F. E. CANDA.

MEANS FOR FORMING UNDERCUT CASTINGS.

APPLICATION FILED APR. 22, 1913.

1,087,435. Patented Feb. 17, 1914.

Fig. 1.

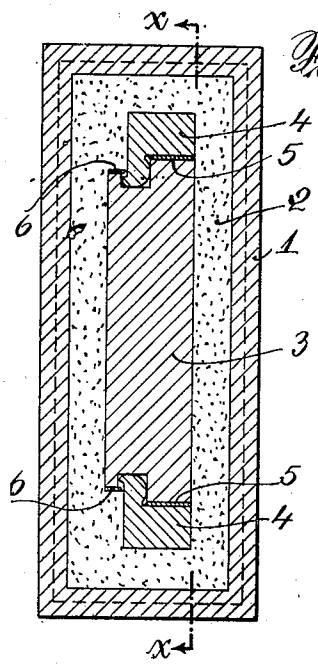


Fig. 2.

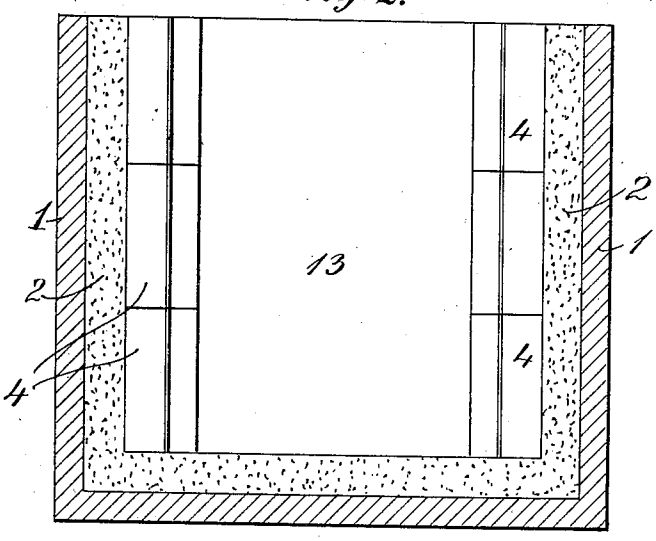


Fig. 3

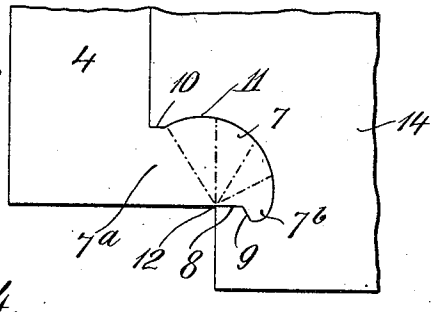
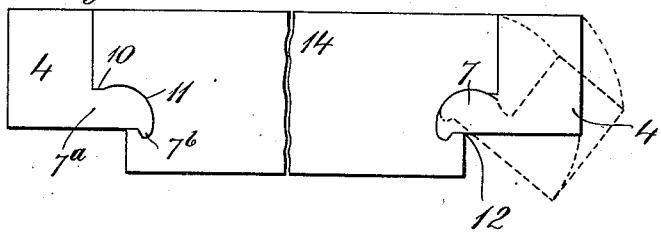


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MEANS FOR FORMING UNDERCUT CASTINGS.

1,087,435. Specification of Letters Patent. Patented Feb. 17, 1914.

Application filed April 22, 1913. Serial No. 762,793.

To all whom it may concern:

Be it known that I, FERDINAND E. CANDA, a citizen of the United States of America, and a resident of New York, county of New York, and State of New York, have invented certain new and useful Means for Forming Undercut Castings, of which the following is a specification.

My invention relates to means for forming under-cut recesses in castings, and is particularly intended for use in the method of producing compound metal ingots set forth in my Patent No. 1,013,860, dated January 9, 1912, and in producing the composite metal ingots covered by my Patent No. 1,059,525 dated April 22, 1913.

In the process described in my Patent No. 1,013,860, metal plates provided in their ends with interlocking spaces or recesses, are set up face to face but separated by a suitable distance, and molten metal is poured into the space between such plates and partly around the ends of the said plates and into the said interlocking spaces, and is permitted to solidify, the cast metal so cast in the space between said plates being thereby interlocked with the said plates, these plates being caused, as a result of such interlocking, to follow the intermediate cast metal during its contraction. In the specific construction illustrated in said Patent No. 1,013,860, the interlocking recesses or spaces referred to are of dove-tail contour.

According to my present invention I provide means for forming in the ends of such plates recesses which, though of under-cut configuration, are not of the ordinary dove-tail form, but are of a modified form. The advantages of the improved form of recess are set forth hereinafter.

My invention consists in means for producing in castings one or more recesses of the improved form hereinafter described.

The object of my invention is to facilitate the production of composite metal ingots.

I will now proceed to describe my invention with reference to the accompanying drawings, and will then point out the novel features in claims.

In the drawings; Figure 1 shows a horizontal section of a mold containing main and end patterns as hereinafter described. Fig. 2 shows a vertical section of said mold on the line x—x of Fig. 1, the main pattern having been removed. Fig. 3 shows, on a larger scale than the preceding views, a top view of one of the end patterns, and shows the contour of the projecting lug of such end pattern. Fig. 4 shows a top view of the completed casting with the end patterns still attached thereto, and indicates in dotted lines how the said end patterns are detached from the cast plate.

