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PROCESS OF MANUFACTURING  
COMPOSITE METAL BODIES  
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Fig. 1

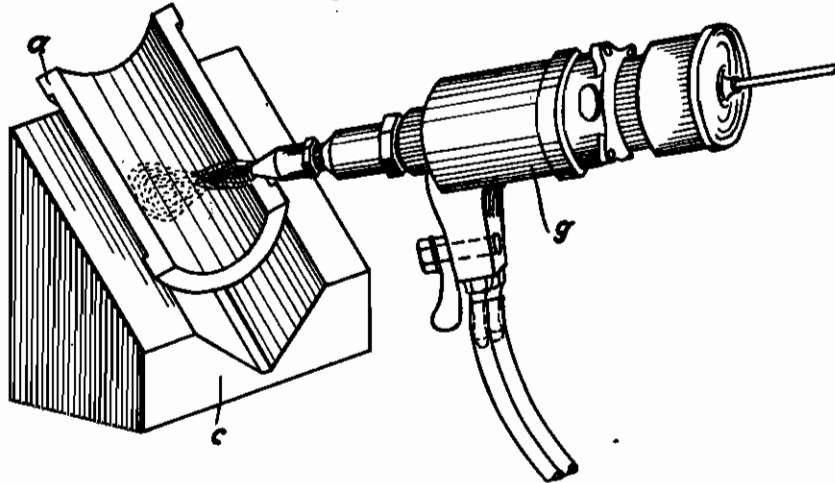


Fig. 2

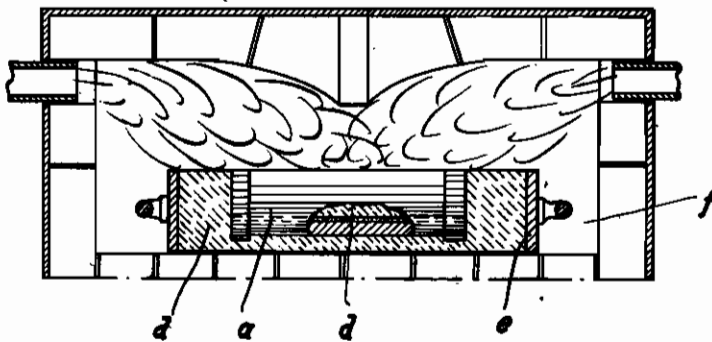
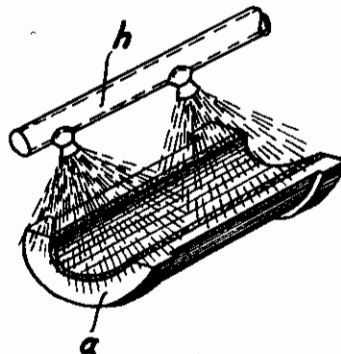


Fig. 3



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# ALIEN PROPERTY CUSTODIAN

## PROCESS OF MANUFACTURING COMPOSITE METAL BODIES

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My invention relates to improvements in the process of manufacturing composite metal bodies, and more particularly in the process in which molten metal is sprayed onto a solid body for coating the same, and the object of the improvements is to provide a process by means of which the sprayed metal is intimately bound to the body of solid metal.

It has heretofore been proposed for preventing oxidation of the metal being sprayed on the metal body by a current of a gaseous fluid, to use an inert gas such as nitrogen for carrying the molten drops of metal onto the surface, or to spray the metal together with a deoxidizing medium which is molten together with the metal and provides a protecting coating for the drops being sprayed. I have found that by this method oxidation of the surface of the solid body of metal is not prevented, because in case of inert gas being used as a protecting medium the said gas does not protect all the parts of the basic body from the oxygen of the air, and, in case of a molten deoxidizing medium being used, by reason of their higher gravity, the metal drops remove the deoxidizing medium from the surface of the basic body by their impact.

The object of the improvements is to provide a process in which oxidation of the surface of the basic body is prevented, and with this object in view my invention consists in applying the deoxidizing medium to the surface of the basic body prior to spraying the metal or metal alloy onto the same, and after spraying subjecting the basic body and the metal sprayed thereon to heat treatment for intimately binding the coating to the basic body.

For the purpose of explaining the invention apparatus for carrying out the process has been shown in the accompanying drawing, in which

Fig. 1 is a perspective view showing a metal spraying apparatus and a basic body to be coated,

Fig. 2 is a sectional elevation showing an apparatus showing the basic body with the coating applied thereto and apparatus for subjecting the same to heat treatment, and

Fig. 3 is an elevation illustrating the cooling of the combined metal body.

For the purpose of explaining the invention I have illustrated the same as embodied in a process for lining a bush with lead bronze. But I wish it to be understood that my invention may be used for applying a coating of a metal or metal alloy to various basic bodies such for example as gear wheels, valve plugs, multi-layer bearings, etc. By my improved process the coating metal is intimately bound to the basic body and therefore I am enabled to apply the coating in exceedingly thin layers to the whole surface of the

basic body or a part thereof. For example, in case of gear wheels it will frequently be sufficient to apply the coating only to the surfaces of the teeth.

5 The basic body may be made from iron, steel, and other metal. The coating metal, such for example as lead bronze, may be applied by means of the well-known spraying gun, and it may be a metal or an alloy in the form of a rod, wire, or powder.

10 Referring now to Fig. 1, the letter *a* indicates the basic body in the form of a bush, the said basic body being placed on a suitable support *c*. Near the said support, a metal spraying device *g* is located, which may have any known or preferred construction. The details of the said spraying apparatus, such as the means for heating the metal, feeding means for the metal and means for producing a blast of air or another gaseous fluid are known in the art, and I deem it not necessary to describe the same in detail.

20 Before the metal is sprayed onto the surface of the body *a* to be coated, a suitable deoxidizing medium such as borax is applied to the said surface, whereupon spraying begins.

25 After the desired thickness of metal has been applied the basic body with the coating applied thereto is embedded all around in a body of sand *d* confined in a box of iron *e*, as is shown in Fig. 2, and the said body is brought into a fire place *f* for being heated therein. To prevent oxidation of the metal the sand may have a deoxidizing medium such as charcoal powder admixed thereto. The body is heated for a suitable length of time depending on the thickness of the body and the desired diffusion of the metal at a temperature of from 900 to 1000° C. According to various conditions such heating may be extended to from 1½ to 10 hours.

30 I have found that it is sufficient to heat a bush having a thickness of 5 millimeters for about 1 hour at a temperature of from 900 to 1000° C. By such subsequent heating the metal coating diffuses into the basic body, whereby it is intimately bound thereto.

35 After the said subsequent heating the body is taken from the box and placed on a suitable support for being cooled by means of cooling water sprayed thereon by means of a nozzle *h*.

40 In my improved process the deoxidizing medium prevents oxidation of the basic body as well as the sprayed metal drops, and it reduces any oxidized metal which may be present. In the heating treatment following the spraying of the metal the deoxidizing medium has the function to prevent oxidation of the basic body or to reduce oxidized metal.

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