

# JEWELLERY WORK - 1

V.Ryan www.technologystudent.com 2021

This mobile revision pdf is based on detailed work found in the 'JEWELLERY WORK AND SILVERSMITHING' section.

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# JEWELLERY WORK - 1

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## 1. INTRODUCTION TO BASIC JEWELLERY TOOLS

## 2. THE JEWELLER'S TORCH, SOLDERING AND ANNEALING

## 3. ENGRAVING, TEXTURING, REPOUSSE

## 4. ENAMELLING

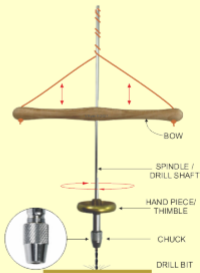
## 5. INLAYING WIRE, STRIPS AND SHEETS

# THE BOW DRILL

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A typical bow drill is made from steel, brass and wood and is the height of a standard 300mm ruler. Rotation of the drill chuck, is achieved by twisting the wooden handle around the steel centre pole, which also twists the cord, providing tension.

**Tap the image for more information and exercises**



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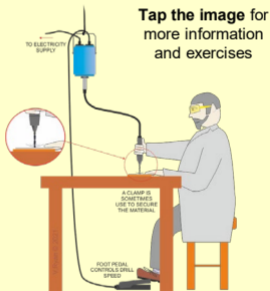
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# PENDANT DRILL

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Pendant drills are very useful, mainly because they have a flexible lead, which means that they can be control by hand easily. The motor is suspended from above, often from a stand. The speed of rotation / the drill bit, is controlled by a foot pedal.



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# THE PIN VICE

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A Pin Vice is a very useful hand tool for a jeweller. It is used to hold small round section material and tools such as deburrers, taps, drills, reamers, scribers, wire and other small tools. The image shown opposite, shows a small diameter drill bit, set up in a pin vice, ready for use.

**Tap the image** for  
more information  
and exercises



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# PLIERS FOR JEWELLERY WORK

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Jewellers' pliers are supplied in a range of shapes, forms and sizes. They are often used to hold strips of thin sheet metal or round sections, when the material is being worked on. Some of the most common jewellers' pliers are shown below.

**Tap the image** for more information and examples of uses, for each set of pliers.



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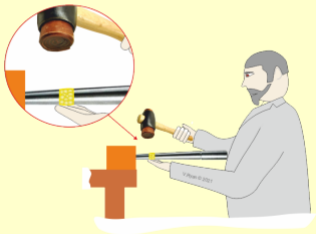


# JEWELLER'S STEEL TRIBLET

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A polished steel triblet, is used to form curves and even rings. Some jewellers make a tapered steel rod, polish it and use in the same way as a triblet. Jewellers sometimes make a series of different diameter polished, tapered steel rods. These are as effective as commercially manufactured triblets.

**Tap the image** for more information and exercises



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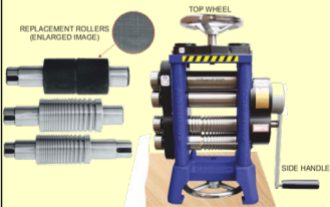


# THE JEWELLERY ROLLING MILL

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A jewellery rolling mill, is used to reduce / thin small gauge wire and sheet metal. It is also used to shape and flatten / taper metal and to pattern / texture imprinting.

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# DOMING BLOCK AND PUNCHES

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A doming block, is used to create accurate curves / domes in sheet metal. It is very important to ensure that the blocks and punches, remain in perfect condition and that they do not become damaged in any way. Scratches on either the punch or block, will be transferred to the metal being worked.

**Tap the image** for more information and exercises



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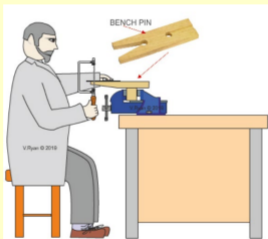


# THE PIERCING SAW (Jeweller's Saw)

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The Piercing Saw is normally used to cut and shape non-ferrous sheet metal, such as brass, copper and nickel silver. It holds a very fine blade and is capable of very accurate work, depending on the skill and experience of the user.

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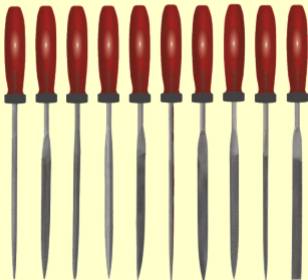


# NEEDLE FILES

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Below is a high carbon steel (hardened and tempered) needle file set. Needle files are very useful for accurate and intricate work, as well as for finishing surfaces. Each of the various sections have a purpose.

