

Basic Silversmithing

a manual by Manuel

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[In Adobe Acrobat](#) [173 KB]



Shop Safety

1. Have fire extinguisher and first aid kit on hand at all times. It is usually a good idea to have a sink with running water accessible. An aloe plant is a good companion to "workers with fire" also.
2. Do not touch an item on your heating pad, fire brick, fire screen, etc. with your bare hands! (This is an excellent accident reduction idea.)
3. Keep long hair tied back!
4. Safety *glasses* (not goggles) are a fairly comfortable way to save your eyesight from damage.
5. Good ventilation is a must.
6. A well-lighted studio is imperative.
7. Before you incorporate any mechanism to assist you in your working, familiarize yourself with the proper use(s) and care and safety precautions relative to the device. If none come with the machinery, find someone who knows the PROPER operation and ASK and learn from them! NEVER be afraid to ask questions!!! It's your life.
8. Make sure your work space is adequate to your needs. Adapt furniture, tables, drawers, tool access, sawing level, fire area, etc., to YOUR comfort. (Some people need a warehouse, some people just a closet.)
9. I do not condone the use of gloves. Too many chances to get 'all thumbs' syndrome and that's DANGEROUS!
10. Keep a good attitude! If it doesn't want to work, let it rest. If you truly care about what you make, let it come of its own volition. Don't force it. You create an unsafe environment for yourself and others.
11. PRACTICE, PRACTICE, PRACTICE. SAFETY IS A HABIT. I could outline everything in detail, but you know yourself better than anyone. If you find these principles 'childish' or elementary, maybe you should consider a different craft or a different teacher. I have more than enough scars to show you how to learn through experience.



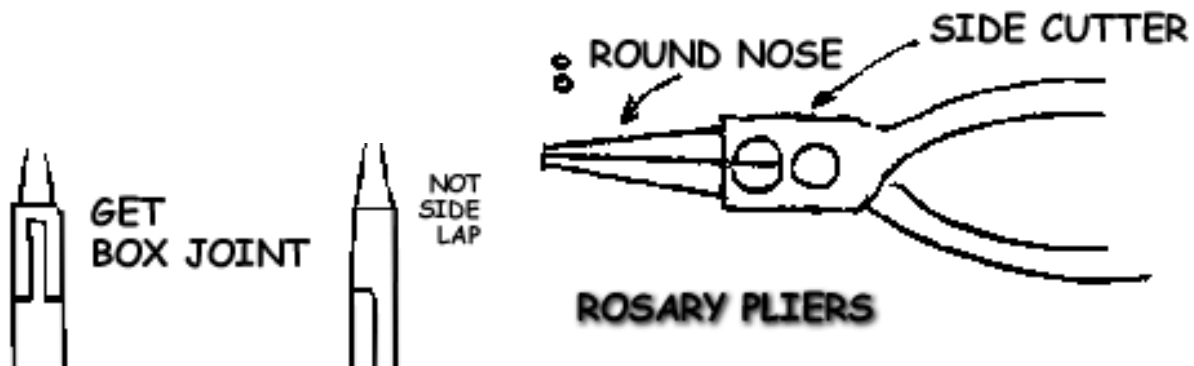
Tool List

1. Bench pin & clamp
2. Jeweler's saw frame and blades (2 dozen each 2-0, 4-0, 8-0)
3. Hobby-sizes reciprocal drill with 2-#68, 4-#76 bits
4. Bench block (anvil)
5. Small ball-peen hammer
6. Needle file set
7. Hand-held propane cannister and pencil-tip torch
8. Fire brick (or 2 thin 'half-bricks') or heating pad
9. 1 pair of long tong copper tweezers
10. Three grades of solder: easy braze, medium and hard, one-foot half-inch wide strip of each
11. Soldering pick or dental tool (even a wire coat hanger!)
12. Sodium bisulfate (pickling compound)
13. Borax (20-mule team pure borax)

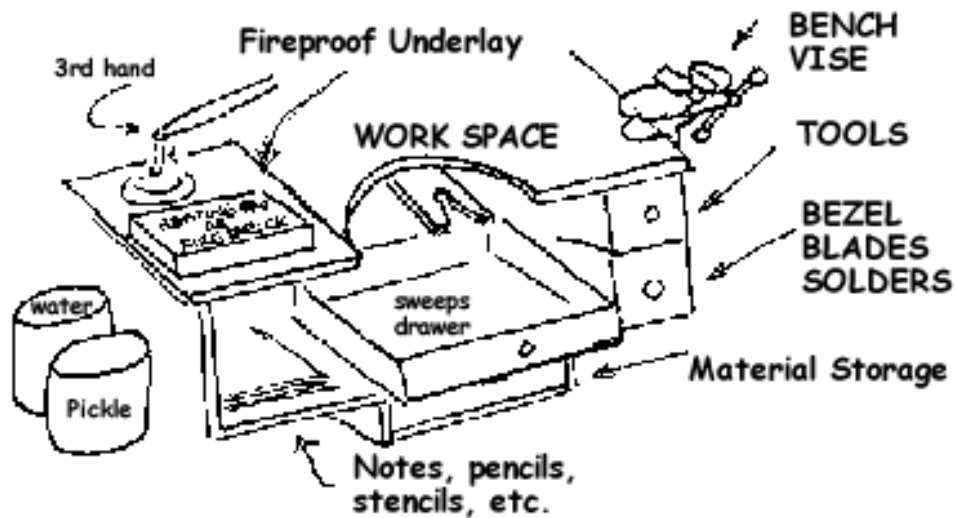
You will also want: 1 heatable container with cover for pickle (wide and deep); 1 water container (wide and deep); 1 small saucer for borax and a cheap watercolor brush, too; one pair of safety glasses, and 1 apron.

