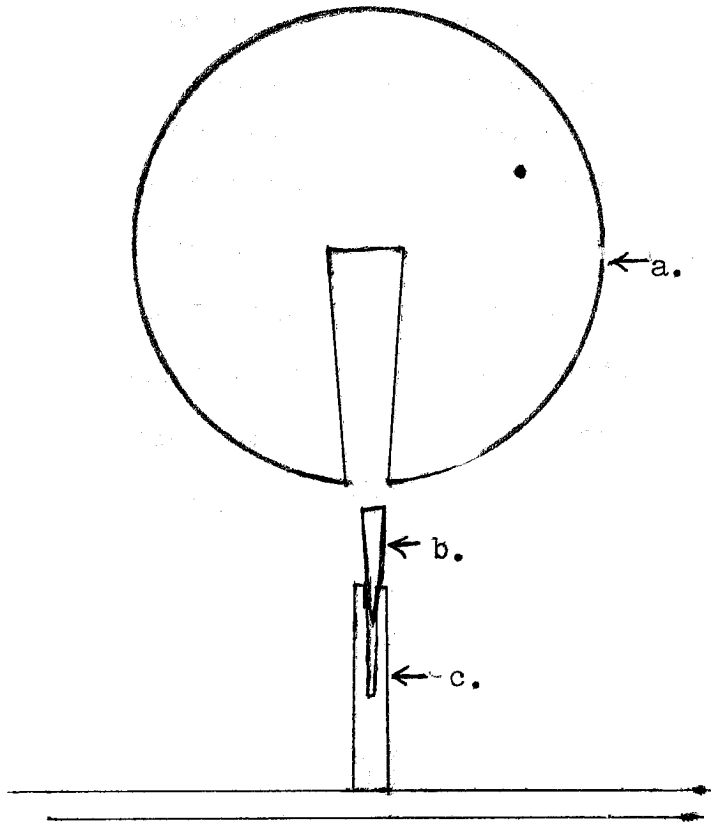


Fig. 5: Split Post

Cross section before setting pearl

a. pearl

b. wedge

c. post

Wrapped Wire Setting for Baroque Double Pearls

This setting is most practical for double or twinned baroque pearls, which need not be perfectly symmetrical.

1. The wire used to wrap the pearl should be proportional to the size of the pearl, as it will fully show. The tapered part of the wire should be long enough to wrap twice around the waist of the pearl.
2. File the wire to gradually taper to the tip. This portion will encircle the pearl.
3. The heavier stem of the wire is soldered, linked, or otherwise attached to the piece of jewelry.
4. When the remainder of the piece of jewelry is completely finished, the tapered end of the wire is wrapped around the narrow center portion of the pearl. This process can be started using pliers, but should be finished by hand to avoid damage. Tightening the wire by tools can cause the pearl to break. A tiny amount of epoxy spread under the wire can be used to keep the wire from slipping or turning on the pearl, but excess should be avoided.

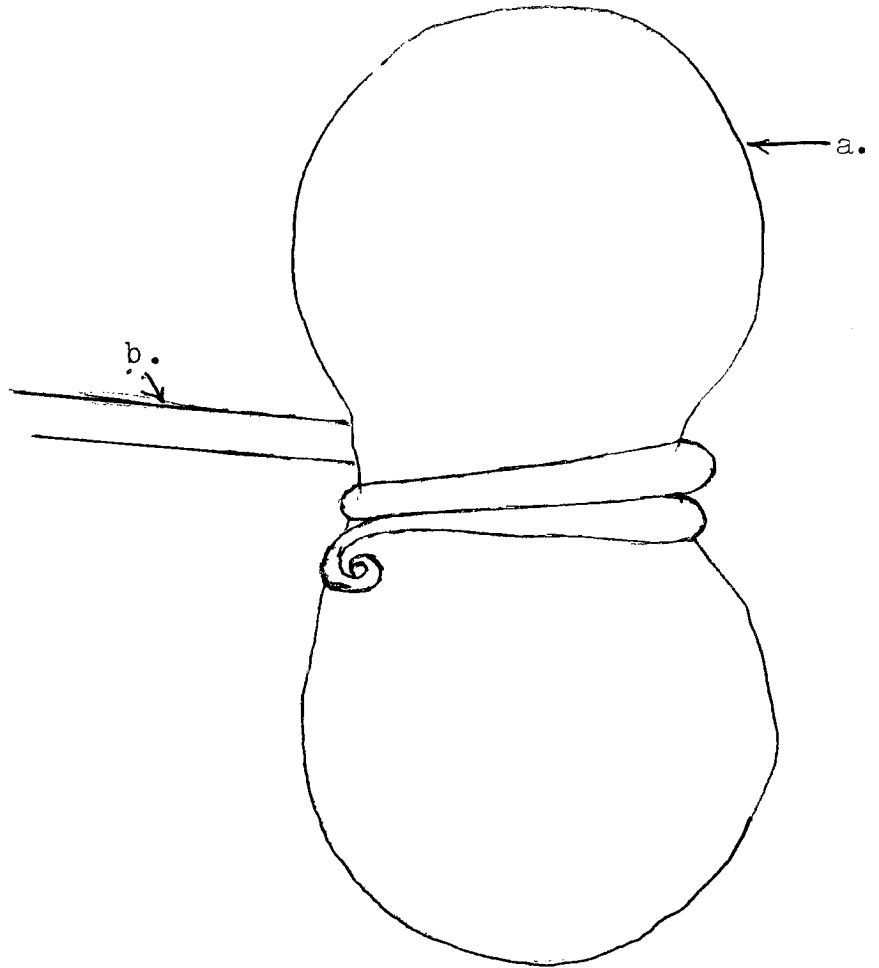


Fig. 6: Wrapped Wire Setting After Setting Stone

a. pearl

b. tapered wire

Bezel Setting for Mowabi Pearl

Mowabi pearls are pearls that have grown attached to the side of the shell. Often they are very large with flat backs and rounded tops. Due to their large size and peculiar shape they are advantageously set in bezels of fine silver or thin sterling. If it is desirable to make a true bezel, follow the directions under Simple Bezel.

1. Use square wire of 16-20 gauge to make a circle which fits snugly around the perimeter of the pearl without pressure.
2. Solder the squared ends of the wire together smoothly.
3. Solder the closed circle into position on the piece of jewelry, and refine as necessary.
4. When the piece of jewelry is otherwise completely finished, a thin coating of epoxy is spread on the plate of the setting and the pearl pressed into position. For added protection, a post may be soldered to the center of the setting and fitted to a drilled hole in the pearl before epoxy is used.

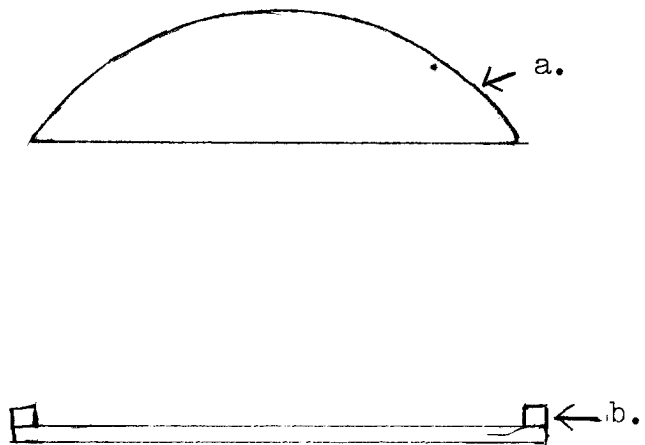


Fig. 7: Bezel for Mowabi Pearl

Cross section before setting

a. pearl

b. square wire bezel

Tube Setting: for Half Drilled Pearls

(Adaptable to Full Drilled Pearls)

This setting uses two similar pearls back with a short length of tubing separating them. Seamless tubing is most satisfactory, but fabricated tubing can be used as desired. See Figure 8.

1. Select or make tubing approximately $1/3$ the diameter of the pearl.
2. The length of the piece of tubing determines the distance between the two pearls. Using a tubing cutter or a saw and file, cut the ends of the tubing exactly at right angles to the length.
3. At each end of the tubing the lining is filed at an angle toward the center so that a smooth flat plane is adjacent to the pearl's convex surface.
4. The tubing is then soldered in place on the piece of jewelry, allowing space for a pearl at each end.
5. When the remainder of the piece is completed, cut a length of wire the same gauge as the drilled holes in the pearls, to form a post. The length of the post should be the length of the tubing plus the diameter of one pearl.
6. Cement the post into one of the pearls using epoxy. When the epoxy has set, run the wire through the tubing, and epoxy the other pearl to the other end of the post. The pearls should be pushed on to fit snugly against the tubing.

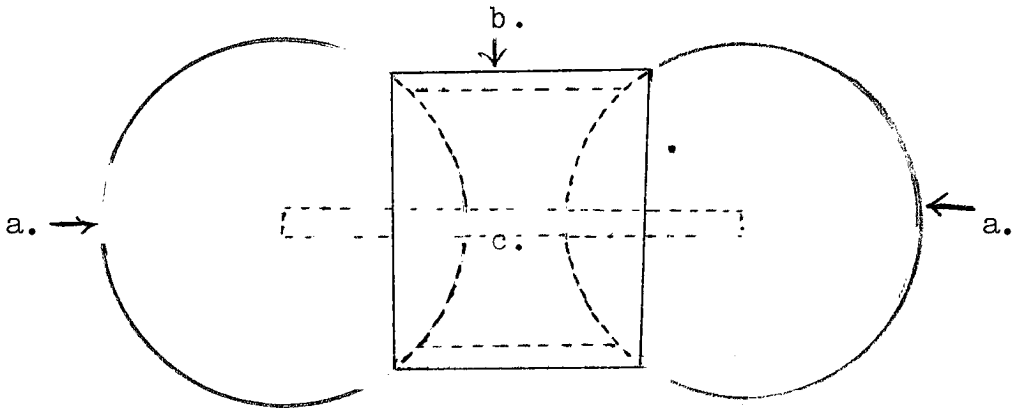


Fig. 8: Tube Setting

Side view after setting

a. pearl

b. tubing

c. post

Summary

In this section, eight methods of setting pearls and beads have been described. Many variations are possible, limited mainly by suitability to the particular piece of jewelry. There can be no arbitrary ruling as to what is a wrong way or a right way to set a pearl. If the pearl is securely protected and is set so as to most advantageously fulfill its role as an integral part of the design, it stands to reason that it has been set "right".

BEZEL SETTINGS

Introduction

Bezel settings can be used for both faceted and cabochon stones. The setting usually completely surrounds the stone, giving it maximum protection against chipping along the edge. A bezel is usually constructed from two separate pieces of metal, one which forms the bearing on which the stone sits, and another which holds the stone in place.

Bezel set stones can be used in many ways, ranging from modular groupings down to single jeweled accents. Generally they can be used in all forms of jewelry because of the strength and protection afforded by such a setting.

Simple Bezel Setting: for Basically Round or Oval
Cabochons (Adaptable to Other Shapes)

1. Using 20-24 ga. metal, cut a strip of metal long enough to go around the circumference of the stone at its base and approximately $\frac{1}{4}$ the height of the stone.
2. Carefully form this strip of metal to the circumference of the stone at its base, being careful not to mark the metal. Saw the strip where the ends overlap in such a way that the stone fits snugly inside, and the ends of the metal strip butt together perfectly.
3. Solder the ends of the strip together smoothly, using hard or medium solder.
4. If the bezel fits loosely, the seam must be sawed open, and the strip trimmed to fit and resoldered. If the bezel is too tight, it can be planished slightly on a ring mandrel until it will slip over the stone base, without forcing.
5. Using a flat plate of metal 20 ga. or heavier, saw out a piece slightly larger than the bezel, and solder the bezel to its surface.
6. After soldering, remove the excess metal projecting outside the bezel.
7. Polish the bezel and incorporate it into the piece of jewelry as planned.
8. Use a burnisher to gently push and smooth the bezel against the sides of the stone after it has been in-

serted in the setting. The piece of work should be firmly supported so pressure on the stone is firm and evenly distributed while working on it; otherwise, sudden changes in pressure may crack or dislodge the stone or make large dents or lumps in the bezel which will be difficult to burnish smooth.