**Tap the image** for more information.



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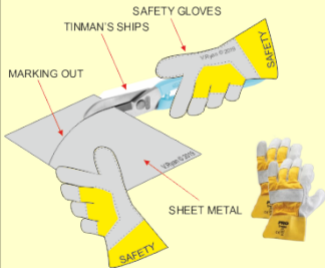


# TINMAN'S SNIPS

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Tinman's Snips are ideal for cutting 'thin' sheet metal, such as aluminium, copper and brass. They are operated by hand and are normally used after the sheet metal has been softened through the annealing process.

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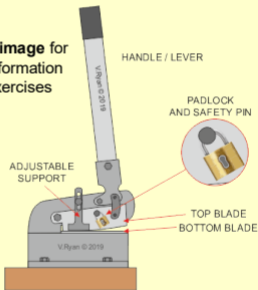
# LIGHT DUTY BENCH SHEARS

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A bench mounted sheet metal shears, is ideal for cutting sheet steel and other sheet metals, such as copper and brass.

The blades are designed to minimise the production of sharp burrs, on the edge of the sheet metal being cut.

**Tap the image** for more information and exercises



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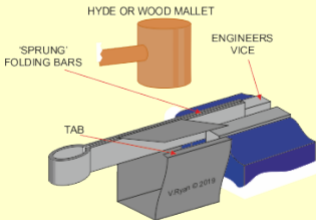


# FOLDING BARS

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Folding bars are a tool / piece of equipment, for working with sheet metal. They are placed in a vice and used to 'fold' the sheet metal, to a 90 degree angle. 'Folding' is the correct term for bending or forming sheet metal to an angle.

**Tap the image** for more information.



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# THE BUFFING MACHINE

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The Polishing Machine (also called the Buffing Machine) is used to polish soft metals including copper and brass as well as plastics such as perspex. The two 'mops' spin at high speed when the 'on' switch is pressed.

**Tap the image** for more information.



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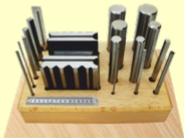
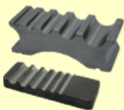


# JEWELLER'S SWAGE BLOCK

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The Jewellers Swage Block, is an important and versatile tool. Swage blocks are often sold with polished metal bars, that are a perfect fit for the grooves, on the top of the swage block. The block allows the jeweller to form, U-shape strips or cylindrical curves, for decorative jewellery designs.

**Tap the image** for more information.



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# THE JEWELLER'S TORCH

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The modern Jeweller's torch is operated by one hand and fuelled by butane gas. When in use, the focussed flame reaches a temperature of 1300oC, which means it can cope with most of the jewellers needs.

Butane torches are for general use. Other popular torches are: Acetylene / Air torches AND Oxygen / propane torches.

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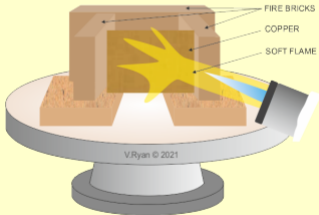
# ANNEALING

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The annealing process leaves nonferrous metals soft, easy to bend, form, shape and cut.

The metal to be annealed is cleaned, heated to a specific temperature and then allowed to cool. The temperature of the metal is indicated by colour change. E.G. copper is heated to dark red and cooled

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# HARD (SILVER) SOLDERING

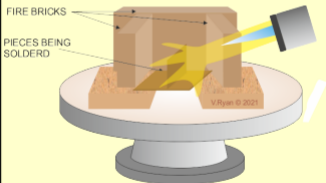
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Hard soldering, is a method of permanently joining nonferrous metals, including copper, brass and nickel silver.

The surfaces of the metals being joined are cleaned. Flux is mixed with water to a paste and applied to each join, with a soft brush.

This prevents oxidation. The metals are heated to a high temperature and a solder stick is introduced, melting along the joints.

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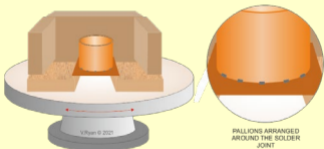
# HARD / SILVER SOLDERING (PALLIONS) and BINDING WIRE

V.Ryan © www.technologystudent.com 2021

Pallions are small pieces of solder, arranged along a joint. This technique allows the jeweller to concentrate on the use of the gas torch.

When the soldering temperature is reached, the solder flows along the joint, without the need to manipulate a solder stick.

**Tap the image** for more information.



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# ENGRAVING WITH 'GRAVERS'

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Jewellers use 'gravers' to engrave the surface of metals, (cutting patterns into the surface). This adds decoration and designs to a plain surface. Engraving can also give the illusion of depth, on a surface that would lack appeal and interest, if left plain.

**Tap the images** for more information.



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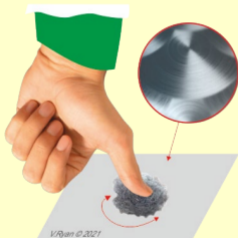
# TEXTURING A SURFACE - 1

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A textured surface on a piece of jewellery, can enhance its aesthetic appeal. Jewellers often create their own textures, with punches and abrasives.