WEAR your 'HOLY' clothes!

PLIERS: (Not included on original list because of the cost). When you do buy jeweler's, be sure to get a box joint, not a side lap. I find 'rosary pliers' the most practical for the money. They run about \$28 a pair.



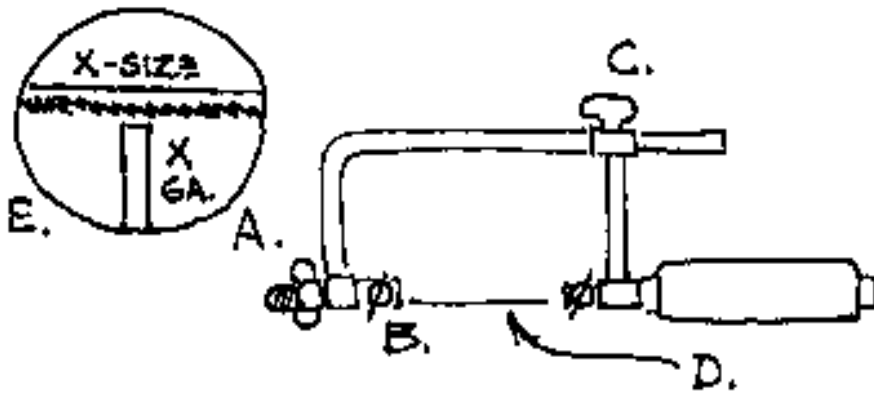
Example of a compact work area



Lighting should be full, but not glaring. Direct sunlight can prove very unpleasant when working with a reflective metal!

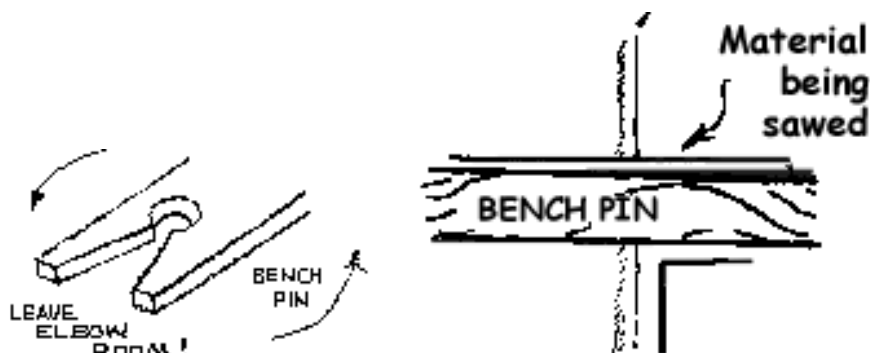


Sawing



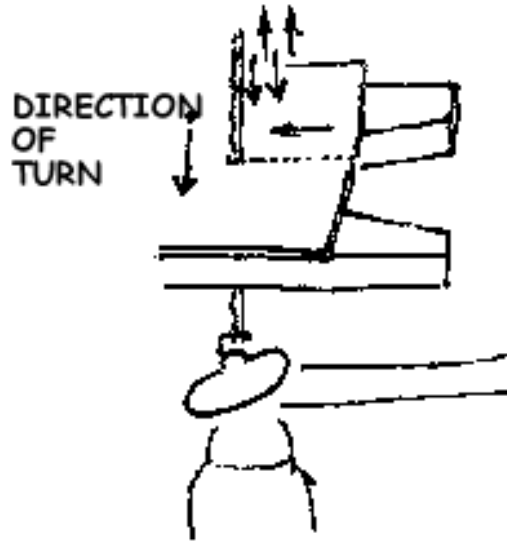
A. tensioner knob (not present on all frames)
B. saw blade grippers
C. gross length adjustment
D. blade
E. points of teeth face handle (saw cuts on downstroke only). Also blade size is generally determined by material thickness or gauge.

