

Recipe to be annotated:

<title id="p083v_a2"> Molding one part in relief and one hollow side</title>

<ab id="p083v_b2a">

It is necessary to cast two parts of very clean **copper, latten** or a similar **metal** and then when you mold the **pipe** [in French, *cave*: "hollow"] in **sand**, leave the **metal** figure, that you have molded in the box mold, without budging it from its place. Then cast and if there is not enough thickness press a bit and force the figure down into the box mold.</ab>

<ab id="p083v_b2b">

It is wise to always mold the faces not close to the cast but the head in bottom because the strength of the material concentrates at the entry of the medal and where the force of the impurity is. Thus if you molded the face close to the cast in this manner, you could find impurities there. It is better that impurities remain on the clothes which you can repair more easily </ab>

<ab id="p083v_b2c">

Vinegar is better for moistening than **wine**. It is necessary that the box mold be quite equal, otherwise as you press one side, it lifts up the opposite [one].</ab>

<ab id="p083v_b2d">

This is why the press is better because it tightens more extremely than by hand, and makes the **sand** become fat which loses its moisture. With soft and fine **sand** which is powdered, and dry, burnish the medal.</ab>

<ab id="p083v_b2e">

When you mold, always leaves your medal in one of the box molds without stirring it because if your pipe is not clean, it will not mold well. You can repair it thanks to the bolts which prevent it from moving. But first, burnish your medal with **charcoal made from willow**. Then clean your medal because that degreases it and makes it easier to remove it from the mold afterwards.</ab>

<ab id="p083v_b2f">Do not knock as you are molding because that damage the box mold and the sand.</ab>

OR

<title id="p092r_a2">Molding a hollow on one side and a relief on the other</title>

<ab id="p092r_b2a">And for this effect, one casts a **fine tin** medal, which is harder to melt. And since it is pure, we mold with it. And one leaves it in one half of the box mold and press it inside so that it holds. Then, thrown in the box mold soldering, the one described above, or something else that melts better than pure tin. In this way, the second medal will melt and mold itself on the

first one without damaging it. But to make this is a better way, soak **noir de lampe** in **water**, and with a brush, apply a thin coat on the medal which is in the box mold, and leave to dry. In this way the medal will not melt at all.</ab>

<ab id="p092r_b2b">But if you have a **copper** or **silver** medal, you can leave it in the casting, if you want to cast in **lead** or **tin**; but the medal must be a bit warm, because otherwise, the **tin** will shrink.</ab>

<ab id="p092r_b2c">**Tin** must be cast very hot, to come clean.</ab>

<ab id="p092r_b2d">**Soft tin**, which is the best one for casting, is the one that, when cast en grille is shiny and polished like a mirror and almost looks as if it has been burnished. This **tin** has no holes like the one that is brittle, and is not shiny as if burnished.</ab>

Related Recipes from MS Fr 640:

fol. 28v: 'pewterers' ("And soon they open their molds so they don't heat too much and after taking the cast off that is on female' side and breaks easily.")

fol. 69r: 'sand' ("I cast a medal with quite high relief in it, and slender, with the thickness of a knife blade or a card. And there being a hollow on one side, the obverse, with the relief being on the other side.")

fol. 81r: 'sand' (also comparison to qualities sulfur); 'earth for moulding'; 'thick paper'

fol. 85v: 'sand experiments'

fol. 91r: 'molding with cuttlefish bone' ("and if the medal has two sides...")

fol. 102v: 'casting' ("Tin casts better when it is thin and delicate, than when it is thick, because when it is thick it contracts in high heat. So if you want to mold a thick piece in tin, mold it only on one side, and if it is possible, make it hollow on the other side. In this way your piece will be neater. And then you can solder two half pieces together.")

[fol. 118v: 'excellent sand' (not definite that this relates to incuse-reverse casting; "In order that the second box mold take the imprint thereupon to indicate the place for making the cast, I uncovered the contour of the medal... and then I filled the male part with sand")]

[fol. 120r: 'stamped medals made from wax' (mentions "hollow," "relief")]

[fol. 124r: 'noyaux for molding hollow' ("But in order to make the core and the noyau, the mold must be freshly molded and not dry")]

fol. 137v: 'wetting sand to mold flat medals' (medals made of wax or metal—procedure seems similar to 118v)

fol. 153r: 'moulding hollow seals or other things'

fol. 156r: 'quickly moulding hollow mould and relief' (casting in bread, term *noyau*)

Additional Sources:

Biringuccio

- 327: refers to "hollow and light in bronze or metal," but this seems to be with a core, not hollow-reverse medals

- 329-332: Possible that entire recipe “The Methods of Moulding Various Kinds of Reliefs” is about incuse-reverse casting; continual references to “hollow” [cavo], “convex/concave,” fitting the two halves of the mold together
 - <http://find.galegroup.com.ezproxy.cul.columbia.edu/mome/infomark.do?&source=gale&prodId=MOME&userGroupName=columbiau&tabID=T001&docId=U3608964055&type=multipage&contentSet=MOMEArticles&version=1.0&docLevel=FASCIMILE> [Pp. 121-124; Image #257-260]
 - 329: translation uses word “intaglio,” with note: “cavo.... Such castings would generally be used as seals” - seems likely this refers to incuse-reverse medals; proceeds: “And I will tell how every relief reduces itself from convex to concave and also how the relief is made from the intaglio”
 - 330: “When this mould [intaglio pattern from the original relief] has been made to your satisfaction, mould it in powder and cast it in bronze or well-melted metal. Likewise, when you wish to make a relief from and intaglio, vice versa”

