March 8, 1927.

1,620,010

G. A. DORNIN

INGOT MOLD

Filed April 16, 1925

2 Sheets-Sheet 1

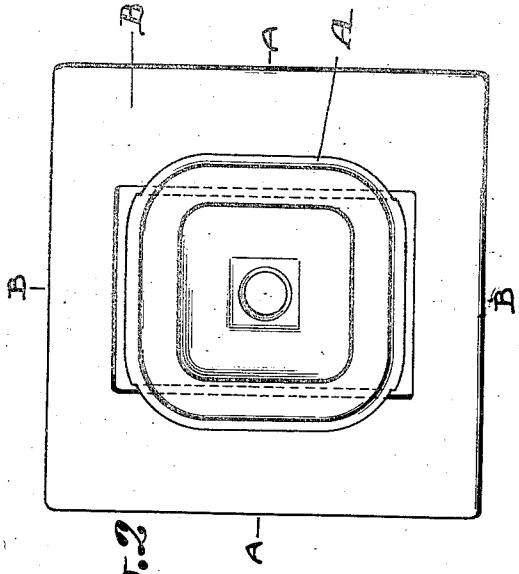

Fig. 2

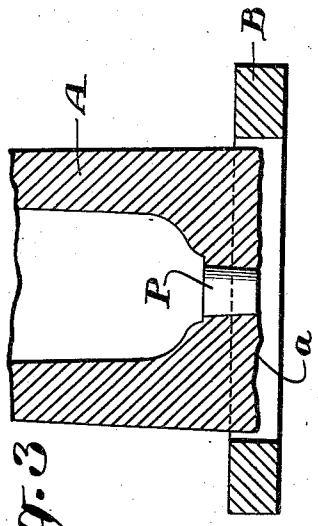

Fig. 3

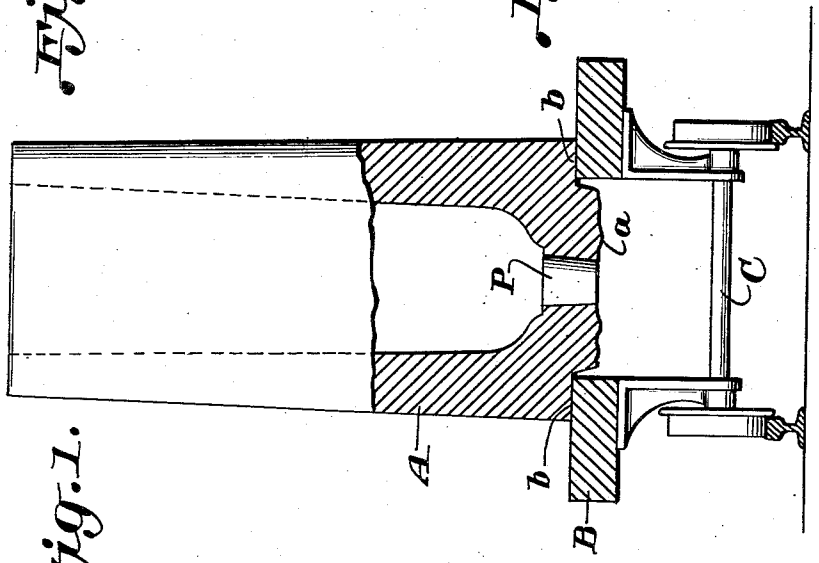

Fig. 1.