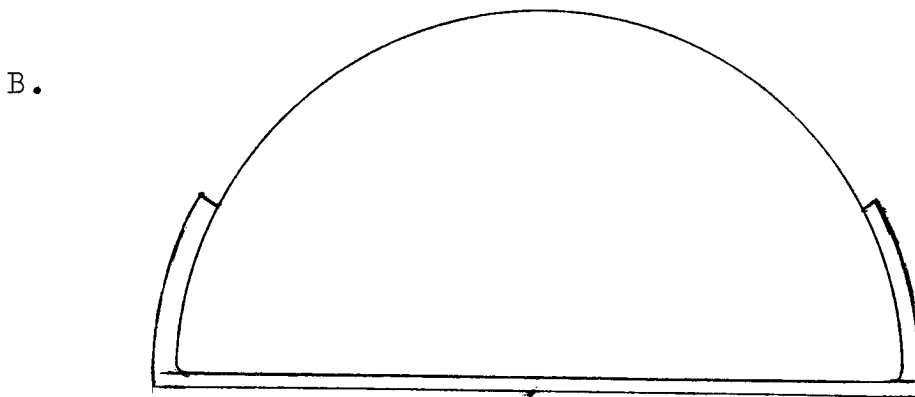
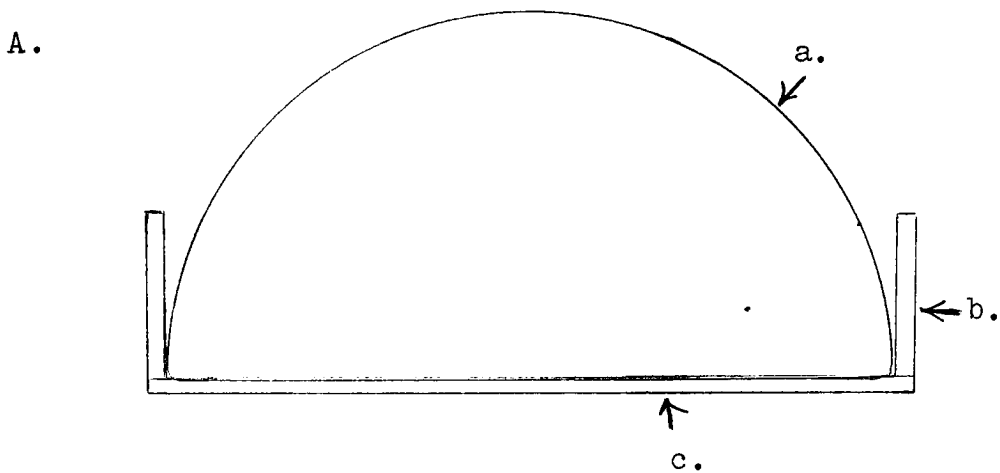


Fig. 9: Simple Bezel in Cross Section

A.

a. stone

b. bezel

c. plate

B. Bezel after setting stone

Simple Bezel Setting With Bearing Strip:

for Round or Oval Stones

1. Select a strip of metal 22 gauge, approximately the width of the bezel desired and slightly longer than the circumference of the stone at its base. A second strip the same length, of 19 gauge and about $\frac{2}{3}$ as wide will also be needed for the bearing.

Both strips must be annealed and pickled.

2. The 22 gauge strip must now be made to fit as tightly as possible around the stone at its greatest girth.

This can be accomplished in many ways: only one way is described here. Make a mock bezel from a strip of paper the same size as the 22 gauge strip and cut it to fit perfectly the girth of the stone, butting the ends. Then using this paper strip as a template, add twice the thickness of the metal and scribe a line on the metal strip being sure that the strip is marked exactly at right angles to the axis of the strip.

Saw the 22 gauge strip at the scribed line to make a square end.

3. Using half round pliers, gently form the strip into a circle or oval with the ends tightly butted together. The plier jaws may be taped to reduce scratching the bezel, but too much force will mark the bezel in spite of padding.

4. Solder the bezel from either the inside or the outside, using hard (#10) or medium (#30) solder.

Pickle and refine.

5. The bezel should now be shaped over a ring mandrel, using a leather mallet until it neatly and snugly fits around the stone. If it is too small it can be planished slightly; if it fits loosely the seam should be opened, the excess removed, and the joint resoldered.
6. Steps 1-5 are now repeated in making the bearing from the narrower strip, with a modification as follows. Using a strip of paper as before, find the exact length of the inside of the bezel, saw the 19 gauge strip slightly shorter than the paper, and form it to fit tightly inside the bezel.
7. Solder and refine the bearing, using the same grade of solder as previously used on the bezel.
8. If the stone being set has a flat bottom, the outside edge of the bearing should now be filed at a slight angle, so that when soldering in the next step the solder will fill the gap without flowing up the side of the bezel and thus creating a curved fillet. See Figure 10A.

If the stone being set has a convex bottom or is faceted, the bearing must be filed on the inside as well as the outside so that a sharp edge does not lie against the stone.

9. The bezel should be placed on a flat surface to be soldered. The bearing is slipped inside, care being taken that it is level with the bezel at the lower edges. Tiny pailions of medium or easy solder are now

set in the groove between the bearing and the bezel. Solder, taking care not to allow the solder to flow up the side of the bezel. Pickle and refine.

10. The bezel is now ready to be incorporated into a piece of jewelry. Setting the stone should not be attempted until all other processes are completed.

11. When the piece of jewelry is completely finished otherwise, then the stone should be set in the bezel as follows.

The piece and bezel should be supported in some way so that the pressure exerted during burnishing will not distort the piece. Using a curved burnisher, begin to push the bezel over the stone, working evenly and alternately on all sides. Do this slowly, a little at a time, to avoid wrinkling the metal. When the bezel is curved inward sufficiently to hold the stone in place without play, burnish the bezel until smooth and firmly in contact with the stone at all points around the circumference. See Figure 10B.

12. Select or prepare a barrette file which has had the edges ground smooth to prevent scratching the stone, and file the top edge of the bezel. The rest of the bezel may be left burnished or it may be polished if polishing compound will not mar the stone.

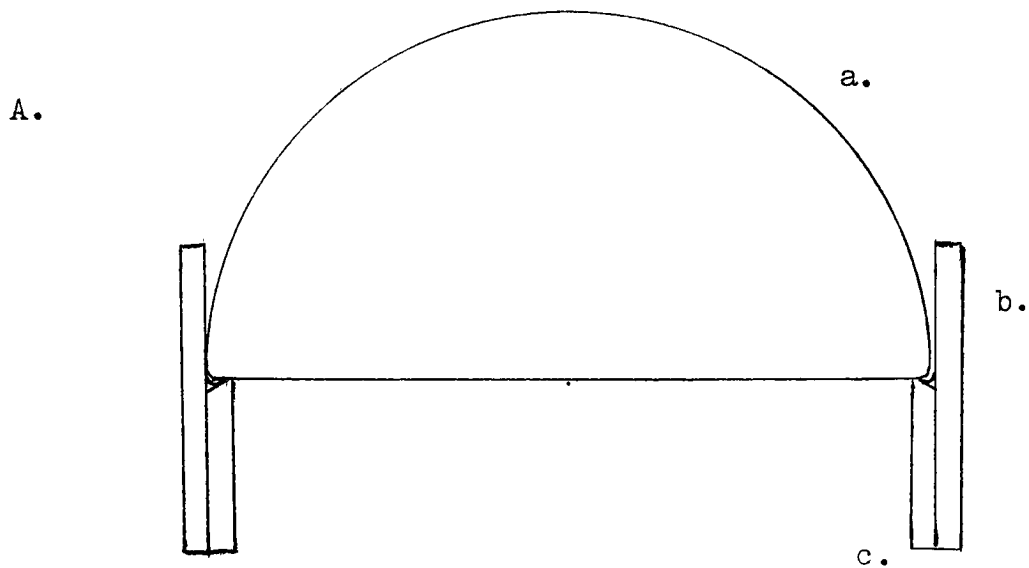
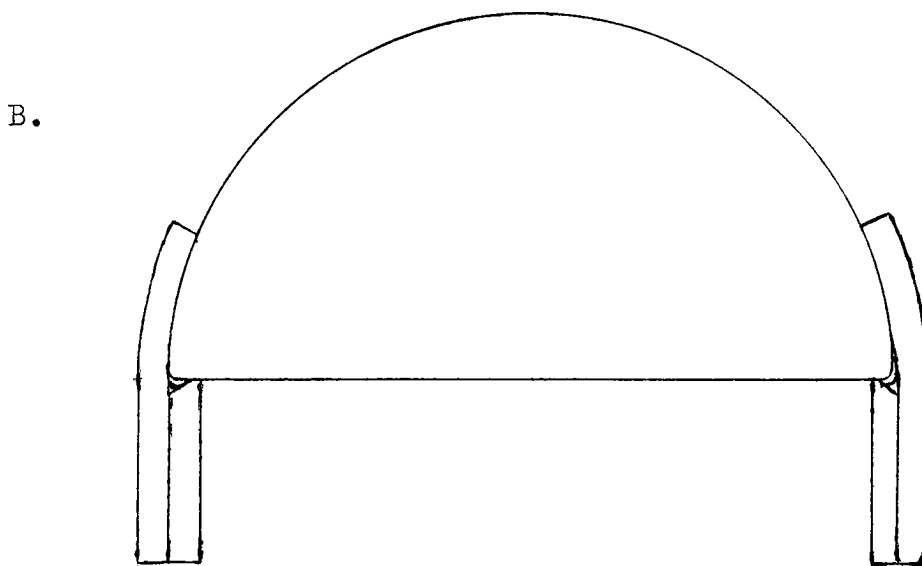


Fig. 10: Simple Bezel with Bearing Strip
In Cross Section

- a. stone
- b. bezel
- c. bearing



Bezel Burnished Closed

Hammered Bezel Setting: for Oval and Round Stones

The hammered bezel setting procedure is basically the same as the burnished bezel or simple bezel #2 just discussed, with a few exceptions as follows.

- a) The metal used for the hammered bezel should be heavier: between 16 and 20 gauge is recommended depending upon the appearance desired. The inside bearing is still made of 19 gauge.
- b) The top of the bezel should be filed on an angle slanting down and away from the center of the stone. Insert stone. See Fig. 11A.
- c) The piece of jewelry should now be well supported while the high inner edge of the bezel is driven down, lightly using a rectangular chasing tool until the top of the bezel is flat and horizontal all around. During this process the high inner edge of the bezel should be forced slowly down and in against the stone, until the bezel is evenly in contact around the edge of the stone. See Fig. 11B.
- d) Using a barrette file as before, carefully file the edge of the bezel to remove any marks left by the chasing tool. Finish as desired.

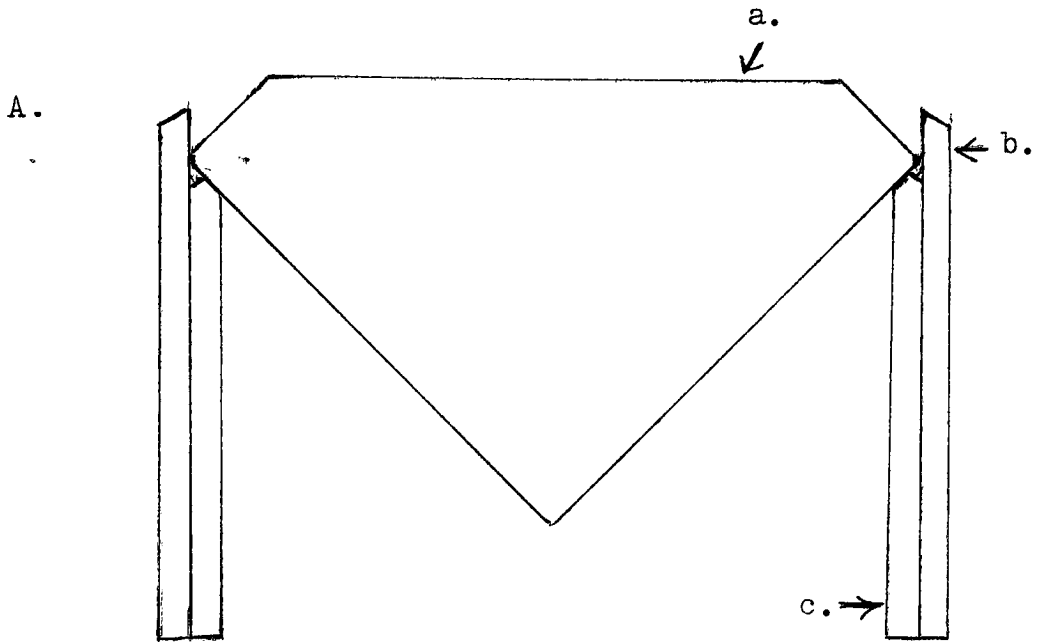


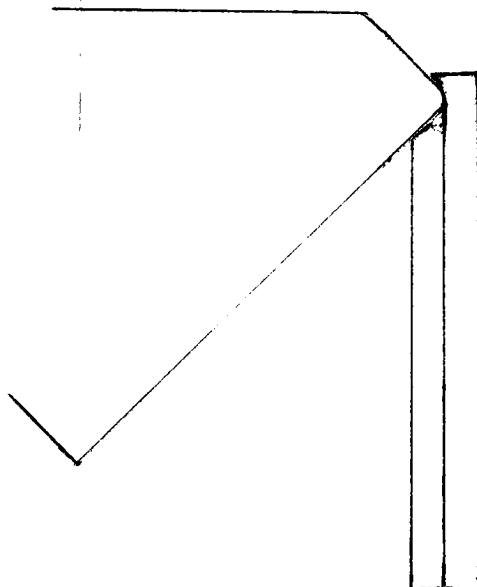
Fig. 11: Hammered Bezel Setting In Cross Section

a. stone

b. bezel

c. bearing

B.



