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HIGH-TEMPERATURE CASTING INVESTMENT.

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My present invention relates to an improved investment, and more particularly to a mixture for forming investments such as are used by dentists and jewelers which is particularly adapted for use in casting metals and alloys having a high melting point.

An object of my invention is to provide a mixture in powdered form which, when combined with water, can be used to form an investment of the type used by dentists and jewelers which will stand a high degree of temperature without disintegration.

Another object of my invention is to provide a powdered mixture which, when mixed with water, can be used in forming investments of the type wherein the metal is melted upon the surface thereof with a blowpipe and later forced into the impression by pressure applied thereto and which will resist a temperature in excess of 2000° C.

At the present time, there are on the market several mixtures which are sold to the trade for the purpose of making investments such as are used for casting dental pieces and jewelry. These mixtures, as far as I have been able to determine, are comprised principally of plaster of Paris and sand of different degrees of coarseness. These materials work very satisfactorily in the melting of gold and its alloys which melt at a relatively low temperature. However, where it is desired to cast metals, such as platinum, palladium, and their alloys, having relatively high melting points, the above materials are wholly unsatisfactory as they disintegrate at temperatures below which these latter metals and alloys melt and it is therefore a further object of my invention to provide an investment in which the above metals and alloys may be melted and cast.

I have discovered that it is possible to construct an investment having all the desirable characteristics of the investments formed by the present existing commercial mixtures with the additional advantage that it will stand up under the high temperatures such as are required in melting the above referred to metals. The materials which I propose to incorporate in my mixture are magnesium oxide plus a sufficient quantity of calcium sulphate to effect a proper binding of the materials. The magnesium oxide should be of a suitable fineness which will be dependent upon the smoothness of the investment desired. To this mixture I might also add an accelerator in the form of a salt for the purpose of speeding up the drying of the investment after being formed.

In carrying out my invention I have found that an investment can be formed which will withstand a temperature under an acetylene torch in excess of 2400° C. without disintegration where the following proportion of ingredients is used: Approximately 75% magnesium oxide plus 25% calcium sulphate. It should be pointed out here that I do not limit myself to these proportions, as it is possible to produce suitable investments for various different classes of work with different proportions of the above ingredients. The proportions set forth above are thought by me to be the most suitable for all-around work. In my experiments I have found that fused magnesium oxide, because of its greater purity and non-shrinking characteristics, is particularly suited to this use. It should be understood, however, that ordinary commercial magnesium oxide can be used with good results.

In the particular branch of the art to which my invention appertains, it is customary to melt the metal to the molten state on the outer surface of the investment and then force the molten metal through a small sprue or gate and into the impression formed therein. Investments such as are contemplated by my invention are formed as follows: After mixing the above ingredients in the proportions set forth above or other proportions, if desired, the same will be mixed with enough water so that the mixture will just pour. This mixture is then poured into a flask within which a pattern has previously been placed and there allowed to harden. After the investment has hardened sufficiently to withstand handling within the flask it will be heated to drive out the remaining water. The pattern, which is of a meltable material such as wax, will then be melted out of the investment and the pattern holding pin withdrawn to form the sprue or gate through which the metal to be later melted can be forced into the impression. After the above operations, the investment will be placed in the casting machine and the metal brought to the molten state under the action of a blowpipe or acetylene torch and then forced into the mold.

After the casting operation has been car-

ried out, the investment, together with its flask and enclosed casting when submerged in water, will completely disintegrate and crumble away from the casting, leaving it clean and bright. This latter feature constitutes a further advantage in addition to its high temperature characteristics, as it makes the problem of removing the casting less difficult than when ordinary present-day materials having much lower temperature characteristics are used.

While I have described a preferred embodiment of my invention as now known to me, it is to be understood that various changes may be made therein without departing from the spirit of the invention as defined in the appended claims.

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

1. A mixture for forming investments suitable for the casting of high melting point metals and alloys composed of at least 50% magnesium oxide and the remainder calcium sulphate.

2. A mixture for forming investments suitable for the casting of high melting point metals and alloys composed of substantially 75% magnesium oxide and 25% calcium sulphate by weight.

3. A mixture for forming investments suitable for the casting of high melting point metals and alloys containing not less than 50% fused magnesium oxide and the remainder calcium sulphate.

4. A mixture for forming investments suitable for the casting of high melting point metals and alloys containing from 50% to 90% magnesium oxide and, respectively, from 50% to 10% calcium sulphate.

5. An investment for melting and casting platinum and its alloys composed of not less than 50% magnesium oxide with calcium sulphate as a binder.

6. An investment for melting and casting high temperature metals and alloys composed of not less than 50% fused magnesium oxide and the remainder a suitable binder.

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