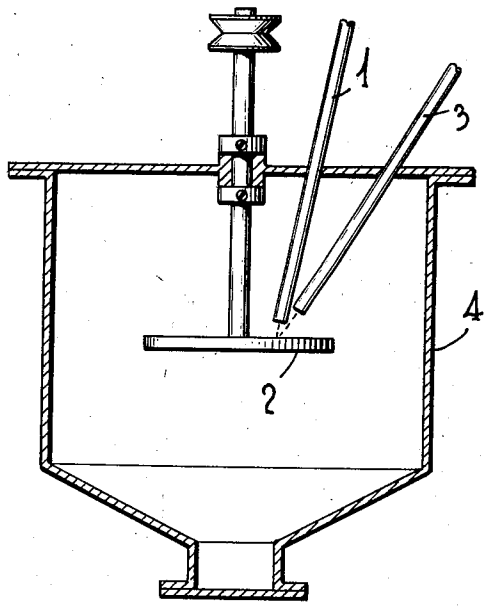
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PROCESS FOR THE CONVERSION OF METALS AND METAL ALLOYS IN FINELY DIVIDED FORM FOR THE MANUFACTURE OF DENTAL AMALGAMS

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PROCESS FOR THE CONVERSION OF METALS AND METAL ALLOYS IN FINELY DIVIDED FORM FOR THE MANUFACTURE OF DENTAL AMALGAMS

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1 Claim. (Cl. 83—91)

For the manufacture of amalgams for dental purposes from solid metals, as for instance, silver tin alloys or the like and mercury, it is necessary to convert the solid metals or alloys into a finely divided form adapted to amalgamate with the mercury. To this end various ways have been suggested. For instance, the alloys were converted by filing into grains, these grains like filings transformed by rolling into thin sheets or foils which were used subsequently for the manufacture of amalgams. Furthermore, the particles obtained by crushing means such as planing, filing or milling were transformed into thin foils by impact effects, for instance, pneumatic hammers, strike hammers or the like. Likewise, these particles, obtained by filing means such as rolling, milling or planing, may be subjected to an additional operation of rolling.

All these measures, however, which subjected the alloys to radical, often multiplied mechanical treatments, thereby causing an undesired change in the character of the alloys, have not proved entirely satisfactory.

The object of our invention is the manufacture of amalgams for dental purposes by converting the usual solid metals or alloys into the necessary finely divided form by subjecting them in a molten condition to a comminuting operation and afterwards treating them with mercury.

The comminution of the melts may be carried out, for instance, in such a way that on the one hand the melts are sprayed or atomised by blowing a current of gas into a jet or melt or, on the other hand, with the aid of rapidly rotating impact devices. Furthermore, this comminution process may be aided by well known means, for instance, by centrifuging the particles of the melt against reflecting surfaces, whereby the melt is still further comminuted. Similarly suitable procedures, such as cooling, promote the comminuting and setting process.

A particularly advantageous method of carrying out our invention is to effect the comminution of the alloy melt by causing the same to impinge on rapidly rotating elements, for instance discs, and at the same time effecting rapid cooling. Cooling liquid may for example be caused to impinge on the rotating disc simultaneously with the molten material, for example by spraying, and be atomised together with the metallic melt. The rotating disc is cooled thereby and owing to the sometimes explosive evaporation of the cooling liquid, the cooling of the metallic melt is promoted and at the same time an advantageously acting vapour atmosphere is produced in the comminuting chamber. If necessary, the walls of the atomizing space may also be cooled and/or the sprayed material be intercepted in liquids.

Our invention may, for instance, be carried out in such a way that the melt, for instance, a silver tin alloy, suitable for the manufacture of amalgams for dental purposes, which may contain still further additions, for example, gold, platinum, bismuth, zinc or the like, impinges in the form of a jet on a rapidly rotating disc mounted in a closeable container, at the same time spraying cooling water, for example with the aid of nozzles, on to the disc. The melt impinging on the disc is torn by the action of centrifugal force into fine or extremely fine particles. Depending on the speed of rotation of the disc, the thickness of the jet of melt, speed of feed (height of fall), viscosity of the melt etc., the process may be extensively controlled, for example, with regard to the degree of fineness of the product. By spraying cooling water onto the disc, the comminution of the melt is promoted; the disc is cooled and owing to the spraying and atomisation of the cooling agent a vapour atmosphere is produced, by which the particles traversing the same are cooled and are prevented from depositing on the walls of the container.

Particularly good effects are obtained by effecting the cooling by the combined use of cooling liquid and cooling gas, for example, by impinging cooling liquid on the disc and simultaneously spraying it with the melt and also introducing cooling gas into the comminuting chamber.

According to one embodiment of our invention gas is conveyed in such a way and at such speed through the atomising zone, that not only a cooling action is exerted, but at the same time finely divided material centrifuged off from the disc is further conveyed off through a gas stream. In this way it is possible to control the time intervening between the conversion of the melt into a finely divided condition and the collection of the finely divided material in a desired manner and for example to prevent too rapid deposition thereof. An alternative procedure is for example to convey the particles formed or portions thereof with the aid of the gas stream into deposition or collecting chambers connected with the atomising chamber. In this way it is possible to obtain the particles in individual fractions after the manner of wind-sifting.

The nature of the gas to be employed depends upon the nature and susceptibility of the alloy to be worked up. Nitrogen, hydrogen, carbon diox-

ide, producer gas, illuminating gas and the like may for example be employed.

When working up metals or alloys which tend to react with water under the given conditions, inert liquids, such as benzene or the like, may be employed.

Our invention offers the possibility of conversion of metals and alloys to be worked up to amalgams for dental purposes into particles which excel in particularly good grinding up and easy amalgamation. The alloys according to our invention result in a form which may be used immediately for dental fillings without any subsequent special ageing process. This excellent quality does not tend to alter afterwards.

The process of our invention may be carried out in a simple way. It is particularly efficient and may be easily controlled. A further advantage will be found inter alia that impurities which hitherto might be introduced into the alloys with the usual procedures such as filing, planing, turning, milling or hammering, are strictly avoided.

The accompanying drawing diagrammatically shows, by way of example, an apparatus suitable for carrying out the process in accordance with the present invention.

In the drawing **1** represents the feed tube for the cooling fluid, **2** the feed tube for the molten material, **3** a rapidly rotatable disc, and **4** the container in which the disc is disposed.

What we claim is:

A process for the conversion into a finely divided state of alloys consisting principally of silver and tin and intended for the production of dental amalgams, which comprises causing the alloy in a molten condition to impinge against a rapidly rotating surface, spraying the surface with a cooling liquid, and to cause the melt thereby to be subjected to centrifugal action and thereby thrown against a cooled surface, and further conveying the centrifuged material further by a gas stream after the manner of wind sifting, thereby converting the alloy into very fine particles.

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