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N. ROLASTON

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MANUFACTURE OF WAX MODELS FOR PRECISION CASTING

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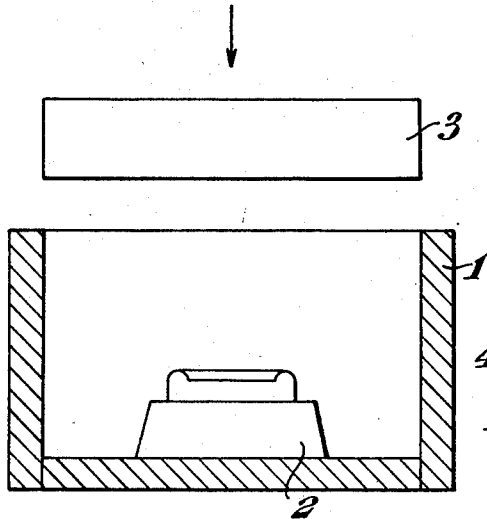


Fig. 1.

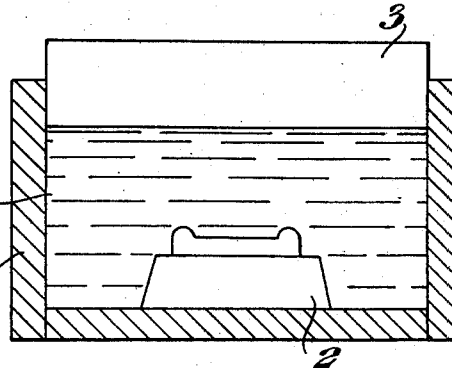


Fig. 2.

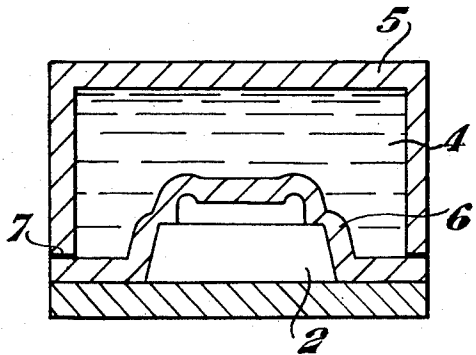


Fig. 3.

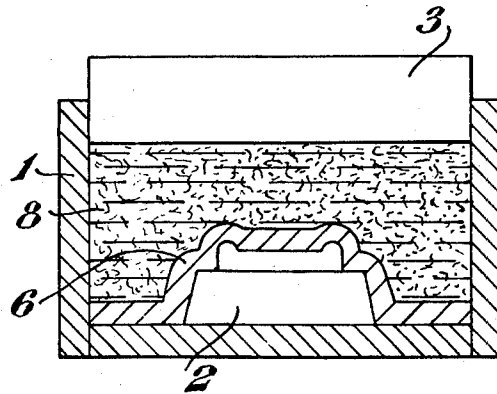


Fig. 4.

Inventor:
Norman Rolaston,
By his attorneys:
Baldwin, Wight, & Prevost

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MANUFACTURE OF WAX MODELS FOR
PRECISION CASTING

Norman Rolaston, London, England, assignor to
British Industrial Plastics Limited, London,
England, a company of Great Britain

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2 Claims. (Cl. 18—55)

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This invention relates to the manufacture of wax models for precision casting.

The primary object of the invention is to ensure that the shape and configuration of the master die or mould (hereinafter called the "former") will be accurately reproduced in all respects in the wax model. This is difficult, if not impossible, to achieve by the normal method in which the mould box, in which the former is situated, is filled with molten wax, because the contraction of the wax on cooling and the different rates of cooling in different parts of the wax cause, especially when the mass is large, the surface in contact with the former to sink or draw away at one place or another and thus give rise to inaccuracy.

A secondary object of the invention is to reduce or eliminate the risk of bursting, cracking or deforming of the body of refractory material, or "investment" as it is called, which is cast about the wax model to produce the mould for the precision casting. This risk, which is considerable in the case of large wax models, is due to the expansion of the wax when it is heated for the purpose of withdrawing it from the investment.