Jeweler's saw frame with blade 'strung'



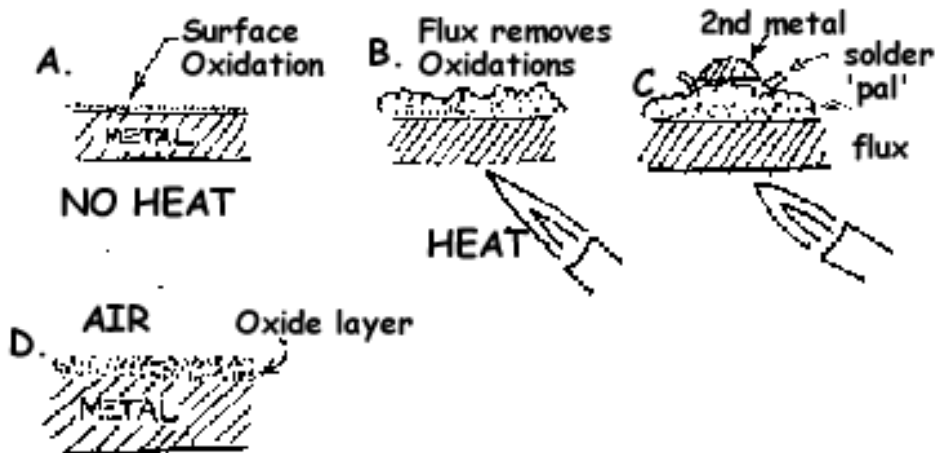
MAIN IDEA: Relax, let the saw cut. If you force it, you spend more time replacing blades than sawing!

HINT: When making a sharp turn while sawing, 'jog' in place at the point of the angle to make space for the turn.



Metal Properties

All metals interact with the oxygen in the atmosphere in some way. This process is known as oxidation (A). This surface coating must be removed (B) for a proper bonding (C) of two given metals to be joined by solder.



Some properties of silver and copper:

1. **Fine silver** is laboratory gradable at .999 parts in 1,000. The remaining .001 part is considered inseparable elements.
2. **Sterling silver** is an alloy of .925 part silver with .070 parts copper and .005 parts tin and antimony. (The copper is why sterling always needs to be polished!)
3. **Copper**. Industrial grade is about 60% copper and 39% tin and other hardening alloys along

with 1% inseparable elements.

Melting points

SOLDERS:

- Soft (easy) braze melts at 1325° F.
- Medium braze melts at 1390° F.
- Hard braze melts at 1423° F.

METALS:

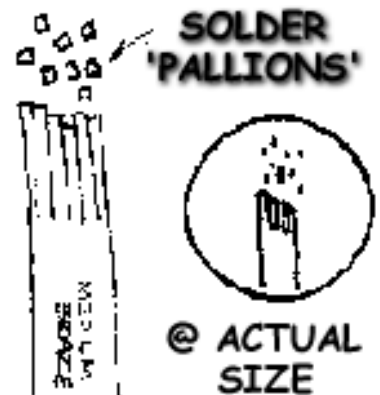
- .999 Silver melts at 1762° F.
- Sterling melts at 1640° F.
- Copper melts at 1989° F.

Note: BORAX is the simplest flux.



