

(No Model.)

A. J. THOWLESS.

PROCESS OF AND APPARATUS FOR FORMING SOLID METAL INGOTS.

No. 484,476.

Patented Oct. 18, 1892.

Fig. 1

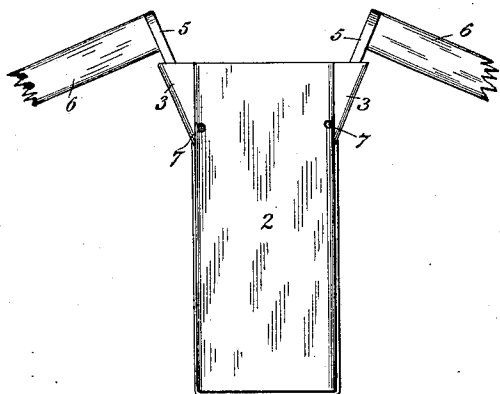


Fig. 2

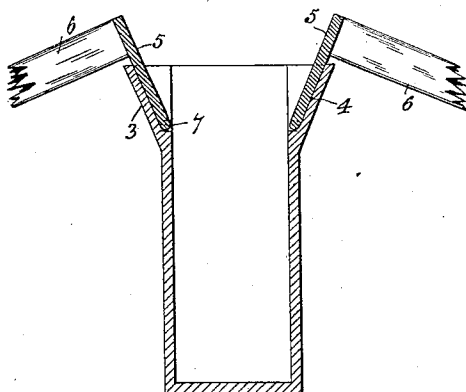


Fig. 3

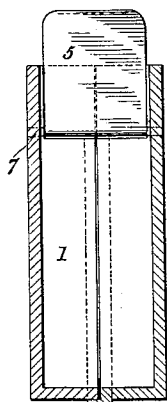


Fig. 4

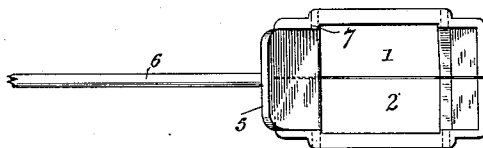
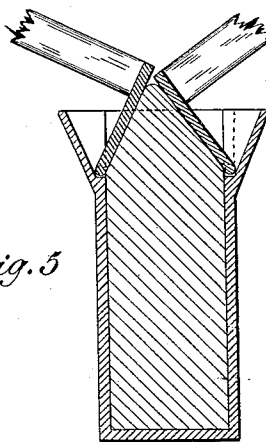


Fig. 5



Witnesses:

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UNITED STATES PATENT OFFICE.

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PROCESS OF AND APPARATUS FOR FORMING SOLID-METAL INGOTS.

SPECIFICATION forming part of Letters Patent No. 484,476, dated October 18, 1892.

Application filed April 8, 1892. Serial No. 428,319. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR JAMES THOWLESS, a subject of the Queen of Great Britain, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Processes of and Apparatus for Forming Solid-Metal Ingots, of which the following is a specification.

My invention relates to a process of and apparatus for forming solid-metal ingots, especially cast-steel ingots; and the object of my invention is to prevent the formation of a cavity or pipe in the ingot. I accomplish this object by the process and means hereinafter described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 represents a side view of an apparatus embodying my invention. Fig. 2 is a vertical sectional view of the same. Fig. 3 is another vertical sectional view taken at right angles to that shown in Fig. 2. Fig. 4 is a top view, and Fig. 5 illustrates the process of lateral compression of the metal.

When metal is poured into an ingot-mold, it shrinks, and to this shrinkage is due the creation of a cavity or pipe in the ingot. To obviate the formation of this pipe which prevents perfect welding together of the parts by reason of oxidation of its walls, the casting has been inverted; but this method is open to objections from which mine is free.

I make my mold in two parts 1 and 2, similar to the ordinary mold, and I flare two opposite sides of the same at the top or mouth, as shown at 3 and 4. I might flare the mouth on all four sides or on one side only; but I prefer to flare it on two opposite sides only as being more convenient and giving more satisfactory results. I hinge or pivot at 7 in each of said flaring sides a compressor 5, provided with a handle 6. I make the flare of the sides at the mouth (and consequently the compressors) a little narrower than the body of the mold, as shown in Fig. 4—say from one-eighth to one-half an inch—for I have

found in practice that when the compressors fit closely to the sides more power is required to move the metal, because of the more rapid cooling of the same where it is in contact with the sides of the mold.

In practicing my process with the apparatus described I proceed as follows: I fill the mold with the molten metal nearly to the top and immediately thereafter take hold of the two compressors and move them inwardly, as shown in Fig. 5, thus compressing the metal between them. I find it preferable to first move one compressor only as far as possible and then move inward the opposite compressor, releasing the one first moved, thus moving the metal back to some extent, the resulting form of the top of the ingot being immaterial. By this lateral compression of the metal at the upper part of the ingot, where the cavity ordinarily commences to form, I prevent the formation of such cavity altogether. In case I employ only one compressor, I make the opposite side of the mold preferably vertical, as shown in dotted lines at the right in Fig. 5.

I am aware that it is common to compress molten metal by driving a wedge between the metal and the mold. The objection to this method is that the sides of the metal set so quickly that it is found very difficult in practice to drive the wedge down, as it tends to displace or tear laterally the surface of the ingot, and also, the metal being hot, the friction is great and prevents the wedge from sliding between the metal and the ingot.

Having thus described my invention, what I claim, and desire to secure by United States Letters Patent, is—

1. The process of forming solid-metal ingots, consisting in filling a mold with molten metal and displacing the metal at the upper portion of the ingot only by pressing it diagonally inward without moving the portions of the ingot near its surface laterally over the metal within, substantially as set forth.

2. An apparatus for forming solid-metal ingots, which consists of a mold or receptacle

for retaining the metal provided with lateral compressing means pivoted to the said mold, substantially as described.

3. An apparatus for forming solid-metal ingots, which consists of a mold provided with a flaring mouth and lateral compressors mounted therein, substantially as described.

4. An apparatus for forming solid-metal ingots, which consists of a mold having a side or sides flared at the mouth, the flared portions being of less width than the width of the

mold and having lateral compressors adjusted to fit the flaring sides, substantially as described.

Signed at New York, in the county of New York and State of New York, this 4th day of April, A. D. 1892.

ARTHUR JAMES THOWLESS.

Witnesses:

MARY C. PINCKNEY,
J. E. M. BOWEN.