Inventor
George A. Dornin
by his Attorneys
Baldwin & Wight

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2 Sheets-Sheet 2

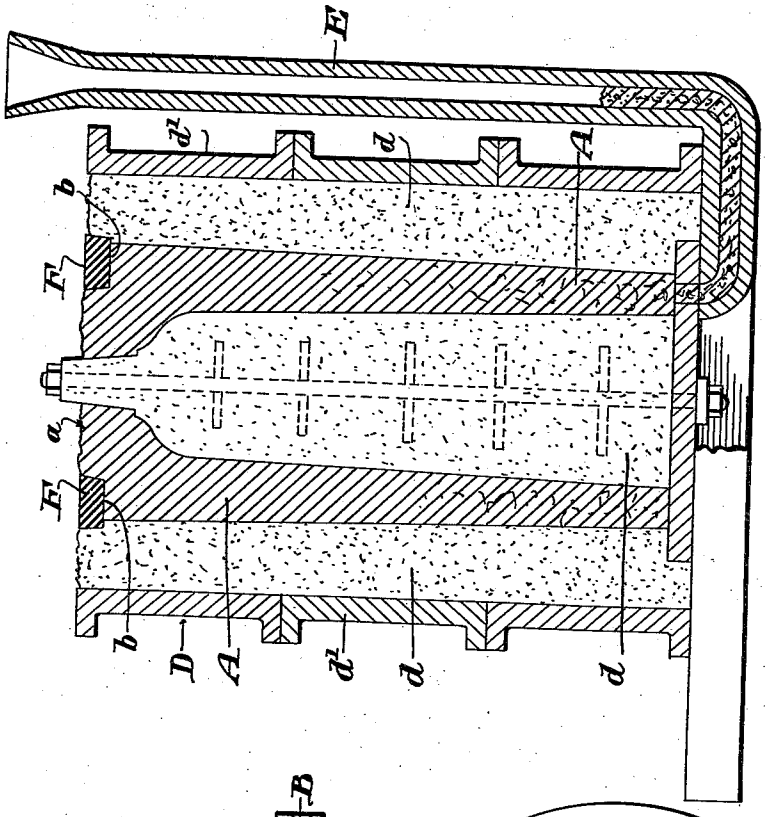

Fig. 5.

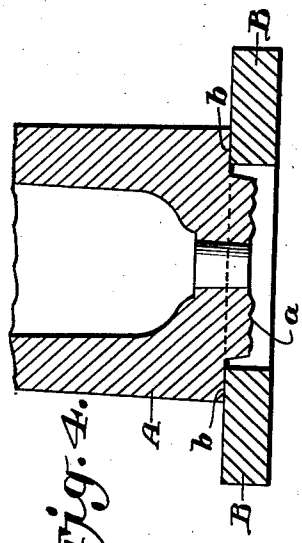

Fig. 4.

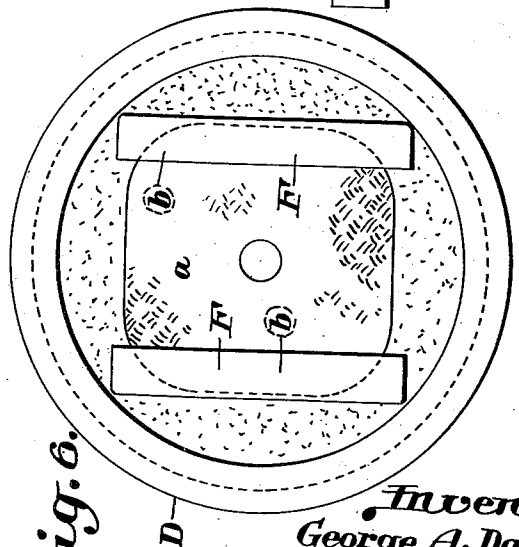

Fig. 6.

Inventor
George A. Dornin
by his Attorneys
Baldwin & Wight

Patented Mar. 8, 1927. 1,620,010

UNITED STATES PATENT OFFICE.

GEORGE A. DORNIN, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE GATHMANN ENGINEERING COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

INGOT MOLD.

Application filed April 16, 1925. Serial No. 23,586.

This invention relates to metal molds of a kind commonly used for casting steel ingots and particularly to molds of this class in which the lower part of the mold walls are made thicker than the upper part thereof and in which the mold cavity is made of larger diameter at the top of the mold than at the bottom thereof. This is a characteristic of the Gathmann molds now in general use.