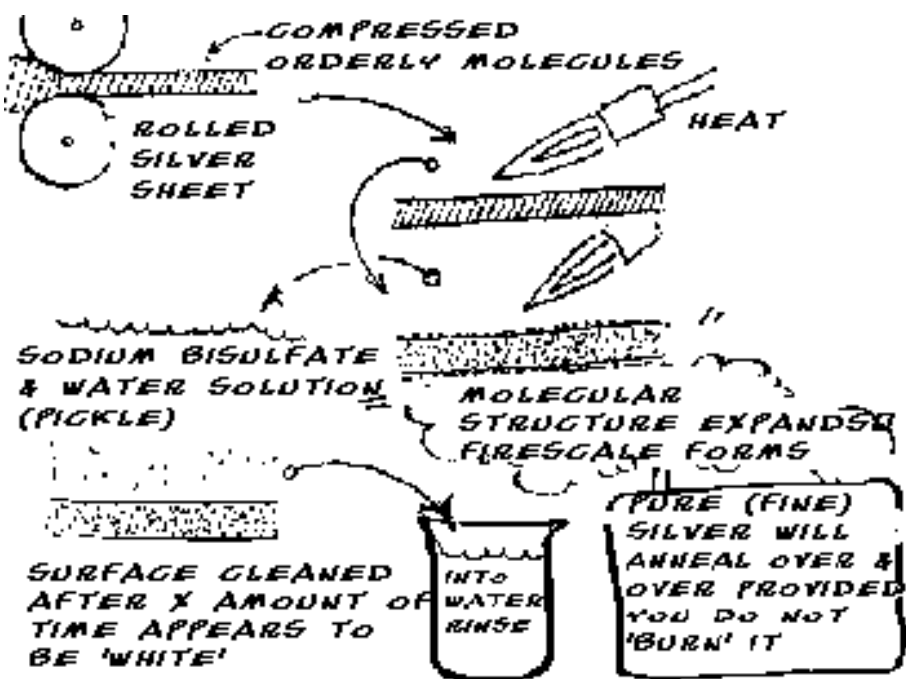
Soldering

1. Clean surfaces physically (by sanding or brushing).
2. Assemble pieces (on work surface).
3. Apply flux.
4. Use solder pick to place pallions on work.
5. Heat to solder flow (for multiple heats the General Rule is to use hard first, medium second, and soft third. I don't always follow this rule.)
6. With **COPPER TONGS**, put piece in '**PICKLE**'. The purpose of the sodium bisulfate solution is to remove 'borax glass' or fire scale left on metal during the heating process. Leave in the pickle until the surface appears white and free of fire scale. Note: Pickle should be kept warm, but **NOT HOT**. Sodium bisulfate is **CAUSTIC**, just like battery acid. It is an electrolyte. Never put **IRON** into pickle. This will impart a copper tone to sterling silver. **WEAR EYE PROTECTION**, an **APRON**, and **NEVER** use your hands to put in or remove an item from pickle!!! **USE THE TONGS!** Wearing your favorite shirts and pants already ridden with holes is a good idea. Do not splash pickle around!
7. Rinse item in a bowl of water or under running water.



Annealing

Metal frequently becomes brittle and hard under constant working, bending, etc. It must be annealed, or softened.



Note: Sterling silver is an alloy that will handle a maximum of about 5 annealing processes, after which the metal loses tin and antimony and becomes easily burned and brittle and cracks. I love copper! You can anneal it to your heart's content!



Hammer-Work (Forging)

Small Pall-peen hammer polished and rounded will serve well as a planishing and forming hammer.

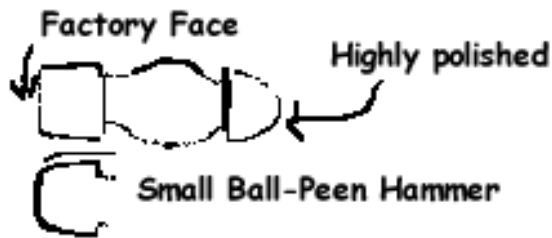
An inexpensive planishing hammer can be made from a garage-sale/hardware store find.

Typical hammer faces (expensive):

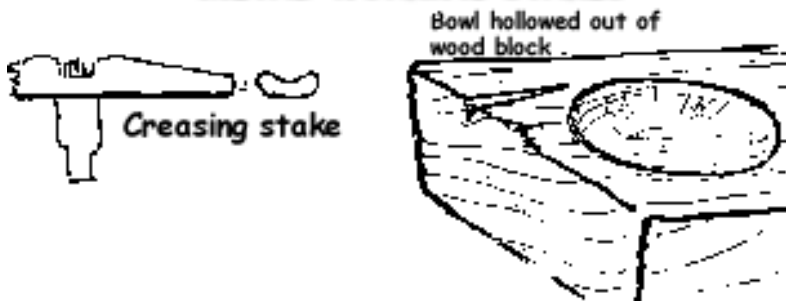
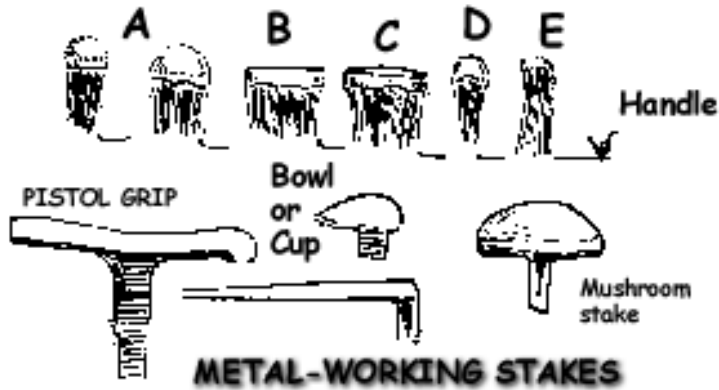
- A. Forming
- B. Flat
- C. Planishing
- D. Rim or Collet
- E. Raising

Metal Working Stakes (expensive)

- Pistol Grip
- Bowl or Cup
- Candle or Horn (also known as



TYPICAL HAMMER FACES



'spout stake'

-- Mushroom

-- Creasing stake (Very expensive), but creaser can also be made of wood (inexpensive).