The process of the invention, whereby these objects are achieved, is characterised by charging molten wax into the mould box in sufficient quantity to cover the surface of the former whose shape or configuration is to be reproduced and, after a layer in contact with said surface has cooled sufficiently to adhere thereto, but not so much as to have lost softness, any wax remaining molten is removed and replaced by a charge of powdered, flaked or granulated solid wax at room temperature which is compressed into a coherent mass welded to the aforesaid layer. Generally an excess of molten wax is charged into the mould box and therefore there will remain a substantial amount of molten wax to be removed after the contact layer is solidified. In some cases, however, particularly where simple contours without intricate detail are involved, it may be unnecessary to charge more molten wax than is sufficient to produce the contact layer.

By such process all difficulties due to contraction and differential cooling are obviated, due to the fact that the main bulk of the wax body consists of a wax utilised at ordinary temperature. The wax model which is produced thereby has a densified shaped and configured surface accurately corresponding to that of the former, and a backing or filling of less density. Accordingly when the mould has been invested and is heated for removal from the investment, the expansion of the individual granules or particles

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within the less dense or spongy mass cannot develop the same internal pressure as would be developed by the heating and consequent expansion of a dense mass which is produced by the freezing of an initially liquid wax charge.

The process is capable of modification whilst still achieving substantially the objects of the invention. For instance, the dense layer of the wax model may be produced by the fusion or softening against a heated former of wax charged into the mould box in the solid state, whilst the less dense backing or filling is produced by compression of the solid particles, flakes or grains which have not been caused to melt.

It should be understood that the term "wax" used in this description and the claims includes other materials useful for the production of models by what is generally known as the "lost wax" method. It therefore includes thermoplastic substances such as synthetic polystyrenes, and also low melting point alloys such as Wood's Metal.

The process of the invention is illustrated by the use of drawings comprising Figures 1, 2, 3, and 4 which are in sectional elevational and which, respectively, represent four successive stages in the operation of the process.

In the drawings, 1 is a mould box, 2 is a former whose shape and configuration have to be reproduced, and 3 is a plunger which slidably fits into the mould box.

As shown in Figure 1, the former 2 is positioned in the mould box 1, the latter being empty and the plunger 3 being withdrawn. In Figure 2, molten wax 4 is shown as having been poured or injected into the mould box, and the plunger has been lowered to apply pressure.

Figure 3 shows the condition of the wax, with the plunger and mould box removed, after a period of cooling. A body of the molten wax 4 is surrounded by a shell 5 of wax which has solidified but which has not completely hardened. The layer 6 of the shell 5 is closely bedded upon the former 2 at all points. At this stage, the shell 5 above the layer 6 from the line 7 is thereupon removed, the molten wax being released and withdrawn.

Figure 4 shows the former 2 with its adherent layer 6 of solidified wax in the mould box into which a charge of powdered, flaked or granulated solid wax 8 has been introduced. The plunger 3 is compressing the charge 8 into a compact coherent mass welded to the layer 6, which then constitute the wax model which is removed from the former and thereafter invested in the customary manner.

I claim:

1. Process for the manufacture of a wax model of a master mould for precision casting by the lost wax method, consisting in forming the shaped face of the model of a layer produced from wax which has been heated so as to be fluid and partly solidified on the die surface of the master mould, and forming the body of the model from subdivided solid wax by compressing it in the mould against said partially solidified layer and thus welding the body into a coherent mass and to the said layer, while the latter is still capable of flow and is still in contact with the die surface.

2. Process for the manufacture of a wax model of a master mould for precision casting by the lost wax method, comprising the steps of introducing molten wax into the master mould and forming therefrom upon the die surface thereof an adherent layer of partially solidified wax, removing molten wax, if any, which remains in

the mould after formation of said layer, charging into the mould against said layer subdivided solid wax and compressing it into a coherent mass and thus welding said solid wax to said layer while the latter is still incompletely solidified and is still in contact with the die surface.

NORMAN ROLASTON.

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