Bezel After Being Set

Modified Bezel Setting: for Oval and Round

Stones, Adaptable to Other Shapes

The procedures in making this setting are the same as for making the burnished setting (simple bezel type #2) up to the point of soldering the bezel to the piece. Before incorporating the bezel into the design, parts of the bezel are removed by filing or sawing down to just above the bearing level. See Fig. 12. Care should be taken not to cut into the bearing or expose the lower edge of the stone unless this has been given previous careful consideration. Hardness and durability of the stone as well as the usage of the piece should be given thought, since by removing part of the bezel and bearing, the risk of damage to the stone from wear is greatly increased.

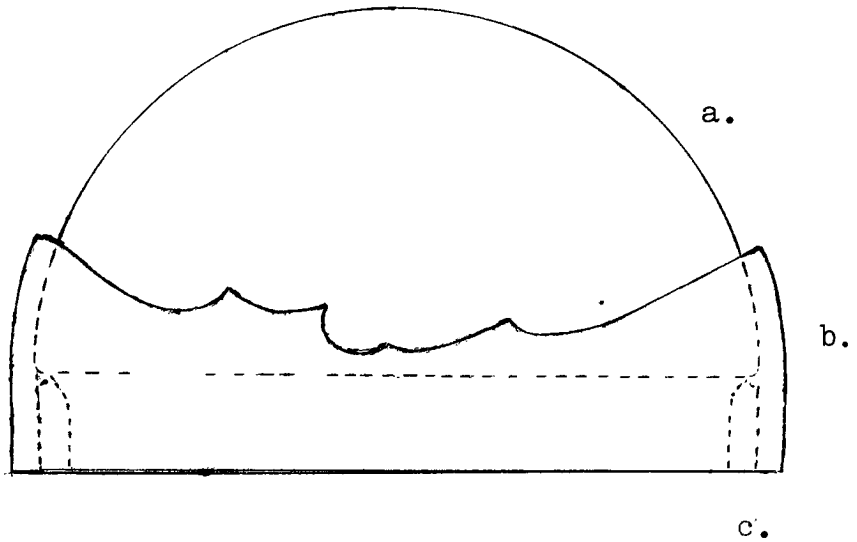


Fig. 12: Modified Bezel Setting: Side View
After Setting

- a. stone
- b. bezel
- c. bearing

Crown Bezel Setting: for Round or
Oval Faceted Stones

The procedure in making a crown bezel is the same as making a simple bezel with bearing as previously discussed, up to the point where the bezel is incorporated into the piece of jewelry. Before soldering the bezel to the piece, prongs are made by filing or sawing away parts of the bezel and bearing to allow light to come up through the faceted stone.

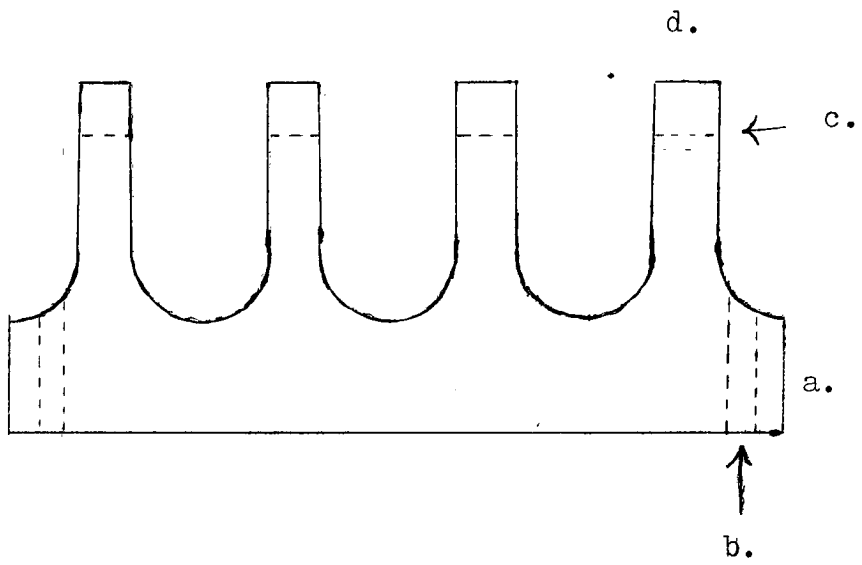


Fig. 13: Crown Setting

Side view

a. bezel

b. bearing

c. bearing

d. prong

Double Bezel Setting: for Round or Oval
Matching Stones

There are three practical ways of making this setting, depending upon the choice of design desired and the space intervening between the stones.

Double Bezel Setting: for Round or Oval Matching
Cabochons with Flat Backs

A sheet of 16 or 18 gauge metal is used for the seat of the setting, or thicker if desired. The gauge of the bezel will be determined by the setting technique, and may be finished by either burnishing or hammering.

1. Starting with the piece of metal selected for the seat, a small hole is drilled where the center of the setting is planned. This hole will be used to line up the two bezels.
2. Using the hole drilled as the center point, scribe a circle on both sides of the metal with a scribe, the circle being the size of the diameter of the stone. If the stone is oval, a paper template may be made and the outline drawn on the metal centered over the hole, taking care that the outlines drawn on the two sides are lined up together.
3. If the stones are transparent, excess metal inside the bezel outline may be filed or sawed away, leaving enough to securely support the bezel and stone at the edges. For opaque stones this step may be omitted.
4. Two well-fitted bezels must now be made to fit the two stones, employing hard solder for these joints.

5. Using medium solder, affix the bezels to the seat one at a time, lining them up with the inscribed outlines previously made. The bezel can be held in place with binding wire or stitches to keep it from shifting during soldering. Pickle and remove fire scale on one bezel as completed before starting the one on the reverse side.
6. Excess metal of the plate outside the bezels should now be removed and the double bezel is ready to be soldered with easy solder to the piece of jewelry.
7. Set the stones using the burnished or hammered technique as described earlier.

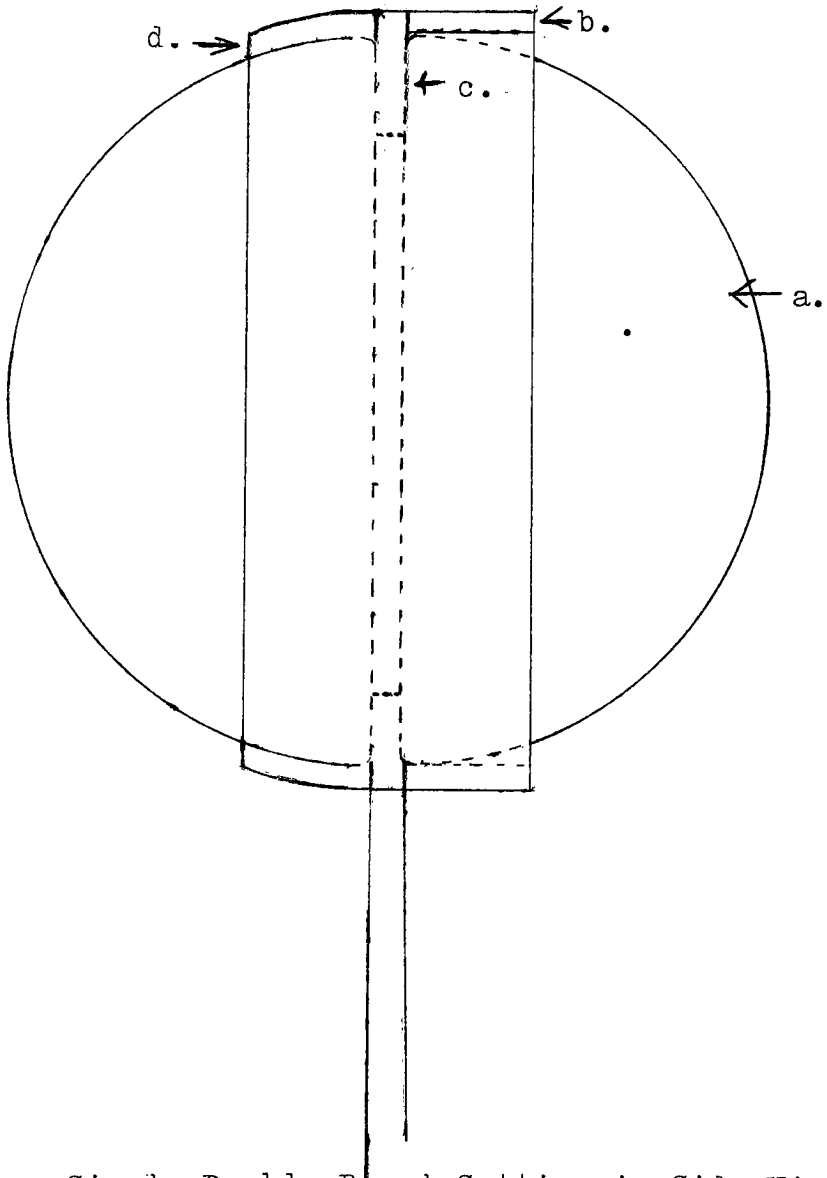


Fig. 14: Simple Double Bezel Setting in Side View

a. stone

b. bezel before setting stone

c. bearing

d. bezel after setting stone.

Double Bezel Setting of Preformed Tubing: for
Matching Round Faceted or Cabochon Stones

A double bezel setting can be constructed using seamless interlocking tubing which fits the stones for the setting, and smaller tubing which fits snugly inside for the bearing.

1. The larger tubing used for the bezel must be long enough to allow for the setting of both stones and a trifle more to allow for refining. It must be sawed to the proper length exactly at right angles to the axis to make squared ends.
2. The tubing for the bearing must be enough shorter than the bezel tubing to allow for setting the stones at the appropriate depth, and sawed off exactly perpendicular to the axis to make squared ends. File the ends smooth and flat.
3. Next the ends of the bearings must be filed at an angle down and away from the inner surface of the bearing so that the solder will flow evenly in the groove without forming a large curved fillet. See Fig. 15.
4. Push the bearing inside the bezel and space it evenly from each end. Solder in place with medium solder. If some solder runs up the inside of the bezel it can be removed by using a stone setting burr in the flexible shaft.
5. The double bezel should now be incorporated into the piece of jewelry.

6. When all other operations have been completed, the stones may be set by gently working the metal over the stone with a burnisher. If the bezel tubing proves too heavy to burnish, remove the stone, emory the outer rim of the bezel until it is thinner, polish it, replace the stone and burnish the setting over the stone.

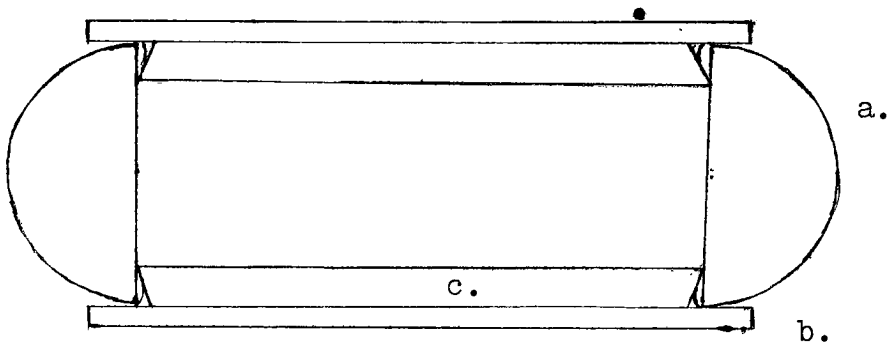


Fig. 15: Double Bezel Setting, Preformed Tubing Type:

Cross Section before Setting Stone

- a. stone
- b. tubing bezel
- c. tubing bearing

Double Bezel Setting Fabricated Tubing

Type: for Round or Oval Matching
Cabochons or Faceted Stones

This method is the same as the previous one described except that a long seamed bezel and a shorter seamed bearing are made into tubing. This method may be necessary for larger stones when pre-formed tubing is unavailable. Hard solder should be used to seam the bezel and the collar, and medium solder is used to solder them together. Suitable gauges are 22 gauge for the bezel and 19 gauge for the bearing.