In the casting of metal molds of the kind just referred to, it has been found that better results are obtained when the sand molds in which the metal molds are cast, are bottom poured, the molten metal being caused to rise in the sand mold until the desired size and shape is obtained. This method of casting ingot molds is so greatly superior to other methods that it has been generally adopted. It has, however, one defect. The upper surface of the casting when formed is quite rough and uneven and in such condition the mold is not suitable for use inasmuch as the top surface of the casting which constitutes the bottom of the ingot mold when in use will not rest properly on a stool or support. Therefore the common practice heretofore has been to remove this rough surface by suitable tools or machine driven implements. This operation however, adds considerably to the cost of the mold and such cost naturally goes into the cost of the ingot and consequently into the cost of the steel.

I have found a most simple, cheap and efficient way of removing these objections and I do this during the process of casting the mold so that the subsequent operation of machining the mold bottom is rendered unnecessary.

The preferred way of carrying out my invention is illustrated in the accompanying drawings in which—

Figure 1 is a view partly in side elevation and partly in vertical section of an ingot mold embodying my improvements and showing how it is supported.

Figure 2 is a top plan view thereof.

Figure 3 shows a vertical section of the lower part of the mold showing how it enters the stool or support, the section being taken on the line B—B of Figure 2.

Figure 4 shows a vertical section of the lower portion of the mold and the stool.

Figure 5 shows a vertical section of a sand mold with my improvements applied and shows how the metal mold is cast therein.

Figure 6 is a top plan view of a sand mold.

In Figure 1 a mold of the Gathmann type is indicated at A. B indicates a stool and C a truck on which the stool is supported.

In general the mold A is of usual construction but it differs from others in the formation of its bottom wall.

It will be observed that the central part *a* of the bottom extends below the marginal portions *b* thereof and that while the under side of the central portion is rough and uneven, the marginal portions are smooth and even so that the mold is held in a truly vertical position when placed on its stool. These smooth marginal portions are preferably formed on two sides only of the mold, but they may extend continuously or at intervals entirely around the mold. These smooth marginal portions are produced during the process of casting.

Figures 5 and 6 illustrate how the smooth and even marginal portions are formed in the mold during the casting operation.

A sand mold of well known construction is illustrated at D, the sand parts being shown at *d* and the flask or frame parts being shown at *d'*. The ingot mold cast in the mold is shown at A. The mold is bottom poured being supplied with molten metal by a feeding device E of well known construction. The sand mold is similar in all respects to those heretofore used but I provide means at the top of the sand mold for producing the smooth and even marginal portions of the ingot mold before referred to. The simplest and best way now known to me for performing this function is to support on the top of the sand mold two heavy metal bars F having smooth under sides. As the molten metal rises in the sand mold, it comes in contact with these bars and is chilled thereby. In this way smooth, even marginal parts are formed on opposite sides of the middle portion of the bottom of the mold which extends between the bars as indicated in Figure 5. When the metal mold is completed, the sand mold is withdrawn and in use the metal mold is reversed and supported in the manner indicated in Figure 1.

It will be observed that the sand mold is

so constructed and its core is so formed that a metal ingot mold of the big-end-up type is produced with an opening in its bottom to receive a plug P which is generally employed in this class of molds to close the bottom of the mold and to provide a stripping device.

The method of casting ingot molds herein shown and described is claimed in my divisional application, No. 54,519, filed Sept. 4, 1925.

I claim as my invention:

1. An ingot mold having a marginal portion on the under side of its lower end which is smoother and harder than the middle or central portion of the lower end of the mold, thus adapting the mold to rest truly on a support.

2. An ingot mold having a relatively hard and smooth marginal portion on the under side of its lower end and a softer relative rough central portion.

3. An ingot mold having a chilled relatively hard and smooth marginal portion on the under side of its lower end and a softer relatively rough central portion.

4. An ingot mold having a marginal portion at its lower end on opposite sides of its central portion, which latter is softer and rougher than the marginal portion.

5. An ingot mold having at its lower end a downwardly extending central portion having a relatively soft and rough outer end which is bounded by a harder and smoother marginal portion disposed on opposite sides of the central portion.

In testimony whereof, I have hereunto subscribed my name.

GEORGE A. DORNIN.