One of the simplest, effective techniques, is to use wire wool, to create a repeated 'circular' pattern.

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## TEXTURING A SURFACE - 2

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A graver can be used to engrave parallel lines into a surface. This type of pattern can be made more complicated by two sets of lines, crossing each other.

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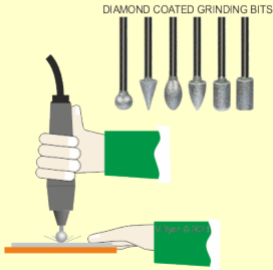
## TEXTURING A SURFACE - 3

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A small grinding bit, fitted to a pendant drill, can be used to produce a textured finish, more defined, than the wire wool technique.

Polishing mops and grinding bits also produce interesting finishes.

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# USING PUNCHES TO TEXTURE AND PATTERN

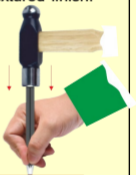
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Decorative metal stamps, are ideal for 'texturing' a surface, with a defined, repeated pattern. Decorative stamps are used in the same way as a centre punch, being tapped by a hammer. If this is done repeatedly over a surface, it results in a textured finish.

**Tap the image**  
for more  
information.



'BUTTERFLY' PUNCH



RUBBER BENCH BLOCK



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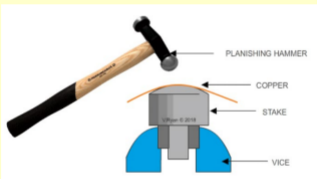


# PLANISHING

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Planishing is a skilled technique, whereby a planishing hammer is used to hammer a patterned finish into the surface of a metal (normally sheet metal).

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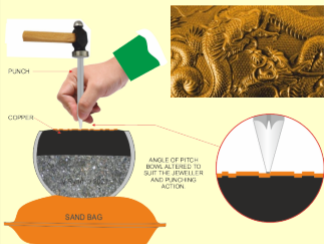


# REPOUSSÉ

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Repoussé is best described as, punching a decorative pattern / feature or character, in the back of a piece of annealed, malleable metal. This creates a design in 'reverse'.

**Tap the image** for more information.



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# TEXTURING HAMMERS

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Texturing hammers are used on nonferrous metals, that have been annealed. The metal is placed on a firm base, such as a steel block or jewellers anvil. A rubber block can also be used.

The hammer is supplied with a range of textured faces, which can be changed.

**Tap the image** for more information.



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# ELECTROPLATING METALS

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Electroplating is a process whereby a cheap base metal, is coated with a much more expensive metal, in order to make it visually attractive and aesthetically pleasing (gold and silver plating are examples).

Electroplating, is usually a decorative process and the aim is to increase the visual appeal of cheaper jewellery.

**Tap the image** for more information.

GOLD PLATED WATCH



COPPER PLATED MUG



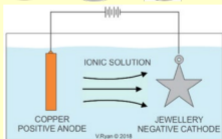
SILVER PLATED TEAPOT



SILVER PLATED GOBLET



CHROME ELECTROPLATED TAP



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# ETCHING PROCESS - TRADITIONAL METHOD

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Traditionally 'etching' is a process, whereby acid is used to slowly remove the unprotected surface of a metal such as copper. If carefully controlled, detailed patterns can be achieved.

The pattern is produced by applying a 'resist' substance to the surface of the copper. The resist can be beeswax or shellac. A sharp tool such as a scribe, is used to 'scratch' a pattern into the resist, removing it where acid is to 'eat into' the surface.

**Tap the image** for more information.



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# ETCHING COPPER USING A PCB TANK AND A VINYL CUTTER

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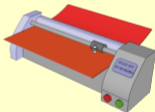
The etching process is 'modernised / simplified', through the use of a PCB etching tank and a vinyl cutter. A pattern is cut from vinyl and placed on the surface of the metal. The etchant solution 'eats' into the surface producing a pattern.

**Tap the image** for more information.

TYPICAL SINGLE  
PCB ETCHANT TANK



VINYL CUTTER



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# INTRODUCTION TO ENAMELLING

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Enamelling is a process, whereby a fine glass powder is applied to a metal surface and heated to a high temperature. This causes the glass powder to fuse to the metal. Enamels are usually supplied as powders and are carefully sieved onto the metal surface.

**Tap the images** for more information.

## OPAQUE ENAMELS



## TRANSPARENT ENAMELS



RED ENAMEL  
ON COPPER

RED ENAMEL  
ON SILVER

BLUE ENAMEL  
ON COPPER

BLUE ENAMEL  
ON SILVER

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# PREPARING THE METAL FOR ENAMELLING

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Nonferrous metals are sometimes given an enamel finish.

A metal such as copper, should be heated with a gas torch, to burn away any grease, followed by pickling in an acid bath and washing in clean water. The copper is then cleaned with a water / pumice powder paste, followed by a final wash.