Cup Bezel: for Round or Oval Cabochons

This setting is decorative as well as functional and may be chosen when the side as well as the top of the stone and setting is in prominent view.

1. A dapped cup slightly larger than the base of the stone is formed from 20 gauge metal. The depth of the cup should be decided in relation to the appearance desired, as it will not affect the security of the stone.
2. A bearing is made from 18 gauge square wire the exact size of the base of the stone and soldered together with hard solder.
3. The bearing should now be fitted to the inside of the dapped cup. It will not reach to bottom, but must be filed as necessary to make ample good contact with the cup lining to allow for strong solder joining.
4. Using medium solder, the bearing is soldered to the cup. Care should be taken to have it evenly centered and to prevent it from slipping during the process.
5. The excess metal of the cup should now be removed by filing or sawing even with the outer surface of the bearing. The seam between the bearing and cup is now exposed but will be covered in the next step. The cut edge of the cup should be filed smooth with the bearing so the bezel will fit tightly. See Figure 16.
6. A bezel is now made using about a 22 gauge strip

if a burnished setting is planned, or about 18 gauge if a hammered setting is planned. Hard solder is used to seam the bezel, which must fit against the bearing and down over the cup to slightly below the level of the cup surface.

7. The bezel is now positioned and soldered to the cup from the bottom side of the setting. Soldering from the top is possible, but there is more risk of making a curved fillet which will have to be removed.

8. The setting may now be incorporated into the piece of jewelry.

9. Set the stone by the burnishing or hammering method previously described.

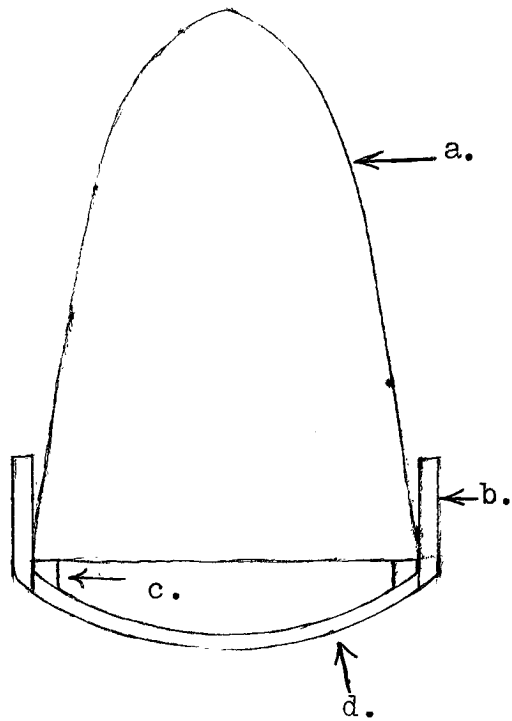


Fig. 16: Cup Bezel Setting: Cross Section
before Setting

- a. stone
- b. bezel
- c. bearing
- d. cup

Half Sphere Bezel Setting: for Round Cabochons

This setting is similar to the dapped cup setting with a few changes as noted here.

1. Dap a hemisphere of 20 gauge metal, using a dapping block. The opening of the hemisphere should be the correct size to admit the stone which must sit low enough in the hemisphere to allow sufficient metal to form a bezel to hold the stone.
2. A bearing to support the stone is made of 18 gauge square wire. It should be the exact size as the base of the stone and soldered together with hard solder. See Figure 17.
3. The outer edge of the bearing must fit tightly against the inside of the hemisphere, so the bearing will have to be filed at an angle around its outer lower border. When filing is completed, the bearing wire will be practically triangular in cross section and it will sit level in the cup.
4. The bearing is next soldered into position with easy solder, care being taken to prevent its shifting position.
5. The half-sphere setting is now incorporated into the piece of jewelry.
6. If necessary, the outer rim of the bezel may be filed at an angle down and away from the center of the stone in order to make the edge thinner for burnishing. This step would be unnecessary for a hammered setting. Complete the setting of the stone as in earlier dis-

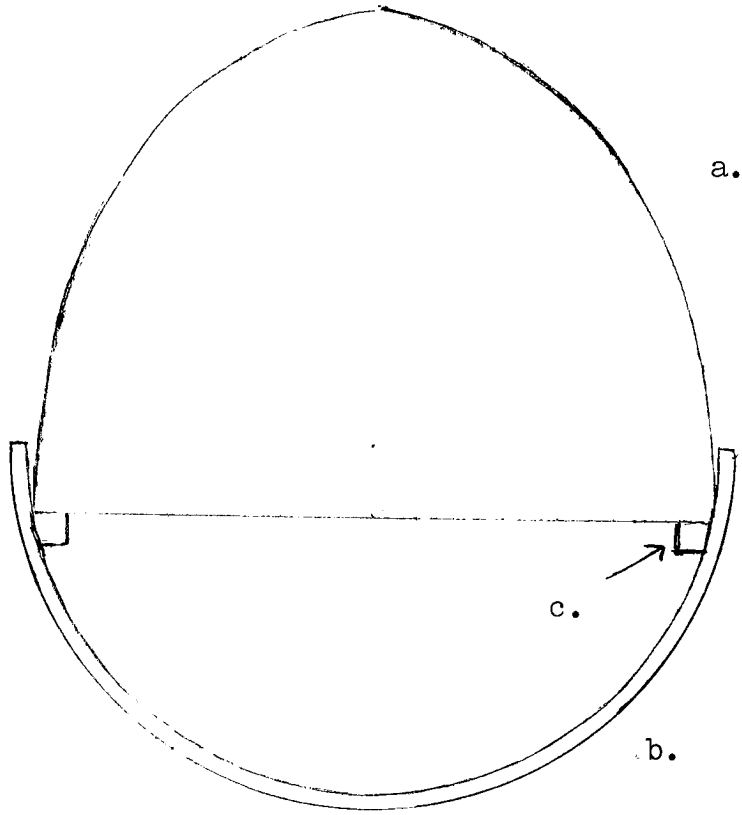


Fig. 17: Half Sphere Bezel Setting

Cross section before setting stone

a. stone

b. dapped half sphere

c. bearing

cussion.

Octagon Bezel Setting: for Faceted or
Cabochon Octagon Stones

This setting is a modification of the round bezel setting, except that the bezel and the bearing are made slightly smaller than the stone and then shaped on an octagon bezel mandrel. During the shaping, they are stretched sufficiently to fit the stone properly.

1. Use a metal strip of 20 gauge to make a soldered bezel slightly smaller than the circumference of the stone. The bezel is worked over an octagon bezel mandrel until it fits the stone perfectly.

2. In a similar fashion, a bearing of 18 gauge soldered to fit the bezel before stretching is now also stretched over the octagon bezel mandrel, until it fits snugly inside the shaped bezel.

3. Solder the bearing inside the bezel.

4. Refine the setting as needed and set the stone by the standard burnishing or hammering methods already discussed.

Pear Shaped Bezel Setting: for Faceted or
Cabochon Pear or Teardrop Shaped Stone

The pear bezel is another modification of the round bezel, and is constructed following the same directions. The bezel is shaped by jeweler's pliers which may have the jaws taped to avoid marking the metal. The site for soldering may be at the pointed end for narrow stones or on one side for wider stones. Setting the stone and completing the setting is the same as for the round bezel.

Simple Square or Rectangular BezelSetting: for Cabochons

The simple bezel described here is for square or rectangular cabochons only. A more complex procedure suitable for either cabochons or faceted stones follows.

1. Select a piece of 18 gauge sheet as large as the stone plus a margin the thickness of the bezel. This sheet will serve as the bearing.
2. To make the bezel, two strips of 20 gauge metal are sawed, each slightly longer than one half the perimeter of the stone, measured from one corner around to the opposite corner. These strips should either have been sawed from annealed metal, or must now be annealed before proceeding further. File all four ends at right angles to the axis of the strip to make square ends.
3. Take one of the strips, lay it against one side of the stone and mark the exact length of the stone from one end of the strip, as precisely as possible. Using the edge of a square file, file a groove across the width of the metal strip at the marked length of the stone. If there is any question about the accuracy of the measurement, better too long than too short, as the excess can be filed away. The groove should be made at exactly right angles to the axis of the strip, and parallel to each end so all intersections are 90 degree angles, and should be filed almost ~~through the~~

metal. Stop filing when a raised line can be seen on the reverse side of the strip. Repeat the measuring and filing step just described, using the second metal strip. See Figure 18.

4. Each strip is now bent along the groove to make a right angle with the groove on the inside of the angle.

5. A single paillon of solder should be sufficient to reinforce the inside of each angle and hold it at 90 degrees.

6. If necessary, saw or file one end of one strip so that that side of the bezel exactly fits one side of the stone. Repeat the fitting of the other strip, making the adjustment to the side of the bezel which will lie parallel to the other side already adjusted. Thus, if the stone is rectangular, both of the short sides have been adjusted to the stone.

7. Lay the stone flat on the working space and assemble the two strips to frame it, letting the two unadjusted sides project out past the corners. With all four sides at point marked c on accompanying diagram. Remove the stone, realign the bezel pieces and solder at scribed joints, using medium solder.

8. Saw off protruding ends and refine bezel.

9. Solder bezel to 18 gauge sheet bearing. Excess metal both inside and outside the bezel may be left, removed, pierced or treated as desired according to

the planned design.

10. The problems of setting the stone are greatly increased if the sides of the bezel are any higher than necessary to hold the stone; so file or grind down the upper rim of the bezel to the lowest practical height.

11. Incorporate the setting into the piece of jewelry.

12. Using a 6/0 saw blade, cut open the corners of the bezel $\frac{2}{3}$ of the way down to the bearing plate.

13. Insert the stone in the setting and burnish the setting closed. The saw cuts should close during this process. The setting may be left burnished or polished.

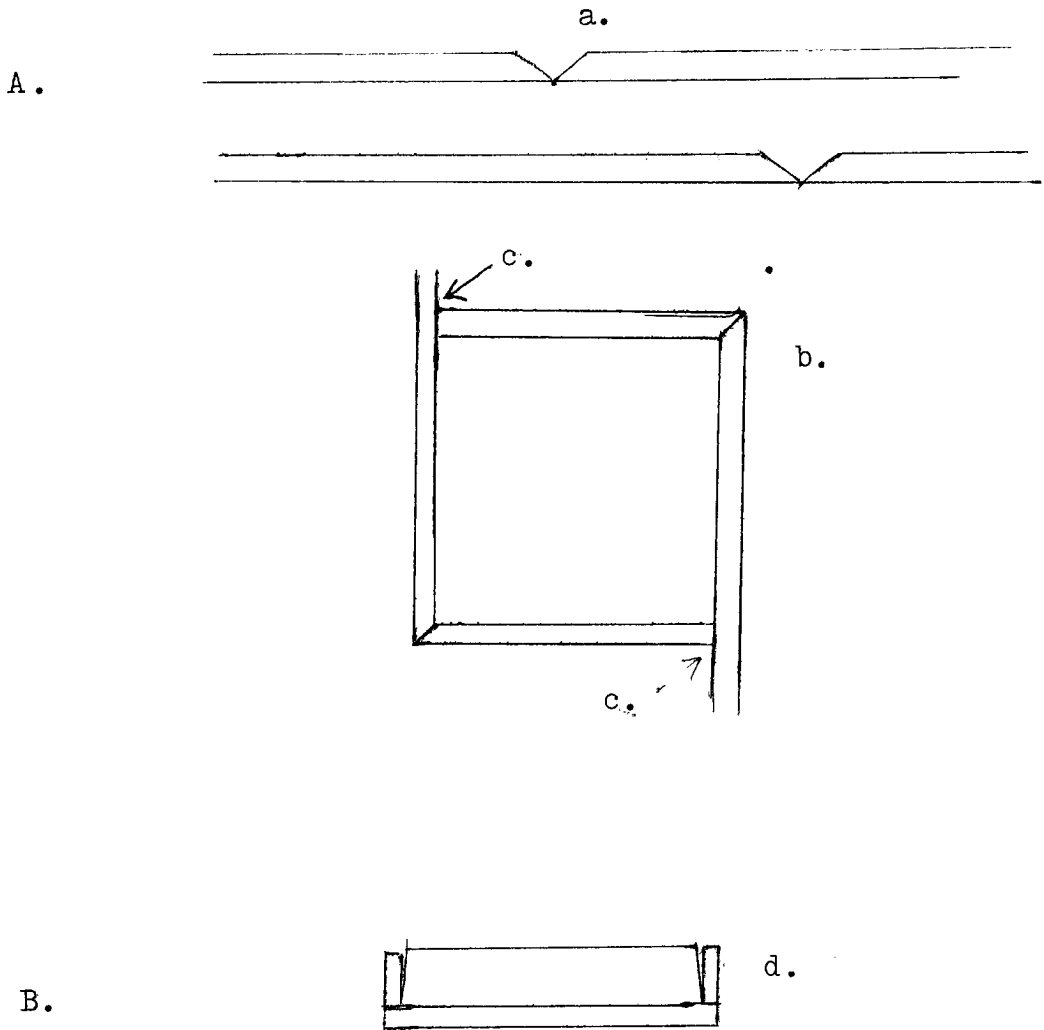


Fig. 18: Simple Square Bezel

- a. bezel with filed notch
- b. bezel being lined up for second soldering
- c. point where line is scribed
- d. cross section before setting stone

Square Bezel Setting with Bearing: for
Square or Rectangular Faceted or
Cabochon Stones

This bezel setting is more complex than the previous simple square bezel setting because the bearing is made like the bezel, only smaller to fit inside the bezel. In this style the bezel must be made high enough so that the culet of the stone is hidden from the side view. The bezel is made from 20 gauge metal and the bearing from slightly thicker metal.