-- Bowl hollowed out of a wood block (very handy)



Raising and Bouging

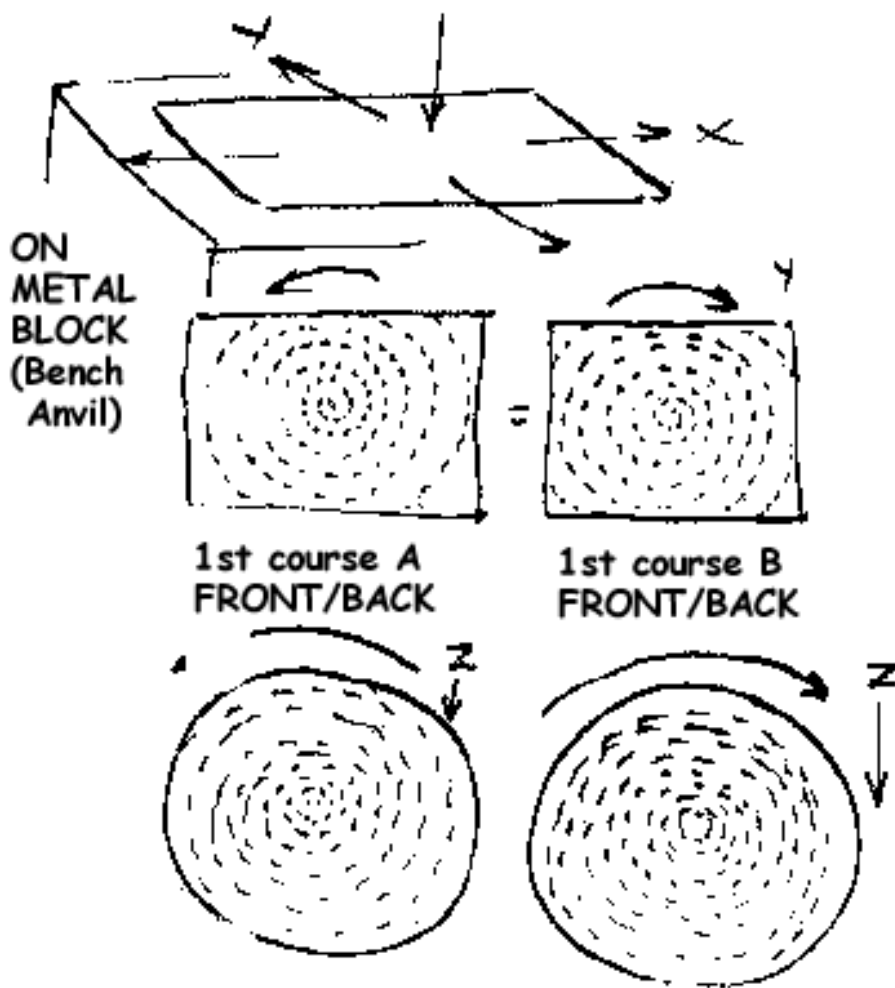
Stretching, thinning, and shaping are learned by experience, but can be demonstrated briefly here.



★ BOUGING STARTS AT RIM AND WORKS IN TO MIDDLE

Bouging starts at the rim and works in to the middle.

Stake planishing goes in reverse, from the middle outwards.



STAKE PLANISHING
GOES IN REVERSE..
MIDDLE to OUT

HINT:
USE
WRIST
ACTION-
LET IT
FLOW

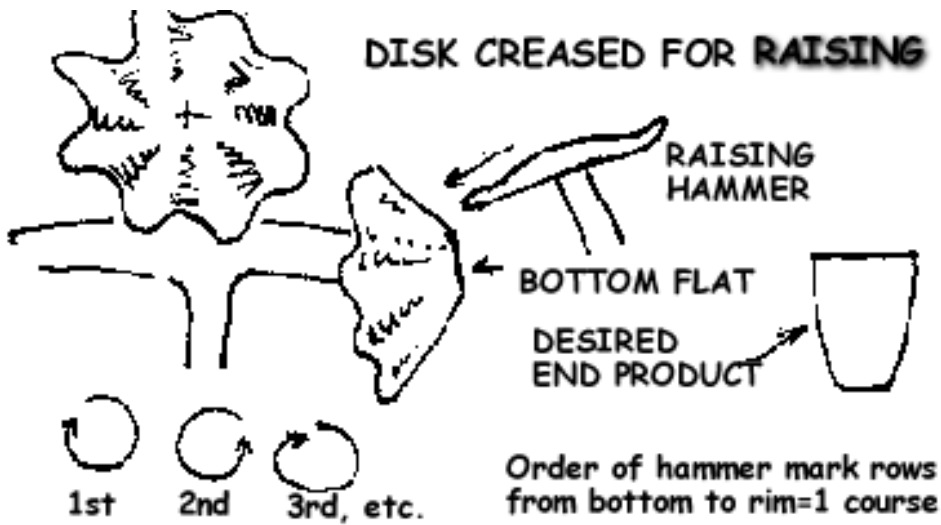


Use wrist action. Let it flow!

