

UNITED STATES PATENT OFFICE

1,979,372

METHOD OF MAKING HARD BODIES

Emil Dühme, Berlin-Siemensstadt, and Emil
 Cremer, Berlin-Charlottenburg, Germany, as-
 signors to Deutsche Edelstahlwerke Aktiengesellschaft, Crefeld, a corporation of Germany

No Drawing. Application November 25, 1932,
 Serial No. 644,268. In Germany November 27,
 1931

3 Claims. (Cl. 75—1)

Our invention relates to a method of making hard bodies, particularly tools, such as turning tools, dies, punches and the like consisting of alloys which contain as essential constituents one or more highly refractory metallic carbides and a binding metallic substance. In making such hard bodies, as a rule carbides and metals are employed in the form of a pulverized mixture. The pulverized mixture is shaped and made compact by pressing and is finally heated in one or more operations to a temperature which lies in the neighborhood of, or above, the melting point of the binding metallic substance. Before applying heat to the pressing, the latter may, if desired, be subjected to a further machining of the surface by a cutting tool.

In making such alloys, the pulverized mixture before being pressed is mixed according to the invention with a small quantity of a liquid substance, which does not form an essential constituent whatever as to the properties inherent in the body to be manufactured but is merely employed to facilitate the gliding of the individual particles of the pulverized mixture during the pressing. To this end, a gliding agent is utilized consisting of a substance which disintegrates or volatilizes during or after the pressing process. As gliding agent above all an alcohol such as, for example, glycerine may be employed.

An essential feature of the invention consists in the fact that the quantity of gliding agent added to the pulverized mixture should be very small and should amount to about 1 per cent at most by weight of pulverized mixture. By the method according to the invention a highly compact texture is obtained during the pressing and, consequently, a greater strength of the pressed bodies or pressings.

As gliding agent glycerine has proved of particular advantage in making hard alloys, which contain as constituents chiefly titanium carbide, molybdenum carbide, tantalum carbide or tungsten carbide and the like or mixtures or double carbides and to which a small percentage of

nickel, cobalt, iron or the like or also several of these metals are added.

The gliding agent is distributed as finely as possible over the entire pulverized mixture, which may be accomplished by spraying it on the pulverized mixture.

By the method according to the invention pressings are obtained whose strength is considerably greater than that of the pressings obtained by the method hitherto employed. Not only the further treatment of the pressed body or pressing is greatly simplified, but also the finished product exhibits better qualities.

We claim as our invention:

1. A method of making tools of hard metal carbide and binding metal, which comprises mixing the powder of hard metal carbide and the powder of binding metal with not more than 1% of finely divided glycerine by weight, pressing the mixture into compact form, working the surface thereof by means of a tool, and subsequently driving off the glycerine and sintering the mass by heat.

2. A method of making tools of hard metal carbide and binding metal, which comprises preparing a mixture of hard metal carbide and the powder of binding metal with an extremely thin film of not more than 1% of glycerine by weight thoroughly distributed over the surface of such powder, pressing the mixture into compact form, tooling the surface of the compact form, and subsequently driving off the glycerine and sintering the mass by heat.

3. A method of making tools of hard metal carbide and binding metal, which comprises spraying not more than 1% of glycerine by weight over the particle surfaces of a mixture of hard metal carbide powder and binding metal powder, pressing the mixture thus prepared into compact form, tooling the surface thereof, and subsequently driving off the glycerine and sintering the tooled body by heat.

EMIL DÜHME.
 EMIL CREMER.

100

105

110