1. Construct the bezel following steps 2-8 under directions for the simple square bezel previously given.
2. Make the bearing using 18 gauge metal strip and repeating the same procedure as in making the bezel, keeping in mind that the bearing must fit snugly inside the bezel when completed.
3. Chamfer the bearing to keep the solder from forming a curved fillet.
4. If the stone to be used is faceted, the inside edge of the bearing also must be chamfered to make a seat for the stone.
5. If necessary, grind or file down the upper rim of the bezel so that the bezel will be only as high as necessary to secure the stone.
6. The bearing and the bezel are soldered together with easy solder, with care to keep the tops level.
7. The setting may now be incorporated into the piece of jewelry.
8. Using a 6/0 saw blade, cut open the corners of the

bezel almost down to the bearing.

9. Insert the stone in the setting and burnish the setting closed, closing the saw cuts in the process. Leave bezel burnished or finish by polished.

Triangular Bezel Setting: For Faceted or
Cabochon Triangular Stone

This setting is best constructed in one piece, making the bearing part of the bezel.

1. Start with a strip of metal that is the approximate width of the bezel planned, and longer than the perimeter of the stone. The gauge of this metal should be heavier if a hammered setting is planned, or lighter if a burnished setting is planned.
2. Solder a strip of 19 gauge metal narrower than the bezel strip to it, using medium solder and leaving enough of the bezel exposed to hold the stone in place when it is set. It is better to leave too much bezel exposed than not enough, because the excess can be filed off after the setting is constructed. Be sure the edges of the bezel and the bearing are parallel while soldering.
3. Measuring ~~in from~~ the end of the strip slightly more than the length of one side of the stone, scribe a line across the width of the bezel on the inside.
4. Using a triangular file, file a groove on this scribed line which must be perfectly perpendicular to the length of the bezel. Continue filing through the bearing and almost through the bezel, until a raised line can be seen on the reverse side of the strip.
5. Scribe another line the exact length of one side of the stone measured from the intersection of the inner edge of the bezel with the filed groove (point c

on Fig. 19).

6. Using the triangular file, file another groove on the inside of the setting and exactly perpendicular to its axis. This second groove should not be started on the scribed line measured in the last step, but at a point the thickness of the bezel past the scribed line. Again, file until a raised line is visible on the outside of the setting.
7. The section of the metal between the two grooves will make one side of the setting. In a similar way measure off an identical section on either side of the finished section. These two grooves will be close to the ends of the strip and should be filed all the way through the setting, thus forming one half a groove at each end, which will be joined together.
8. The strip is now formed into a triangle with the filed grooves on the inside of the setting.
9. All three corners are now soldered on the inside with easy solder. One paillon of solder for each corner should be sufficient.
10. Incorporate the setting into the piece of jewelry.
11. Insert the stone in the setting and finish setting by the hammering method, or saw open the corners of the setting and burnish the setting over the stone as in doing a square bezel.

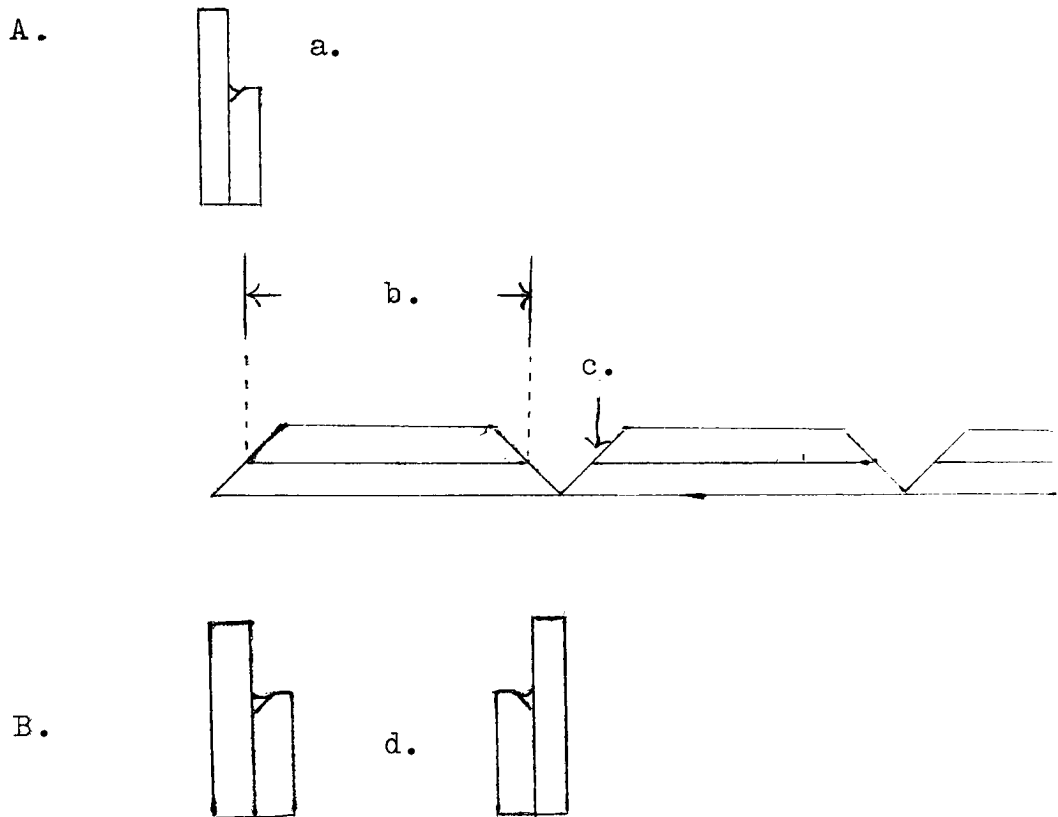


Fig. 19: Triangular Bezel Setting

a. end view of bezel

b. length of one side of the stone to be set

c. intersection of bezel and groove

d. cross section

Reverse Bezel Setting: for Any Shape of Cabochon

This setting can only be used when the back of the setting is accessible, and is especially suitable for stones on a large flat surface.

1. Select a sheet of metal 16 gauge or heavier for the bezel. A hole is sawed in this piece which is the shape of the base of the stone but smaller.
2. The hole is filed on an angle from the side which will be the back toward the center of the hole. The angle is determined by the angle of the sides of the cabochon at its base, since the stone must fit into the opening from the back and be flush with the back surface, as well as fitting snugly against the sides of the opening on the front surface. See Figure 20.
3. When the mounting is finished so that the stone fits it well, tabs of metal are soldered to the back of the mounting. These should be of 22 gauge so they can be easily worked, and three are sufficient to hold the stone in the setting, but more may be used to make the back of the setting decorative if this is appropriate to the design. For the average stone each tab should be 2 or 3 mm. in width, and they are spaced to project far enough toward the center setting so that they will hold and support the stone. Using medium solder, attach the tabs flat against the back of the plate. (For a variation see section on Rivets).
4. The setting may now be incorporated into the piece for which it was designed.

5. To set the stone, carefully bend the tabs back using parallel jaw pliers. Bend them only enough to allow the stone to be slipped into the setting from the back. Once the stone is set straight, the tabs are burnished back into place against the back of the stone.

6. A variation in setting the stone is to put a bearing which just fits the bottom of the stone behind or below the stone before burnishing the tabs closed.

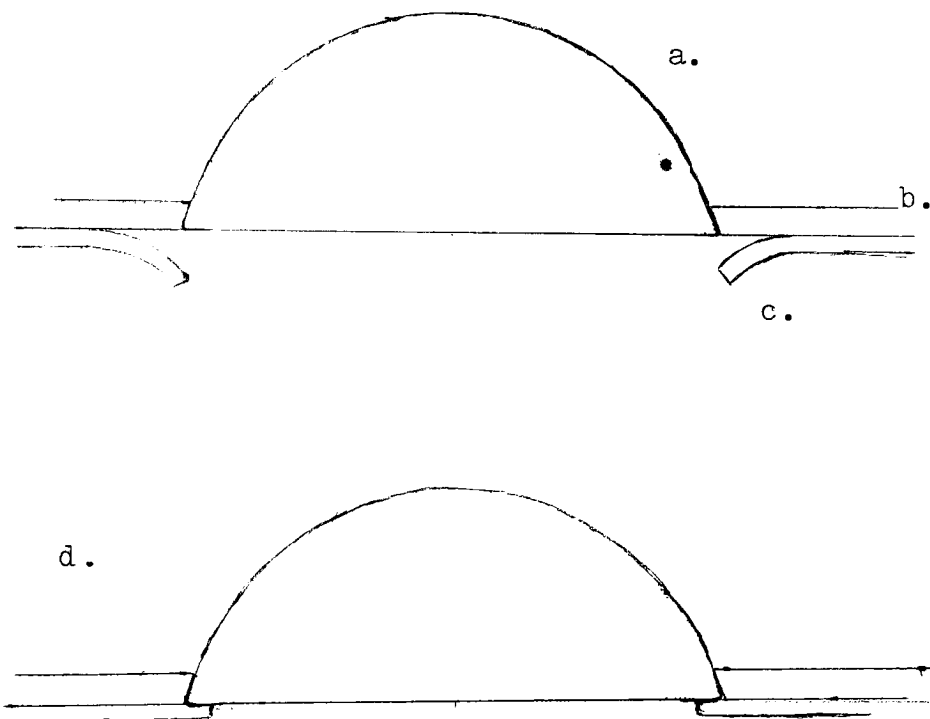


Fig. 20: Reverse Bezel Setting

Cross section

a. stone

b. setting

c. prong

d. stone after being set

Summary

There are sixteen bezel settings described in this section. Their explanations have been kept as simple and direct as possible, and no implication is intended that these are absolute answers to bezel setting problems. Each of these settings may be varied both in construction and design, and the craftsman should feel free to modify according to his own work habits. Although the designs have been kept very simple to avoid confusion in following the directions, it is assumed that the craftsman may wish to elaborate on the basic structure employing techniques of inlay, woodgraining, marriage of metals and other means to enhance the design or express his individuality. Since more elaborate techniques naturally increase the difficulties, it is suggested that the basic methods described here be mastered before adding new technical problems to the task.

FABRICATED PRONG SETTINGS

Round Fabricated Prong Settings: for Cabochons, Round, Oval, or Pear Shapes

This setting is sturdy and easy to construct, but does not offer much protection to the stone against the setting itself.

1. Using 18 gauge square wire, make a bearing the exact size of the base of the stone, making sure the stone does not project past the edge of the bearing at any point.
2. The ends of the square wire bearing should butt against each other tightly, and the joint soldered with hard solder.
3. A coiled asbestos soldering pad or a charcoal block is needed for the next step of construction. Saw four lengths of 18 gauge square wire, each about 2 1/2 times the length of the prongs desired.
4. With the bearing centered on the pad or block, space the prongs as desired around the outside of the bearing, pushing the end of each prong down into the pad or block so it stands vertically and tight against the bearing.
5. With each prong squarely in contact with the bearing use medium or easy solder to fasten them to the bearing.

6. Remove the setting from the block and saw off the extra length that was imbedded. Emory the bottom of each prong and its joint to finish the bottom of the setting.
7. The top of the prongs should now be cut to the same length, as desired.
8. The outer side of the tip of each prong is tapered as shown in part d of the accompanying diagram, so that the part to be burnished over the stone will be thinner.
9. The setting is now ready for use in a piece of jewelry and may be incorporated.
10. When all else is completed, insert the stone in the setting, and push the prongs over the stone with approved burnishing technique.

