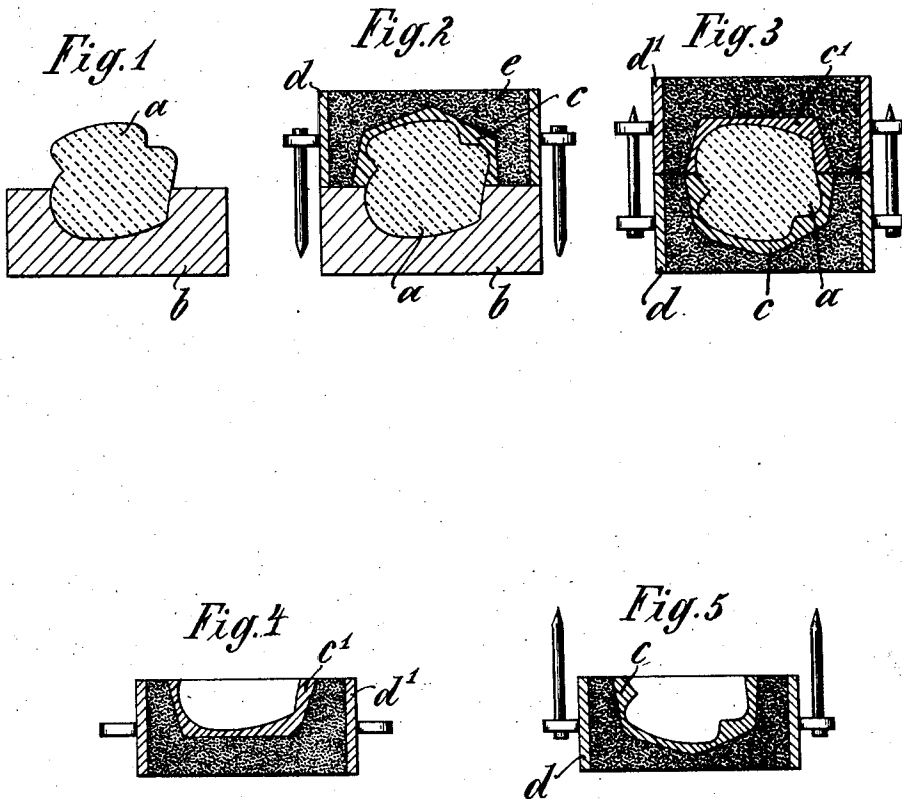


No. 805,144.

PATENTED NOV. 21, 1905.

M. KÜLLER.
PROCESS FOR MAKING MOLDS.
APPLICATION FILED NOV. 21, 1902.



Witnesses:

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UNITED STATES PATENT OFFICE.

MAX KÜLLER, OF BUDAPEST, AUSTRIA-HUNGARY.

PROCESS FOR MAKING MOLDS.

No. 805,144.

Specification of Letters Patent.

Patented Nov. 21, 1905.

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To all whom it may concern:

Be it known that I, MAX KÜLLER, a subject of the King of Prussia, German Emperor, and a resident of Budapest, Empire of Austria-Hungary, have invented a certain new and useful Process for Making Molds, of which the following is a description.

The object of the present invention is to produce a mold into which molten metal may be cast from models or patterns even of the most complicated nature with recesses and undercuts without the employment of false core and without employing wax or elastic or flexible intermediate models or patterns. This object is obtained by mixing suitable ingredients with the mold-forming mass, which is plastered onto the model or pattern in a pasty consistency, which ingredients impart to the said mass the property or capability of becoming elastic or flexible for a certain time and under certain conditions. This enables the mass which subsequently forms the mold to be removed from the model or pattern without, however, damaging or altering the impression obtained. The mass is subsequently rendered quite hard, retaining the impression even to the smallest details, and after having been dried forms the mold into which the metal is cast.

In carrying out the process the mass of which the mold is made—such, for instance, as sand, infusorial earth, fire-clay, wood or coal dust, tow-waste, molasses, or the like—together with a suitable proportion of a binding medium—such as plaster-of-paris, resin, glycerin, dextrin, Arabic gum, or other suitable substance, or even without such addition—is mixed up with a solution of an elastic material—such, for instance, as glue, gelatin, agar-agar, caoutchouc, gutta-percha, or the like—in a warm or cold condition. The pasty mass thus obtained is pasted in an even layer onto the model or pattern. This mass will become flexible in a short time, but remains sufficiently tough to enable it to be moved or pulled in any direction without breaking or tearing. The mass may consequently be stripped or carefully pulled off the model or pattern and subsequently become perfectly rigid or hard. This subsequent hardening is due to the fact that the above-mentioned mass—sand, infusorial earth, or the like, with or without the addition of resin or the like—is first held together by the elastic or flexible substance added and that the binding medium—for instance, in the case of plaster-of-paris—does not harden at once,