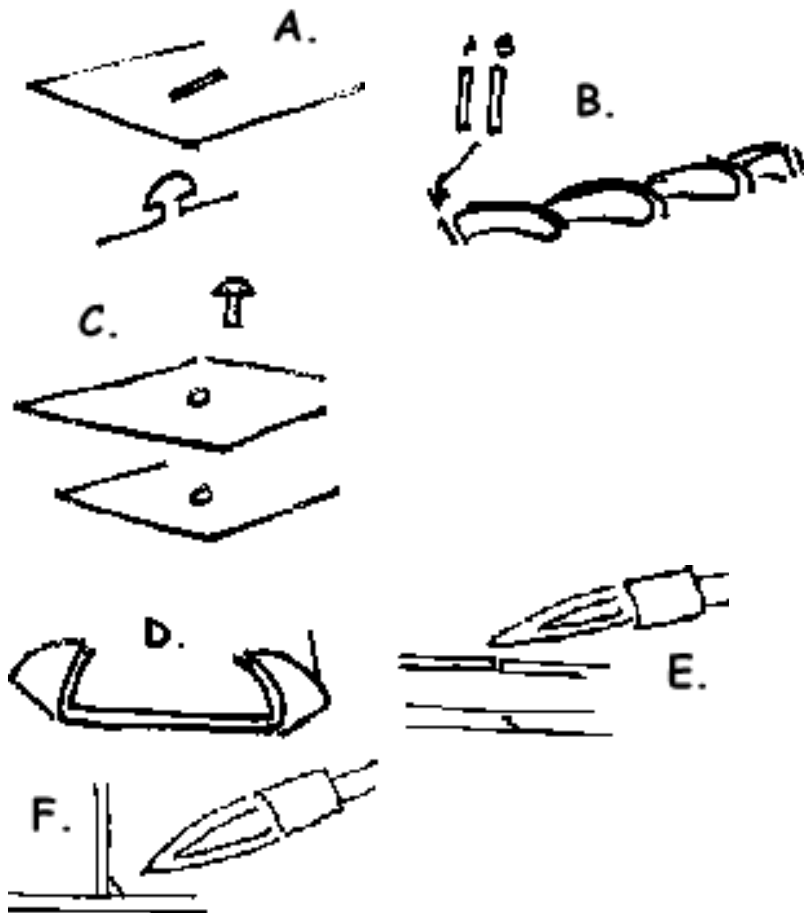
To spread metal evenly and flat, hammer in a spiral counterclockwise from the center to the edge, then reverse and go clockwise from edge to center. Turn the piece over and do the same on the other side.

For a bowl spread (raising), do the same process, but only on ONE SIDE, the side that will be the inside of the bowl. (It should be noted that the circle for a bowl should be cut to the desired circumference + 10 times the thickness of the sheet of metal that is being used.)

It is preferable to 'bouge' out the bowl with a forming hammer in a bowl mandrel and planish as above on a metal mushroom stake, depending on the desired finish.

