UNITED STATES PATENT OFFICE.

CHARLES PACK, OF NEW YORK, N. Y., ASSIGNOR TO DOEBLER DIE CASTING COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

DIE-CASTING PROCESS.

1,416,412.


To all whom it may concern:

Be it known that I, CHARLES PACK, a citizen of the United States, residing in the borough of Queens, county of Queens, city and State of New York, have invented certain new and useful Improvements in Die-Casting Processes, of which the following is a specification.

This invention relates to processes for producing die-castings, and, in particular, to processes for casting under cuts in die-castings.

In producing die-castings all of the surfaces of the mold cavity against which the casting is formed must be maintained rigid until the casting has become sufficiently set and cooled to permit of its removal from the mold. The mold members are usually of steel, but the usual steel member cannot be used in casting an under cut in a die-casting because it cannot be removed from the casting after the casting has become set.

One of the objects of my invention is to provide a process for casting under cuts in die-casting, and, my invention, which is thought to be broadly new, primarily consists in casting the desired under cut in die-casting about a mold unit or core of material having a fusing point lower than that of the alloy used for the casting, so that after the casting has set, by applying a heat sufficient to melt the unit or core, but not sufficient to melt the casting, the unit or core may be melted and withdrawn from the casting.

Another object of my invention is to provide a mold unit or core adapted to be inserted in a mold cavity, for the formation of a die-casting thereabout, and of such character that it will remain sufficiently rigid during the formation of a casting, but may readily be melted away from the casting without melting the casting, such mold unit or core being provided for use in carrying out my improved process.

Other objects will be in part obvious and in part pointed out hereinafter.

In carrying out the process of my invention a mold unit or core is made of some metal that has a lower fusing point than the alloy used in making the casting. The unit is then coated with some metal having a higher fusing point than the alloy used for the casting. This unit is then supported in a suitable position in the mold cavity of the die-casting mold, and the metal to form the casting is flowed into the mold in the usual manner with the portion forming the under cut abutting the unit.

After the casting has been sufficiently set, the casting, together with the unit, is removed from the mold and thereafter sufficient heat is applied to melt the unit but not the casting, and the material forming the unit is allowed to flow away from the casting. Usually the melted unit will carry with it its surface coating of material of high fusing point, but should any of such material be left behind on the casting it may easily be removed on account of its sheerness.

It is obvious that this invention is not limited to the use of any particular metal, or alloy, since many different materials or alloys may be used for the core or unit with satisfactory results. Similarly, many different materials may be used for the coating of the core. Moreover the choice of materials may be varied according to the character of the material, or alloy used for the casting. For example, in making castings of alloys of aluminum it has been found satisfactory to use either lead or zinc or alloys of lead and zinc for the core, and to use either copper or nickel for its surface coating. Such coating may be readily deposited on the mold unit or core electrolytically. The coating need not be very thick, for in die-casting the metal usually fills the mold quite rapidly and very little opportunity is given for the heat from the molten metal to fuse the core.

The character of the core should be such that, when properly coated, the core will remain sufficiently rigid while the casting is becoming set, and also be readily fusible after the casting has become set by the application of heat insufficient to melt the casting. The thickness and character of the coating should be such that it will prevent the mold unit or core from becoming prematurely distorted or melted, and yet, of such character and thinness that it will break down and flow away from the core or mold unit when the latter is purposely melted to remove it from the casting.

From the foregoing it is evident that an apparatus or device suitable for carrying out the process of this invention includes, essentially, a suitably shaped mold unit or
core of material having a lower fusing point than that of the material used for the casting, and adapted to have the casting formed about the unit and, after the casting has set, adapted to be melted away to leave the casting free.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming part of this application and illustrating one manner in which my improved process may be practiced, together with an improved apparatus for practicing the same, and in particular as applied to the die-casting of a spout for a tea pot or coffee pot. In the drawings, Fig. 1 shows a mold unit or core, about which a casting under cut or interior may be formed, in position in a mold cavity; Fig. 2 is similar to Fig. 1 and shows the metal filling the mold cavity; Fig. 3 is a sectional view of the casting as formed about the mold unit or core; and Fig. 4 is a view of the casting after the mold unit or core has been removed therefrom.