**Tap the image** for more information.

1. HEATED BY TORCH



2. PICKLE IN ACID BATH



3. WASH



4. CLEANED WITH PUMICE POWDER



5. WASH



6. DRY



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# PREPARING THE METAL FOR ENAMELLING

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**Tap the images for more information and exercises**

A 'holding' solution (enamel adhesive) is applied to the copper surface to be enamelled.

HOLDING SOLUTION APPLIED



To load the surface with enamel powder, tap the sieve and it will fall through the mesh



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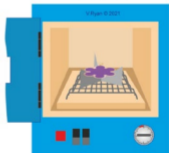
# HOW TO FIRE ENAMEL

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Enamelling can then be carried out in a kiln (usually the preferred method) or using a gas torch, such as a brazing hearth torch. The metal with its enamel, is heated until it melts and fuses to the surface.



DOOR OPEN



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for more  
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# COUNTER ENAMELLING

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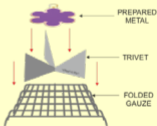
It is good practice to 'counter enamel', if the metal is less than 1.3mm in thickness. The procedure involves enamelling the back of the piece / metal. This helps prevent the metal warping and the enamel on the front, from cracking, as the metal deforms due to heat.

**Tap the image** for more information.

APPLYING COUNTER ENAMEL TO THE BACK



APPLYING ENAMEL TO THE FRONT



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# PLIQUE-À-JOUR

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This is a style of enamelling, whereby transparent enamel is used to fill holes / hollow shapes, giving a stained glass effect. The sample opposite, shows a simple piece of copper jewellery, with holes / hollows filled with transparent enamel.

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# CHAMPLEVÉ

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Champlevé is an enamelling technique, whereby engraved or etched shapes in the surface of the metal, are filled with enamel and fired. Engraving the decoration is completed by hand, using a graver or using the acid etching technique. A CNC machine could also be used to create an 'engraving', suitable for this enamelling technique.

**Tap the image** for more information.



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# BASSE-TAILLE

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Basse-taille is similar to Champlevé. The difference being, that the etching / engraving is to different depths. The entire surface is then enamelled. The deeper parts of the engraved area, appears darker than other parts.

**Tap the image** for more information.

TRANSPARENT ENAMELS SHOW LIGHT AND DARKER AREAS - DEPENDING ON THE DEPTH OF ENGRAVING



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# GRISAILLE

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Grisaille enamel starts with a white vitreous enamel, mixed with water or klyr-fire gum solution, to produce a paste. This is painted onto the metal surface and fired. Enamel composed of fine metallic oxides (dark enamels), are built up layer after layer, being applied with a paint brush. After the addition of each layer, firing in a kiln takes place. This builds up a 3D effect.

**Tap the image** for more information.

1. WHITE ENAMEL APPLIED AS A PASTE TO THE BACKGROUND

2. DARK OXIDE ENAMEL ADDED - LAYER AFTER LAYER

3. FINAL MONOTONE / GREY SCALE GRISAILLE ENAMEL JEWELLERY



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# CLOISSONÉ

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Cloisonné enamelling is a technique that starts with wire or strips of metal, being shaped into a design, forming 'enclosures' / 'cells' for enamel. These are 'glued' to the backing copper, with klyr-fire gum solution and left to dry before firing. The copper must be clean, before the application of a holding solution. (Some jewellers prefer to solder the 'wire / strips' in position).

**Tap the image** for more information.

Klyr-fire gum solution brushed on the surface.



Wire / strips placed in position with 'bent nose' pliers. Gum allowed to dry.



Enamel mixed to a paste with water, applied to the enclosures as a thin layer.



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# LIMOGES / PAINTED ENAMEL

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This technique begins with a background (E.G. copper), being enamelled in white. Special enamel painting colours, are then brushed on to the background, with an artists paint brush, in the same way as an artist paints a canvas watercolour. Painting enamel is applied a layer at a time, followed by firing. It requires the skills of an artist and a jeweller, for the very best quality, detailed work.

**Tap the image** for more information.



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# INLAYING METAL STRIPS AND WIRE

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Inlaying metals is a really interesting way of adding detail to jewellery. This technique increases contrast between the various inlays, in terms of colour and surface reflection. A graver is used to cut a path across the metal, followed by a punch being used to undercut the path. Wire is then tapped permanently in position. A file is used to remove excess wire.

**Tap the image** for more information.



Brushed brass with nickle silver inlay.



Planished copper with silver inlay.



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# INLAYING METAL SHEETS

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Sheets can be inlaid and pressed or tapped permanently in position. The process normally starts by cutting out a shape in one sheet of metal and cutting another piece (a different metal) to fit the gap.

It can produce impressive results.

**Tap the image** for more information.



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