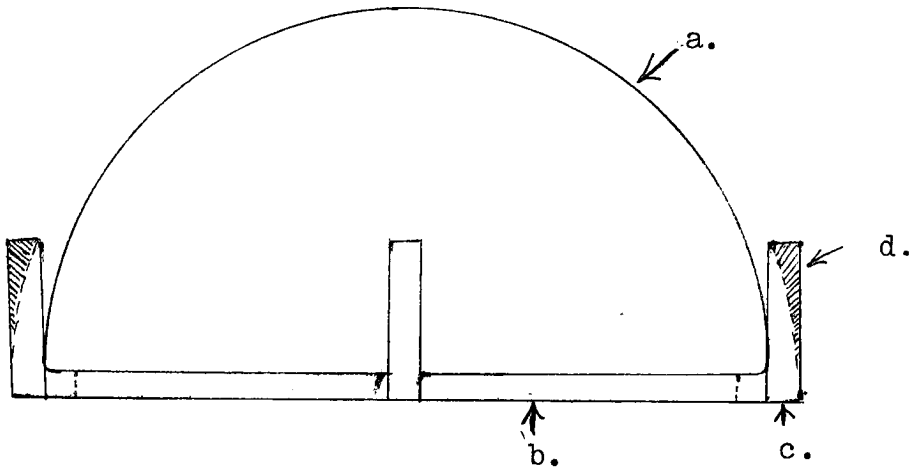


Fig. 21: Fabricated Prong Setting for Round Stones

Side View

a. stone

b. bearing

c. prong

d. section removed when tapering the prong

Square Fabricated Prong Settings: for Square,
Rectangular, Triangular Shapes,
Adaptable to Other Shapes

Stones with corners used in this type of setting should be supported by a prong on each side of any corner.

1. The bearing should be made out of annealed 18 gauge wire cut long enough to easily encompass the perimeter of the stone.
2. Scribe a line straight across one side of the wire very near one end of it. From this line measure in exactly the length of one side of the stone and scribe a second line. Repeat this procedure until each side of the stone has been marked on the wire, working in successive order around the stone if it has sides of different lengths.
3. Using one corner of a triangular file, file a groove at each scribed line deep enough so that a raised line is detectible on the reverse side. Grooves at each end are filed all the way through to make angular ends.
4. The wire is now shaped into a bearing the shape of the stone, being careful not to break it at any of the corners. The filed grooves are now on the inside of the bearing.
5. Use a paillon of solder to fasten each corner on the inside of the angle.
6. Cut two prongs of 18 gauge wire for each corner of

the stone of the length desired. Complete the setting the same way as for a round stone, following steps 3-10 under that description.

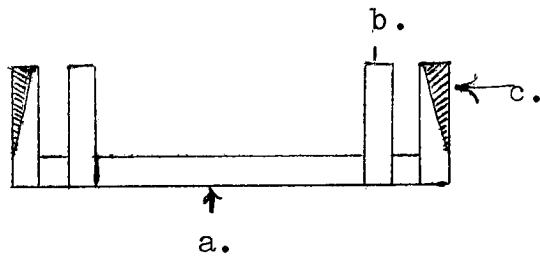
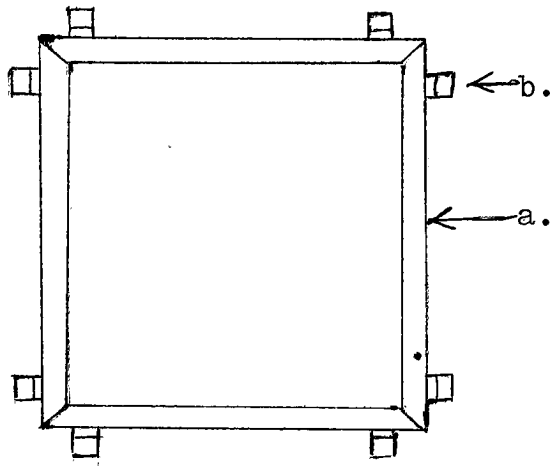


Fig. 22: Prong Setting for Square or Angular Stones

a. bearing

b. prong

c. side view--section that is removed when tapering
the prong

Cone Prong Setting: for Round Faceted
or Cabochon Stones

This setting is similar to the commercial crown setting.

1. A cone is fabricated out of 20 gauge sheet metal. This cone should be slightly smaller at its wider end than the diameter of the stone; that is, the stone will be too large to fit into it. The angle of the sides of the cone depend on height and visual effect desired, since a narrow cone will form a higher setting than a wide cone. See Fig. 23 for making a cone.
2. The cone should be soldered closed and refined before the prongs are soldered to it.
3. Depending upon the size of the stone, 18 gauge or heavier square wire is used to make the prongs, which are made long enough to extend from the point of the cone out past the wide end of the cone far enough to form a setting into which the stone will fit. See diagram of cone setting.
4. As in the previous two descriptions, a coiled asbestos pad or charcoal block is used to support the cone and prongs while soldering. Stand the cone on the block and space the prongs evenly around it, each prong touching the cone throughout its entire length, and one end firmly implanted in the block to hold it in position while soldering.
5. Using medium or easy solder, solder each prong in place.

6. Remove the setting from the block, saw off any excess of each prong projecting beyond the small end of the cone and emory smooth this end of the cone, the prongs, and their joints.
7. Insert the stone so it sits level in the prongs and scribe a line on the inside of each prong slightly below the point where the circumference of the stone touches the prong. The stone should rest just above these marks.
8. Set aside the stone and file a groove straight across each prong on the scribed line, using a triangular needle file. The filed groove should be about $1/3$ of the thickness of the prong.
9. When all grooves are completed, the stone should pop into the setting and rest securely, using only gentle pressure on the stone. If the grooves are too deep and the stone seems at all loose, remove the stone, squeeze the prongs slightly together and refit the stone.
10. When the stone is fitted properly, remove it from the setting. The excess of each prong above the filed groove is now sawed off, leaving enough on each one above the groove to finish the setting. The saw cut must be angled and parallel to the top of the groove. Refer to diagram of cone setting, part d.
11. Metal forming the upper side of the filed notch should now be filed away to the top of the prong, as illustrated in part e of the accompanying diagram of

a cone setting, to allow for pushing the prong over the stone.

12. The setting is now ready to be incorporated into the piece of jewelry.

13. After the stone is securely seated in the notches without undue strain on the stone, a chasing tool can be used to start the prong over, and a burnisher to finish tightening the prongs.

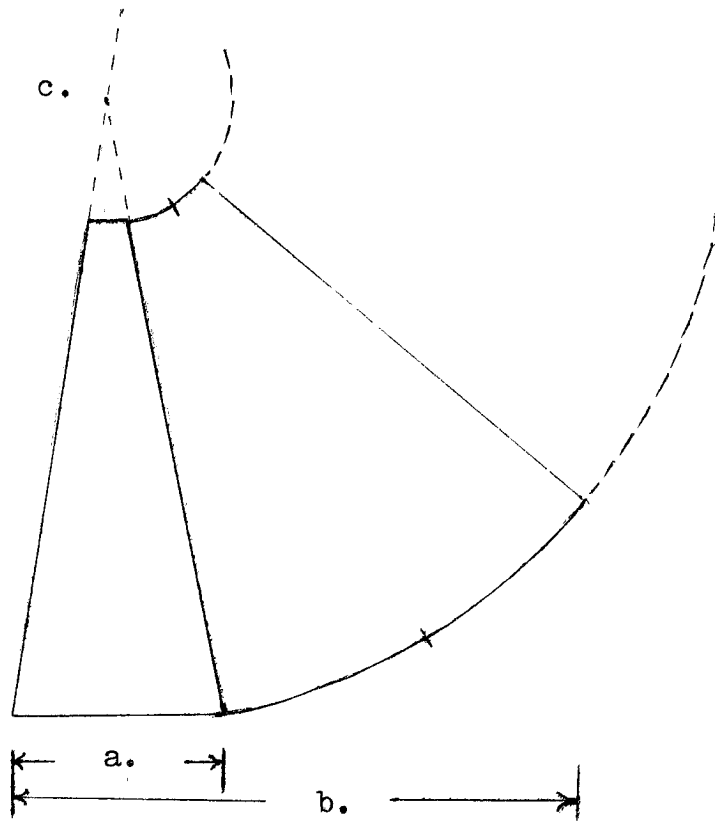


Fig. 23: Pattern for Cone

- a. size of desired cone
- b. size of pattern
- c. center of cone

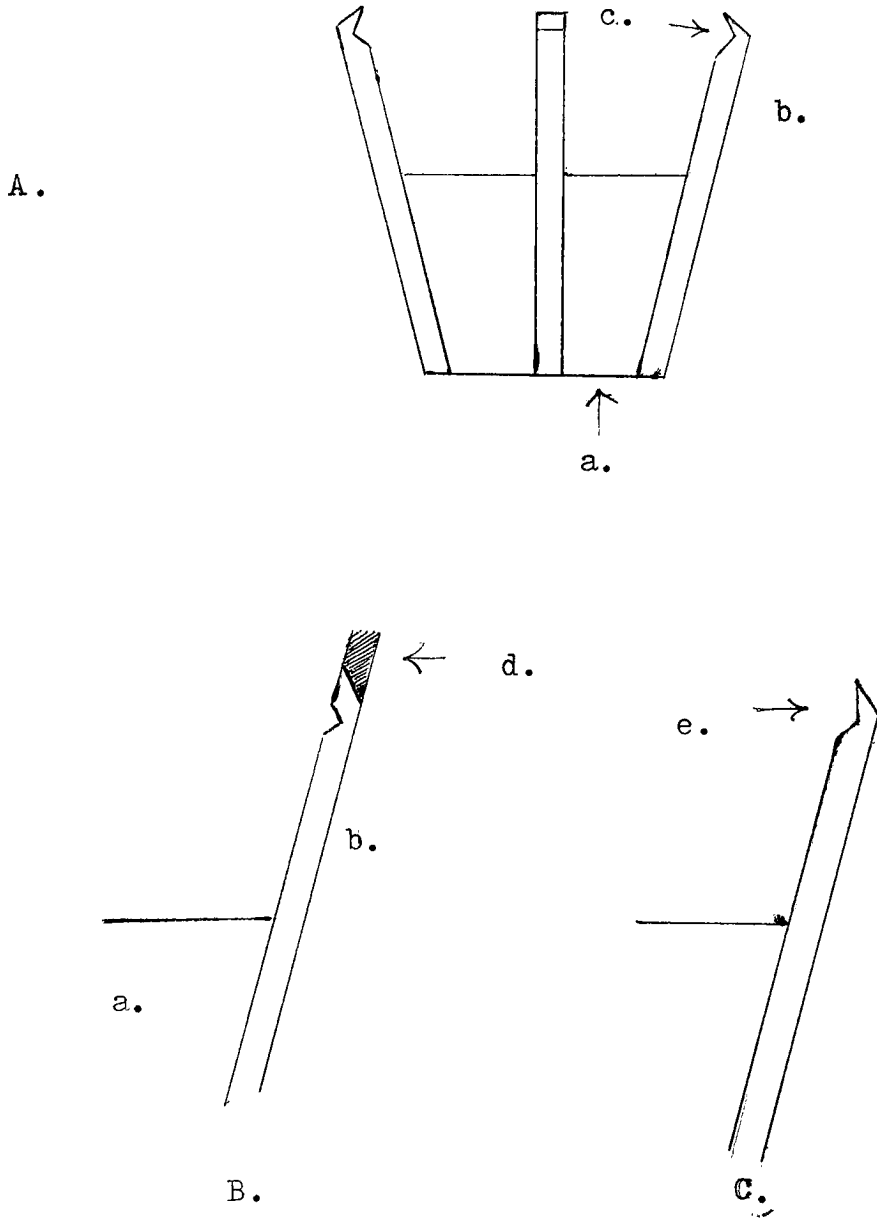


Fig. 24: Cone Prong Setting

A. side view

a. cone

b. prong

c. bearing

B.--d. angle at which excess is removed

C.--e. final shape of prong

Two-Prong Setting with Bearing: for Round or
Oval Faceted Stones, Adaptable
to Other Shapes

Only two prongs are needed to hold the stone in place, and the bearing keeps the stone from moving.

This setting is not recommended for rings because of the wear to which they are subjected.