Piemontese

- The Seconde part, 49-50: “To make a Paper borde of beaten and stampd Paper, for mouldes and hollowe things.” (not exactly relevant)

Plat, 1594

- book 4, pp. 56-57, no. 18: “But if you will caste any imbossed patterns, of waxe, or any other slender or curious paternes, that be under cutte as they terme it .s. such as stande anticke wife, and whereof you may see some partes behinde, which will not suffer them to come oute of the moldes without breaking either the patternes or the moldes, then must you use this devise following. Take one pound of common glew, put thereto one ounce of yellow waxe (some put two or three ounces) but first dissolve the glew by a gentle fire, with a little water into a thicke body, and after this solution, put in your waxe, into which waxe, some doe use to put a little quantity of fine powder or charcole seared, and some mingle the blacking only that commeth of the smoke of waxe or rosen there with. Then laye an even peece of lome according to the fashion of your patterne, but an inch broder then the paterne and in the midst thereof place your paterne firste oyled, then sette uppe the lome sides of your coffin and powre your glew thereon, being of a temperat heate // and when it is throughly cold, take away the sides of loame, and take out your patern gently. Note also y whe[n] you have molded any gentle pattern in glue, you may open the moldes by slitting of them, or bowing them backwards thereby the esilyer to get out the patterne without danger of breaking it, and yet the mold will returne to his first shape.
- Book 4, pp. 64-65, no. 38: recipe to cast hollow - but here meaning with a core. He uses a paste made out of flour+water, which is later removed to let in the metal.

Materials:

- fol. 83v: ‘molding one part in relief and one hollow side’
 - Metal (copper/latten/similar metal)
 - Sand (doesn’t specify here what kind; says “soft and fine”)
 - Box mold

- Vinegar/wine (“vinegar is better for moistening than wine”)
- Charcoal made from willow
- fol. 92r: ‘molding a hollow on one side and a relief on the other’
 - Fine tin medal
 - Box mold (presumably with sand in it; type of sand is not specified, though recipes for sand that mention “hollow” are in fols. 69r, 85v)
 - “Soldering” (solder? metal with melting point lower than tin)
 - Refers to recipe just above on fol. 92r: ‘Mixture that is easy to melt,’ which includes tin, lead, bismuth, mercury)
 - Noir de lampe (lampblack, pigment: according to pigment glossary in Drive, “Carbon in the form of soot collected from burning wood, paper, wax candles or other sources”; Cennini gives directions for this on pp. 22-23 of *Il Libro dell’Arte*)
 - Water
 - [Copper/silver/tin (not necessary: “But if you have a copper or silver medal, you can leave it in the casting, if you want to cast in lead or tin...”)]
- Materials for other related recipes
 - fol. 69r: ‘sand’
 - Sand from quarries or rock caves (not from sea/dried out by sun)
 - Marble slab
 - Linen
 - Wine
 - Brass
 - Calcinated vitriol (heated iron/copper sulphate—sulphuric acid)
 - Copper
 - Bulls’ feet/ox foot bones/sheep foot bones
 - Elm tree roots
 - Olive oil
 - Egg whites
 - Calcined Glass
 - Latten (copper alloy: bronze/brass)
 - Box frame
 - Human bones (calcined)
 - Iron shavings/filings
 - Saltpeter
 - Paper (?)
 - Fine double sieve (Research - visual depictions? any other descriptions?)
 - Old printers’ letters
 - Tin/lead with added mercury
 - fol. 81r: ‘sand’
 - Sheath maker’s earth or the one potters use to blanch the pots to make the lead flow better
 - Lead
 - fol. 85v: ‘sand experiments’
 - Sand of Thoulouse/sand from a mine

- Skillet
- Fine tammy cloth
- Elm root
- Potin (bronze, tin, lead alloy; mentioned on fol. 92r, but recipe not given)
- Material of a frying pan (?)
- Box mold
- Bull's foot bone
- Egg white
- Wine
- [Copper/latten/"other great metals" (not necessary)]
- Paper
- [fol. 118v: 'excellent sand']
 - Fine sand (made of plaster, brick, feather alum)
 - Sal Ammoniac
 - Spirits
 - Charcoal (same as "pulverized carbon"?)
 - Iron trivets
 - Lead/tin
- fol. 156r: 'quickly moulding hollow mould and relief'
 - Colored wax
 - Sand
 - Lead/tin
 - Gold/silver/"any other metal you like"
 - Bread loaf

Experiments: t.b.d.

Questions:

- Is this type of casting used/described in the MS? Where, when, to what purpose and how? Can we understand the processes he describes?
- What is the terminology used? "Relief" and "hollow", and perhaps sometimes also "male" and "female"? Does the term "noyau" have anything to do with this process? Are "hollow" and "incused" synonymous? "Hollow" seems to imply that reverse is empty; would it have been "filled" with anything? Use of "hollow" for casting with a core also?
- Were these types of medals used for a different purpose than double-sided ones?
- What are the benefits of this type of casting? Tuttle hypothesizes that the thinness of the material yields a more accurate impression; is this true? What might be the other reasons for employing this process? Could one reason be economic, to limit amounts of precious metals used?
- Continual process of inversion of impression ("male" to "female" and back, several times) seems directly evident in the actual product of this type of casting; is demonstration of ways of making in the actual object a possible motivation? A lot of work

Incuse-Reverse Casting

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28 October 2014

went into disguising the ways in which casts were made; why in this process might the material process/facture have been exposed/celebrated?

- Can we find examples of this type of medal in present-day collections from this period (and region)?