Mar. 20, 1923. 1,449,053.

C. PACK.

METHOD OF MAKING DIE CASTINGS.

FILED NOV. 15, 1921.

Fig. 1,

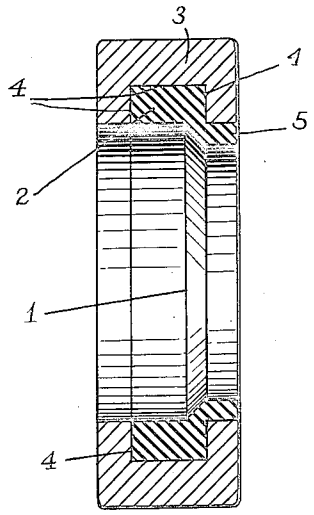


Fig. 3,

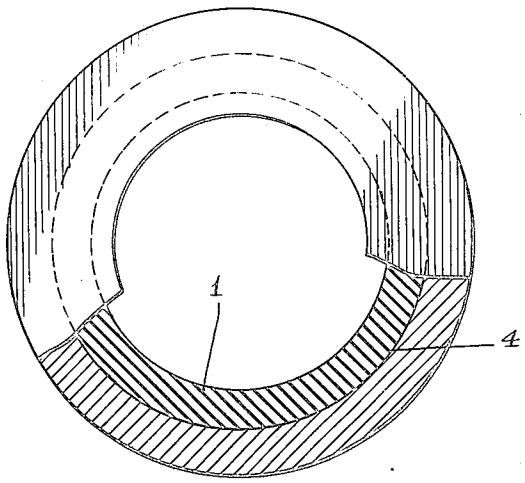


Fig. 2,

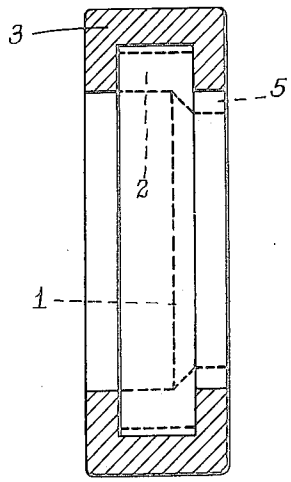


Fig. 4,

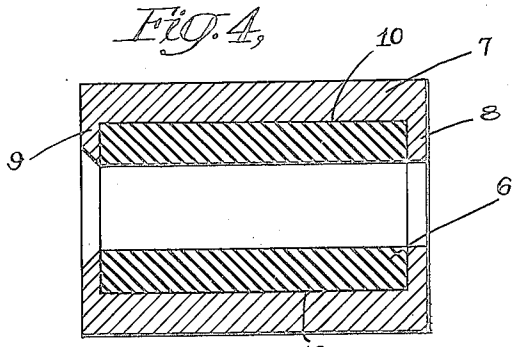
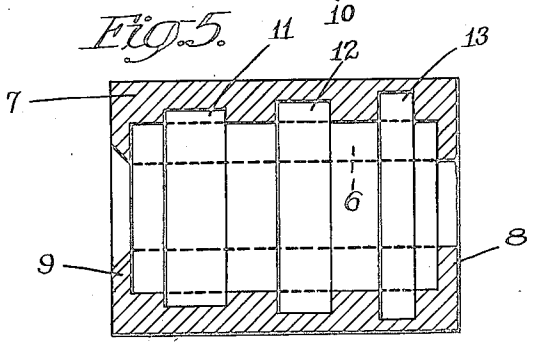


Fig. 5.



INVENTOR

BY Charles Pack

P. O. Edmonds

ATTORNEY

Patented Mar. 20, 1923. 1,449,053

UNITED STATES PATENT OFFICE.

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

METHOD OF MAKING DIE CASTINGS.

Application filed November 15, 1921. Serial No. 515,213.

To all whom it may concern:

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

This invention relates to the art of die casting, and more particularly to a method for producing die castings.

It is well known that the structure of a die casting is relatively dense on the chilled surfaces, and that the structure is less dense and more porous as the interior of the casting is approached. In heavy sections blow holes of varying sizes will be found toward and in the center of the casting. When the casting does not require machining this is not objectionable, but when the casting must be machined, these blow holes are very objectionable, since they are apt to be uncovered in the machining operation. The object of my invention is to provide a method for producing die castings whereby predetermined portions of the die casting will be free from blow holes, and a method of producing a die casting which may be machined interiorly without uncovering blow holes. Further objects of my invention include the method of creating an area of unusually great density at interior portions of a die casting, and a method of forming an internally located chilled surface in a die casting. Other objects will be in part obvious and in part pointed out hereafter.

In accordance with my invention, I provide a core of machinable material approximately the size and shape of the cut which it is desired to form in the finished casting, the core being preferably somewhat smaller than the cut in size. I then form a die casting about this core, and after the casting has become set, remove the core together with a slight portion of the casting by a machining operation to form the desired finished casting.