1. A bearing is made to support the stone, from 14-16 gauge sheet metal, using heavier metal for a larger stone. The piece of sheet metal should be large enough to permit handling while sawing it to the size of the stone. At the point which marks the center of the projected setting, a hole is drilled or pierced. The diameter of the hole should be the diameter of the stone minus twice the thickness of the sheet metal.

2. If the stone is round, using a stone setting burr the exact size of the stone girdle, cut open the drilled hole until the girdle of the stone will sit flush with the surface.

3. Saw around the outside of the opening, staying as close as possible to the edge of the burred portion without cutting into it. This should result in production of a metal ring which is triangular in cross section, whose outside diameter is the same as the stone, and whose inside border is slightly smaller and angled to fit the sides of the stone supporting the girdle.

4. File and refine the outside edge of the bearing.

When the stone is placed in the bearing, no part of the metal should project outside the circumference of the stone.

5. Note: If the stone is any other shape than round, the inner border of the bearing cannot be formed by use of the stone setting burr, but will have to be filed at the proper angle by hand in a bearing fabricated out of square wire.

6. Use 14-16 gauge sheet metal to make the prongs and decorative part of the setting. The inside opening formed by the prongs must be exact so that the bearing will just fit within the opening supported by a shelf, and fit snugly against the parts that will become the prongs. Refer to the illustration of two prong setting.

7. The bearing is now soldered in place in the setting with medium solder and the setting is refined.

8. The setting is now ready to be incorporated into a piece of jewelry.

9. After all other operations are completed, the prongs are cut. Using a 6/0 saw blade, two prongs are cut by sawing straight down from the top of the bezel to a point just above the bearing. The thickness of the prong should be the same as the thickness of the metal. Refer to diagram of two-prong setting, part d.

10. Insert the stone in the setting and start the prongs over using a knife blade. Finish working the

prongs down with a burnisher. The prongs should not extend past the first row of facets. If the stone is still a little loose in the setting after the prongs are down, the bearing may be burnished up slightly to tighten it.

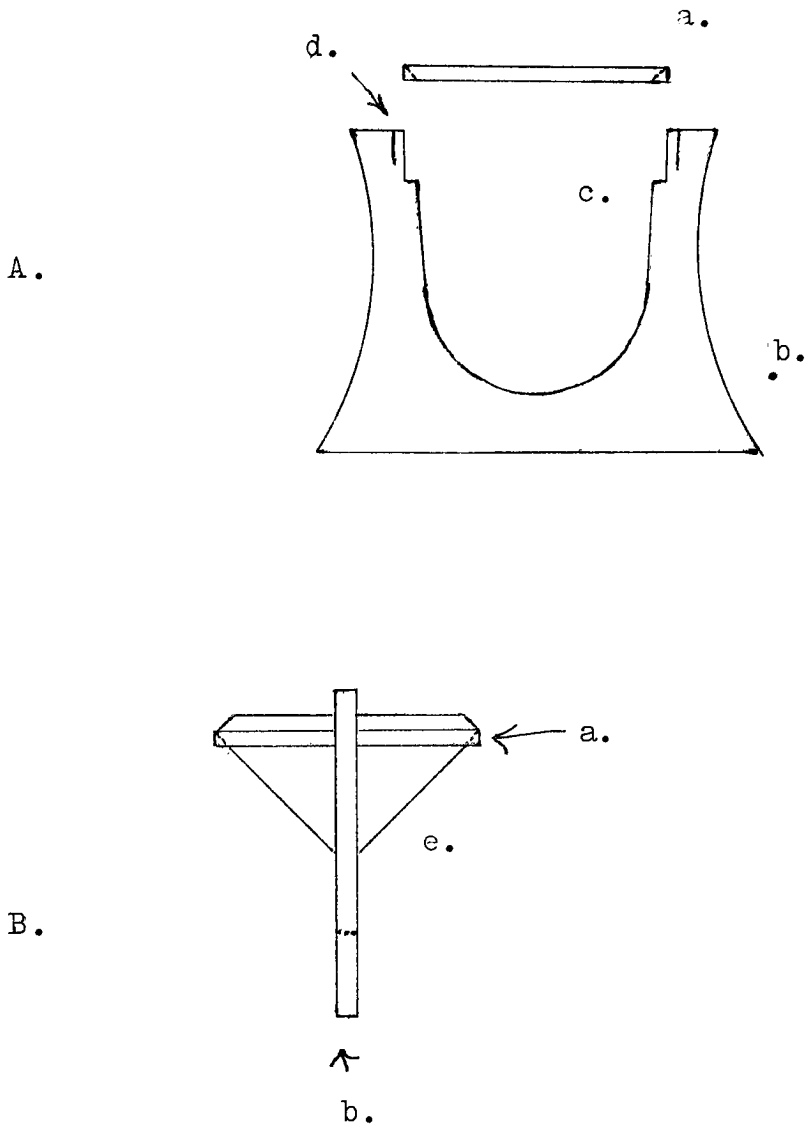


Fig. 25: Two-Prong Setting with Bearing

A. side view

B. end view

a. bearing

b. sheet prong

c. bearing seat

d. saw cut for prong

e. stone

Four-Prong Setting: for Round, Oval, Square or
Emerald Shapes, Adaptable to Other Shapes

This setting should be fabricated from heavy sheet metal, such as 12-16 gauge. This procedure is adaptable to a six, eight, ten-prong setting, or larger.

1. Cut a paper pattern the size and shape of the setting desired. The inside diameter of the opening of the setting must be the size of the stone minus twice the thickness of the sheet metal employed. See the accompanying diagram.
2. Cement together two sheets of metal the same gauge. These pieces should be large enough to allow for handling while sawing out the setting. Cement the paper pattern to the center of the double thickness of sheet metal.
3. Before separating the two sheets, file the edges of the prongs and refine the setting. Using a rectangular needle file, at this time start the seat for the stone. Using a triangular file, continue filing the seat for the stone. See illustration of four-prong setting. The opening between the prongs must be just large enough for the stone to fit between the prongs.
5. Separate the two sheets of metal and on each piece scribe a line which divides the setting into mirror halves.
6. On one of the pieces saw a rectangular notch the

same width as the gauge of the metal along the scribed line starting at the bottom of the setting and sawing $1/2$ the way up through the base of the setting, as in d of the illustration.

7. On the other piece, saw a similar rectangular notch along the scribed line, this time starting at the inside or top of the setting and sawing down $1/2$ way to the bottom, as illustrated at e in the diagram.

8. The two pieces should now fit together forming a symmetrical four-prong setting with the bases in line.

9. Prongs should be polished and then the two pieces soldered together squarely with medium solder.

10. The setting is now ready to be incorporated into the piece of jewelry.

11. When the piece of jewelry is otherwise completed, the prongs are cut using a 6/0 saw blade. Make a saw cut parallel to the opening to form a prong slightly thinner than the thickness of the metal. This procedure is repeated on the other three prongs.

12. Place the stone in the setting and start the prongs toward the stone with a knife blade, working on opposite prongs alternately. Once started, the setting can be completed by use of a chasing tool or burnisher.

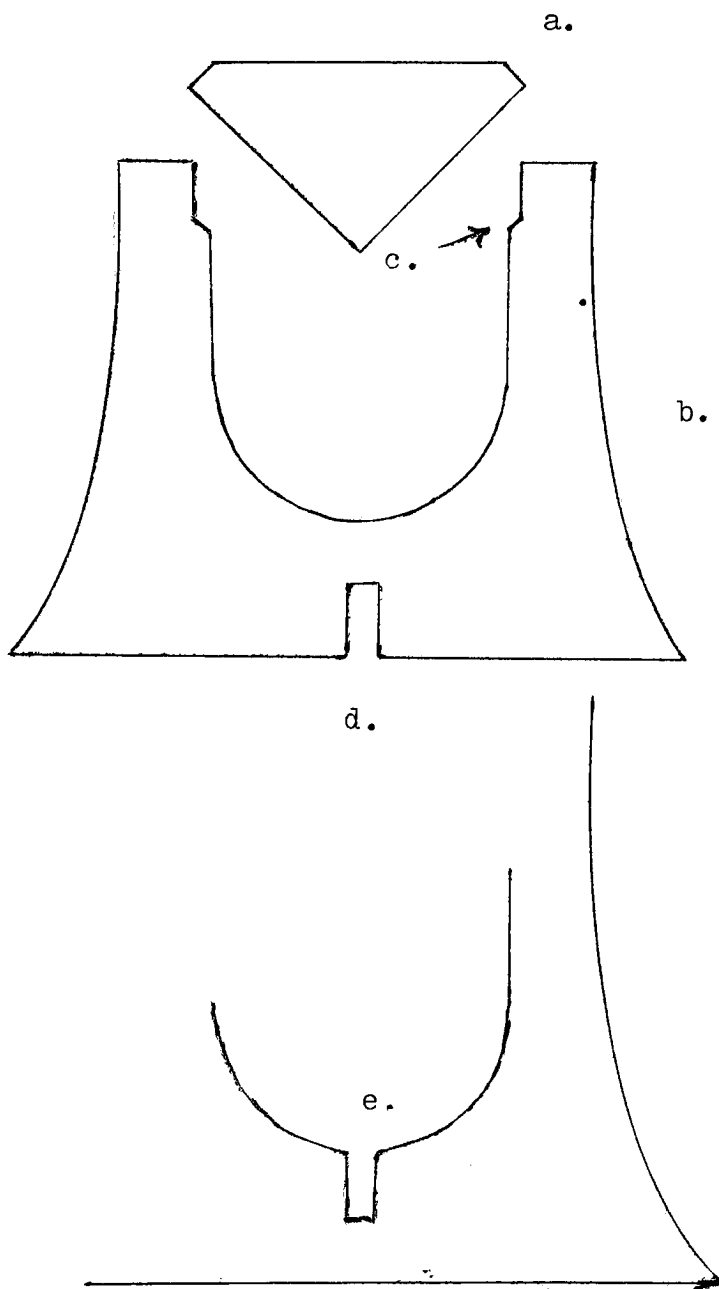


Fig. 26: Fabricated Four-Prong Setting

Side view before assembling

a. stone

c. bearing

b. prong d. & e. notch for assembling

Fabricated Tension Setting: for Square or
 Rectangular Stones, Adaptable to
 Other Shapes.

This setting is adaptable to almost any type of jewelry. The basic principle is that the stone is held between two sheets of metal which form the setting, and the stone is kept in place by pressure and notches or grooves in the metal setting. Spheres etc. can be set by utilizing pierced holes instead of filed grooves.

1. Select 16 gauge or heavier sheet metal to cut two matching pieces of metal for the sides of the setting. They must be wide enough so that when stood up on edge they will allow for the depth of the stone plus the depth of the connecting spacer bar between them, without the bottom of the stone touching the metal spacer bar. See accompanying diagram.

2. A spacer bar $\frac{1}{3}$ narrower than the width of the stone is soldered between the two sheets forming the setting.

3. Allowing sufficient space for the bottom of the stone to clear the spacer bar, a groove is filed horizontally along the inside of each side of the setting deep enough to support the edge of the stone. Care must be taken that the two grooves are exactly opposite and parallel to each other. The grooves must be the length of the opposite sides of the stone. Refine the setting.

4. The setting is now ready to be incorporated into

the piece for which it was designed.

5. After completion of all other steps, the stone can be set. It should fit into the grooves with slight pressure. If the setting is too tight to accept the stone, the sides of the setting can be worked open slightly with a burnisher. Epoxy can be used as a reinforcing agent along the groove.

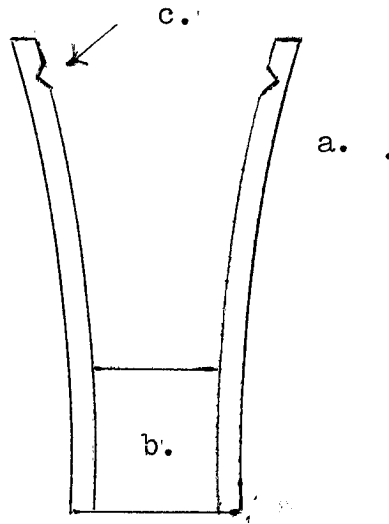


Fig. 27: Fabricated Tension Setting

End view

a. sheet prong

b. spacer

c. filed bearing

MECHANICAL SETTINGS

Rivets, screws and decorative nuts and bolts are used in conjunction with stone settings when soldering is contraindicated. In some cases they can be used to hold the stone directly. The two following settings utilize rivets, but screws or decorative nuts and bolts would do as well, depending upon the effect desired. Many of the fabricated settings in the previous discussion can be assembled in this manner.