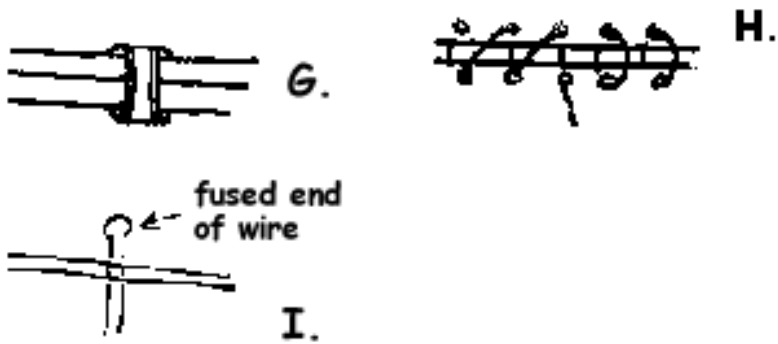


Joining Ideas



A. Tab
B. Twisting
C. Rivets

D. Folding
E. Fusing with Heat
F. Soldering

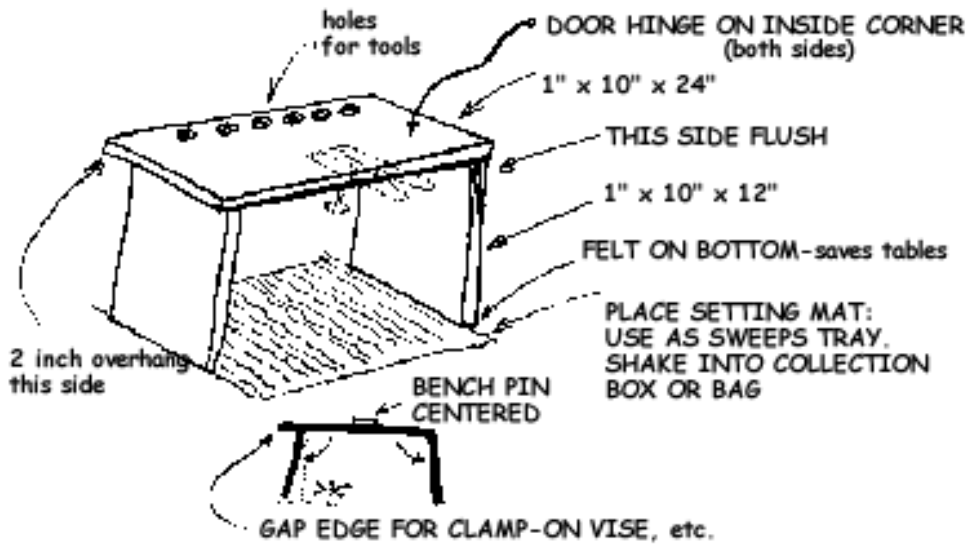


G. Tube rivet
H. Joined with loops
I. Fused end of wire

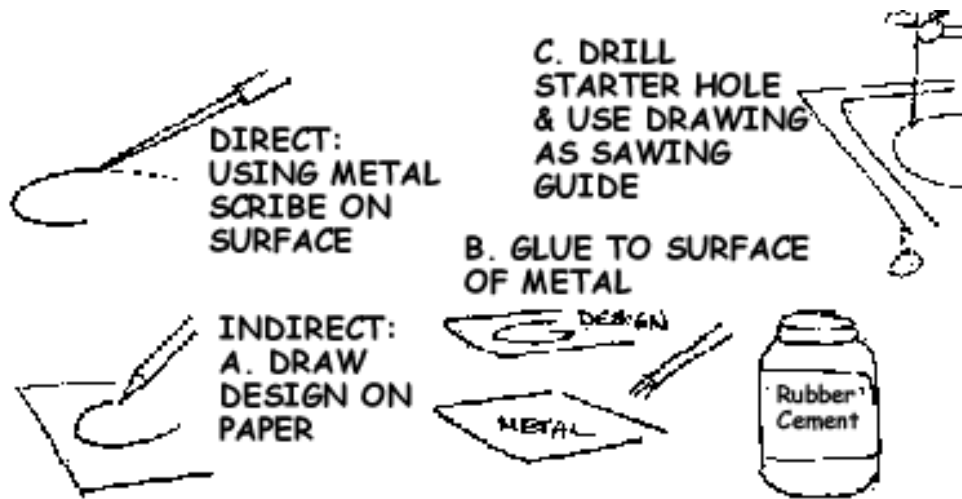
USE YOUR
IMAGINATION!



A Simple Portable Jeweler's Bench

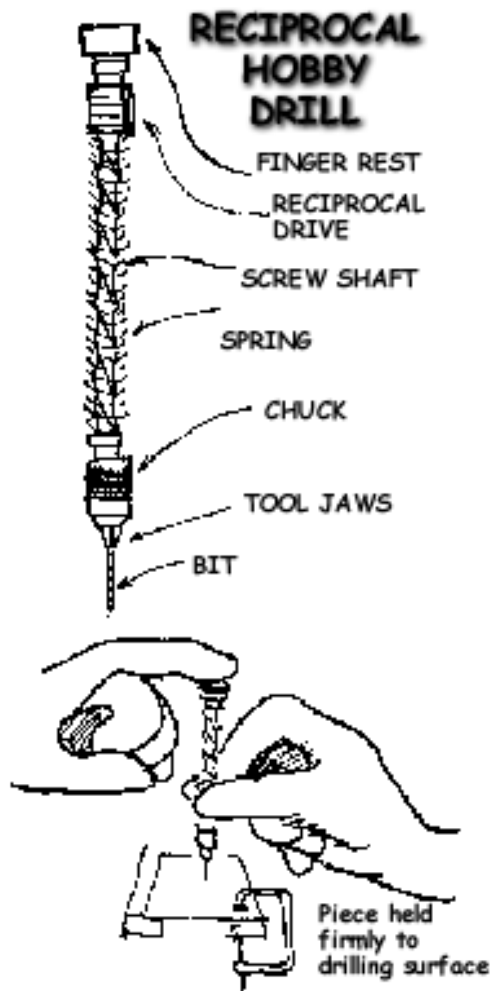


Transferring a Design



Reciprocal Hobby Drill

Operation:

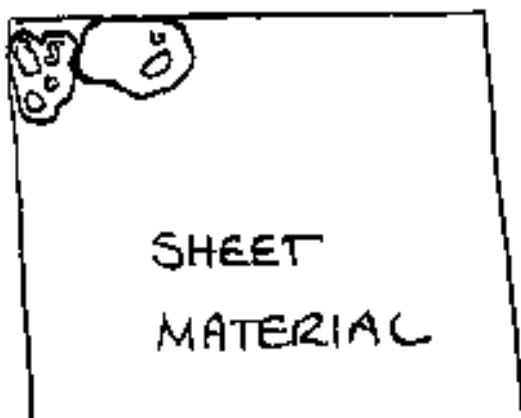


Grip drive, push drive down. **RELEASE**. Do NOT pull back up, as that will damage the bit. We are talking small here, since the average drill bit is .020 inch diameter.

The drill only really drills one way. This takes practice. Patience helps a lot!



