

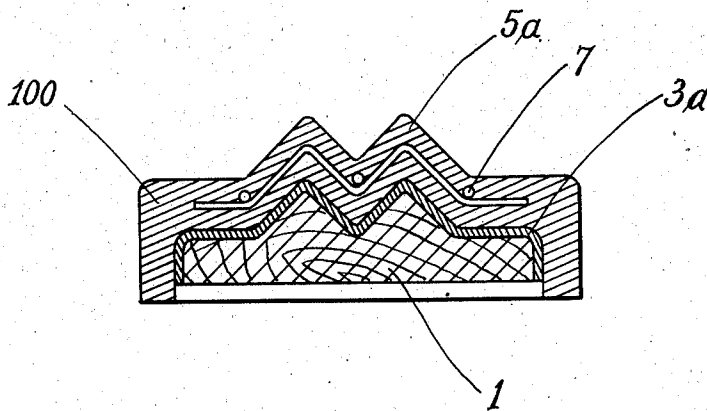
July 7, 1942.

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2,288,658

PRODUCTION OF SPRAY METAL MOLDS

Original Filed May 22, 1939



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2,288,658

PRODUCTION OF SPRAY METAL MOLDS

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Original application May 22, 1939, Serial No. 274,951. Divided and this application May 29, 1940, Serial No. 337,790. In Great Britain January 11, 1938

4 Claims. (Cl. 22—200)

The invention relates to the production of spray metal molds of the type that are particularly useful in the casting or molding of plastics such as synthetic resins, rubber, celluloid or glass and the like. This is a division of my application Serial No. 274,951, filed May 22nd, 1939.

At the present, molds for this use are generally produced by cutting the molds from solid metal blocks by means of machining and engraving tools. This method involves considerable time and expense and is not commercially practicable for low-cost production, except when the molds thus made are used in mass production, where the cost of the mold can be distributed over numerous products made therefrom. Even then the length of time necessary to produce a mold is a material drawback.

A few attempts have been made to produce molds for this work by spraying metal upon a model or a positive and thus forming a mold or negative. Such attempts were unsuccessful because of distortion and inaccuracy and the tendency of the sprayed metal to peel off the model, particularly when spraying with metals having a fusion point above 600° C. This tendency to peel is apparently due to uneven thermal stresses produced in the metal when it is sprayed upon the model and is particularly prevalent when the metal is sprayed to a thickness exceeding 0.1 millimeter, or 0.0025 inch. This "peeling" makes it impossible to spray an accurate negative or mold having sufficient strength or rigidity for any practical use and particularly a strength or rigidity capable of resisting the normal pressures present in molding operations.

It is the purpose of my present invention to produce an accurate and usable negative or mold economically and commercially by spraying a model, either the original or a reproduced model, in such a manner as to overcome the heretofore mentioned difficulties, as well as other defects and limitations.

Further objects and their resultant advantages will be apparent from the following description taken in connection with the drawing representing a cross-sectional side elevation of one embodiment of my invention.

In accordance with the invention a suitable model is first coated with a suitable spray metal. A suitable metal form or insert is thereafter placed onto the coated model, whereupon spray metal is applied over the coated model and form, substantially covering both, to any desired thickness.

Referring to the drawing, my invention is ex-

emplified in connection with a particular mold making process by way of illustration but not of limitation. As there shown, a model of suitable material such as the model 1 of, for example, wood is to be reproduced. This model may be roughened, if desired, by any suitable means, such as sanding or sand-blasting. The model is coated with a suitable metal by spraying the top and sides of the model. A suitable metal form or insert such as the cage or wire form 7, preferably shaped as closely as possible to the outline of the model surface, is placed over the coated model. Additional spray metal is thereupon sprayed over the entire coated model and form so as to substantially cover the coated model and wire form. The spray metal coating thus carries embedded therein the metal form 7. The spray metal coating may be increased to any desired thickness by repeated sprayings to form a negative or mold which, because of the thickness of the coating and the added rigidity of the wire 7 has sufficient strength to withstand the uses to which it is to be put. After the spray metal coating has reached the desired thickness, the negative or mold made up of the spray metal 3a and 5a and wire form 7, is separated from the positive or master model 1 and the flashing or rim 100 removed, if desired, by any suitable method, such as chiseling or milling.

In the specific mold making process illustrated, the model has preferably received a spray metal coating composed of two different metals, forming the coating 3a of suitable low melting point metal, such as tin, and the coating 5a of a harder metal, such as zinc. The resulting compound spray metal mold may be used with advantage where it is desired to make from the same, by the metal spray process, a duplicate of the original model, as for instance, by spraying onto the face of the mold a higher melting point metal and recovering a substantial duplicate of the original model by melting off the coating of low melting point metal, such as tin. This procedure is particularly advantageous where the surface of the original model does not permit the direct spraying with a particular spray metal.

Accurate molds may thus be produced in accordance with the invention at a low cost, which molds are satisfactory and adequate for the reproduction of molded articles, even if such articles are desired for samples or small consumption rather than for mass production, in which case it was heretofore economically impossible to do this because of the expense in producing a mold. The material of which a particular sprayed

mold is to be made may be selected according to the conditions to which it is to be subjected or the use to which it is to be put. For example, aluminum or aluminum alloys, bronze or similar metals may be used if little strain is to be put on the mold or if the number of articles to be made therefrom is small. If, on the other hand, however, the mold is to be used for mass production, or if for any other reason it must be of harder material, such metals as steel, nickel, or chrome-nickel alloys or the like may be used.

The spray metal mold in accordance with the invention may be used either for the production of another model or the reproduction of articles.

It will be apparent to those skilled in the art that minor variations and deviations from the foregoing as described may be indulged in without departing from the spirit and scope of this invention, as defined in the appended claims.

I claim:

1. Method of making a spray metal mold which comprises spraying a coating of spray metal onto a model, placing a metal form insert onto and substantially across the surface of said coated model, spraying metal onto said metal form insert and coated model, and recovering the spray metal mold thus formed.

2. Method in accordance with claim 1 in which a wire shape is placed onto and substantially across the surface of said coated model.

3. Method of making a spray metal mold in accordance with claim 1 in which a wire shape substantially corresponding in surface contour to the contour of the surface of said model is placed onto and substantially across the surface of said coated model.

4. Method of preventing warping in the manufacture of a spray metal mold which comprises applying to a master a preliminary substantially even surfaced coherent first coat of spray metal, at least part of said coat being so bonded as to be strippable from said master thereafter placing substantially across said first spray metal coat at least one metal insert of high tensile strength in substantially snug fitting contact with said first spray metal coat overlaying said strippable part, spraying metal onto the insert fitted first spray metal coat at least until said insert is substantially imbedded in spray metal, removing the spray metal shell and imbedded insert thus formed and recovering a spray metal mold having said insert as an integral constituent part thereof.

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