Similar reference characters designate similar parts throughout the several views of the drawings.

Referring to the drawings, in Figs. 1 and 2, 1 indicates a mold plate of a mold, 2 a mold cavity in said plate and 3, 3, openings through which molten metal is adapted to enter the cavity to form the casting. A companion plate, not shown, to plate 1 is provided, having a mold cavity adapted to cooperate with the cavity in plate 1 to define a mold cavity which conforms substantially to the outside shape and size of the article to be produced, all as is well understood by those familiar with the art.

A core or mold unit 4, of the character above described, and shaped to present a surface conforming substantially with the shape of the casting cut under, and in the drawings is shown to conform to the interior of the spout, is inserted and suitably supported in the mold cavity so as to provide a space between its surface and the surface of the mold cavity of substantially the size and shape of the desired casting.

One means for suitably supporting the mold unit may comprise projections formed on the unit as shown at 5 and 6 adapted to be seated in corresponding recesses in one or both of the mold plates, whereby the unit is removably held in proper position during the formation of the casting. Molten metal to form the casting is then flowed through openings 3 until the mold cavity is filled as shown at 7 in Fig. 2, and when cooled will form the casting 8. After the casting 8 has become sufficiently set, the mold is opened and the casting, together with the mold unit or core, is removed therefrom (see Fig. 3). Heat sufficient to melt the mold unit or core is then applied to melt the unit but not the casting, and the unit or core together with its coating is withdrawn from the casting, leaving the casting in its desired condition and freed from the mold and the core, as shown in Fig. 4. The expression “mold unit” is not limited to a core adapted to be completely surrounded by the casting but is intended to cover any surface against which an under cut is formed and whether or not such under cut may be considered to be on the interior or on the exterior of the casting.

As many changes could be made in carrying out the above process without departing from the scope of the invention, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limited sense.

It is not deemed necessary to describe more particularly the manner in which heat may be supplied to the core for melting the same or an apparatus adapted to supply such heat, as this step may be accomplished in many ways and by means of many different apparatus, well known to those acquainted with the art.

What I claim is:

1. A process for making die castings, comprising, casting a mold unit of material having a lower fusing point than the material from which the final casting is made, depositing a light coating of material having a higher fusing point than the material from which the final casting is made upon said mold unit, forming a casting about said mold unit and melting the mold unit and simultaneously breaking down said coating to separate both said mold unit and said coating from the casting.

2. A process for making die castings, comprising, forming the casting about a mold unit of material having a lower fusing point than the material from which the casting is made and a surface coating of material having a higher fusing point than the material from which the casting is made, and melting the mold unit to separate it, together with its coating, from the casting.

3. A process for making castings, comprising, forming a mold unit from material having a lower fusing point than the material from which the casting is made, coating said unit with material having a higher fusing point than the material from which the casting is made, forming the casting about said unit, and after said casting has become set, removing the core, together with its coating, from the casting by applying heat sufficient to melt the core but not the casting.

4. A process for making die castings, comprising, forming the casting about a mold unit of material having a lower fusing
point than the material from which the casting is made, and a surface coating of material having a higher fusing point than the material from which the casting is made, melting the mold unit to separate it from the casting, and removing the coating of the mold unit from the casting.

5. An apparatus for casting under cuts in die-castings which comprises a mold unit of material having a lower fusing point than that of the alloy from which the casting is made, and a coating of material having a higher fusing point than that of the alloy from which the casting is made and adapted to become disintegrated when said mold unit is melted.

6. An apparatus for casting under cuts in die-castings which comprises a mold unit of material having a lower fusing point than that of the alloy from which the casting is made, the surface of said unit presenting material having a higher fusing point than that of the alloy from which the casting is made, and adapted to become disintegrated when said mold unit is melted.

This specification signed and witnessed this 23rd day of Feb., 1921.

CHARLES PACK.

Witnesses:

WILLIAM E. BAUERSCHMIDT,
WILLIAM R. AHRBERG.