owing to the effect of the elastic substance on it, but only after the elapse of some little time. If resin is employed as a binding medium, the same may be rendered effective—*i. e.*, the hardening attained—by the application of heat. If now substances are added to the fluid mass or coated onto the mass after it has attained its elastic state which are capable of rendering the elastic substances (glue, gelatin, and the like) insoluble—such, for instance, as alum, chromates, formalin—the gelatin or the like cannot dissolve, and when dried very strong molds will be obtained from which the elastic substances may either be burned out (by glowing) or may be removed by suitable dissolving acids. By this means the necessary gas porosity is attained, which may be increased by adding suitable materials—such as resin, tow-waste, coal dust, or the like—which will burn out when drying.

In the accompanying drawings, Figure 1 shows a model or pattern, such as a bust supported upon a suitable base. Fig. 2 shows the same pattern or bust partly covered by the material of which the mold is made, the latter being surrounded by a sand bed held within a mold-box. Fig. 3 shows bust completely covered by the material of which the mold is made with the inclosing sand bed and mold-box. Figs. 4 and 5 show the parts of the mold-box separated and the pattern removed, but with the mold parts in place.

In carrying out my invention I proceed as follows: For instance, in casting a bust *a* having many recesses and undercuts the model is first embedded to its half in sand *b*, clay, or the like, and a thin even layer *c* of the mass previously described is applied to the open half and the exterior of the mass smoothed over. A mold-box *d* is then placed over this half, and sand *e* is stamped onto the whole mass. The whole model is then turned over, and the half of the same previously embedded is laid free and treated in exactly the same manner as that described. If now the two parts *d d'* of the mold-box are removed, the elastic flexible layers *c c'* will remain on the model. This flexible coating forming the actual mold may then be carefully taken or stripped off the model and each half then laid in its respective mold-box, where it is allowed to harden or caused to harden by heat or in any other manner, according to the ingredients employed in making the mass as previously specified. In this

state the overhanging parts of the mold thus formed may be temporarily supported by pins or struts, and the core is made in the usual manner.

- 5 If to the plaster-of-paris, sand, infusorial earth, fire-clay, or the like substances such as resin, coal-dust or carbon-dust, tow-waste, or the like are added, the glowing or burning will be unnecessary, since these substances
10 burn or vaporize in the ordinary heat of the drying-furnace. The necessary porosity may be attained by suitable dissolving means or by employing acids, in which case the molds will be sufficiently pervious to render the
15 casting of iron in the same possible.

According to one method of producing the mold-forming mass about seventy-five grams of best gelatin are melted in about 1.56 liters of water slightly warmed. 1.4 kilograms of
20 finely-sieved molders' sand are then finely mixed with one kilogram of best plaster-of-paris, and this mixture is added to the gelatin solution above mentioned, the whole being gently stirred, the mass being then ready for
25 use.

I claim as my invention—

1. The herein-described process of producing molds for casting metals from a mold-forming material having the quality, at successive stages, of taking an impression, of
30 elasticity or flexibility permitting withdrawal without impairing the impression and of hardening to receive molten metal, consisting in

first applying the mold-forming material to the pattern or model; allowing the mass to set
35 sufficiently to secure a permanent impression; removing or stripping the mass while elastic from the pattern or model; allowing it to harden and finally imparting to it the nature of a sand mold by means of heat. 40

2. A process for producing molds for casting metals which consists in applying to the model or pattern a substance, possessing the property of becoming elastically flexible before it hardens, removing the said coating, 45 while in its elastically-flexible state from the model or pattern, hardening the material and finally reducing it to a refractory sandy condition by heat.

3. A process for making molds for casting 50 metals which consists in first applying to a model or pattern a mold-forming mass, consisting of a body material, an elastic element and a binding medium; allowing the mass to receive an impression of the model or pattern 55 and assume the elastic condition; removing the mass from the model while in an elastic condition, subsequently hardening the same and reducing it to the condition of a sand mold by heat. 60

In witness whereof I have hereunto set my hand in presence of two witnesses.

MAX KÜLLER.

Witnesses:

FRANK DYER CHESTER,
NORMAN W. WILLEY.