It is desirable that the interlocking spaces or recesses in the ends of the plates used in the process of my Patent No. 1,013,860, above referred to, shall be true to form and shall be free from scale, slag, etc., which may interfere with union with the metal cast into such spaces or recesses. If the said interlocking spaces or recesses are of ordinary dove-tail form it is practically necessary to form these dove-tail spaces or recesses by means of sand cores, for metal cores, if used, cannot be removed from the cast plate because of the shrinking of the cast metal against such metal cores. By the present invention, however, I provide a metal core or end pattern which, while it forms in the end of the cast plate a space or recess equivalent to a dove-tail recess, may be removed from such cast plate by a simple rotary motion. By the use of these improved end patterns, the casting of plates provided with locking spaces or recesses, for use in the process of my said Patent No. 1,013,860, is very much simplified.

In the drawings, 1 designates the flask of the mold, 2 the molding sand or other molding material, 3 the main pattern and 4, 4 end patterns designed to form recesses of undercut configuration in the casting. The main pattern 3 is customarily of wood, and, when formed of wood, is customarily provided with metal end pieces 5, 5 and 6, 6 which are provided to protect the ends of the pattern against injury and to insure proper outline of the ends of the pattern. The end patterns 4 are customarily formed of metal (usually steel) and are allowed to remain in the mold

after the main pattern 3 is withdrawn; the molten metal being therefore cast against these end patterns 4; and after such molten metal has solidified such end patterns are removed.

To form recesses of the desired undercut configuration in the ends of the casting, each end pattern 4 is provided with a projecting lug 7 of general hook-shape, provided, near its base, with a contracted neck 7^a, and near its end, with a laterally-projecting bill 7^b, each such lug having on its front side a substantially plane portion 8, at the end of which is provided an angularly related surface 9 terminating at the end of the bill 7^b; while the rear side of such lug is provided with a short plane portion 10, in the neck portion 7^a of the lug, merging into a curved portion 11, the characteristic feature of the curvature of such surface 11 being that, taking point 12 (Fig. 3) as a center, the radii from such point 12 progressively decrease in length from the point of intersection of surfaces 10 and 11 to the end of the bill 7^b. In Fig. 3 several such radii are indicated by dot and dash lines. The end of the bill 7^b, that is to say, the point of the bill, projects laterally beyond the neck portion 7^a of the lug, in front of the plane of the surface 8; and the width of the lug 7, measured from the point 12, in a direction parallel to a perpendicular to surface 10, is greater than the width of the neck 7^a; in other words, the rear surface of the lug extends laterally, between the neck 7^a and bill 7^b, beyond the rear lateral limit of the neck portion 7^a. It follows, therefore, that the recess produced in the cast plate by the lug 7, is undercut on both sides; the form of the recess being, in this respect, equivalent to a dove-tail form. But whereas a pattern-lug to form a recess of true dove-tail form, cannot be removed from the cast plate, end patterns of the construction shown in the accompanying drawings may be removed by a rotary motion indicated in dotted lines in Fig. 4, the lugs 7 pivoting, for such motion, about the point 12, and the progressively decreasing radius of curvature of the rear surface of the lug 7 permitting such rotation.

In Fig. 2, 13 designates the mold cavity, and in Fig. 3, 14 designates the cast plate. When these plates are of considerable height, as indicated in Fig. 2 by the height of the mold cavity 13, the end patterns 4 are commonly made in a plurality of sections, as indicated in Fig. 2.

What I claim is:—

1. Means for forming under-cut recesses in castings, comprising a pattern member adapted to be located in a mold and to have the molten metal cast against one face, such face of said pattern member provided with a projecting lug provided near its end with a laterally projecting bill, said lug increasing progressively in thickness, measured radially from a center point near said bill, from the point of said bill to a point near the face of said pattern member from which said lug projects.

2. Means for forming under-cut recesses in castings, comprising a pattern member adapted to be located in a mold and to have the molten metal cast against one face, such face of said pattern member provided with a projecting lug provided near its end with a laterally projecting bill, said lug increasing progressively in thickness, measured radially from a center point near said bill, from the point of said bill to a point near the face of said pattern member from which said lug projects, said lug having a neck portion near its base which is of less thickness than a portion of said lug intermediate said neck and bill.

3. The combination with a main pattern having in one end a recess, of an end pattern having a projecting lug adapted to enter said recess, and having on one side a projecting bill and having a contracted neck portion intermediate the base of the lug and said bill, said main pattern terminating with respect to said end-pattern, on the bill side of the lug, at a point intermediate the said bill and said neck portion of the lug, said lug provided, on the side opposite that on which said bill is located, with a curved surface extending from the said neck portion of the bill, the radius of curvature of such curved surface, with respect to the point on said lug at which the main pattern terminates, decreasing progressively from the said neck portion to said bill.

4. Means for forming under-cut recesses in castings, comprising a pattern member adapted to be located in a mold and to have the molten metal cast against one face, such face of said pattern member provided with a projecting lug having near its base a neck portion and having, beyond said neck portion, other portions which project laterally beyond the lateral limits of said neck portion, said pattern member adapted to be detached from the casting formed against it, by partial rotation of said pattern member against a corner of such casting as a center, which corner is adjacent to one face of said lug, the thickness of said lug, measured radially with respect to such pivoting point of the lug, decreasing progressively in thickness from near the base of the lug to the end thereof.

5. Means for forming under-cut recesses in castings, comprising a pattern member adapted to be located in a mold and to have the molten metal cast against one face, such face of said pattern member provided with a projecting lug provided at one point with

a relatively contracted neck, portions of such lug between the neck and the end of the lug projecting laterally beyond the limits of the neck portion of the lug, said pattern member adapted to be detached from castings formed against it by partial rotation of such pattern member with respect to said casting.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FERDINAND E. CANDA.

Witnesses:
H. M. MARBLE,
PAUL H. FRANKE.