Reverse Bezel Setting with Rivets: Adaptable to

Any Shape of Cabochon with Flat Back

1. The setting is constructed of sheet metal 16 gauge or heavier. An opening the shape of the base of the stone but smaller than the base of the stone is sawed in the plate.
2. File the margins of the opening at an angle from the back of the plate toward the center of the setting. The angle of the file cut is determined by the angle of the sides of the cabochon near its base. The cabochon must be able to fit into the opening from the back of the plate so that the base of the stone is flush with the back of the metal plate, and the sides of the stone are in good contact with the margins of the opening all around.
3. Cement a plate of 18-20 gauge metal to the back of the setting just made. This will temporarily

keep the two sheets lined up without slipping when the rivet holes are being drilled.

4. Drill holes for the rivets all the way through both sheets. The holes may be countersunk if desired, using a cone burr.

5. Separate the two sheets of metal. The piece with the stone opening is now ready to be incorporated into the piece of jewelry, baring in mind that the stone must be able to be inserted from the back of the setting, and the rivet holes must also be accessible.

6. Rivets are made of round wire the size of the drilled holes, slightly longer than the thickness of both plates together, and beaded at one end. In cutting the lengths of wire, they should be sawed, not snapped, to avoid distortion.

7. Insert the stone in the setting and line up the front and back plates. Rivets may now be inserted through both plates. The beaded end must be supported so the sawed end can be worked down with a rivet hammer or chasing tool. Each rivet must be so tightened.

Note: Rivets can be made from tubing instead of wire. These are worked down with dapping tools, one supporting the back while one is used to work down the rivet.

Tubular Riveted Settings: for Durable Stone
Slabs, Adaptable to Holloware

1. Holes are drilled through a slab of stone, using a diamond drill or a diamond core drill for large rivets, or a carborundum drill. Water-soluble oil is used as a coolant during drilling.
2. The tubing used for the rivets should be the same diameter as the holes.
3. Lay the pierced stone slab over the piece of metal plate to which it is to be riveted, and mark the metal through the holes, being sure the slab doesn't shift during the process.
4. Saw some short lengths of tubing, long enough to extend through the slab, and file perfectly square ends on them. Solder each one perpendicular to the metal plate at a marked spot, being sure each one is perfectly vertical to the plate and will fit through the hole without strain or bending. Use hard or medium solder. If the slab does not fit perfectly on these posts, the stone will crack during setting.
5. The top end of each rivet is filed if necessary to be smooth and square, and to be just slightly protruding from the face of the slab, when it is pressed down.
6. When the stone is otherwise completed, the stone can be set. The metal plate must be firmly supported as any distortion of the back plate may cause the slab to crack.

7. Put the stone in place and start to flare the tubing rivets, using a dapping punch that is larger than the opening in the rivet. This will cause the tubing to flare outward. Work on opposite rivets alternately without completing one at a time, until the stone is tightly held in place. As soon as the stone is secured stop any further working on the rivets, as unnecessary additional stress may cause the slab to crack.

CHEMICAL FUSION SETTINGS

Epoxy is the best method of setting by chemical fusion which is afforded by today's technology. Epoxy is nearly always used with pearl settings as a major factor, but in other settings it should be secondary to the craftsmanship, if it is used at all.

CAST SETTINGS

Cast settings are suitable for cabochon or faceted stones and may be designed to be cast with the stone already in place, or the setting may be finished after casting and the stone set later, as indicated in the following examples. .

Simple Cast Setting: for Cabochon or Faceted Stones

This method can only be used for setting stones which will withstand high temperatures from the burnout. Stones recommended for this purpose are diamond, ruby, sapphire, synthetic corundums and spinal.

1. A wax model of the setting is carved and the stone is mounted in the carved model. Some type of prong setting is most suitable for this method so that the stone will not shift or come loose in the flask during burnout.
2. The flask is burned out using standard burnout procedures.
3. Cast the metal and allow the flask to cool completely before quenching. If the interior is still hot, the stone may crack during quenching.
4. The piece is now refined and finished through normal procedures.

Cast Channel Setting: for Square or Rectangular
Stones, Adaptable to Cabochons

This setting is carved or filed out of wax and then cast in metal. The mounting is started in the wax completed after casting. A channel setting is designed to hold the stone by pressure along the opposite sides of the stone and thus is similar to the fabricated tension channel setting already discussed.

1. In preparing the wax model, an opening is filed to make the cavity where the stone is to be set. This cavity must be deeper but narrower than the stone as it is to be oriented.
2. The wax model is then cast in metal and the casting refined.
3. Use a triangular file to start filing a groove the length of the setting close below the top of one side of the channel, which will support one side of the stone. File a matching groove on the opposite wall of the channel to support the other side of the stone. These grooves must be perfectly parallel to avoid strain on the stone.
4. The grooves should now be tapered slightly in depth so that both grooves are slightly deeper at the same end of the setting than they are at the other end. This will allow the stone to be slid in from the deeper end.
5. Always fitting from the same end of the setting, keep attempting to slide the stone in from the end with

the deeper grooves, and continue filing adjustments until the stone will slide all the way into the setting. Avoid unnecessary filing, as the stone is held by a pressure fit and should not slide out easily.

6. A tiny bit of epoxy can be used to insure the security of the stone, especially at the end where the grooves are deeper.

Cast Prong Setting: for Faceted or Cabochon
Stones, Adaptable to Any Cut Stone

This setting is perhaps the most versatile of all stone settings. It can be purely symmetrical or totally assymetrical, and will serve to hold any shape of stone. Therefore, instead of describing any particular setting, some fundamental important points to be kept in mind are outlined.

1. If the stone is transparent or translucent, the setting should be high enough to allow light underneath the stone and up through it.

2. Any metal beneath or behind a transparent stone should be highly polished to reflect light and enhance the brilliance of the stone or its luminous quality.

3. The support of a faceted stone in the setting should always be planned to be high enough so that the cutlet of the stone never touches the metal.

4. The bearing supporting the stone must be perfectly level and smooth so the stone will not rock in the setting or crack from uneven strain.

Gypsy Setting: for Round or Oval Cabochon or
Faceted Stones, Adaptable to Other Shapes

This setting can be used in fabricated and cast work, and is most applicable to rings. The following description is for cast work done in wax. The block of wax should be large enough to have the entire cast portion of the piece carved out in one piece. In the case of a ring, probably the whole ring will be cast in one piece including the setting.

1. A hole $\frac{2}{3}$ the size of the stone should be drilled into the wax where the center of the stone will be located, to allow light into the stone from the back, and to lighten the setting. Refer to b on the accompanying diagram, Fig. 28.
2. Using a stone setting burr the exact size of the stone redrill the previously drilled hole until the girdle of the stone sits below the surface of the wax as in c of the diagram.
3. The surface of the wax around the setting must be carefully filed away leaving a ridge around the setting as indicated at d of the diagram. This ridge will eventually be chased down to set the stone.
4. The wax is now sprued up, burnt out, and cast.
5. Refine the setting to its finished state.
6. To set the stone, support the setting or piece firmly, insert the stone in the setting, and carefully chase down the ridge that was formed by filing in step 3 above, until it is level with the surface.

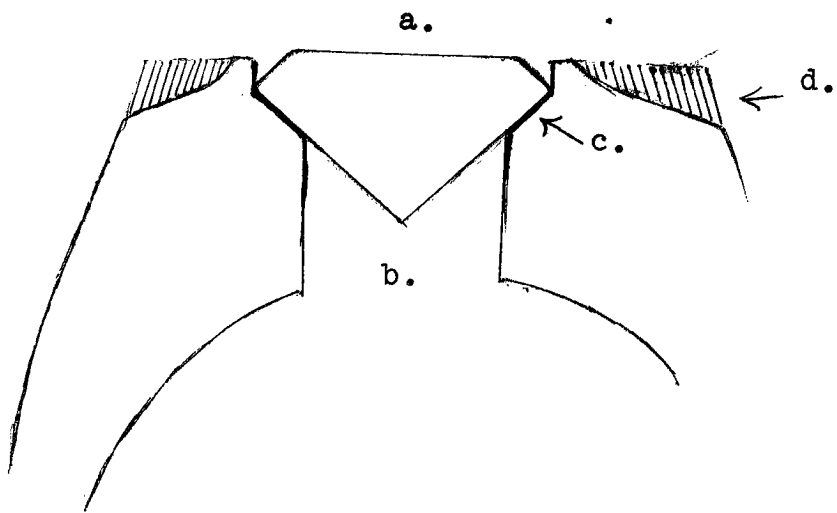


Fig. 28: Gypsy Setting

Cross section before setting

a. stone

b. drilled hole

c. bearing

d. section to be removed by filing

7. The area surrounding the stone may be filed smooth with a barrette file and then polished.

Soldered Collar Settings: for Cabochons or Faceted Round Stones, Adaptable to Other Shapes

This setting can be used only on stones which are capable of withstanding direct application of heat without damage, as torch will be used to set the stone. Recommended stones are: diamond, ruby, sapphire, and synthetic corundum or spinel. A soldered collar is a most secure setting and is adaptable to almost any kind of cast setting design.

1. Using triangular wire 18-20 gauge, make a wire ring the dimension of the stone. When slipped over the top of the stone, the metal should not project out past the base of the stone. This is the collar referred to.
2. The previously made cast setting and bearing should be polished before soldering the stone in place, especially if it is a prong setting.
3. Place the stone in its setting so that it sits evenly on the bearing, and place the collar of triangular wire over the stone. If a prong setting is used, the collar fits inside the prongs and firmly in contact with both the sides of the stone and the inside of each prong.
4. Make a concentrated solution of boric acid dissolved in alcohol. Support the setting so nothing moves and coat the entire setting, stone, and collar with the solution. Ignite the flammable mixture with the torch and let the flame die out, leaving a white powdery de-

posit.

5. Slowly start heating the stone and setting with a gentle flame which can be increased after the initial temperature change. Use a soldering pick during the heating process to prevent the stone and collar from shifting position due to the bubbling effect of the solution as it boils.
6. When the solution becomes transparent, stop heating it and allow the setting and stone to cool to room temperature.
7. Place a tiny paillon of easy solder where the collar touches each prong. Solder and allow to cool to room temperature to avoid cracking the stone, before pickling.
8. Saw away the excess parts of the collar, leaving only the parts where the collar touches the prongs. Refine the saw cuts if necessary, being careful of the stone edge.

INLAY SETTINGS

Inlay is used to fill in a groove, depression, or enclosed section. When finished, it should be flush with the surface unless it is surrounded by a metal ring to protect the edges of the inlay. The stone generally used for inlay work is turquoise because it is soft and can be easily crushed by hand, using a carborundum stone.

Terrazzo Inlay

1. The stone to be used for making the inlay should be wrapped in a clean smooth cloth and then ~~hammered~~ to break it into small chunks the appropriate size to fill the opening to be inlaid.
2. The crushed stone is mixed with epoxy and smoothed into the depression to be filled. Epoxy can be dyed by admixture with dry pigment so that it will ~~match~~ the turquoise or other stone being used.
3. After the epoxy and stone mixture has completely hardened, the inlay should be stoned down with a carborundum stone under water until the surface is flush with the surrounding metal. After stoning, the inlay surface will be dull. If desired, it can be polished with tin or cerium oxide on a soft buff.

Delrin Inlay

Delrin is a very durable synthetic material very suitable for inlay work. It is used as a sub-

stitute for ivory or ebony which it resembles, and can be filed and refined the same as metal in making or decorating handles, insulators and other such parts. It is especially suitable for making inlay for large areas of jewelry, where it should be inlaid into a depression or surrounded by a metal edge if raised above the metal surface.

1. The delrin is sawed and filed to a shape slightly larger than the area to be filled and slightly thicker than the depth of the recess.
2. The rest of the piece should be refined and polished to a tripoli finish before inlaying the delrin.
3. The piece must be strongly supported because force may be needed to press the delrin into the heated setting.
4. Using the torch, heat the area to be inlaid to about 400 degrees which is the melting temperature for delrin. When the metal is hot enough, set the shaped piece of delrin squarely over the recess and push it down into the depression. On contact with the metal, the edges of the delrin should soften and melt, allowing it to be forced in. The excess around the edges should be filed away and the piece finished as with any metal piece.

Note: If it is desired to inlay into the delrin, the metal which has been left roughly filed for good grip is heated above 400 degrees and pressed into the delrin.

CONCLUSION

The settings that have been described in this thesis are only a few of the most basic settings. These descriptions should, for the most part, function only as a guide when making the setting. The descriptions have also been oriented to the technical aspect rather than the aesthetic view point. The aesthetic quality of a stone setting should be determined by the student in relation to the stone being set and the piece of jewelry.

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