In order that a clearer understanding of my invention may be had, attention is hereby directed to the accompanying drawings forming a part of this application and illustrating certain possible embodiments of my invention. Referring to the drawings, Figure 1 is a section of a casting showing the core in place; Figure 2 is a view similar to Figure 1 showing the finished casting after the desired cut has been formed therein; Figure 3 is a top view of the casting illustrated in Figure 1 having a portion broken away for the sake of clearness; Figure 4 is a sectional view of another casting showing the core in place; and Figure 5 is a sectional view similar to Figure 4 showing the finished casting with the desired cut formed therein.

My improved method may be applied to the production of die castings irrespective of their shape or size and to the production of cuts in die castings extending into any surface thereof. In Figures 1, 2 and 3 of the drawings I have illustrated the application of my invention to the production of a die cast ring having an undercut annular groove formed to extend inwardly from the inner surface of the ring. In carrying out my method I first provide an annular ring 1 of machinable material having an annular portion 2 approximately the same size and shape of the undercut which it is desired to form in the finished casting. Using this core 1 as an insert I form a die casting 3 thereabout, and after the casting has become set, I remove the core 2 by a machining operation and thus provide the desired undercut in the casting 3. By casting the ring 3 about the core 1 the surfaces 4, which contact the core 1, become chilled and the portions of casting 3 adjacent these surfaces are relatively dense and free from blow holes, so that the casting may be machined for a distance inwardly of these surfaces without the danger of uncovering or exposing blow holes. I preferably make the core 1 slightly smaller in size than the size of the desired undercut, so that the machining operation may be continued to some extent into the core 3 to form the desired undercut and to place a machine finish on the surfaces of the undercut. In casting a ring as illustrated in Figures 1, 2 and 3 of the drawings the insert or core 1, if desired, may have a portion 5 extending outwardly to aid in positioning the core in the desired position in the die, it being understood that such portion 5 is to be removed by machining or other operation if such insert is not desired in the finished casting.

In Figures 4 and 5 I have illustrated my method as applied in the casting of a hollow cylindrical die casting having a plural-

ity of annular grooves cut on the interior thereof, the grooves being of various depths and widths. To form the casting here illustrated I first provide a core or insert 6 of a diameter approximately equaling the smallest interior diameter of the finished casting, and of a length approximately the axial distance covered by the undercuts. I form a die casting 7 about the core 6, the casting 7, as shown, having annular end flanges 8 and 9 overlapping the outer ends of the core 6. In forming the casting 7 about the core 6 in the manner above described, it will be noted that the casting will have interiorly located chilled surfaces 10 where the casting abuts against the outer circumference of the core 6. The structure of the die casting 7 adjacent the surfaces will be relatively dense and solid and free from blow holes, and the desired grooves 11, 12 and 13 respectively, may be machined in the die casting without the danger of exposing blow holes. The core may be entirely machined away, and then the grooves 11, 12 and 13 formed in the casting 7 by continuing the machining operation.

In producing castings by the above method in quantities, I preferably employ a die adapted to form not only the casting about the inserted core, but is also adapted at the same operation to form a core which may be used in the production of the next succeeding casting. In this way the cost of producing the necessary cores by separate operations is eliminated. For instance, in producing a quantity of castings of the type illustrated in Figures 1, 2 and 3, the die may be fashioned to contain a cavity for casting the ring 3 about an inserted core 1 and another cavity wherein a core 1 may be die cast. When the casting has been made the newly cast core 1 may be broken off from the casting 3 at the gate. The newly cast core 1 is then used as an insert in the next casting operation.

It is to be understood that my invention relates to the forming of dense portions of chilled surfaces in any part of a die casting, and to the forming of cuts on the outside of a casting as well as on the inside.

As many changes could be made in carrying out the above method 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 limiting sense.

What I claim is:—

1. A method of producing a die casting, which comprises, providing a core of machinable material, forming a die casting about said core and machining the core away from said casting.

2. A method of producing a die casting having a cut, which comprises, providing a core of machinable material approximately the size and shape of the desired cut, forming a die casting about said core and machining away said core from said casting.

3. A method of producing a die casting having a cut, which comprises, providing a core of machinable material slightly smaller in size than the desired cut and approximating the cut in shape, forming a die casting about said core and machining away said core and a portion of the casting adjacent thereto to form the cut.

4. A method of producing a plurality of die castings, which comprises, successively forming die castings, each comprising a casting formed about an insert and an integral casting constituting a replication of said insert, severing the newly-formed insert from the other casting, and using said newly-formed insert as an insert in forming a succeeding die casting.

This specification signed and witnessed this 4th day of November, 1921.

CHARLES PACK.

Witnesses:
WILLIAM R. AHRBERG,
WILLIAM E. BAUERSCHMIDT.