(No Model.)

F. M. HARRIS.

ART OF UNITING METALS.

No. 489,077. Patented Jan. 3, 1893.

FIG. 1.

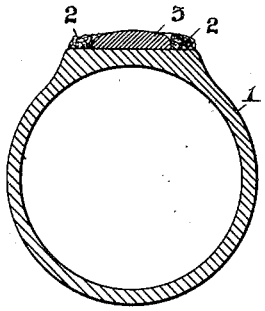


FIG. 2.

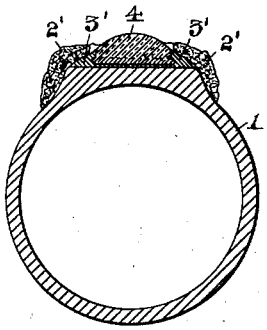


FIG. 3.

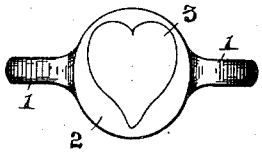
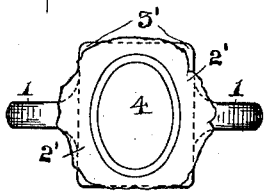


FIG. 4.



WITNESSES

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ART OF UNITING METALS.

SPECIFICATION forming part of Letters Patent No. 489,077, dated January 3, 1893.

Application filed November 30, 1891. Serial No. 413,496. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. HARRIS, a resident of New Albany, in the county of Floyd and State of Indiana, have invented certain new and useful Improvements in the Art of Uniting Metals and Forming Metal Joints; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to the art of permanently joining amalgamable metals or alloys to metallic or non-metallic bases and consists in the methods hereinafter described and particularly pointed out.

In the accompanying drawings: Figure 1 is a section of a ring with a mold thereon, and an addition to the ring cast in the mold; Fig. 2 is a similar view of a ring, mold; and a stone secured in position by metal cast in the mold; Fig. 3 is a plan of the construction shown in Fig. 1; and Fig. 4 is a plan of that shown in Fig. 2.

In carrying out the invention plastic amalgam of a metal, or of metals or alloys adapted to be worked and shaped by a tool is forced into a matrix, depression, crevice or receptacle and is made to fit the interior of said matrix. The exterior surface which is acted upon by the tool can be given any desired contour. Sufficient heat is thereupon applied in any convenient manner, as by baking or by a flame, to volatilize the mercury. The metal of the amalgam will form a cast of the desired form and will adhere to the mold or receptacle or to such part of it as desired. If any portion of the mold is formed of frangible material or of removable parts to which the metal has no adhesion or but slight adhesion such part of the matrix can be removed after forming the amalgam and expelling the mercury, leaving the suitably formed cast. It will ordinarily be found convenient to work the amalgam into the matrix by successive portions, the mercury being suitably expelled. To effect this, amalgam of the desired metal or alloy is pressed into the matrix. This is then heated to expel the mercury whereupon more amalgam or foil or filings are pressed into the matrix upon the amalgam first introduced. They unite with the same and the mercury being expelled by heat the cast fills the matrix and is of the desired metal or alloy. The degree of heat required to expel the mercury is not high being below the melting point of gold solder.

To alloy metals they are amalgamated in the desired ratio and heated. Thus gold and platinum being amalgamated and mixed in the ratio of fifty to one and the mercury expelled by heat, an alloy containing two per cent of platinum will remain. If therefore gold or any amalgamable metal in pure state be unsuitable for the desired uses it can be properly alloyed to secure the desired degree of hardness or other quality by the method just described.

The invention is capable of use in any art where it may be desirable to add or unite an amalgamable metal to an article or foundation such addition having a shape determined wholly or in part by the foundation or by a matrix formed thereon. If such foundation is not itself amalgamable and has no undercut portions they may be provided in any convenient manner to give the amalgamable addition metal a mechanical hold upon the article or foundation. This will be required only in case the amalgamable metal has insufficient adhesion to the foundation and the matrix is in practice to be removed.

The improvement is applicable in metal working whenever it is desired to build additions of amalgamable metal or alloy upon a metallic base or foundation, but it is not limited to such foundation. If the foundation be amalgamable the added amalgam will amalgamate said foundation and form a specially close and compact union.

By the term mold as used herein is intended any receptacle or foundation that will give form to amalgam in whole or in part and retain it and at the same time permit it to be worked into a desired position or shape by a tool.

In the drawings numeral 1 denotes a metal ring, 2 a mold of plaster of paris or equivalent material, and 3 an ornamental or other metallic addition produced by forming an amalgam of the metal and placing it in the mold and expelling the mercury as described.

In Figs. 3 and 4 numeral 4 may indicate a non-metallic article, 2′ a mold and 3′ a metallic addition formed by introducing an amalgam within the mold about the article 4, the mercury having been subsequently expelled. The metal 3′ is united to the mold base and mechanically holds the non-metallic article. A ring has for convenience been employed to illustrate the uses of the invention which is however entirely independent of the particular article. The mold if made of plaster will ordinarily be removed, though under some circumstances it will be practicable to use a mold which will remain a part of the completed article.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is:

1. The improvement in the art of uniting an amalgamable metal to a base which consists in forming an addition of amalgam upon the base within a matrix and expelling the mercury by heat, the solid metal of the addition being thereby permanently fixed to the base in the form desired; substantially as set forth.

2. The improvement in the art of uniting amalgamable metals to an amalgamable metallic base which consists in forming thereon an addition of amalgam within a matrix and expelling the mercury by heat, the solid metal of the addition being thereby permanently fixed to the base in the form desired; substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANK M. HARRIS.

Witnesses:
BENJ. R. CATLIN,
O. H. KEAN.