Conserving Metal

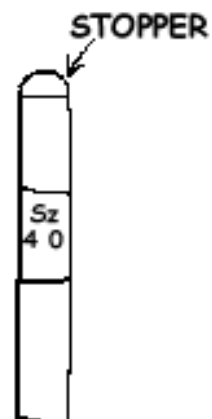


Keep multiple designs close to the edge. Interior cut outs are started with a drilled hole, saw unstrung. Thread saw blade through hole (design side up!) and refasten blade. Place on sawing surface (bench pin) and saw to your heart's content.



Time Savers

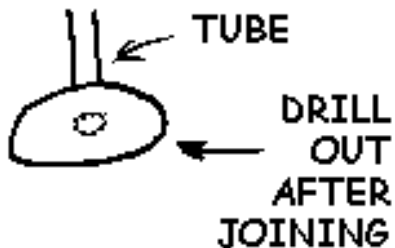
- Buy solder in sheet form and cut your own.
- Keep saw blades in air tight DRY containers (with size clearly marked). Buy by the gross if possible. Do the same for drill bits.
- Keep pickle in a container with a close-fitting cover..



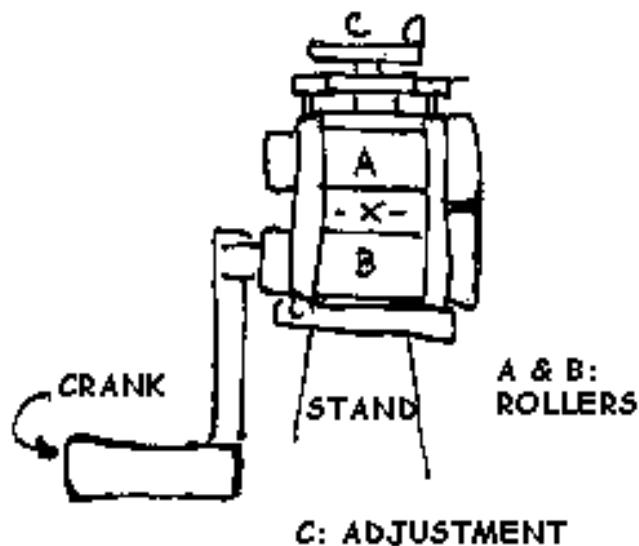
IMPROVISE!

- Solder work together, THEN cut out.

**SOLDER WORK
TOGETHER & THEN
CUT OUT**

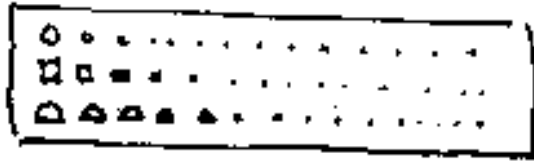


- A rolling mill is an expensive tool. However, if you plan on doing a lot of jewelry or metal work, it is invaluable for forming and recycling melted scrap into usable sheet and wire.

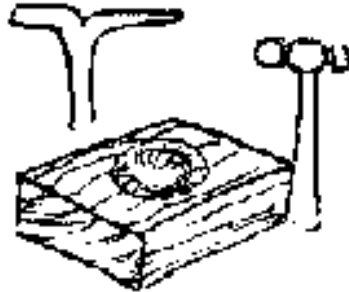


REMEMBER: if you buy for function instead of name, you're ahead of the game, and will have change left over.

- Wire drawplates are expensive, but come in handy.



- Improvise: Learn to adapt and make your own tools.



Bibliography

1. *Jewelry Concepts and Technology* by Oppi Untracht. Doubleday ISBN 0-385-04185-3 Considered the BIBLE by many. About \$100
2. *The Complete Metalsmith: an illustrated handbook* by Tim McCreight. Davis ISBN 0-87192-135-9 REAL HANDY! About \$18
3. *Jewelry Making and Design* by Rose & Cirino. Dover ISBN 0-486-21750-7 GOOD BOOK TO HAVE! About \$6
4. *Jewelry Making: An illustrated guide to technique* by D. DiPasquale. Prentice Hall ISBN 0-13-509828-9 About \$16
5. *Jewelry Making* by Hamish Bowie. Henry Regnery Co. ISBN 0-8092-7987-8 paper
6. *Metalwork for Craftsmen: Step by step guide with 55 projects* by E.F.Kronquist. Dover ISBN 0-486-22789-8 BEST BOOK OF ITS KIND FOR THE MONEY (about \$5)
7. *Silversmithing and Art Metal for Schools, Tradesmen and Craftsmen* by Murray Bovin. Bovin Pub ISBN 910280-03-7 About \$20
8. *Silversmithing* by Finegold and Seitz. Chilton Books ISBN 0-8019-7232-9. (If I ever open a school, this will most likely be the textbook I start with.)



Resources

Stebgo Metals, Inc.
PO Box 7
South St. Paul, MN 55075
1-800-289-0138
FAX: 612-451-1397
www.stebgo.com

great catalogue! \$\$\$\$
Wholesale tools, metals, etc., etc.

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